ANDRITZ
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WE ARE CELEBRATING SPECTRUM – HAPPY ANNIVERSARY – 40

SPECTRUM

ONE PLUS ONE IS MORE THAN TWO

Zellstoff Pöls AG // 34

Contents

AUGMENTED REALITY CONTENT

To view videos, illustrations and picture galleries in a more direct and lively way, we added augmented reality to several articles! **Download our ANDRITZ AR APP** on our website or in the AppStore/PlayStore!

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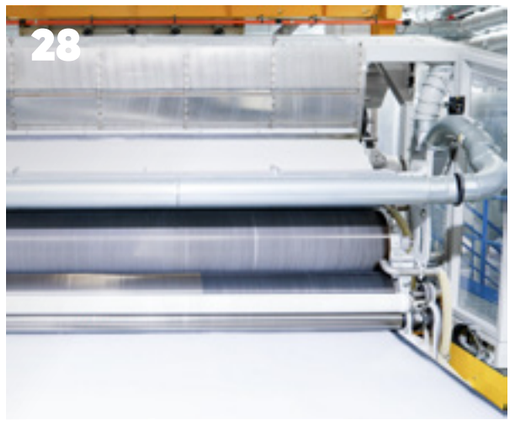
AR AR AR

Zellstoff Pöls AG:

ONE PLUS ONE IS MORE THAN TWO

Cover Story // 34



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On the cover: One plus one is more than two (page 34)

ANDRITZ.COM/SPECTRUM

Dear Readers,

As SPECTRUM's Editor-in-Chief it is a pleasure to celebrate the 40th issue of SPECTRUM with you!

What modestly started as "Fiber Spectrum" at the end of the 1990s has evolved into a high-quality and strongly profiled customer magazine for our readers engaged in the pulp and paper industry. The initial idea was to reach out to existing and potential customers by presenting ANDRITZ's capabilities in pulp and paper. For more than 20 years ANDRITZ has grown in both industries despite some painful transformations – for instance, the dramatic changes in demand for newsprint. However, on the up side, we have seen constantly growing demand for packaging grades. During the same period we have seen innovations that clearly contribute to improved efficiency and enhanced environmental standards in regards to water, air, chemical, and energy consumption.

Why a "customer magazine"? Certainly, we at ANDRITZ are proud of the customer benefits emerging from our technologies, products, and services. And we like sharing these with you. But being in the "project business" we also find it impressive and interesting to be allowed to reveal how our customers carry out their projects together with ANDRITZ and to have the opportunity to witness how customers master their sometimes massive and often complicated projects. SPECTRUM gives the opportunity for its readers to get first-hand insights into these masterpieces.

Right from the very beginning, we wanted to reflect that success is a function of individuals' ingenuity, efforts, ideas, cooperation, hard work, and risk-taking. Therefore, in SPECTRUM we give a clear focus on "people" who show the way instead of letting machinery play the main role. We are convinced that this is inspiring to our readers.

SPECTRUM today is, of course, packed with all the latest in media technology. Through the SPECTRUM app you are directed to videos and background details in our articles. Even though online tools have an impressive impact on media consumption, we at ANDRITZ stick to SPECTRUM printed on paper! Paper is a sustainable material and many people still value the opportunity to lean back and read a quality magazine such as SPECTRUM – and thereby hopefully are inspired and get new ideas that help them and their companies reach their targets!

Should you have opinions on how we can make the next 40 issues of SPECTRUM even more interesting and "read-worthy", we would highly appreciate hearing about them. Please participate in our online survey (more information on page 91) or send us a message to spectrum@andritz.com.

Read on!

Yours sincerely,

Bjørn Hansen

Editor-in-Chief "SPECTRUM"

NEWS

Makerthon – fast-tracking ideas into solutions

To create a practical solution, a prototype has to be actually made before it can be tested, developed, and evolved. Only then can it be proven to have potential for future applications.

ANDRITZ Tissue and Automation Groups took up the challenge of being one of the industrial partners for the "Makerthon", presented by the Institute of Innovation and Industrial Management at the Graz University of Technology. The institute operates the Schumpeter Laboratory for Innovation, which has the very latest infrastructure and digital production machinery for rapid prototyping as well as extensive multimedia and communication systems. This laboratory provided the optimum environment in which to host the Makerthon.

The Makerthon (Making + Marathon) is a new format to create not only new ideas for products, but also to realize physical prototypes within 48 hours. The teams, each of up to five international and interdisciplinary participants, have to understand the challenge given by ANDRITZ, detect the real issue, generate and select ideas, and then realize prototypes at the brand new Laboratory for Innovation. At the end of the process, they have five minutes to pitch their products and services to the jury and explain why their solution will change the business.

ANDRITZ Tissue and Automation introduced the challenges for "Smart Solutions for Industrial Plants" to the Makerthon teams. In the 48-hour workshop, the Makers were free to find ideas about products, technologies, concepts, services, or even new markets for "Condition Monitoring, Data Coordination or Complexity of parts". In the final "reveal", all teams presented different but impressive results, software, and prototypes for smart sensor and control systems, applicable on bearings, felts, and reel spools.

Judging criteria were "Degree of Innovation" (Value & Novelty), "Originality" (Wow-Effect), "Quality of Prototype", and "Pitching Performance". The winning team presented ANDRITZ its ideas for a double sensor-based monitoring system, prediction software, and a pressure sensor for process monitoring (in the felt section).

ANDRITZ is an industry partner of the Institute of Innovation and Industrial Management at Graz University of Technology. Both partners gain and share knowledge and networks about trends in industrial innovation, research, and support of entrepreneurship by having collaborative workshops and events like the "Makerthon", "Product Innovation Projects", and many more.

The Winning Team: Yahia Alkhaldi, Rucai Wang, Henry Koothur with ANDRITZ (M. Menezes, T. Morgenbesser, K. Blechinger, C. Matejka) and TU Graz (C. Ramsauer - A.F. Kohlweiss)

Thanks to all participants and partners of Makerthon #3 at the Institute of Innovation and Industrial Management, Graz University of Technology, May 15-17, 2019

Acquisition of KEMPULP enhances ANDRITZ's chemical pulping portfolio

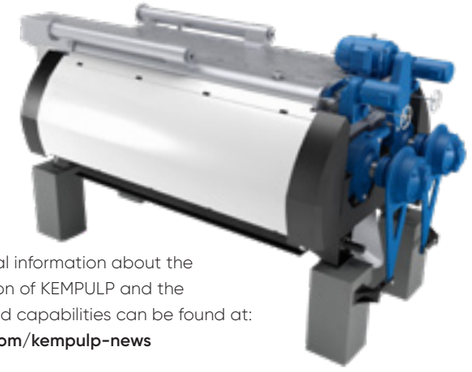
In summer 2019, ANDRITZ acquired the Swedish company KEMPULP, a specialist in providing technologies and services for key chemical pulping processes such as washing, oxygen delignification, and bleaching. This acquisition enhances and expands the solutions ANDRITZ offers to pulp producers.

Former KEMPULP products and services complement ANDRITZ washing and MC-technologies – both for new plants and upgrades to existing lines. The company has a number of well-known products, most notably the COMPACT PRESS®, an advanced and well-established wash press.

The ANDRITZ DD-Washer based washing technology has gained a strong market position over the years, with hundreds of units operating on the world's largest fiberlines. The COMPACT PRESS technology will complement ANDRITZ's washing solutions, particularly in certain positions on washing lines where separate water circulations, reduced water consumption, reduced effluents, or higher discharge consistencies are important.

On the service side, ANDRITZ will continue to support existing KEMPULP customers with technical support, replacement parts, and methods to upgrade the performance of existing products with minimal investment.

The KEMPULP team has now been integrated into ANDRITZ's Pulp & Paper organization. Most of the team is located in Karlstad, the heart of the forestry-based bioeconomy in Sweden. Members of the team collectively have decades of experience in the world of chemical pulping.



Additional information about the acquisition of KEMPULP and the integrated capabilities can be found at:
andritz.com/kempulp-news

FlowScanner multifunctional device for optimizing pulp process performance

The FlowScanner is a unique device that combines a moisture meter, a weightometer, and a foreign object detector all inside one machine using advanced Dual X-ray technology. The main benefit of the device is the enabling of real-time feed-forward control of chips going into the pulp digester, resulting in increased stability, chemical savings, higher yields, and improved product quality. Foreign object detection also provides higher uptimes due to the avoidance of machine breakdowns and other disturbances in the process.

REAL-TIME KNOWLEDGE OF THE KEY PARAMETERS OF WOOD CHIPS

By integrating the FlowScanner data directly into the control system of the digester, the process can be adjusted on-demand to react to wood chip parameter variations. This brings more stability to the digester as well as to the whole fiberline and chemical cycle. The results are a better and more controlled end product quality, increased production, reduced fiber consumption, and chemical savings. Further savings can be achieved by increasing the uptime of the mill and reducing the costs of possible damage caused by foreign objects going into the digester parts. Thus, the payback time of investing in FlowScanner technology can be significantly short. Numerous successful installations and satisfied customers prove FlowScanner to be a solid raw material analyzing solution and it complements ANDRITZ's Fiberline technology offering to further benefit customers.

ANDRITZ FlowScanner – Stop guessing, start knowing!
andritz.com/flowscanner

AR View video footage of this report in our augmented reality App!

FOR FURTHER INFORMATION SEE PAGE 3

THE ONLY WAY IS UP

Stora Enso Imatra in eastern Finland, is one of the world's largest producers of liquid packaging board. Now, thanks to the latest ANDRITZ flash drying technology, the mill is also able to fully utilize its BCTMP plant, which can now produce dry pulp for its internal use, as well as for the market.

In late 2017, and after a lot of deliberation and analysis, it was decided that Stora Enso's Imatra Mill could better utilize its BCTMP plant. What was needed was the flexibility to be able to feed the board and paper machines with whatever capacity they needed, and then any extra could be diverted to a drying line. This would then get the needed result of the extra baled pulp, which could be used internally, or sold on the market. But there were challenges; the new drying line would have to be squeezed into a tight space between the BCTMP plant and the board machines. This meant a lot of creative engineering design, as really, the only way was up.

"Before we installed the Flash Dryer from ANDRITZ we had a lot of capacity in the BCTMP plant that we were not using," explains Kalle Mäkelä, Production Manager, BM4 and BCTMP, Stora Enso Imatra Mills. "We were feeding wet pulp straight to the board and paper machines, but because of the extra capacity we knew we could be doing more and, of course, that meant making more pulp.

"We needed to be extremely creative when it came to finding space for a drying line."

Close cooperation is vital in order to secure a successful execution and operation of the installation: Magnus Holmqvist, Area Sales Manager, ANDRITZ and Kalle Mäkelä, Production Manager BM4 and CTMP, Stora Enso.

The ANDRITZ Twin Wire Press has been proven in many applications for all pulp types and is the best suited thickening equipment prior to a Flash Dryer.

Stora Enso Imatra and ANDRITZ together developed how to locate the Flash Drying plant in an efficient space in the mill. The new Flash Drying Line was fitted into the overall layout.

A TRIO OF TOP DEWATWERING AND DRYING TECHNOLOGY

ANDRITZ has had vast experience designing Flash Dryers for different types of fibers with each installation optimized according to its application. The focus in terms of operating efficiency centers on low and optimum energy consumption, heat recovery, and low environmental impact, as well as providing parts for complete systems to ensure short start-up and ramp-up times.

As the leading supplier of flash drying systems with numerous installed bases around the world, ANDRITZ was selected by Stora Enso to deliver the latest in drying technology for the project. The scope of supply included a Twin Wire Press, HC-Fluffer, and Flash Dryer – all well-proven ANDRITZ technologies.

In the case of the Flash Dryer, ANDRITZ technology gives maximum energy efficiency and minimum environmental impact. "One reason for this is the steam heat exchangers used, which give a possibility to combine steam and gas heating," says Ola Larsson, Director of Technology and R&D, Pulp Drying, ANDRITZ. "And in order to meet the high environmental requirements, including dust emissions, a scrubber system handles the exhaust air before release to the atmosphere. The design is also ready for future requirements such as low NOx emission."

The Twin Wire Press and the HC-Fluffer combined with the Flash Dryer make the perfect combination when it comes to consistent and high-quality pulp drying. The Twin Wire Press has been proven in many applications for all types of pulp and is particularly pulps that are difficult to dewater and to reach high discharge dryness – a prerequisite for obtaining lower thermal energy consumption in the flash dryer.

The HC-Fluffer breaks up fiber particles with very low energy input, and thus has no negative impact on fiber properties. The fluffed pulp, with its large accessible fiber surface, is a crucial requirement for high and even dryness out of the subsequent flash drying stage.

"STORA ENSO KNEW WHAT THEY WANTED FROM BEGINNING TO END"

Stora Enso made the decision to go ahead with the new drying line at the mill in November 2017. Heikki Kangas, Project Manager, Technology & Investments, Stora Enso, says, "We selected a team of engineers and then started the works; we were determined to be involved as much as possible and that our ideas be taken into account.

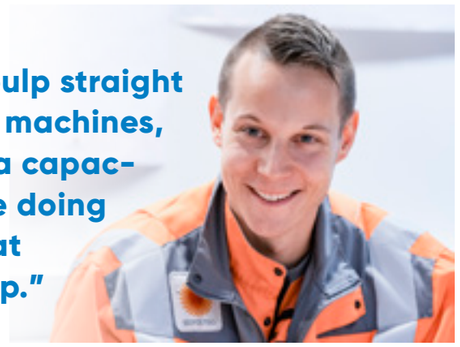
"This project was a challenge due to the tight space we had, and really the only way was up in the design of the drying line in terms of making it fit the space. It was also a project that would mostly take place in the middle of the Finnish winters."

Stora Enso employed 3D modelling technology for the project, involving suppliers,

→

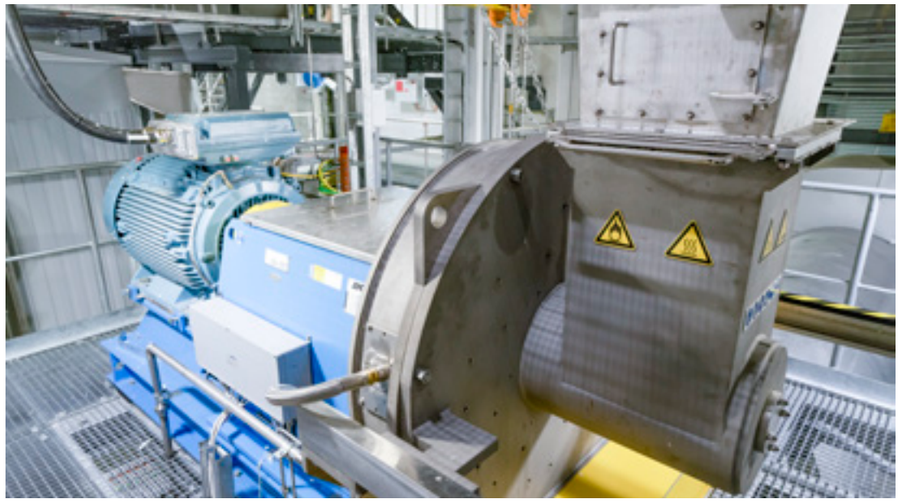
KALLE MÄKELÄ
Production Manager,
BM4 and CTMP,
Stora Enso

"We were feeding wet pulp straight to the board and paper machines, but because of the extra capacity we knew we could be doing more and, of course, that meant making more pulp."



HEIKKI KANGAS
Project Manager,
Technology & Investments,
Stora Enso

"This project was a challenge due to the tight space we had, and really the only way was up in the design of the drying line in terms of making it fit the space."



The HC-Fluffer breaks up fiber particles. The fluffed pulp is well-prepared for the further drying process.

Equipment is easily accessible for service and maintenance, despite the tight space available.

operators, and consultants to make sure that all future needs were also taken into account. "We had a lot of meetings, and we asked our operators to come up with all the ideas and needs they might have for the new line," adds Mäkelä. "We asked them to compile a list of requirements in a spreadsheet detailing where any losses or disruption may take place on the new line. In the end, there was a list of over 200 requirements that we then sent on to the suppliers to the project.

"The 3D design technology came in very useful during our meetings and discussions, ensuring that we didn't miss any vital equipment of pipework, due to the tight space."

Franz-Peter Kittel, Senior Product Manager, ANDRITZ says, "Of course, it is always better to find out early what is needed on these projects and, in this particular project, Stora Enso had a lot of good ideas. The operators at the mill really knew what they wanted, from beginning to end."

FLEXIBILITY IS THE KEY

Commissioning and start-up of the new drying line took place in early January 2019 and went mostly according to plan, with the start-up of the Twin Wire Press and Flash Dryer, particularly going well according to Mäkelä, who said, "What we were most impressed with was the start-up curve; we quickly ramped up production to maximum level, and the quality of the pulp we are producing is superb.

"The most important feature for us is the one of flexibility, as we were very dependent on what happened on the board and paper machines. We now have a BCTMP plant that we can run continuously at high capacity, which is a lot more economical than increasing or decreasing capacity, depending on the demand of the board machines."

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THOMAS HALLBERG
Pulp Drying, Project Manager, ANDRITZ

"The equipment we have supplied to Stora Enso comes with the very latest in safety technology and is the safest drying line around."

THE VERY LATEST IN HEALTH AND SAFTEY TECHNOLOGY

A key area of the project was the Health & Safety factor, of not only the whole project, but of the drying line itself. ANDRITZ has paid specific attention to added safety features on its latest drying lines, including the wire changing procedure that has been changed from a manual to a semi-automatic system.

Thomas Hallberg, Pulp Drying, Project Manager, ANDRITZ, says, "The equipment we have supplied to Stora Enso comes with the very latest in safety technology and is the safest drying line around."

This fits well with the serious culture Health & Safety rules when working with Stora Enso, and the attention to detail when carrying out this project was very impressive.

"We have the same culture at ANDRITZ when it comes to Health & Safety, which extends beyond our projects and into our technology and equipment."

ANDRITZ statistics from the project, which ran from August 2018 to January 2019 in an outdoor, winter environment involving challenges from heavy lifting to snowy and slippery conditions, amounted to zero accidents, injuries, and medical or first aid treatments.

Kangas adds, "The safety statistics from across this project were very impressive; in fact, the safety record during the project was even better than for the mill itself."

An innovative concept – ANDRITZ Screen Booster – helps any mill upgrade the performance of its Screen Room. The Booster modules – Basket, Bearing Unit, Rotor, and Dilution Rotor – were created to enhance any of four critical components in a screening system. Any one, or all, of these upgrades can be easily installed on a screen as needed, regardless of the original equipment manufacturer.

A BETTER WAY TO BOOST SCREEN PERFORMANCE

The ANDRITZ Screen Booster concept consists of modular upgrades to help a mill achieve the highest performance from its Screen Room. The Boosters provide significant improvements in efficiency, capacity, debris removal, reliability, and energy savings. An ROI on these cost-effective solutions can, depending upon the approach, be achieved in a matter of weeks.

BASKET BOOSTER

The Screen Basket upgrade is a big step toward realizing the full potential of a screen by directly profiting from the most efficient debris removal while maintaining capacity and runnability. This upgrade features the BarTec UTwist basket design, the first and only screen basket that allows adjustment of the profile height along the vertical position of the basket. This ability to adjust the wire permits achieving a perfect balance between runnability and screening efficiency for a variety of screening applications.

In any screening process, the basket's profile height and slot width are crucial for achieving the required debris removal at a desired capacity. Slot accuracy and precision are critical – smaller slots are likely to plug the screen while larger slots allow unwanted debris to find its way into the accept pulp.

By adjusting the UTwist wires, a minimum profile height can be set at the top of the basket (for high debris removal screening efficiency) while increasing the profile height in the reject area to avoid stock thickening, and the risk of higher fiber losses or plugging that often is associated with high thickening factors.

BEARING BOOSTER

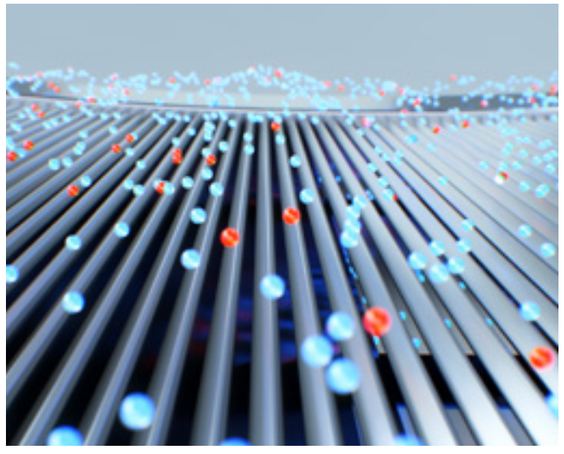
The Screen Bearing Unit upgrade dramatically increases the operating life and reliability of the screen's bearing unit. Since the overall design on the upgraded Bearing Unit is modular, every unit is customized to fit the specific screen in which it is being installed. The Bearing Unit upgrade can be installed on most common screen models.

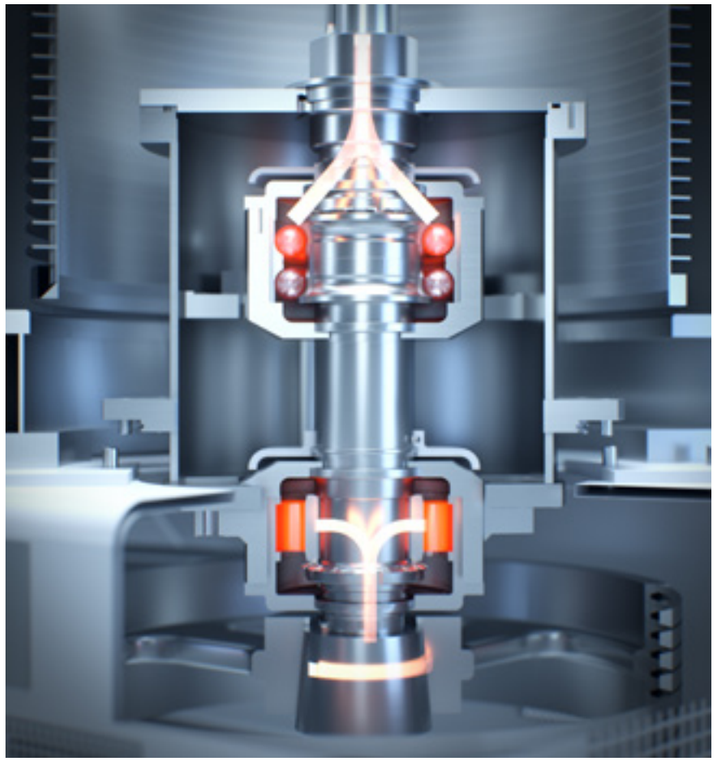
An ROI in terms of less downtime, longer maintenance intervals, and reduced inventory carrying costs for spare parts is often recognized in applications where high production rates, high rotor tip speeds, high motor loads, and high temperatures place additional demands on the screen bearings.

The upgraded Bearing Unit is designed with the shaft package and bearing frame as separate units. Bolted construction enables quick dismantling of the shaft package without removing the frame. The design allows quick and easy access to individual bearings, to reduce downtime and save maintenance costs. Since the shaft package is the only component requiring a changeout, replacement part costs are reduced to a minimum.

The key to the Bearing Unit's extended life can be found in its ability to perfectly balance the radial and axial forces inside the screen. The load on the upper bearings is primarily an axial load from the weight of the shaft and rotor, so inclined ball bearings are used to absorb the forces at their point of origin. Unloaded from axial forces, the lower bearings (floating cylindrical roller bearings) easily accommodate the remaining radial load generated by the motor. The cylindrical bearing design compensates for any thermal expansion of the shaft.

UTwist Screen Basket - the perfect balance between runnability and screening efficiency.





The Screen Bearing Unit Upgrade for increased operating life and reliability.

Protecting the bearings from water leakage is also crucial. The upgraded Bearing Unit uses multiple methods to protect the bearings from contamination. First, there are separate bolted bearing housings and double-acting mechanical seals to prevent water from entering the bearing frame. In addition, rotating deflectors protect the bearing housings inside the frame in the unlikely event of a seal failure. Large openings between the shaft package and the bearing frame allow for any water to be removed, avoiding plugging of drainpipes or water penetrating the bearing housing. Leaked water and grease are collected and discharged by a splash guard to protect the pulley system below.

The splash guard provides a kind of "early warning system" of seal failure, allowing a quick response to potential problems. In addition, the Bearing Unit can be equipped with vibration and temperature sensors for online monitoring.

The unique hydrodynamic shape for high capacity while saving energy.

ROTOR BOOSTER

The Screen Rotor upgrade includes a closed (drum) rotor design with optimized foils to fluidize stock for high capacity while saving energy.

The rotor – an ANDRITZ Drum 400 Dolphin – is a proven performer. It has foils with a unique hydrodynamic shape that has been perfected with sophisticated computer-based simulation tools and proven in hundreds of installations around the world. The ROI from reductions in power consumption compared to a conventional rotor can be quite substantial.

The streamlined foil geometry creates minimal restrictions to stock flow, even at high consistencies. This allows operation of the rotor at a lower speed to achieve the same throughput as a conventional rotor, with lower power consumption. The pressure zone of the Dolphin foil provides optimum flow distribution over the entire screen basket surface, saving energy, while the suction (pulse) zone reduces the thickening effect, keeps the basket clean, and improves runnability.

DILUTION ROTOR BOOSTER

The Screen Dilution Rotor upgrade can be easily combined with the Rotor Booster to minimize expensive fiber losses – increasing yield, minimizing plugging, and reducing downtime for maintenance or operational adjustments. This patented upgrade is available for most common screen types. The Dilution Rotor upgrade addresses two major issues impacting the operation of a pressure screen:

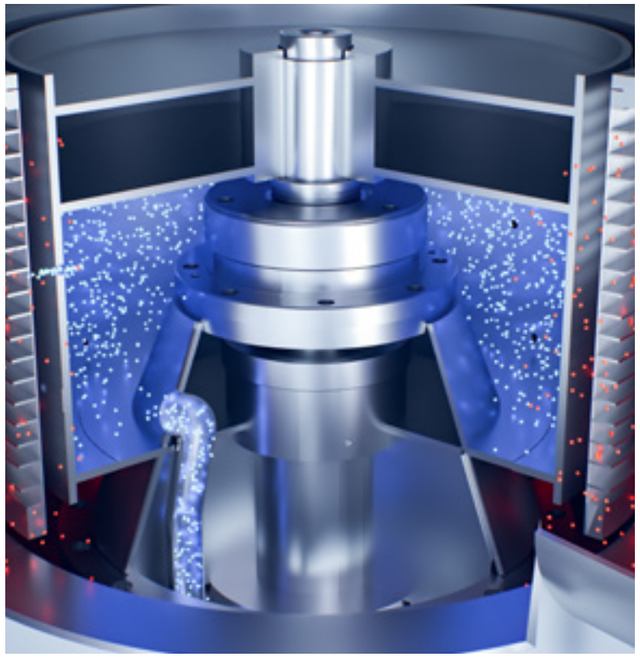
1/ During operation, stock tends to thicken toward the reject end of the screen, which results in fiber loss and lower yield, and can cause plugging of the screen. This thickening effect is more noticeable when running narrow slots, which are often needed to achieve the required screening efficiency.

2/ The vortex created by the screen rotor moves plastics and other contaminants to the center of the rotor and away from the basket. These contaminants can wrap around the shaft and damage the mechanical seal or even the bearing unit.

The Dilution Rotor upgrade manages and controls the stock thickening effect AND protects the rotor interior from damaging contaminants. This is accomplished by adding a dilution pipe and sealing ring to the existing bearing housing.

Dilution water is fed through the dilution pipe into the lower part of the rotor. The dilution water flows through holes in the rotor shell into the screening zone, which reduces the stock consistency before critical thickening occurs in the reject section of the screen. The sealing ring installed in the bearing housing maintains an over-pressure situation to control the dilution water and also prevents contaminants from accumulating inside the rotor.

The Dilution Rotor upgrade manages and controls the stock thickening effect and protects the rotor interior from damaging contaminants.



A BOOST TO PERFORMANCE

Modular upgrades are often the most cost-effective and quick-ROI approaches to enhance screening performance. Sometimes it is obvious where the "weak link" is in the screen (e.g., frequent bearing failures). Other times, a mill may benefit from an audit by an ANDRITZ specialist to determine the components to upgrade.

ANDRITZ has decades of experience with designing and building its own screen brands – as well as optimizing thousands of competitors' screens.

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AN IMMACULATE OPERATION IN GREEN HEAT AND POWER

ANDRITZ recently supplied the very first Bubbling Fluidized Bed (BFB) biomass boiler to the country of Denmark, which will assist in nationwide efforts to reduce CO_2 emissions. The new boiler is installed at Helsingør Kraftvarmeværk's new district heat and power generation plant, which is immaculate in design as well as operation.

View video footage of this report in our augmented reality App!

FOR FURTHER INFORMATION SEE PAGE 3

The first thing that strikes visitors to the brand-new biomass district heating and power plant at Helsingør Kraftvarmeværk's site in Helsingør is the clean, modern design, both inside and out. Architects, artists, and suppliers alike were commissioned and contracted by the company to create a structure and plant that not only delivers but also fits in well with the local environment.

"As we are operating in the middle of an urban area close to the city center, it is important that the power plant sits well in the community from an aesthetic point of view, but also with regards to noise and emissions," says Jens Steffen Hansen, Project Leader, Forsyning Helsingør. "And in general, the Danish population understands the fact that we need to reduce CO_2 emissions – so the new plant here is welcomed by local people.

ANDRITZ's scope of supply included the boiler island, from fuel silos to boiler outlet, based on its Ecofluid BFB boiler design.

"The plant supplies heat and power for thousands of households around the Helsingør area; so at the same time, of course, our main mission is to produce efficient, low-cost district heating to the local population and have the ability to generate electricity to export to the national grid for extra income."

Hansen is speaking from the offices of Forsyning Helsingør, co-owner of Helsingør Kraftvarmeværk, where the plant started up in spring 2019. The ANDRITZ scope of supply included the boiler island, from fuel silos to boiler outlet based on its Ecofluid BFB boiler design that combines high efficiency with excellent environmental performance. The boiler burns wood-based biomass, which consists of forest residues, bark, sawdust, and wood chips, and generates 75 t/h of steam to the turbine. The steam temperature is around 500 °C with a steam pressure of 65 bar (a).

STRINGENT EMISSION CONTROLS

The site is around 25 years old and was formerly utilized for district heating and power generation using natural gas as a fuel. "The decision was taken around 2013 to replace the fossil fuel we were using, mainly due to the local and national ambitions to reduce CO_2 emissions, but also to cut down on expensive natural gas costs."

Helsingør Kraftvarmeværk chose ANDRITZ BFB technology because of its ability to handle the stringent emission demands. Marko Natunen, Director, Engineering and Project Execution, Power Boilers, ANDRITZ, says, "Our BFB technology is the best available on the market for biofuel processing on the scale needed at the Helsingør Kraftvarmeværk plant. Due to the stringent emission controls laid down, it is difficult to control emissions with the common 'grate' technology, which is the type most used in similar-sized power stations in Denmark."

ANDRITZ was able to fulfill the strict requirements regarding emissions for both CO and NOx with the specified biomass fuels and with combustion air humidification. Grate boiler technology is generally not able to meet these tough parameters. The CO emissions needed to be limited to 50 mg/Nm³ (dry 6% O_2), which is exceptionally low for forest biomass fuels. Also, NOx emissions needed to be below 150 mg/Nm³ (dry 6% O_2), which is reached with ammonia injection involving selective

MARKO NATUNEN
Director, Engineering and Project Execution, Power Boilers, ANDRITZ

"Due to the stringent emission controls, our BFB technology is the best available technology on the market for this size of plant."

JENS STEFFEN HANSEN
Project Leader, Forsyning Helsingør

"We are really pleased, as we have achieved our aim to lower CO_2 in and around the city, at the same time as give our customers district heating at a favorable price."

The boiler burns wood-based biomass, which consists of forest residues, bark, sawdust, and woodchips.

The steam temperature is around 500 °C with a steam pressure of 65 bar (a).

Helsingør Kraftvarmeværk specified colors of various equipment for the visual identification of different boiler parts.

non-catalytic reductions in the combustion chamber.

There were other requirements made by Helsingør Kraftvarmeværk, which included a minimum footprint, an inclined wall of the boiler house, special insulation cladding, and specified colors of various equipment for the visual identification of different boiler parts.

"We are very proud of this installation and we have many visitors here, including students from local schools, colleges, and universities who take part in our 'Walk the Science' project, looking at how the physics are applied in the running of a biomass power plant," says Hansen. "It was important that the plant not only looks good but has optimal safety for groups to walk around. We made sure this was taken into account during this project."

THE PROJECT – LOCAL CHALLENGES

ANDRITZ was chosen as the boiler supplier after a tender process in June 2016, which involved other vendors including those with grate technology. "We looked at a few references, including one in Karlstad, Sweden, and it was clear that ANDRITZ has long experience in boiler design and production, and the BFB technology was the right fit for our operation," says Hansen.

The installation of the boiler island started after contracts were signed in 2016 and went very well according to Hansen, who has a lot of experience in the building of biomass power plants around Denmark. "There are always ups and downs during the execution phase of projects like this; however, the management of the engineering was very good and the delivery of the parts in sequence was very impressive. The erection of the boiler happened very fast, with enormous parts being delivered and then put up together very quickly.

"We were also very impressed with the ANDRITZ approach to safety during the project; we could clearly see that it's a subject high on the agenda, as it is in our operations, too."

Natunen adds, "As this was our first boiler delivery to Denmark, there was a lot work to be done on making sure all the certifications and local regulations were adhered to. All countries have different interpretations of certificates and regulations, and you need to have close contact with the local authorities to ensure that the project complies with them.

"Also, Helsingør Kraftvarmeværk threw us some extra challenges on the design front at the execution stage, which we managed to include, but the project went smoothly from our point of view and the cooperation was very good.

"We were quite demanding, and there were times when we asked a lot of ANDRITZ in terms of design changes and putting our own ideas to them," adds Hansen.

→

"If there is an alarm or alert, we simply turn on the iPad and we can manage the whole plant from wherever we are situated, even outside of the plant."

JOACHIM RASMUSSEN
Marine Engineer,
Forsyning Helsingør

LARS FROST
Marine Engineer,
Forsyning Helsingør

"We have been very impressed so far with the plant and it's running very smoothly."

Left to right: Lars Frost, Marine Engineer, Forsyning Helsingør; Jens Steffen Hansen, Project Leader, Forsyning Helsingør; Marko Natunen, Director, Engineering and Project Execution, Power Boilers, ANDRITZ; Joachim Rasmussen, Marine Engineer, Forsyning Helsingør

The power plant is designed to run completely unmanned for up to 72 hours at a time.

The plant is now fully operational and ready for its first winter of operation.

A 72 HR UNMANNED OPERATION

Commissioning and start-up of the plant took place in the period from autumn 2018 to spring 2019 and went well with no major problems. There are now seven people employed to run the power plant, which has been designed and built to operate completely unmanned for up to 72 hours at a time. When the plant is unmanned, it is remote-controlled from the control room of a waste incineration plant at Norfors, located in Hørsholm, 15 km south of Helsingør.

Lars Frost, Marine Engineer, Forsyning Helsingør, says, "It's actually quite common for a power plant to run unmanned for certain amounts of time, particularly when fueled by natural gas. In the case of a biomass plant, it is slightly different as the fuel is not as homogenous, with its different shapes and forms. We have been very impressed so far with the plant and it's running very smoothly."

The new power plant is fitted with the very latest in automation and digital technology. Joachim Rasmussen, Marine Engineer, Forsyning Helsingør, adds, "When we are running unmanned, we take it in turns to be on call should anything go wrong at the plant. If there is an alarm or alert, we simply turn on the iPad and we can manage the whole plant from wherever we are situated, even outside of the plant."

The plant is now fully operational and ready to increase to full load for its first winter of operation where it will provide heat to the local residents and also generate valuable extra electricity. "We are really pleased, as we have achieved our aim to lower CO_2 in and around the city, at the same time as give our customers district heating at a favorable price. The extra bonus for us is that we can now take advantage of the electricity market when prices are high and optimize our earnings capability."

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TIMO KYLLÖNEN
Project Manager,
Power Plant Service, ANDRITZ

ANDRITZ COMPLETE SERVICE FOR BFB AND CFB BOILERS

Operating from Norrköping in Sweden, ANDRITZ provides a dedicated service for BFB and CFB boilers. The center has a complete facility, including design, material storage, and workshop to provide parts and service to our Scandinavian customers.

"Our purpose is to assist customers to extend the life of their BFB and CFB boilers and also to optimize performance," says Timo Kyllönen, Project Manager, Power Plant Service, ANDRITZ. "The center provides services across the board, including upgrading and renewing essential components of bubbling fluidized bed and circulating fluidized bed boilers. The service center also provides expertise in reducing emissions, minimizing corrosion, and integrating challenging fuels."

IN THE MIDDLE OF THE MAPA PROJECT

Arauco's MAPA project in Horcones, Chile is now in full swing; the earthmoving and foundation building has almost been completed and the civil works have started. ANDRITZ is a major supplier to the project and has been closely working together with Arauco, which will see the Chilean company become the third largest producer of eucalyptus pulp in the world. Start-up is scheduled for the first quarter of 2021.

"We are now in the middle of the MAPA project, which is by far the most important project Arauco has ever had, so we are very excited about it. We are making sure we all do our very best," says Patricio Henriquez, Arauco´s Engineering and Construction Division Director.

"Currently, we have more or less 200 people from Arauco working here; this includes our site administration together with all our site supervisors and Health & Safety people. The main goal of this huge project is that it ends with zero accidents, as well as to have a successful project with a smooth start-up."

A seasoned project director, Henriquez, has been working at Arauco for 30 years, taking care of the largest and most important projects related to the company's forest industry product areas. "At the moment we are still in the preparation stage and starting with the civil works. We have already hired the principal and main construction companies and equipment erection will also begin shortly."

ANDRITZ's scope of supply to the project includes a complete wood processing plant, fiberline, black liquor evaporation plant, and complete white liquor plant.

COMMUNICATION IS KEY

"ANDRITZ has been a very good company to work with so far on the MAPA project," says Henriquez. "We learned a lot about how it operates during the negotiation phase, and it is clear that these projects are taken very seriously; at the same time, flexibility is very important, as we need to be flexible, too. We are also happy with the ANDRITZ equipment that has been chosen; our experience at our other mills in Chile and Uruguay make us feel very confident in the technology being provided.

"One thing we have noticed about working with the ANDRITZ team over the many months, since even before this project began, is the communication, which has been excellent. We feel we have a real partner in ANDRITZ, and this communication will be key during the commissioning and start-up phase."

As the project moves into the construction phase, there are more and more challenges as more and more people arrive at the site. "There is going to be a lot of equipment, engineers, and workers coming on to the site during the construction phase and we have to be very careful and work as a team with all our vendors engaged in the project," says Henriquez.

Arauco has prepared a particular procedure for Health & Safety for the MAPA project at the site and work began on plans for Health & Safety some months before the project started. "We are leading from the front, and all people on site have to fulfill exactly what's expected of them when it comes to safety," says Henriquez. "As well as insisting on day-to-day safe working procedures being followed, we also have dedicated plans in case of emergencies, for instance, an earthquake, explosions, or fire. We have regular meetings with all people working on the site, to make sure that the importance of staying safe is an absolute priority."

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FOR FURTHER INFORMATION SEE PAGE 3

RIGHT ON SCHEDULE AS PLANNED

ANDRITZ has a major role in Arauco's MAPA project, with around 1,000 skilled employees and sub-suppliers currently working around the world in all kinds of specialized areas, including, logistics, engineering, and manufacturing.

At this time, there are 10 ANDRITZ people working on site at the MAPA site in Chile with another 40 expected to join over the next year.

"Currently, we are right on the planned schedule," says ANDRITZ Project Director for MAPA, Harri Makkonen. "We are finalizing our engineering according to schedule and all the purchasing of parts and equipment has been completed. Some of the first shipments of equipment have already arrived at the site."

Manufacturing for the project is currently ongoing and ramping up to full scale, with completion of all equipment required scheduled for Q2 2020. The main manufacturing sites for equipment supplied to the MAPA project are located at ANDRITZ, Finland, with other specialist parts coming from several other sites around the globe.

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Patricio Henriquez, Arauco´s Engineering and Construction Division Director and Harri Makkonen, Project Director for MAPA from ANDRITZ discuss the project status and next steps.

A CLINICAL OPERATION WITH MAXIMIZED EFFICIENCY

The production area of Turkish specialist nonwovens producer Sapro is more like a group of clinical laboratories than the production hub of one of the world's largest producers of wet wipes. And it's not just super clean; the company has embarked on a journey utilizing Metris solutions that will see it become one of the most efficient wet wipe producers in the industry.

"This is a very serious business we are in," says Ceyhun Zincirkiran, Managing Director, Sapro. "Our products are used by some of the most important people on the planet – mothers and babies – therefore there is no option for less than perfect products."

Sapro is based in Istanbul, Turkey, close to the new airport, and is one of the top three producers of wet wipes globally. It makes, converts, and supplies some 120 million wipes a day for personal, household, and industrial use. It exports 70% of its production, which goes all across Europe, the Middle East, the US, and Australia.

"So, you might think because this is a niche market that it's an added value area of the hygiene industry, and with good profit margins," continues Zincirkiran, "but actually we are subject to the same market price conditions as any other industry; we are in a commodity business. We have to find ways of making our own margins, and that is why we have to become ultra-efficient in everything we do. This is the only way to create our own decent profit margins."

JetlaceEssentiel hydroentanglement unit with neXjet injector state-of-the-art

eXcelle TT card in 3.75 m working width

Sapro is a company with a history typical of those led by visionary entrepreneurs. Starting out as a supplier for "Fast-Moving Consumer Goods" companies in 1995, Zincirkiran and his partner, joint Managing Director Mehmet Gündogdu, saw other opportunities in which to engage and in 1997, they formed Sapro to enter into the fast-growing wet wipes market, as a converter. "This was a time when there was a shift from cotton pads to spunlace products, and we could clearly see there was an opportunity for us," adds Zincirkiran.

BACKWARD INTEGRATION

Progress was rapid and Sapro grew, adding numerous converting lines for various wet wipe products. The company began consuming a lot of spunlace material from other suppliers and it soon became clear that a move into producing its own spunlace would make real economic sense.

"We have always had the adage here that 'we have to grow'. We have a history of vertical integration with our other companies and we decided that what we really needed to do in this case was to backward integrate and to begin producing our own spunlace material," says Zincirkiran.

For Sapro, there was only one company that first came to mind to supply the spunlace technology for its own production needs, ANDRITZ. Zincirkiran has a long association with the wet wipes industry and knew that ANDRITZ could supply the very best in technology; he says, "In 2016, we gave ANDRITZ a call and started talking. ANDRITZ came and visited us, and pretty quickly we decided to install the very latest in technology for our spunlace production."

ANDRITZ scope of supply for the spunlace line included technology and equipment for web forming, bonding, and drying. For forming, it supplied opening-blending, card chute feeds, and two eXcelle cards. For bonding, ANDRITZ supplied its JetlaceEssentiel hydroentanglement unit with one pre-wetting injector and five high-pressure injectors and a water filtration system. Web drying included a neXocodry energy optimization system for dewatering, a neXdry dryer with two "U-drums", smart heat recovery with an air-heat exchanger.

Spunlace line for production of wipes for hygiene markets

After signing of the contract, the project to install the spunlace line began in August 2016. "We chose the main equipment from ANDRITZ as we knew it was the best, but also we knew we would get good service," says Zincirkiran.

The project, which has been realized by the sister company of Sapro, Lotus, went without too many hitches despite the fact that there was a small space into which the line had to fit. Volkan Yavuz, Sapro's project manager for the installation and now Factory Manager for the spunlace plant, says, "We had to be quite inventive with this installation and, because of space limitations, we had to design the line as a "C" shape as there was not enough length in the building for a straight spunlace line.

"However, the project went according to plan, and within six months of the start of the project we began producing top quality spunlace, and we were up to full speed not long after."

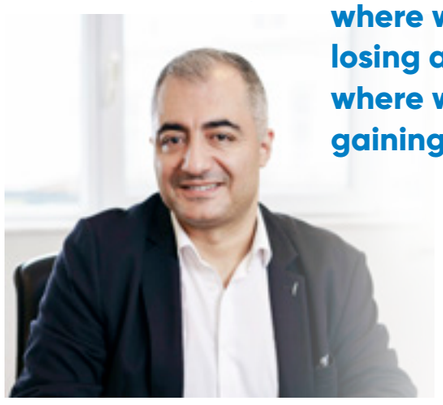
"WE WERE VERY ENTHUSIASTIC ABOUT METRIS SOLUTIONS"

Once up and running and producing top quality spunlace, Sapro began looking for ways to implement its already high standards of efficiency into the line. Zincirkiran says, "We were already using various Industry 4.0 applications in converting lines and other areas of the factory through our management information system; it was the next natural step to apply our knowledge and experience to the spunlace line.

"After the spunlace line had been running successfully for some months, ANDRITZ approached us and demonstrated its Metris portfolio of digital solutions, and asked us if we would collaborate with them and install a system on our spunlace line. We were very enthusiastic as we really do believe that digitalization and data management is the future for us."

VOLKAN YAVUZ
Factory Manager, Lotus

"With Metris UX we can now see at one glance where we are losing and where we are gaining."



André Michalon, Sales Director, Nonwoven Division, ANDRITZ, says, "We asked Sapro to collaborate with us on implementing Metris solutions on the spunlace line simply because they are already speaking the digital language at the production site. We could also see Metris applications making a real difference to efficiencies of operation of the line.

"The Metris UX Platform as a tool is very user friendly and the hardware can be configured within a few weeks. The most important part of implementing the solution is listening to the customer and understanding their expectations. In the case of Sapro, we know the process and technology well, how the company operates, and we could quickly focus on their needs."

REAL SAVINGS

The Metris UX Platform was installed and implemented on Sapro's spunlace line in March 2019. The package consisted of the use of existing sensors installed around the line, installation of new sensors when

Performing filtration system designed by ANDRITZ

"We really do believe that digitalization and data management are the future for us."

CEYHUN ZINCIRKIRAN
Managing Director, Sapro

required, linked to software tools for managing a huge array of process operations, from pumps and motors to PID loops. The system allows operators to see exactly their real time usage of raw material, energy, water, and also maintenance issues, for instance an overheating pump, or a bearing that needs replacing.

"We have only been using the Metris UX Platform a short while, and we are really impressed with the visibility of the operating processes of the spunlace line it has given us," says Yavuz. "At a glance we can clearly see where we are losing and where we are gaining, how much energy and water we are using, and how well all the sections of the line are performing.

"This is a very busy spunlace line, we sometimes have up to 10 or 11 changes of products being made in one day. Before Metris UX was installed, we didn't really know how long a change from one product to another was taking us, but we soon could see that it was around 15 minutes. Using Metris technologies, and analysing data from the line, we could see areas that were slowing the change times down and after some concentration on these areas we have now got the changes down to around five minutes. This is a real saving."

Metris UX is also a viable and real solution for predictive maintenance using a series warning lights and alarms. "Before Metris UX, each area of operation on the spunlace line was down to the expert knowledge of the operator. Now, with the traffic light

ANDRÉ MICHALON
Sales Director, Nonwoven Division, ANDRITZ

Metris
ANDRITZ Digital Solutions

INSTALLING METRIS SOLUTIONS ON AN EXISTING SPUNLACE LINE

Most nonwoven lines are not equipped with central control systems such as SCADA or DCS. However, ANDRITZ can install Metris solutions in any new or existing nonwoven lines and enhance performance thanks to data acquisition and analytics, even starting from single PLCs dedicated to individual machines only.

Whereas a dedicated server and visualization have to be foreseen, it can be virtual units incorporated into the customer's existing IT infrastructure, thus involving no change to the integrity of the customer's IT network other than opening a VPN connection with ANDRITZ. All data remain the property of the customer.

In a nutshell, the Metris UX Platform is very user friendly and the hardware can be configured within a few weeks. However, every nonwoven line is unique, therefore most of the intensive work involved is to listen to and analyze the needs of our customers, in order to properly set the system and data acquisition. ANDRITZ experts are able to implement monitoring of the line within two to three months after an agreement is in place, with identifiable savings in process optimization achievable within three months.

Monitoring system for process supervision

End of line: Jumbo ready to be used in the converting line

neXdry dryer with heat recovery

system of red amber and green, we can tell straight away from the monitor display how each part of the process is performing and if we need to carry out any maintenance. If everything is green, we are happy; if it's amber, we act; the plan is to never get to the red.Metris UX helps us with that."

METRIS – THE FORTUNE TELLER

So far, Sapro is very pleased with Metris UX and the way it has helped identify areas of its production on the spunlace line, but what about the bottom line? Is it going to make a difference when it comes to making the operation more profitable? "This is all about uptime and increasing productivity," says Zincirkiran. "It's early to say what difference Metris UX has made to the bottom line, but already we have identified parts on the spunlace line that could be redesigned to improve productivity; this will help us and, of course, ANDRITZ in their own technology design. So far, we have noted many small wins in productivity and, of course, they all add up.

"This really is the future for improving efficiency at our plant. Even an expert on the line can't be a fortune teller, but Metris UX is our fortune teller. We can see exactly what we are looking at, trends on the line, figures, graphs and tables all in real time, and then act on them."

ENVIRONMENTAL AND SOCIAL RESPONSIBILITY – RIGHT AT THE HEART OF SAPRO OPERATIONS

"The most significant and important trend that we are identifying in the nonwovens market, is the consumers' need for environmentally sound and sustainable products," says Zincirkiran. As "Generation Y" – those born in the 1980s and 90s – start families, they are not only looking for the safest products, they are also looking for the most sustainable ones. Here we are working very closely with our suppliers of raw material to make sure we can deliver on those demands."

This focus on the environment and sustainability also extends right into the heart of Sapro operations, where a close eye is kept on electricity, gas, and water use. "This is another area where Metris UX is helping us win," says Zincirkiran. "We can clearly identify where we are using too much energy and we can also identify the sweet spots where we are maximizing our raw material and energy usage."

As well as environmental considerations, the health and well-being of the 650 employees is of paramount concern at Sapro. As well as providing free meals in a dedicated canteen on a 24-hour basis, all production areas of the factory are completely air-conditioned for the comfort of the employees. "We really do care about the people that work for us here, and we do our utmost to provide a safe and comfortable working environment. Air-conditioning helps us to keep the inside temperature the same throughout the year, particularly throughout our hot summers."

Due to the highly critical and hygienic nature of the nonwoven production at Sapro, the company is subject to over 50 audits a year from both independent and internal auditors, with visits often occurring unannounced at any time. "We have all the top quality certifications here at Sapro, and we never worry about any audits. We have a culture where everybody follows all the rules on hygiene and safety to the letter, all the way across the length and breadth of the company."

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At a glance, the spunlace line operators can clearly see losses and gains in productivity.

The spunlace line at Sapro can have up to 10 or 11 changes of products being made in one day.

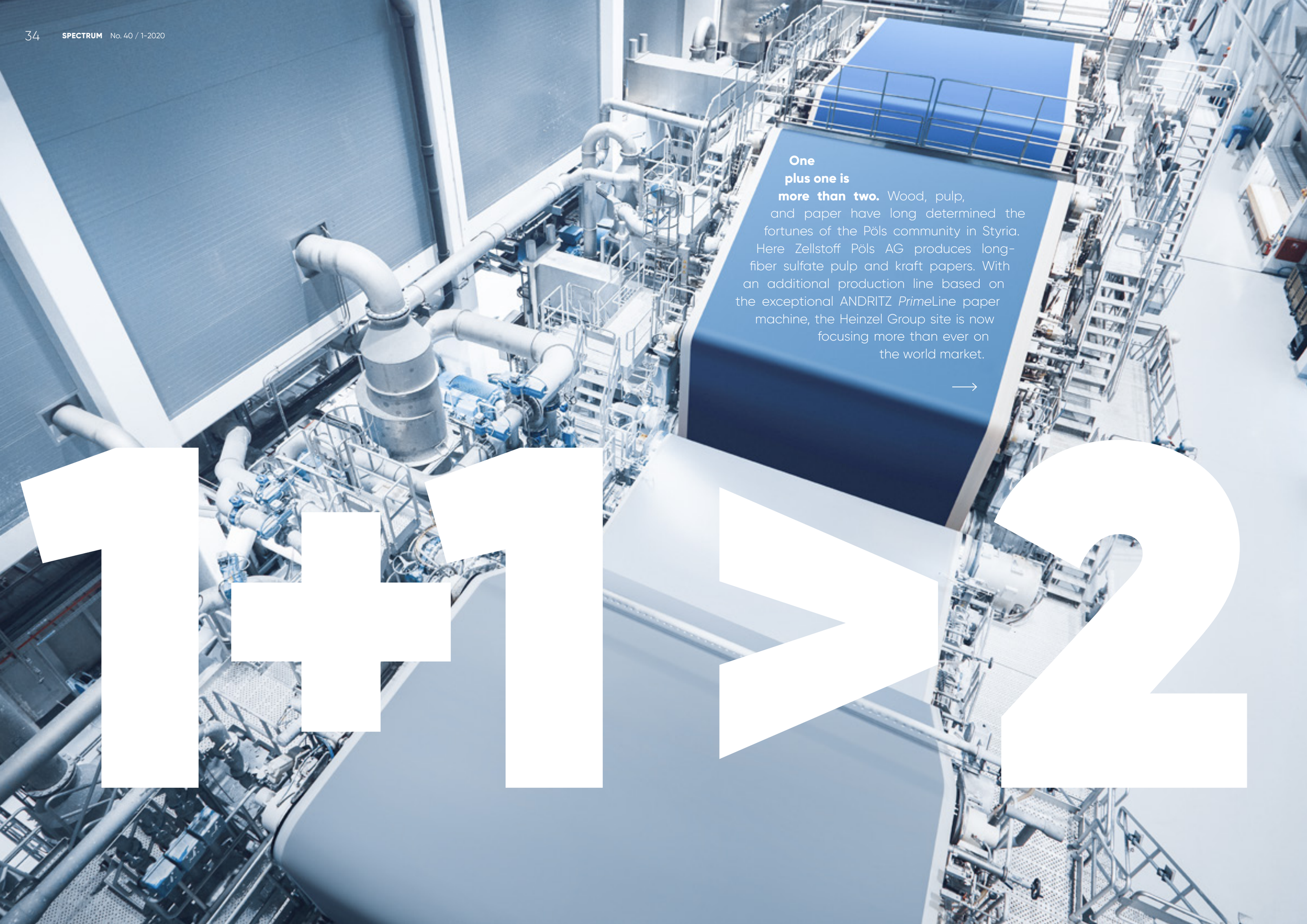
THE FULL ANDRITZ SCOPE OF SUPPLY AT SAPRO

WEB FORMING:
- 2 TMS: Fiber reserve silo: 1.75 m working width
- 2 TCF: Card chute feed: 3.75 m working width
- 2 Servo-X: Card input auotoleveller
- 2 eXcelle TT cards (type S56TT): 3.75 m working width

WEB BONDING:
- 1 JetlaceEssentiel: Hydroentanglement unit with 1 pre-wetting injector and 5 water-needle injectors
- 1 Water filtration system (including a water high-pressure system): 160 m³/h
- 1 Supervision system

WEB DRYING:
- 1 neXocodry energy optimization system for dewatering (moisture content at the inlet of the dryer can be reduced up 15%)
- 1 neXdry dryer with 2 U-drums
- 1 dryer heat recovery: One air-air heat exchanger collecting the energy of the dryer dumped air and pre-heating the dryer make-up air

METRIS UX PLATFORM



One plus one is more than two. Wood, pulp, and paper have long determined the fortunes of the Pöls community in Styria. Here Zellstoff Pöls AG produces long-fiber sulfate pulp and kraft papers. With an additional production line based on the exceptional ANDRITZ *Prime*Line paper machine, the Heinzel Group site is now focusing more than ever on the world market.

→

ANDREAS RAUSCHER
CEO
Zellstoff Pöls AG

"We have a strong intention to achieve together something extraordinary at all levels of cooperation, whether in management or in technology."

Mountains, forests, trees. Earthy brown and lush green. Visitors to Pöls can already sense from a distance what the heartbeat of the small community in Styria feels like. And the closer they get to the factory buildings and towers of Zellstoff Pöls AG rising into the sky, the more certain they become that Austrian Heinzel Group's mill – where long-fiber sulfate pulp and kraft papers are produced – has shaped the fortunes of the town and region for many decades.

More than 500 people work at the site, and signs are pointing towards further growth. After a *Prime*Line MG paper machine from ANDRITZ, PM2, went into operation back in 2013, another even more powerful machine, PM3, followed in the summer of 2019. With this machine, production has taken a giant step forward; capacities have increased from 100,000 tonnes to 200,000 tonnes of white kraft paper per year. This marks the dawn of a new era for Zellstoff Pöls AG. It has finally become a global player, marketing its "STARKRAFT" brand across emerging markets worldwide. Zellstoff Pöls AG actively contributes to solutions for sustainably packaged food as their importance grows in supermarkets and fast food restaurants.

ANDRITZ is assisting the company in its aims. "We have a strong intention to achieve together something extraordinary at all levels of cooperation, whether in management or in technology," says Andreas Rauscher, CEO of Zellstoff Pöls AG. "ANDRITZ does not simply supply machines, but also supports us in the role of consultant and system supplier from the first to the last moments of a project. The formula 'one plus one is more than two' really does apply to the relationship between our two companies."

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PM3 – MACHINE DESIGN AT A GLANCE

- Annual capacity 100,000 t
- Design speed 1,400 m/min
- Working width 5.4 m
- MG papers for flexible packaging and release: 20–70 g/m²
- Commissioning: 05/2019 – two weeks ahead of schedule

WERNER HARTMANN
Managing Director
Starkraft, Business Unit of
Zellstoff Pöls AG

"Due to their low basis weight, these paper grades are environmentally friendly and have a very good price-performance ratio."

Five TwinFlo disc refiners enable smooth and efficient refining.

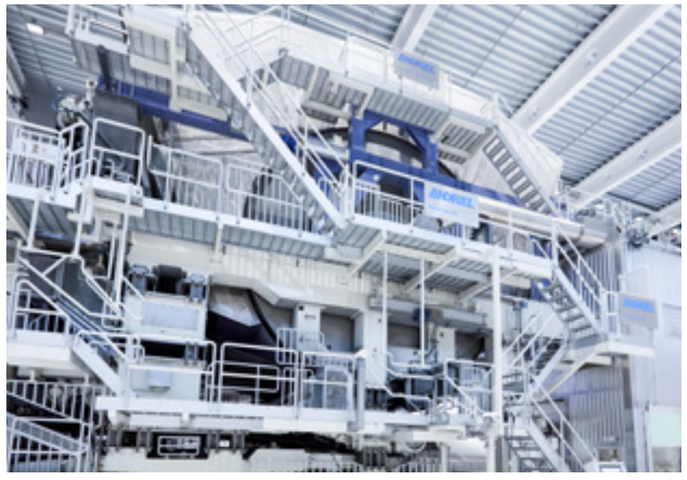
KEY COMPONENTS IN STOCK PREPARATION:

- Vertical Screw Thickener (VST)
- FibreSolve FSV pulper
- Five TwinFlo disc refiners
- Five-stage cleaner system
- Five ModuScreen screens in stock preparation and ShortFlow approach flow system

Five-stage cleaner system for the new PM3

ERWIN HOLZINGER
Senior Project Manager PM3
ANDRITZ AG

"From the transport of the Yankee halves to the start-up of the complete production line: a really impressive project!"



The 24 ft MG steel Yankee is the largest of its kind worldwide.

Based on the unique ANDRITZ engineering and logistics concept, the Yankee was transported in two halves and assembled on site.

A SPECIAL MACHINE CONCEPT

The PM3 project launched in August 2017 bears witness to this. As with PM2, ANDRITZ developed and supplied the new production line, including stock preparation and approach flow system, automation technology, process pumps and, of course, the paper machine itself.

PM3 went into operation at the end of May 2019, two weeks before the scheduled project date, and has since been producing kraft paper for a wide range of packaging applications as well as release papers. With an annual capacity of 100,000 tonnes, a design speed of 1,400 meters per minute, and a working width of 5.4 meters, it is the largest machine of its kind in Europe.

The customized concept, which is characterized by efficient refining, a specially designed wire section, and a closed draw press, among other elements, is unique. The configuration allows flexible production of paper qualities with maximum strength, high printability, and low basis weight. "PM3 specializes in high-quality papers with basis weights of less than 28 g/m², thus perfectly complementing PM2," says Werner Hartmann, Managing Director Starkraft, Business Unit of Zellstoff Pöls AG. "Due to their low basis weight, these paper grades are environmentally friendly and have a very good price-performance ratio. This is precisely why our customers in growth markets are increasingly asking for these grades."

Some special machine components are required to produce MG paper. An impressive component is the high-precision steel Yankee, where the paper is dried and the required surface property of the paper is created. The "*Prime*Dry MG Steel Yankee" from ANDRITZ, with a diameter of 7.315 meters and a weight of 200 tonnes, is the largest of its kind worldwide. "Logistics was one of the most exciting phases of the project," recalls Siegfried Gruber, Head of Project Engineering at Zellstoff Pöls AG. "On August 4, 2018, the individual parts were brought to the site on trucks on the interstate freeway as scheduled before being welded together by ANDRITZ experts on site in the weeks that followed. In November, a huge, special crane lifted the Yankee into the machine hall."

MG cylinders (Yankees) made of steel have significant advantages over cast iron models. Due to the elasticity of the steel, spontaneous fracture is impossible. Furthermore, up to 10% higher heat transfer is achieved. "The extremely large diameter of the Yankee is of central technological importance. This ensures that the paper remains on the hot surface of the Yankee for the required dwell time, even at maximum production rates, in order to produce the smoothness typical of MG papers," explains Gruber. "The effort has been well worthwhile as both the drying performance achieved and the smoothness of the paper are very good."

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FOR FURTHER INFORMATION SEE PAGE 3

"The effort has proved to be highly beneficial as both the drying performance achieved and the smoothness of the paper are exceptional."

SIEGFRIED GRUBER
Head of Project Engineering
Zellstoff Pöls AG

SUCCESSFUL START, GOOD PROSPECTS

Another innovative component is the Vertical Screw Thickener (VST). Due to its vertical design, the VST has a small footprint and takes up relatively little space. The vertical design has additional advantages; pulp fed in from above is dewatered by means of gravity and additional mechanically caused pressure. The entire available screening area at the bottom of the screw is fully used – resulting in high efficiency; the VST dewaters the pulp in Pöls from an inlet consistency of 3% to up to 30% at the outlet – a peak value.

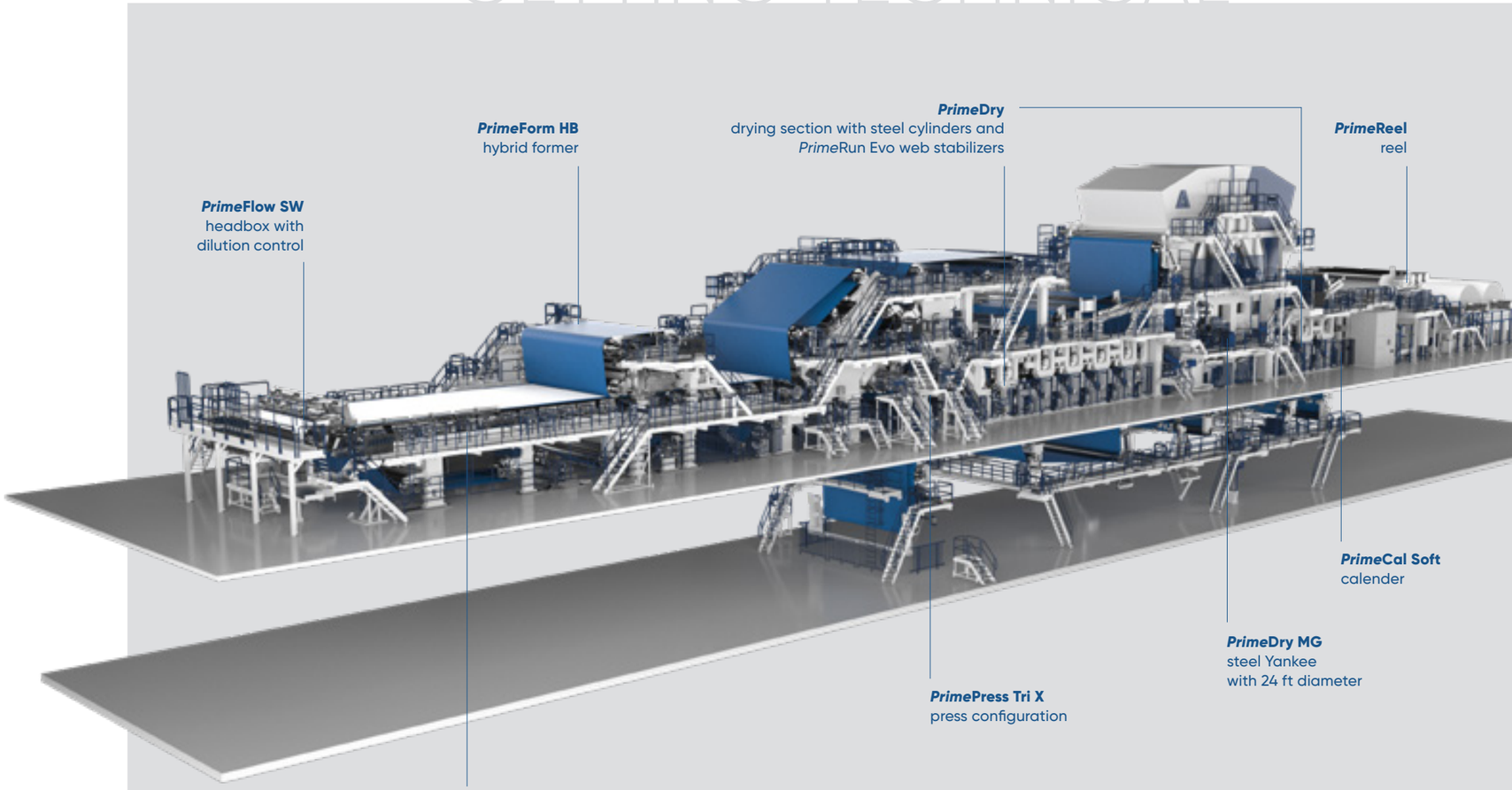
And there's a further aspect; the water circuits of the pulp mill and the paper machine are separated from each other. The VST is located just before the storage tower that supplies PM2 and PM3. The filtrate removed from the screw press is returned to the pulp mill where it is reused. The dewatered pulp is then diluted to 12% with hot water from the paper machine. It worked smoothly right from the beginning. This great start is certainly also due to the preliminary tests carried out at the ANDRITZ Stock Preparation Pilot Plant in Graz.

ZELLSTOFF PÖLS PM3 VERTICAL SCREW THICKENER (VST)

INSTALLATION OF NEW ANDRITZ DEWATERING TECHNOLOGY

- Located before the pulp storage tank that feeds the PM2 and PM3
- Enables separation of pulp and paper mill water loops
- Screw press with vertical configuration
- Dewaters pulp suspension from 3% inlet to 25-30% outlet consistency
- Previous tests in the Stock Preparation Pilot Plant, Graz

GETTING TECHNICAL



"The good water circuit separation between pulp mill and paper machines is highly important as a shared water circulation could lead to problems. The system has been running without issues since the start and meets our expectations!"

JÜRGEN RIEGER
Paper Production Manager
Zellstoff Pöls AG

The forming section is equipped with a hybrid former.

Pre- and after drying section features steel cylinders for efficient heat transfer and web stabilizers for a stable paper run.

Which raises the general questions of how PM3 has performed in the first five months of operation and expectations for the future. "We haven't completed all of the performance tests yet, but our experience has been very positive so far," says Jürgen Rieger, Chief Operations Manager Zellstoff Pöls AG. "The start-up phase was impressive. Operation is very stable, and the paper grades with basis weights between 20 and 52 g/m² were produced successfully. We are optimistic that the machine will also run well under full load."

Nevertheless, this is by no means the end of the story. In Pöls, there are a number of considerations as to how paper production can be further optimized, for example, by increasing use of digitally supported tools, Big Data, algorithms, and Machine Learning. ANDRITZ offers its Metris solutions as a partner, especially as these products are already being used in the stock preparation plant at Pöls. In papermaking, they could also increase efficiency by using sensors to collect and statistically analyze real-time process variables in order to initiate additional improvements directly in operation. Without a doubt, the PM3 marks a milestone for Pöls.

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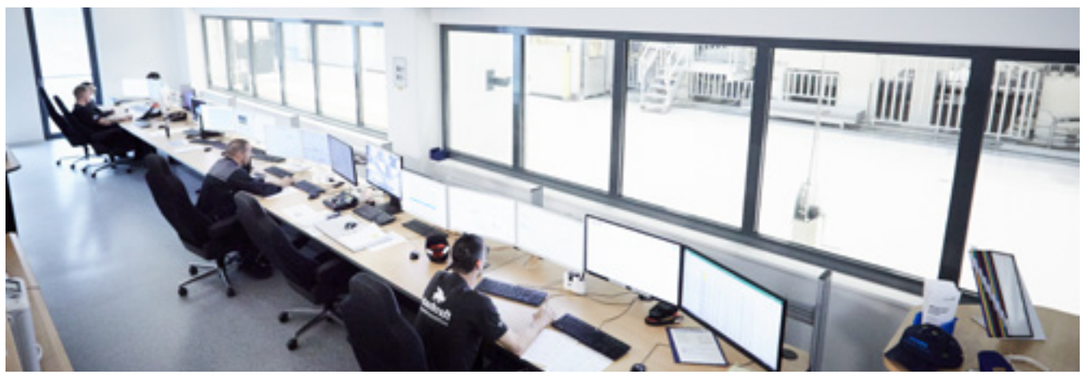


THE COMPANY: HEINZEL GROUP AND ZELLSTOFF PÖLS AG

With its industrial companies Zellstoff Pöls and Laakirchen Papier (Austria) as well as Raubling Papier (Germany) and Estonian Cell (Estonia), the Heinzel Group is one of the largest manufacturers of market pulp, specialty and magazine paper, and corrugated base paper in Central and Eastern Europe. Zellstoff Pöls AG generated annual sales of around 324 million euros in 2018. It is the largest manufacturer of high-grade, elemental chlorine-free, bleached, long-fiber sulphate pulp in Central and Southeastern Europe. Pulp is brought to market with the brand name "ORION", white kraft paper with the brand name "STARKRAFT".

"THIS IS RARE"

In Spectrum, we often have the privilege of reporting on new technological breakthroughs. But in this article about upgrading BM1 at PJSC Kyiv Cardboard and Paper Mill in Ukraine, that is not so much the focus. The new shoe press and calender from ANDRITZ have brought gains, true, but what was arguably most interesting in this case was…

The upgraded press section on BM1 has a new geometry and increased capacity, with a new ANDRITZ *Prime*Press X shoe press in the original second position.

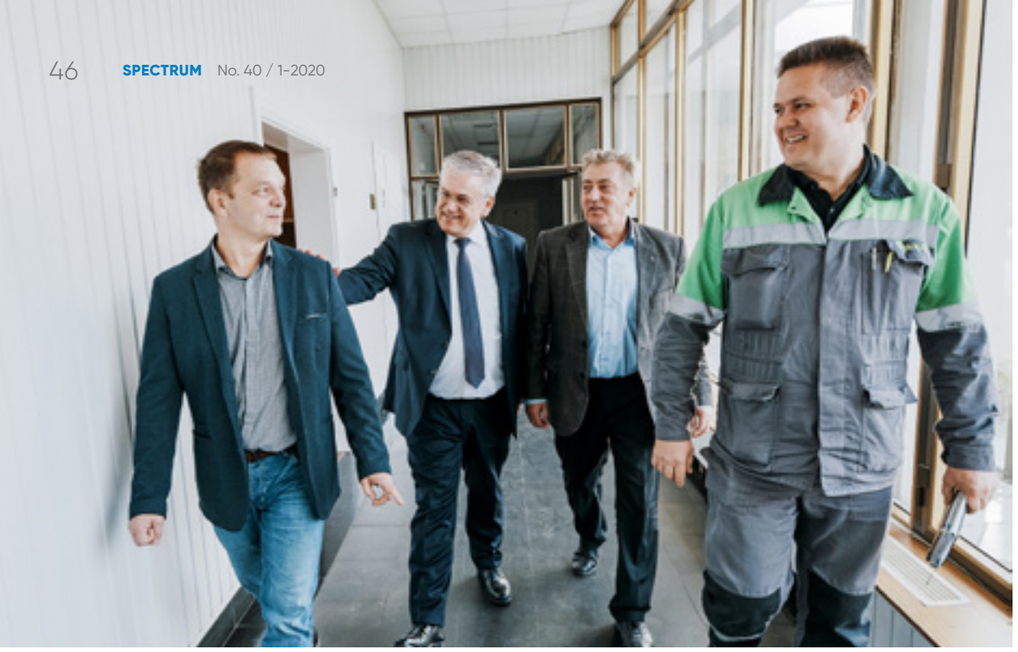
"We didn't need guarantee runs."

So says Aleksandr Yakovina, Quality Director at the mill, where he started working on BM1 three decades ago.

In this case, we are talking about a 37-year-old machine, one of four identical board lines built during the Soviet era - two in Russia, and two in Ukraine. With a working width of 4.2 m, BM1 produces white-top liner and white-lined chipboard (GD2 & GD3) in a basis-weight range of 125–420 gsm, combining with the mill's BM2 to turn out up to 240,000 tonnes per year of packaging paper and board. The mill sells these in almost 30 countries in Central and Eastern Europe, Asia and Latin America, with customers including Unilever, Nestle, and McDonald's.

PROBLEMS SOLVED

Yakovina explains, "We are trying to continue modernizing step by step to reflect market requirements, e.g., BM1 is starting to produce lots of products in low grammages (150-200 gsm) for flexographic printing." In this respect, the upgrade to the press section in early 2019, as Yakovina says, "has improved all of the low grammages, as well as enabling us to make lighter-weight grades in the 150-180 gsm range."



"Normally, it takes six or seven months to acceptance. Here it only took three."

GEORG-MICHAEL SAUTTER
Senior Sales Director
Paper & Board, ANDRITZ

(Left to right) Aleksandr Kravchenko, Georg-Michael Sautter, Aleksandr Yakovina, and Vitaly Solovyov

What is perhaps most remarkable about Yakovina's claim that guarantee runs were unnecessary is that this was not an easy project.

According to Aleksandr Kravchenko, the mill's Chief Technical Officer, "It was a tough start-up." The mill planned a 21-day shutdown for the project (from last paper to first paper), with three of those days set aside for the start-up. As Yakovina explains, "There are problems to be solved in every start-up" and, in this case, that meant "we eliminated some threading issues in the press section and into the dryers."

Georg-Michael Sautter, Senior Director Sales, Paper & Board, ANDRITZ, says, "What I remember most was that during the installation we had meetings every morning and the team leader came to me calmly, gave me a notebook and pen, and said 'Write that down [Sautter's recommendations] and I will communicate it to our specialists.' Every morning, we solved some issues."

Indeed, Yakovina confirms, "We solved all of the problems and started up on schedule." And, the machine achieved the contracted values for dryness, bulk, and smoothness right away.

YOU'VE GOT TO HAVE FAITH

Georg-Michael points out, "Normally, it takes six or seven months to acceptance." In this case, the more than 30-year industry expert explains, "It only took three." All of which brings us back to Yakovina saying there was no need for guarantee runs. He explains why, "We saw that all the contract values were being achieved in normal operation, so we didn't need to do a warranty test run. This is rare." Vitaly Solovyov, Chief of Cardboard Production at Kyiv, adds, "This depends on the supplier's experience."

And the Kyiv team had seen plenty of evidence of ANDRITZ's experience. Before going ahead with this upgrade, they visited one of the identical BMs (at Naberezhnye Chelny in Russia - twice), as well as Reno di Medici in Arnsberg, Germany and the Iggesund mill in Workington, UK (see Spectrum 2/2016).

IT'S COMPLICATED

That led to the green light for this several million Euro project, and while there may not have been any world firsts involved, that is not to say that there were no points of technological interest. Sautter notes, "The press section wasn't simple. Look at the space and the height. Plus, we used bigger rolls and new sheet-feeding technology - the project was a real challenge. The tough part is that you're going into an existing plant – you have to take account of all the parts that are already there. It's much harder than building it new."

This part of the upgrade involved ANDRITZ moving the existing 1982 press from the second to a newly-created third position, while installing a new ANDRITZ *Prime*Press X shoe press in the original second position, between the two original presses. The special shoe design delivers gentle dewatering and preserves bulk, while reducing steam consumption and cleaning time. Besides that, "The shoe press has some unique features," explains Sautter, which include "a patented solution that doesn't cause belt wear, so the belt doesn't need to be moved to prevent wear." But the key point of this upgrade was reduced energy consumption, and steam use in BM1's rebuilt press section is now down by 20%. The upgrade was future-orientated, as Yakovina points out, "This is the first step in a whole modernization concept. The aim was to reduce energy consumption and we succeeded. Now, if we raise the capacity of the machine in the future, we will need to use less energy."

On that subject, the press section upgrade has increased the potential capacity of that part of the machine to 800 m/min, and the next bottleneck is the 7-stage mould cylinder former section, which is currently maxed out at 450 m/min. The

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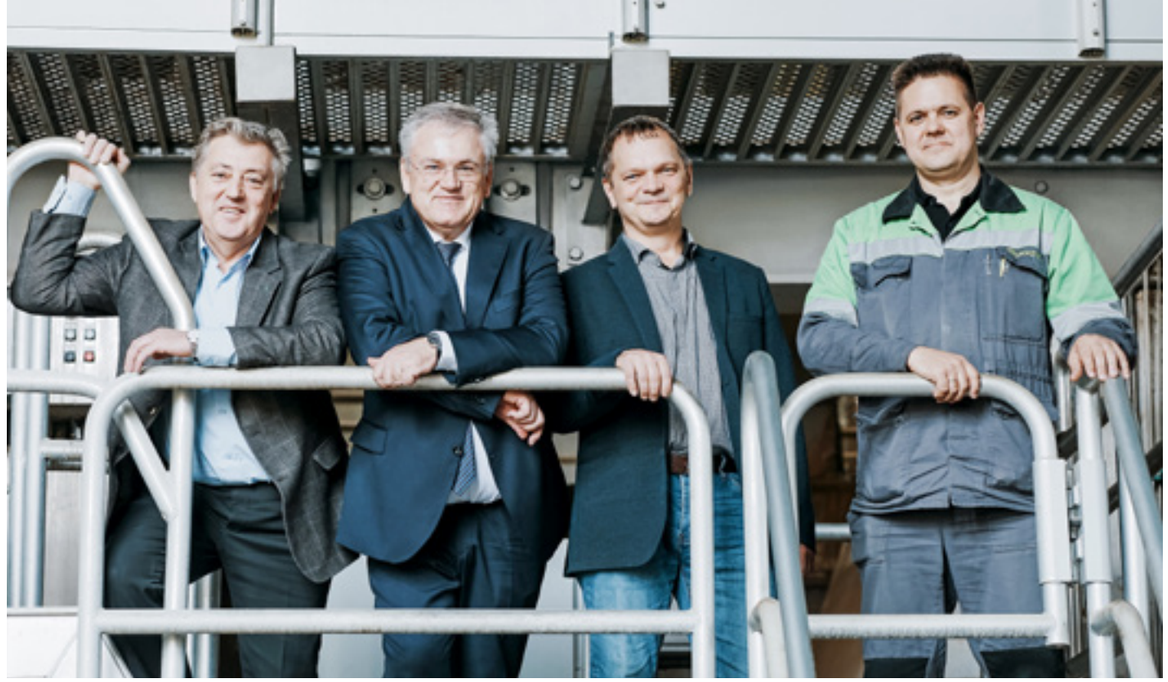
BM1 produces white-top liner and white-lined chipboard in a basis-weight range of 125-420 gsm.

BM1 and BM2 together produce up to 240,000 tonnes of packaging paper and board per year.



The new *Prime*Cal Hard hard-nip calender from ANDRITZ achieved the agreed smoothness parameters soon after start-up.

short-term aim is to install an 8th vacuum former, so the machine will be able to run less mass per former, and therefore raise the running speed. This is expected in February 2020. The mill then plans to rebuild the whole wire section into a four-drinier section in a later investment.

In contrast to all the planned and completed changes in the wet end, the Soviet-designed dryer section will not be re-designed. It uses 95 cast-steel cylinders arranged in 8 groups, with 93 drying and 2 cooling. Although these have all been running since the mill's start-up in 1982, there are no plans to replace these – as Sautter explains, "Steel cylinders can last for over a century." However, the steam and condensate system will likely be upgraded at some stage in the future.

CALENDER DATE

In the calender section, ANDRITZ installed a new *Prime*Cal Hard hard-nip calender to provide a consistent CD caliper profile, bulk control, and a smoother surface finish. Yakovina explains that the resulting consistent board geometry is key for flexographic printing. And the 200 °C calender also had a target of delivering roughness in a range of 2.5-3 pps (Parker Print Surf), especially on low grammages. Sautter says, "There was nothing unusual in the calender, but we delivered it, installed it, it ran and it achieved its smoothness targets – it worked."

Also part of the upgrade by ANDRITZ was an extension of the automation system on BM1. Although Sautter admits this is a normal part of any major upgrade, Yakovina adds that in this case, it "helped us to achieve stable quality."

HISTORY LESSONS

Besides the techno-industrial aspects of this project, both ANDRITZ and the Kyiv mill's team seem very focused on people.

Yakovina says, "The most interesting thing for me was when ANDRITZ told us its history during the negotiations. I like very much that ANDRITZ honours its history. For example, if you go to different departments, ANDRITZ seems to keep hold of all of its knowledge and pass it on to new people from generation to generation." Which is key, as Yakovina continues, "An important factor is to have the appropriate technical personnel to solve technical problems. I have worked on many modernizations and, frankly, there is no company or project that doesn't have some sort of issue. The question is, how do they communicate and help us solve it? If problems arise, ANDRITZ doesn't leave us alone; they give us advice. Every time there is good communication. In the end, everyone was satisfied."

Solovyov adds, "All of the preparatory work and project realization was good, with a high-level quality of work and experienced people. If there were any questions, they got solved very fast. It's not difficult when everyone is experienced."

CONTACT
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"This is the first step in a whole modernization concept. The aim was to reduce energy consumption and we succeeded."

ALEKSANDR YAKOVINA
Quality Director,
PJSC Kyiv Cardboard and Paper Mill

VITALY SOLOVYOV
Chief of Cardboard Production,
PJSC Kyiv Cardboard and Paper Mill

"All of the preparatory work and project realization was really good, with a high-level quality of work and experienced people."

A DAY IN THE LIFE OF...

... HARRI MAKKONEN

Workplace: Concepción and Arauco, Chile
Position: Project Director, Arauco MAPA

Harri Makkonen took over as Arauco MAPA Project Director for ANDRITZ on October 1, 2018. In July 2019, Makkonen moved to Concepción, Chile, together with his family after accepting the demanding challenge of being ANDRITZ Project Director for Arauco's huge MAPA project. Makkonen's family includes his wife Susanna and his 18-year-old daughter Matilda. Both support him in every way they can, and Makkonen is delighted to have his family with him in Chile.

Arauco's MAPA project is not only the most important expansion the company has ever undertaken, it is also the only eucalyptus pulp project in progress anywhere in the world at the moment. After start-up in 2021, Arauco's Mill in Horcones will be the most modern mill operating in the 21st century.

AUGUST 29, 2019

A DAY IN THE LIFE OF HARRI MAKKONEN, ANDRITZ PROJECT DIRECTOR FOR ARAUCO MAPA

08:30 // APPOINTMENT AT THE REGISTRATION OFFICE IN CONCEPCIÓN

Today, the Makkonens have a special topic to discuss: Daughter Mathilda needs to complete her final registrations regarding her stay in Chile, which is trickier than expected. Since Makkonen and his family moved to Concepción, nearly every day is different, and there are some challenges that have to be resolved. The family was pleased to accept this opportunity to move to the other side of the world together, and they are all looking forward to the next two years in Chile.

10:30 // WEEKLY APPOINTMENT WITH THE PROJECT TEAM

The ANDRITZ project team come together weekly for a review and outlook meeting. If there are any problems or challenges to resolve, the team can decide together on any action needed. Additionally, there is also an important steering committee meeting this week in Santiago with the senior management from both Arauco and ANDRITZ . So the team needs to prepare a project status report.

14:30 // SITE INSPECTION

Makkonen meets with Patricio Henriquez, Arauco's Project Director for MAPA, nearly every day to keep pace and strengthen contact with all the people working at the site. The main goal for both ANDRITZ and Arauco is to make sure that both teams are working as one to ensure a successful, zero-accident project. ANDRITZ has nearly 300 employees working directly on the project.

13:00 // LUNCH IN THE CANTEEN

16:00 // GENERAL OFFICE WORK, REVIEW WORKING DAY

Before the end of his working day, Makkonen reviews all the important points he has covered with his project team and the project team from Arauco. He defines the next tasks and prepares everything for the next day. This daily routine enables him to rethink everything that was discussed during the meetings and maintain an overview of the various outcomes of such a busy day.

07:00 // CONFERENCE CALLS TO FINLAND

Makkonen starts his day with conference calls to his colleagues back home in Finland, who operate from various ANDRITZ offices and manufacturing plants. Due to the time difference between Chile and Finland, it is the best time to discuss any important topics relating to the MAPA project and any equipment being manufactured or shipped. After early morning calls, he enjoys a quick breakfast with his family.

10:00 // ARRIVAL AT THE ARAUCO MAPA FACILITY

After arriving at the Arauco mill, Makkonen starts his day with general office work. As the Project Director for ANDRITZ, he is in charge of the entire operation on site. Arauco did an excellent job in providing office buildings for all the project teams on site, where ANDRITZ is also located.

11:30 // MEETING WITH ARAUCO PROJECT TEAM

Makkonen and his team also have a formal meeting once a week with Arauco's project team to ensure that everyone is up-to-date and informed about the project. Important issues in the current phase of the project are basically the shipping and logistics plans for delivery of the equipment to the site. Furthermore, safety and emergency plans are always important issues and are discussed during these meetings.

18:00 // SPANISH LESSONS WITH THE FAMILY

Since the Makkonen family has not been in Chile for long, they spend time focusing on learning the local language together. It will be two exciting years here for them, but they are all in this together and would like to learn as much as possible during this time. The stay will be an excellent opportunity to immerse themselves in the local culture, and language skills will certainly help the family achieve that.

View video footage of this report in our augmented reality App!

FOR FURTHER INFORMATION SEE PAGE 3

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Key Equipment:
THE CASE FOR CONVENTIONAL T HINKING

ANDRITZ is regarded as an innovator in developing technologies for the manufacture of premium tissue grades that are in high demand today. Yet the majority of the world's tissue is produced using conventional dry-creping techniques. To serve this large market, ANDRITZ continually enhances the reliability and performance of its "standard" technology.

View video footage of this report in our augmented reality App!

FOR FURTHER INFORMATION SEE PAGE 3

ANDRITZ is the number one supplier of tissue machines in China, where it all began with the first tissue machine at Hengan – the company now operates 13 ANDRITZ machines.

ANDRITZ has long recognized the importance of this foundation and has built upon it. ANDRITZ has invested a great deal of R&D work – with the inauguration of the pilot plant in Graz – in the development of new technologies for the production of texturized and TAD paper grades. Nevertheless, ANDRITZ also recognizes the importance of the conventional tissue machine, which is still a highly engineered machine worthy of respect.

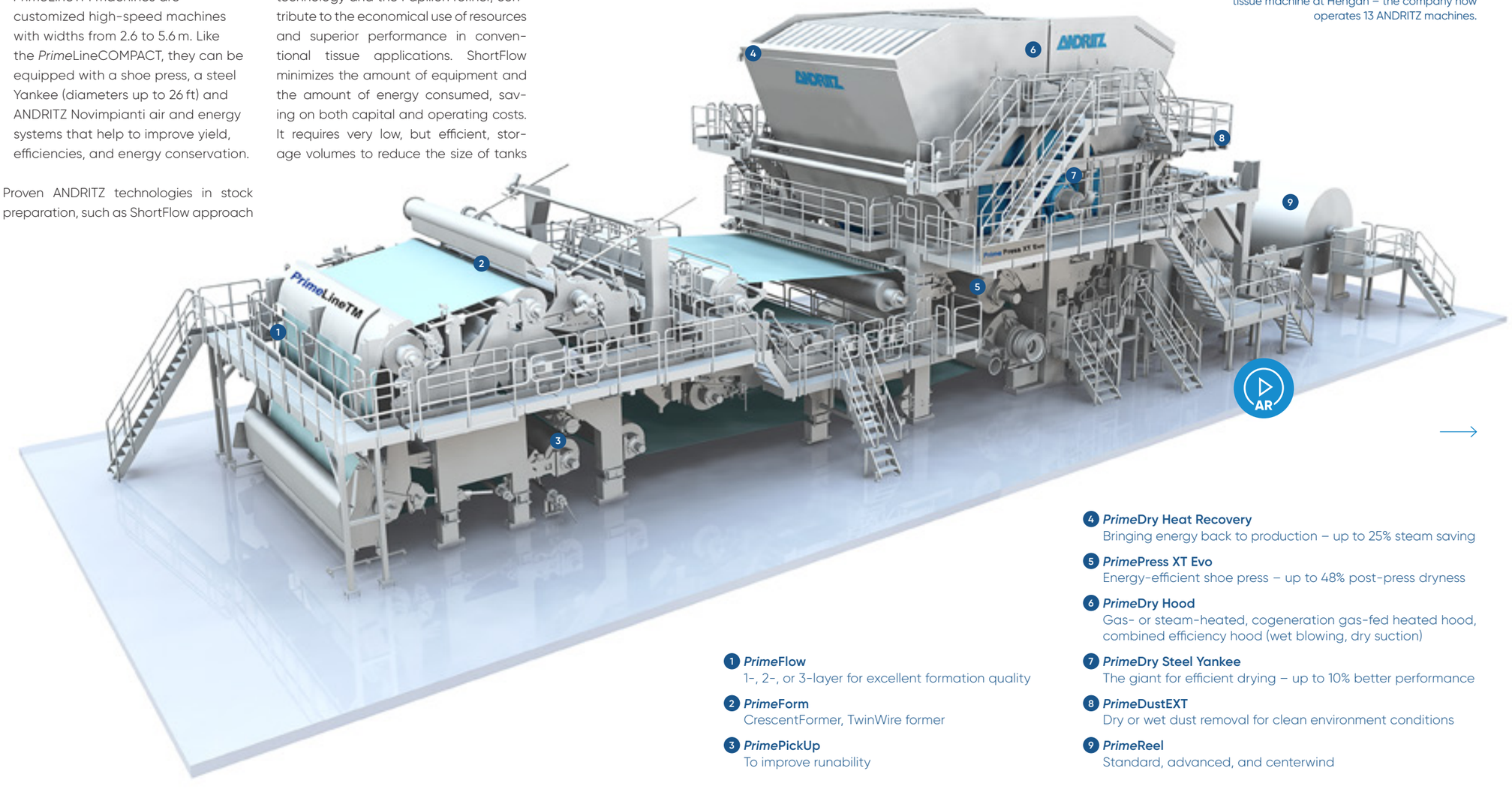
FULL LINE OF DRY-CREPING SOLUTIONS

Today, ANDRITZ is among the top three tissue technology suppliers in the world and the number one supplier in China, where it all began with the first tissue machine at Hengan – the company now operates 13 ANDRITZ machines. Further installations have taken place at almost all major Chinese tissue producers.

With this solid foundation, the company continues to improve the performance and cost-efficiency of its dry-crepe product technologies *Prime*LineCOMPACT and *Prime*LineTM which are available in a variety of widths and capacities:

- *Prime*LineCOMPACT machines are ideal for producers who appreciate a standardized, modular approach that reduces engineering, transport, infrastructure, installation, and start-up costs. The COMPACT machine ensures a certain throughput and production quality in a streamlined, cost-effective package.
- *Prime*LineTM machines are customized high-speed machines with widths from 2.6 to 5.6 m. Like the *Prime*LineCOMPACT, they can be equipped with a shoe press, a steel Yankee (diameters up to 26 ft) and ANDRITZ Novimpianti air and energy systems that help to improve yield, efficiencies, and energy conservation.

Proven ANDRITZ technologies in stock preparation, such as ShortFlow approach technology and the Papillon refiner, contribute to the economical use of resources and superior performance in conventional tissue applications. ShortFlow minimizes the amount of equipment and the amount of energy consumed, saving on both capital and operating costs. It requires very low, but efficient, storage volumes to reduce the size of tanks



1 ***Prime*Flow**
1-, 2-, or 3-layer for excellent formation quality

2 ***Prime*Form**
CrescentFormer, TwinWire former

3 ***Prime*PickUp**
To improve runability

4 ***Prime*Dry Heat Recovery**
Bringing energy back to production – up to 25% steam saving

5 ***Prime*Press XT Evo**
Energy-efficient shoe press – up to 48% post-press dryness

6 ***Prime*Dry Hood**
Gas- or steam-heated, cogeneration gas-fed heated hood, combined efficiency hood (wet blowing, dry suction)

7 ***Prime*Dry Steel Yankee**
The giant for efficient drying – up to 10% better performance

8 ***Prime*DustEXT**
Dry or wet dust removal for clean environment conditions

9 ***Prime*Reel**
Standard, advanced, and centerwind

ANDRITZ Papillon refiner with its compact cylindrical rotor design

and allow for fast grade changes on the machine. For refining, the Papillon refiner has a compact cylindrical rotor design. Energy savings can be quite significant when compared to competitive refiners, and the fiber is properly treated over the entire refining area.

One of the more recent innovations in stock preparation, the *Prime*Screen X, improves energy consumption, screening efficiency, and ease of maintenance. This new screen has a top feed stock inlet and a new *Prime*Rotor configuration with new rotor foils to offer unique benefits.

Machine and mill automation are addressed through ANDRITZ Automation's Metris technologies for digitalization, simulation, and overall optimization. Smart Solutions for tissue producers include, but are not limited to, automation technologies for predictive maintenance, the Metris UX Platform, Metris Smart Service including the Metris Spare Parts Catalog and Metris OPP (Optimization of Process Performance).

INNOVATION AND PERFORMANCE

To further develop and support its technologies, ANDRITZ continues to make investments in the *Prime*LineTIAC. The tissue pilot plant is available to all tissue producers and suppliers worldwide, and also to partners and institutions within the tissue value chain. For example, the latest machine design, *Prime*LineTEX, was developed and tested at the tissue pilot plant. It enables the production of premium textured tissue with a quality very close to TAD. The *Prime*LineTEX tissue machine is of utmost flexibility: it can be configured as a "pure" textured machine or as a machine that can produce either dry-crepe or textured tissue.

CONTACT
tissue@andritz.com

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MEET OUR TISSUE EXPERTS!

Our tissue experts, their know-how, passion, and excitement, are what make the difference for our customers when it comes to best-in-class tissue technology, production equipment, and service.

Get to know Erwin Walcher, ANDRITZ Senior Sales Manager, with more than 40 years of experience in the tissue business.

ERWIN WALCHER
Senior Sales Manager at ANDRITZ

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ANDRITZ high-performance *Prime*Dry Steel Yankees are made entirely of steel, contributing to enhanced safety and 8 – 10% better machine performance when compared to a cast Yankee.

SAFETY FIRST IN EVERYTHING WE DO

ANDRITZ is always exploring ways to take the ever-important issues of Health & Safety to new levels. We have recently launched the internationally recognized IOSH Managing Safely courses for all employees engaged in responsible positions within our pulp and paper activities around the globe.

The Institution of Occupational Safety and Health (IOSH) is an international chartered professional body for Health & Safety in the workplace. Formed in 1945, the UK based institution acts as a champion, adviser, advocate, and trainer for health and safety professionals working in all organizations, and has over 47,000 members from over 120 countries.

The IOSH has become leader of a profession that has transformed the world of work, making it a safer and healthier place to be. Its vision is very simple: a safe and healthy world of work.

ANDRITZ is now running regular IOSH Managing Safely courses, which are tailor-made for ANDRITZ professionals, in particular project managers, site managers, supervisors, and QHSE. The training consists of a variety of modules, including identifying hazards, assessing and controlling risks, investigating accidents and incidents, and measuring performance. In addition, the course provides relevant information directly related to ANDRITZ common site risks, including working at height, confined spaces, traffic management, permit to work, and use of lifting equipment.

The IOSH Managing Safely courses are an intermediate level, which run for three full days. The courses have a maximum of 20 places – a requirement of the institution – as this allows learning in the most effective manner, and also allows the individual attention needed.

We have challenges when arranging the courses, as the nature of project management means that the people we want to train are spread all over the world. However, such is the importance and interest in the course that we are really pleased to have already trained and certified more than 100 project staff and have planned two more courses this year in Helsinki, Finland and Graz, Austria.

The training itself contains standard material with guidelines that have to be strictly adhered to, and cannot be altered or removed. However, additional information regarding specific ANDRITZ rules, instructions, and operational processes are included to make the training even more relevant for our organization.

One authorized, qualified, and competent IOSH trainer conducts the course with great enthusiasm and excellent communication skills. The same trainer runs all ANDRITZ courses to ensure a uniform and effective teaching approach. The course includes a series of presentations with open discussions, where delegates are constantly involved, relating their own experiences. There are also dedicated workshops in which all delegates take part. The three-day course finishes with a final exam, one hour in length, containing 30 multi-format questions and a practical project. Only successful delegates are awarded an IOSH Managing Safety certificate.

Graduates of recent IOSH training in Germany and Austria.

Our experience of the IOSH Managing Safety course so far has been very revealing; by the second day, it is evident that the delegates have discovered a whole new world of Health & Safety guidelines, and they are keen to go out and put into practice all they have learned. It is our aim at ANDRITZ to make IOSH courses the basic training for all professional staff in roles that involve Health & Safety in our pulp and paper projects, workshops, and offices all around the world.

GIUSEPPE D'AMELJ
HSE Manager
Pulp & Paper Capital Systems

GOING FROM STRENGTH TO STRENGTH

CMPC Biopackaging – Boxboard and ANDRITZ have been collaborating successfully on ramping up mechanical pulp production for a number of years. The mill has gone from strength to strength, increasing capacity, to supply the demanding global market for high-quality, lightweight, folding boxboard.

Within sight of the Andes mountains, the CMPC Biopackaging – Boxboard mill operates in the Maule region of Chile, just a short drive south from the capital, Santiago. The mill is part of the Chilean pulp and paper giant Empresas CMPC, an integrated forestry group with headquarters in Santiago. The group also has subsidiaries in Brazil, Argentina, Uruguay, Peru, Columbia, and Mexico.

The CMPC Biopackaging – Boxboard mill has always had something of an ambitious streak when it comes to the production of high-quality board. Originally, the foundations for the mill were laid in 1995 with the inauguration taking place in 1998. After a succession of rebuilds and expansions over the years, the mill now produces some 420,000 tonnes of high-quality folding boxboard in weights from 200 to 390 g/m², in sheets and rolls, all from 100% local Radiata pine.

Juan Constabel, Operation Manager, CMPC Biopackaging – Boxboard, says, "The mill here has been perfectly suited to us in terms of both expansion and location, and also with regard to access to water and raw materials. Added to this, we are close to the local market, as well as ports for exporting our board.

"When we first started up here in 1998, we began serving the local folding boxboard market in Chile, which had a demand of around 66,000 tonnes a year. We had a machine capacity of 40,000 tonnes at the time, but we saw that this was a growing market, and we installed a machine with a capacity of 130,000 tonnes – double the country's market demand. Since, the installation of that board machine we have rebuilt and upgraded it a lot of times to increase capacity. Now we are producing an incredible 420,000 tonnes, but we believe we can go up to as much as 450,000 tonnes, from the same machine. We have created an incredible toy to increase capacity and quality."

AR View video footage of this report in our augmented reality App!

FOR FURTHER INFORMATION SEE PAGE 3

JUAN CONSTABEL
Operation Manager,
CMPC Biopackaging – Boxboard

"The mill here has been perfectly suited to us in terms of both expansion and location, and also with regard to access to water and raw materials."

Left to right: Micheal Jaeger, Director Order Execution, ANDRITZ; Edin Paredes, Project Manager, CMPC Biopackaging – Boxboard; Marcelo Ribeiro, Senior Technical and Commercial Manager, ANDRITZ; Juan Constabel, Mill Manager, CMPC Biopackaging – Boxboard

"The main challenge was the very short shutdown time, just 21 days, so we made sure we carried out as much work as we possibly could beforehand."

MARCELO RIBEIRO
Senior Technical and Commercial Manager, ANDRITZ Paper, Fiber and Recycling Division

HAND IN HAND ON QUANTITY AND QUALITY

Along with the intensive board machine upgrades, the integrated pulp production also had to keep pace with the expansion, as well as include all the latest technology for producing the best quality end products.

ANDRITZ has been working hand in hand with CMPC Biopackaging – Boxboard at Maule for a number of years. Beginning with an RMP process with primary and secondary refining in 1998, the first TMP line ANDRITZ delivered to the mill was in 2002 and was based on the ANDRITZ RTS technology. The system had a capacity of 24 t/h of bleached thermo-mechanical pulp. The delivery also included a high-consistency peroxide bleach plant, and a wet-lap system, including a twin wire press, cutter layboy, and baling line.

"At this mill we only like to have the top technology available, and we know that ANDRITZ is the leader when it comes to mechanical pulping and bleaching," says Constabel. "That's why we have always worked closely together for all our mechanical pulping demands."

During the mill's progressive capacity expansion, CMPC chose ANDRITZ again to carry out several line upgrades. In 2007, capacity of the RTS TMP line was upgraded from 24 to 36 t/h and the capacity of the bleach plant from 24 to 27 t/h.

In 2012, the mill embarked upon a major production upgrade to 44 t/h and bleached pulp at a rate of 30 t/h. The target of this project, the "BTMP 44", included increased capacity, but also an important target was the reduction of energy. After the rebuild, the mill had two almost identical parallel TMP lines that produced 22 t/h each. Also added during this upgrade were two new ANDRITZ LC refiners.

MULTIPLE CHALLENGES

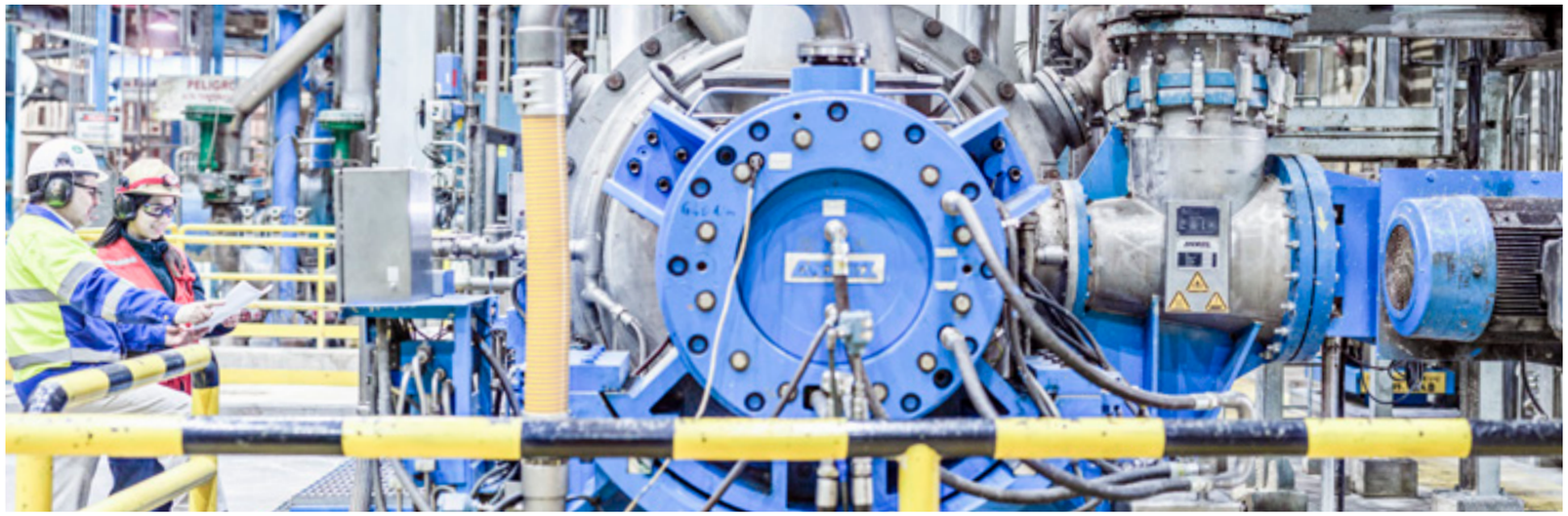
The latest rebuild and upgrade ANDRITZ conducted at the mill provided many challenges: A bleaching system upgrade to increase BTMP production from 30 to 37 t/h, at the same time as maintaining pulp properties and chemical consumption to the same levels as before the project. Also, a reduction in energy use was requested.

The key equipment delivered as part of the rebuild and upgrade for the project included a machine rebuild of the existing screw press feeding to the HC-mixer, a screw conveyor system linked to the high-consistency bleach tower, a new high-consistency bleach tower with medium-consistency (MC) discharge, and a new pulp screw press.

Edin Paredes, Project Manager, CMPC Biopackaging – Boxboard, says, "The capacity of the board machine was increased again in 2016 and, of course, whenever there is a capacity increase in one part of the mill, a bottleneck in another part of the mill becomes apparent. This time it was the bleaching area. This was important from a quality aspect, as we needed to maintain the stiffness and bulk of our board products and an upgrade to the pulp area was essential.

"We had several meetings with ANDRITZ; it was really good for us because we were talking to people who virtually knew this mill as well as we do, having worked together on a lot of projects in the past."

High-speed ANDRITZ HC refiner S3068 with side entry plug feeder



ANDRITZ Pulp Screw Presses

Left to right: Alex Valdés, Contract Administrator, ANDRITZ; Marcelo Ribeiro, Senior Technical and Commercial Manager, ANDRITZ; Micheal Jaeger, Director Order Execution, ANDRITZ; Juan Constabel, Operation Manager, CMPC Biopackaging – Boxboard; Pedro Hermosilla, Senior Sales Engineer, ANDRITZ; Edin Paredes, Project Manager, CMPC Biopackaging – Boxboard

ANDRITZ PHC bleach tower with MC discharge

Paper wrapping at the end of the line

Michael Jaeger, Director Order Execution, Paper, Fiber and Recycling Division, ANDRITZ, says, "Leading such a rebuild project to a successful conclusion requires a high degree of planning and good cooperation between the parties to tackle the challenges in a timely manner."

Contracts were signed in August 2016 to upgrade the complete high-consistency peroxide bleaching system at the mill. Start of erection began just over a year later and commissioning and start-up of the upgraded system took place September 27, 2017.

Marcelo Ribeiro, Senior Technical and Commercial Manager, ANDRITZ Paper, Fiber and Recycling Division, says, "There were a lot of challenges with this project, but we already had a head start as we have a great relationship with the mill people here – our association with the mill goes back a long way.

"The main challenge was the very short shutdown time, just 21 days, so we made sure we carried out as much work as we possibly could beforehand. There were also transport issues with the very large bleaching tower that had to go into an existing building and, of course, consideration that the mill is located in an area of high seismic activity – there was a magnitude 9.4 earthquake here in 2010."

During the installation over the 21 days, the teams of both CMPC and ANDRITZ worked around the clock to get everything installed and up and running. "We had a full order book on our board machine," adds Paredes. "There was no option for delays, and the interaction with ANDRITZ was good before, during, and after the shutdown."

The bleaching system upgrade at CMPC Biopackaging – Boxboard carried out by ANDRITZ has resulted in a 20% increase in BTMP production at the same time as maintaining pulp properties and chemical consumption to what it was before. Specific energy consumption per tonne of pulp has reduced due to the installation of the new bleach tower discharge system, the MC pump, as well as the removal of several conveyors and pumps.

Constabel adds, "All these expansions we have had are not just about increasing capacity; it's about cost leadership. We started out with a board machine making 130,000 tonnes a year, and now we have one three times that size – but we didn't pay three times the cost. We also have the latest in BTMP technology to produce the pulp."

OPTIMIZING BY MEASURING AND MANAGING

As part of its cost-leadership initiatives, the mill benefits from the Metris OPP (Optimization of Process Performance) contract for measuring and managing production data from bleaching plant and refining – and it is already showing significant returns when it comes to chemical savings. "Metris OPP has become part of our 'excellence in operation' project, where we are managing the data from the pulp operations," says Constabel. "It's incredible what you can do when you begin to realize that you can manage the fluctuations in production efficiencies, particularly in the case of chemicals and energy usage. You can see where you are losing and where you are gaining, and then manage the process accordingly."

The results of using Metris OPP at the mill for the BTMP plant are reaping rewards in particular on chemical consumption, with the mill recording dramatic savings on chemical use equating to over USD 100,000 a month.

CMPC Biopackaging – Boxboard has also embarked on one of the first ANDRITZ Synergy agreements, which ensures the operational continuity of equipment and processes in the levels of efficiency required by the woodyard and the mechanical pulp plant, thereby maintaining the quality of the fiber obtained. The objective of this agreement is to enable the mill to deliver mechanical pulp in the quality and quantity necessary for the manufacture of folding boxboard, and according to the demands of the board machine. ANDRITZ already had a contract providing technical assistance of specialists and supervision for the BTMP plant, as well as another one for maintenance of the chipper and supply of knives (HQ+) for the woodyard, which have been running since 2009. The latest Synergy contract will cover these areas for the next three years.

Constabel concludes, "At the outset during the creation of this mill, we asked for the very best in technology, but you don't buy just technology or equipment, you buy the concepts. Here we are, decades later, still using ANDRITZ, and that is because, in my opinion, the company has the best technology concepts; good, strong equipment and products; and excellent optimization services. These have all contributed to our own success."

MICHAEL JAEGER
Director Order Execution, Paper, Fiber and Recycling Division, ANDRITZ

"Leading such a rebuild project to a successful conclusion requires a high degree of planning and good cooperation between the parties to tackle the challenges in a timely manner."

SCOPE OF SUPPLY

THE ANDRITZ BLEACHING SYSTEM UPGRADE AT CMPC BIOPACKAGING – BOXBOARD INCLUDED:

- The machine rebuild of the existing screw press feeding to the HC mixer
- New screw conveyor system to the PHC bleach tower
- New ANDRITZ PHC bleach tower with MC discharge and integrated MC pump
- New ANDRITZ Pulp Screw Press SCP1410 replacing the existing one, including dilution conveyor
- New MC pump after pulp screw press SCP2

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WE ARE CELEBRATING 40 ISSUES OF SPECTRUM!

The last two decades have seen major developments in the pulp and paper industries globally. SPECTRUM magazine was launched with perfect timing at the beginning of the 21st century – some 20 years ago – and has been showcasing both industries as they went through major transitions in terms of global markets at the same time as introducing game-changing technology.

SPECTRUM was created because we saw a distinct need to get the message out about the major successes that pulp and paper producers have worldwide as they install the very best in technology from ANDRITZ. The magazine was also created to highlight the major issues facing the industry in the areas of environmental sustainability, increasingly more demanding end-consumers, and the emergence of disruptive technology.

Over the last 20 years, we have created a magazine that gets to the very heart of industry issues, at the same time as highlighting real-life – and often incredible – examples of how our customers experience and overcome the challenges that are thrown at them in the 21st century.

We are looking forward to remaining one of your preferred industry magazines over the next 20 years and beyond!

HAPPY ANNIVERSARY!

GLOBAL PACKAGING TRENDS

by Ken Waghorne, Vice Pre sident, Global Packaging, Fastmarkets RISI

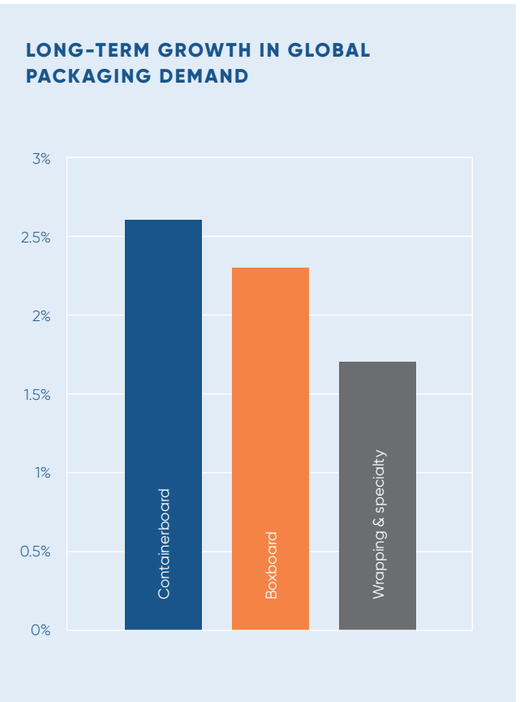
The downturn in global manufacturing activity during the last year has created a difficult demand environment for many packaging grades. However, this is expected to be relatively short lived, since there are several factors that suggest better times are ahead, once the uncertainty on the manufacturing front eases. Global demand for packaging paper and board should grow 2.4% annually during the next five years, even if conditions remain challenging in 2020.

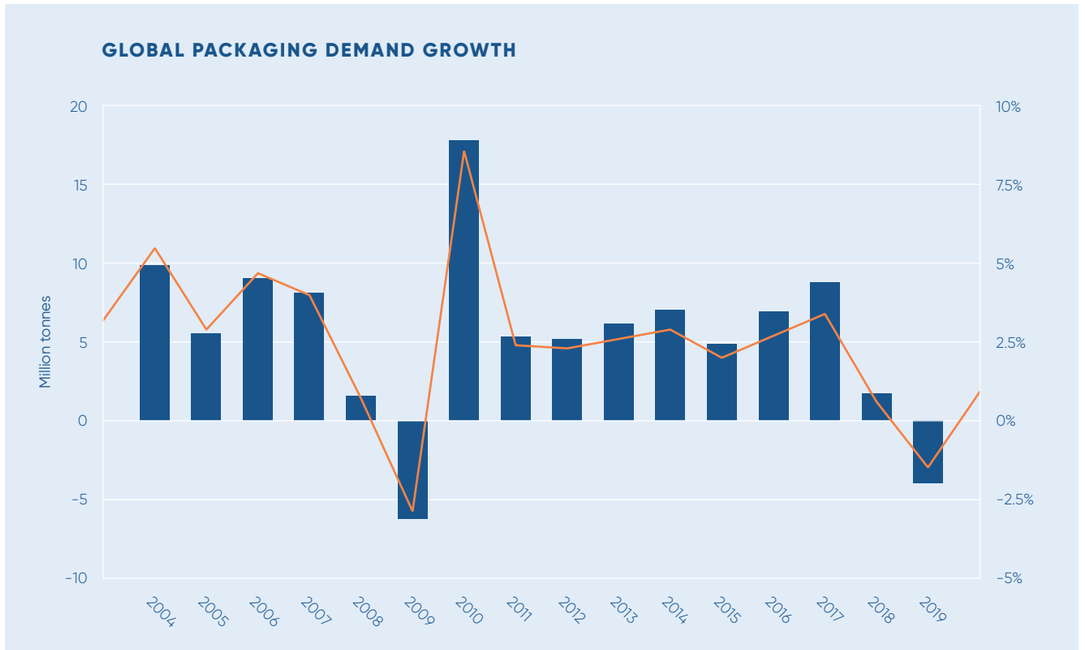
1 **Global paper packaging demand growth averaged 6.9 million tonnes per year between 2014 and 2017, up substantially from the 5.0 million tonne average increase between 2008 and 2013.** However, demand growth slowed to 1.7 million tonnes in 2018 and is poised to decline 4.0 million tonnes in 2019. The downturn in global manufacturing activity in response to increased trade tensions has been the biggest factor behind the slowdown, but Chinese demand is also being affected by shifts in government policy.

2 **Nearly 60% of the growth in demand between 2014 and 2017 was in the Asian market, with growth averaging 4.1 million tonnes per year.** Interestingly, this region has been the focal point for the demand softness during the last two years, with regional demand falling 1.4 million tonnes in 2018 and an estimated 2.5 million tonnes in 2019. Demand for the rest of the world grew 3.1 million tonnes in 2018, but is on pace to decline 1.5 million tonnes in 2019.

3 **Virtually all the packaging grades are participating in the longer-term demand rally, although for somewhat different reasons.** The explosive growth in e-commerce has boosted demand for containerboard, since products shipped to consumers via the e-commerce channels require more corrugated than products sold through traditional retail. Consumer product companies have begun to adjust their packaging to meet the needs of the e-commerce channel. The growing resistance to single use plastic products is creating opportunities in the boxboard, sack, and specialty packaging markets, providing more upward demand momentum.

4 **All of the positive factors on the demand front created extremely tight market conditions in 2017, since it takes several years for supply to respond to a tight market.** However, we are now two years beyond the peak of the market tightness and supply has definitely responded. Several existing producers have come out with plans to build new machines, although the goal of these producers is often to maintain the balance in their systems by retiring older machines. However, capacity is also entering the market via conversions or machine installations by new players to the market, which can be much more disruptive to the market. Many market segments are currently oversupplied, and even when global manufacturing begins to recover it is difficult to envision the redevelopment of the tightness that gripped the global markets in 2017.





BENEFITS OF CUSTOMIZED ROLL TECHNOLOGY ANDBETTER ANALYTICS

A closer look at the way roll covers, spreader rolls, SMART™ technology and Rezolve predictive analytics improve paper machine productivity, enhance product quality, and reduce operating costs

In October 2018, ANDRITZ and Xerium Technologies merged to form the ANDRITZ Fabrics and Rolls division. This new entity combines an extensive portfolio of pulp and paper machinery with the high-quality and customizable consumable products (such as machine clothing and roll technology) developed by Xerium. Creating a product-specific custom fit between machinery and the consumable products used by that machinery can generate tremendous value in the form of improved productivity, enhanced quality, and reduced operating costs. Now, with 30 global facilities producing customized roll and machine clothing technology solutions, ANDRITZ Fabrics and Rolls customers can equip their new or rebuilt machines for optimal performance more easily than ever before.

The influence these consumable products can have on the entire papermaking process may be surprising. After all, roll covers and machine clothing represent only 2-3% of a customers' cost per ton of paper or pulp produced. However, these components can have a dramatic impact on the overall performance and profitability of the machine. Some customers have realized annual gains in improved productivity and energy savings that total over 1 million USD from simply replacing conventional roll covers with custom-engineered roll covers, tailored specifically for their machine and the end-product it produces.

THE VALUE OF A CUSTOMIZED ROLL COVER

Roll covers are produced with a combination of sophisticated materials and chemical formulations that are applied in layers to a metal core. The specific performance goals and engineering parameters of a roll cover depend upon the section of the machine in which it is installed. A roll cover in a press section has very different objectives and must function in different conditions when compared to roll covers located in calenders, coaters, and size presses.

At ANDRITZ Fabrics and Rolls, the specific materials and chemical formulations that comprise the various layers in the roll cover can be adjusted to create a customized solution that delivers very precise performance results. For example, controlled rates of dewatering and defined end-product characteristics can be achieved, while extending the reliability and life of the cover itself.

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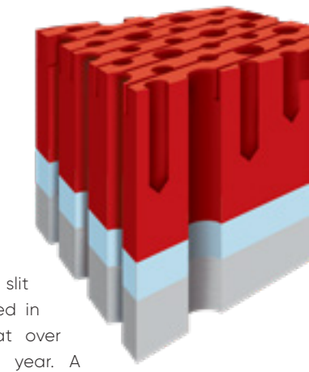
Polyurethane roll cover after rotational casting

Dave Pretty – President, Fabrics and Rolls, North America

Composite roll cover production

Rotational casting of polyurethane roll cover

Customized roll covers layered with specific drilling and grooving on surface



The venting pattern, i.e., holes and grooves, is another highly customizable feature of the cover's surface that plays a critical role in optimizing performance. Proprietary drilling and patented hole and groove patterns, originally developed by Xerium Technologies, are specially engineered to provide better and more consistent performance throughout the life of the cover.

While there are "off the shelf" roll covers available on the market, customized roll covers often deliver results that are truly astounding. One customer producing printing paper products recently documented benefits exceeding 750,000 USD per year simply through new roll cover materials and a new proprietary venting pattern. Another customer producing pulp grades increased output by 7% and reduced energy consumption by nearly 18% by changing to newly recommended roll cover technology along with upgraded cover drilling and grooving pattern technology. The total benefit has been valued at several hundred thousand dollars per year.

THE VALUE OF HIGH-QUALITY ROLL REFURBISHMENT

ANDRITZ Fabrics and Rolls also provides comprehensive roll refurbishment services that include a full range of roll-related repairs and upgrades—complete suction roll and suction box repairs and overhauls; vibration analysis; optical and laser alignment; bearing, journal, and housing inspections and repairs; and much more. In short, this means that customers can send in their used rolls that are old, damaged, corroded, or simply worn out and receive a reconditioned roll, and new customized cover, which will often perform better than the original.

THE VALUE OF CUSTOMIZED SPREADER ROLLS

Spreader rolls, also referred to as bowed rolls and banana rolls, are designed to stabilize various types of webs, including paper, fabrics, and nonwoven materials as they run through the machine. They are often used to widen and remove wrinkles from these webs throughout various stages of the manufacturing process. As with roll covers, the specific position in which the spreader roll is placed and the specific conditions to which it is subjected can be considered during the customization process to deliver a component that is tailored to perform reliably in even the most demanding positions. Spreader rolls can be customized to best accommodate a long list of important variables, including speed and operating temperature.

As the world's inventor and largest manufacturer of spreader rolls for nearly a century, offering the broadest range of solutions that include several roll types and sizes, fixed and variable bow controls, and an assortment of telemetry features and sleeve designs, ANDRITZ also engineers and custom manufactures components using the latest CNC machinery and steel plating technology. This unparalleled capability enables ANDRITZ experts to engineer the spreader roll to precisely match the needs of each customer, every time. One customer reported that through the implementation of ANDRITZ' advanced spreader roll telemetry (measuring vibration, temperature, RPM and more), they were able to save over 750,000 USD per year through improved reliability and roll life. Another customer replaced a competitive spreader roll with the ANDRITZ Uniform Slit Separation System and eliminated sheet slit issues that resulted in savings valued at over 400,000 USD per year. A tissue customer reported over 75,000 USD annual savings with a new ANDRITZ spreader roll with an advanced sleeve (outer cover) along with upgraded lubrication technology in the bearings.

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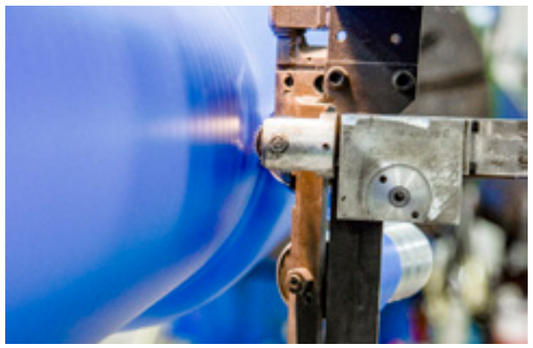
Composite roll cover production

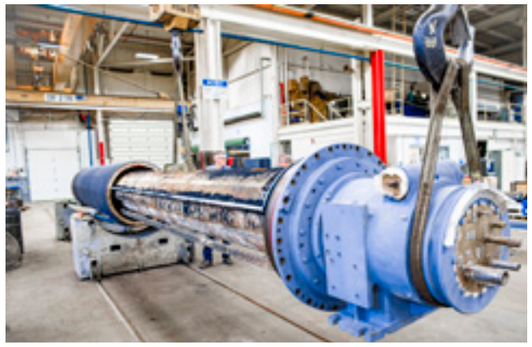


Rubber roll cover production

Roll cover drilling process

Operator inspecting drilling quality

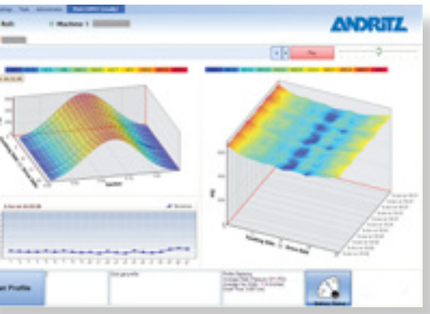
Suction box being removed from suction roll



Suction roll shell

Suction box being removed from suction roll

Refurbished suction box



Operators can view critical, actionable nip data in real time

IMPROVE PERFORMANCE WITH BETTER, ACTIONABLE INFORMATION

Beyond customizing the consumable products to best meet the needs of the machine, based on the type of product being produced and the operational objectives of the customer, ANDRITZ Fabrics and Rolls is creating solutions that will help customers continuously improve operations with better information and insight. The two innovations providing this unprecedented level of information and making actionable recommendations are SMART roll technology and Rezolve predictive analytics.

SMART roll technology, invented by ANDRITZ, is the only real-time 3D nip measurement system on the market. Using embedded sensors inside the roll cover, this technology continuously streams data that describes nip conditions in a high level of detail. This information offers operators extraordinary insight into the real-time performance of the machine, without costly downtime. With SMART technology, operators get continuous and actionable information enabling them to optimize machine performance, while the machine is in full operation. SMART Connect technology enables customers to monitor their machines from any remotely connected device.

The Rezolve predictive analytics platform employs a concept called *machine learning* to help determine and eliminate a machine's barriers to achieving optimum performance. In order to identify any areas for improvement, Rezolve examines and evaluates over 400 machine and process variables to help prioritize the operational and equipment changes that would lead to higher performance levels, without machine downtime. Rezolve also receives data from the SMART technology system to evaluate and recommend new combinations of roll cover materials, venting patterns, and machine clothing to adapt to changes in machine conditions and objectives.

Combining SMART technology and Rezolve produces impressive value for customers.

- A customer producing containerboard reported over 1 million USD in annual energy savings and additional productivity through a recommendation to modify a press roll cover venting pattern along with new press felt designs.
- Another customer documented over 700,000 USD in annual raw material/fiber savings as a result of a machine optimization.
- Another customer eliminated over 750,000 USD in annual product quality rejects due to a machine optimization.

FUTURE BENEFITS AND OPTIMIZATION

As separate entities, both ANDRITZ and Xerium were industry leaders. Xerium introduced the first rubber, polyurethane, and SMART technology roll covers to the market and pioneered the development of the spreader roll industry. Today, ANDRITZ Fabrics and Rolls is making it easier for customers to improve their operations by delivering critical insights that help achieve new performance goals in output, quality, efficiency, and profitability. Looking forward, the research and development of enhanced rolls technology, new chemical compounds, and next generation SMART components will advance the level of real-time detail and type of actionable data available to operators, which will help customers achieve increasingly aggressive operational goals and realize next-level performance.

"Fundamentally, ANDRITZ Fabrics and Rolls offers its customers greater value than just the rolls or clothing technology it provides because it is now able to offer an exclusive, comprehensive, and precisely tailored solution that is custom-fit for every customer. In the process of papermaking, that level of customization can deliver remarkable benefits to the bottom line," says David Pretty, President North America, ANDRITZ Fabrics and Rolls.

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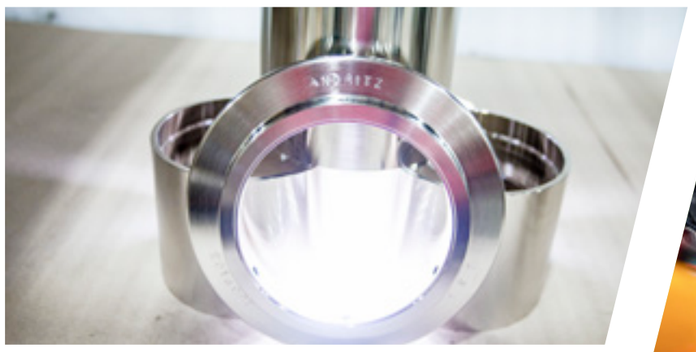
Researcher developing and testing new advanced SMART roll functionality

Completed spreader roll in high-speed quality control station

All metal spreader roll during spool assembly



Custom engineered spreader roll components after CNC machining and nickel plating

TOP CLASS SERVICE AT THE END OF THE WORLD

Due to its perfect climate for fiber growth, Chile has become a major pulp and paper making nation over recent decades, with some of the world's largest producers now situated in the South American country. ANDRITZ has also grown its base in Chile, and now offers complete equipment sales, project management, service, and maintenance support for its thriving pulp and paper mills.

"We are a long way away from anywhere here," says Peyman Behirad, General Director, ANDRITZ Concepción Workshop. "In fact we have a saying in Chile that, 'we are at the end of the world'".

The country may be a long way from Europe and North America, the common centers of technology for the industry, but because of its status as a major pulp and paper producing nation, ANDRITZ has also seen the need to invest, build, and grow here. Robert Clua, General Manager, ANDRITZ Chile says, "Over the years, the pulp and paper industry has become very important to this country; we have major producers here supplying the local market, but also exporting their products all over the world.

"Pulp and paper, of course, are industries that are extremely important to us at ANDRITZ, which is why we have developed top class facilities here for capital equipment, maintenance, and service, and we walk hand in hand with our customers across Chile."

Operating in Chile for decades, ANDRITZ has a number of offices and operations in the country and has recently moved to a new, larger, headquarters in Santiago, the country´s capital, with the purpose of maximizing synergies between work areas. Located in Las Condes area of the city, the headquarters is responsible for the administration of the company and coordination of the different divisions and locations. ANDRITZ Chile employs around 500 people and has a major service center in the city of Concepción as well as other project sites.

"Our service offerings to pulp and paper customers are situated in ideal locations that are able to cover the whole of the country and all of the mills, from Valdivia in the south to Santiago," adds Clua.

RIGHT IN THE MIDDLE

The ANDRITZ Chile Concepción site has been developed as a special service area for pulp and paper customers, and is situated right in the middle of the pulp producing region. Behirad says, "Most of the major pulp mills are around this area; we have at least five of them within just a short drive from our location in Concepción.

"We are also in an ideal location as we are close to sea ports for importing machinery and parts, and there is also an airport close by."

The site has its own workshop with the complete scope of requirements for maintaining services for pulp producers, including engineered wear parts, local support for optimization, repair works, upgrades, and equipment fabrication. The site employs around 150 people, most of whom are highly experienced in pulp and paper service and maintenance,

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The workshop in Concepción has been developed as a special service area for pulp and paper customers and is situated right in the middle of the pulp producing region.

The complete service offering from Concepción includes rebuilds, support for field services and inspections, parts and consumables, shutdown and start-up services, and machining and grinding.

Robert Clua, General Manager, ANDRITZ Chile and Peyman Behirad, General Director, ANDRITZ Concepción Workshop

including engineers, project managers, and quality managers. "We started out in 2004 servicing mostly woodyard equipment at the pulp mills where we have a significant installed base, but we have grown rapidly, and we now offer services for the complete fiberline from the Concepción site," says Behirad.

COMPLETE SERVICE AND AN EMERGENCY CORRIDOR

The complete service offering from Concepción includes rebuilds, support for field services and inspections, parts and consumables, shutdown and start-up services, and machining and grinding. The workshop itself has the very latest in engineering technology, including CNC machines, milling, grinding, and welding.

"It is vital to us that all the equipment we provide and install is cared for and optimized; for this, we have specialized field engineers, who are in constant conversation with our customers," says Behirad.

Some of the rapidly growing services provided to pulp and paper customers from the Concepción site are Metris solutions to maximize efficiencies, provided in cooperation with ANDRITZ Process Optimization (APO). "We are achieving real results with these digital solutions, gathering and managing data for our customers," says Behirad. "One customer in particular is so impressed with the savings made on the fiberline using our innovative digital solutions that we have been asked to optimize production on its board machine as well."

Robert Clua comments about the projection of Metris in ANDRITZ Chile, "Metris UX enables customers to connect their industries to all digitalization and AI (Artificial Intelligence) benefits through an easy and reliable platform that inherits global expertise and state-of-the-art cyber-security processes."

The workshop also has an "emergency corridor" where vital parts and engineering are fast tracked to make sure the mills have maximum uptime. Clua says, "As we all know, things do sometimes happen with machines and equipment, and it is our mission to make sure our customers' mills are up and running as soon as possible when it comes to any events that may occur. The emergency corridor has proved very successful in achieving that mission."

SAFETY AND QUALITY – TOP PRIORITIES

ANDRITZ operations in Chile have all the required international standards for safety and quality, including the latest ISO and BS OHSAS certificates for certified operations. Clua says, "Safety is always our top priority. It is part of our culture and values and is the most important issue when it comes to all services we provide. We are committed to this culture because we care about our people; they are our biggest asset. This commitment to safety is an area that our customers in Chile really appreciate.

"We apply international safety standards to all the work we do and there are also strict regulations here in Chile. Added to these standards and regulations, we implement safety practices that come from ANDRITZ activities in other locations, specifically in focused areas of pulp and paper operations, for instance, processes for shutdowns, repairs, and working activities in workshops."

It is the ANDRITZ mission for all its customers around the globe to drive success through providing innovative, quality engineering and services, at the same time as having a positive impact on key industries and the planet. ANDRITZ Chile customers can be assured that this mission is directly applied to all activities and operations carried out in the country. Forming strong and sustainable relationships is also part of this mission, and ANDRITZ is the perfect partner to accompany pulp and paper customers through the complete lifecycles of their mills.

Clua concludes, "We are committed to supplying the best quality products together with the best in service and maintenance, at the same time as generating the least waste possible using minimum natural resources. As part of our mission at ANDRITZ Chile, we walk beside our customers, and we make sure we take care of all our activities from beginning to end."

The workshop has the very latest in engineering technology, including CNC machines, milling, grinding, and welding.

CONTACT
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COMPLETE SERVICE OFFERING

- Rebuilds
- Support for field services and inspections
- Parts and consumables
- Support for start-up and shutdown services
- Machining and grinding services
- Support for HQ-Plus Service Agreements
- Support for Inspection Agreements

MODERNIZATIONS AND UPGRADES

- Modernizing existing equipment (independent of original supplier) to current technology to improve quality, productivity, and reliability

PRODUCTS AND REBUILDS

- Wear parts
- Knife segments
- Wear segments
- Bed knives / bed knife wear segments
- Screws
- Rollers
- Chipper hoods and wear plates
- Filters
- Screen rotors
- High and low pressure feeders rebuilds

WORKSHOP KEY MACHINERY

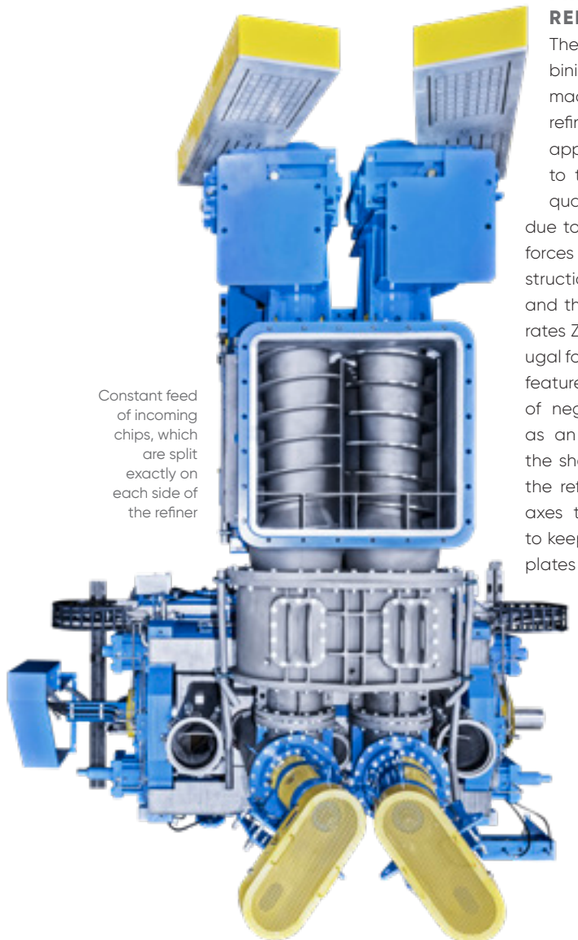
- CNC machine
- CNC cutting table
- Vertical milling machine
- Automatic service grinder
- Submerged ARC welding
- Three horizontal milling machines
- Swing lathes

HIGH CAPACITY HIGH PERFORM ANCE

TX68 REFINER FEATURES NEW FEED SYSTEM

ANDRITZ has designed a broad range of high-consistency (HC) refiners to meet the demands of pulp, paper, panelboard, and recycle producers. At the top of the line in terms of throughput and motor power is the TX68 twin refiner.

With unmatched design capacity, the TX68 refiner is both a workhorse and a racehorse. One look at its design and build shows why it can achieve continuous high throughput, high speed, and long life. In developing the TX68, ANDRITZ re-examined the refiner design from end-to-end with an eye toward simplification, symmetry, and strength.



Constant feed of incoming chips, which are split exactly on each side of the refiner

PRECISE, CONSTANT REFINING GAP

The TX68 is a twin refiner, combining two refining zones in one machine. It maintains a constant refining gap to ensure the best application of specific energy to the fiber while keeping pulp quality constant over time. This is due to a design that balances the forces on the disc and robust construction of both the rotating disc and the stators. The TX68 incorporates Zero Spin Deflection – centrifugal forces are 90° to refiner axis – a feature that eliminates the influence of negative rotor dynamics (such as an imbalance of deflection of the shaft) on plate parallelism and the refining gap. In addition, two-axes tramming allows adjustment to keep the rotating and stationary plates perfectly parallel.

The refining gap in the TX68 is amazingly precise for such a high-throughput machine. The gap is automatically adjusted with a fast and accurate plate adjustment system. A small and constant gap across the entire diameter of the disc produces less shives and better fiber quality. The position of the rotating disc is fixed and the stator position precisely defines the refining gap on each side of the TX68. Hydraulic cylinders on each end are servo-controlled to automatically adjust the gaps to allow fast loading and unloading in response to process fluctuations or operator entries.

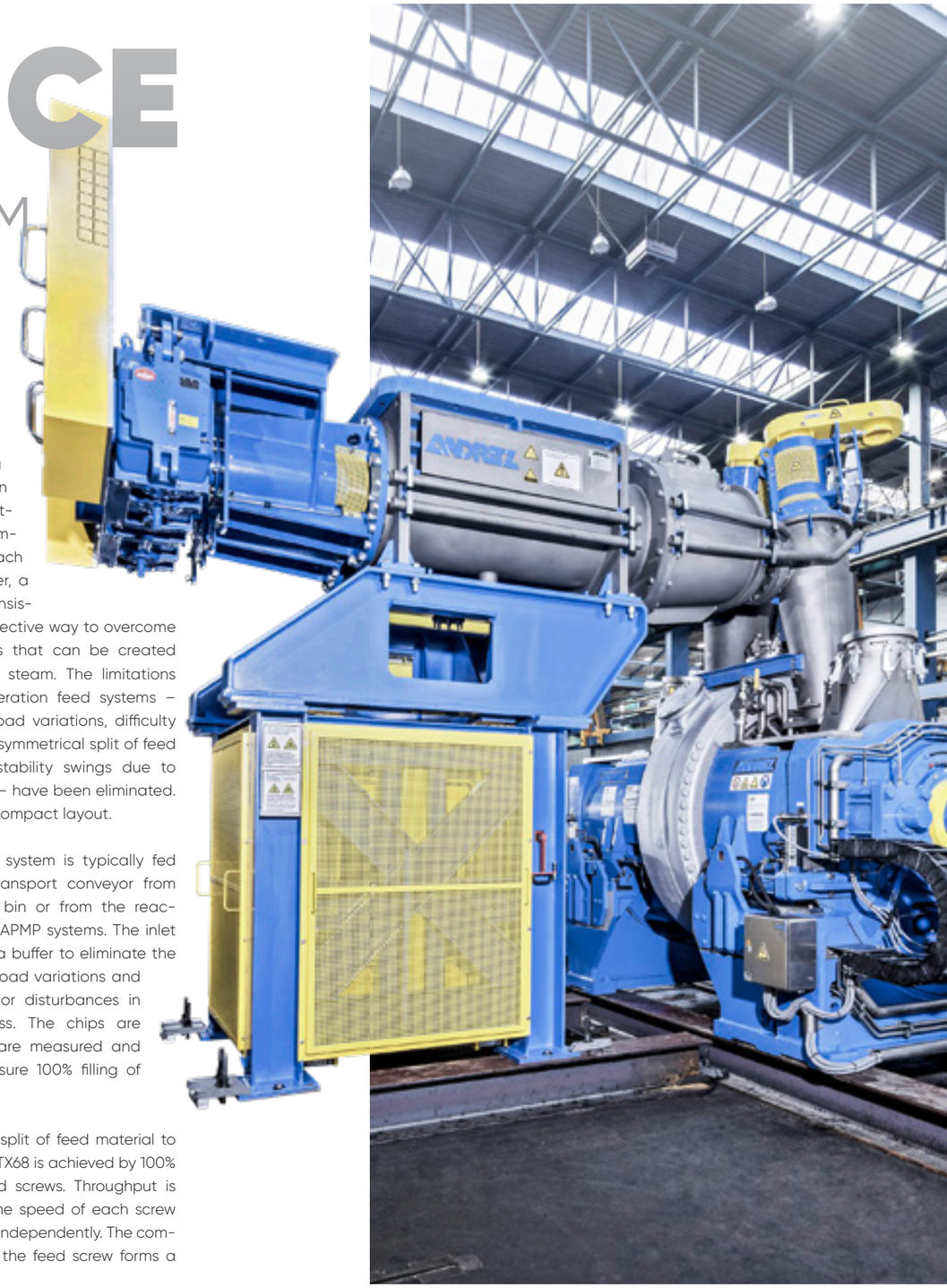
ADVANCED FEEDING TAKES TX68 TO HIGHER CAPACITIES

The TX68 has separate chip feeding for each refiner side, separate back steam outlets on each refiner side, and a common blow line for fiber and steam.

When developing the TX68 to handle higher and higher capacities, ANDRITZ designers recognized that its traditional feed system had reached practical limitations and had become the bottleneck. Rethinking the design of the feed system became a priority. The result is a new advanced feed system that is a main advantage of the TX68 today.

Although "new" in its current form, the advanced feeding system combines well-tested and proven concepts of ANDRITZ's Side Entry Plug Feeder (SEPF) with a Constant Feeder (C-Feeder). The "new" development is that each side of the twin refiner has its own SEPF and C-Feeder.

The DoubleSEPF feed system improves the feeding of the TX68 refiner and provides better steam control. It ensures a constant feed, an exact and adjustable split of incoming chips on each side of the refiner, a constant feed consistency, and an effective way to overcome the disturbances that can be created by back-flowing steam. The limitations of previous-generation feed systems – such as motor load variations, difficulty in maintaining a symmetrical split of feed materials, and stability swings due to steam backflow – have been eliminated. All this in a very compact layout.



The DoubleSEPF system is typically fed directly via a transport conveyor from a pre-steaming bin or from the reaction bin in P-RC APMP systems. The inlet chute serves as a buffer to eliminate the effect on motor load variations and to allow for minor disturbances in upstream process. The chips are metered: levels are measured and controlled to ensure 100% filling of the feed screws.

The symmetrical split of feed material to each side of the TX68 is achieved by 100% filling of the feed screws. Throughput is determined by the speed of each screw and is controlled independently. The compression zone of the feed screw forms a

dewatering area to eliminate free water and maintain a constant feed consistency.

When processing chips that have been treated and impregnated in an MSD Impressafiner, the DoubleSEPF forms a pressure-dense plug. Because of this, no large plug screw feeder is required. This allows for a much more compact layout than with the TX68's predecessor. The plug produced is positioned directly in front of the refiner. This prohibits backflow steam from entering the feed system – thus avoiding disturbances and improving motor load stability.

The screw in the C-Feeder continuously scrapes the homogeneous plug from the DoubleSEPF and moves it in a constant and continuous flow of feedstock into the TX68. A floating seal between C-Feeder and refiner allows compensation for any thermal expansion.

EASE OF PLATE CHANGES

Two hydraulic systems are built into the TX68 to make plate changes easier and faster. One system lifts the feed system out of the way and the second opens the refiner casing. This provides direct, maintenance-friendly access to the refiner. A sliding flange at the inlet makes it simpler and faster to lift the unit.

PROVEN PERFORMER

The highest capacity TX68 operating today has a design throughput of 900 admt/d of eucalyptus pulp for the production of both board and printing and writing grades. There are other units, with capacities around 500 admt/d on newsprint and improved newsprint applications, with pine and spruce as the raw material, which require higher specific refining energies and therefore have lower capacities. The future trend is for even higher capacities up to 1,500 admt/d, which is well within the design capability of the TX68.

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TX68 TWIN REFINER MAIN DATA

DESIGN PRINCIPLE:

- Twin-disc refiner with two flat refining zones
- Simple supported shaft with bearing units on each side of the rotating disc
- Two floating stators; fixed rotor

Plate diameter:	68 in (173 cm)
Installed motor power:	Up to 40,000 kW at 2,300 rpm
Rotational speed:	1,500 – 2,300 rpm
Capacity:	Up to 1,500 admt/d
Feed material:	Wood chips, impregnated wood chips
Weight TX68 refiner:	51.6 tons (w/o feeding and motor)
Weight feeding system:	19.4 tons (w/o gearbox, belts, and motor)

Applications:

ATMP: ANDRITZ process for softwood
(Advanced Thermo Mechanical Pulping)

P-RC APMP: ANDRITZ process for hardwood
(Pre-conditioning Refiner Chemical Alkaline Peroxide Mechanical Pulp)

ANDRITZ TX68 refiner with DoubleSEPF (Side Entry Plug Feeder) and C-Feeder (Constant Feeder)

Feeding system lifted for twin refiner opening

A ROBOTIC SOLUTION

FOR A HARSH ENVIRONMENT

The recovery boiler smelt spout area is an unwelcoming and potentially dangerous place to work. However, essential regular tasks need to be carried out in the area for efficient and smooth operation of the boiler. A combined team of ANDRITZ design experts and workshop engineers have come up with a smart solution, the Smelt Spout Cleaning System, that enables essential work and maintenance to take place in a harsh environment.

Smelt can cause several issues in the spout area since it tends to coagulate and plug the openings, which means regular cleaning is essential. In most cases, this operation is carried out manually by the operators with long steel rods to remove solidified smelt. Splashing smelt and a hot environment may sometimes make the spout area a dangerous place to work.

Design and engineering teams from ANDRITZ in Finland merged and used their combined expertise to create a robotic solution that turns a possibly harmful task into an efficient, automated process. Jokke Jantunen, Product Engineer, Recovery Boilers, ANDRITZ says, "Safety is the number one priority all around the world. Therefore, our main mission is to provide our customers with the finest products that are also the safest to operate and maintain.

"The smelt spout area has always been a potentially dangerous place to work due to the splashing smelt. The smelt spouts are sensitive to plugging and need to be cleaned regularly to prevent hot splashes and small explosions from occurring. In most recovery boilers, this task is carried out manually, which exposes personnel working in the spout area to possible injuries."

THE SMELT SPOUT CLEANING SYSTEM

After a lot of research and analyzing other products on the market – including other heavy industries where harsh environments are the norm – ANDRITZ teams collaborated and designed a solution that would fit the purpose by utilizing the latest in robotic technology. After a few trials and many experiments, they came up with the Smelt Spout Cleaning System, an automated, intelligent concept that will clean and maintain up to three ANDRITZ standard spaced smelt spouts using one robotic arm.

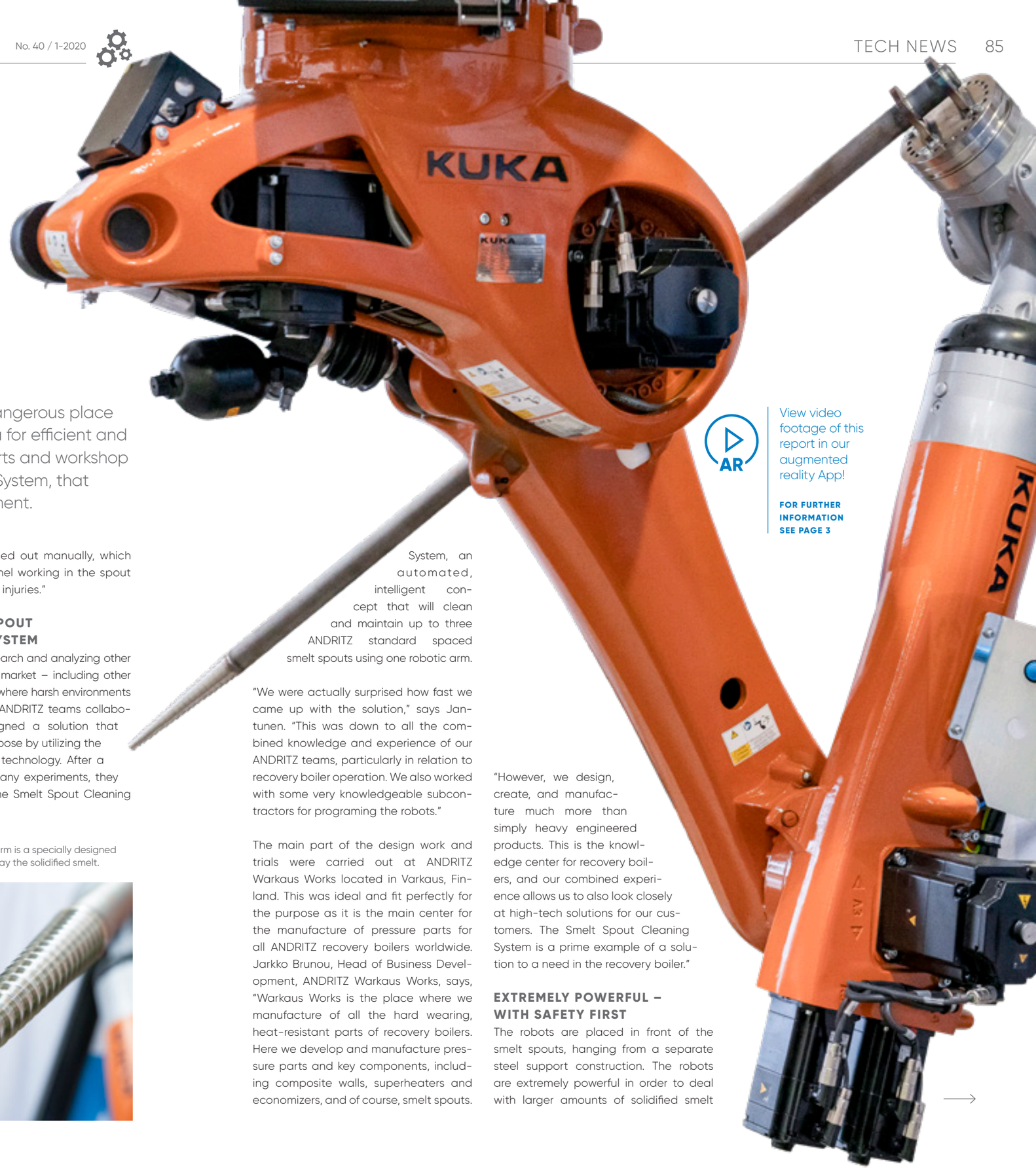
"We were actually surprised how fast we came up with the solution," says Jantunen. "This was down to all the combined knowledge and experience of our ANDRITZ teams, particularly in relation to recovery boiler operation. We also worked with some very knowledgeable subcontractors for programing the robots."

The main part of the design work and trials were carried out at ANDRITZ Warkaus Works located in Varkaus, Finland. This was ideal and fit perfectly for the purpose as it is the main center for the manufacture of pressure parts for all ANDRITZ recovery boilers worldwide. Jarkko Brunou, Head of Business Development, ANDRITZ Warkaus Works, says, "Warkaus Works is the place where we manufacture of all the hard wearing, heat-resistant parts of recovery boilers. Here we develop and manufacture pressure parts and key components, including composite walls, superheaters and economizers, and of course, smelt spouts.

"However, we design, create, and manufacture much more than simply heavy engineered products. This is the knowledge center for recovery boilers, and our combined experience allows us to also look closely at high-tech solutions for our customers. The Smelt Spout Cleaning System is a prime example of a solution to a need in the recovery boiler."

EXTREMELY POWERFUL – WITH SAFETY FIRST

The robots are placed in front of the smelt spouts, hanging from a separate steel support construction. The robots are extremely powerful in order to deal with larger amounts of solidified smelt



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FOR FURTHER INFORMATION SEE PAGE 3

The ANDRITZ Smelt Spout Robot at the testing environment in ANDRITZ Warkaus Works in Varkaus, Finland.

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On the end of the arm is a specially designed tool that cleans away the solidified smelt.

and one robot can clean up to three spouts using a long-reach arm. Despite its power, the robot recognizes the position of the spouts through positioning sensors and does not damage them during the cleaning procedure. On the end of the arm is a specially designed tool that cleans away the solidified smelt.

If there are more than three spouts in the recovery boiler, multiple robots can be installed to cover the full range of spouts.

Safety elements have been paramount in the design of the Smelt Spout Cleaning System. The actual working area of the robots is isolated behind a safety fence and the area is locked and clear of personnel when in operation. Access to the area is by permission only, and when an operator wants to enter the area, robots are automatically driven into a standby mode.

Added safety measures include smelt spout location scanners and cameras for remotely monitoring robot operation. These measures reduce the need to physically inspect the robot working area.

In terms of controls, the system has a local PLC, which handles communication between the DCS and PLC as well as between the PLC and the robotic system. The robot itself can be operated via a touch panel located outside of the safety fence.

The robot control unit contains preprogrammed cleaning sequences and during normal operation the system runs automatically based on cleanliness of the spouts or on a preset timer. If at any time there is a need for the operator to access the working area, a dedicated button can be pressed that will end the current cleaning sequence and drive the robot into a standby position.

The tools at the end of the robotic arm are tailor-made depending on particular smelt behavior. Tool wear is monitored remotely and tool replacement is made easier by the robot automatically moving to the service position, away from smelt splashes. The tool has been designed to be easily changed.

Maintenance of the robots has been designed with safety and simplicity in mind. The smelt spout robot area is equipped with several well-placed hoisting points to allow easy access for maintenance. Normal and scheduled maintenance is carried out on site and can easily be carried out by mill personnel.

BRINGING A ROBOT TO LIFE

The ANDRITZ teams working on the Smelt Spout Cleaning System have built a dedicated, automatic solution to a common problem in recovery boilers – the one of keeping people safe at the same as time carrying out essential tasks to ensure maximum efficiency. The robots themselves are supplied by the German company KUKA Robotics, but it's the bespoke design, tailor-made components, and actions for recovery boilers that have brought to life the Smelt Spout Cleaning System.

Jantunen says, "There has been a lot of knowledge, experience, and hard work applied to bringing the Smelt Spout Cleaning System to the market. We have implemented many features that are specifically designed for operation in the smelt spouts of recovery boilers, and we are really pleased with the results we are getting.

Stora Enso Varkaus, one of the company's flagship integrated board mills is located in the same town as ANDRITZ Warkaus Works and the management at the mill has been very keen to try out the new robotic concept. ANDRITZ installed one of its first smelt spout cleaning robots in the recovery boiler at the mill where it has received a warm welcome, especially from the operators.

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JOKKE JANTUNEN
Recovery and Power,
Product Engineer,
Recovery Boilers,
ANDRITZ

"Our main mission is to provide our customers with the finest products that are also the safest to operate and maintain."

JARKKO BRUNOU
Head of Business Development,
ANDRITZ Warkaus Works

"The Smelt Spout Cleaning System is a prime example of a solution to a need in the recovery boiler."

GAINING YOUR AUTOMATION INDEPENDENCE

Metris
ANDRITZ Digital Solutions

Customers confide in us that a major source of pain is being locked into a single automation supplier with a control system that cannot be easily upgraded. Why can't it be like their smartphone with an App Store where they can download and add functions with ease?

The Metris UX Platform contains 60 apps that can be composed individually to meet customer needs. The Metris Virtual Assistant Sophia helps the user with instant and consistent high-quality information.

In answering that, I recall an old saying, "If the only tool you have is a hammer, everything around you looks like a nail!"

In the automation business, the "hammer" is the legacy DCS the supplier sold to the mill years ago. Any new or upgraded function has to be designed to reside in that DCS. The investment is just too large to start afresh, and there is no practical way to modernize with another supplier.

UNTIL NOW. UNTIL METRIS UX.

Metris UX was developed for today's real world and tomorrow's ideal world. The real world recognizes that you already have sensors, field devices, PLCs, and a DCS in place and you can't afford to scrap them. The ideal world opens the gateway to the new or improved functionality your mill needs (simulation, condition monitoring, process control, maintenance planning, system learning, control autonomy) that is totally vendor-independent.

ALL-IN-ONE DATABASE

Metris UX can do this because of its software-based structure. In designing it, we were able to look forward instead of back at all the compatibility issues with legacy systems installed over the last 20 years. We started afresh by choosing from the latest, most powerful, and proven IT solutions.

The key strategic decision for us was to create an all-in-one database with Artificial Intelligence (AI) capabilities. This strategy is in direct contrast to classic networks found in mills that use a patchwork of protocols and house-independent (and sometimes incompatible) databases for engineering, process control, business, and maintenance activities.

Having everything in an all-in-one database allows AI to shine. It continually "learns" what questions are being asked, what information is needed (and when), and what actions are being taken to respond to changing process conditions. By recognizing patterns and identifying disturbances, it learns to predict future occurrences. The ultimate goal is to be capable of putting about 80% of standard interactions on autopilot and provide expert guidance to less experienced operators and maintenance staff for the remaining 20%.

OPEN. OPEN. OPEN.

Customers are screaming for supplier standards and open platforms – to tear down the legacy walls and make it easy to plug and play. Metris UX plugs and plays in an open platform environment very easily. It has a high-quality and widely accepted run-time kernel. Its block language is simple and powerful so that mill staff can easily add or change functions without deep programming expertise. Its architecture is in line with Time Sensitive Networking (TSN), Namur (German), and the Open Group international standards. It is "configured" rather than "programmed" so that sub-systems and functions can be easily linked together using a highly graphical, functional interface.

With Metris UX as the digital backbone, applications for plant performance and maintenance management are quickly scalable from single machines to entire smart factories due to an all-in-one database covering all areas. Using Sophia (the Metris Virtual Assistant), mill personnel can search for information to make better decisions.

There is a clear need in the pulp, paper, and power industries for vendor-independent automation solutions that will help mills foresee digitally – and ANDRITZ Automation is delivering these solutions.

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New Orders

Africaine Paper Mills (APM), Algeria
Tissue machine including stock preparation and approach flow system

Bracell, Lençois Paulista, SP, Brazil
Woodyard with four chipping lines and smart woodyard products, two fiberlines with LoSolids continuous cooking, EvoDry Pulp Drying System with two pulp drying lines and one of the world's largest shoe presses, and HERB recovery boiler for flexible kraft and dissolving pulp production line

JK Paper, CPM Songadh, India
Recovery boiler and recausticizing plant

JSC Volga, Balakhna, Russia
Conversion of former groundwood reject system to TMP line

JSC Ilim Group, Ust-Ilimsk, Russia
Wood processing plant with two debarking and chipping lines including Smart Woodyard control system, two complete kraftliner fiberlines, new HERB recovery boiler, lime kiln upgrade with LimeFlash and recausticizing line modernization for the "Big Ust-Ilimsk Project"

Metsä Fibre, Joutseno, Finland
Upgrade for lime kiln flue gas scrubber

MG TEC Industry, Dej, Romania
Two *Prime*LineCOMPACT V tissue machines including stock preparation and approach flow systems

Orient Paper Mills Prop. Orient Paper & Industries Limited, Amlai, India
HERB recovery boiler

Papierfabrik Palm, Aalen, Germany
Complete reject treatment and sludge handling system

SCA Obbola AB, Obbola, Sweden
Capacity upgrade of recovery boiler

St. Gobain Adfors, Litomysl, Czech Republic
Wetlaid line for glass fiber veils including stock preparation, former, and binder wire

Stora Enso, Oulu, Finland
Production technologies and key process equipment for rebuild of the fiberline and drying machine as well as for modernization of the stock preparation system

Tamil Nadu Newsprint & Papers (TNPL), Unit II, India
Full recovery island – recovery boiler, evaporation plant, recausticizing plant, and lime kiln

UPM, Paso de los Toros, Uruguay
Wood processing plant, fiberline, EvoDry Pulp Drying System evaporation plant, HERB recovery boiler, EcoFluid power boiler, white liquor plant

Start-ups

ENCE Energia y Celulosa, Navia, Spain
Fiberline modernization including CompactCooking G2 plant conversion to LoSolids cooking technology and new DD-Washer; White liquor plant modernization, evaporation plant upgrade and Recovery Boiler retrofit

Helsingør Kraftvarmeværk, Helsingør, Denmark
Biomass-fired EcoFluid BFB boiler

Holmen Iggesund Paperboard, Iggesund, Sweden
Fiberline modernization including new DD-Washer and evaporation plant

Iggesund Workington, Workington, UK
Upgrade of SizePress

LOTUS, Silivri, Istanbul, Turkey
Metris UX for spunlace line

Mondi, Ružomberok, Slovakia
Upgrades of woodyard, ozone stage in fiberline, and recovery boiler

Naberezhnye Chelny Paper Mill, Chelny, Russia
Upgrade of approach flow system, increase of dewatering capacity wire section, upgrade of dryer section, and installation of new FibreFlow drum pulping system

PJSC Kyiv Cardboard and Paper Mill, Obukhiv, Ukraine
Rebuild of packaging paper machine (BM1) with new shoe press and calender

Shouguang Meilun, Shandong Province, China
Chip handling plant, fiberline with continuous kraft cooking, DD-Washers, and bleaching with world's largest ozone stage, 7.5-effects evaporation plant, a surface condenser, firing liquor tank, integrated stripper, and methanol plant, HERB recovery boiler, chlorine and potassium removal system, biomass gasification plant, and a white liquor plant with biogas-fueled lime kiln. ANDRITZ also delivered a mill-wide non-condensable gas (NCG) collection system and two NCG boilers.

Stora Enso Enocell, Uimaharju, Finland
Evaporation plant upgrade

Zellstoff Pöls AG, Pöls, Austria
Complete special paper production plant including stock preparation, MG paper machine (PM3), and related automation

ANDRITZ to supply major pulp production technologies and key process equipment for Bracell's new pulp mill in Brazil

ANDRITZ has received an order from Bracell to supply energy-efficient and environmentally friendly pulp production technologies and key process equipment for Bracell's Project "STAR" in Lençóis Paulista, in the state of São Paulo, Brazil.

ANDRITZ will provide four of the six most important process islands in the pulp mill, which are to be supplied on EPCC (Engineering, Procurement, Construction and Civil Construction) basis:

- A complete Wood Processing Plant using ANDRITZ's proven technologies and including chipping lines, stacker-reclaimer, chip screening, biomass handling with ANDRITZ BioCrushers, and biomass storage.
- An ANDRITZ HERB Recovery Boiler with high steam parameters of 101 bar(a) and 515 °C to maximize power generation.
- Environmentally friendly hardwood Fiberlines that ensure low-effluent emissions and can produce both kraft and dissolving pulp. The cooking plant for the fiberline is state-of-the-art in the continuous cooking process for production of dissolving pulp.
- A new innovative EvoDry Pulp Drying System with energy-efficient pulp drying based on the high-capacity Twin Wire Former technology, with airborne dryers, cutter-layboy and baling lines.

ANDRITZ to supply complete pulp mill to UPM in Uruguay

ANDRITZ was selected by UPM to supply energy-efficient and environmentally leading equipment and processes for all main process islands in fiber production and chemical recovery for their new pulp mill to be built near Paso de los Toros in central Uruguay. This world-class eucalyptus pulp mill will have an annual production capacity of 2.1 million tonnes and is scheduled for start-up in the second half of 2022.

THE ANDRITZ SCOPE OF SUPPLY INCLUDES:

- A complete Wood Processing Plant maximizing utilization of various eucalyptus species.
- The world's largest single-line Fiberline including state-of-the-art LoSolids continuous cooking with efficient heat recovery and unique washing and bleaching technology based on DD-Washers, all contributing towards high-quality pulp, highest operational time, and low chemical consumption, thus having lowest environmental impact.
- A new and innovative EvoDry Pulp Drying System with two energy-efficient pulp drying lines based on the high-capacity Twin Wire Former technology.
- An energy-efficient black liquor Evaporation Plant with a tailor-made process solution resulting in high availability and increasing the overall production and efficiency of the plant.
- The HERB Recovery Boiler features energy-efficient flue gas cooling and feed water preheating technologies to maximize steam production for power generation. The state-of-the-art HERB Recovery Boiler is designed for extended operating periods.
- A biomass Power Boiler based on high-quality ANDRITZ EcoFluid Bubbling Fluidized Bed (BFB) technology. The scope of supply includes a biomass-fired boiler with flue gas cleaning and other auxiliary equipment. The Power Boiler also supplies steam for the mill during start-up. The fuels used are bark, harvesting residues and sludges from the mill.
- A complete White Liquor Plant. The new recausticizing plant includes efficient green liquor filtration with LimeGreen filters – producing clean green liquor and minimizing waste to landfill. The new lime kiln plant includes two lime kilns with high-efficiency ANDRITZ LimeCools.

This major order once again confirms the excellent and long-term business relationship between ANDRITZ and UPM. ANDRITZ also supplied a complete pulp mill in Fray Bentos, Uruguay, which was started up successfully in 2007 and is now owned by UPM.

Participate in our online survey!

The SPECTRUM editorial team is very keen to make sure that you are getting all the stories and content most relevant to what you need. We really enjoy visiting and writing about ANDRITZ customers around the world, as well as bringing you articles on the very latest technology. But it's you, the reader, that we are really working for and your opinions are very important to us.

In terms of content in SPECTRUM, is there something you would like to see more or less of? Is there anything you would like to see covered in greater depth? What type of feature stories are you most interested in? Is it success stories or technology articles that inform and inspire you most?

These and other questions can be answered in our online survey that can be accessed via this QR-code or the following link:

ANDRITZ.COM/SPECTRUM-SURVEY2020

We would really appreciate your valuable feedback to help us continue to make SPECTRUM one of the most-read customer magazines in the global industry.

DID YOU **KNOW** THAT...

... ANDRITZ TECHNOLOGIES ACHIEVE PRODUCTION RECORD AT ELDORADO BRASIL?

The Eldorado Brasil pulp mill in Três Lagoas, Brazil, set an outstanding production record of 5,576 admt/d on September 21, 2019, with ANDRITZ technologies. In addition, production has been running for the past 200 consecutive days without a sheet break on the MS2 line.

The mill was started up successfully at the end of 2012 and has achieved several production records since then. Metris OPP, which is part of ANDRITZ's digital solutions, has been supporting Eldorado Brasil to reach these excellent results. ANDRITZ delivered the woodyard, complete fiberline, white liquor plant, and the new generation of pulp drying plants to Eldorado, including two parallel Twin Wire Former pulp machines, two airborne dryers, two cutter-layboys with 6,670 m working width, and four bale finishing lines.

Get more information at:
ANDRITZ.COM/ELDORADO-RECORD

... ANDRITZ BRASIL AGAIN WON ABTCP "BEST OF THE PULP & PAPER INDUSTRY" AWARDS?

Every year, ABTCP (Associação Brasileira Técnica de Celulose e Papel – the Brazilian Pulp and Paper Technical Association) honors companies that have contributed substantially to technological developments in the pulp and paper industry.

ANDRITZ Brasil has received the best manufacturer award in two categories of this year's ABTCP Awards; for Machines and equipment for pulp production (for the fifth consecutive year) and Equipment and systems for liquor recovery and energy generation (for the second consecutive year).

Get more information at:
ANDRITZ.COM/ABTCP-AWARDS2019

... ANDRITZ AND MONDI MET TO DISCUSS MAJOR TECHNOLOGY TRENDS FOR THE PULP AND PAPER INDUSTRIES?

We were proud to welcome more than 25 members of different mills and locations of the packaging and paper group Mondi at our headquarters in Graz!

We met for two days to talk about the latest innovations and technologies. During the workshop tour and the stock preparation pilot plant visit, our customers had the chance to get insights into our production and trials. It was a great opportunity for networking and exchange of know-how!

Get more information at:
ANDRITZ.COM/MONDIDAYS2019