The development of the Autonomous Mill is following the same path as that of the autonomous auto. First, smart sensors and instruments were required to reliably collect data. Next came secure and robust communications methods to move the data from the mill floor to a control computer, and back. And now comes the software and human expertise to combine equipment data with data pulled from process computers (DCS) and data mined from a mill’s enterprise-wide computer (ERP) to “navigate” the best path for production and profits. That software/service is called Optimization of Process Performance (OPP) and is offered by ANDRITZ.

OPP has been around for over a decade, and is being implemented in various forms globally. OPP A “BIG DIFFERENCE”

Why does a mill operating in the top-tier globally choose a service such as OPP?

“We are single-line mill,” says Leonardo Pimenta, Technical Control Manager at Eldorado and the leader of the OPP project. “We are well-managed and have tight cost controls. But we can always improve our position. We focus on every detail to stay ahead of our competition. OPP is a tool for helping us stay ahead.”

AUTOMATIC MODE IS CRITICAL

“Central to achieving results is the knowledge that processes are better controlled by automatic advanced process control (APC) strategies compared to operator intervention,” says Pimenta. “Stability is a key issue in a mill. The fewer surprises, the better the performance. Every loop in auto makes us money.”

When ANDRITZ proposed a pilot project on the Eldorado fiberline, the main targets were: 1) that all main processes would be controlled by Advanced Process Control (APC) strategies; 2) that over 95% of the control loops would be available in automatic mode; and 3) that the APC routines would be turned on at least 90% and our variable costs could be reduced between 5-10%.” Pimenta says.

“They were pretty high targets, especially for a well-run mill,” Figueiredo admits. “But, Eldorado and ANDRITZ were both committed to achieving them. We signed an agreement in August 2016 with the idea that we would have all the front-end work done by the end of the year so we could start measuring results in January 2017.”

“PUT ALL OUR EFFORT INTO THIS”

There are various “flavors” of OPP in various mills, according to Arthur Santos, OPP Technical Specialist at ANDRITZ, ranging from evaluation and tuning of control loops to more complex data mining and integration of separate mill databases. The one thing in common is that the work is done in collaboration with mill personnel—operators, technical resources, and management.

“However, Eldorado is unique in that from the very beginning we formed a joint team that works together daily,” Santos says. “In the same room you can find Eldorado process engineers and maintenance reliability engineers and ANDRITZ OPP analysts. We interact constantly, collaborating and solving problems together.”

According to Pimenta, when Eldorado decided to go with OPP, it did so in a big way. “We chose to apply all the concepts and all the technologies that OPP offers at the same time,” he says. “We didn’t want to do it in pieces, but all at the same time and as fast as possible. That’s the Eldorado way.”

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SUPPORT FOR RISK-BASED MAINTENANCE

Luiz Roberto Araujo is Maintenance Manager for Eldorado. He has three Reliability Engineers from his group working on the OPP team in a project to support the mill’s culture of Risk-Based Maintenance by centralizing information from the process and the equipment in the same database. Sounds easy enough, but the volume of work is quite challenging. ANDRITZ OPP analysts have tapped into the mill’s SAP maintenance planning software to get vital information about Eldorado’s 23,000 assets in the database and combine this with process information from the DCS. The team is working on making this a two-way communication between the databases.

“Setting the correct KPIs requires very open discussions between a mill and us,” says Luis Binotto, Senior Vice President of ANDRITZ’s APO group. “Their targets are our targets. There is only one team here.”

The three KPIs selected most critical are:
1) operational stability in the 90-93% range;
2) a reduction in variable costs vs. budget;
3) operational stability in the 90-93% range.

In addition to Mill Balance, there are projects involving the lime kiln, recovery boiler, bleach plant, and drying machines.

“We are also working on an Augmented Reality (AR) project to help maintenance people get instant information in the field simply by looking at a piece of equipment with AR glasses,” Pimenta says. “And we are quite far along with making checklists for operators and maintenance people available on their mobile devices.”

“BIG DIFFERENCE”

According to Monteiro, OPP has made a “big difference” in Eldorado’s performance.

“ar in a short time, we have achieved excellent results,” he says. “Every loop in APC makes us money. Selfishly, I would prefer if no other pulp mills would invest OPP. But even for those who do, we intend to keep pushing, and to stay ahead.”

“I suppose there are some people who believe that the Internet of Things (IoT) is just a marketing gimmick,” says Daniel Schuck, Vice President of Technology for ANDRITZ APO. “Maybe they said the same thing about transmitters and early distributed control systems. But what we are doing is not pie-in-the-sky fantasy. We are using new tools to do traditional things – saving mills millions of dollars a year.”

“The commitment of our operational team was fundamental to this project,” Pimenta says. “We might have tried to do some of this alone, but we chose to bring in an experienced partner with ANDRITZ. They have the tools and the experience to help us reach a much higher level of performance faster. I don’t see any good reason to wait. Our results show that there is a lot to be discovered from our assets before having to make additional capital investments.”

FIBERLINE STABILIZED

Ederson Reis, Eldorado Technical Assistant for Fiberline, was active in seeking the input from operators and explaining the benefits to them. “We involve operators in every phase,” he says. “They quickly began to see how automated control makes their jobs easier.”

An example is a problem that Eldorado was having with the hydraulic balances inside their massive digester. “We used to have to backwash the third screen in the digester every three days, which cost us time and production,” Reis says. “After implementing digester APC about one year ago, the digester has run with excellent stability. We have not had to purge the screen, so operators can work on preventative actions and more valuable things.”

The team has categorized each asset A, B, C, or D depending upon the critical importance of the equipment to the mill’s operations. “We monitor the risks for each asset, and focus our attention on the highest priority risks to our most critical assets,” Araujo explains. “One glance at a computer screen shows us where to focus our efforts to avoid unnecessary shutdowns.”

The result? “We’re operating at 95% overall equipment availability,” Araujo says. “That’s an excellent result.”

KPIs MET

Early in the project, Eldorado and ANDRITZ set clear goals against which to measure success. These goals, known as Key Performance Indicators (KPIs), form the basis for 30% of ANDRITZ’s compensation, so they are important. What gets measured gets done.

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