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Mike Zlatic, distribution channel manager for MAGPOWR, found a successful collaboration with Georgia-Pacific operator Jeff Reganall.

Tension-control seminar leads to line solution

A Georgia Pacific operator enlisted supplier experts to find a process solution that's now the converter's waste-cutting standard.

Edited by Managing Editor Melissa Larson

When operator Jeff Reganall of Georgia Pacific's Muskogee, OK, Mill attended a MAGPOWR Tension Control seminar, he hoped to find out why he was experiencing certain problems in his core-winding application. Reganall was in charge of a machine that was not able to run full rolls of material all the way to the core. The result was large amounts of waste, due to rolls that could not be used any further than 2-3 in. from the core. This amount accounted for over 5.5 percent waste every time a roll was run.

Part of the Muskogee Mill includes operations to manufacture cores for paper towels and toilet paper.

At the seminar, Reganall had a chance to sit down with several MAGPOWR application engineers and discuss the particular issues that he was facing. They agreed to visit Georgia Pacific and review the application, then worked directly with Reganall to design the best solution.

As a result, Georgia Pacific has increased efficiency on their core machine process lines to eliminate waste, increase line speed, and reduce operator intervention. The machine that was designed for this specific application has become the standard design for Georgia Pacific's Muskogee Mill, saving extreme amounts of waste and allowing their machinery to run faster than ever before.

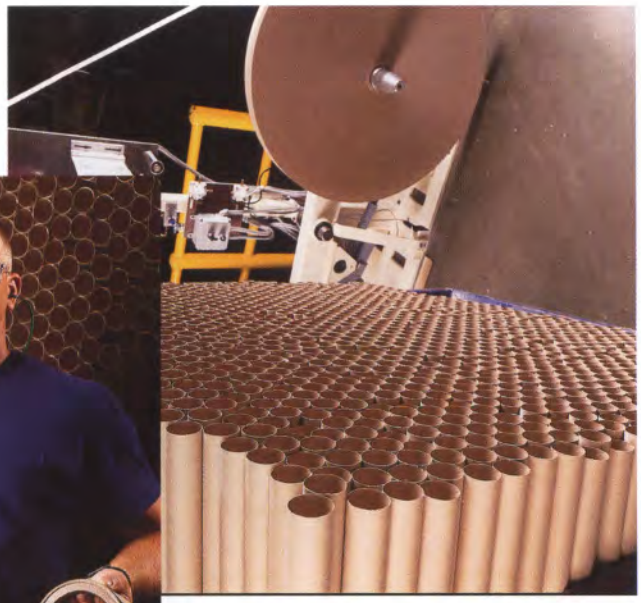
Three process problems

MAGPOWR application engineers identified three common process problems affecting the Georgia Pacific line, and found relatively simple ways to solve them:

Excessive Waste. Due to the large roll build (12:1), low control gain was used to prevent the dancer from becoming unstable near the core. As a result of using the low gain, the control was sluggish and unresponsive to error in the dancer arm position. Also, a roll could never be run all the way to core, because the dancer arm would "bottom out" on a stop with a 12-in. roll of material left.

Solution: By using the VERSATEC™ Dancer Control, in conjunction with a US-2 Ultrasonic Sensor for diameter feedback, the dancer control becomes gain compensated. This means that the control can be set for high gain at full roll, while the gain is reduced in proportion to cube of the unwind roll diameter. The result is a system that runs high gain from full roll to core, making the control responsive to error in dancer arm position. Furthermore, the machine could be run all the way down to the 4-in. core without any problems; eliminating waste. Throughout the entire roll, the dancer arm hovered right around the set-point horizontal position.

Inconsistent Tension. Due to an extremely short dancer arm, the ability to accumulate material was limited. As a result, during ramp-up to line speed, the dancer system would empty out all of its material and "bottom out" on one of the stops. Moreover, during slowdown at the end of the roll, the dancer system would fill up and bottom out on the other stop. In both cases, tension was not consistent.



Left: Operator Reganall poses with the previous wasteful roll (his right) and the more efficient roll on his left. Above, paperboard tubes await cutting for their role as toilet-paper and towel cores.

Solution: MAGPOWR suggested Reganall use a rolling-diaphragm air cylinder to load the dancer arm, a quick relieving regulator to keep air pressure constant in the air cylinder, and an air tank to minimize errors in pressure. Together, these devices provide a consistent method to load a dancer arm that keeps mass as low as possible.

A rolling diaphragm air cylinder, by its design, is virtually "frictionless." It is an easy way to load while allowing for the ability to easily change the load on the dancer arm which sets the tension in the web (i.e. different materials need different tension). A quick relieving air regulator sets pressure. As the dancer arm moves up and down, and the effective volume of the air system changes, the quick relieving air regulator compensates by adding air or bleeding air out. An air tank adds air volume to minimize the change in pressure due to dancer arm movement.

Tension Error. Because the load on the dancer arm sets the tension in the web, the machine was designed with moveable counterweights on each dancer arm. By sliding the weight back and forth, the effective load on the dancer arm was changed, thus changing the tension in the web. Unfortunately, excessive mass in a dancer system can induce greater errors in tension.

How a core machine works

The core machine takes two large rolls of paperboard, applies glue to one of them and wraps them both around a mandrel to create a continuous core for toilet paper and paper towels. These cores are automatically cut into 5-ft sections and stored in a bin for later use.

The critical aspect of this application is the tension at which the paperboard is wrapped around the mandrel. When wrapped too tightly, it binds up the mandrel drive mechanism. If it's too loose, the core falls apart. As a result of out-of-round rolls, core machines employ a dancer system to control brake torque on the unwind rolls.

Solution: A longer dancer arm was installed to allow more accumulation so start-up and slow down wouldn't bottom out the dancer arm. MAGPOWR engineers also recommended that the dancer be made out of a lightweight material to keep the mass as low as possible, minimizing errors in tension caused by accelerating the mass of the dancer arm.

Operators relax

Although Georgia Pacific managers will not disclose the amount of their cost savings due to the new tension-control system, they describe it as "exponential."

An additional advantage, according to Reganall, is that far less operator tweaking is necessary to keep tension in control. "Our operators can easily monitor three or four machines at a time," he says. "Previously, we had to have one person on each machine."

During and after the installation of the new tension-control equipment, MAGPOWR kept in consistent contact with Reganall to ensure that the installation was successful. Overall, it was a nice return on the minimal investment of sending an operator to a supplier seminar. ■

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