

Mondi SCP

Running a lime kiln with brains

When one piece of production equipment becomes a bottleneck or energy-sink, the discussion centers around *rebuild* or *replace*. Mondi SCP's mill in Slovakia became aware of a third option: *automate*. They now have a lime kiln with brains!

In most mills, the lime kiln is easy to see: a 100 m long rotating cylinder. But at Mondi SCP's mill in Slovakia, it seems to have disappeared. Where did it go?

"It's right here," says Vladimir Krajči, Recovery Line manager, pointing to a roof-covered structure. It is just very unique." Krajči explains that the old kiln is "part Russian style, part Western style." Part of the "Russian" contribution was the full-length roof which shields the kiln.

The kiln had become a big bottleneck and a general pain in the posterior for the operators at Ružomberok. Through technical improvements and changes in operating procedures, it had been coaxed from its original 250 t/d rating to 350 t/d – on a good day. However, dusting, plugging, and near-constant ring formations



"Andritz took us by surprise with their solution." Branislav Benčo, Head of DCS for the recovery area

led to a production curve that resembled a yo-yo.

"We have five shifts, which means five operators," says Peter Scholtz, Recovery Line production manager. "One operator would adjust the feed end temperature to avoid plugging. After the shift change, the next operator would see rings forming

and would have to take the kiln offline for a few hours to blast the rings. The next operator would over-adjust excess oxygen, and the next operator would be dealing with residual calcium carbonate tests that were too low."

Extra energy consumption in the form of natural gas was costing big money. To compensate, the mill purchased a significant quantity of lime, which of course was costly as well. "We had done everything we could do mechanically," Scholtz says. "There was nothing left to do but replace it."

Taken by surprise

Inquiries for a new kiln went out. Instead of a replacement kiln, Andritz proposed an automation solution. "We didn't know much about Andritz's automation capabilities at the time, but we decided to politely listen to their proposal," says Branislav Benčo, Head of DCS for the recovery area.

"They took us by surprise during the meeting," Benčo says. "The more we learned about their KilnACE system, the more we liked the concept. The technology runs on a standard PC and could



Vladimir Krajči (left) and Peter Scholtz, Recovery Line production manager on top of the mill's recovery boiler

be easily linked to our DCS. No special instruments, no months of programming. Andritz said they could have the control up and running in only a few weeks.”

“On top of this,” Krajči says, “Andritz offered a trial period so that we could see for ourselves how much improvement we could get.”

KilnACE consists of two layers: a BrainWave controller to stabilise the process, and the ACE layer which does optimisation. BrainWave is different than other controllers on the market. “It outperforms other control technologies because of two main components: an adaptive model and a predictive controller,” Andritz project manager Sava Kovac says. “This means that the controller learns from past performance. Then, it doesn’t have to wait for an error to occur and then react – it can predict the process response.”

Of the many features, the one that interested Benčo most was MIMO. “MIMO stands for multiple input, multiple output,” he says. “It coordinates the control of multiple variables so they don’t interfere with each other. I don’t know of any other controller that can do this.”

“BrainWave stabilised the temperatures and excess oxygen in very short order,”



Thanks to the tight control of kiln temperatures and excess oxygen provided by KilnACE, Mondi SCP has eliminated purchased lime and has reduced specific energy consumption. Here, Vladimir Krajči, Recovery Line manager, inspects the firing end of the kiln

Benčo says. “But our operators were skeptical and tended to run the kiln in manual like the old days. Today, the operators use the control 100% of the time.”

“The system holds the kiln temperature within a narrow window so my operators can run high production and avoid the severe ringing we had before,” Scholtz says. “Solving this problem was the primary goal of the project.”

“We initially justified the Andritz control package based on an estimated six months payback,” Krajči remarks. “I can tell you that the payback was a lot quicker. The economics come from a reduction in specific energy consumption, a significant reduction in purchased lime, and a big reduction in production stoppages.”

ACE in the future?

ACE is an “expert operator” layer that sits above BrainWave and manages everything about the kiln operation: production rate, temperature targets, and excess oxygen targets to maintain a certain quality and throughput. The only input from the operator is the lab test for residual calcium carbonate. Unlike a “black box,” ACE advises the operator at all times about what it is doing or planning to do.

“At our mill,” Krajči says, “the kiln temperature must be highly constrained to prevent plugging and ringing. There is little room to optimize for residual carbonate control, so it’s not clear how much more we could benefit from the other ACE functions.”

“But,” he says as he winks, “we intend to give it a try soon and see if we can improve upon an already good situation.”



One of the kiln operators oversees operations from the control room. The BrainWave layer of KilnACE is utilised 100% of the time