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FEATURE

DRYING INSTABILITY ON THE WAY OUT

By Martin Koeppenick, Innova

Far from the black box days of even a decade ago, drying has become much more predictable and stable, putting the days of flooded drying cylinders in the past. Thanks to advanced dryer management, operators are more “hands free,” concentrating on maintaining high performance, instead of wasting hours with unscheduled downtime.

New Page Corporation’s Biron mill in North America was a pioneer in dryer management, installing the Kadant Dryer Management System™ control software (DMS) in June of 2003. Originally cost justified based on energy savings, reduced maintenance has proven to be significant. Says Dave Nalbach, line superintendent for Biron’s PM 26, “The DMS gives us more flexibility from the control room to control drying. We see less wear and tear on the system. Our upgrading of dryer steam joints and Turbulator™ bars has also contributed to our high level of efficiency.

Nalbach continues, “Our operators go out on the floor less often to turn valve dryers on and off, based the grades that we are running. We meet our objectives for all grades equally well, which range from 30 to 40 lb. basis weights at 3300 sq. ft.”

Referring to the biggest obstacle overcome he says, “The anti-flooding logic of the DMS eliminated flooding right from the start. We don’t have to worry about the detrimental effects of flooding, such as a syphon break. We are no longer consumed by upset conditions, which were quite common. The DMS allows more time to focus on other aspects of the operation.”

Nalbach notes that operators now have more time make rounds, troubleshoot, and generally anticipate and deal with other problems. Nalbach also confirms that the DMS has paid for itself based on energy savings alone. He points out, “We see a 15-20% reduction in steam consumption per pound of paper. We do need to credit upgrades with the syphons and spoiler bars, as well.”

DMS INNOVATION AT BIRON

Says Nalbach, “As a means to minimize sheet breaks, we had the idea to have three different turndowns, based on different drying rates. In fact, the DMS experts and our people achieved the tailing moisture level that we wanted on all grades. Repeatable tailing performance and controlling threading moistures mean a lot.”

Adjustments by operators in the control room reduce production losses at the tailing section. Moisture range is critical to control, and it’s now more precise in all sections of the machine.

Speaking about further optimization, Nalbach says, “We have benefited from best practices know-how gained from other

mills. Now that more DMS systems are in the field, we receive ongoing support to further optimize on an ongoing basis.”

In conclusion Nalbach points out, “The leap of faith we took in 2003 has paid off.”

The advanced dryer management system helps operators anticipate problems and therefore avoid them, minimizing upsets and unscheduled downtime.

In the past, managing the dryer section for high performance required operators to be drying, steam, and control system experts. With the new generation of dryer control, all steam system set points are automatically and continuously adjusted to create a stable and efficient dryer section operation.

MINIMIZING GLITCHES

For many mills the DMS system has proved to be a viable tool to minimize breaks. When a break occurs on a paper machine, one person (usually the back tender) controls the steam and makes sure that the machine is running correctly, when they try to put the paper back through the machine. The normal procedure has been known to virtually ignore dryer surface temperature characteristics. The problem with this approach is that the drying cylinders are often too hot or too cold, resulting in breaks, energy waste, and off-spec production when operators try to thread the paper back through the dryer section. Operators can waste a lot of time and money trying to bring the paper back through the machine that can take less time with the DMS control system.

Dealing with a break, a targeted adjustment, or making a grade change is easier, because the whole drying system is ratcheted up or down to the optimal drying requirements. The DMS control system continuously monitors and adjusts the dryer settings to optimize runnability and energy efficiency.

OUT OF THE MIST

Mills have found many novel ways to improve workplace conditions, in order to increase productivity gains and maintenance. One of the best of these recent developments has been mist elimination around paper machines. When the fog lifts, operators are able to get jobs done that were previously awkward, if not dangerous. The new system design eliminates the mist that occurs with high-pressure showering, and thoroughly cleans the forming fabric.

One fine paper machine had top-wire fabric cleaning issues, due to the limitation of showers running at only 150 PSI to minimize mist. After the switch to the new mist eliminator, cleaning was possible at 350 PSI. They have also seen an increase in fabric life with the improved cleaning efficiency. The mill management now believes they will be able to increase machine speed from the current 3600 fpm to over 4,000 fpm.

According to Tom Vaughn, Vice President Sales & Marketing with Kadant AES, "Anyone who has spent time at the wet end of a paper machine understands that the mix of water vapor and fibre in the air ends up coating everything. Effective mist elimination literally clears the air to make the workplace better and safer. When the mill environment improves, mills see gains in productivity. Mill management confirms that operators and technicians appreciate the additional time to focus on other machine issues and not worry about the next wet end break".

Mist elimination fits the classic model of productivity and quality gains, while reducing maintenance at the same time.

Increasing profitability by reducing wet end breaks and reducing product loss due to poor formation and holes, are considered valid reasons to move in this direction. In addition, fewer wash ups of the paper machine, and the potential for fewer safety incidents are equally valuable to running clean and incident free.

MAINTENANCE DRIVEN JOINTS

Sometimes reduced maintenance is as simple as a change in the steam joints. The popularity of Kadant's PTX (advanced piston-type) steam joints and cantilever stationary siphons is all about runnability and minimal maintenance. When a mill wants to operate their steam and condensate systems over a wide range of conditions, they need joints designed for high pressures, high speeds, and capable of handling misalignment. They also need joints to accommodate thermal expansion of the dryer journal.

In the end, what's the key to minimizing unscheduled downtime and maximizing maintenance performance of papermaking and drying? In a word - runnability. The wet end and the dryer section are critical to properties in the sheet, as well as mill efficiency. The more predictable and stable they are, the more effective maintenance can be.



What Areas Can DMS Impact?

- **Consistency of operation**
 - Dryers operate the same way regardless of operating conditions or experience of operating crew
 - Consistency translates to machine efficiency & quality
- **Energy consumption – run & sheet break**
 - Keep the system "tight" through proper management of pressure & differential pressure
 - Reduce venting on sheet breaks
 - Reduce energy use for hood and dryer air systems
- **Recovery from sheet breaks**
 - Precise control of dryer temperatures during breaks
 - Best tail threading temperatures for all operating conditions
 - Fast recovery back to 1st quality moisture
- **Grade changes**
 - Accurate prediction of dryer pressures or speeds during and after grade change
 - DMS uses proprietary drying formulas and builds a grade dependant data base to make projections
 - Has potential to reduce grade change time and eliminate "snap offs" during grade changes
- **Ease of operation**
 - Minimizes need for operators to make adjustments to system
 - Automatic start-up of system
 - Provides a clear "operator interface" to system
- **Improved monitoring & troubleshooting**
 - On-line press moisture indication
 - On-line drying efficiency calculation
 - On-line energy efficiency reporting
 - Clear operator screens showing critical system information
 - Built in alarms and warnings
 - Kadant Johnson Systems on-site & off-site support