



## SUMMARY

### ArcelorMittal - Long Products Canada

#### INDUSTRY

Metals and Metallurgy

#### BUSINESS VALUE

- Sustainability
- Knowledge Transfer
- Quality Assurance
- Data Democratization
- Change Management
- Process Automation
- Workforce Engagement

#### PI SYSTEM™ COMPONENTS

- PI Server™
  - Data Archive
  - Asset Framework (AF)
  - Notifications
  - Event Frames
- PI DataLink™
- PI ProcessBook™

## ArcelorMittal Long Products Democratizes Data to Empower People and Improve Quality

With annual achievable production capacity of approximately 114 million tons of crude steel, and some 210,000 employees across 60 countries, ArcelorMittal is the world's leading steel and mining company. ArcelorMittal Long Products (AMLP) Canada specializes in the manufacture of semi-finished products such as billets, slabs, bars and rod. Jean-Yves St. Onge of AMLP and Alexandre Côté of ATS Process Automation Systems described how AMLP updated legacy VAX-VMS systems to empower their people and improve quality.

St. Onge began by describing why they decided to replace their legacy Fortran VAX production systems. Despite the excellent reliability that the system offered, the people who had used the system were retiring. As they left, it was becoming harder and harder to find people who could program in Fortran. AMLP decided that they would migrate their legacy "all-in-one" system to an open, multi-layer architecture. With the next generation, L2 platform, operators, engineers and ad-hoc specialists would have open access to data as well as standardized calculations and models. St. Onge said, "We wanted to empower our people with data."

### Automating the Slab Casting Process

Up until 2014, the PI System was used primarily as a historian. St. Onge continued, "Two years ago, we attacked the real automation part of it. That's where we started to integrate the modern PI System and take advantage of Asset Framework (AF) and Event Frames (EF) to track everything."

ALMP's first project addressed their slab casting processes. Their objective was to build a reliable slab tracking system in order to understand where each centimeter of steel was in relation to the process. Côté explained that slab casting itself is a relatively simple process; however, the machines "are of gigantic proportion." By connecting the PI System with their MES and a front end where they could enter production information and quality events, engineers were able to see what was happening across the process in real time as well as dig in to analyses to understand events affecting quality at each step of the process.

### Five Steps to Advanced Process Control

St. Onge defined advanced process control as making raw data intelligible to improve quality and process. He and Côté cited five core components to building a next generation automation system with the PI System.

**1. Building an AF data structure.** The first step was to bring all data from every system possible "into one data store" and add structure to reflect process. To create "not just a great, but an awesome data structure," AMLP involved production staff and even operators to help the architects understand what

was going on under the surface of the machines. AMLP based their AF data structure on reusable templates so that they could easily roll it out to future installations. Asset-based templates also made data access simple.

**2. Cleansing the data.** With their legacy system, production data was not clean nor did it give AMLP the information they needed. For example, AF helped eliminate redundant data, convert units and structure data into attributes to give engineers and operators direct access to real-time, intelligible information.

**3. Automating calculation and analyses.** AMLP incorporated two levels of analysis into their process control. For example, AMLP embedded 150-200 relatively simple calculations into their AF data structure for slab casting. For advanced process control, AMLP used the Asset Framework Software Developer's Kit (AFSDK) as a programmatic way to access the PI System to do more complex analysis. In these cases, AFSDK allowed them to create code when their simple calculations were used for more complex calculations or to generate Event Frames.

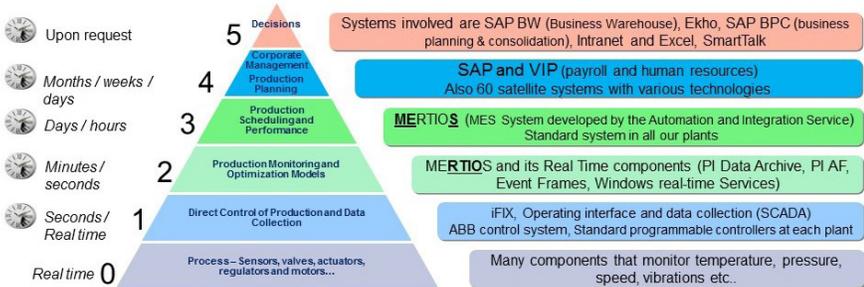
**4. Adding context.** AMLP used Event Frames to see slabs transit through each section of the machine. To address quality, AMLP used Event Frames to link quality events, time and spatial position so they could geo-localize quality events on to the product.

**5. Visualization.** AMLP gave its stakeholders access to multiple tools including PI DataLink, PI ProcessBook and Notifications and AFSDK to dig into the data. Employees used the PI System to visualize real-time trends as well as build shift reports, daily production reports and web applications.

**Asset Framework is a good format to empower anyone -- power users, process engineers, automation engineers -- to make the data speak and be what they want it to be.**

Jean Yves St. Onge  
ArcelorMittal Long Products

### ArcelorMittal Automation Systems Architecture



### Benefits and Future Directions

AMLP considers their project a success. St. Onge stated that they "did not create any down time when we changed the production systems." He added that, "Change management is not always easy, but this one was very easy because of the enthusiasm of the operators, users and the engineers. Another big benefit was to capture the knowledge of the process within the system."

AMLP's next steps are to keep the PI System as "the centerpiece of their architecture" to track more events and expand their next generation automation system to other production systems.

St-Onge, J-Y, Côté A., Slab Casting Automation, Contextualize Raw Data into Operational Intelligence. OSISOft. com. 4 April 2016. Web. 01 July 2016. <http://www.osisoft.com/Presentations/Slab-Casting-Automation---Contextualize-Raw-Data-into-Operational-Intelligence/>