Magazine of Pulp & Paper // 2022

ANDRITZ

SPECTRUM № 43

CO_2 reduction

in tissue mills // 24

Äänekoski – Predicting The Future // 44

Leipa – Sludge Dewatering At The Highest Level // 52

Celbi – Making Every Fiber Count // 64

CO_2 reduction

in tissue mills

WANT TO STAY UP-TO-DATE?

Discover our latest news, success stories and technological innovations on LinkedIn.

SPECTRUM is published by:
ANDRITZ AG
Stattegger Strasse 18, 8045 Graz, Austria
Phone: +43 (316) 6902 0
E-Mail: spectrum@andritz.com

Editor-in-Chief: Bjørn Hansen
bjoern.hansen@andritz.com
Project Director: Carina Weissensteiner
carina.weissensteiner@andritz.com
Editorial Consultant: Mark Rushton
mark@editorialservicesdirect.com

Editorial Board:
Aline Gomes, Tamara Huber-Huber, Pirjo Nousjoki, Minna Sinijärvi, Ursula Suppanen, Elisabeth Wolfond
Contributing Writers:
Robert Puhr, Jonathan Roberts, Mark Rushton
Contributing Photographers & Providers:
Lars Behrendt, Croce&Wir, Clemens Humeniuk, Robert Illemann, Riku Isohella, Christopher Rausch, Thomas Wedderwille, Daniel Vegel
Layout & Design:
INTOUCH Werbeagentur und Internetagentur, Austria

On the cover: CO_2 reduction in tissue mills (page 24)

ANDRITZ.COM/SPECTRUM-NOW

CONTENTS

A NEW ERA OF OPPORTUNITIES

Facing down the challenges of energy volatility and climate change

There is no doubt that we are experiencing challenging times, particularly when it comes to energy supply and price volatility, and we are fully aware that these challenges are affecting our customers greatly. All of us living on this planet are also experiencing the effects of climate change, which we now witness almost on a daily basis somewhere around the globe.

These kinds of challenges often create new opportunities; as an example, we at ANDRITZ have already been working tirelessly on energy reduction in the pulp, paper, board, and tissue industries. In fact, we are already delivering proven technology that is currently helping our customers in becoming much more energy efficient. These endeavors are part of our strategy to position ourselves firmly for the global megatrends of Decarbonization, Circular Economy, and Digitization. These important megatrends, when addressed in the right way, can truly contribute to a more sustainable future.

Also, through our new initiative towards zero emissions and zero waste in pulp and paper mills, CircleToZero, we are already attracting a lot of interest as pulp, paper, and tissue mills aim to cut waste and emissions. These industries are also growing. So now is the perfect opportunity to be aiming for zero emissions and zero waste together with higher overall resource efficiency that are the main drivers of sustainability.

ANDRITZ solutions in action

In this issue of SPECTRUM magazine, there are some excellent examples demonstrating some of the work we have been doing on these solutions for increasing sustainability at mills, including:

The A-ConApex continuous cooking system that was developed in close collaboration with Altri's Celbi mill in Portugal. The system takes waste from the woodyard in the shape of sawdust, fines, and rejects and turns them into valuable, quality pulp, thus increasing pulp production at the mill by an extra 60 tonnes per day. This is a perfect example of CircleToZero in action; turning what was once waste into a valuable product.

Another example of our technology and expertise in action is at Sofidel's Kisa mill in Sweden. The company has identified an opportunity to reduce CO_2 emissions by 8,500 tons a year at the mill using energy based on locally sourced woodchips and turned into bio-syngas, replacing LPG (Liquefied petroleum gas) for tissue drying. One of the essential ingredients to reach this ambitious goal was to install ANDRITZ Novimpianti air and energy systems technology, which had to be designed and built specially to handle bio-syngas as a new energy source.

Of course, the digitization megatrend has become of major importance to ANDRITZ as we aim to make the fully autonomous mill a reality. In this issue you can read about the step-by-step transformation of the whole recovery island: recovery boiler, white liquor plant, evaporation plant, and power boiler. This digital evolution is no longer a dream; it is right here with us and ANDRITZ is already delivering proven autonomous solutions across the pulp and paper industry.

ANDRITZ can and will contribute towards society by developing technologies that enable respectful and sustainable utilization of our planet's resources, renewable energy through biomass boilers and bio-methanol plants, technology for the recovery of vital chemicals for commercial or own mill use, carbon capture from flue gases, textile recycling, and green hydrogen, to name but a few.

I am pleased and honored to have taken on the role as the new CEO of this company.

Enjoy this latest issue of SPECTRUM!

Sincerely,

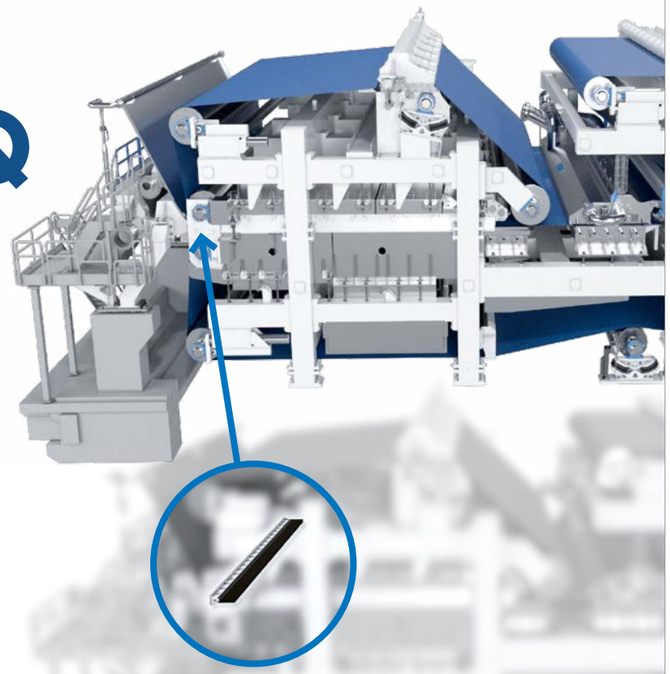
Joachim Schönbeck

President and CEO, ANDRITZ

SPOTLIGHT ON

Sensing wear level to increase plant uptime

Metris DryQ Sensing Sealing Lip



The Metris DryQ Sensing Sealing Lip is able to determine its own wear status and thus fosters the ability to provide predictive maintenance to plant operations.

Plant operations have the opportunity to benefit from the DryQ Sensing Sealing Lip by an increase in system uptime resulting from an online indication of its wear status and a prediction of its end of life, allowing more accurate planning, scheduling, and executing of maintenance work. Furthermore, by integration of the information into the plant's ERP system, the ordering and spare part handling process can be further automated and simplified.

Highest uptime is of paramount importance in order to operate pulp production equipment in a sustainable and economical way. That is why sealing lips, being wear parts, are normally replaced at regular intervals.

ANDRITZ has improved the situation by developing the DryQ Sensing Sealing Lip that detects its wear level and reports online via a dedicated measurement unit to the mill's control system. A sensor strip is embedded in the special carbon fiber sealing lip to deliver information relating to the sealing lip's current condition.

The intelligent sensor features a visualization of the current wear status, including a prediction of the end-of-life that is achieved by combining its own data with the relevant machine information. This information can be exchanged with the mill's distributed control system via standard interfaces, enabling maintenance stops to be planned optimally and with the lowest risk.

METRIS DryQ – DIGITAL PULP DRYING SOLUTIONS

ANDRITZ offers a broad and constantly growing range of digital products and services that help customers enhance plant efficiency, profitability, and ecological footprint through resource optimization, constant achievement of the expected product quality, increases in production uptime, and operator-friendly interfaces. Metris DryQ offers this range of digital pulp drying solutions in the form of Smart and Autonomous Systems, Analytic Solutions, and Connect-to-Expert support, fully specific to customers' needs.

CONTACT US FOR FURTHER INFORMATION:

Georg Brückler
georg.brueckler@andritz.com
or **andritz.com/dryq**

ANDRITZ service center Levice – Support close at hand for your pulping equipment

Extended pulper life-time, optimized process stability and increased production output

We offer upgrades and repairs for all types of rotors and screen plates, independent of the OEM – now also at our ANDRITZ service center in Levice in Slovakia! Thanks to our many years of experience in the development and manufacturing of stock preparation equipment, we can provide a wide range of services for pulping and the surrounding processes, including:

- **Audit and inspections**
- **Restoration of the original rotor geometry**
- **Machining and balancing**
- **Application of wear protection**
- **Upgrading with guide vanes and cutting blades**

In addition, pulping systems can be analyzed for optimizations with the aim of increasing the production output and process efficiency.

We are enthusiastic and we love what we do. We use our knowledge, skills, tools, and techniques to succeed in every area of work.

For further information, visit our ANDRITZ Pulper service website **andritz.com/pulper-service**

Metris Risk-based management – a holistic, factory-wide concept

It is now state-of-the-art that single assets or devices can self-diagnose well, utilizing AI methods and also predict their impending problems. The Metris Risk based management approach goes much further. For the state of health of individual process areas, it will calculate automatically the technical production risk, which can be very high for singular units, but low for redundant concepts.

Risk Based Management (RBM) calculates the complete asset health, together with maintenance risks and Cyber Security vulnerability of the whole factory.

- **Condition monitoring for critical assets (motors, valves, pumps, …)**
- **Calculation of individual production risks (single source, redundant equipment, …)**
- **Embedding maintenance risks (maintenance routes, inspections, …)**
- **Including cyber security risks (vulnerabilities, remote access, …)**

As the industry is heading towards autonomous production, Metris Risk-based Management serves as an integrated layer for stable and reliable processes covering the equipment health and security conditions of the whole mill.

CUSTOMER BENEFITS

- Highest asset availability by means of risk identification with a holistic factory-wide view
- Maximum security through unique approach with embedded OT cyber security vulnerability check
- Excellent efficiency of maintenance resources available, focusing on the "right assets"
- Ideal contribution towards finding the optimum for specific maintenance costs

Watch our video

A tissue breakthrough using annual sustainable fiber.

ESSITY'S CIRCULAR INNOVATION

Essity's mission to produce more-from-less drives an effort to integrate more "circularity" into its business: from responsible raw material sourcing to more efficient production with a smaller climate footprint. The latest example is its innovative project to convert agricultural residue into bleached pulp and utilize it in high-quality tissue products. ANDRITZ is a technology partner in making this happen.

Mannheim mill is Essity's largest tissue facility in Europe with capacity of 283,000 t/a.

MANNHEIM MILL EMBARKS ON A UNIQUE PROJECT

Essity's Mannheim mill is the company's largest tissue facility in Europe with capacity of 283,000 t/a. The mill, which was founded in 1884 as a producer of packaging products, has a long and storied history. The mill has for decades produced sulphite pulp on-site, which is unique in its own right. Adding to its uniqueness, the mill has recently started up a new pulping process that will convert 70,000 t/a of regionally sourced wheat straw into 35,000 t/a of bleached pulp.

"Wheat straw pulping is certainly not new," says Jim Haeffele, Essity's Vice President Technology, Material Breakthrough. "What is unique here is that this is the first large-scale use of bleached wheat straw for tissue production in the world."

The wheat straw pulp is blended with the 220,000 t/a of long- and short-fiber wood pulp to produce a full range of tissue and towel grades, including the company's Zewa brand which is a leading brand in Europe. Tissue and towel products are manufactured on Mannheim's five tissue machines (four conventional and one TAD machine).

SUSTAINABLE FIBER SOURCE

Essity signed a license agreement granting exclusive rights with an American company, Sustainable Fiber Technologies (SFT). SFT developed a proprietary process (the Phoenix Process™) for pulping non-wood raw materials in a way that is environmentally friendly and delivers quality comparable to wood-based pulp at a competitive cost. In this way, Essity can reduce its climate footprint and utilize a material formerly considered to be waste.

ANDRITZ has been working with SFT for a number of years, supplying equipment for SFT's pilot plant and some of the company's commercial applications. As Markus Pichler, Vice President for Mechanical Pulping Systems with ANDRITZ's Paper, Fiber and Recycling Division, explains, "We have done extensive lab trials with SFT for various alternative raw materials at our pilot plants in Austria and the USA. That has led us to exclusively employ the Phoenix Process for pulping non-wood raw materials."

That is why it was a "natural choice" according to Martin Wiens, Factory and Project Manager for Mannheim's wheat straw plant to select ANDRITZ to supply the main equipment. This includes screening, cleaning, dewatering, chemical mixing, heating, bleach tower discharge, and refining systems. Mechanical installation, commissioning, and start-up supervision were also part of the scope of supply.

"We have developed unique processing technology that does not exist anywhere else in the world," Wiens says. "The design is based on the SFT/ANDRITZ pilot work and together we managed to go from concept to reality in a little over two years. That is really impressive!"

BLEACHED QUALITY FOR TISSUE

For the uninitiated, wheat straw is considered an "agricultural residue" – cellulosic material that remains in the farmer's field after a grain harvest. Up to about one-third of the residue can be tilled back into the field to maintain soil integrity, but what to do with the rest? A portion is used for such things as animal bedding.

Haeffele and his colleagues began discussions with SFT in 2017 because Essity was looking to secure wheat straw pulp to replace OCC (Old Corrugated Containers) due to instabilities in the recycled market at that time. "Unbleached wheat straw pulp was being produced at commercial scale primarily for packaging grades, but the more that we discussed the process with Mark Lewis (Founder and CEO of SFT) the more we began thinking about installing our own line for bleached wheat straw pulp," he says.

Lewis was excited by the idea. "We looked forward to working with Essity and ANDRITZ to prove out the pulping and bleaching processes on a large-scale," he says. "Pulp produced with our Phoenix Process has characteristics comparable to virgin hardwood pulp and superior to recycled fiber. The process uses significantly less energy, water, and chemicals than conventional wood pulping and is sulfur-free."

TIMELINE

The 40 MEUR investment in the wheat straw plant was approved by Essity's board of directors in 2019 and construction began in May 2020. The plant started up in August 2021.

→

"By converting agricultural residue into high-quality bleached pulp, we become more circular and can offer our consumers a tissue product with less climate impact."

Jim Haeffele
Vice President Technology
Material Breakthrough, Essity

ANDRITZ supplied most of the main equipment, from technology for cleaning, screening, dewatering, and bleach tower discharge to refining.

The Mannheim mill is receiving its raw material within a radius of about 300 km from the mill.

"The design is based on the SFT/ANDRITZ pilot work and together we managed to go from concept to reality in a little over two years. That is really impressive!"

Dr. Martin Wiens
Factory and Project Manager
Essity Mannheim mill

Unique processing technology

Project activities were performed in parallel, Wiens explains, to keep to an aggressive schedule. "We already had started erection while we were still finalizing procurement of some of the equipment such as piping, equipment, etc.," he says.

As with virtually every project, there were daily surprises in erecting and starting up Mannheim's straw pulp plant. "This mill has been in existence since 1884 and in excavating the site chosen for the wheat straw plant, we found old foundations, tunnels, and other structures that had to be removed and filled in," Wiens says. "Construction occurred during the hottest summer and the coldest winter that we had experienced in Germany in many decades. Just to add to the challenge, we worked through the COVID-19 pandemic as well. Throughout it all, we prevailed and ANDRITZ was a very professional and flexible partner."

"STRAW IS NOT WOOD CHIPS"

In the run-up to the project, several trials for dewatering, refining, bleaching, and the mixing behavior of wheat straw were conducted at ANDRITZ's fiber preparation pilot plants in Austria and the USA. Pichler of ANDRITZ notes, "We were, of course, familiar with the SFT process, but most of our trial work was at small scale. We needed to do extensive testing of the wheat straw to specify the correct machine sizing. We had to confirm our assumptions about pulp properties and fiber development at 100 t/d scale.

"The raw material is so different from wood fibers that it behaves differently in every machine from what was expected," Pichler explains. "We had to confirm our assumptions about pulp properties and fiber development for each process step."

Straw pulp was shipped from SFT's pilot plant in the USA to Graz (Austria) to run dry-crepe and structured (TAD) tissue trials at ANDRITZ's *Prime*Line Tissue Innovation and Application Center (TIAC), the world's most modern tissue pilot plant. "This facility brings together customers, suppliers, and R&D institutes in a very special way to create solutions," Haeffele says. "ANDRITZ's approach to R&D is very sophisticated and professional."

Even with the trials and pilot plant work, there have been surprises – some positive and some challenging. "Producing bleached wheat straw pulp of tissue-grade quality is complicated," Haeffele explains. "Achieving wood-like characteristics for brightness and drainage from wheat straw is not a simple matter. It sounds simplistic, but straw is not wood chips. It has been a learning curve for sure."

"The raw material is so different from wood fibers that it behaves differently in every machine from what was expected. We had to confirm our assumptions about pulp properties and fiber development for each process step."

Markus Pichler
Paper, Fiber and Recycling Division
ANDRITZ

One of the most positive learnings so far is that the wheat straw pulp has excellent strength characteristics. "We originally thought that it would be more of a hardwood replacement," Haeffele explains, "but because of the high tensile characteristics, it is a suitable softwood replacement."

The new cellulose made from straw is as soft, tear-resistant, and highly absorbent as conventional cellulose made from wood fibers. The pulping process uses less water, chemicals, and energy, than wood fiber pulping.

VALUABLE BYPRODUCTS

A byproduct of the wheat straw processing at Mannheim is a lignin (minus the sulfur that is present in wood-based lignin which is produced via standard pulping technologies) that is valuable as a feedstock to produce biopolymers. These biopolymers can replace oil-based chemicals in dust abatement, corrosion inhibitors, binders, feed, cement additives, and other specialty chemicals.

"This fits our more-from-less philosophy completely," Wiens says. "We don't waste anything. We take what used to be agricultural waste and make tissue. From the byproducts, we could even make the packaging for our products – biobased, biodegradable, compostable, and recyclable. This is a real circular economy."

NEW INFRASTRUCTURE REQUIREMENTS

In developed countries, there is significantly more agricultural biomass available than wood biomass. In Europe, Essity estimates that there exists about 15 million tonnes of wheat straw each growing season. Mannheim is receiving its raw material within a radius of about 300 km from the mill, the same radius that they source their wood fiber, according to Wiens. "Since this is a new fiber source for us, and since the fiber procurement is done once per year, we had to develop our own infrastructure for the centralized purchasing, gathering, storage, and transport of wheat straw," he says.

The mill keeps about 1,500 tonnes (five-day supply) at the mill site. The remaining supply is stored at special facilities nearby.

SECURITY AND FLEXIBLITY

"There are many benefits to this project in terms of having an alternative fiber source that meets our sustainability ambitions while reducing our climate footprint and improving our cost efficiency," Wiens says. "Adding to our existing expertise in processing sustainable wood-based fresh fiber and recycled fibers, our growing expertise in processing alternative fibers gives us much more security and flexibility in sourcing. This will allow us to capitalize on fiber availability and pricing in the future."

ANDRITZ bleach tower discharger and MC pump

"Globally, half of all straw goes unused," Haeffele adds. "By converting agricultural residue into high-quality bleached pulp, we become more circular and can offer our consumers a tissue product with less climate impact. Mannheim is showing that there is an alternative way to produce tissue. The world needs alternatives to meet the increasing consumption demands in developing countries."

CONTACT
Markus Pichler
markus.pichler@andritz.com

Consumer demand and textile industry targets are driving the circularity agenda, but it is technology that will actually make it happen.

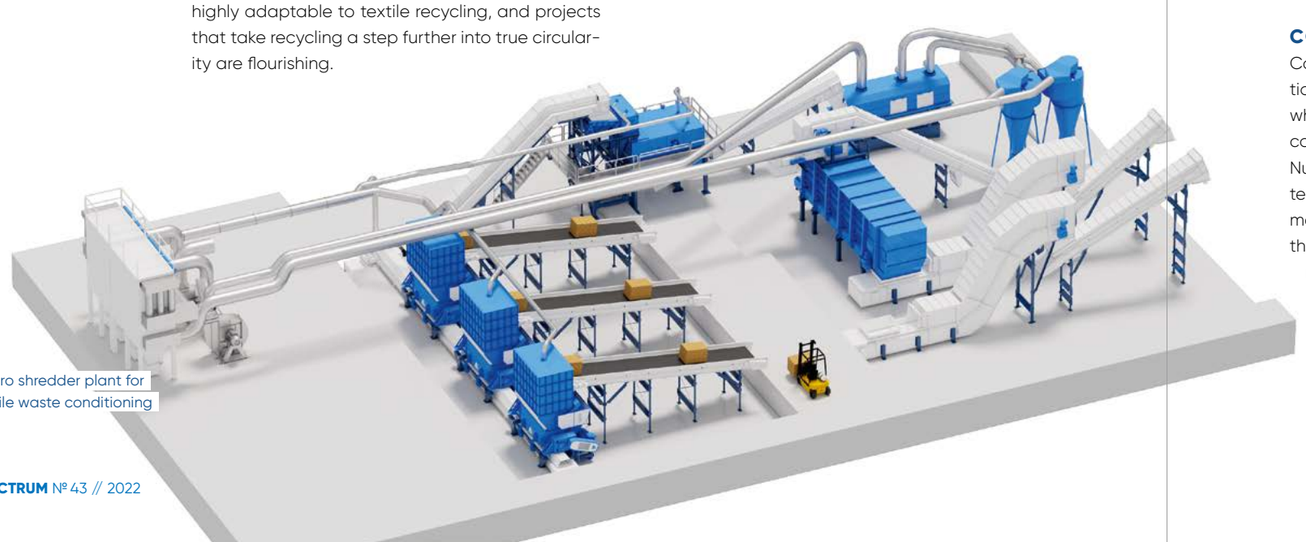
Textile-to-Textile: THE NEW OPPORTUNITY

CHALLENGES. SOLUTIONS.

The world of textiles and the textile industry should be under no illusions about their responsibilities. The price of fast fashion is that making clothes accounts for around 10 % of CO_2 emissions from human activity. Despite the need for circularity in our use of resources, the clothing industry has been fed by a distinctly linear value chain. Clothing is notoriously over-supplied, and while it might be resold, recycled into cloths or insulation, much of it ends up incinerated or in landfill. Textile-to-textile circularity has been conspicuously absent.

But this is changing thanks to media pressure, consumer demand, regulations, and technology. Our ignorance about the price the planet pays for our full wardrobes is at last being replaced by a deep concern about the impact of textiles on the environment. There is also an increasing awareness of the need to make greater use of sustainable raw materials in the fiber and textile production. Meanwhile, existing technologies are proving highly adaptable to textile recycling, and projects that take recycling a step further into true circularity are flourishing.

As part of its Environment Social Governance (ESG) program and with the goal to generate 50 % of its revenue with sustainable products and solutions, the ANDRITZ GROUP is at the core of the movement to provide industrially and economically viable solutions for recycling pre- and post-consumer waste made from natural and synthetic fibers. There is no single, catch-all solution to the recycling of textiles, and this plays to ANDRITZ's strengths because the group has such a diversity of solutions to offer and several cooperation partners covering the value chain from recovery of fibers to chemical modification and preparation for the production of yarn.



ADuro shredder plant for textile waste conditioning

Some solutions are derived from strong expertise in the field of pulp and paper; others have been developed specifically for textiles. As a whole, they offer single and multiple complementary technologies to address the needs of different textile recycling challenges.

What follows is a brief resumé of ANDRITZ's scope of supply for textile waste recycling machinery.

CONDITIONING OF FEED MATERIAL

Conditioning of textile waste lays the foundation for the subsequent textile recycling process, whether it is based on mechanical, chemical, combined, or other customer-specific treatments. Numerous parameters influencing the choice of technology include the nature of the waste (garments, linens, carpets, white/colored textiles, etc.), the feeding conditions (e.g., baled or loose feed material), the required size of the shredded textiles in output, the presence of impurities such as zippers, the output purity, the capacity, and all other requirements of downstream processing.

CIRC and ANDRITZ cooperation includes mechanical, thermal, and chemical process period

ANDRITZ Reject and Recycling offers single equipment units and complete conditioning systems, from material feed and shredding right up to the finally conditioned material. A landmark was ANDRITZ Reject and Recycling's order in 2021 from Swedish company Renewcell for a 60,000 t/a textile recycling line, featuring ADuro shredders, for its first large-scale textile-to-textile recycling plant in Sundsvall. At the same time, shredding systems capable of managing volumes of up to 200 t/d are being developed and optimized in combina- →

tion with the separation technique, based on trials conducted in the ART Center (ANDRITZ Recycling Technology Center) near Graz, Austria.

Complementary to the services of ANDRITZ Reject and Recycling, ANDRITZ Laroche offers a different mechanical conditioning process based on tearing. With more than 2,000 reference projects worldwide offering one of the largest installed bases for textile recycling mills, ANDRITZ Laroche's mechanical recycling process can be preparatory to the following main options: nonwovens production lines, short staple fiber spinning mills for yarn "respinning" with the creation of woven or knitted fabrics, including blends of up to 100 % recycled fibers, or to downstream chemical processes for the production of new man-made fibers if required. Let's look at those markets.

MECHANICAL RECYCLING FOR TEXTILE-TO-TEXTILE

Today, ANDRITZ Laroche offers a complete process range of tearing equipment, from 50 up to 3,000 kg/h, applicable to almost all types of pre-/post-consumer waste textiles with the aim of maintaining the nature of the original fibers by – with cotton for example – maximizing fiber length, strength and feel. Today, Ne24 and Ne30 yarn counts use 70 % recycled cotton fibers in some blends. In addition, the mechanical recycling process uses less water, no chemicals, and allows for a reduced machinery installation footprint.

NONWOVENS BRING NEW LIFE TO TEXTILES

Transformation of recycled textile fibers into technical nonwoven felts is one of the key methods for recycling textiles into new products, and ANDRITZ offers complete nonwoven roll-good production lines to process recycled fibers from textile waste. This includes lines such as spunlace, wetlace, needlepunch, and airlay processes. In general, these lines include fiber opening and blending, fine openers and web forming (in which fibers are treated and laid to form a sheet), web bonding (in which the sheet is entangled/bonded), as well as slitting and winding equipment. New products, such as wipes, building insulation, mattresses, car interiors, and furniture fillings, can be created with these roll goods.

CHEMICAL RECYCLING

Chemical recycling of textile waste is a vital, emerging business area. It is the piece of the puzzle that completes the picture of textile-to-textile circularity. ANDRITZ is a key player because the core process steps involved can use the same equipment as in existing pulp and paper technology, where ANDRITZ is an acknowledged expert.

The process often requires the input of raw material based on a blend of different fibers that have been mechanically treated prior to chemical modification. ANDRITZ has the equipment and expertise to offer technology solutions for new chemical processes according to the customer's needs, including complete production lines and individual equipment for chemical recycling processes such as washing, mixing, cooking, bleaching, and drying.

Depending on the customer's technology solution, cellulose-based fibers and polyester from fiber blends, for example, are further modified to allow them to be used in any textile fiber spinning process (such as viscose or Lyocell production) in the same way as market dissolving pulp.

ANDRITZ AND INFINITED FIBER COMPANY. COOPERATION BRINGS RESULTS.

Infinited Fiber Company and ANDRITZ signed a cooperation agreement in 2020 to develop the process and equipment solutions for Infinited Fiber Company's textile fiber regeneration technology. Under the cooperation agreement, the two companies will work together to develop the factory process and equipment solutions, aiming to optimize every process step in preparation for the technology to be scaled up to commercial production.

Infinited Fiber Company is building a 30,000 t/a flagship plant in Finland, representing an investment of 220 MEUR, which is due to go into operation in 2024. The plant will be one of a kind in the

NOW WE CAN UPCYCLE, TOO

The key textile brands are strongly motivated to find circular solutions and are especially keen to add recycled fiber to their clothes.

So far, recycling of post-consumer textile waste has been limited to the production of lower quality/value products, such as cleaning rags, in a "downcycling" process. Although downcycling is an important part of the complete recycling process, textile waste can now find new life as textile yarn, in an "upcycling" process, and be turned into a product of equal, if not better, quality and value. With this addition of upcycling opportunities to existing downcycling processes, we are seeing a parallel evolution in recycling. The effect on feed material conditioning is that we need to be even more precise in the way we carry out sorting and shredding to create high-quality secondary textile material for subsequent textile recycling process steps.

Michael Waupotitsch
Vice President,
Reject and Recycling, Paper,
Fiber and Recycling Division

Anastasia Zefkili
Head of ART Center,
Paper, Fiber and
Recycling Division

Fiber length, for example, which affects fiber strength, depends on the downstream process, and there are contaminants to manage, attached to the textiles, such as zippers and buttons, and external ones like bale wires. Overall, we are consistently improving process steps with purity up and textile loss down. The choice for the customer is how many process steps they want to include from an investment and capacity point of view. We are here to help ensure the most suitable technology is applied. The ART Center (ANDRITZ Recycling Technology Center) is a valuable tool to achieve this, where shredding is tested in combination with the separation technique and optimized together according to the customer's material and process requirements.

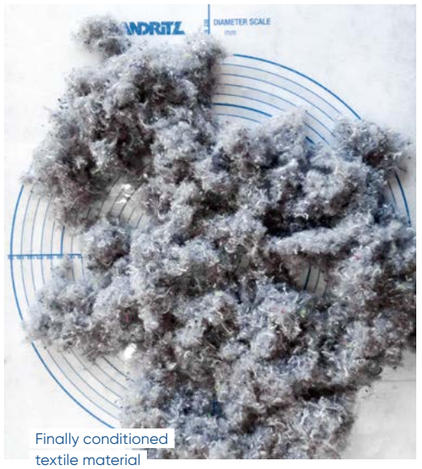
MORE PULL THAN PUSH

Jorma Latva-Kokko
Vice President,
Mechanical Pulping, Paper,
Fiber and Recycling Division

Demand has certainly been a strong driver for the development of circular textile recycling. It's a mammoth problem, but brands and consumers really are waking up to it. There is more pull than push I would say.

It is remarkable how we have been able to use existing pulp and paper equipment for the processing of textile waste, and mostly we are looking at one or more complementary technologies from our various divisions to achieve the desired outcome. To a large extent, the achievement of textile-to-textile recycling is, therefore, an evolution of existing solutions. This is great for customers because it involves less risk for them.

One of our strengths is that we don't have to direct people towards a particular technical solution because we can offer them all. The partnerships we are involved in, most specifically Infinited Fiber Company and CIRC, are the catalysts for big advances in technology. We have learned a tremendous amount from these partnerships – we have caught a big wave.



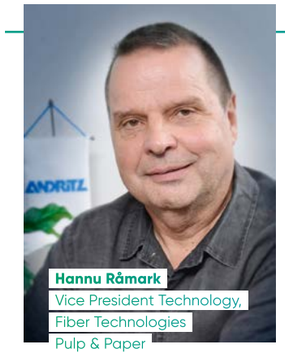
Finally conditioned textile material

ANDRITZ mechanical recycling line based on tearing

COOPERATION IS THE KEY

It was a big feature in the establishment of our cooperation with Infinited Fiber Company that they saw we have so many different technologies, essentially a one-stop shop, and that ANDRITZ Fiber Technologies has the already-validated chemical pulping equipment that is suitable for their needs.

ANDRITZ is happy to work with Infinited Fiber Company to create solutions for textile recycling, especially bearing in mind that the EU Waste Framework Directive legislates that Member States should set up separate collection for textiles by January 1, 2025.



Hannu Råmark
Vice President Technology,
Fiber Technologies
Pulp & Paper

Elina Pesonen
Product Manager,
Fiber Technologies
Pulp & Paper

Alongside our work with Infinited Fiber Company, we have successful collaborations with universities and research institutes, which are particularly strong in the area of chemical pulping and have great facilities. This is helping us take large strides in developing our equipment for chemical treatment of textiles.

world, and Infinited Fiber Company's technology, with ANDRITZ equipment, can be used in new fiber factories or as retrofits in existing viscose fiber lines. At the moment, ANDRITZ is conducting pre-engineering for the pre-treatment of textile waste for the flagship plant.

Infinited Fiber Company's technology can turn any cellulose-rich raw material, including discarded textiles, used cardboard or rice/wheat straw, into Infinna™ cellulose carbamate fibers. These unique, high-quality textile fibers have the look and feel of cotton. In the process itself, impurities including buttons and zippers are mechanically removed prior to a chemical pre-treatment step in which textile colorants and non-cellulosic fibers are separated before pure cellulose is synthesized into carbamate ready to be spun into a CCA fiber.

ANDRITZ AND CIRC: POLYCOTTON PROGRESS

Meanwhile, on the other side of the Atlantic, ANDRITZ signed a cooperation agreement in 2021 with CIRC, located in Virginia, USA, to pool each party's expertise in the field of textile recycling and upscale CIRC's recycling technology for commercial use.

The concept is based on the extraction of both recycled PET and cotton from polycotton to produce new textiles, while only non-recyclable elements like buttons and zippers in the feed material are rejected.

The CIRC/ANDRITZ concept is a combination of mechanical, thermal, and chemical process steps. First, PET is dissolved, separated, and transformed into recycled PET. The cotton released is processed in the fiber line, where the quality is adjusted and all the residuals of PET and other impurities, including dyes, are removed. Recycled cotton can then be used as a feed material in the Lyocell process, for example.

Of course, processing polycotton has its challenges, one of which is to understand end-use requirements and find ways to measure relevant parameters to control final quality and the process as a whole. ANDRITZ has proved the feasibility of the concept in repeated small-scale production runs at its Springfield, Ohio, pilot plant in the USA. CIRC intends to have its first factory up and running in commercial operation in 2024, with ANDRITZ equipment installed.

The CIRC/ANDRITZ concept is a combination of mechanical, thermal, and chemical process steps.

THE FULL SUITE

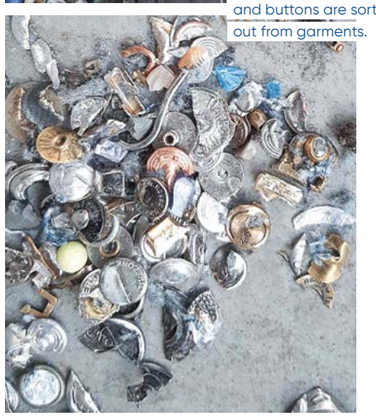
ANDRITZ has the full suite of expertise and technology to provide tailormade textile recycling processes that manage diverse types of textile waste. It also leads the way in research and development, with a worldwide network of pilot plants and technology centers, offering an excellent platform for customer trials and R&D work. In addition, the ANDRITZ GROUP'S capabilities in the field of digital solutions offer an excellent platform to optimize equipment and system performance.

Already a formidable brand across several sectors, ANDRITZ has established itself as a globally operating partner when it comes to textile recycling processes, in a sector in which there is no such thing as a one-size-fits-all solution. Complementary technologies backed by an over-arching vision are the way forward.

With the experience and skills for material conditioning, mechanical, chemical, and combined recycling methods, ANDRITZ cooperates with innovative technology partners and focuses on continuous further development of machinery and recycling processes to accompany the customer throughout the product lifecycle and beyond. Quite simply, ANDRITZ is the partner with the vision, expertise, and capability when it comes to textile recycling processes.

CONTACT
textile-recycling@andritz.com

Impurities like zippers and buttons are sorted out from garments.



THE GAME CHANGER

Chemical and mechanical processes are fully complementary in the drive to achieve the desired end result, but the addition of chemical treatment is certainly a game changer for textile-to-textile recycling.

The great thing with our range of technologies is that we can adjust the process according to the end use. If you require a certain colour of yarn, then this can be achieved through a combination of the choice of textile waste, the use of dyes, and the chemical input – these can all be balanced to optimize the process and minimize the use of bleach, for example.

Alexandre Butte
General Manager,
ANDRITZ Laroche

Charles Junker
Head of Sales,
ANDRITZ Laroche

Our customers come to us with their ideas and raw materials options, and depending on their target, we use our equipment to fulfil their ambitions. We have almost all the relevant technology in our technology center at ANDRITZ Laroche, France, but the ART center in St. Michael, Austria, is a great partner because it has what we don't – shredders, for example – and then there is the pulp testing center in Graz, Austria. We have projects in the pipeline for which we can combine technologies to achieve great things for our customers.

Looking at the costs associated with textile recycling technologies, clearly it makes a difference how much one is paying for the end product. The cost of yarn in a 2.99 EUR T-shirt will have considerably more impact than in a premium item. But industrial scale will bring the price of fiber down, and we need to look at the whole value chain: Through our own development work and in-depth collaboration with, for example, the CETI technical center equipped by ANDRITZ in northern France, we are looking to produce fiber that is easily processable, and this needs to be taken into account when assessing the total cost. Also, with more advanced customers, if it comes to a choice between a virgin fiber and one that is recycled for a price difference of plus or minus 10 %, then it won't be a hard decision to choose the recycled option. It will come naturally.

It is critical that this is driven by the big brands – they are the ones that can really push this forward.

ANDRITZ LAMELLA EVAPORATORS

GROWING TOGETHER TO SERVE

ANDRITZ lamella evaporation plants have proven to be so successful among pulp producing customers that major expansion in manufacturing has occurred three times over the last decade to keep up with the increased orders. The latest addition to lamella manufacturing will see a brand-new state-of-the art facility starting-up in China in the summer of 2022.

There are now some 450 references around the world for ANDRITZ lamella evaporation plants and the unique technology is extremely well received among kraft and mechanical pulp producers alike. To ensure quality standards are kept to absolute top quality, all manufacturing of lamellas is kept in-house at a specialist facility in Tiszakécske, Hungary, and a soon-to-be operational facility in Foshan, China. The new facility now doubles the original capacity of ANDRITZ lamella manufacturing.

"Originally, the lamellas were manufactured in Finland, but as we received more and more orders a new location was needed," says Jarmo Kaila, Global Area Manager, Evaporation Plants, ANDRITZ. "Tiszakécske in Hungary was finally chosen, and it has proven to be the perfect location from which to serve our customers worldwide. The facility began manufacturing lamellas in 2009.

"Order volume has continued to increase ever since the first lamella rolled off the line in Hungary in 2009, and since then we have increased capacity at the site twice as the orders continued to come in. The new facility in China will help us to keep up with demand as well as to better serve our customers across Asia."

And it's not just an increase in orders that ANDRITZ is experiencing; the size of lamella evaporation plants is also increasing. Sanna Semi, Vice President, Evaporation Plants, ANDRITZ, says, "There has been huge activity in the market recently, and plants have quickly risen in capacity in the last ten years from a maximum of 1,500 t/h to our biggest now at 3,500 t/h."

THE SECRET TO SUCCESS

The secret to the success of the ANDRITZ lamella evaporation plants is down to the unique process benefits and easy and safe operation throughout their whole lifecycle. "Our lamella evaporators offer unique advantages that are ideally suited for the modern pulp mills," explains Kaila. "Our process solution is robust, achieving reliable and uninterrupted black liquor processing required by modern, single-line mills. Lamella evaporators also ensure that evaporated water that is returned to the process as condensate is clean, making sure it can be re-used and that no effluent is produced."

"Low vapor velocity inherent to our design is one important aspect for achieving full condensate re-use. In and of itself, it reduces liquor carryover, reducing COD load of the produced condensate. It also makes the system more tolerant to black liquor that has a tendency to foam, again ensuring that liquor carryover to the condensate doesn't happen even during slight upset conditions."

In the case of lamella evaporators, the liquid to be concentrated is on the outside of the heating surface, another major benefit for the high solids effects. "You simply put in some low solids liquid, ideally weak black liquor, and it washes away water soluble fouling with no need to shut down," explains Kaila.

Semi adds, "The unique benefits of the lamella evaporators in very difficult service have also proven popular outside our traditional black liquor evaporator service. For example, our customers in mechanical pulping and other industries use it for effluent evaporation; even difficult effluents can be recycled back to process so raw water use is reduced and emissions eliminated."

The detailed manufacturing methods that go into the making of ANDRITZ lamella heat transfer surfaces are a closely guarded secret.

TECHNICALLY DEMANDING MANUFACTURING REQUIRING HIGHLY-SKILLED PERSONNEL

The detailed manufacturing methods that go into the making of ANDRITZ lamella heat transfer surfaces are a closely guarded secret and a result of decades of development work. The personnel involved in the manufacturing of lamellas have to

"Order volume has continued to increase ever since the first lamella rolled off the line in Hungary in 2009, and since then we have increased capacity at the site twice as the orders continued to come in."

Jarmo Kaila
Global Area Manager, Evaporation Plants
ANDRITZ

"There has been huge activity in the market recently, and plants have quickly risen in capacity in the last ten years from a maximum of 1,500 t/h to our biggest now at 3,500 t/h."

Sanna Semi
Vice President, Evaporation Plants
ANDRITZ

Only the highest quality stainless steel is used to make the lamellas.

Automated manufacturing is used as much as possible during the manufacturing process, but for quality purposes human need is vital.

HIGH-QUALITY MANUFACTURING

acquire new skills. In Hungary, ANDRITZ operates a special school for welders since the skillset required for lamella fabrication is unique.

"We have a unique way of manufacturing the lamellas," says Kaila. "The process involves hydroforming of the lamella, using tools and machinery developed in-house. We only use the highest quality stainless steel, followed by a carefully designed fabrication process. During the hydroforming process we also proof-test each lamella in pressures that far exceed what is required in final use or for pressure vessel testing."

There are thousands of welds needed on each lamella, with a large evaporation plant with all effects adding up to millions of individual welds. Each weld must be perfect. To facilitate this, ANDRITZ uses the very latest in laser welding technology. "This is where excellent quality control and quality assurance are an absolute essential," says Kaila. "We have automated manufacturing as much as possible, but the human need here is vital. In fact, the skilled operators are still the very best quality control instrument in this process."

"Our personnel are skilled and highly experienced," says Róbert Csoke, Operations Director, ANDRITZ. "They can often be seen running their hands over the surface of the lamellas to look for imperfections, as well as being able to identify the quality of weld by the sight and sound of welding."

THE NEW FOSHAN FACILITY

Due to demand for more and more lamellas for ANDRITZ evaporation plants, investment into significantly higher manufacturing capacity was decided. The new location in Foshan, China was decided on due to its proximity to a wider far Eastern customer base. The project is part of a new ANDRITZ (Foshan) Intelligent Manufacturing Co., Ltd, utilizing all the proven machinery, knowhow, and decades of experience in the manufacturing of lamellas and supplementing it with the latest advances in manufacturing automation. The facility will be a close replica of the site in Hungary when it comes to quality manufacturing and accumulated expertise in the making of lamellas. "In Foshan, we have built a brand new facility leveraging the latest technology and automation, which will make it a truly state-of-the-art lamella manufacturing plant," says Kaila. "When it comes to quality and performance, we are leveraging our knowhow and what we do in Hungary."

President of ANDRITZ China, Thomas Schmitz, states, "The global demand for ANDRITZ lamellas and evaporation plants is increasing and we are very proud to be expanding here in Foshan, China. In fact, the Eastern Asian and Chinese markets are particularly showing an increase in demand for our products, with China already being the world's largest producer of paper products and consumer pulp. It is logical that ANDRITZ expand lamella production here."

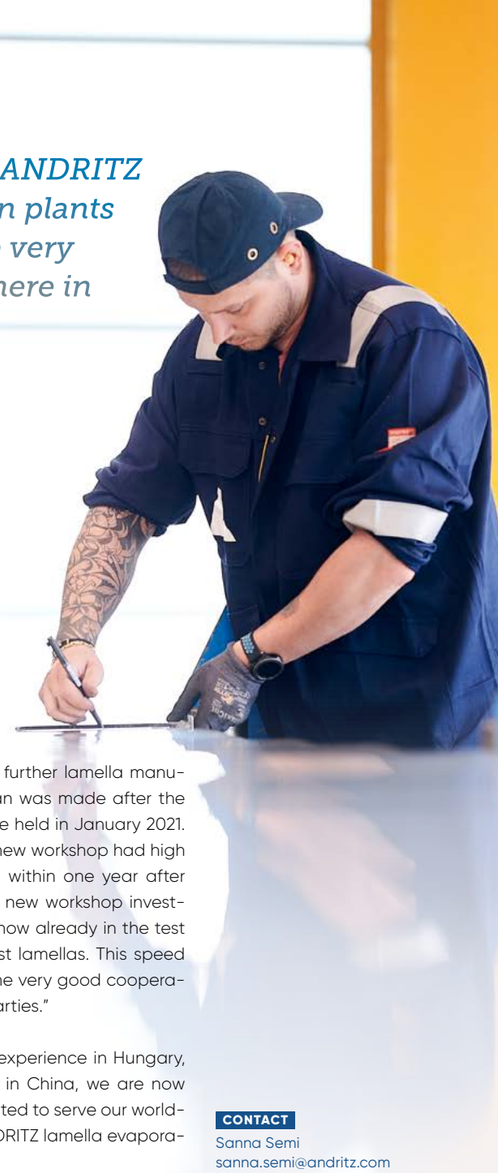
"The decision to invest into further lamella manufacturing capacity in Foshan was made after the first internal discussions were held in January 2021. The implementation of our new workshop had high priority. We are proud that within one year after the final green light for the new workshop investment was granted; we are now already in the test production phase of our first lamellas. This speed and progress is based on the very good cooperation between all involved parties."

"With our tried and tested experience in Hungary, and our brand new facility in China, we are now well placed and ideally located to serve our worldwide customer base for ANDRITZ lamella evaporators," concludes Kaila.

CONTACT
Sanna Semi
sanna.semi@andritz.com

"Our personnel are skilled and highly experienced, they can be often seen running their hands over the surface of the lamellas to look for imperfections, as well as being able to identify the quality of weld by the sight and sound of welding."

Róbert Csoke
Operations Director
ANDRITZ



"The global demand for ANDRITZ lamellas and evaporation plants is increasing and we are very proud to be expanding here in Foshan, China."

Thomas Schmitz
President
ANDRITZ China

The new location in Foshan, China, was decided on due to its proximity to ANDRITZ's wider and growing far Eastern customer base.

Suzano's Fluff Pulp Endeavor:

SERIOUS CHALLENGE – GREAT RESULT

Brazilian pulp giant Suzano is not only the world's largest producer of eucalyptus pulp, it is also a dynamic innovator, intent on taking advantage of the new wave of environmentally sound products that are possible from eucalyptus-based hardwood pulp. ANDRITZ and Suzano teamed up on an ambitious project to convert an existing paper machine to make fluff pulp.

The production of paper products from eucalyptus pulp has come a long way in a relatively short space of time; in fact, just 45 years ago eucalyptus pulp hardly existed. "In that short space of time eucalyptus pulp has become hugely successful in the global market," says Ari Borg, Suzano's Global Fluff Sales and Strategic Projects Director, "with Suzano now being the world's largest producer of eucalyptus pulp."

However, the innovation work doesn't stop, and acting on the saying, "Never put all your eggs in one basket," Suzano has been looking at other ways to enter new markets and develop new products using eucalyptus fiber as a base. Borg adds, "At Suzano, we want to diversify so that we are not dependent on just one line of products."

A SERIOUS CHALLENGE

In 2015, the company began looking long and hard at the growth in hygiene products and the possibility of using eucalyptus to make fluff pulp. After a lot of consultation and internal and external R&D, it was decided that its existing PM5 wood-free coated paper machine, at Suzano's mill in São Paulo, could possibly be converted for the purpose. Suzano also had one more challenging task; the machine would have to be able to switch back and forth from making fluff pulp to coated paper according to the demand for both products.

After deep consultation with various equipment suppliers, ANDRITZ was chosen to convert PM5 to produce Suzano's own Eucafluff pulp for the hygiene market, as well as switch back to wood-free coated paper as and when needed. Alexandre Lanna, Suzano's Executive Mill Manager says, "We were completely reassured that ANDRITZ had the knowledge and history of supplying large assets for fluff manufacturing and drying, as well as machine conversion experience.

"In addition to this, we knew that ANDRITZ has short-fiber eucalyptus knowledge in its DNA, and we were happy that our challenge was accepted."

ANDRITZ developed the design and engineering for the machine conversion with the use of 3D modeling and testing at its pilot plant in Graz. At the time, there was no data for hardwood in relation to making fluff pulp, so this meant major pioneering work taking place on behalf of both companies.

The conversion of PM5, originally built in the 1960s, included changing the original forming section from double to single screen, modification of the press felt circuit, changing the tip passage, and the installation of a steam box. The machine's condensate extraction system was also changed, as well as the winder was refurbished.

"This really was a serious challenge," says Leonardo de Figueiredo, Senior Commercial & Technical Manager, ANDRITZ. "Not only had fluff pulp never been made from hardwood before, there was also a very tight project schedule of just eight months from contract signing to start-up."

FULL ORDER BOOK

The fully converted PM5 started up in November 2015 and for the last three years the machine has been running at 100% capacity. The Eucafluff brand is now well known in the hygiene market as an innovative and sustainable solution that, when applied to absorbent hygiene products, provides more comfort and well-being to consumers, thanks to the unique characteristics of eucalyptus fluff pulp. Eucafluff can now be found in products around the world like: adult and infant diapers, feminine hygiene products, and airlaid and hospital products.

"This really was a pioneering project on behalf of both Suzano and ANDRITZ, and there were certainly some risks involved," says Guilherme Melo, Suzano's Eucalfluff Line Production Manager. "We very much adopted the "learning by doing" concept and a successful path was found thanks to this great partnership."

The entrance into the global fluff market was so successful that the PM5 is no longer converted back to paper manufacturing and now produces fluff pulp 100% of the time.

"We have a full order book and we are constantly completely sold out," concludes Borg. "At Suzano, we are delighted with the way the move into fluff pulp has gone, and along with foreseen 3-4% growth in the market as a whole, the environmental benefits of Eucafluff are also getting a lot of attention due to its low carbon footprint and other environmental benefits.

"We are actively looking at the next steps in the expansion of our Eucafluff journey."

CONTACT
Leonardo de Figueiredo
leonardo.figueiredo@andritz.com

"Eucalyptus pulp has become hugely successful in the global market. We have a full order book and we are constantly completely sold out."

Ari Borg
Global Fluff Sales
and Strategic Projects Director
Suzano

Eucalyptus fluff pulp production line at Suzano's mill

ANDRITZ and Suzano teamed up to convert an existing paper machine to make fluff pulp

TECHNOLOGIES TO REDUCE CARBON EMISSIONS
IN TISSUE PRODUCTION

Even though pulp and paper mills are energy-intensive, our industry is one of the least CO_2-intensive due to the wide use of bio-based and renewable fuels. The tissue and towel sector, however, emits more carbon per tonne of paper than most other paper grades, primarily due to purchased electricity from fossil-fuel sources. ANDRITZ is contributing in many ways to reduce the carbon footprint for tissue production through its "CircleToZero" initiative.

Pulp & Paper production plays an essential role in many countries' economies. While there are industries that emit considerably more greenhouse gas (GHG) emissions than Pulp & Paper, the industry's GHG output (estimated to be about 9% globally) is large enough to attract the attention of governments and consumers.

The GHG most relevant to the paper industry is carbon dioxide (CO_2), with smaller amounts of methane and nitrous oxide. These emissions are generally reported as mass of Carbon Dioxide Equivalent (CO_{2eq}).

Twelve countries account for 80% of worldwide tissue and toweling production. Carbon emissions from the European Union's (EU) paper industry have reduced by 48% per tonne during the period from 1990 to 2019. The EU has defined a set of ambitious targets to limit the increase in average global temperatures. These include reducing GHG emissions by 40% by 2030 and by 80–95% before 2050 (compared to 1990 levels).

Specific electricity consumption for tissue is highest of the standard grades, primarily due to the drying process. In a study of USA mills, tissue production was second highest in total GHG Intensity (behind specialty paper grades) at 1,720 kg of CO_{2eq} per metric tonne of product from fuel, purchased electricity, fiber, chemicals, and transportation.

There are clearly opportunities and challenges for tissue and toweling producers with regards to reducing GHG emissions and strengthening the relationship with consumers who increasingly prefer carbon-neutral products.

PRACTICAL WAYS TO REDUCE TISSUE'S CARBON FOOTPRINT

At a mill site, the actual production of tissue/toweling emits a relatively small amount of GHG, especially if the electricity and steam energy is derived from non-fossil fuel sources. However, in addition to combustion of on-site fuels, the tissue industry is also measured on its use of indirect emissions of GHG due to off-site generation of heat, steam, and electricity that are purchased by or transferred to the mill.

Our challenge as a technology partner with the tissue industry is to not only offer solutions for conserving energy and raw materials within the mill complex – but also to offer solutions that help mitigate or replace GHG emissions from "upstream" sources of fiber, electricity, water, and chemicals.

This work is part of our global "CircleToZero" initiative, an initiative to achieve zero emissions and zero waste. Emissions of all sorts can be thought of as losses or waste. Recovering, reusing, and recirculating these potential losses offer clear environmental and financial benefits for customers.

ANDRITZ offers a variety of practical solutions to reduce a tissue mill's carbon footprint in the categories of energy, fiber, biochemicals, and automation.

UTILITIES	AVERAGE CONSUMPTION	EQUIVALENT CO_2 EMISSION (*)
Gas	~ 600 kWh/t	~ 132 kg CO_2/t
Steam consumption	~ 750 kWh/t	~ 165 kg CO_2/t
Electrical consumption	~ 890 kWh/t	~ 356 kg CO_2/t
TOTAL	**~ 2,240 kWh/t**	**~ 653 kg CO_2/t**
Total per year for production of 200 t/d		**~ 47,081 kg CO_2/a**

Figure 1: Typical consumption data for a dry-crepe tissue machine

STEP-BY-STEP TO CARBON FOOTPRINT REDUCTION

Our observation, based on decades of personal experience serving tissue customers around the world, is that each mill site is unique. Sure, there are product solutions and technology modules that are "building blocks" for a lot of machines and mills. But generally, these building blocks require our design and engineering expertise, working closely with each mill, to achieve the best results.

ANDRITZ offers solutions to reduce a tissue mill's carbon footprint in the categories of energy, fiber, water, biochemicals, and digitalization.

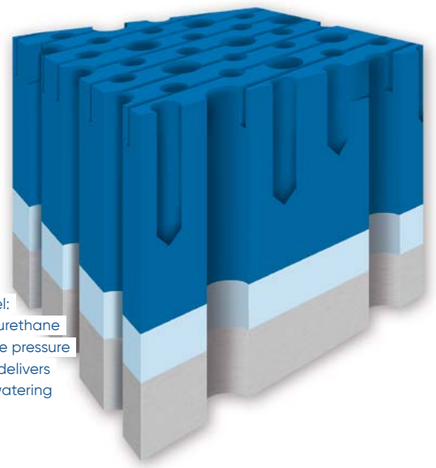


Figure 3: Rebel: Premium polyurethane cover for tissue pressure roll positions, delivers improved dewatering

By our calculations (Figure 1) we estimate that a "typical" tissue machine using conventional technologies (e.g., suction press rolls and cast Yankee) and producing 200 t/d emits just over 47,000 tons per year of CO_{2eq}. This is for the stock preparation system and the machine itself, and not for other upstream or downstream processes.

Some of our technology modules which reduce kilowatt hours per tonne, and therefore CO_{2eq}/t, are shown in Figure 2. Implementing these modules, each of which has its own ROI benefits, makes it possible to reduce kilowatt hours per tonne by up to 17% and CO_{2eq}/t by about 15%. These are significant reductions.

- Designing the approach flow system with double dilution to reduce the energy consumed by the fan pump and screen by about 10%.
- Insulating the heads of the Yankee to reduce energy losses and to reduce steam consumption by about 5%.
- Utilizing vacuum blowers instead of water ring pumps to save about 25% energy in the main motors. The exhaust from the blowers is hot enough to be used in different heating systems and less fresh water is required to operate them.

"One of our major goals is to help our customers to reduce their CO_2 footprint. Our technologies help to reduce the environmental impact without compromising the quality of the end product."

Carlos Gallo
Product Director
Tissue and Drying
ANDRITZ

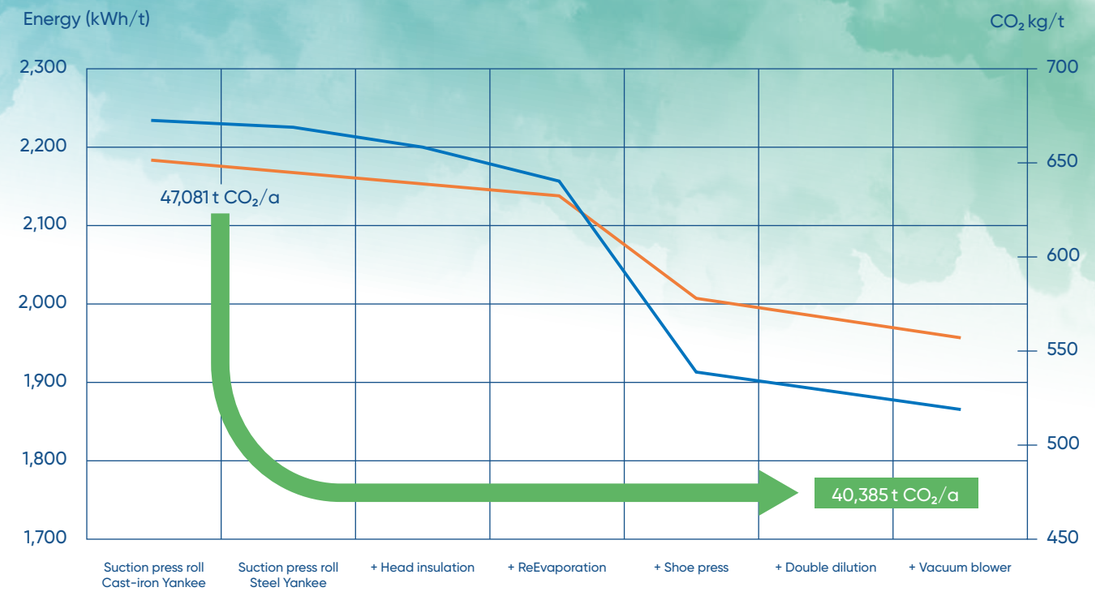


Figure 2: Potential for energy-reduction with ANDRITZ technologies

- Installing a Rebel high-performance roll cover (Figure 3) on the tissue suction roll can improve sheet dryness after the press of 1% and more, allowing a machine speed increase or energy savings in the drying section between 50-100 kWh/t of paper produced. The Rebel can operate without water cooling, permitting energy savings up to 25% of the initial roll driving power requirement.
- Installing a *Prime*Press XT Evo shoe press (Figure 4) to reduce fiber consumption and/or save energy. The shoe press is loaded by two pressurized hoses, allowing a mill to fine-tune the nip profile for maximum dryness, or maximum bulk, or somewhere in-between. If the goal is high dryness, the *Prime*Press XT Evo offers about a 6% after-press dryness gain compared to a conventional suction roll – meaning thermal energy savings of up to 24%. If the goal is high bulk at a target same dryness, basis weight or fibers can be reduced up to 10% – reducing the corresponding CO_{2eq} emissions. In combination with the *Prime*Press XT Evo shoe press, ANDRITZ supplies shoe press belts and press felts to achieve maximum post-press consistency for the lowest possible energy consumption.

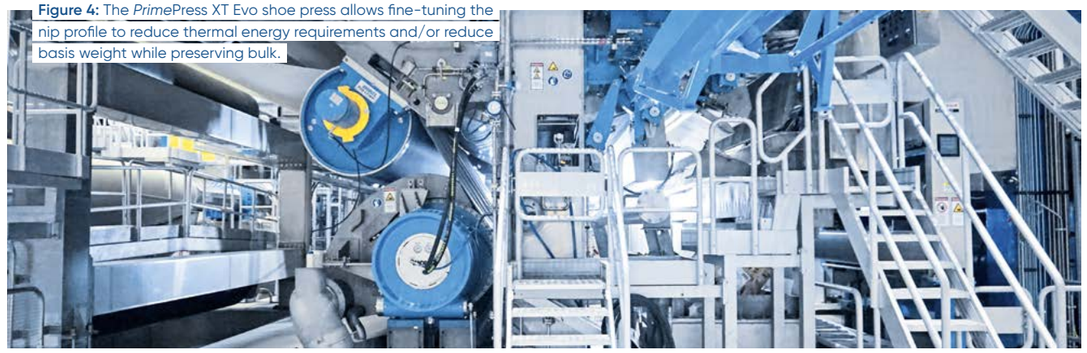


Figure 4: The *Prime*Press XT Evo shoe press allows fine-tuning the nip profile to reduce thermal energy requirements and/or reduce basis weight while preserving bulk.

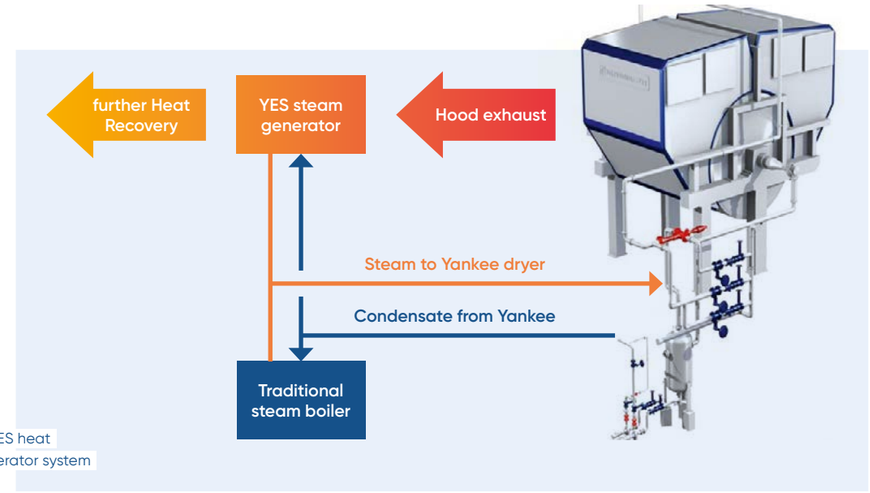


Figure 5: *Prime*Dry YES heat recovery steam generator system

- Installing a *Prime*Dry YES heat recovery steam generator system (Figure 5). Steam is typically produced by a mill's boiler which, due to its ago and steam piping arrangement, may contribute to excessive losses of steam pressure and energy at the tissue machine. Our solution is to use exhaust air from a gas-fired Yankee hood and condensate from the Yankee with a steam generator (heat exchanger) to produce 15% of the steam required for the Yankee, saving up to 5% in thermal energy consumption.

- Installing a larger diameter *Prime*Dry Steel Yankee in combination with a steam-heated *Prime*Dry Hood. Steam generated with biomass is used in both systems resulting in a drying system with zero CO_{2eq} emissions.

- Another possibility is to use biomass to generate renewable bio-syngas to replace fossil fuels when firing the Yankee burners. Sofidel, a major European tissue producer, entered into a long-term collaboration with Meva Energy to build and operate a syngas generation plant at Sofidel's Kisa, Sweden mill, utilizing biomass as the feedstock. This will enable the mill to reduce CO_{2eq} emissions by 8,500 t/a. ANDRITZ Novimpianti air and energy and ANDRITZ burner experts are collaborating in the project, which also involves the Department of Energy of Pisa University.

- Some tissue producers are considering on-site cogeneration of electricity, especially when there are no sources free from fossil fuels for purchased electricity. ANDRITZ offers the option to use hot air from the turbine exhaust to heat the Yankee hood, allowing conventional hood burners to be switched off (Figure 6). The hot exhaust air can also be used to generate steam for the Yankee. With cogeneration in place, a mill can be self-sufficient from an electrical view and may be able to sell excess kilowatts to the grid to generate revenue.

- Hydrogen (either purchased or produced on-site via electrolysis) can replace natural gas and significantly reduce CO_{2eq} emissions. Hydrogen can be used to replace 100% of the fuel used to heat the Yankee hood while also partially replacing the fuel used in a cogeneration system. Combustion of hydrogen provides a direct reduction of CO_{2eq} and CO emissions by about 15%.

For mills located in regions where CO_{2eq} emissions are restricted, but there is increasing consumer interest in higher quality products, a new technology *Prime*LineTEX machine (Figure 7) may be worthy of consideration. The *Prime*LineTEX produces a "textured" sheet with quality much better than dry-crepe and close to TAD. The required energy is slightly higher than dry-crepe, but about one-half that of TAD. The higher quality of the TEX products opens the possibility to substantially reduce (up to 30%) the fiber input compared to dry-crepe.

While the reduction in water consumption is not directly related to CO_{2eq} emissions reduction, the transport and treatment of water in a tissue mill require energy and chemicals. We have a portfolio of product solutions to close the water loop in the mill, as well as the ability to recover evaporated water from the Yankee/Hood systems and recirculate it for tissue production.

Current lab trials at the ANDRITZ Tissue Innovation and Application Center ("TIAC") in collaboration with a global leader in chemical supply are designed to develop sustainable and state-of-the-art bio-chemicals for tissue production. These bio-renewable products will contribute to overall carbon emissions reductions.

Any tissue mill can benefit from digitalization to improve efficiencies and repeatability. Digital solutions such as ANDRITZ Metris are well suited to optimize production while minimizing a tissue mill's total GHG emissions. Since there are very few integrated tissue mills existing today that have access to steam generated by sources free from fossil fuels such as black liquor or wood waste boilers. The Metris APC Tissue Energy Balance solution would be beneficial in minimizing steam and electricity requirements. The result is less of a demand on the mill's main steam requirements, allowing for a reduction in fossil fuel usage (and the corresponding reduction in GHG emissions). Other Metris solutions include advanced dryer controls to save considerable energy with excellent payback. Metris APC solutions enhance the standard regulatory or DCS-level controls found in a typical mill and are specifically focused on optimization of throughput, quality, and cost. A major advantage to tissue producers is the use of integrated Artificial Intelligence (AI) and Machine Learning (ML) in these digital systems, which can duplicate the decisions of the very best operators to avoid sheet breaks and other downtime. These systems also "remember" start-up and shutdown sequences to minimize waste or disruptions and can handle changing conditions and adjust accordingly.

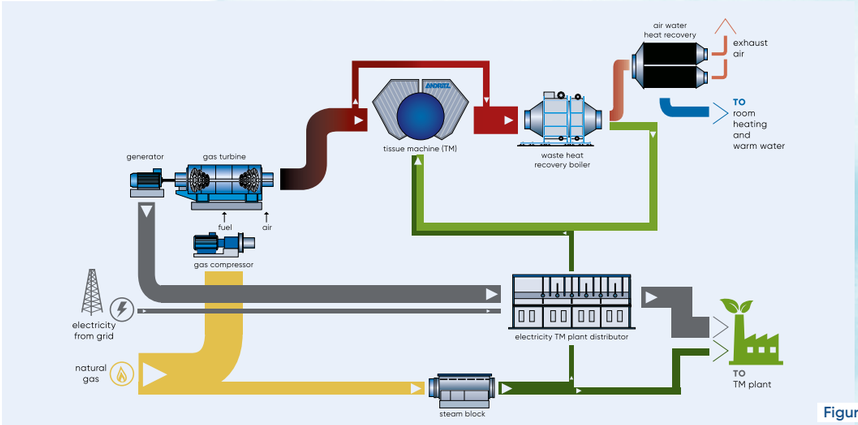


Figure 6: CoGeneration

CONTACT
Carlos Gallo
carlos.gallo@andritz.com

Figure 7: *Prime*LineTEX tissue machine to produce textured tissue of a quality being superior to dry crepe and very close to structured (TAD) tissue, while at the same time achieving significant energy savings.

1917
Workshop was founded

1920
Shipbuilding, steam engines, steam boilers

A POWERFUL SERVICE

FOR ALL REFINERS

1950
Manufacturing of mechanical pulping equipment

1970
Enso-Refiner and Ecofilter

1983
First DD-Washer

1987
Ownership to Ahlström Corp

2002
Ownership to ANDRITZ, first competitor refiner rebuilt in the Service Center

2020
Test Bench rework

2022
Further upgrades, e.g., AdvaCon

Alignment in ANDRITZ Test Bench

Twenty years ago ANDRITZ rebuilt the first competitor refiner at its Savonlinna site in Finland. Since then a huge amount of development has taken place and now the refiner service division is truly global in its scope. The division offers service and maintenance of several kinds and types of refiners independent of the OEM.

The Savonlinna site is located northeast of Helsinki, in Finland and has quickly evolved as a dedicated, high-performance service center for almost every refiner operating globally in mechanical pulping and MDF industries. Historically, there has always been a lot of experience in pulp service know-how on the site; the workshops were first built over 100 years ago and were formerly owned by pulp and paper giant Stora Enso, followed by Ahlstrom, before finally being taken over by ANDRITZ at the beginning of 2000.

Savonlinna is well known in the pulping industry for the supply of the DD Washer, one of ANDRITZ's foremost and successful pulp washing products. Tomi Talka, Global Product Manager, Refiners, says, "The site at Savonlinna is perfect for us, we have a lot of skill sets here, and with the DD Washer manufacturing site right next to us we have excellent access to personal expertise as well as machinery facilities.

"This allows us to be one of the top developers and to provide a high-performance service for around 75 different refiner types or models that are transported in from all over the globe, mainly our competitors' models and products. All of this success would not have been possible without the team we have created over the past years and without the personal passion and commitment of each and every member at all levels."


Savonlinna site in Finland

Test Bench in action

We use these measurements along with a deep understanding of the refiner designs based on the refiner families manufactured by ANDRITZ (Sprout, Bauer, Hymac, Pilão, Enso) but also the knowledge we have gleaned from the non-OEMs."

This combination of selecting the best features out of each design has led to multiple different upgrades: for example, the hydrodynamic thrust bearing for RGP refiners that allows higher production while extending the lifetime.

After the upgrade has taken place, each refiner goes through a rigorous test on specially developed test benches to ensure they are operating at the highest quality and efficiency.

"The test benches are a vital addition to our service offering with each refiner undergoing an average of eight hours of heavy testing before they are sent back to the customer," adds Kaiser.

The latest update of the test benches has seen the testing area now completely enclosed inside a noise cancelling room for a safer working environment. Future upgrades will include an integrated online refiner protection and condition monitoring system, the ANDRITZ AdvaCon.

Like our company vision claim 'The world keeps changing, our passion stays the same', "We are ever curious, and ready for whatever comes next in the world of refiner maintenance and service," concludes Kaiser.

SERVICE FOR ALL REFINER DESIGNS

ANDRITZ focuses on servicing and maintaining refiners for the pulping processes across the mill including chip washing, impregnation, HC refining, MC bleaching, and steam handling. As well as Savonlinna – ANDRITZ's main site for competitor refiners – there are also four other service hubs specialized in refiners located in Graz, Austria; Brantford in North America; Schuler in Brazil; and Foshan in China.

"In just a short space of time we have shared our global knowledge between all our service centers," says Thomas Kaiser, Director, HC-Refiner Service, ANDRITZ. "The ANDRITZ refiner service has now evolved very quickly from a predominantly spare parts supplier in the mid 2000s to a fully-fledged service offering with a very strong focus on engineering." says Thomas Kaiser.

"Our real strength when it comes to servicing refiners is that we analyze each machine in detail; for instance, we have a calculation of the bearing lifetime based on the operational mode of the refiner.

Watch our video

CONTACT
Thomas Kaiser
thomas.kaiser@andritz.com

CONTACT
Tomi Talka
tomi.talka@andritz.com

DIGITAL EVOLUTION ACROSS THE RECOVERY ISLAND

We are in the middle of a massive digital transformation in all areas of our lives – at home, at work, even in our cars – as digitalization fully enters our lives. The pulp industry has by no means been ignored, and now there are already promising results being seen at pulp mills as the latest in Metris Digital Solutions from ANDRITZ bring major advantages to process islands.

"This is not simply the case of jumping on the digital bandwagon," says Li Liao, Vice President, Automation and Digitalization – SMART Products, at ANDRITZ. "Far from it; digitalization in the pulping process is already bringing major benefits to our customers."

And digitalization of the pulping process really is all about customer benefits. Liao continues, "We know our customers really well, and they are not looking for anything fancy or trendy just because they are digital. They are looking for clear solutions that bring added value, for instance, on how to reduce operating expenses and optimize performance mill-wide."

ANDRITZ has combined its world leading expertise in core pulping technology with the latest in digital innovations that together have proven to reduce emissions and operating costs at the same time as increasing productivity, safety, and chemical recovery of a recovery island. Under the umbrella of ANDRITZ autonomous solutions, there is now a rapid evolution taking place at the heart of the pulping process.

ANDRITZ has been implementing digitalization across the whole pulping process including all recovery islands: recovery boiler, white liquor plant, evaporation plant, and power boiler. Liao says, "ANDRITZ has core expertise, know how, and decades of experience across the whole pulping process. This is why we have full confidence in applying digitalization; we have all the background knowledge we need to create full autonomy across all the recovery islands and then to integrate into the whole mill production process."

Liao compares the digitization process at pulp mills to the structure of an onion, "First of all, there is the core ANDRITZ pulp and paper process, and then we add the different layers of autonomy and digital optimization. This step-by-step process of autonomy of each of the islands gives us the ultimate aim of linking all the processes together on the way to full autonomy."

FOUR STEPS TO FULL AUTONOMY

ANDRITZ has created four steps as a way of achieving full autonomy of the pulping process:

The first level of digitalization in a process island is Operator Assistance, which uses the latest Metris AVA (Advanced Visual Analysis) machine vision technology along with smart sensors to fully inform the operator of what is happening in the process. "A good analogy of this first step is to think about the latest cars. Some cars now, via cameras and sensors, can inform a driver of lane position or distance to the next car, allowing the driver to know where he/she is in relation to the lanes on the road. But it's still "hands on wheel" and the responsibility for safe driving here still rests with the driver," says Liao.

"This is the same with the process islands; the information that comes back via AVA visualization and smart sensors allows the operator to know exactly how the process is performing, so adjustments can be made accordingly."

The next step is Partial Automation utilizing Metris ACE (Advanced Control Expert) solutions, which bring together all the information about what is happening in the process and then allowing automatic advanced process control to take place. "At this stage, using the driving of a car again as an example, this is where basically the car can drive itself. In the case of the process islands, based on the information collected, ACE enables automatic functions to take place in tuning and managing the processes. There are different ACE systems placed across all the recovery islands," says Liao.

Conditional Automation is the third step on the way to full autonomy, where the introduction of robotic technology takes away some of the human activity that takes place in the mill field work. "This is an important step in the automation process where we take certain tasks that are carried out by field personnel and replace them where possible with robotic technology," says Liao. "This is key when we are enabling a much safer operation across the recovery islands, as well as bringing in a more stable operation.

"This step is where we can free people from the field carrying out manual work in inhospitable environments, as well as avoid a lot of people sitting in the control room analyzing data."

The fourth step to the full autonomy of a mill is the High Automation stage. This is where the whole system is connected via Metris Digital Twin, and where the mill can be completely optimized all of the time. When connected to a Digital Twin, process islands are capable of self-optimizing control ready for fully autonomous operation. Liao says, "This is the ideal situation where the Digital Twin from each of the process islands is captured in one platform, making the mill one organic, fully linked operation."

ANDRITZ AUTONOMOUS SOLUTIONS FOR RECOVERY ISLAND

ANDRITZ already has many years of experience in the collection of data using smart sensors, along with its AVA and ACE technologies implemented for autonomous operations across the recovery islands. Now with the implementation of Digital Twin along with the latest in robotic technology, ANDRITZ brings cutting edge autonomous solutions to the market for recovery boilers, white liquor plants, evaporation plants, and power boilers.

RECOVERY BOILER

The main purpose of the recovery boiler is to burn black liquor, generate energy and recover chemicals. For autonomous solutions ANDRITZ focuses on four main areas: capacity, cleanability, safety, and emissions. The central focus on each of these areas is how stepwise autonomy can bring value to the recovery boiler operation with the benefits of increased stability and availability, improved safety, increased productivity, and lower emissions.

ANDRITZ provides the following autonomous solutions for the recovery boiler:

Increased capacity:

AVA Recovery Boiler Toolbox is the base of all autonomy in the recovery boiler, where it continuously monitors the status of the combustion in the boiler using smart sensors to feed back data, allowing operators to make decisions.

Combustion ACE automatically fine-tunes and adjusts the liquor feeding and air distribution controls with the integrated AVA data. The operator still needs to tune few parameters in the process.

Digital Twin continuously calculates the best setpoints for the combustion ACE to achieve full autonomy. The capacity of the boiler will be automatically calculated, allowing for fully optimized boiler operation.

Improved cleanability:

Metris HEWI smart sensors continually monitor the ash load on the superheaters and check for fouling.

Sootblowing ACE, using data from HEWI, provides a dynamic sequence to clean foulings and control the sootblowers when and where needed.

The Digital Twin continually calculates the best setpoints for the sootblowing ACE to achieve full autonomy.

Improved safety:

AVA Smelt Flow Tool visually monitors the buildup of smelt in the spouts on the recovery boiler smelt deck. AVA Charbed Tool monitors the height level of the charbed.

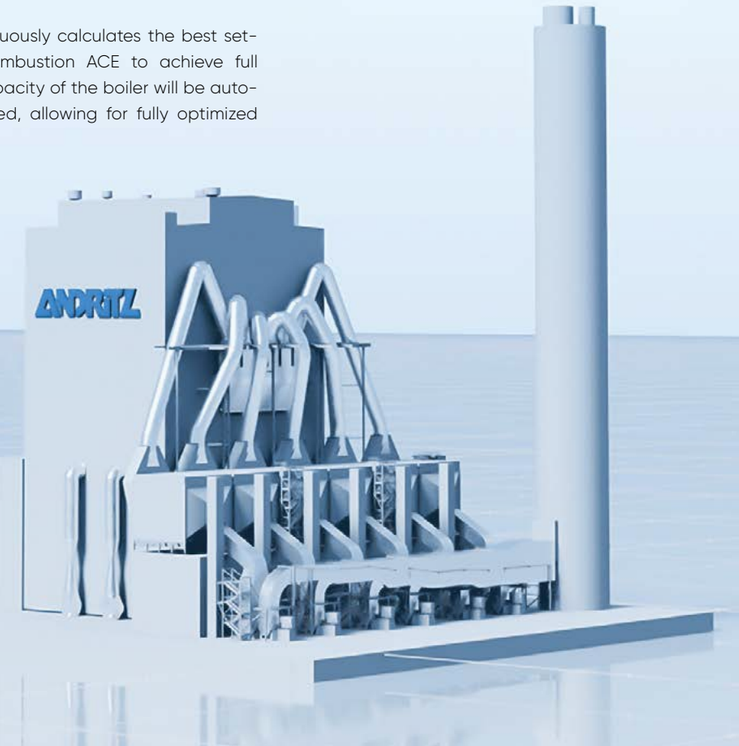
Robotic solutions to free operators from working in a dangerous work environment. Added value comes from operators being free to concentrate on other important operational tasks.

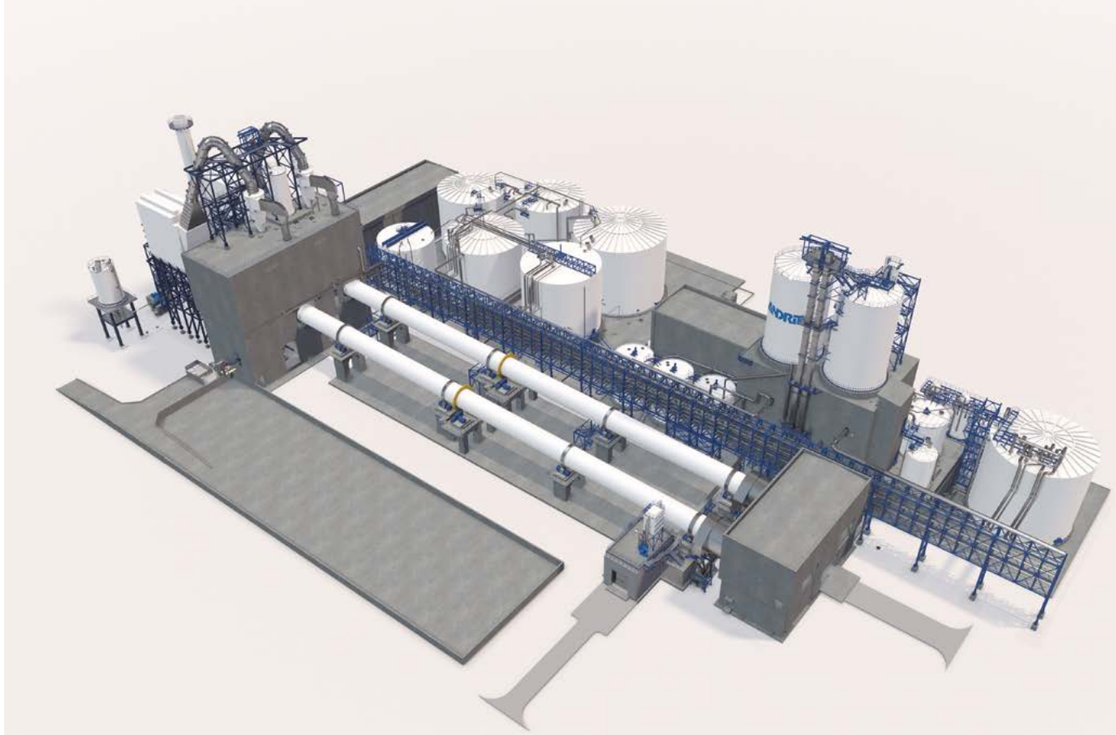
Metris WLA leakage advisor monitoring the potential risks of water leakage.

Reduced emissions:

As all processes have been stabilized and optimized via autonomous solutions, emissions from the boiler will also be reduced accordingly.

Watch our video





WHITE LIQUOR PLANT

The main function of the white liquor plant is to create high-quality white liquor for the cooking process from the green liquor obtained from the other recovery islands. The key is to make sure the plant runs as efficiently as possible by using the minimum amount of heat in the lime kiln. Digitalization and autonomy of the process allows the reduction of any excessive heat consumption and therefore reduces fuel consumption while optimizing the quality of the end product, white liquor.

ANDRITZ provides the following autonomous solutions for the white liquor plant:

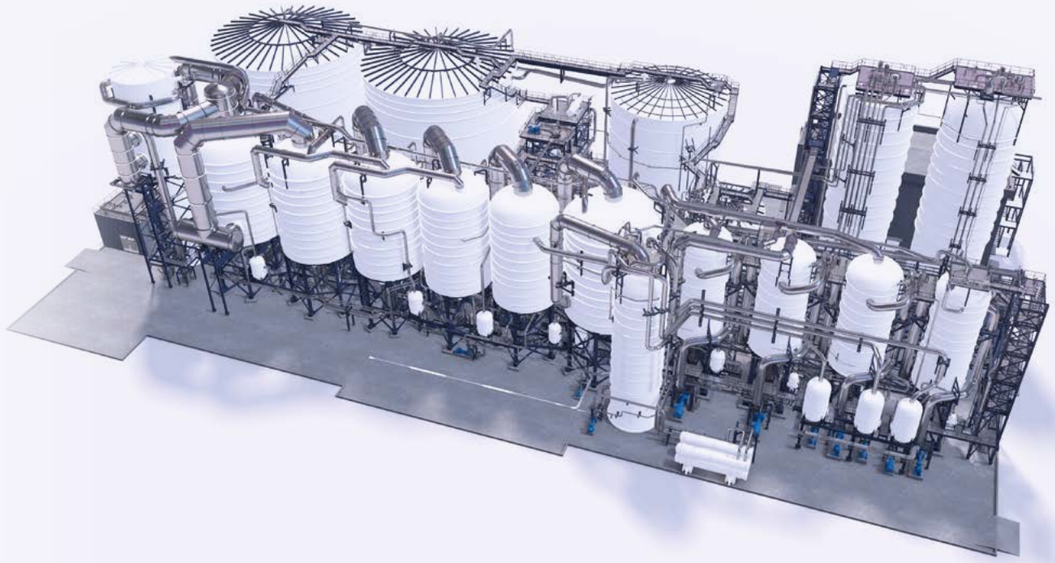
Smart sensors, AVA measurements, and digital advisers act as the "eyes and ears" of the white liquor plant. AVA provides data from the inside of the lime kiln, monitoring the shape and size of the flame. AVA also provides visualization of the kiln bed and distribution of lime pellets.

Two of the latest smart sensor measurement tools developed by ANDRITZ are the LimeDry Solids Analyzer, which measures the moisture of lime mud fed to the kiln, and the Residual Carbonate Analyzer, a quality measurement tool for measuring the residual carbonate level of the burnt lime coming out of the kiln. The digital advisor provides lime kiln condition monitoring, checking on the health of the lime kiln.

Kiln & Gas ACE and Recaust ACE process controls utilize new measurements from level one together with traditional instrumentation. With these, we can partially automate and optimize the process operation in recausticizing, lime reburning, and biomass gasification.

Robotics are engaged in the operation of a residual carbonate analyzer, sampling the lime from the kiln on a regular basis, leading to improved health and safety of operators, at the same time as enabling a high amount of data points.

Digital Twin works closely with ACE by directing the automatic process control instead of being carried out by a human operator. The Digital Twin has the ability to look around and decide on smart setpoints, thus optimizing the process to the full. Digital Twin also has the ability to look ahead and decide on the next setpoints according to the data gathered from the process.



EVAPORATION PLANT

An evaporation plant is utilized to produce a stable, high-solids black liquor stream for efficient combustion in the recovery boiler. Evaporator plant operators often face questions such as: How do I run the plant to minimize operational costs to the full? What rate should I run at to meet the set targets? How soon or often should I wash? What is the maximum capacity I can get right now?

ANDRITZ has accepted these challenges and is developing autonomous solutions for evaporator plant operation that center on how to add value. In the first step, machine vision technology (AVA) collects valuable data and information, supporting the operator in controlling operation and decision making. Amongst others, ANDRITZ offers a soap separation camera and turpentine level camera for the evaporation plant.

The second level of autonomous operations, Evaporation ACE, combines the knowledge and information gathered through machine vision and traditional instruments, thus providing better control of key parameters like dry solids, production rate, storage tank inventory, and fouling indication. Therefore, Evaporation ACE helps in optimizing the evaporation plant's productivity.

A step further takes the Digital Twin. The implementation of the Digital Twin continuously solves the actual and ideal heat and mass balance continuously. It produces real-time data and predictions that can be fed to ACE controllers. One example of the use of Digital Twin in the evaporation plant is washing prediction. Washing the evaporator units is crucial for the evaporation plant to run efficiently. The status of the units is derived from the heat and mass balance that is automatically solved by Digital Twin. With Digital Twin more accurate data can be obtained than by using traditional instruments, allowing operators to plan the operation ahead of time:

Digital Twin data can also feed data to ANDRITZ Smart sequences that can dynamically:

- Decide which unit should be washed based on cleanliness status and the operational situation
- Provide a preventative opportunity wash
- Optimize washing when a bottleneck occurs

The aim of an autonomous evaporation plant is to support customers in maximizing reachable capacity, optimize flows based on feed and product tank levels, and minimize steam consumption, which result in higher productivity and reduced operational costs.

POWER BOILER

The main purpose of the power boiler is to efficiently produce power while keeping the emissions within environmentally safe limits. Today, there is a constant need to improve and optimize boiler performance and decrease the operating and maintenance costs.

Metris BOA – developed by ANDRITZ – is a web app that utilizes live data as well as historical data from the plant to optimize and analyze power plant processes and monitor the equipment installed. Tailored operation advisor apps will actively support the operator in increasing the efficiency of the boiler, detect opportunities to improve consumption values, and help start processes according to operational needs. Furthermore, automatically generated performance reports comparing current data with data from previous periods provide information at a glance for overall management of the power plant. The ANDRITZ Metris BOA platform will be integrated into the control architecture as a third layer of automation and control together with the boiler protection and plant automation systems (DCS).

The software architecture is based on micro-services with standardized communication channels. This makes it possible to tailor Metris BOA to the user's needs.

With the Metris BOA smart solutions, ANDRITZ provides a solution to optimize the following key factors:

- Optimizing performance
- Increasing reliability
- Reducing operating costs
- Optimizing the use of resources

CONTACT
Li Liao
li.liao@andritz.com

Watch our video

"This is not simply the case of jumping on the digital bandwagon. Far from it; digitalization in the pulping process is already bringing major benefits to our customers."

Li Liao
Vice President, Automation and Digitalization – SMART Products
ANDRITZ

BENEFITS

- Increased safety
- Higher availability
- Improved efficiency
- Better transparency of operations
- Optimized productivity leading to stable processes
- Reduced operational costs
- Optimized use of resources
- Reduced time on maintenance

intelligent control systems

Suzano increases availability in Drying with...

The Suzano Unit in Imperatriz, Brazil was able to reduce the unproductive time in Pulp Drying by applying Artificial Intelligence (AI) and advanced controls from ANDRITZ in the tail threading system on its pulp drying machines.

The tail threading system is a very important process during market pulp drying production resumptions. At this stage, stabilizing the dry sheet weight means faster production acceptance on the cutter, reducing process adjustment times for sheet quality parameters. With this challenge in mind, Suzano and ANDRITZ combined their expertise in studies and development of advanced controls with the exclusive technology of Metris UX, leading the Imperatriz Unit mill to improve the production process with enhanced availability of its drying machines.

Metris UX is ANDRITZ's IoT platform that hosts several tools for management and optimization of processes and equipment. The platform is the result of years of knowledge and development of modern technologies that have brought excellent results to ANDRITZ's customers.

At Suzano, the implementation of advanced controls is related to what the company calls "innovability", the union of innovation and sustainability. Edson Hélio, Executive Production Manager at Suzano Unit Imperatriz, says, "Improvement management is applied in conducting initiatives that will help us achieve our goals. Strategic and priority projects are coordinated and reported within a regular project management routine. Within this routine are the projects developed with the ANDRITZ team."

"We increased the availability of the machines, which allowed us to surpass previous monthly production records at the mill."

Edson Hélio
Executive Production Manager,
Suzano Unit Imperatriz

ADVANCED PROCESS AND GRAMMAGE CONTROL IN THE TAIL THREADING

One of the main challenges facing the pulp industry today is to combine cost with guaranteed profitability and product quality.

In the case of the Imperatriz Unit, the project in partnership with ANDRITZ started looking at the downtime of the pulp dryer lines, in which two machines operate. "There was a loss in machine availability due to the time needed to reach the finished product's moisture specification and a low assertiveness in the tail threading due to fluctuations in the sheet grammage," explains Lucas do Nascimento, Production Consultant at Suzano Imperatriz Unit.

PROJECT DEVELOPMENT FOR THE ADVANCED PROCESS CONTROL OF THE TAIL THREADING

The mass balance control to stabilize the grammage was one of the important points for project development, as it was previously done manually. "Thus, under the best process conditions, the average time to carry out the tail threading and have the production acceptance was relatively high and depending on the process conditions could be longer," comments Jhonatas Santos and Job Camargo, OPP Analysts at ANDRITZ.

"We concluded that the time for process adjustments and production acceptance on the machines could be reduced with the application of artificial intelligence added to advanced process controls. In this way, the technology would be used to have the fastest production acceptance on the cutter, reducing process adjustment times for sheet quality parameters," explains Heller Braga, Specialist in Automation and Process Optimization at ANDRITZ.

After a variety of tests, the team analyzed four downtimes that were used as a reference. With this, it was observed that the advanced control managed to reduce the passage time by approximately 40%. According to Hélio, the results created a new milestone for the Imperatriz Unit. "We increased the availability of the machines, which allowed us to surpass previous monthly production records at the mill," he says.

ADVANCED CONTROLS ARE A KEY PART OF THE DIGITAL TRANSFORMATION PROCESS

Advanced process controls are the last instance before formalizing an autonomous industrial mill. They do not replace basic process controls but provide value to what exists. They use information about changing process conditions or constraint influences to make real-time improvements. The objective is to effectively transfer the operators' activities to the automation system.

Jhonatas Santos and Job Camargo, OPP Analysts at ANDRITZ

One of the most important additions to increase machine availability and stabilize grammage deviation in the Imperatriz Unit was the use of virtual sensors. These sensors are utilized by the Digital Twin application that exists in Metris. The Digital Twin uses machine learning to understand the behavior of variables and creates models that will be used to predict new soft sensor values.

The realization of this project, therefore, contributed to turning another page in the digital transformation of Suzano Imperatriz. However, Hélio says that this movement is not just about embedded technologies, it also involves a new way of thinking. "We believe that digital transformation empowers people to use technology in an uncomplicated, intelligent, and agile way," concludes Hélio.

CONTACT
Luiz Vega
luiz.vega@andritz.com

Read the complete story online!

The giant on its way: 26 ft. steel Yankee – manufactured in two halves – for special paper production at Zellstoff Pöls, Austria

The Growth of the ANDRITZ STEEL YANKEE

Yankee service: when analyzing measurement results, the ability to see the bigger picture, meaning the production system and mill as a whole, is of utmost importance.

Nowadays the main part of new tissue machines is equipped with a steel Yankee.

ANDRITZ has developed a worldwide reputation as a leader in the production of steel Yankees for a variety of paper grades and even tobacco machines. The utilization of Yankees generally offers paper producers greater drying performance, and in the case of steel Yankees, even better heat transfer as well as increased safety due to the properties of the fine-grained pressure vessel steel.

ANDRITZ first started investigations into the viability of making steel Yankees in 2007. By 2009, it had already manufactured its first one, a small, 12 ft. diameter Yankee which was sold to Saigon My Xuan Paper, Vietnam. Next was a delivery to APP's mill in Perawang, Indonesia, which was also 12 ft. in diameter.

By 2010, interest was gathering in the installation of ANDRITZ steel Yankees based on the success of the first installations, and the company began manufacturing double wide and larger Yankees, moving up to 16 ft. and then 18 ft. in diameter and, by 2012, it had produced a 22 ft. version.

Fast forward to 2021 and ANDRITZ had now supplied more than 90 steel Yankees around the globe, including the installation of the world's largest steel Yankee – 24 ft. in diameter – at Heinzel Pöls in Austria. Since the first delivery in 2009, not one of the installed Yankees has had to be replaced, illustrating the durability and reliability of ANDRITZ steel Yankees.

Following is an interview with ANDRITZ Yankee experts, explaining the advantages of the technology for various applications in the paper-making industry. ANDRITZ experts interviewed are: Franz Harrer, Head of Technology Tissue; Riccardo Pierini, Steel Yankee Product and Customer Care Manager; and Robert Schloffer, Director Paper Machine Service.

What paper products are Yankees ideally suited for?

HARRER: In general, steel Yankees are mostly used for new tissue machines and rebuilds, including dry-crepe tissue but also advanced technologies such as textured and structured (TAD). It's a matter of fact that the Yankee is not only the heart of the tissue machine but one of the main cost drivers of the tissue production process, and because of its advantages compared to cast iron Yankees, the steel Yankee is the preferred solution.

Step by step, the steel Yankee technology has entered other business areas; for instance, ANDRITZ is an established supplier for Yankees for MG (machine glazed) machines and tobacco paper machines. And this is not the end of the story: drying cylinders of the pre- and after dryer section of paper and board machines can be fully made of steel as well – delivering the same benefits like the larger, single steel Yankees.

Additionally, ANDRITZ supplies Yankees to other industries, including the food manufacturing industry for special drying purposes.

Is the installation of steel Yankees a growing trend?

HARRER: As a Yankee is still a mandatory component for conventional tissue machines, the number of installations is growing. We believe that steel Yankees, in particular, are showing even more significant growth as cast Yankees have their disadvantages and sustainable, energy-efficient, and safe production is nowadays of utmost importance.

What are the main advantages of steel Yankees, either in new machines or in retrofitting one on an existing machine?

HARRER: For new machines, steel Yankees are state-of-the-art technologies based on a number of advantages, for example, better drying performance and more sustainable production than cast-iron models: Steel Yankees with their higher efficiency and steam pressure, together with a shoe press that operates at high press loads offer a remarkable potential for energy reduction. Up to 24% compared to other machine configurations are possible! In combination with steam-heated hoods, the saving potential is even higher.

For Yankee replacements, steel Yankees are the technology of choice. Multiple cast Yankees have a limited lifetime expectancy and therefore must be replaced. When doing such a replacement (steel instead of cast iron), one big advantage is that the new Yankee can be operated at higher pressure, thus providing enhanced performance. This performance increase can be achieved without any changes in the length of the existing dryer section.

However, one of the biggest advantages of steel Yankees is the safety aspects. The ductile material is safer in case of imperfections in the material than the brittle cast iron. Cast iron has the big disadvantage that it could explode without any indications beforehand. In addition, the steel Yankees need less maintenance than cast Yankees.

"With a steel Yankee, consumption will be reduced, or the production increased, which finally ends up in lower CO_2 emissions per ton of paper."

Riccardo Pierini
Steel Yankee Product and Customer Care Manager ANDRITZ

"Because of the unique and patented logistic concept, ANDRITZ is able to provide Yankees up to 26 ft. diameter and with a length up to 8.4 m."

Franz Harrer
Head of Technology Tissue
ANDRITZ

Are there any limitations when it comes to size of Yankee ANDRITZ can produce, either width or diameter?

HARRER: Up to now, ANDRITZ holds the record for the largest installed steel Yankee worldwide. Because of the unique and patented logistic concept, ANDRITZ is able to provide Yankees up to 26 ft. diameter and with a length up to 8.4 m.

ANDRITZ's aim in sizing and dimensioning is to find the most efficient solution for our customers. Depending on the customers' demand taking economic and ecological factors into consideration, the best Yankee size and design is chosen. To guarantee best performance, every Yankee is customized.

DIAGNOSTIC

For a high operation level
- Measurement of crown and wear
- Visual inspection internal and surface
- Chemical/organic coating
- On the run measurement
- Boiler water steam & condensate measurements and recommendations
- Steam and condensate rotary joint check
- Doctor alignment and adjustment
- Yankee performance check

For safety
- Eddy current measurement
- Non-destructive examination (like Ultrasonic single beam, TOFD, Phased Array, Magnetic Particles, Penetrant Liquid, etc.)
- Visual check/measurements

CONSULTING

- **Yankee performance check**
- **Analysis of OTR-measurement and recommendation**
- **Crown optimization**
- **Optimization of the steam and condensate system**
- **Contact drying vs. impingement drying**

How do Yankees stack up when it comes to the environmental footprint and CO_2 emissions?

PIERINI: Compared to cast Yankees, steel Yankees can be manufactured with lower wall thickness thanks to the material properties of steel compared to cast iron. This provides a better heat transfer and more economic use of the steam. All in all, the consumption will be reduced, or the production increased, which finally ends up in lower CO_2 emissions per ton of paper.

SERVICE	EXAMPLES
Mechanical on-site services	Grinding, metalizing, spot-repair, upgrade and repair of internal parts, etc.
Diagnostics and analysis	On-the-run measurement, performance measurement, coating measurements, etc.
Logistics and engineering	Customized rebuild solutions, on-site services, etc.
Performance and consulting	Drying-limit calculation, runnability and energy consumption evaluation, etc.
Troubleshooting	Steam leaking, vibrations, reduced drying performance, wear on doctor blades, soda straws plugging, etc.
Safety and risk management	Lifetime calculation, NDT inspection like ultrasonic, metallurgical, and acoustic sound emission test, etc.

What is special about ANDRITZ Yankees and the way they are manufactured?

PIERINI: ANDRITZ has all technologies around steel Yankees and their whole lifecycle in house, including:

- Full understanding of the papermaking process and technologies
- Dimensioning and sizing of Yankees
- Design, mechanical, and fracture mechanic calculation
- Manufacturing technology
- Metallizing technologies
- NDT (non-destructive testing) inspections at workshop and on site
- Yankee service, audit, and optimization
- Yankee repairs
- Yankee replacements with the new ANDRITZ *Prime*Dry Steel Yankee
- OTR (on-the-run) measurement and troubleshooting
- Full understanding of steam and condensate system

Can you tell us about the service and maintenance ANDRITZ offers to Yankee customers?

SCHLOFFER: A well-maintained Yankee offers a high potential for improved runnability and efficient production – a remarkable competitive advantage for the customer. With our Yankee lifecycle management, we focus on the overall added value of Yankees: from calculation, to manufacturing, metallizing (*Prime*Coat Stratos), operation, and optimization; no matter if the Yankee is used for tissue, paper, or tobacco production.

Manufacturing takes place at the workshops in Europe and Asia

"A well-maintained Yankee offers a high potential for improved runnability and efficient production — a remarkable competitive advantage for the customer."

Robert Schloffer
Director Paper Machine Service
ANDRITZ

Metris Digital Twin in Action at Äänekoski

Predicting the Future

We have heard a lot about the possibility of "foreseeing digitally" when it comes to processes in the pulp and paper industry, but now it's actually happening. Metsä Fibre's Äänekoski bioproduct mill in Finland is predicting the future utilizing the latest digital technology from ANDRITZ for its white liquor plant.

Metsä Fibre's, part of Metsä Group, Äänekoski bioproduct mill is no stranger to the implementation of new technology. In fact, the mill is world-renowned as a leader in the new era of pulp mills as they revolutionize production processes, and become dynamic hubs for the production of bioproducts.

In 2019, the mill was looking to solve issues with its recausticizing plant that was causing variation in white liquor quality. In particular, the mill was looking to install an advisory platform for its recausticizing process to provide enhanced visibility for operators in the white liquor plant.

Matti Toivonen, Metsä Fibre's Vice President of Technology says, "At the outset and start-up of the mill the decision was taken not to have any advanced tools to help the operators so that they learned how to run the process themselves. In the beginning, apart from a few basic controls, the white liquor plant was essentially run manually.

"However, we soon noticed that we were getting a lot of variation in burnt lime and white liquor quality, so it was decided to implement a system to help us solve these issues, as well as give us a good overview of what was happening across the white liquor plant. We turned to ANDRITZ as they delivered the plant and had deep knowledge of the processes, as well as working references using the Digital Twin solution."

DIGITAL TWIN – OPTIMIZING THE WHITE LIQUOR PROCESS TO THE FULL

Metris Digital Twin is a spearhead online tool, powered by IDEAS technology, that provides comprehensive process performance insights for process improvement, operational visibility, and proactive decision-making. The Digital Twin technology can be applied across the mill and in all process islands.

The Digital Twin works in the white liquor plant by directing the automatic process control, a task usually carried out by a human operator. The technology has the ability to look around and decide on smart setpoints, optimizing the process to the full. The technology also has the ability to look ahead and decide on the next setpoints according to the data gathered from the process.

Jani Honga, Manager, ANDRITZ Automation explains, "With the Digital Twin implemented in the white liquor plant, we can predict the behavior of the process in real time by using a combination of virtual transmitters and soft sensors.

"The ultimate goal of the Digital Twin is to stabilize the process and maintain the optimal level of production. The most important factor here is monitoring and managing the causticizing efficiency (CE%), taking out the manual part of the action, and automating the process. Other advantages that the Digital Twin brings are providing visibility of the process, and advising on factors such as production levels and lime mud quality."

The contract for implementing Digital Twin in the white liquor plant at Äänekoski was signed in March 2019 and work began on building the model offline. This was a first not only for the mill, but also for ANDRITZ. By August 2019 live communication with the Digital Twin application was set up and starting to advise the operators by providing predictions and process information. By March 2021 the mill had optimal closed loop control of the white liquor plant, allowing full visibility, monitoring, and maintenance of the process.

The ANDRITZ scope of supply to the mill included a Digital Twin of the recausticizing plant to optimize white liquor quality, along with virtual transmitters.

The outputs now being obtained from the Digital Twin include:

- Early (3 hours) predictions for lime, lime milk, and white liquor quality
- Under and over liming predictions for scheduling white liquor filter washing
- Optimum delta temperature and lime/GL ratio RSP for slaker Digital Twin control (DCS control logic)
- Calculator for production and inventory planning
- Virtual densitometer (GL, lime mud) and white liquor flowmeters for white liquor and lime mud

Toivonen says, "In close collaboration with ANDRITZ's experts we built the system up and to begin with in phase I the Digital Twin was only advising our operators what to do, giving continuous advice and optimum setpoints for the white liquor process operation. We saw straight away the difference it was making to levelling the operation.

"We quickly moved onto phase II and decided to enable the Digital Twin to give the setpoints automatically with only minor operator interaction. Again we noticed that the process was becoming more stable and uniform, automatically adjusting parameters more often and keeping to the set targets much more accurately than was done manually."

Recausticizing plant at Metsä Fibre bioproduct mill at Äänekoski, Finland

OPTIMIZED PROCESS

STABLE PROCESS AND INCREASED CAPACITY

The Digital Twin at Äänekoski has now been running constantly at the mill since April 2021 with excellent results. The closed loop control for causticizing efficiency (CE) (1% increase in CE and a 15% reduction in standard deviation for CE% and efficient alkaline (EA). Operators are regularly using the production calculators for operations planning, and Metsä Fibre is delighted with the metrics and predictions made possible by the Digital Twin.

"We are successfully using the Digital Twin to control the recausticizing in the white liquor plant," says Toivonen. "It is predicting what will happen in the process three hours ahead of time, so the end result is known for the set point of the calcium to be added to the slaker in the recausticizing process.

"We are using the Digital Twin to achieve certain target values, in particular CE% for the end product after the recausticizing process where setpoints are automatically added so we reach the targets in all cases."

Ultimately the Digital Twin has created major improvements across the whole white liquor plant and process, including increasing capacity. Toivonen continues, "The variation in the process is now a lot lower than before the system was in place, which means we can control the level of carbonate in the white liquor. Also, the white liquor used in the cooking process is now more uniform, lowering the risks of impurities in the fiberline. One of the surprises we had with the Digital Twin is how accurate the output is. We estimated that it would be good, maybe 95%, but actually its closer to 99% and often 100% accurate.

"Overall, the Digital Twin is helping us to have a more consistent product at the same time as opening up the bottlenecks in the white liquor plant. This means more capacity in the white liquor plant due to lower variation."

An extra hidden bonus for Äänekoski is the feature of the Digital Twin that will also calculate the quality of the lime mud coming out of the process. This ability has greatly assisted when it comes to washing the white liquor filter. "Traditionally we did a wash, and then there was still an hour of waiting when there was low quality lime mud still coming from the process, which meant another wash. Now the Digital Twin lets us know immediately when the lime mud quality is good, and has eliminated the need for another wash. This again helps us to increase capacity of the white liquor plant.

"We didn't know about this feature when we first implemented the Digital Twin, so we were delighted with the extra bonus."

"We are successfully using the Digital Twin to control the recausticizing in the white liquor plant. It is predicting what will happen in the process three hours ahead of time, so the end result is known for the set point of the calcium to be added to the slaker in the recausticizing process."

Matti Toivonen
Vice President of Technology
Metsä Fibre

ANDRITZ SYNERGY AT ÄÄNEKOSKI

The implementation of the Digital Twin at Äänekoski is part of the ANDRITZ SYNERGY concept at the mill that offers a combination of the latest in technology with in-depth process knowledge.

"The Digital Twin is a good tool to have in the SYNERGY agreement," Toivonen concludes. "It is designed to enable us to have access to deep process knowledge from ANDRITZ, at the same time as implementing the latest digital tools, all in one package."

Hannu Pyykönen, Product Manager, SYNERGY, says, "The implementation of the Digital Twin at Äänekoski is a prime example of how SYNERGY agreements benefit our customers. They are never left alone, our experts are always on hand to provide the very best in process expertise at the same time as implementing the very latest technology.

"We are very pleased with the fruitful and continuous cooperation we have with Metsä Fibre at Äänekoski."

Other SYNERGY agreements in place at the Äänekoski mill include Digital Twin for the cooking process, DD-Washers and Smart Woodyard.

CONTACT
Jani Honga
jani.honga@andritz.com

A new Energy Source. A new Challenge.

NACHHALTIGE LÖSUNGEN & PRODUKTE

ANDRITZ Novimpianti is working with Sofidel on a ground-breaking solution to cut fossil fuel out of the tissue drying equation.

The burning of fossil fuels in industry applications to generate heat and power is one of the greatest contributors to global greenhouse gas emissions, according to the United Nations' Intergovernmental Panel on Climate Change (IPCC). Process heat used in manufacturing represents around 25% of the world's energy consumption. Action to reduce this source of carbon dioxide (CO_2) is therefore one of the main targets under the European Commission's ambition for climate neutrality by 2050. Leading global tissue producer Sofidel is the second-largest tissue producer in Europe and well-known for its Regina brand, among others. The company takes its responsibility to reduce its environmental impact very seriously. A pillar of its strategy is to achieve a 40% reduction in its CO_2 emissions per tonne of paper produced by 2030 compared with the base year 2019. The Science Based Target Initiative (SBTi), which promotes best practices in line with climate science, has approved this target as being consistent with limiting global warming to well below 2 °C.

As part of this commitment, and with the help of ANDRITZ Novimpianti, gasification technology specialists Meva Energy, and the University of Pisa, Sofidel has identified an opportunity for an annual reduction in CO_2 emissions of 8,500 tons through a project at its Kisa tissue mill in the southeast of Sweden. In common with many tissue plants, Kisa uses LPG to generate process heat for tissue drying – for now. Through a 10-year agreement between Meva Energy and Sofidel Sweden, however, Meva Energy will operate a thermochemical conversion plant with the capacity to generate at least 4.2 MW of gas on site at Kisa, based on locally-sourced woodchips as biofuel. During the first half of 2023, the renewable gas production will replace fossil-based LPG for a substantial part of Kisa's tissue drying needs.

According to Meva Energy, on-site generation in combination with not having to refine the gas to pure methane is the basis for reaching a high conversion efficiency along with CO_2 reductions that are more substantial than with conventional types of biofuel. The Meva Energy system also produces biochar, a stable form of renewable carbon that creates a carbon sink and can be used for soil improvement.

"We developed a model for operating the hood that would reflect the change in gas composition from LPG to bio-syngas"

Chiara Galletti
Professor, Department of Civil and Industrial Engineering
University of Pisa

A PAPER-DRYING FIRST

Bio-syngas is not a direct substitute for LPG however. With its lower energy density, bio-syngas requires significant downstream modifications to enable the ANDRITZ 3.4 m CrescentFormer PM3 tissue machine at Kisa to perform to its potential. This is where ANDRITZ Novimpianti has played a vital role with its long experience in air and energy systems for tissue, paper, and board. ANDRITZ Novimpianti Managing Director Luca Linari explains, "This is the first time that syngas or bio-syngas has been used to dry paper – any type of paper. ANDRITZ has several current CO_2-reduction initiatives across its portfolio but this project shows particularly interesting potential. It is a significant step for the whole paper industry and for sustainability but also a stimulating technical challenge."

The different characteristics of bio-syngas compared with LPG mean it is necessary to replace the burners and upgrade the combustion chamber in the hood of Kisa PM3, to ensure the uniform flow of gas and therefore heat that is essential for effective and consistent tissue drying. PM3 will be 100% reliant on bio-syngas for paper drying while PM4 at the same mill will be partially fed by bio-syngas. It is also possible to use bio-syngas to generate electrical power via a turbine, but the Kisa project is focussed on heat for now.

This specific application at Kisa of burners within the hood for tissue drying based on bio-syngas is also a world first for the paper industry.

"The volume of gas is bigger with syngas compared with LPG, which has an impact on the flow, so the main challenge is to keep combustion even," continues Linari. "In addition, the combustion chamber and fans are integrated within the hood on PM3 at Kisa, which means we have less space to work with. But we are confident that the combination of the specially-designed burners and modifications within the hood itself will enable a strong drying performance combined with the crucial environmental benefits which are the main motivation behind this project."

DETAILED MODELING ESSENTIAL

Before Sofidel and ANDRITZ Novimpianti could be confident that the proposed solution for Kisa would perform in practice on the scale of a commercial tissue machine, it was necessary to perform detailed modeling. This is where Department of Civil and Industrial Engineering at the University of Pisa stepped in as an essential contributor to a collaborative feasibility study with Sofidel and ANDRITZ Novimpianti. Professor Chiara Galletti of the University of Pisa takes up the story, "We developed a model for operating the hood that would reflect the change in gas composition from LPG to bio-syngas. The composition of bio-syngas makes it challenging for combustion and thermal power, so using computational fluid dynamics (CFD), we could verify that the new fuel would provide a stable flame and flow of heat without excessive production of CO_2 or pollutants such as carbon monoxide and nitrogen dioxide.

"This was a complex and detailed modeling scenario, involving dozens of processors and numerous simulations that each ran for 10 days or more. But we needed to be rigorous to be sure the combination of Meva Energy's gasification and ANDRITZ Novimpianti's hood technology could produce a stable flame, acceptable emissions, and effective drying performance. The results were very encouraging and not only for this single project. We were also able to simulate other biofuel inputs and establish the scalability of the technology, too."

For Sofidel, Kisa represents a landmark installation, according to Sofidel's Chief Technical Officer Davide Mainardi: "There are many elements to achieving our target of a 40% reduction in emissions by 2030 compared with 2018. Cumulative changes throughout our operations are important: a shoe press, for example, can reduce the energy requirement of a tissue machine with consequent carbon-reduction benefits. But we also need to be ready to take more radical steps and the adoption of bio-syngas at Kisa, which will achieve an annual reduction in CO_2 emissions of 8,500 tons, is a major feature on our roadmap towards 2030 and beyond.

"It's a privilege to be involved in such a landmark project where analysis and innovation can help significantly towards a reduced environmental footprint for a world-class tissue producer."

Luca Linari
Managing Director
ANDRITZ Novimpianti

"The ultimate goal of carbon neutrality will not happen without huge commitment and unprecendented levels of innovation from us and our suppliers. We are looking at many potential solutions to achieve the CO_2 reductions we need, but SBTi has helped define our goals in relation to specific climate targets. As an approach to tackling Scope 2 emissions, this initiative with ANDRITZ Novimpianti, Meva Energy, and the University of Pisa brings concrete benefits which will yield results within a relatively short timeframe. It will also help give us confidence that our interim goal of a 40% reduction in CO_2 emissions by 2030 is achievable with available technology."

With the help of ANDRITZ Novimpianti, Meva Energy, and the University of Pisa, Sofidel's Kisa mill is set to be a reference point for best practice in tissue mills as the tissue sector strives to reduce, and ultimately eliminate, fossil-based CO_2 emissions. The project represents not only a tissue industry first but is pioneering for all process industries. The Meva Energy plant is the first in the world to use bio-syngas (or any form or syngas) for industrial process heat and ANDRITZ Novimpianti has harnessed this capability with an unprecedented solution applicable to tissue manufacturing, which is flexible according to local biofuel sources.

"Science-based targets require a scientific approach," says Linari. "It's a privilege to be involved in such a landmark project where analysis and innovation can help significantly towards a reduced environmental footprint for a world-class tissue producer."

CONTACT
Luca Linari
luca.linari@andritz.com

"The adoption of bio-syngas at Kisa will achieve an annual reduction in CO_2 emissions of 8,500 tons."

Davide Mainardi
Chief Technical Officer
Sofidel

SYNGAS

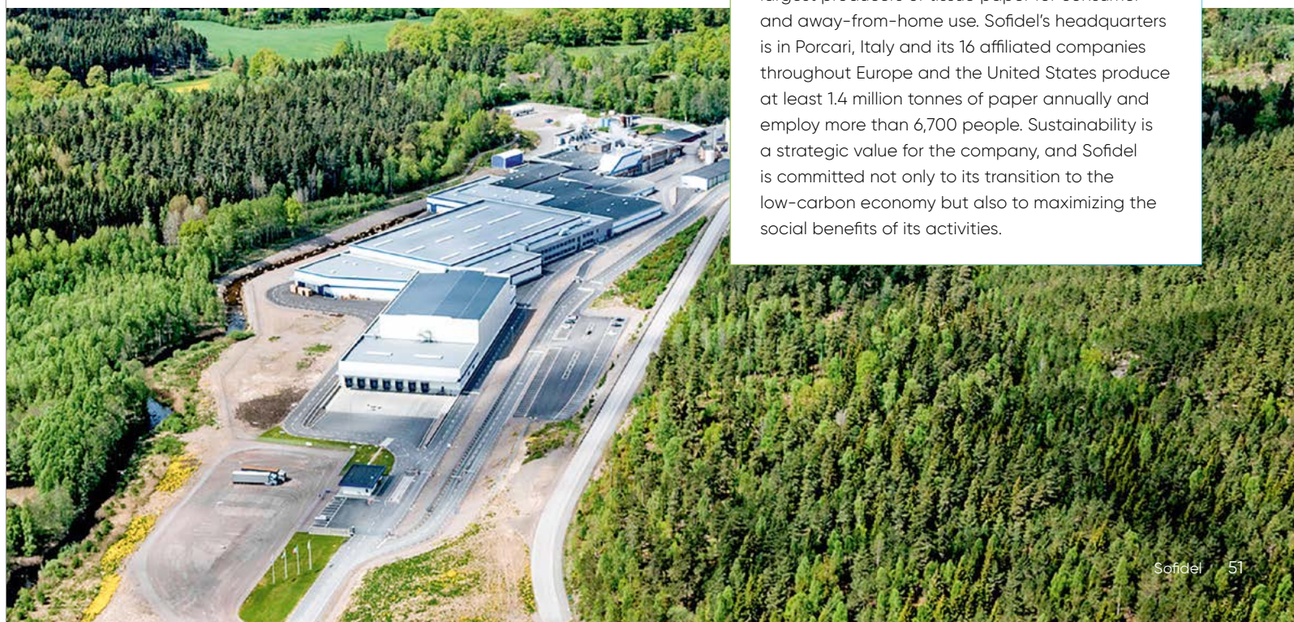
Syngas, short for synthesis gas, is produced by the gasification of a carbon-containing fuel such as coal or, in the case of Sofidel at Kisa, biomass, when it is known as bio-syngas. A challenge with using syngas is its relatively low energy density but it brings benefits of lower carbon emissions and the ability to generate renewable power.

UNIVERSITY OF PISA

Founded in 1343, the University of Pisa can count among its alumni numerous successful and influential technicians active in the paper and tissue industry, as well as two Nobel Prize-Winners in physics. It has a tradition of successful collaboration with industry and its research centres, including the Department of Energy, are recognized internationally.

SOFIDEL

Founded in 1966, Sofidel is one of the world's largest producers of tissue paper for consumer and away-from-home use. Sofidel's headquarters is in Porcari, Italy and its 16 affiliated companies throughout Europe and the United States produce at least 1.4 million tonnes of paper annually and employ more than 6,700 people. Sustainability is a strategic value for the company, and Sofidel is committed not only to its transition to the low-carbon economy but also to maximizing the social benefits of its activities.

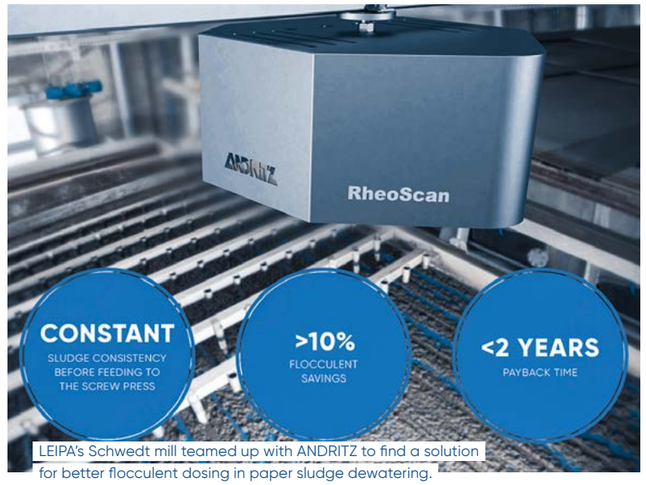


Sludge dewatering at the

HIGHEST LEVEL

ANDRITZ helped LEIPA's Schwedt paper mill reduce flocculent consumption in paper sludge dewatering with Metris addIQ RheoScan, an optical measuring system for automatic polymer dosage. At the same time, this pioneering project has raised the degree of plant automation and increased the operating reliability.

Metris addIQ RheoScan for automatic polymer dosage in real time optimized according to the specific requirements.



LEIPA's Schwedt mill teamed up with ANDRITZ to find a solution for better flocculent dosing in paper sludge dewatering.

Treating waste paper to produce graphic recycling grades is a complex matter. In the deinking process, for example, printing ink is removed from old newspapers with the aid of chemicals and then discarded, creating sludges containing printing ink, filler particles, and other contaminants as a residual product that is difficult to dewater. These sludges cannot be dewatered successfully by mechanical means without adding flocculents. Due to the varying sludge quality and volumes, the flocculent dosage has to be adjusted frequently. If this is not done efficiently, flocculent is wasted.

The LEIPA Group is a family business with over 170 years of passion invested in environmentally-friendly processes and technologies and operates numerous dewatering machines – primarily gravity tables, disc filters, and screw presses – manufactured by ANDRITZ. In 2016, LEIPA decided to tackle the issue of flocculent dosage. In addition to optimizing flocculent dosage, LEIPA set itself the target of increasing the degree of equipment automation at its facility in Schwedt. In search of an innovative solution that achieves both goals, the matter was discussed with longtime partner ANDRITZ. It was soon discovered that the newly developed Metris addIQ RheoScan would be the ideal solution.

SMART AND AUTOMATIC FLOCCULENT DOSAGE

Following initial discussions, a try-and-buy process was agreed at the end of 2018 to upgrade an existing ANDRITZ pre-gravity table with the Metris addIQ RheoScan, which was brand-new at the time. RheoScan is an optical measuring system that detects the current sludge viscosity during the thickening and dewatering process and controls flocculent dosage automatically according to the specific requirements. The product was originally developed for sewage sludges; however, ANDRITZ was happy to optimize it for the paper sludges that its longtime partner LEIPA processes. In order to simplify future upgrades of other machines, LEIPA decided to use its most complicated application for the test installation. The gravity table selected treats sludges that vary widely in their composition, consistency, and feed flow before they are fed to the screw press.

INCREASED AUTOMATION AND OPERATING RELIABILITY

Due to the pioneering nature of the project and the complexity of the sludge conditions on the gravity table, the settings had to be adjusted constantly in order to provide ideal results. After a few visits to the customer's facility and the precisions adjustments made remotely due to the Covid-19 pandemic, it was clear in 2020 that the effort had been worthwhile. Not only is the sludge consistency constant before feeding to the screw press, the goal of 10% flocculent savings was met and even surpassed. As a result, the expected payback time was reduced to less than two years. Now that the most complicated application in the entire plant has consistently provided good results, there is no longer any reason not to upgrade more machines.

"As one of the first customers for a product innovation, we were well aware that the test installation would be a complex matter. Thanks to the excellent cooperation, we were able to optimize Metris addIQ RheoScan for our purposes and increase the operating reliability and degree of plant automation at the same time."

Adrian Lompe
Manager Water Treatment,
LEIPA Georg Leinfelder GmbH

Thai Tiger: BJC Cellox aiming to be #1 IN TISSUE

Thai tissue producer BJC Cellox needed a new tissue line to take advantage of growing demand for its high-quality products. ANDRITZ was chosen to supply a complete turn-key line including a *Prime*LineCOMPACT tissue machine.

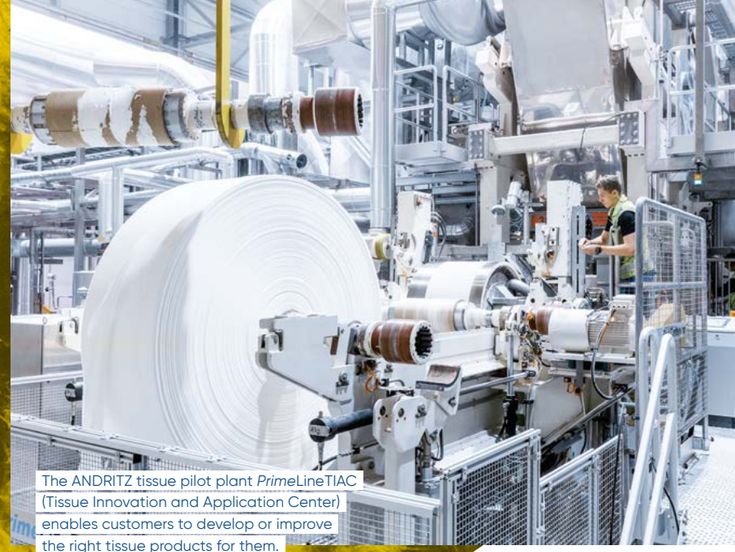
Berli Jucker Cellox (BJC Cellox), first established in 1990, is a dynamic, growing tissue manufacturer located some 150 kilometers southeast of Bangkok, in Prachinburi, Thailand. Since its founding the company has taken advantage of rapid growth in tissue demand in the region, and it now has five tissue machines dedicated to serving the Asian market.

"There is very healthy demand for tissue in Thailand as well as in the surrounding regions," says Apinan Laocharoensuk, Managing Director of BJC Cellox. "It is our aim to be the No. 1 tissue supplier in Thailand, as well as grow beyond our borders into other countries, for instance Vietnam."

The company makes a complete range of tissue products for bathroom, facial, kitchen towel, and napkins under the brand names of Cellox, Zilk, Maxo, Belle, and Hygienist for AfH (Away from Home) products. As well as the domestic market, the company also exports to neighboring countries including Singapore, Cambodia, and Burma.

BJC Cellox is in an excellent position in a region that is only set to grow when it comes to consumption. "In our region tissue consumption per capita is still low when compared to other countries such as Japan or South Korea. In fact, per capita consumption here is just one quarter of the amount of that consumed in those countries," adds Laocharoensuk.

High-quality and energy efficient tissue production at Berli Jucker Cellox



The ANDRITZ tissue pilot plant *Prime*LineTIAC (Tissue Innovation and Application Center) enables customers to develop or improve the right tissue products for them.

ANDRITZ TICKED ALL THE BOXES

To assist in its ambition to be No. 1 and to cope with burgeoning tissue demand, in 2018 the management at BJC Cellox began looking very closely at all suppliers to the tissue industry in search of the best solution for its expansion needs. Laocharoensuk says, "Ultimately we chose ANDRITZ to supply what is now PM 5 as we knew the company was one of the leading suppliers to the tissue industry globally. When commercial discussions began, straight away we had an excellent collaboration."

The company decided on a complete tissue production line supplied by ANDRITZ. The delivery consisted of a *Prime*LineCOMPACT tissue machine with steel Yankee and shoe press as well as a complete stock preparation system, forming fabrics, press felts, and shoe press belts. It also included automation with Metris digitization technology for remote support, which was to provide a vital lifeline during start-up.

The tissue machine has an annual capacity of 35,000 t/y, a design speed of 1,900 m/min and a working width of 2.80 m. The Yankee diameter is 16 ft. The stock preparation system is split into a short and a long fiber line and is equipped with ANDRITZ Papillon refiners with a cylindrical refining zone. Ji Haihong, ANDRITZ Project Manager Stock Preparation, explains: "The special geometry of our Papillon refiners combines gentle and homogeneous fiber treatment. Thanks to the compact rotor design, the refiner concept offers significant improvements in energy consumption compared to other refiners on the market."

"ANDRITZ simply ticked all the boxes with its solution of the complete tissue line," says Laocharoensuk. "In addition, they have a remarkable USP, namely their *Prime*LineTIAC, the world's most modern tissue pilot plant. This gives us the unique opportunity to deeply exchange know-how and to develop our products further and to achieve even better quality. This will bring us ahead of our competition!"

→

"Ultimately we chose ANDRITZ to supply what is now PM 5 as we knew the company was one of the leading suppliers to the tissue industry globally. When commercial discussions began, straight away we had an excellent collaboration."

Apinan Laocharoensuk
Managing Director
Berli Jucker Cellox

"Due to the open communication and absolute respect from both sides, we mastered the challenge."

Tine Kocbek
Project Manager Tissue
ANDRITZ

REMOTE ASSISTANCE DURING START-UP AND FOR ONGOING OPTIMIZATION

The complete tissue production line was successfully started up in early 2021, right in the middle of the worst of the COVID-19 pandemic. A key part of the successful start-up was down to Metris Remote Assistance, which was utilized to the full, allowing ANDRITZ specialists from all over Europe to fully take part in the technical procedures. Some ANDRITZ experts were also on location during the start-up.

"Despite the COVID-19 situation, we had full support from ANDRITZ," says Laocharoensuk. "We had technicians on site, as well as remote assistance and I have to say that our mill team here together with ANDRITZ did a great job and we achieved a remarkable result. We even started up on time."

Tine Kocbek, ANDRITZ Project Manager Tissue, says, "Managing the start-up with remote assistance by experts from our European locations and colleagues on site at Prachinburi was quite an experience, especially in the middle of a serious pandemic. This project to me was like my very own baby, and I must admit I had one or two sleepless nights. However, due to the open communication and absolute respect from both sides, we mastered the challenge."

Remote assistance via Metris has continued as PM 5 now is up and running and adding another 20 t/d of high-quality tissue production to the mill's total output of 90 t/d. Pisit Samatta, Associate Manufacturing Director, BJC Cellox, says, "One of the features we are really pleased with on the new tissue line is the remote assistance we receive from ANDRITZ when optimizing the efficiency of the machine. Specialists are able to see exactly how well the line is running, and offer assistance to optimize the line even further.

"This was really helpful during the learning curve when we started up, and now to have remote assistance whenever we need it has come in really handy."

HIGHER QUALITY, LESS ENERGY COSTS

The tissue line from ANDRITZ is now running at 1,700 m/min producing high-quality tissue at markedly reduced energy consumption. This is due to

Watch our video

*Prime*LineCOMPACT tissue machine with resource saving components

Stock blending system as part of the stock preparation

The combination of a 16 ft. *Prime*Dry Steel Yankee and the latest *Prime*Press XT Evo shoe press technology enables a high drying capacity and achieves remarkable cost savings and operational flexibility as well as improved product quality.

ANDRITZ's focus is on the ever-growing importance of energy savings in tissue production, but it's also down to one of the key components supplied to the tissue line at BJC Cellox; the *Prime*Press XT Evo shoe press.

When used in combination with the steel Yankee, the shoe press dewaters the paper web very gently, but very thoroughly. By doing so it achieves a higher dry content than conventional presses. Due to the special design of the press, and the reduced need for thermal drying, as much as 20% of energy can be saved under optimal operating conditions. In addition, the StrataPress T press felt ensures peak performance in the press section at high machine speeds.

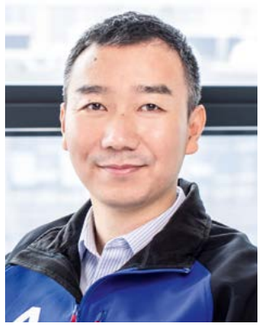
Mr. Chusak Soysungvam, Mill Director, BJC Cellox, says, "We are very pleased with the speed of the machine and the quality of the tissue coming off the new line; the increased bulk of the tissue means we can possibly even enter new markets.

"But what we are really impressed with is the amount of energy we are now saving due to the shoe press using so much less LPG. The shoe press removes a large amount of moisture before the Yankee cylinder, meaning we save a lot of money in the drying process."

With the introduction of the new line from ANDRITZ, BJC Cellox is now well on its way to achieving its ambition to be No.1 in tissue in Thailand. Laocharoensuk says, "We have an ambition to be the market leader in Thailand, which will happen very soon, as well as having our expansion plans into other markets.

"We clearly made the right decision to select ANDRITZ for our PM 5 project. We received really professional and outstanding service and support covering all areas from commercial evaluation, technical clarification, machine installation, and start-up, as well as ongoing support."

CONTACT
Tine Kocbek
tine.kocbek@andritz.com



"Thanks to the compact rotor design, the refiner concept offers significant improvements in energy consumption compared to the market standard."

Ji Haihong
Project Manager Stock Preparation
ANDRITZ China

Getting **TECHNICAL**

STOCK PREPARATION:

Stock preparation system consists of two lines in order to process short-fiber and long-fiber pulp separately, and includes the option of adding recycled fiber. Additionally, the lines are equipped with an approach flow system and Dissolved Air Flotation (DAF) for fiber recovery. The installed water system is designed to minimize water consumption, thus ensuring highest efficiency and sustainable operation.

KEY EQUIPMENT:

- FibreSolve FSV pulpers for efficient slushing at low energy consumption
- Papillon refiners with cylindrical machine concept for optimum development of the fiber potential at low energy consumption as well as for a strong and stable end product
- ModuScreen HB head box screens enabling almost pulsation-free screening at low energy consumption and optimum protection of the tissue machine
- ShortFlow blending systems enable reduced chest volumes in the approach flow and energy savings

TISSUE MACHINE:

The tissue machine has a design speed of 1,900 m/min, a paper width on reel of 2,800 mm, and an annual capacity of 35,000 t. It is equipped with the ANDRITZ *Prime*Control automation system for an optimized production process.

KEY EQUIPMENT:

- **Headbox and forming section:** 1-layer headbox, the optimized step diffusor turbulence generator is constructed of tube bundles with inserts for optimal formation over a wide range of headbox flow rates and consistencies. In combination with the optimized nozzle geometry, gives superior paper quality. The special design features include a low recirculation flow achieved through a tapered header directly mounted to the headbox. The forming section is equipped with TransForm Synergy Plus forming fabrics for faster drainage and superior sheet quality.
- **Press section:** *Prime*Press XT Evo shoe press that ensures both improved dewatering and better product quality, thus reducing the need for thermal drying. As a result, the energy demand of the tissue machine with shoe press is substantially lower.
- **Drying section:** *Prime*Dry Steel Yankee (16 ft. diameter) for drying-efficient and safe operation.
- **Shoe press in combination with the steel Yankee:** The *Prime*Press XT Evo shoe press dewaters the paper web very gently but also very thoroughly. By doing so, it achieves a higher dry content than conventional presses. Due to the special design of the press and the reduced need for thermal drying, energy is saved. Specifically, this means that energy savings of up to 20 percent are possible under optimum operating conditions in combination with the ANDRITZ *Prime*Dry Steel Yankee.
- **Reel:** The secondary arm of the *Prime*Reel is equipped with a nip load compensation system to adjust the nip pressure through the winding process. A reel spool magazine is installed to store the reel spools and to feed them to the reel via the reel spool lift and ensure efficient and automated operation.

Yankee service

Remote support is now a reality

The Tjiwi Kimia paper mill in Mojokerto, Indonesia, produces MG paper on its PM 13, which has a working width of about 7 meters. To produce the necessary gloss, the machine uses a 15 ft. Yankee.

The steam that enters the cylinder on the tender side condenses when it comes into contact with the inside of the cylinder shell, thereby giving off the energy for the drying process. The resulting condensate is transported out of the cylinder by means of the siphon system, which Tjiwi Kimia decided to modernize: „The existing system on the PM 13 was the original one supplied when the paper machine was built. But the demands on the system are great, due to factors such as variable machine speeds and working pressures", explains Reinhard Joebstl, ANDRITZ project manager for this service.

Tjiwi Kimia's mill team

NEW, STATE-OF-THE-ART HEADER AND SIPHON SYSTEM

ANDRITZ has a long-standing relationship with Tjiwi Kimia, having supplied the Yankee originally and assisted with the initial start-up of PM 13, as well as providing support ever since. ANDRITZ's solution in this case was to replace the original header and siphon system with a new, state-of-the-art configuration of the next generation.

Because of travel restrictions due to COVID-19, Yankee service experts had to provide remote support from Austria. Nevertheless, distance was no obstacle to the project's success.

Read the complete story online!

Metris OPP optimizes Suzano Jacareí's digester

and generates greater stability in the process

Suzano's Jacareí Mill saw the cooking process being standardized with Metris OPP. ANDRITZ's advanced controls were able to reduce the standard deviation of the Kappa number and increase pulp mill productivity.

The Kappa number is one of the most important factors for pulp quality and paper composition. It is like this in all mills in Brazil and it could not be different for Suzano's Jacareí. The mill located in the city of Jacareí (SP) has a capacity of 1,070 tkADT/year, has one digester and two bleaching lines. With the optimization carried out by Metris OPP in the mill's digester, it was possible to stabilize the cooking process and reduce the use of chemicals. André Luiz Guimarães, Pulp Production Manager at Suzano Jacareí, considers this project a game changer in the sector: "In fact, when we manage to translate all the variability into a control, which is the main output of a pulp mill, the Kappa number, that's fantastic."

Read the complete story online!

ANDRITZ Smelt Spout Cleaning Systems

Improving Safety in the Recovery Boiler

ANDRITZ Smelt Spout Cleaning Systems are proving to be something of a hit with recovery boiler operators worldwide, with several successful installations and more than 20 new systems on order.

Jarkko Brunou, Product Manager, ANDRITZ Oy says, "We have had an excellent response to our first Smelt Spout Cleaning Systems, which basically use robots to monitor and clear the smelt spouts in the recovery boiler. This is a very hot and potentially dangerous area and using the robotic cleaning systems means that much fewer person-hours need to be spent working on the spout deck.

"Although our first installations have been well received and have been operating successfully, we at ANDRITZ have also learned a lot about how the robots operate in such a harsh environment and because of this we have added a number of new and extra features to our systems."

NEW FEATURES ACROSS THE BOARD

New features that are now available with the Smelt Spout Cleaning System include: a more powerful robot with stronger cleaning power, smelt reduction measurement, a collision-free robotic operation, a new suit, specially designed and built cameras, a smart cleaning function, and tool cleaning station. ANDRITZ has also made installation of the system a lot easier and safer by designing a new robot frame that further increases safety and greatly reduces erection and installation time.

"One of the main advances we have made is to make the robot even more powerful than the previous ones," says Brunou. "They now have a payload of 250 kg as opposed to 150 kg. Added to this, we have updated the tool, which makes it more durable and stable, giving more consistency during spout cleaning."

Another major addition to the system is the new smelt reduction measuring feature, Brunou explains, "This is a world first; we can now automatically measure smelt reductions by taking samples from each spout and measuring them separately. This is a major advancement as the results from the samples are instant. In normal operations, you would have to wait several hours for feedback."

CONTACT
Jarkko Brunou
jarkko.brunou@andritz.com

CONTACT
Walter Scholz-Sommerbauer
walter.scholz-sommerbauer@andritz.com

Read the complete story online!

"By using a robot, we have substantially reduced the physical and also mental strain in this exposed area."

Gottfried Joham
Managing Director at Mondi Frantschach

From left to right:
Walter Scholz-Sommerbauer, ANDRITZ Key Account Manager
Gottfried Joham, Managing Director, Mondi Frantschach
Jarkko Brunou, Product Manager Smeltrobot, ANDRITZ
Michael Gruber, Project Manager, Mondi Frantschach
Stefan Sattler, Head of Project Department Mechanical Engineering, Mondi Frantschach

SMELT SPOUT CLEANING SYSTEM AT MONDI FRANTSCHACH

One of the latest installations of the Smelt Spout Cleaning System took place at the Mondi Frantschach mill in Carinthia Province, Austria, in September 2021.

Michael Gruber, Project Manager at the Frantschach mill says, "At Mondi we are always looking for ways to reduce risks to our employees, and here our focus was the smelt spout area. After looking at various options on the market, we decided upon the ANDRITZ system as it fitted well into the tight area in front of the smelt spouts in our recovery boiler. Another advantage was that our recovery boiler at the mill was delivered and installed by ANDRITZ, which meant there was already a lot of knowledge of the equipment and processes. It also meant that the whole package could be installed with the minimum of fuss as the interfaces were the same."

After some consultation, the contract for a Smelt Spout Cleaning System was signed in January 2021. ANDRITZ supplied a complete system to the mill, including a smelt spout robot with a payload of 210 kg and a working radius of R3100. It also supplied a cleaning station, DCS control, and on-arm cameras.

"We were really pleased at how the installation of the cleaning system went," says Gruber. "Despite a tight space in the smelt spot area and the movement of heavy equipment, ANDRITZ had planned the operation perfectly, with all engineers automatically knowing what they had to do next to ensure a smooth installation."

Gottfried Joham, Managing Director at Mondi Frantschach, sums up the importance of the new system at the mill, "Installation and operation of the new smelt spout robot at recovery boiler #4 has created a milestone in terms of greater work safety in this very challenging environment. By using a robot, we have substantially reduced the physical and also mental strain in this exposed area."

Walter Scholz-Sommerbauer, ANDRITZ Pulp and Paper Mill Service and Mondi Frantschach Key Account Manager, concludes, "It is very nice to hear that our robotic system is fully integrated into the daily business at the mill and that it will lead to improved safety for the customer. We are proud to be a partner with the Mondi Group with our new innovation, which adds to several other references that we already have in our regional market."

CircleToZero:

Working Together on Sustainable Targets

Interview with Naveen Chenna, Head of Business and Technology Development, ANDRITZ

In a nutshell, can you tell us what the CircleToZero initiative is all about?

CircleToZero is a global ANDRITZ initiative with the goal of achieving zero emissions and zero waste at the same time as creating financial growth for customers. For pulp and paper producers this means eliminating unused industry side streams, turning them into new value-added products, and achieving zero waste and zero emission production.

CircleToZero is not only for pulp and paper industries – we also have the initiative implemented into ANDRITZ's other business areas including Separation, Metals, and Hydro.

Can you tell us what sort of response ANDRITZ customers are giving to the initiative so far?

The response has been very good so far and many requests are hitting our mailboxes every day. We think that the tremendous response from our customers is due to the fact that our initiative is aligned with their own sustainable targets, which makes mutually beneficial collaboration and proposals work smoothly and easily.

Do you have any examples of projects you are working on already under the initiative?

We are working with a few customers on confidential projects that are aiming to replace various waste streams and turn them into products. For example, at one mill we are working to optimize the water balances to reduce fresh water use and finding ways to use the effluent emissions. We are also working with another customer to introduce new technology to reduce the impact of solid sludge.

Can you tell us about any new business models that you are encouraging as part of CircleToZero?

This is potentially a game-changing area across the industry. We see the initiative as being a stepping stone to employ new "win win" business models with a range of possible opportunities. As we are working with the customer from the beginning of their challenges, we are able to advise on various ways to reuse waste or monetize side streams. Also, we are already working on various examples where outside companies are setting up facilities inside pulp mill fences to take advantage of renewable raw material from the pulping process to make new bioproducts.

The pulp and paper industries are a key part of the circular bioeconomy and we are very keen to involve various partners and stakeholders to further increase the size of the sector and create more value chains. The role of CircleToZero is to further strengthen the circular bioeconomy, especially with the further utilization of side streams. For this to happen, the creation of partnerships with companies outside of the traditional pulp and paper industry is essential.

As a global initiative, can you tell us how you deal with regional variations?

This is a very important question; different regions have different regulations therefore we cannot handle things universally as they are applicable everywhere. However, what we are aiming for is zero emissions and zero waste everywhere. So according to our customers' locations and needs, we will work with them according to those local regulations, but with the aim of reducing emissions and waste completely.

Can you tell us about the ANDRITZ team that is working within the initiative?

On our team we have several senior development engineers, lifecycle assessment specialists, and business and finance majors. Then we also have various people with project experience. Basically, we have all the skills related to starting with an idea and bringing it to implementation at a mill. Of course, we also have access to the deep knowledge within ANDRITZ when it comes to working with flue gases, solid side streams, and liquids.

How do pulp and paper industry producers join the CircleToZero initiative?

We would like customers to come to us directly with the challenges they are facing by emailing us at circletozero@andritz.com, or alternatively, contacting their local ANDRITZ office.

Naveen Chenna
Head of Business and Technology Development, ANDRITZ

ANDRITZ A-ConApex MAKING EVERY FIBER COUNT at Altri's Celbi Mill

Altri's Celbi mill, situated near Figueira da Foz on Portugal's Atlantic coast, is a classic example of the concept of the circular bioeconomy in action. Here financial and environmental sustainability have gone hand-in-hand for decades, and circularity and sustainability are simply the norm. In its latest move the mill has installed a unique technology from ANDRITZ – the A-ConApex concept – to utilize cellulosic waste by turning it into quality pulp.

"Our aim here is to have zero waste and zero use of fossil fuels by 2030," says Paulo Jordão, Industrial Director, Celbi mill. "Circularity at our mill is at the top of our list for all departments."

And circularity is certainly not a new concept at the Celbi mill. Jordão continues, "I started my career at the mill here a while ago as a young engineer, and the mindset at Altri has always been one of optimizing production and making savings, reusing and recycling wherever possible – whether it be water, energy, or raw materials."

The overall company strategy at Altri encompasses four pillars: Continuous Improvement, Teamwork, Knowledge, and Innovation. It was under all these pillars that Celbi decided it had to find a way to utilize the waste in the pulping process, namely sawdust, fines, and rejects. Sofia Rebola, Director of Production, Celbi says, "In 2019, we decided that we would like to find a better solution for using the waste and rejects in the process. So we began some dedicated laboratory trials at Celbi to see what the possibilities were of converting the waste into pulp.

"We were encouraged by the results we were achieving, and after a year of intense laboratory work we believed that we could bring significant improvements to the mill by utilizing the waste."

After internal discussions, deeper collaboration took place with ANDRITZ cooking experts in Finland and a solution was found by creating the A-ConApex continuous cooking system, the first of its kind in the world. With this technology, a mill can fully utilize all the cellulose-containing material not typically utilized in the pulp production process.

Earlier this year, the first A-ConApex system was installed and integrated into the existing ANDRITZ Lo-Solids Cooking process at Celbi, which was first started up at the mill in 2017. The new concept fits perfectly into the company strategy of using all possible waste, in this case sawdust, fines, and rejects that would normally either be burnt or sent to landfill. →

"Our aim here is to have zero waste and zero use of fossil fuels by 2030. Circularity at our mill is at the top of our list for all departments."

Paulo Jordão
Industrial Director
Celbi mill

"It was in 2019 that we decided we would like to find a better solution of using the waste and rejects in the process. So we began some dedicated laboratory trials at Celbi to see what the possibilities were of converting the waste into pulp."

Sofia Rebola
Director of Production
Celbi

"Together with the Celbi team, we have used our decades of pulp process experience at ANDRITZ to create what is a really simple and ingenious add-on to a pulp mill that can bring real value to a mill with a short payback time."

Mika Pärssinen
ANDRITZ Project Manager
Fiberline

SIMPLICITY BASED ON DECADES OF PROCESS EXPERIENCE

The ANDRITZ A-ConApex system is a fully independent continuous cooking system installed next to the existing digester at the Celbi mill. Quite simple in its design and make-up, the system has just one conveyor, a materials bin, a cooking reactor, a steam feed, a mixer and two pumps.

Mika Pärssinen, ANDRITZ Project Manager, Fiberline says, "The A-ConApex system is purely designed to use the waste from the mill processes and turn it into pulp. This is a very simple process which utilizes high temperature cooking in the reactor."

Start-up of the system took place in October 2021. Fiberline Manager at Celbi, Daniel Teixeira Marcos says, "ANDRITZ did an amazing job, and the technical side of things went very well including commissioning. We of course had a few small challenges which are to be expected, but there were no big jams or blockages.

"Our digester operators here at Celbi are very experienced and they are very happy with how easy the A-ConApex system is to operate, in fact, compared to the main digester they liken the system to a toy!"

It may be simple, and easy to operate, however, this powerful addition to the cooking plant has made all the difference to the mill when it was looking at turning what was once waste into valuable, quality pulp. In fact utilizing sawdust, fines and rejects from the process, Celbi has increased pulp capacity by an impressive 2.5%, adding up to 60 tonnes per day of extra production.

"The ANDRITZ A-ConApex system fits perfectly into our strategy at the mill," says Jordão. "Instead of burning our fines and sawdust, we are now repossessing them, saving the material that we have already paid for. It means we are actually reducing wood consumption, or increasing production, it depends which way you look at it."

Pärssinen says, "Together with the Celbi team, we have used our decades of pulp process experience at ANDRITZ to create what is a really simple and ingenious add-on to a pulp mill that can bring real value to a mill with a short payback time."

"A GREAT PROJECT FOR US"

Gabriel Sousa, Executive Director for Innovation and Technological Development at Altri, says, "This really was a great project for us. It goes to the core depths of our principles; to be lean and efficient, and it fits in clearly with our aim to create a circular economy at our pulp mills."

"The implementation of the A-ConApex system was made possible because of the set-up of the pulp processing line we have at the Celbi mill. This allowed to implement the system with only a simplified set of equipment and no further downstream equipment was needed, like blowtank or washers. There is a serendipity about the technology from ANDRITZ and process from Celbi that made it possible to achieve what might be unthinkable at a pulp mill, but together we made it happen."

Sousa comments on the collaboration between Altri and ANDRITZ to create the unique A-ConApex system, "This system is a groundbreaking prototype, both ANDRITZ and Altri have learned a lot about the design and implementation, and the next generation of A-ConApex will be refined and even better.

"This project was only possible due to the close collaboration between Celbi and ANDRITZ; We could not develop this type of technology on our own. We brought in all our technical departments for this project, from innovation to production and we have worked closely together to find solution with ANDRITZ. We believe that this type of open collaboration is the key to success and the working model that makes changes happen faster."

CONTACT
Mika Pärssinen
mika.parssinen@andritz.com

"Our digester operators here at Celbi are very experienced and they are very happy with how easy the A-ConApex system is to operate!"

Daniel Teixeira Marcos
Fiberline Manager
Celbi

Passionate paper engineer

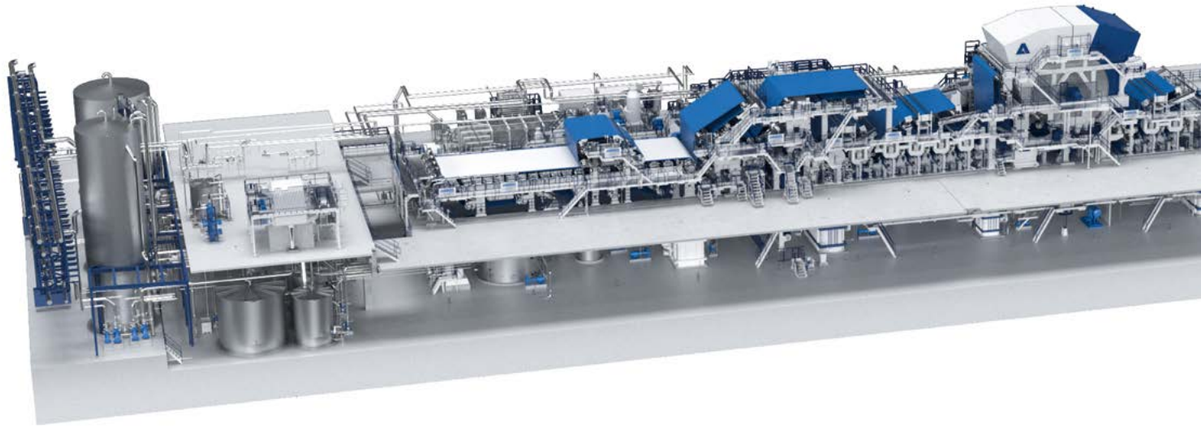
Albrecht Miletzky

joins ANDRITZ as Head of Technology for Paper and Board

ANDRITZ has appointed Albrecht Miletzky, a paper engineer and production manager with many years of experience at one of the leading European paper and board producers, for containerboard among other things, as Head of Technology for Paper and Board.

He joins the Group at a pivotal time for the sector. Paper and board manufacturers are working increasingly on energy efficiency and sustainability by investing in state-of-the-art technology, innovations and, additionally, a higher degree of automation and digitalized processes. The skills and attitude required from technology companies like ANDRITZ have needed to evolve to ensure an effective and productive partnership with customers.

"We are not just a supplier of machinery, but of sustainable solutions based on know-how," says Miletzky. "A shoe blade gap former, for example, is not just a piece of equipment, but part of the forming process that ensures our customers excellent productivity by providing a high dewatering capacity at changing furnish conditions and machine speeds. The same applies to the shoe press, with the highest line loads available on the market and customized shoe profiles. This enables the mill to save energy because higher dry contents are achieved after the press section. In addition, we stand side-by-side with our customers by continuously improving their operations in terms of reliability and predictability as well as building up know-how on their processes. Here, I would just like to mention our expertise in machine clothing design and our digital solutions platform called Metris. We have to ensure that our customers evolve the skills to run ever-more complex paper machines, and we take this responsibility very seriously. In my relatively short time at ANDRITZ, I have witnessed the passion, expertise, open culture, and closeness to the customer that enables great results to be achieved in this context."



MUTUAL BENEFITS

The benefits of such a partnership approach are mutual. The customers' gain is being able to access a knowledge and service support network. This ensures that their assets run at peak efficiency and use the minimum amount of energy to maximize the sustainability of their processes.

In turn, ANDRITZ receives invaluable input for its R&D efforts to support customers even better in the future. "Every time we help make a press section more efficient, increasing the dry content, we gain further insights that we can use in our own developments. Moreover, when we listen to our customers, we effectively generate a heat map of where the most critical needs of the industry lie, and this helps us to focus even more on outcome-driven innovations. It helps us to be very targeted," says Miletzky.

The strategic home of innovation at ANDRITZ is ANDRITZ Ventures, the dedicated corporate innovation and startup arm of the group. Miletzky: "ANDRITZ Ventures is about marshalling our internal and external innovations networks. It harnesses the fact that the ANDRITZ GROUP has diverse end-use technologies that often have synergies, for example paper, board, tissue and nonwovens. This opens our minds to new ways of thinking and can bring real benefits for customers."

STRATEGIC OBJECTIVE

A strategic objective for ANDRITZ is to expand in the containerboard market, and Miletzky's years of experience in production of containerboard help him see the whole picture. "As a paper engineer, I experienced ANDRITZ as a highly competent partner that is very close to its customers. I want to build on that, to listen carefully and provide unique solutions where appropriate, both for rebuilds and complete lines."

ANDRITZ has a record it can be proud of. Recent orders include Mayr Melnhof Karton in Frohnleiten, Austria, which will increase production, improve quality, and shrink the environmental footprint of KM3, which is due to start up in 2023. Then there is the reference at Heinzel Group's Laakirchen Papier in Austria, which, with speeds up to 1,420 m/min. following the ANDRITZ rebuild, has become the fastest converted containerboard production machine in the world. The next step is a ropeless tail-threading system from ANDRITZ in the double-tier part of the after-dryer section.

"I look forward to further enhancing ANDRITZ's strong reputation as part of the excellent team here at Paper and Board," concludes Miletzky. "We take nothing for granted and are serious about our responsibility to support the most innovative, sustainable paper and board production – now and in the future."

CONTACT
Albrecht Miletzky
albrecht.miletzky@andritz.com

A two-in-one solution

PRIME CLEANING PERFORMANCE IN A SINGLE UNIT

The new *Prime*Clean TO is the latest innovation in cleaners from ANDRITZ. The "TO" designation comes from the fact that it combines two cleaning stages in one unit (two-in-one). Thanks to its innovative reject chamber design, the *Prime*Clean TO is ideal for removing sand and small particle debris from approach flow stock and recycled fiber processing lines at higher feed consistencies. The first systems have been sold and start-up is planned for early next year.

The *Prime*Clean TO was thoroughly tested at ANDRITZ's Stock Preparation Pilot Plant in Austria.

The *Prime*Clean TO is the newest addition to the ANDRITZ family of low consistency hydro-cyclone cleaners. It is ideally suited for recycled fiber and approach flow applications with feed consistencies up to 3%.

Its ability to handle higher feed consistencies enables the *Prime*Clean TO to operate with less water in the stock. A considerable reduction in the volumetric flow is noticeable in the first two cleaner plant stages. This translates to a significant reduction in pumping energy, with separation efficiency remaining at the highest level, when compared to a conventional LC cleaner plant.

TWO CLEANING ZONES IN A SINGLE UNIT

The technological cornerstone of the *Prime*Clean TO is its two-in-one design: a first-stage cleaner cone stacked on top of a second-stage cone with dilution water injected at the transition between the two stages. This increases separation efficiency and reduces energy consumption in a smaller physical footprint.

The design was prototyped and extensively tested at ANDRITZ R&D facilities in Finland and Austria. After proof-of-concept, commercial-scale cleaner units were installed in approach flow and OCC lines in Finnish mills. The results were impressive: superior dirt removal for paper machine approach, and excellent sand removal for OCC when compared with conventional cleaners.

The two-stage *Prime*Clean TO can be installed in the same physical footprint (one-to-one replacement) for a conventional SC133 single-stage cleaner from ANDRITZ. This is a major benefit in rebuild and upgrade situations because mills can increase stock throughput and quality at the same time.

SMALLER IS BETTER

For hydro-cyclone style cleaners, the smaller the diameter of the separating cone, the higher the separation forces inside the cone and the higher the cleaning efficiency. The cones in the *Prime*Clean TO have a unique design to achieve this efficiency. The stock flow inside each small-diameter cone is uniformly directed through three chambers to efficiently separate good fibers from rejects.

ANDRITZ engineers used computer-based modeling and simulation software to arrive at the optimum diameters for reaching high separation efficiencies in the cleaning zones while achieving the desired throughput, reject levels, and runnability.

There are two reject chamber options for the *Prime*Clean TO – one without dilution and one with ANDRITZ's patented Multi-Injection Vortex Control (MIVC) technology to provide additional dilution water.

OPTIONS FOR REJECT DISCHARGE

The reject chambers in the *Prime*Clean TO have a large area to ensure stable operation and to minimize the risk of plugging. There are two options for reject discharge – one without dilution and one with ANDRITZ's patented Multi-Injection Vortex Control (MIVC) technology. With MIVC, the reject port is equipped with a hose connection to provide additional dilution water. This is particularly beneficial in OCC and high-contaminant applications. Minimal dilution water is required with MIVC since it is utilized directly in the rejects flow without diluting the accepts flow. With MIVC, good fibers are retained, and plugging is virtually eliminated.

HIGH-TEMP AND WEAR-RESISTANT

The cleaner cones in the *Prime*Clean TO are made from a special OX polymer material that was developed by ANDRITZ to operate in high-temperature and/or high-wear installations. The OX material is resistant to chemicals, so the inner surface of the cone remains very clean. As an option, mills can specify that the lower cleaner cone and reject chambers can be produced from ceramic materials to further increase product life.

COLOR CODING OF PARTS

Asymmetrical cleaner parts in the *Prime*Clean TO (i.e., parts for the left and right sides of the cleaner bank) are produced in different colors to avoid an accidental mix-up when assembling or when performing maintenance work.

SUMMARY

In many applications, the installation of a *Prime*Clean TO can eliminate a bank of cleaners while ensuring the same separation efficiency. Or higher efficiencies can be achieved using less pumping energy.

The reality of a cleaning plant with a smaller footprint that can remove smaller particles from the stock and consume considerably less pumping energy when compared to a conventional LC cleaner plant is now here with the *Prime*Clean TO.

CONTACT
Antti Nykanen
antti.nykanen@andritz.com

The *Prime*Clean TO cleaner bank with reject dilution option.

Automatic Tail Threading:

KEEPING SKILLED PERSONNEL SAFE

It is a credit to the skills of pulp makers across the globe that there are not more accidents reported when carrying out tail threading in the drying process. ANDRITZ has created a full range of solutions for automated tail threading from the wet end to the cutter to avoid exposure to moving parts.

"We have already been supplying ANDRITZ automatic tail threading for dryers and cutters for decades," says Fredrik Fors, Product Manager, Dryer, Pulp Drying, ANDRITZ. "This means that we have built up a lot of experience in design and operation – we can even guarantee the success rate of the systems."

To an outside observer, tail threading could look like a particularly dangerous task especially in the wet end due to the threading of a tail between press nips, over rolls, and other moving parts. "The majority of all tail threading at the wet end is still done by hand," says Michael Bloder, Product and Technology Manager, Wet End, Pulp Drying, ANDRITZ. "This is a very skilled task; the operator takes the tail and feeds it between presses and rolls.

Automatic tail threading system from wet end to cutter installed at SCA's Östrand pulp mill.

"But this is also a dangerous task; just a slip or a trip could mean a fatality or at the least a serious injury. As the focus on safety has increased, ANDRITZ has already been hard at work on developing automatic tail threading for the wet end, which means the system now covers the whole line."

"After a lot of development work, we now have automatic tail threading applicable to machines and equipment of any design and production processes and at a wide range of speeds. These can all be combined with center tails as well as edge tails," adds Fors.

Moreover, pulp producers are aiming to increase the safety of their employees. Personnel shall no longer be exposed to running equipment and machines that, of course, directly affect tail threading procedures.

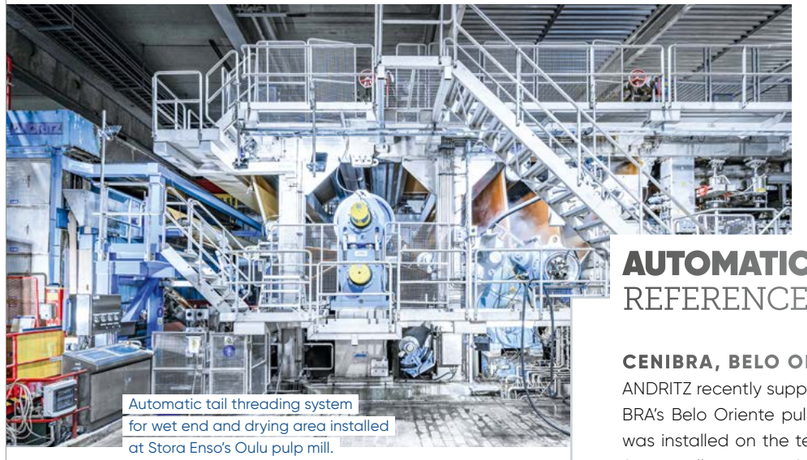
TAILOR-MADE FOR EACH APPLICATION

The automatic tail threaders have different designs for different stations along the line, and all are tailored individually to the particular stations. The automatic threading technology includes various solutions to ensure that tail threading takes place accurately, for example, threading tape, conveyors, a mixture of vacuums, and cushions of air.

"There are different principals needed at each threading area according to where the sheet is on the line," says Bloder. "The wet end, for instance, demands a different format of threader sequence and technology as the sheet is much weaker, and it carries a lot more water."

Wet end automatic threaders are not as common in the industry, simply because demand and regulation have not yet existed for the wet end. However new regulations set to be introduced into the industry means that pulp producers will need to install automatic threaders onto the wet end in the near future. "There are relatively few installations of the tail feeders in the wet end area globally," says Bloder, "however, we are expecting a ramp up of installations as the regulations come in."

"We now have cases where pulp producing companies are not even getting permits to operate new lines without automatic tail threaders on board.



Automatic tail threading system for wet end and drying area installed at Stora Enso's Oulu pulp mill.

All our systems have now been developed to be hands-free, which means safe feeding throughout the whole machine," says Fors.

COMPLYING WITH THE LATEST SAFETY REGULATIONS

ANDRITZ now supplies automatic transfer systems for the complete pulping line that completely eliminate operational risks, providing the process with reliability and safety. Importantly, the systems also comply with all the latest safety regulations.

Added to the basic wet end transfer systems, ANDRITZ has also developed the Advanced Web Transfer for tail threading that dramatically reduces the risk of sheet breaks due to the removal of the open draw between the combi press and shoe press. In this case, the system is fully supported throughout the press section, thus leading to increased reliability.

Installations of the systems generally take just a few days, with the systems being adaptable and robust, and able to be tailored to be installed into tight spaces. "Installation is quite straightforward," says Bloder. "We can basically find a unique solution for every customer as we are well aware that there is lot of variation when it comes to size and area available.

"Once running, the automatic tail feeders can be adjusted and optimized according to the process needs by simply touching a screen or pressing the start and stop button."

CONTACT

Fredrik Fors
fredrik.fors@andritz.com

Michael Bloder
michael.bloder@andritz.com

AUTOMATIC TAIL THREADING SYSTEM REFERENCES

CENIBRA, BELO ORIENTE, MINAS GERAIS, BRAZIL

ANDRITZ recently supplied an automatic tail threading system to CENIBRA's Belo Oriente pulp mill in Brazil. The system, from dryer to cutter, was installed on the tending side of an existing Lamb cutter that was first installed in the 1970s. There were no major modifications needed during installation.

Weldon de Paula Nascimento, Cenibra's baling coordinator, says, "The work required to return the machine to operating status naturally demands greater attention from the operator as there are numerous actions to be carried out very close to the equipment. The system provides an increase in operator safety and has become more autonomous."

SCA ÖSTRAND, SWEDEN

In 2018, ANDRITZ supplied a complete new pulp drying line to SCA's Östrand's pulp mill in Sweden. The delivery included an automatic tail threading system that operates throughout the whole pulp drying line.

Andreas Jonsson, operation specialist from SCA Östrand says, "We are really pleased with the installation of the automatic tail threading system from ANDRITZ. The system is effective and reliable and, above all, improves safety for our operators."

STORA ENSO OULU, FINLAND

In 2021, ANDRITZ supplied an automatic tail threading system for the wet end and drying area to Stora Enso's Oulu pulp mill in Finland.

Pekka Kylliäinen, Drying Machine Area Manager, OCO-project says, "Safety of our personnel is a top priority at Stora Enso. The automatic tail threading system fulfills our needs perfectly by eliminating risk of injuries during tail threading. We are satisfied with the easy operation of the system."

SUZANO, JACAREI, SAO PAULO, BRAZIL

ANDRITZ recently supplied an automatic tail threading system throughout the forming machine and the cutter to Suzano's Jacarei pulp mill in Brazil.

Tertuliano Rodrigues de Lima Neto, Production Manager from Suzano says, "The system has provided more security in tail threading activity as everything is now carried out automatically. The operator simply requests the process on the machine and the equipment promptly initiates the action in a continuous and safe way."

Fabio Antero Afonso, Project Coordinator from Suzano adds, "The additional benefit is that the tail threading process is now more reliable in terms of process quality and standardization."

DD-WASHER PLUS™

A Hidden Gem in the Fiberline

The ANDRITZ DD-Washer is now preferred by many of the major pulp producers around the world because of its high capacity, superior washing performance, and smaller overall footprint.

Watch our video

Well over 400 ANDRITZ DD-Washer drum displacer washers have been installed on fiberlines at pulp mills all around the world, where they quietly and consistently deliver remarkable results for pulp producers. The four-stage washer has gone through numerous updates and developments since it was first launched in the 1980s, and now the ANDRITZ DD-Washer PLUS next generation drum displacer washer is the first choice of the largest and most efficient pulp producers across the globe.

ANDRITZ DD-Washer is the hidden gem in the pulp production process, sparkling brightly when it comes to performance in the fiberline. "The DD-Washer really is a remarkable piece of innovative engineering," says Markku Oksanen, Development Director, Fiber Technologies at ANDRITZ. "It is one of our most successful products and we have noticed that whenever pulp production experts first become aware of the performance of the DD-Washer, it's not long before the orders start coming in.

"It simply knocks the competition into the shade," adds Oksanen.

The core principle of the DD-Washer is multi-stage washing taking place in a single washing unit in a rotating drum at even MC-consistency without any intermediate dilution. This approach to pulp washing stabilizes the entire fiberline process and because there is no mechanical pressing of the pulp during washing, the DD-Washer is extremely gentle, avoiding fiber damage and deformation.

"The DD-Washer is unique," says Oksanen. "Because it can have up to four washing stages in one unit, it is less expensive and a space saving solution compared to several wash presses required to give a corresponding washing result."

A LONG EVOLUTION

After decades of development, including a prototype installed at the Enso-Gutzeit mill in Kotka, Finland in 1983 (now MM Kotkamills), the very first official production-scale DD-Washer was delivered to Kymmene Oy Kaukas mill (now owned by UPM) in Lappeenranta, Finland. Installed in 1987, even then the washer made an immediate impression as it reached its performance guarantees for washing and throughput in an incredible 45 minutes after start-up.

Fast forward to 2022 and the DD-Washer PLUS is a completely different animal, although retaining the core principles and features that made it so successful in the first place. Oksanen says, "The original DD-Washer design has been through at least five generations of major change and development since the first one installed in the 80s, whilst keeping its main attributes of multi-stage washing in a compact design."

Although the DD-Washer Plus may look similar on the outside, improvements over the years on the inside include a raft of adaptations and additions.

ADAPTIONS AND ADDITIONS

- A simplified wash sector design
- Improved pulp pocket design
- Incorporated fold seal
- Addition of VFD controlled pumps
- Improved wash water process
- Combined filtrates
- Improved cake release
- Addition of digitalization solutions

The improvements and additions implemented to the latest DD-Washers bring huge savings in chemicals, water, and energy. "Although looking similar to the original ones, the DD-Washer PLUS is now a completely different machine. In fact, it has gone through a complete transformation. It is available in a bigger size, is more efficient, uses less energy, and at the same time is able to handle a higher capacity, compared to earlier generations of the same size. Nowadays, there are also a number of smart functionalities that can further enhance its performance," says Oksanen.

The ANDRITZ DD-Washer is now preferred by many of the major pulp producers around the world because of its high capacity, superior washing performance, and smaller overall footprint when compared to the installation of rows of wash presses. The size of the DD-Washer has also grown considerably, whilst still retaining a compact design, with the latest sizes going up to 11 m in drum length.

remarkable results for pulp producers

Although the DD-Washer PLUS may look similar on the outside, improvements over the years on the inside include a raft of adaptations and additions.

ANDRITZ has recently received its largest ever orders for its biggest DD-Washer units for single line pulp mills in Indonesia and Brazil, and 14 washers in total for kraft and dissolving pulp lines at another mill in Brazil.

FUTUREPROOFING AS STANDARD

One of the advantages of retaining the original outside design of the DD-Washer is that any existing DD-Washer can be upgraded with the latest improvements and technology on the inside.

"Due to the unique basic design that has remained the same while making further improvements over the years, the DD-Washer has always been delivered futureproofed as standard," says Oksanen. "We are able to upgrade practically any existing DD-Washer to include the very latest technology.

"This is perfect for customers with mills that have had to adapt to business environment changes over the years, which may include a need for more capacity, or are simply looking to get higher efficiency with lower energy costs. Thus, upgrading older washers offers the possibility to extend their lifetimes and can be a feasible alternative to replacement with a new unit."

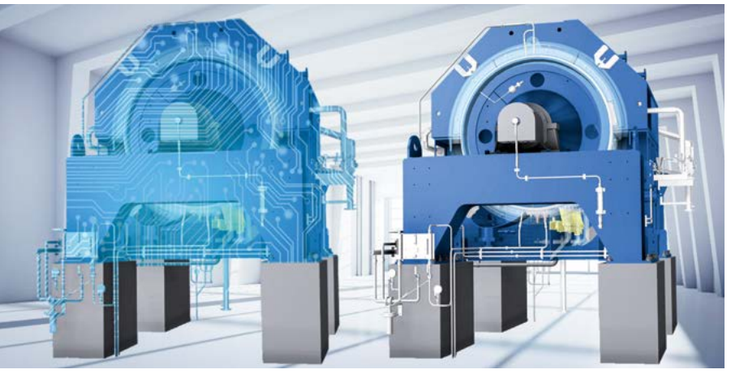
As part of its commitment to ongoing development, the new DD-Washer PLUS comes with the option to include the very latest in digital technology for optimized efficiency and uninterrupted availability.

Jussi Piira, Director of Fiberline Digitalization, ANDRITZ, says, "For the DD-Washer PLUS we have developed a number of digital solutions for our customers that center around intelligent functionalities of process automation.

"Using the latest Metris Digital IIoT solutions from ANDRITZ, we can monitor the equipment in real time, which allows us to estimate the lifetime of components in the washer and manage predictive maintenance. It also allows the opportunity to monitor the operational efficiency of the DD-Washer PLUS."

ANDRITZ now has various digital sensors applied to the DD-Washer PLUS that cover all aspects of operation: for example, screen plate scaling index, drum end seal thickness, seal water system diagnostics, predictive maintenance, remote support, and washing efficiency calculations. The main purpose of these digitalization solutions is to ensure timely and necessary maintenance so that the customer can avoid unexpected production losses due to equipment failures and provide the opportunity to operate the washing equipment so that it always offers the best possible performance.

CONTACT
Antti Hyvönen
antti.hyvonen@andritz.com



The new DD-Washer PLUS comes with the option to include the very latest in digital technology for optimized efficiency and uninterrupted availability.

Health & Safety:
Local Safety Challenges Demand Tailored Communication Skills

Over the years, ANDRITZ Chile has provided equipment maintenance, repair, and installation services to customers in the pulp and paper industry through its pulp service division. In the course of our work, we have learned that each safety situation and location demand a unique approach when it comes to the most effective channels of communication.

In August last year, maintenance was performed in the fiber area at CMPC's Santa Fe Mill in Chile. The project involved 81 skilled personnel from ANDRITZ Chile along with around 4,000 workers from other contractors for a period of 15 days.

During this activity, ANDRITZ was tasked to perform maintenance and service on a total of 10 different pieces of equipment, one of the most important of which was the DD-Washer. One of the most critical and relevant activities was the inspection and repair of the PRE-2 filter, as this required a 30-ton piece of equipment that needed to be lifted. To carry out this activity, we had to coordinate constantly with the customer in order to permit our specialized personnel to execute the lifting plan.

Understanding the importance of these activities to be executed, and taking preventive action before and during the task, were key to obtaining good results in terms of safety. The control and monitoring of all preventive aspects took place by using the Quentic Safety Observation system, which allowed the development of tasks avoiding the occurrence of incidents onsite and giving full compliance with the customer's requirements.

The Quentic Safety Observation system is an essential ingredient in the management of safety; however, the optimization of a safe work environment is also about psychology, and how best to communicate the importance of safety in the most successful way. In order to increase our preventive culture at the mill, we brought together all our collaborators involved with the project to reinforce day-to-day safety practices by means of different informative and educational exercises. These exercises involved games and activities that were designed to highlight the importance of all safety measures, and why they were taken, which included: a safety golden rules puzzle, safety fishing, hazard bowling, and even a dance exercise.

ENZO VIVEROS
HSEQ Manager
ANDRITZ Chile

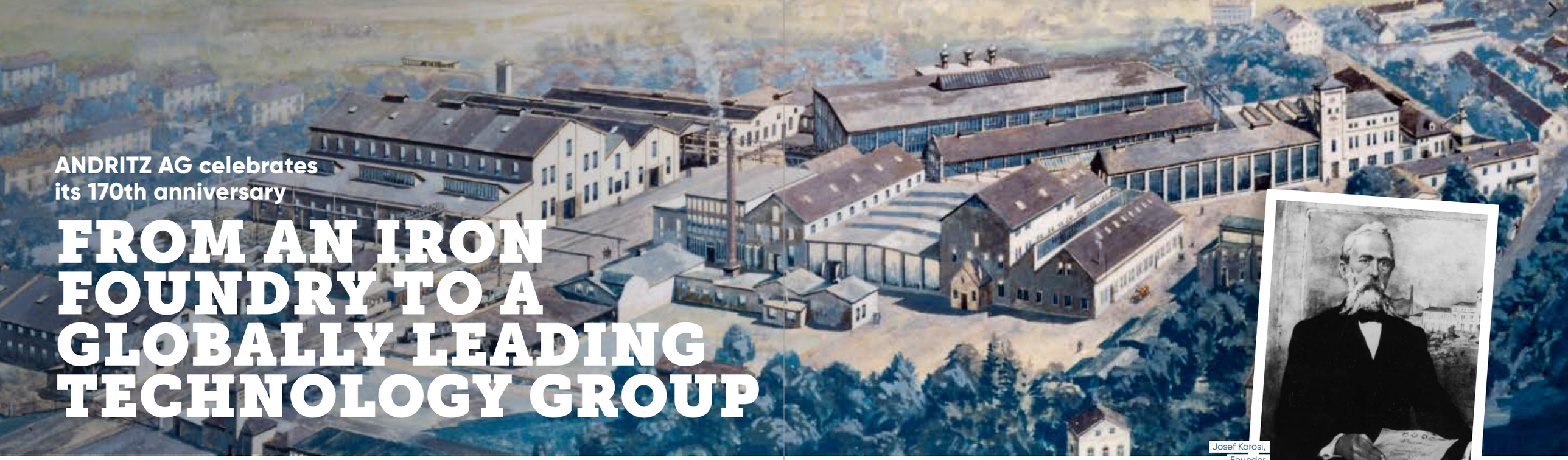
THE MAGIC OF SAFETY

One of the safety dynamics that had the greatest impact on people working in and around the site was an activity called "The Magic of Safety", the purpose of which was to give workers a moment of thoughtfulness and generate a special magic atmosphere, as well as to give them a powerful family message that would remain with them for a long time.

This act consisted of asking four workers to write on a piece of paper the name of the most important person in their lives and then put it in a bag. Then a worker was asked to take one of the papers and read the answer with the name written on it, while a masked figure approached. Once he mentioned the name that appeared on the paper, the magician asked the masked person to come closer and discover her face to reveal her secret identity, which turned out to be his wife.

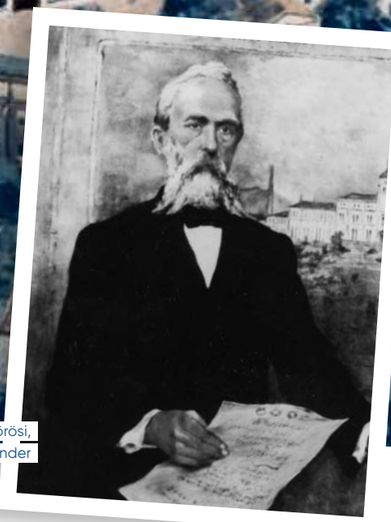
When everyone saw what happened, an emotional atmosphere was generated within the work team, who applauded and congratulated the magician for his act. To conclude this activity, the wife of our worker spoke to all our gathered workers and reinforced their safety commitment.

The achievement of these successful safety results motivate our HSEQ team to continue working and generating new strategies with the main objective to protect and care for our greatest treasure, our people.



ANDRITZ AG celebrates its 170th anniversary

FROM AN IRON FOUNDRY TO A GLOBALLY LEADING TECHNOLOGY GROUP



Josef Körösi, Founder

What began in 1852 with the production of metal goods such as wire nails, chains, iron gratings and grave crosses developed into a market-leading, globally operating technology group.

ANDRITZ AG in Graz is celebrating a special anniversary this year: 170 years ago, the Hungarian Josef Körösi established the "k. k. privilegierte Maschinenfabrik und Eisengießerei" in Andritz near Graz, thus laying the foundation stone for today's ANDRITZ GROUP.

Today, the international technology group ANDRITZ is a globally leading supplier of plants, equipment, and services for hydropower stations, the pulp and paper industry, the metalworking and steel industries, and for solid/liquid separation in the municipal and industrial segments.

ON TRACK FOR GROWTH THROUGH ACQUISITIONS, RESEARCH, AND DEVELOPMENT

The ANDRITZ GROUP has grown very strongly in the last few decades. Since 1990, ANDRITZ has acquired around 70 companies with complementary product portfolios and integrated them into the Group. The second key component of the company's successful growth is organic growth, driven primarily by research and development. Every year, ANDRITZ spends around three percent of sales on innovation and research and development, including order-related work, to always provide its customers with the most modern and efficient technologies and products. In addition to the company's own research centers and pilot plants, ANDRITZ also operates an active ideas and innovation management system, which promotes the ideas of its employees.

COMPREHENSIVE PORTFOLIO OF SUSTAINABLE PRODUCTS AND IN THE AREA OF DIGITALIZATION

The passion for cutting-edge engineering and outstanding innovations is also reflected in the way ANDRITZ takes on the challenges in the fields of smart services and the Industrial Internet of Things (IIoT). Thus, digitalization is an important focus of research and development work. In the meantime, digital solutions from ANDRITZ Automation sold under the umbrella brand "Metris – ANDRITZ Digital Solutions" number among the leading solutions in industry. Thanks to new processes and tools, they are also equipped with a high level of protection against cyber-attacks, thus reducing the risk of production downtime to a minimum for customers.

In the development of all its innovative products and processes, ANDRITZ always pays great attention to environmental and climate protection and the conservation of natural resources. The company already generates around 40% of its sales from green products, such as renewable energies and e-mobility, helping its customers comply with environmental specifications in the best possible way and to generate economic value added at the same time by reducing costs and increasing productivity.

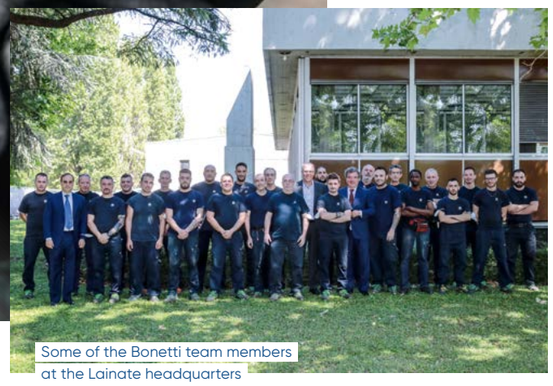
100 YEARS OF APPRENTICESHIP TRAINING AT ANDRITZ IN GRAZ

Electrical engineering technician, industrial clerk or design engineer: Since the founding of the apprentice workshop in Graz in 1922, the training and further education opportunities have offered young people the start of a promising career at ANDRITZ. As of the end of 2021, the entire Group employed 638 apprentices, 95 of them at the apprentice workshop in Graz, which was established in 1922 and is thus celebrating its 100th anniversary this year.

ANDRITZ offers a positive, safe, and balanced working environment in which all employees are treated with fairness and respect. The different backgrounds of the employees and diversity in any form are seen as a great enrichment and valued. ANDRITZ is committed to a multi-cultural working environment with international career perspectives. Employees come from more than 32 different countries and more than 23 languages are spoken in the company.

BONETTI GROUP JOINS ANDRITZ

Bonetti makes blades from metals, fiberglass and carbon for doctoring, coating, and creping.



Some of the Bonetti team members at the Lainate headquarters

A renowned supplier to the paper industry, mainly of consumables and services, the Italian Bonetti Group became a member of the ANDRITZ GROUP on June 30, 2022.

"Bonetti helps us close a gap in our service offering and further strengthens our aftermarket business," says Dietmar Heinisser, Business Area Manager responsible for Paper Service. "We want to be a solid and valuable member of ANDRITZ," emphasizes Managing Director Giovanni Bonetti. Managing Director Alberto Corsi adds, "I believe our products and services complement ANDRITZ's portfolio well, and ANDRITZ's global presence will help us grow and increase our market share."

Giovanni Bonetti bears the name of his grandfather who established the company almost 100 years ago, in 1923, as a reseller of carbon steel strips. The Bonetti Group has served the paper industry for over 50 years now. It produces blades and blade holder systems for paper, board, and tissue machines. Paper machines can be equipped with up to 100 blades, which need to be replaced regularly.

Blades are important for paper machine runnability and product quality. Bonetti makes blades from metals, fiberglass and carbon fibers for doctoring (removing water and debris from rolls), coating, and creping (in tissue applications). The blades run across the entire paper machine and are held and activated by blade holders, a product engineered and serviced by ANDRITZ Bonetti.

QUALITY IS THE PRIORITY

Bonetti products are well-known in the market for their quality. "The quality of our products has always been a priority for us. Quality, reliability, and integrity characterize our corporate attitude and reputation that we have built over nearly a century of hard work," says Bonetti. "As a family-run business, we pay special attention to the needs of the people working for us. This caring is also evident in the products we manufacture, sell and service."

ANDRITZ Bonetti achieves annual revenue of about 25 million euros with a staff of around 150 employees located at the headquarters in Lainate near Milan, and at four more plants in Italy, Germany, the USA, and Canada. The company's activities have so far focused on the European and North American markets. Being a member of the ANDRITZ GROUP will provide opportunities to extend Bonetti's activities to other market areas.

ANDRITZ BONETTI AT A GLANCE

Products:	Consumables for paper, board and tissue machines (doctor, creping, and coater blades), blade holders and doctoring/creping systems, related services
Locations:	Headquartered in Lainate, Italy (near Milan), additional manufacturing locations in Cantalupo (Italy), Sturtevant (Wisconsin, USA), Hagen (Germany), and Trois Rivières (Canada)
Employees:	~ 150
Sales:	~ EUR 25 million
Organization:	Part of Pulp & Paper Service, Fabrics & Rolls division

SPECTRUM PODCAST

Mark Rushton, Host of the ANDRITZ SPECTRUM Podcast.

HELLO TO ALL FRIENDS & FANS OF THE PULP, PAPER & BIOPRODUCTS INDUSTRIES. WELCOME TO OUR EXCITING ANDRITZ SPECTRUM PODCAST.

In the first season of our podcast, we will bring together the trends, challenges and solutions that matter most to ANDRITZ customers, and to the pulp, paper and bioproduct industries at large.

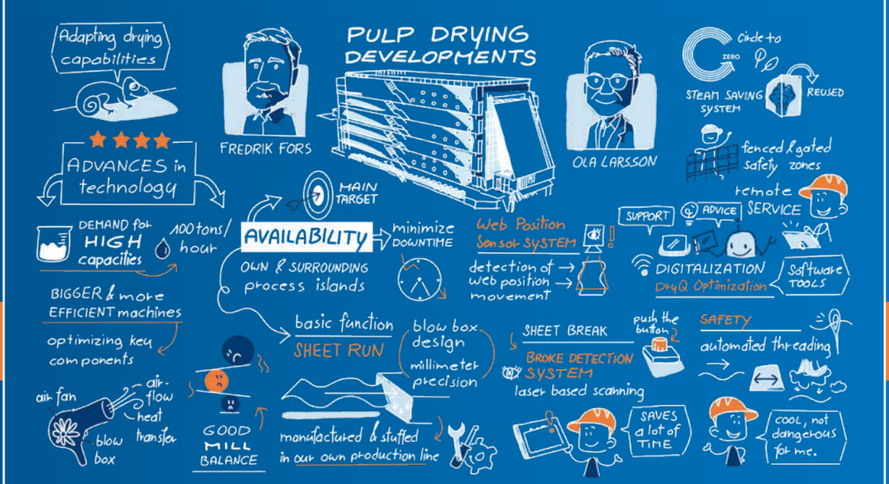
You will have the chance to listen to expert views as we discuss the current hottest topics of our industry. We will deep dive in the world of the latest innovations and digital solutions, as well as exciting journeys into the latest mill and technology start-ups.

Follow and subscribe to our podcast and never miss a new episode!

What you can expect to learn in a single episode.

WHAT ARE THE LATEST DEVELOPMENTS FOR ACHIEVING MAXIMUM AVAILABILITY IN THE DRYING LINE?

Listen to this deep-dive episode to learn more about significant developments in the pulp drying line over recent years and, how ANDRITZ has dealt with this rapid ramp up of capacity!



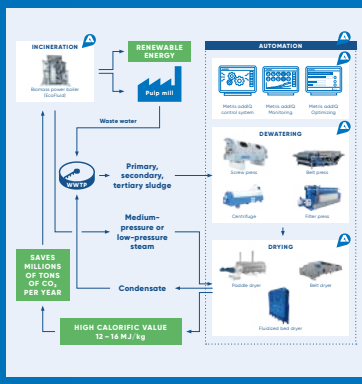
Tune in to our podcast

Season 1

DID YOU **KNOW** THAT . . .

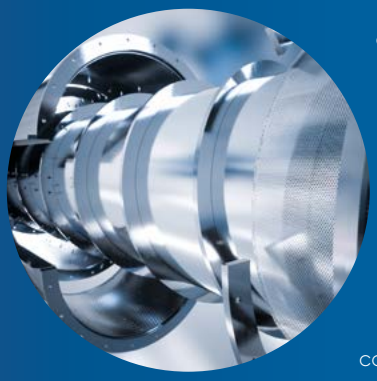
… TAKING A HOLISTIC APPROACH TO SLUDGE TREATMENT ENABLES PULP MILL OPERATORS TO TURN SLUDGE INTO FUEL?

While reducing waste volume, the high calorific value of dried sludge helps make operations energy self-sufficient and contributes towards reducing their carbon footprint. The ANDRITZ contribution? We design, deliver, and service complete systems that integrate suitable dewatering and drying solutions and are supported by smart automation.



Get more information at:
ANDRITZ.COM/PULP-SLUDGE

… ANDRITZ CAN HELP YOU MEET YOUR SCREW PRESS IMPROVEMENT REQUIREMENTS WITH A TAILOR-MADE UPGRADE SOLUTION?



When there is a need to upgrade your screw press, different challenges can be the driver, mainly increased throughput, higher outlet consistency, or reduced energy consumption. The key to achieving this is a new screw shaft with special geometry and a customized compression. It is supplemented by other upgrade products as well as engineered wear parts, such as screen baskets, wear protection on the shaft, a headbox with tangential inlet, or modern counter-pressure systems. The recommended measures are always in line with your improvement goals.

Get more information at:
ANDRITZ.COM/SCREWPRESS-SERVICE

… ANDRITZ' FIRST STEP TOWARDS AUTONOMOUS POWER BOILERS IS THE DIGITAL ADVISOR METRIS BOA – A WEB APPLICATION THAT UTILIZES BIG DATA (B) TO OPTIMIZE (O) AND ANALYZE (A) THE POWER PLANT PROCESSES AND MONITOR THE EQUIPMENT INSTALLED?

The Metris BOA digital adviser provides guidance for the operator to improve process efficiency, increase the runnability of the plant, and optimize the use of additives and consumables, which all lead to reductions in operating cost and maintenance costs. The web browser-based application uses the real-time data from the plant or equipment and presents them in a modern dashboard. Actual data and calculated KPIs relating to processes or equipment provide status information at a glance.

Get more information at:
ANDRITZ.COM/METRIS-BOA