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TECHNICAL PAPER

TTC-Total Tissue Capability: driving cost savings through process improvement

The benefits of automated control strategies for both stock preparation and the wet end are well described in applications such as fine paper, LWC and other DIP-containing grades. But in tissue production, control solutions using instrumentation are not yet widely applied, despite their proven impact on the Yankee performance.

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An integrated approach is needed, combining creping expertise and wet-end chemistry knowledge to generate cost-effective improvements for the entire tissue process – taking advantage of high-quality, highly-reliable on-line transmitters and analyzers used in a closed loop control scheme to optimize chemical consumption, machine performance, sheet quality and profitability.
A wide range of instrumentation is available from charge analysis and brightness control to consistency transmitters and drainage control. The BTG approach combines these core competencies with real-time machine data, detailed lab surveys and creping expertise into a Total Control Strategy for process improvement.

A SIX-STEP PROCESS. The BTG approach involves six discrete steps: 1. Process Measurement – 'Back to basics'; 2. Plan development; 3. Generating the data; 4. What to do with the data; 5. Program implementation; 6. Results analysis.
Process Measurement asks "If you don't measure it how can you improve it?' as well as 'What are you measuring and why?". Quite often this is a question of identifying variability in the process as a first step to reducing it.
In the Plan development stage we define the process survey, map the process, study existing control strategies, and define lab sample points and data mining. This shows the variability at key parts of the process and delivers the list of potential improvement opportunities.
We then generate the survey data – this may include a consistency survey and fiber morphology study employing specialized instruments. Critical to this stage of the tissue-specific study will be the survey of the crepe operation.
The next steps are to establish what to do with the data and how to implement the program. By establishing databases and monitoring processes we generate and analyze the results, and can make clear recommendations and proposals.
For example, a good charge control strategy can use a fixative to control this so-called anionic trash (Figure 2) and both reduce deposition-related problems and improve wet strength resin efficiency (Figure 3).
In concrete terms that allows us, for example, to help eliminate wire deposits; optimize high wet strength resin consumption; avoid unstable absorbency values; improve machine speeds; avoid foam issues; avoid failed fixative trials and varying chemical doses; and improve blade life. A continued creping investigation can also lead to recommendations to trial high-performance creping doctor blades.

CREPING DOCTOR BLADE STRATEGY. Improvements in wet end chemistry control can improve the Yankee operation via more stable coating conditions, enabling speed increases or improvements in crepe ratio. These more stable conditions can in turn enable the implementation of a further improvement strategy for tissue by using BTG high-performance Duroblade® creping blades.
The benefits of high-performance blades have long been recognized. These include: more even wear; more consistent tissue quality; higher softness; longer time between blade changes, Figure 4, (itself a reduction in process variability); and superior asset protection in terms of Yankee wear.

High-performance creping blades derive these benefits from having tips coated in a harder material, such as ceramics or cermets (ceramic-metal compounds). The treated surface will be more resistant to wear, and in particular the reduction in 'sliding wear' means that a high-performance blade lasts longer between blade changes than a steel equivalent.
Hard-tipped blades are also resistant to the impact wear – Figure 5 – of the tissue inherent to the crepe process which causes the crepe quality (and hence tissue smoothness and caliper properties) to deteriorate.
The wear-resistant tip of the high-performance doctor blade does not exhibit the same impact wear, and hence tissue quality is maintained for far longer - Figure 6 - .
A Total Control Strategy, as outlined above, creates the best possible conditions to exploit all the potential benefits that high-performance creping blades may offer. BTG Total Tissue Capability aims to leverage both of these competencies in one integrated holistic approach.

CLEAR BENEFITS. Many benefits are realized when a Total Control Strategy is fully implemented: the use of chemical additives is optimized, optimized addition of fixing agent, optimized dewatering in fiber recovery, reduction of wet strength resin in water circuits, stabilized coating at Yankee.
Raw material usage is maximized: controlled fines, maximum yield.
Finally leading to improved production efficiencies through: higher drying efficiency, stabilized dewatering, increased blade life. •

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