

Leave Dryer Headaches Behind

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Advances in dryer control technology, integrated with the steam and condensate system design, are helping paper and board makers run more smoothly, improve quality and save energy.

Proven at numerous mills in Europe and North America, the latest dryer management system employs supervisory control to manage all steam system set points continuously and automatically, to create a stable and efficient dryer section operation.

With automatic start-up and shut-down control, the dryer management system relieves the operator from being tied to the steam system control panel and provides change management at the fastest rate possible. Proper relationships between the various set points allows the dryer section to operate with improved energy efficiency, with fewer sheet breaks, and a wider range of control.

Key Factors For Greater Drying

Improved dryer control includes the following:

- Utilizing supervisory control to manage all system set points under steady state, transitory, and upset conditions; Automatic startup and shutdown of the system;

Monitoring dryer operations to aid troubleshooting and assess system performance; and

- Continuous monitoring of the condition of the field devices.

Two ways to implement a dryer management system are as follows: a separate dryer drainage control system can be installed that is dedicated

Minimize sheet breaks, ease grade changes, improve quality, and save energy with a proven dryer management system.

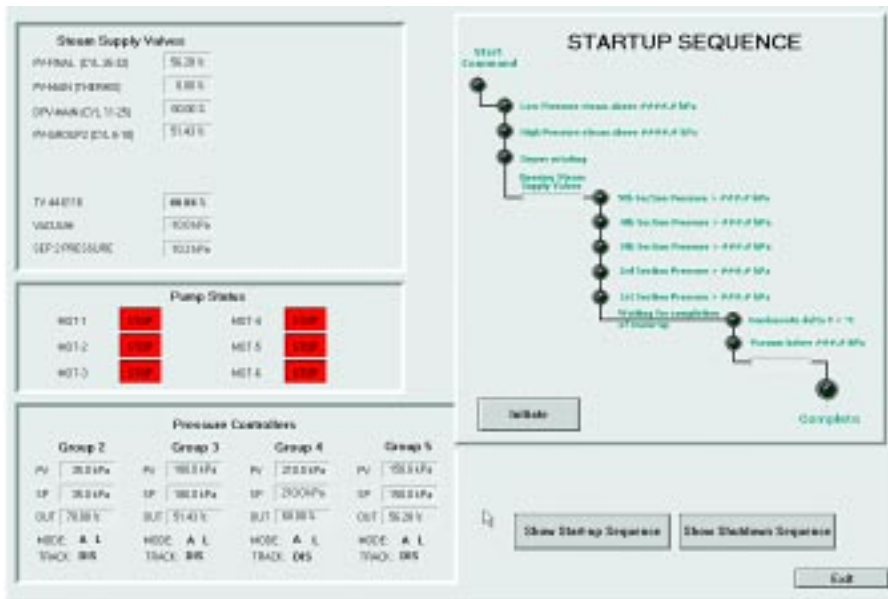


to the dryer section; or a Supervisory Computer can be added to interface to the existing DCS controllers.

A dedicated drainage control system is installed when no existing dryer control system is available. The dryer management system workstation interfaces directly to the dryer system controllers. The supervisory and regulatory control logic is downloaded into the controllers where it runs in-

dependently of the workstation. The workstation is used as an interface to the controllers. All the screens and interface to the system are configured into the human-machine interface running on the workstation. The operators can also be given full view and control of the dryer drainage workstation screens from their existing machine DCS workstations.

As an alternative, the dryer man-



ergy-efficient operating point. The system stability is maintained over the entire operating range, with no venting, by closely regulating the dryer pressure relationships. A number of sets of pressure curves can be built into the supervisory control system.

The operators can then select the appropriate set. Typically, an aggressive drying strategy would be used for heavier weight grades and a more gradual drying strategy would be used for lightweight grades.

Fewer Sheet Breaks

Most dryer drainage systems operate without problems during steady state operation. They may not operate with the highest efficiency, but they do not create problems. However, it is during upsets such as sheet breaks and grade changes that system problems frequently occur.

Sheet breaks can be best handled using a dryer management system

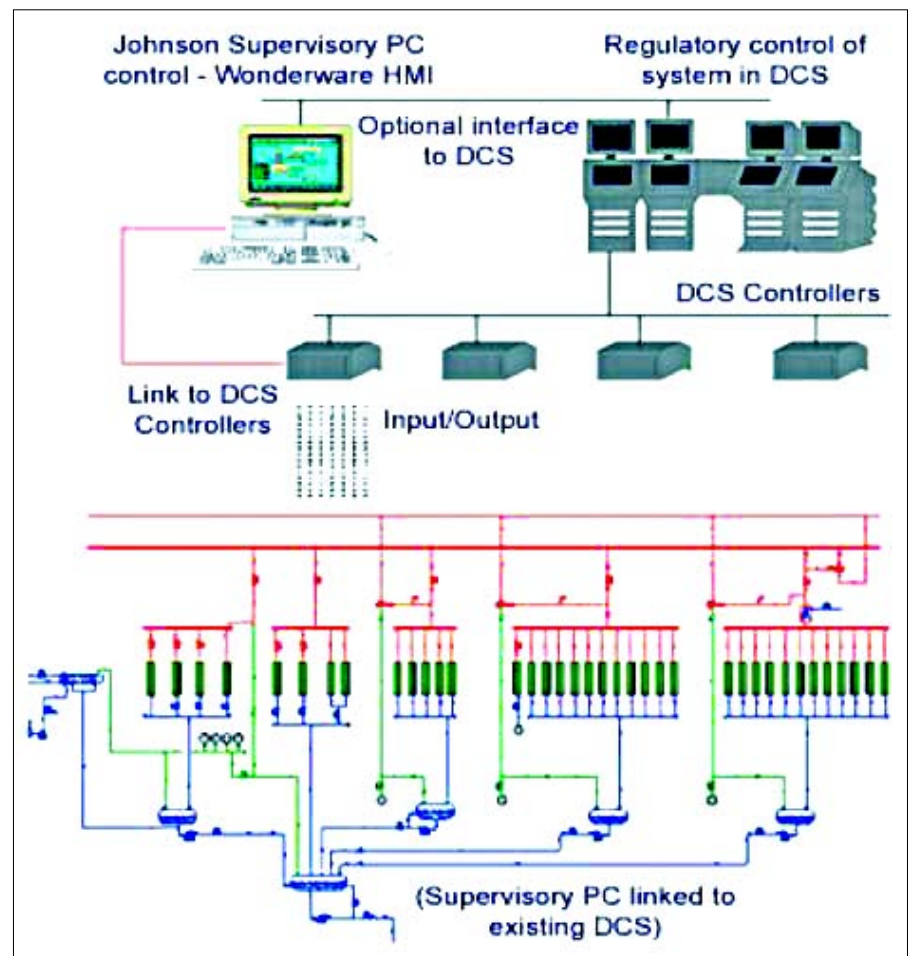
agement system can be added to an existing DCS where regulatory control functions for the dryer drainage system are done through the existing DCS controllers. A direct communication link is made between the DCS controllers and the supervisory computer. The supervisory computer reads and writes information to the DCS controller to adjust the system set points. In the event of a communications failure with the supervisory computer, the operators would remain in control of the system through the DCS; however, they would need to adjust system set points manually.

ied in the same manner each time and for each operating crew. The pressure curves are developed to

See Your Performance

The development of pressure curves is a key component of supervisory control of the dryer section. The pressure curves determine the relationship between the steam pressures used in the different steam groups. They are developed using drying formulae, which keep the dryer temperature response linear with regard to drying capacity. Linear temperature response, not pressure response, is a key to good dryer and machine direction sheet moisture control. A linear temperature response provides the same sheet moisture control response whether the dryers are operating at high or low steam pressures. The pressure curves provide improved consistency and runnability.

As machine operating conditions change, the dryer pressures are var-



With an advanced Dryer Management System (DMS), all steam system set points are automatically and continuously adjusted to create a stable and efficient dryer section operation.

● SPECIAL FEATURE

control strategy. The dryer ramp-down and ramp-up rates are regulated by the supervisory control system. The ramp rates are established to keep the system stable and the dryers draining during the break. The blow-through flows and differential pressures are also regulated to minimize the venting during breaks and to keep the vacuum condenser stable.

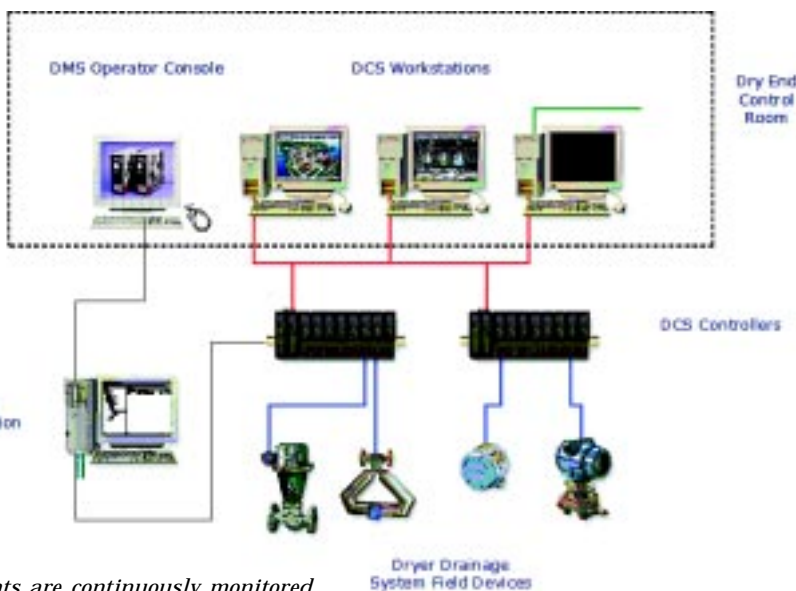
Grade Changes With Ease

Grade change is another non-steady state condition that typically is not handled efficiently by traditional dryer drainage control systems. Dryer performance can be improved during grade changes by using the pressure curves to adjust the dryer pressure before the moisture gauge has had a chance to detect the need. Drying calculations can be used to anticipate the dryer pressure change that will be required as the basis weight and speed are altered. The drying calculations examine drying efficiency prior to the grade change and recalculate the required drying pressures. The pressure curves are then used to adjust the dryer pressures to follow the grade change without having to wait for the moisture gauge to make the adjustment. This grade change strategy allows changes to be made more rapidly with less potential for sheet breaks due to draw changes caused by improper pressure settings.



DRYER MANAGEMENT SYSTEM BENEFITS

- Improved machine efficiency
- Fast sheet moisture control
- Reduced sheet breaks
- Elimination of dryer flooding
- Consistent draw control
- Reduced grade change time
- Reduced tail threading time
- Reduced motive steam use
- Reduced wet-end dryer picking and sheet cockle
- Elimination of steam venting under all conditions
- Wider range of operation
- Rapid start-up following shut-downs
- Consistent dryer section control



Set points are continuously monitored and adjusted to ensure the dryer section runs consistently and reliably.

Easy Start-Up

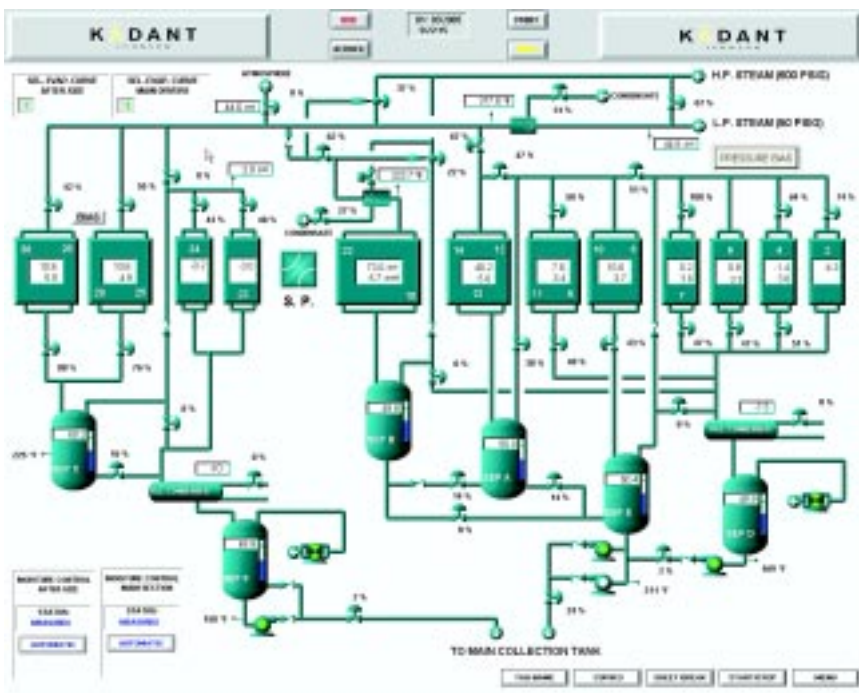
Startup of the steam system is often an area that is inconsistently handled by operating personnel. The startup time should vary depending on how long the machine has been shut down. In most cases, it is impossible for the operators to know how fast to warm up the dryers. If it is done too quickly, there is the potential for bearing failures due to temperature differences. If it is done too slowly, production is lost.

Supervisory logic can be used to take control of the startup and shut-down procedures. Logic is used to control the valve openings to bleed air from the system, introduce steam to the system, and ramp up pressures to the dryers. The temperature of the condensate being returned from the system determines if the dryers have achieved stable temperatures. Once they have reached stable tem-

Utilizing advanced controls, the Dryer Management System allows the operator to look inside the dryer system through the DCS output screen.



There is no job so urgent, no work so important, that it cannot be done safely.



peratures, the system brings the dryers up to their operating pressures.

Taking Control of Your Dryer Performance

The advances in dryer control technology now offer papermakers a new outlook on dryer system management. Supervisory control can be used with most traditional system designs, if the system is well designed and in good condition. Both traditional cascade and thermocompressor systems can be made to operate in a more efficient, user-friendly manner.

With added control providing reliable, consistent dryer section operation, the system can pay for itself in a very short period of time. In summary, drying is much easier, less costly, and requires little operator adjustment. The focus can shift to ramping up quality, efficiency, and new grade developments, while reducing recurring costs. **_PA**