

CONTROLLING WARP ON THE CORRUGATOR

A PARTNERSHIP BETWEEN STORA ENSO PACKAGING AND VALMET HAS RESULTED IN NEW MOISTURE CONTROL TECHNOLOGY THAT ELIMINATES WARP.

BY SÖREN BACK

THE IQ SCANNER MEASURING THE SURFACE MOISTURE OF THE OUTER LINER.

Due to ever-faster packaging lines and a need for increased efficiency, corrugated board users put higher demands on their corrugated suppliers. At the same time the manufacturers of corrugated strive to increase their own production efficiency, both on the corrugator and in the subsequent printing and converting. A development project between Stora Enso Packaging in Jönköping, Sweden, and Valmet has proven that a key to higher efficiency is to eliminate warp by controlling the liner reels' moisture profile on the corrugator.

Stora Enso Packaging's corrugator plant in Jönköping celebrated its 100th anniversary in 2015; hence it is the oldest corrugator plant in Sweden, and



THE AIM WAS TO DEVELOP A SYSTEM MEASURING AND CONTROLLING THE LINER REELS' MOISTURE PROFILE IN THE CORRUGATOR IN ORDER TO ELIMINATE THE PROBLEM OF WARP.

Eliminating Warp



ONE OF TWO IQ MOISTURIZER SPRAYBOOMS INSTALLED ON THE CORRUGATOR.

one of Stora Enso Packaging's three Swedish plants.

"The corrugated board we produce is often aimed at packaging requiring high quality printing which needs flat sheets and minimal impact on the outer liner to avoid washboard that affect the print quality," says Ola Lindberg, Process Engineer at Stora Enso Packaging in Jönköping. "Our focus is on corrugated board packaging where high print quality is requested, and our customers are in practically all businesses. The 98-inch BHS corrugator is equipped with flying splice in all unwind stands. The machine speed is 984 ft/min. Our latest investment is a diecut and flexo press for high quality printing.

"The demands on a stable and consistent process and totally flat sheets of corrugated board coming out of the corrugator increases," Lindberg continues. "Warp causes rejections or problems in the subsequent printing presses or converting machines. Traditionally we have tried to combat the problem by measuring the liner

reels' temperature profile and adjust the temperature of the preheater drum accordingly, not always giving a result which is good enough."

Successful Cooperation

In 2013, Valmet approached Stora Enso Packaging about participating in a joint project. The aim was to develop a system measuring and controlling the liner reels' moisture profile in the corrugator in order to eliminate the problem of warp. "We were of course interested," Lindberg says. "The technology exists for many years for paper machines and Valmet saw the opportunity to adapt it to corrugators, which are wide machines as well."

Stora Enso Packaging produces corrugated packaging with a variety of liner and flute combinations, such as bleached and unbleached kraftliner, white top liner, testliner, coated liner and semi-chemical fluting. "The general trend regarding order sizes is that they are getting smaller and we are facing more frequent quality changes,"

Lindberg explains. "Frequent changes of liner and fluting qualities are potential disturbances resulting in rejected corrugated material until reaching a consistent quality level. We therefore saw a potential to attain the approved quality faster after each grade change by online measuring and controlling the moisture profile of liner reels."

The first step of the development project was the installation in 2014 of manual equipment to control the moisture profile. By optically checking the existence of warp and by spraying moisture in positions where the moisture level deviated from the target value, i.e. was drier than normal, warp problems were immediately eliminated. Lindberg says it was a great and quick success and a clear answer to how warp problems should be solved. The following year a Valmet IQ Scanner, measuring the surface moisture of the corrugated board, was installed and in doing so the possibility to achieve a moisture closed loop control was in place.

Today the corrugator is equipped with two IQ Scanners, one measuring the surface moisture on the backside of the corrugated board web and the other measuring the surface moisture of the top side. Two IQ Moisturizer spraybooms are installed, one correcting moisture variations of the liner side of the singleface board and the other doing the same for the bottom liner before the double backer. The measurement results from the scanners control the need and positions for moistening to prevent warp problems.

Flat Sheets

"The result of being able to even out deviations of the liner reels' moisture profile was really great," Lindberg says. "In 2013 before we started the project

Eliminating Warp



THE IQ SCANNER MEASURES THE SURFACE MOISTURE ACROSS THE CORRUGATED BOARD WEB.



THE RESULTING FLAT SHEETS.

we had too many internal claims due to uneven moisture profiles. By internal claims we mean problems where too much warp has made the sheets out of tolerance. Last year we had only a few internal claims due to a warp problem – a definite proof of the success of our new way of working.

"Today's corrugators are wide and there can only be three or four liner or fluting reels cut from the paper machine width," he continues. "It means that

two reels out of each three or four are edge reels and one edge of these reels is often drier than the rest of the reel. By using moisture control we can now compensate drier parts resulting in flat sheets. Another effect of the Valmet system is that if the machine rolls are not exactly in parallel with each other, it can be spotted from the scanning of moisture profiles and corrected sooner.

"Our cooperation with Valmet has been very useful as we now have

a system capable of automatically detecting and correcting moisture profiles to achieve flat sheets of corrugated board. Paper is a living material and is as such influenced by moisture changes so that it shrinks when being dried and swells when picking up moisture. By optimizing the level of moisture to achieve an optimal gluing result and levelling out the moisture profile of the liner reels used in the corrugator, the corrugated board sheets are flat irrespective of the liner or fluting qualities used," Lindberg says.

The IQ Multipoint Moisture Measurement system and camera based IQ Warp Measurement for the combined board flatness control was developed at Valmet's automation headquarters in Finland and is available to North American corrugated converters. The products are supported out of the company's Atlanta, Ga., office. ■



OLA LINDBERG OBSERVES THE IQ SCANNER.

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