SUCCESS STORY

Total control over paperboard production in Skoghall

ABB Web Imaging System (WIS) enables Stora Enso to improve quality and reduce rejects

Stora Enso in Skoghall, Sweden, is one of the world's largest paperboard producers. In 2012, the mill's web imaging system was upgraded, with a similar investment on their other board machine following in 2015.

"The installation of ABB's Web Imaging System (WIS) on BM8 has been a success story. Installing the latest generation of WIS on BM7 was consequently a natural step, and the initiative has been nothing but positive. Since we now have the world's largest and most complex system, we can improve quality while speeding up our volume production," says Leif Karlsson, Project Manager at Stora Enso in Skoghall.

A need for web inspection and quality control
Skoghall Mill belongs to the Stora Enso Group and manufactures paperboard, primarily for the food industry; milk and juice cartons are frequently the end product. The mill has two board machines, BM7 and BM8; both operate continuously day and night, all year round, and together produce 100 million one-liter packages within a 24-hour production period. BM8 is also the world's largest board machine for liquid packaging board.

Quality demands in relation to packaging continue to increase. It is not enough for the packaging to be practical – it has also become a more integrated part of the food industry's marketing. The paperboard must have the appropriate characteristics for different printing methods and color combinations. This is why, in cooperation with Stora Enso, ABB has helped augment its inspection system to achieve total quality control for both machines.

Upgrading the system
The ABB Web Imaging System was installed on BM8 in 2006 and was updated in 2012. The first version was installed on BM7 in 2008 and was updated in 2015 with the addition of HDI 9. Through an updated camera model and specially designed algorithms, every square millimeter of the paperboard web is now inspected at speeds of up to 800 meters a minute. The most recent upgrades that were performed also allow for the detection of shearing defects in the paperboard.

"Shearing defects are tiny millimeter-sized shifts in the paperboard's structure, which, in the worst-case scenario, can lead to cracks when the paperboard is folded into packaging. The cracks can then cause leakage when the cartons are filled with liquid," says Björn Wikström, Maintenance Technician at Stora Enso in Skoghall.

Correcting shearing defects is time-consuming and can result in major production losses. Using camera beams at BM8 and now at BM7, Stora Enso can correct the process in 2–3 minutes, thanks to continuously updated information that reaches the operator stations within seconds.

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A finished paperboard roll in BM8 weighs 55 metric tons, is approx. 35 kilometers long, and is approx. 8.6 meters wide.

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Björn Wikström, System Engineer QCS/WIS at Stora Enso in Skoghall, thinks that the ABB WIS is user-friendly.

> “(Adding shearing defect capability) has been a very user-friendly tool that benefits everyone, from machine operators to winder and re-reeler operators, and naturally also our quality and development engineers”
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> Björn Wikström, Maintenance Technician at Stora Enso

“Shearing arises very sporadically. The cameras have to be able to detect tens of thousands of defects in just a few minutes. At the same time, the defects have to be analyzed and visualized so that they can be rectified quickly. The operator now has a tool at his or her disposal that visualizes the shearing defects of various sizes as color-coded markings on a chart,” says Håkan Österholm, product manager at ABB.

“This is a very user-friendly tool that benefits everyone, from machine operators to winder and re-reeler operators, and naturally also our quality and development engineers. We have designed the interface so that it suits the unique needs of all user groups,” adds Wikström.

Less rejects

With ABB’s WIS system, the mill has full control over the production, which in the long run means less rejected paperboard and further enables the mill to save large amounts of energy. Every meter of paperboard that cannot be delivered to customers results in unnecessary consumption of energy and raw materials.

Karlsson also emphasizes another advantage of ABB’s WIS – It is now easier to specifically address customer concerns and pinpoint the exact location of product defects.

“The system has not only improved quality and the work environment for operators, our sales organization also greatly benefits from it. We were previously often forced to take back the entire order if a customer discovered defects in some of the delivered rolls. Today we can trace exactly which rolls are concerned through our database where all of the images are stored for at least two years. The difference in complaint-related costs is enormous,” said Karlsson.

The ABB WIS’s massive memory storage capacity is the secret. One year of production at Stora Enso in Skoghall corresponds to a paperboard web that circles the earth 10 times – every square millimeter is inspected, and all defects are traced in photos that can be easily accessed when required. This is truly big data; the tens of thousands of gigabytes enable valuable and easily accessible information to be created.

About the ABB WIS installation
The Web Imaging System detects, photographs, visualizes and traces all defects that are larger than one square millimeter in the paperboard web. The detection process takes place throughout the entire production line – from board machine, via the coater, to the winder and re-reeler. The system inspects the top, the bottom and even the inside of the paperboard. The configuration on BM8 is based on six inspection stations, and it contains 100 digital cameras, while the configuration on BM7 has four inspection stations and 65 digital cameras.

ABB's Web Imaging System notifies the operators in each processing segment of all defects that need to be rectified, so that production can be continuously optimized. Skoghall's salespeople can also log into the system's database, and thus together with their customer, more specifically trace which paperboard roll caused a potential complaint.

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Challenge
The mill had issues with end quality, often having to take back entire orders from their customers.

Solution
- Installation and upgrade of the newest generation of ABB's Web Imaging System
- Addition of shear defect feature

Benefits
- Improved quality
- Increased production volume
- Improved customer satisfaction

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