KLABIN: PAPER GETS A DIGITAL TWIN

Klabin, founded in 1899, is Brazil’s largest producer and exporter of paper products and pulp. The company operates 17 plants in Brazil and Argentina and produces 3.5 million tons of pulp per year.

The Puma plant represents the largest investment in Klabin’s 120 year history and the largest private investment to date in the Brazilian state of Paraná. The plant churns out 1.5 million tons of pulp per year and is energy self-sufficient, producing 270MW of its own energy per day, enough power for a city of one million people. OSIsoft’s PI System software gave Klabin the power to create a real-time digital model of pulp production at Puma, from tree harvesting all the way through drying. As a result, Klabin can make faster, better decisions, automate notifications of abnormal production conditions, and trace products through the entire production process.

COMPLEX SYSTEMS, SIMPLE GOALS

At Puma, plant engineers collect data in real time from more than 20,000 process measure instruments, 3,000 control valves, 600 pumps and 3,500 motors.

With the PI System, Klabin wanted to “guarantee that data is available when it is required,” said Heli Rabelo, an analyst for the IT industrial consulting company IHM Engenharia. “In total, we have 85,000 variables of the various integration systems, and the PI System keeps it all in one place.”

DIGITAL TWIN & TRACEABILITY

One of the most important aspects of Puma’s PI System-based digital twin is the ability to trace batches from tree to finished product and analyze batch data on the fly. Using a digital model of production, Klabin “can correlate information about the finished quality products, such as brightness, viscosity, pH, dryness, dirtiness,” Rabelo said. “We can correlate this information with cutting time, age, density and percentage of each species that made that pulp.”

For instance, data on one pulp batch showed an unusually low point in the brightness of the pulp coming out of a drying machine on a particular day. By using the PI System to compare data at every step of the process, from the cutting of forest logs through chipping, bleaching and drying, Klabin engineers were able to quickly trace the problem with the pulp brightness to an issue with part of the bleaching process, upstream from the drying machine.

HIGHLIGHTS:

Avoided 2 boiler shutdowns for $9.6 million in cost savings

Added 3400 air dry tons per year of production

Automated notifications to avoid potential production stops due to low chemical stock
FASTER, BETTER DECISIONS

Having a digital twin of the Puma plant has also accelerated decision-making. Previously, a decision to adjust the production pace would take 1-2 hours while process coordinators manually evaluated the effect of the change. Now these same process coordinators can simulate decisions in real-time and react more quickly and effectively across the plant to optimize the pace of production for real-time operating conditions. As a result, they have added an additional 3400 air dry tons per year, equivalent to a day’s worth of plant production.

“This is really helpful in decision-making for factory coordinators, since they have a tool which permits them to evaluate the stability of the factory and to take an action much faster when something’s not going well,” Rabelo said.

THE PI SYSTEM: A POWERFUL TOOLBOX

By integrating a web API with PI Vision, Klabin has created a variety of visualization tools geared towards specific roles: managers, engineers, and operators. For instance, one dashboard allows managers to see at a glance whether the materials being produced in a critical interface between two processes are meeting strict quality control limits. Other PI Vision displays allow managers to track KPIs across the entire plant and compare real-time values to historical ones.

“PI Vision was a tool that brought us a lot of agility,” said Raquel Goulart, specialist DEPR at Klabin. “The data is in our hands.”

Klabin also uses automated Notifications from the PI System to track and detect problems with equipment and to move toward predictive maintenance for costly machinery. Since establishing notifications for tank level and flow, they have had no production stops due to low stock.

Additionally, with real-time process monitoring, Klabin could better control water quality in their boilers and avoid expensive shutdowns. Each time a boiler has to be shutdown is 8 hours of lost production and an estimated $4.8 million cost per incident. Klabin created automated Notifications that have already prevented two boiler shutdowns for $9.6 million in cost savings.

But Klabin’s digital transformation journey isn’t over yet. Today, they are working on a daily management report that highlights lagging key performance indicators (KPIs) so management can focus on the most mission critical issues.

For more information about Klabin and the PI System, watch the full presentation here.

Klabin has modeled their entire production process at the Puma Unit for faster decisions and millions in cost savings.

PARTNER: IHM ENGENHARIA

PI System Components:
- PI Server™
- Asset Framework
- Data Archive
- Event Frames
- Notifications
- Asset Analytics
- PI DataLink™
- PI ProcessBook™
- PI Vision™

“The data is in our hands.”
— Raquel Goulart, Specialist DEPR at Klabin