TISSUE: Going Global

Markets around the world are growing and big tissue producers are in hot pursuit.

MARKET PULP

Weakening demand has pushed inventories higher and prices lower. A market correction? Or sign of things to come?
State-of-the-Art automation provides much more capability than the traditional DCS and/or QCS. Modern automation arms papermakers with enhanced abilities to reduce downtime, increase production rates, and develop consistency in product quality.

By Keith Masters

To be competitive in today's market, papermakers know it's essential to invest in the automation that is right for their mill. But balancing their technology needs with the realities of their budgets is never an easy task.

Typically, the business case for automation investment is based on the equipment's ability to reduce product variation and increase economic returns (see Figure 1).

Distributed Control Systems (DCS) and Programmable Logic Controls (PLC) control the valves and motors that run paper machines. Quality Control Systems (QCS) provide online measurement and control of paper grade specification parameters such as basis weight, moisture, thickness, color and opacity.

State-of-the-Art automation provides much more capability than the traditional DCS and/or QCS. Modern automation gives papermakers the ability to achieve incremental efficiency improvements through best-practice implementations and optimization technologies.
As variation improves, results increase

Figure 1. By operating closer to limit conditions, mills can achieve better economic value.

USING BEST PRACTICES TO IMPROVE PRODUCTION

Automation systems collect process information from flow, pressure, temperature, level, pH and other process measurement devices as well as the weight, moisture, color, thickness and related quality measurements provided by the QCS. Today’s systems use commercially available technology for computing and network infrastructure to provide access to more mill information.

With new technology, operators have fast access to the information that can help them make sound decisions, including control information, trend information, interlocks, alarms, diagnostic information, descriptions of proper operation and maintenance history (See Figure 2).

With modern automation systems, people can be connected to needed information cost effectively. One example of a best practice is to make the information from intelligent devices including documentation, diagnostic, condition, configuration and operating information inherently available when these devices are configured in the automation system. In this way, when an intelligent device reports an error message, the control loop is automatically shifted to a safe operating condition and the operator is notified. At the same time, the instrument technician is also notified, shortening the time it takes to diagnose and correct a problem. In another example of a best practice, the maintenance history of a critical part of the process, such as the headbox, is made available for the user to view. In both cases, the information is provided in context with what the user is viewing with a simple right click of a mouse.

THREE-STEP OPTIMIZATION

ABB’s optimization consists of a three step process: diagnose, implement and sustain.

The diagnostic portion, Process Fingerprint, includes an experience database representing several hundred studies. Key performance indicators, KPIs, cover Product Variability, Stock Approach Stability, Machine Response and Profile Capability. Expressed as an index, the KPIs are compared to benchmark performance from the experience database. The Product Variability index, derived from adding individual weight and moisture indices, indicates the process’s cyclic tendency. The Stock Approach Stability index represents the stability of dominant stock approach control loops. The Machine Response index is an indication of weight, moisture and headbox control performance and is the sum of the individual control indices. The Profile Capability index indicates Cross Direction weight and moisture control performance.

By evaluating the process information, the cyclic nature of a variation can be characterized as pulsations, surges, vibration or mechanical condition, and the variation can be accurately linked to its source (see Figure 3).

Stock Delivery System

- Maintenance history
- Description of proper control action
- Diagnostic information provided by intelligent process measurement devices
- Alarms associated with the variables
- Interlock information
- Trend information
- Control information

Figure 2. Providing the right person with access to the right information at the right time enables better decision making and the opportunity to improve mill operations.

Figure 3. By analyzing process information, users can link a variation in a stock delivery system to its source.
ABB provides an action plan that explains the improvements needed for optimization. Information from the Process Fingerprint is used to identify and prioritize the recommended actions.

The optimization program’s sustain phase involves monitoring the KPIs and reporting when appropriate (see Figure 4).

At US Corrugated in Cowpens, SC, an ABB optimization program brought achievable benefits. The mill went from producing 280 tpd to producing more than 780 tpd. The program with US Corrugated evolved over several years and now includes the capability for experts to connect remotely. Through remote connection, problems have been fixed in minutes instead of days since the right expert is involved in the solution more quickly.

**SUMMARY**

Papermakers using these best practices and optimization capabilities are realizing efficiency improvements in the range of 1 to 3%. Determining the improvement possibilities for a specific operation requires evaluation of the factors that impact efficiency. A gap analysis is performed to identify the issues that are impacting the availability of the operation, ability to produce at target production rates and desired quality (see Figure 5).

A combination of factors can help companies improve their efficiency. Technology helps by bringing information together from a number of sources in a cohesive way, structuring information so it is relevant to a user’s job function and providing analysis and decision support tools.

When people use these capabilities, downtime is reduced, production rates increase, and product quality is more consistent.

Commercially available leading edge technology provides mill systems with a solid foundation — and users with the information they need to be competitive in today’s market. What we choose to do with the information that is available is up to us. As we consider the various types of information in the mill computer systems, our challenge is to decide how we can better leverage this information to improve mill operations.

**References:**


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