Integrated technologies improve product quality and prevent breaks

TotalVision makes it faster and easier to produce high quality paper. By Carol Rich

Eliminating the defects that can lower product quality or disrupt the process is a constant concern at paper mills and to catch imperfections, most mills use web inspection systems (WIS) and web monitoring systems (WMS).

Each system is effective in its own way as a tool for detecting problems. Each focuses, however, on a different aspect of capturing flaws. Two suppliers, ABB and Papertech, recognised how valuable WIS and WMS would be if they were combined. These companies have integrated the existing technologies to deliver a new depth of process vision.

The new system created by ABB and Papertech, TotalVision, is already in place at several mills in Europe. TotalVision makes it faster and easier to produce high quality paper. Stora Enso Nymböla and UPM's and Sappi's German mills are all using TotalVision to capture a greater level of detail about imperfections.

Both WIS and WMS use cameras to produce images of the paper web during production. Each system is used to monitor and diagnose paper breaks and defects.

Web Inspection Systems, such as Web Imaging HD1800 from ABB, are mill essentials because of the quality control they bring to production. HD1800 uses line-scan cameras to constantly scrutinise the moving paper web for imperfections; the system detects even the smallest and subtlest flaws. Papertakers especially prize HD1800 for its ability to catch the defects that trigger the paper breaks that lead to loss of production time.

Operators use WIS information to learn what caused problems and to
help them problem-solve. For specifics on where web breaks originate, however, mills use web monitoring systems.

Web monitoring systems, such as WebVision by Papertech, capture video images at critical locations throughout the process. Mill personnel using WMS can replay captured events and use them to diagnose the root causes of breaks. WebVision uses a combination of digital cameras and software with comprehensive features to provide especially high-speed, high-quality pictures to monitor the process and generate alarms if a change occurs.

With the video that contains the captures, web breaks can be traced back to their original sources so mill personnel can make the necessary adjustments. However, since operators need to rewind and playback the videos to view where the breaks originated, during rewind and playback WMS can’t be used for new recording, which limits its flexibility and coverage.

**SHORTENING TROUBLESHOOTING TIME**

Seeking the advantages of both WIS and WMS, mills have turned to ABB and Papertech for a system that can provide optimal monitoring along with specific information on the origins of all kinds of potentially troublesome defects.

ABB and Papertech are both staffed with highly experienced personnel who have the technical knowledge to problem-solve and create innovative solutions. Recognising the
Above: The ABB Web Imaging HDI800
Far left: Using the industrial IT system 800xA
Left: TotalVision can be used from a single operator station
advantages of combining ABB's HD1800 WIS technology and Papertech's WebVision WMS technology, ABB and Papertech worked together to create an integrated bidirectional solution called TotalVision.

TotalVision integrates HD1800 and WebVision so that defect and video information are shared between both. Operators can see a flaw discovered by the HD1800 and compare it with a video image captured using WebVision to pinpoint its origin. By synchronising multiple cameras on the same piece of paper and time-stamping event data, mills can quickly and accurately determine a defect's root cause and make the necessary corrections - a process that previously could take days or weeks as personnel scrutinised large amounts of video shot by the WMS cameras to find exactly the data they needed.

With TotalVision, mill personnel need only a single operator station with multiple monitors to view the WIS defect map and WMS break tools side-by-side for quick analysis. All events are time-stamped, making it easy to see exactly when they occurred. Importantly, the WIS and WMS systems are synchronised so users can automatically find the place in a video that they need. This dramatically shortens the time it takes to sort through multiple images so mill personnel can understand the precise way an event unfolded.

ABB and Papertech designed TotalVision with open protocol architecture. This expands its usefulness, because mills can anticipate adding to the system's scope as needed in the future.

TAKING PROBLEM DETECTION TO ANOTHER LEVEL
TotalVision's two modes, automatic critical defect analysis and on-demand defect analysis, make it easy for mills to maintain production and ensure quality.

Mills use the automatic critical defect analysis mode to deal with the critical problems that upset production and lower quality. In this mode, operators can specify the kinds of defects they want the system to alert them to. When the WIS encounters a flaw that fits the profile, it automatically highlights the image on a map and generates important data that will help the operator classify the problem and, ultimately, eliminate it.

The defect is time-stamped and the system sends a hyperlink to its image to the WMS. As soon as the image is received, WMS cameras automatically generate synchronised video. The operator can then view the defect image as it appears on the WIS along with video from the WMS shot from multiple cameras as the imperfection moves through the paper web.

MULTIPLE BENEFITS
Using WMS video, an operator can find the clips that show where the problem began and then move in, enlarging the image if desired, for even more precise location information. The operator can also rewind the video and play it back at a slower speed to pick up greater detail. Operators can watch video taken later in the process to observe how the flaw changes as it moves through the paper web; valuable information mills can use for later analysis.

The on-demand detail analysis mode helps mills study defects to prevent re-occurrences. In this mode, operators can click on a defect on the WIS map and retrieve specific data on that defect. They can also simultaneously access corresponding video from the WMS. While the WMS video plays, the defect image from the WIS appears, giving operators a convenient display for examining and tracking information.

Since WMS videos are automatically stored for later retrieval, the information they contain can be studied whenever mill personnel want to access them.

For example, if a small defect hasn't caused a situation that requires immediate action, like a break, an engineer can study it whenever the time is convenient. Or if a key person is absent from the mill when a break occurs, they can still investigate the cause when they return.

TOTALVISION FOR CLEAR CAPTURE
Mills have found that with TotalVision, image quality is especially high, and users are able to view a far greater level of detail than they have previously. This allows them to see more sizes and kinds of defects and breaks. With fast and accurate image access, mills can even track breaks within breaks.

At Stora Enso Nymölä, one of the first mills to install TotalVision, mill personnel can see imperfections at their start, even those that are extremely slight, and correct them before they become serious. The mill uses immediate information downloads and image captures provided by TotalVision to follow flaws from wet-end to dry-end without interruptions caused by the system. Data are also stored for later analysis and investigation.

The unusual cooperation between ABB and Papertech that resulted in the integration of the HD1800 and WebVision has given Stora Enso Nymölä and other mills an easier and more efficient way to pinpoint problems and follow them through the system.

Flaws can be viewed in great detail, at critical junctures. Automatic video storage provides mill personnel with a highly convenient way to study all kinds of problems at a time of their choosing. And precise synchronisation ensures that operator time isn't wasted.

As a result, papermakers have a faster, easier, more in-depth tool for catching and diagnosing defects and an opportunity to create a better quality product.