

EFFICIENT PROCESSES AND HIGH-QUALITY PRODUCTS ARE CREATED THROUGH COOPERATION AND COMMITMENT

ANDRITZ played a major part in Stora Enso's Oulu mill success in reaching a new era as the mill was converted from fine paper to kraftliner production. The virgin fiber-based kraftliner produced by the mill will serve the strongly growing global packaging market.

The conversion of the production line at Stora Enso's Oulu mill was a major undertaking, as the project will also increase the capacity of the pulp mill and the pulp drying line. Kraftliner, made of unbleached sulphate pulp, is used in food, fruit, and vegetable packaging that requires strength, high quality, and purity.

"The online shopping boom has led to increasing consumption of packaging materials. Demand for kraftliner is constantly growing, while the need for coated printing paper is decreasing at an accelerating rate," says Juha Mäkimattila, Mill Director, Stora Enso Oulu.

He says that the company is on the right track to respond to the current global trends related to the environment, changing lifestyles, urbanization, growing demand of bio-based products, replacement of plastic, and growth of the packaging market.

FROM WHITE TO BROWN PULP

Converting a mill from fine paper to kraftliner production does not happen overnight. In fact, this challenging, multi-phase conversion project took several years to complete. The total investment budget was approximately 350 MEUR. The implementation of the project itself took just under two

years. In that time, the extensive mill area has undergone an almost complete transformation with the help of some 200 suppliers.

The former paper machine was converted to the production of kraftliner, and the pulp mill was converted to produce unbleached pulp. Changes were also made at the mill to achieve considerable improvements in the treatment of odorous gases and wastewater as well as chip storage. Environmental investments totalled approximately 40 MEUR.

"Specialization in premium quality and high-price products will continue to be the backbone of our business. The competitiveness of our products is based on the use of the best possible raw material. With the investment at the Oulu mill, our processes are now efficient and highly competitive," says Mäkimattila.

ANDRITZ was among the suppliers responding to the strict quality production performance goals set by

Stora Enso during the Oulu mill conversion project. It converted the fiberline of Stora Enso's Oulu mill to produce unbleached high-kappa pulp, upgraded the pulp drying machine, and modernized the stock preparation. ANDRITZ also supplied a significant number of process pumps to various areas of the mill and was responsible for the rebuild and capacity increase of the lime kiln.

"Our clear-cut goal is to be the market leader in terms of quality. Our pulp has to live up to this goal; that is, it must be better than any other producer's. The process solutions must, for their part, ensure that we are constantly able to produce premium quality. We reflected the technical solutions of various suppliers against this goal." This is how Klaus Leppänen, Area Manager responsible for Stora Enso's fiberline in the investment project, responds when asked what were the main reasons behind their decision to select ANDRITZ as the supplier of production technologies and key process equipment.

"The starting point of all our operations is that we are the best on the market, both in the production of market pulp and kraftliner. In pulp and packaging board production,

"The old production was in progress until September 2020, so the construction, testing, and commissioning related to new production had to be completed in just over two months."

ARI SAARNIO
Stora Enso, Project
Director, OCO Project



premium quality cannot be achieved by talking; it requires cutting-edge technology and expertise," says Pekka Kylliäinen, Project Manager responsible for Stora Enso's drying machine in the project.

CONVERSION OF THE VARKAUS MILL STILL FRESH IN MIND

ANDRITZ has proven experience in implementing similar modifications at Stora Enso's Varkaus mill in 2015–2016 and also with its Imatra mill's new drying line in 2017.

The successful conversion project in Varkaus, where a paper machine was converted to produce kraftliner, was still fresh in mind at Stora Enso. On the other hand, they also had an equally clear recollection of the challenges encountered in Varkaus. Based on previous experiences, Stora Enso and ANDRITZ joined forces in the Oulu project and created functional renovation concepts for both the fiberline and the drying machine.

"One of the lessons we learned in Varkaus was the fact that washers operate differently with high-kappa pulp. Furthermore, high-kappa pulp requires mechanical defibration to achieve a good level of quality. We reviewed the old washing line in Oulu and found that we would not be able to utilize all of the existing technology in the new production," Leppänen says.

Kylliäinen, for his part, had had previous experience cooperating with ANDRITZ in connection with the implementation of the new drying line at the Imatra mill.

"One of the great innovations is the ANDRITZ automatic tail threading system for the drying machine, which has proved to be both functional and reliable. This equipment has also increased the safety level of the drying line," says Kylliäinen.

TECHNOLOGY, BUT ABOVE ALL, HUMAN COOPERATION

When it comes to rebuild projects such as the one that took place at Stora Enso's Oulu mill, off-the-shelf technology alone is not enough. People carry out the work, and cooperation is needed to find solutions to the most demanding technical challenges when the goal is to tune the production

process performance to perfection and guarantee the customer world-class quality.

"Shared experiences, desire to learn, and cooperation are all very important factors in this. We continuously stressed the fact that the project was a joint venture. This way, we were able to utilize each person's competence and experience to the maximum and got them to fully commit themselves to the project," Leppänen says.

Kylliäinen agrees, "Everyone's contribution is so important in process development. The solution will not be good if the supplier only picks up standard pieces off the shelf and arranges them in line. The know-how of both parties is required. Production processes are always different, and you have to really understand what is required to create a functional solution. This is where professional skills and cooperation weigh in."

PROJECT WORK CARRIED OUT IN THE SHADOW OF COVID-19

Ari Saarnio, Project Manager responsible for the conversion project at Stora Enso, is satisfied with the outcome of the project and also with the fact that such a large-scale project was completed within budget and also almost on schedule, even though the work was carried out in the shadow of the COVID-19 pandemic.

"When the first news of COVID-19 carried from abroad, we were quick to respond. We immediately turned our attention to our Chinese deliveries, and made plans on how to get them all delivered. This is another example of our excellent cooperation with ANDRITZ. In the end, we received all of the equipment on



The upgrade project included a rebuild of the complete pulp drying line.

"A new mill can be designed completely in 3D. A mill conversion requires people to travel to the site and work there."

KLAUS LEPPÄNEN
Stora Enso, Area Manager
Fiberline, Woodhandling



schedule," Saarnio says. "Because of the COVID-19 pandemic, we also had to create additional remote control rooms from which the facilities were commissioned."

BUILDING A NEW MILL VS. REBUILDING AN EXISTING ONE

Saarnio emphasizes that a project such as the one undertaken at the Oulu mill, where an existing mill is converted to new production, is dozens of times more challenging than constructing a similar mill from scratch. Costs are saved, but the amount of work involved is tenfold.

"Connecting old equipment to new is extremely challenging. When constructing a new mill, the testing and commissioning work alone can take up to six months. In our project, the old production continued until September 2020, so the construction, testing, and commissioning related to new production had to be completed in just over two months."

"Many of the challenges and details that are involved in mill conversions became evident at the project planning stage. I consider it important that we were able to discuss the details together well in advance and find solutions to the most demanding issues," says Jorma Olkkonen, Project Manager at ANDRITZ.

The remote connections implemented by ANDRITZ in Graz, Kotka, and Växjö were used to plan and monitor the progress of the project and production. This has facilitated the flow of information between Stora Enso and ANDRITZ and has allowed for situations to be handled remotely without having to travel to the site.

Even without the COVID-19 pandemic, the project standards would have still been high. Discontinuation of old production, extensive dismantling work, and making new installations all have required overlapping and coordination among several operators within a tight schedule. Nor was compromising safety an option at any point of the project.

"The COVID-19 pandemic posed a whole new set of major challenges to the project, but we were able to solve all issues and achieved our original goals in terms of production and quality," Mäkimattila concludes.

CONTACT

Jorma Olkkonen
jorma.olkkonen@andritz.com

GETTING TECHNICAL

THE ANDRITZ DELIVERY:

- Conversion of the fiberline to produce high-Kappa unbleached pulp, including cooking modernization with new TurboFeed™ chip feeding system, Diamondback™ chip silo, and new impregnation vessel. The delivery also included a new DD-Washer™ for brown stock washing, new screening plant, and new refiners.
- Rebuild of the complete pulp drying line, including modernization of the wet-end with new headbox and shoe press, modernization of the drying section, and upgrade of the baling line.
- Installation of the latest innovation in dewatering – three Vertical Screw Thickeners, dilution conveyor system, MC-pump, and rebuild of the broke screening system.
- Rebuild and capacity increase of the lime kiln.
- Significant amount of process pumps to all areas of the mill.



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