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ONE TEAM – ONE GOAL

**FIBRIA**

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ONE  
TEAM  
FIBRIA  
ONE  
GOAL



# Bigger. Better. Faster. Smarter.

One of the repeated requests we have from our pulp producing customers is to develop higher capacity machinery and processes. Of course, this is in order to realize the economies of scale in investment and operational costs, and it is a growing trend; the average maximum single line pulp mill capacity has increased by around 80% in the past 10 years. We believe this trend will continue, and we will, of course, develop to meet further future demand.

However, these challenges we are meeting and exceeding do not only relate to size; there is also overall performance to consider, and we are working across our products and processes at ANDRITZ to ensure maximum efficiencies and returns for our customers. Take our A-Yield concept that enables higher yield – with wood consumption reduced by as much as 4%. Or our new generation bark presses that increase net green energy value by as much as 15%. Add these developments and combine them with the latest IIoT technology and you have what are now the benchmarks in pulp production sites.



## A PRIME EXAMPLE

A major recent success story, and a prime example of a combination of extra-large capacity production equipment working with the very latest in ANDRITZ top technology, is contained in this issue of SPECTRUM. On pages 30-39 of this issue, we have a report on Fibria's Três Lagoas Horizonte 2, the world's largest pulp mill with a single fiberline. Starting up in August of last year, this was an immense turnkey project, designed to expand further into the fast-growing eucalyptus pulp market. With the theme laid out from the start of *One Team, One Goal*, Fibria and ANDRITZ pulled together to complete one of the most important projects of the last decade, which is already showing incredible results as it ramps up to full production.

We hope you enjoy this issue of SPECTRUM!

Sincerely,

Joachim Schönbeck  
Member of Executive Board  
PULP & PAPER Capital Systems

Humbert Köfler  
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# NEWS

## ANDRITZ launches the world's most modern research center for tissue

ANDRITZ has officially launched the *PrimeLineTIAC* Tissue Innovation and Application Center in Graz, Austria. The opening ceremony, attended by around 150 customers and other stakeholders from the tissue industry, was a great success. Together with the ANDRITZ experts and technical partner companies, the participants discussed the functions, designs, and features of the new *PrimeLineTIAC* and took a guided tour through the pilot plant. Several guest speakers also gave interesting inside views on developments in the tissue industry.

The Tissue Innovation and Application Center comprises a complete, state-of-the-art tissue production line, including laboratory facilities for tests and trials to develop new products and processes in the tissue sector. The center is available to tissue producers and suppliers, research and development companies, and universities. Thus, customers and developers can conduct tests and trials under many different conditions, for example, to optimize fibers for a specific product, improve product qualities, increase dryness, and reduce energy consumption.

The tissue production line offers utmost flexibility for the production of conventional, textured, and structured (TAD) tissue. The line currently features various configurations that are also available on the market as single-machine concepts.



The pilot plant has its own complete stock preparation line together with the approach flow system and is equipped with the Metris *PrimeControl E* automation hardware and software developed by ANDRITZ. The automation system provides utmost flexibility in monitoring and controlling the various machine configurations as well as the stock preparation system. Custom-tailored pump solutions convey stock suspensions with the required consistencies in all production stages.



## New drying production world record achieved by ANDRITZ drying line at Celbi, Portugal

After successful modernization of the pulp drying line by ANDRITZ (see article in SPECTRUM 35), Portuguese pulp producer Celbi achieved a new drying production world record of 2,340 tonnes per day at its Leirosa mill in Portugal on March 12, 2018. In terms of specific drying capacity, Celbi achieved 480 tonnes per day and meter of working width on the 4.88 meter wide sheet drying plant. This new world record followed the world record of 451 tonnes per day and meter of working width, which was also set by Celbi at the same mill in May 2015.

This impressive performance was enabled by ANDRITZ's key and proven pulp drying technology, including the ANDRITZ Twin Wire Former and shoe press equipment, once again confirming ANDRITZ's key position in delivery and modernization of pulp drying plants.

As a member of the Altri Group since August 2006, Celbi is one of the most efficient global producers of eucalyptus pulp, with an installed production capacity of more than 700,000 tonnes

per year. Celbi is recognized worldwide for its high-quality products and excellent customer service, which makes the company a benchmark producer in Europe.



## ANDRITZ and Aalto University bring a new bioproduct to the global market

Aalto University, Finland, and ANDRITZ Oy have agreed on cooperation to commercialize AaltoCell™ technology for the global market. AaltoCell™, developed under the lead of Professor Olli Dahl, allows high capacity production of microcrystalline cellulose (MCC) in pulp mills instead of small production units, using significantly less quantities of chemicals than before.

MCC is nearly 100% cellulose and is easily digestible for ruminants – livestock including cattle, sheep, and goats – and offers a good source of energy. According to Professor Dahl, its most promising volume markets can be found in the animal feed industry.

### MULTIANNUAL RESEARCH COOPERATION

In addition to commercialization, the agreement includes multiannual research cooperation that aims to develop new bioproducts with high processing value using MCC produced with the AaltoCell™ technology. So far, high production costs have restricted the use of MCC but, in the future, new applications may be found in several fields of industry.

"ANDRITZ's equipment and process portfolio offers good opportunities for new bioproducts, and the cooperation with Aalto

University is a significant step towards creating new, innovative bioproducts," says Kari Tuominen, President and CEO of ANDRITZ Oy.

"Materials and sustainable use of natural resources are one of Aalto University's key areas in research, where the bioeconomy plays a central role. This is an area where we want to be world leaders in teaching, research, and creating innovations, and we are very pleased with the agreement signed with ANDRITZ Oy," says Ilkka Niemelä, President of Aalto University.





PrimeDry Steel cylinders yield better drying performance with the same size and operating pressure as traditional cast-iron cylinders, and thus help to increase production or save energy.

October 28, 2017 saw production of the first roll of corrugated base paper at Heinzl Group's Laakirchen Papier AG in Austria. ANDRITZ took on the challenge of the remarkable conversion of the mill's PM 10 from graphic paper to packaging paper, including a rebuild of the groundwood mill into a complete OCC line. The rebuilt machine is now performing well over the planned start-up curve, ready to capture a fast-growing market.

At Laakirchen, the prime concern of the parent company, the Heinzl Group, was to make the mill fit for the future. The history of this upgrade began in April 2013, after the Heinzl Group took over the location that was producing graphic paper grades on two paper machines. Mark Lunabba, CEO of Laakirchen Papier AG, remembers, "One of the first ideas our chairman, Alfred Heinzl, had was that we would have to improve our results

and avoid being affected by the falling demand for printing grades."

Various possibilities were discussed, but it soon became clear that PM 10 would be ideal for the production of corrugated base paper. Lunabba says, "Market volume was also needed that would match the capacity of the machine. And as a result, corrugated base paper became our specialty."

#### GOOD FOUNDATIONS

The final decision on the rebuild of PM 10 was made in August 2016. It was decided that the machine would now be converted to make 450,000 t/a of high-grade fluting and testliner with a grammage of 70–140 g/m<sup>2</sup> from 500,000 tonnes of recycled fibers (RCF). A budget of around 100 MEUR was estimated. The other machine, PM 11, was to continue producing graphic paper grades in a highly efficient production process.

"We didn't want to run any quality risks," says Lunabba. "So it was important for us to go with tested and proven solutions. ANDRITZ has a great deal of experience with RCF lines and had also proved that they know how to successfully convert machines. However, ANDRITZ was new to corrugated base paper so we also had to work together closely and help each other in determining solutions."

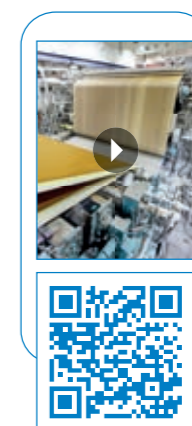
Another reason for placing the order in Graz, according to Lunabba, was the successful experience the Heinzl Group had with ANDRITZ and sister company Zellstoff Pöls, during installation of its PM 2 specialty paper machine, which went into operation at the mill in 2013.

Michael Pichler, Head of the global Paper and Tissue Division at ANDRITZ, also emphasizes that it "was a project of high strategic significance, and Heinzl was the ideal partner for us. There is a great deal of mutual trust."

The rebuild covered the stock preparation system, the wet end and dry end of the paper machine, the film press as well as automation. In addition, ANDRITZ supplied the complete basic process engineering.

#### CRITICAL PHASE

The rebuild phase was influenced by two special factors: the extreme time pressure – a corridor of only twelve months



For more information about the conversion of the mill's PM 10, view the video on your smartphone.

Scan this QR-Code!

was defined between the decision to make the investment and start-up of the machine rebuild – and the customer's stipulation to integrate as much of the



**MARK LUNABBA**  
CEO, Laakirchen Papier

**"The overall result is very positive – ANDRITZ really proved that they were able to handle this project."**



**"We saw a benefit to have the stock preparation and the paper machine from one supplier. That's one of the reasons why we decided for ANDRITZ."**

**JAN REIBERT**  
PM 10 Production Manager  
Laakirchen Papier

existing equipment as possible at the same time as allowing PM 11 to continue running alongside the rebuild work.

"The actual time scheduled for the rebuild work itself was ten weeks. We were then four days late in getting stock onto the wire. In view of the intensity of the rebuild, that was a very brief delay," says Mark Lunabba.

Johann Stadlmayr, head of technical planning, adds, "Completing this project within that time set new standards. After

all, the shutdown phase was estimated at a point where we did not want as much rebuild work. Then more and more items were added in the course of the project, although the deadline remained the same because there was already a demand for the product on the market."

**NEW STANDARDS**

Up to 600 people were working on the site over a period of four to five weeks, and there were actually more than 800 there during the peak phase. There was

very little space, the second machine was running, and as if that wasn't enough, building work, installation, and cabling had to be carried out simultaneously as well. "The overall logistics were an absolute masterpiece," says Stadlmayr.

"And the overall result is very positive, ANDRITZ really proved that they were able to handle this project," says Lunabba.

Stadlmayr adds, "Of course, there were some obstacles, but we were able to

overcome them relatively quickly and professionally. Everyone involved went through a learning process in this project; however, drive never let up. The achievements of the ANDRITZ Project Manager, Franz Fischer, who did a very good job, were also very positive. He was extremely approachable, 24 hours a day, seven days a week, and was always able to suggest a swift solution." Fischer describes the start-up itself as an emotional roller coaster ride, "One day we would make good progress only to suffer a setback

again the next day." However, now, the rebuilt machine is performing well over the planned start-up curve.

**FAVORABLE FEEDBACK FROM THE MARKET**

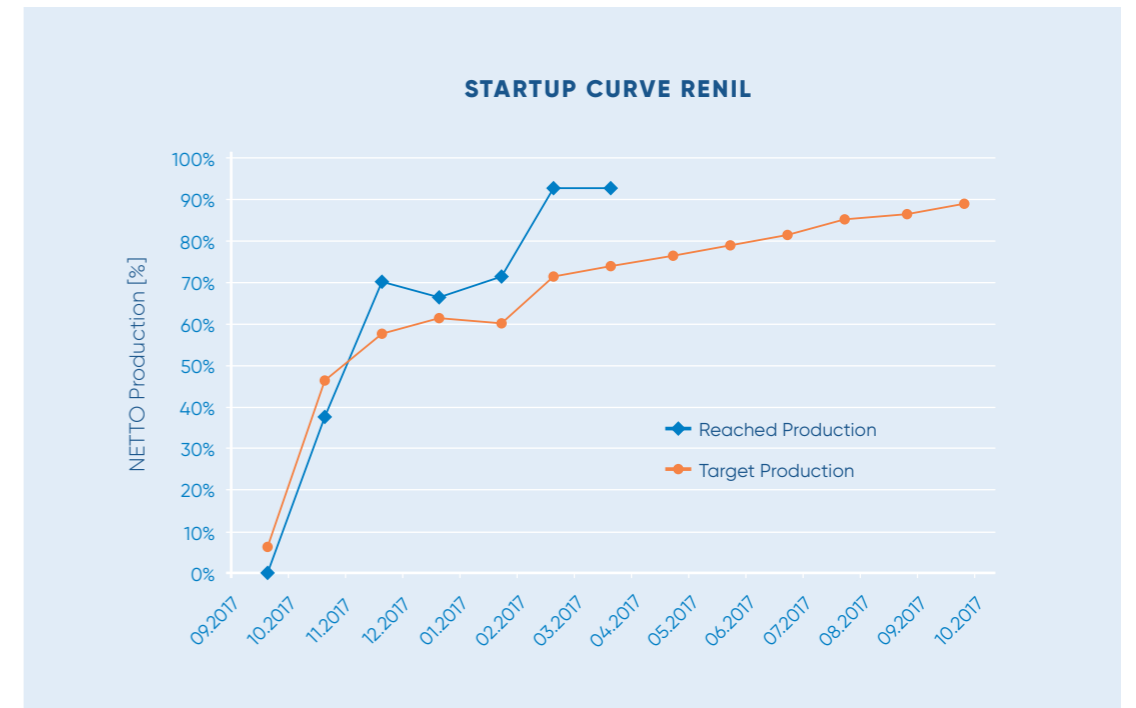
Jan Reibert, PM 10 Production Manager, confirms, "The paper machine is now operating with 100% recycled fibers. That meant a fundamental rethinking process for all those involved. The film press was also new ground for us, but we had it well under control from the word 'go'."

Two months later, the challenges involved in every start-up were resolved, and the paper machine is running very smoothly without any web breaks, according to all those involved. The highest daily gross production was recorded so far on March 17 at 1,360 tonnes saleable production. The speed was in the region of 1,200 m/min, and the operators have already set a target of 1,400 m/min. Since the beginning of the year, the plant has seen very stable production – considerably above the planned start-up curve.

ModuScreens TD tailing screens are part of coarse screening. Efficient washing of fibers is done with a FibreWash Drum – one important part of the detraging system.



The pulping system with detraging includes a 130 m³ FibreSolve FSR pulper – the largest LC pulper ANDRITZ ever installed in Europe.



**MICHAEL  
PICHLER**  
Division Manager  
Paper and Tissue  
ANDRITZ

**"Heinzel was the  
ideal partner  
for us; there is  
a great deal  
of mutual  
trust."**



"The market situation for our new product is currently very good. That's why we also did not want to have any delays," says Lunabba. The company expects the demand for corrugated base paper to increase by 5% per annum, so the timing is absolutely perfect. "We wanted to sign contracts at the end of 2017 for 2018," he says, and refers to the positive feedback from the market, "The goods we sent to customers received top ratings. There was not a single complaint."

#### GRAND FINALE

After 17 years at Laakirchen, Mark Lunabba is retiring. The PM 10 project was thus the grand finale of his career. "I am leaving on a high note and with confidence in the top-performance organization we have here."

Johann Stadlmayr is also looking to the future with optimism, "This was one of the most challenging, intensive, and exciting projects for Laakirchen and one that involved major changes. It was a great achievement and we can all be proud of where we are today. This is a key project for the future!"

#### CONTACT

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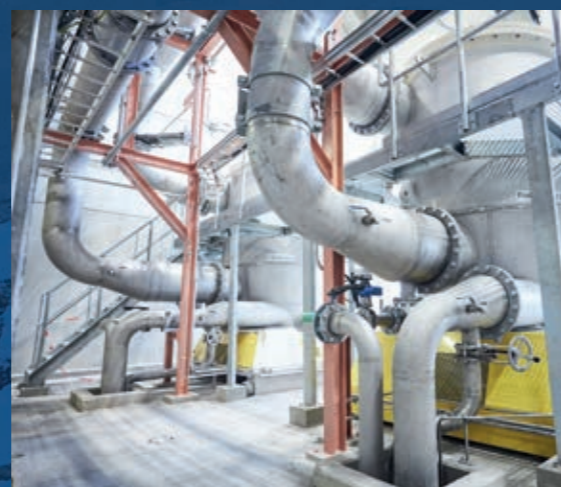
# GETTING TECHNICAL

#### ADVANCED STOCK PREPARATION

The former groundwood mill was rebuilt into a complete OCC line with a capacity of 1,350 t/d. The rebuild of the existing approach flow system, as well as systems for sludge and reject handling, were also part of the scope. The pulping system with detashing includes a FibreSolve FSR pulper with a volume of 130 m<sup>3</sup>, which is the largest low-consistency pulper ANDRITZ has ever installed in Europe. In the process, this is followed by high-density cleaners, coarse screens, and a five-stage cleaner plant. In coarse screening, ModuScreen TD tailing screens were combined with existing screens fitted with new BAR-TEC Rejector screen baskets and Dolphin rotors.

The fractionation section comprises a combination of existing equipment and a ModuScreen A with a matched screen basket/rotor concept and hydraulically optimized shape that guarantees both excellent fractionating effect as well as smooth operation. The long fibers are processed further in a four-stage screening plant – once again combining existing screens, fitted with new BAR-TEC Valeo baskets, with new ModuScreens F. In addition, in the short- and long-fiber lines, the stock is thickened with new and re-used disc filters and twin wire presses.

In the approach flow system two low-pulsation ModuScreen HB-E units with proven inflow design were installed in the base ply. The existing deculator, which is now used for dilution water only, has been rebuilt and converted from full flow to partial deaeration.



#### A PRIME REBUILD OF THE PAPER MACHINE

A *PrimeFlow* TW double-layer headbox with *PrimeProfil* F consistency profiling system was installed at the wet end. This headbox enables the best profiles at maximum production flexibility with a stiff separating lamella between the layers. The new *PrimeForm* TW gap former with a specially-designed forming suction roll surface provides high dewatering capacity and gentle dewatering at the same time and ensures high first-pass retention. Forming shoes on both sides of the sheet enable optimized dewatering within a broad operating range.

In the first drying group, the new generation of *PrimeRun* Evo web stabilizers are used to improve the runnability of the machine after the press section. The *PrimeRun* Evo web stabilization system uses step-by-step reduction of vacuum in free draw to control the paper web's runnability. The main principle is to divide the vacuum into three different zones depending on the vacuum needed to neutralize the forces and stabilize the web. In

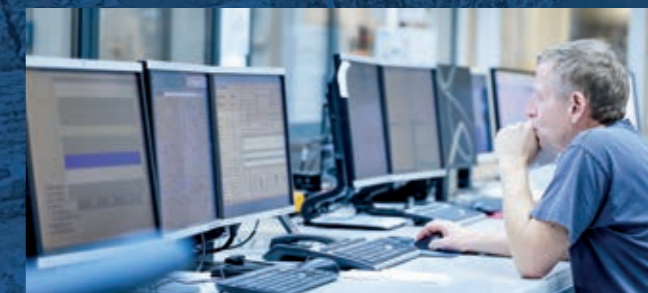
addition, *PrimeRun* Duo web stabilizers were used in the pre-drying section and in the new after-drying section to enable an even web run throughout the drying section.

*PrimeDry* Steel cylinders were selected instead of traditional cast-iron. Steel cylinders yield better drying performance with the same size and operating pressure and thus provide a means of increasing production or saving energy. Moreover, a new air system including heat recovery for the rebuilt drying section was supplied to also enable energy-efficient paper production.

The new *PrimeFilm* film press applies starch simultaneously to both sides of the paper web in order to achieve the desired strength values at the high speed specified of up to 1,600 m/min. The *PrimeAir* Glide AirTurn and *PrimeFeeder* sheet transfer system ensure gentle turning as well as safe and rapid transfer of the web through the entire paper machine.

#### AT THE CLICK OF A MOUSE

In spite of the many innovative units and technical refinements, PM 10 can be operated very easily at the click of a mouse thanks to the *PrimeControl* automation package. Johann Enzi, head of maintenance, electrical planning, and control engineering explains, "We already had a very high automation standard here, which was further developed in the course of the upgrade project. ANDRITZ addressed our situation very well when preparing the automation concept."



# HAVING IT ALL-TOP QUALITY SCREENING AND HIGH LEVEL RUNNABILITY

The main goal in the screening process is to efficiently remove debris, including stickies, shives and other contaminants from the stock. However, there are other factors to consider such as targeted capacity, reject rate, energy efficiency, and runnability. ANDRITZ UTwist adaptable screening profile wire allows a mill to have it all.

A standard screen basket has a fixed wire profile from top to bottom. This is the norm even though the stock thickens as it flows from the feed end to the reject end – increasing the risk for plugging in the reject end where the thickening reaches its peak. What is becoming more of a challenge is to operate the screen under changing process conditions – inconsistencies in incoming raw materials, excessive amounts of contaminants, shutdowns, and other process disturbances.

Since screening efficiency and runnability are contradictory objectives, this points to the inherent compromise in basket specification; setting the wire profile height low enough to ensure good efficiency (high accept quality with minimal contaminants), yet high enough to produce enough turbulence on the basket surface to maintain throughput and high runnability.

The design of the wire in a slotted screen basket has a major effect on both screening capacity and accept quality. The profile height is determined by adjusting the angle of the wires and it affects the turbulence on the basket surface.

Turbulence has a crucial effect on the behaviour of the fiber suspension. Increasing the profile height increases turbulence on the basket surface, which is beneficial for stock fluidization and increased throughput. Higher turbulence also prevents fiber mat to build up too strongly on the basket surface, which might lead to plugging. However, if the turbulence is too strong, more contaminants will pass through the basket reducing the accept quality.

A low profile height on the contrary improves screening efficiency, but lowers the throughput of the screen. It also contributes to higher rejects thickening, especially in the reject end of the screen, which again may jeopardize runnability.

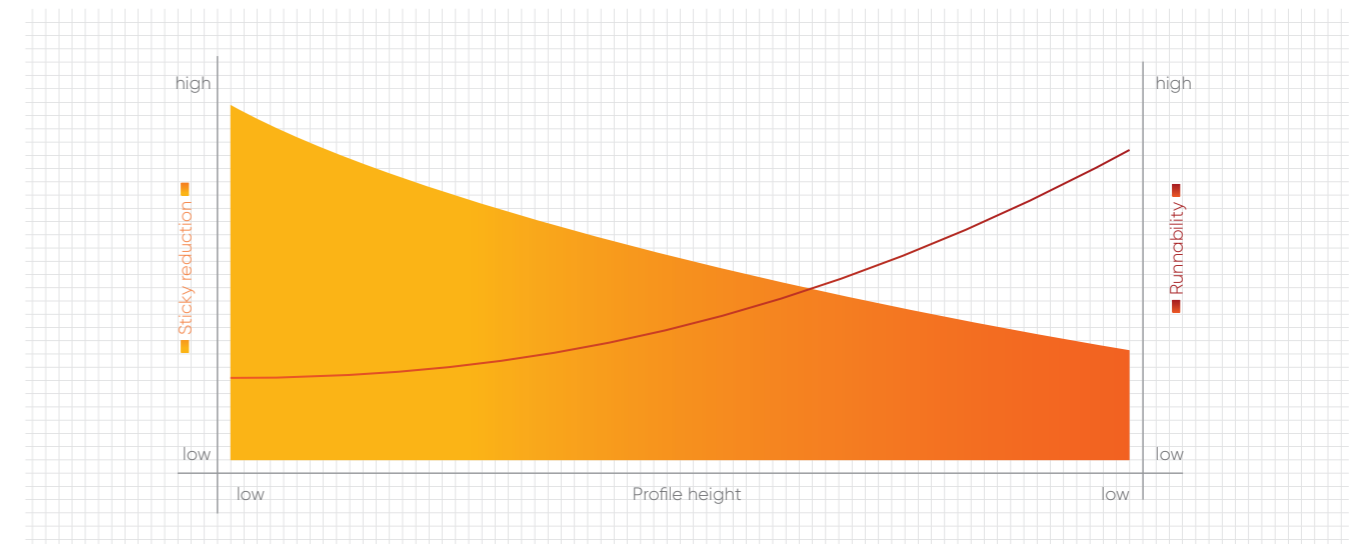


Figure 1: Effect of the profile height on sticky reduction and on runnability

## PILOT PLANT TRIALS

Pilot plant trials of the UTwist were conducted on a small screen (A12) in the ANDRITZ laboratory. For the trial, two screen baskets were compared under identical process conditions and with the same rotor (tip speed 15.3 m/s):

- ANDRITZ Bar-Tec Nobilis: slot width 0.16 mm; profile height of 0.6 mm
- ANDRITZ Bar-Tec Nobilis UTwist: slot width 0.16 mm; profile height of 0.4 mm on the top and 0.7 mm on the bottom

The results of the pilot plant tests confirmed the design (Figure 2). The UTwist version of the Nobilis basket showed an approximate 10% higher reduction in stickies at the same throughput and energy consumption.

## WHY NOT HAVE AN ADAPTABLE WIRE?

In a traditional basket design, with a given slot width, the manufacturer must accommodate the compromise between screening efficiency and capacity with a profile height that is uniform from the top to the bottom of the basket. Prioritizing runnability when selecting the profile (i.e., no critical thickening, no plugging and no

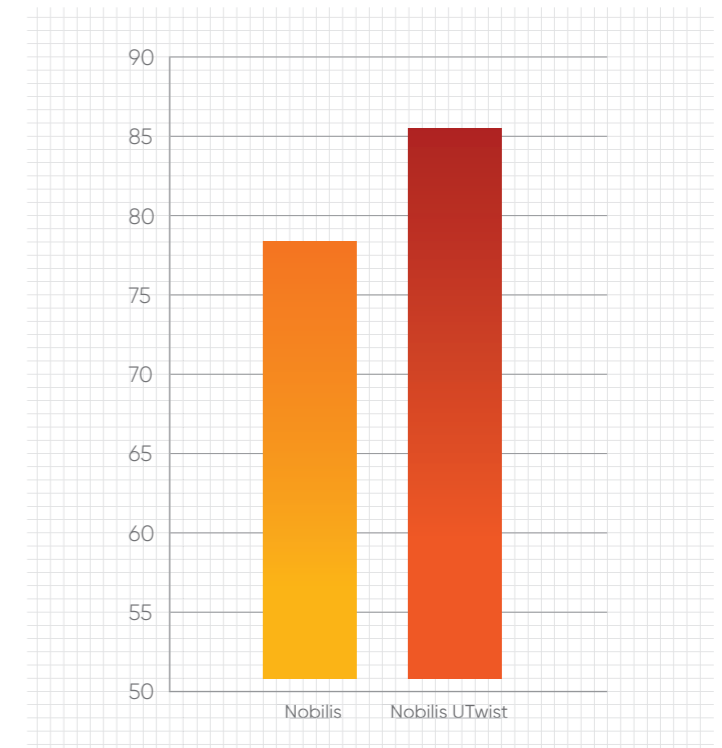


Figure 2: Pilot Plant Results





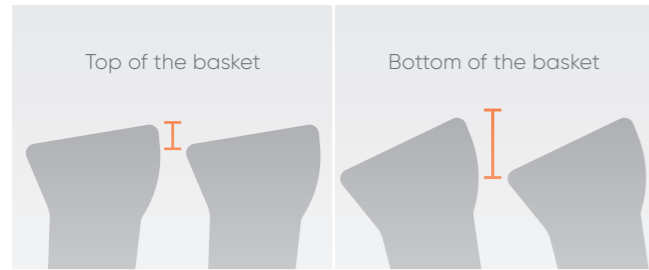


Figure 3: Different profile heights in different sections of the basket

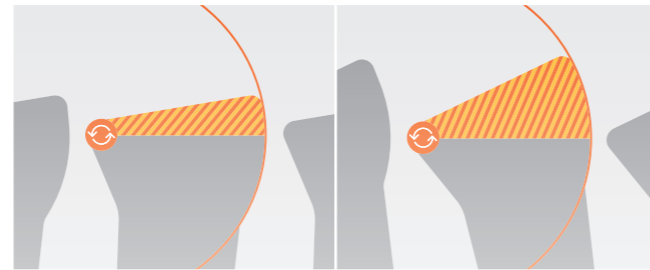


Figure 4: Tilting of UTWist wire

unexpected shutdowns) ensures that optimum screening efficiency is never achieved. This is why the ability to tailor the profile height along the length of the wire – from feed to rejects – is so desirable.

Basket suppliers often need to specify a higher profile to create enough turbulence to avoid critical thickening, which can reduce screening efficiency. Therefore, the chosen profile height is not optimum for every position of the basket – meaning that the full potential of the basket is not achieved.

ANDRITZ has solved this problem by developing UTWist, an adaptable-profile wire which ensures the lowest possible profile height at any vertical position of the basket. The ability to adjust the profile height across the basket is unique, enabling low profiles close to the feeding zone to increase screening efficiency, and a higher profile in the following zone to avoid critical thickening.

The patented profile geometry enables tilting the wire without impacting slot width. This is not possible with any other profile wire.

## RESULTS FROM THE MILL

Based upon the successful pilot plant trial, the UTWist concept was introduced to the first customers.

## OCC FINE SCREENING

A mill in Central Europe using OCC furnish for the production of packaging paper wished to improve the accept quality. A side-by-side comparison test was done in the first stage fine screens (ANDRITZ F60) in line 1 and line 2.

The rotors in both screens were identical (RO-TEC LRsr with a tip speed of 20.6 m/s):

- Line 1: Bar-Tec Valeo, slot width 0.15 mm; PG wire with 0.9 mm profile height
- Line 2: Bar-Tec Valeo UTWist, slot width 0.15 mm; PGR wire with a profile height of 0.7 mm (top) to 0.9 mm (bottom)

Figures 5, 6, and 7 show the results.



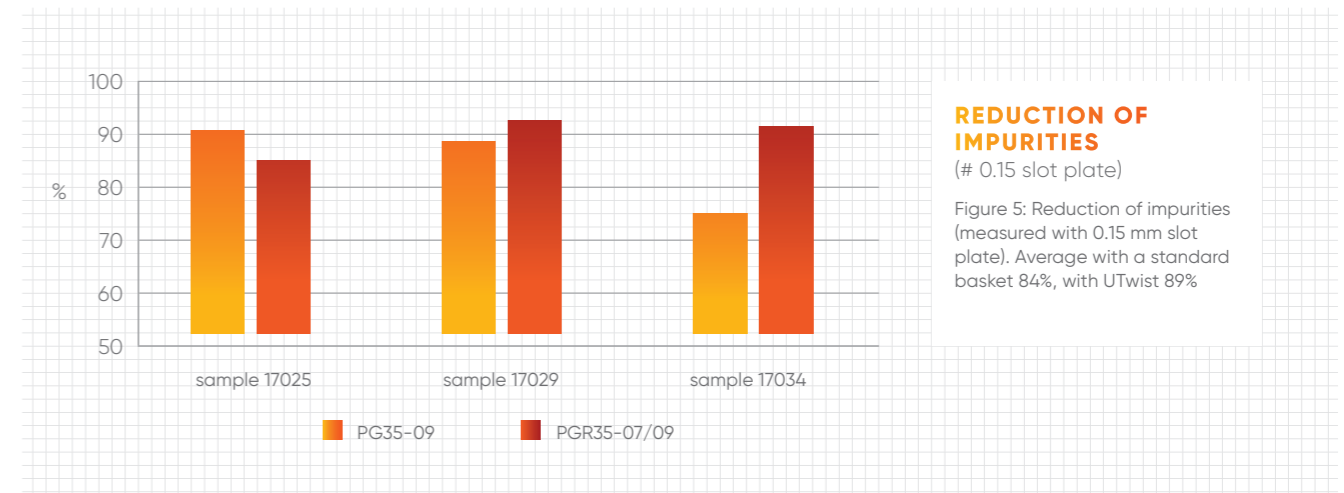
## IMPROVEMENTS ACROSS THE PROCESS

The efficiency and effectiveness of the screening process relies to a great extent on the performance of the screen basket. The development of the UTWist basket, a key and patented technology from ANDRITZ, allows improving the operation of virtually any screening system, regardless of the original manufacturer. With this basket design, the wire profile can be adjusted to account for variations in stock thickening as it flows from the feed end of the screen to the reject end.

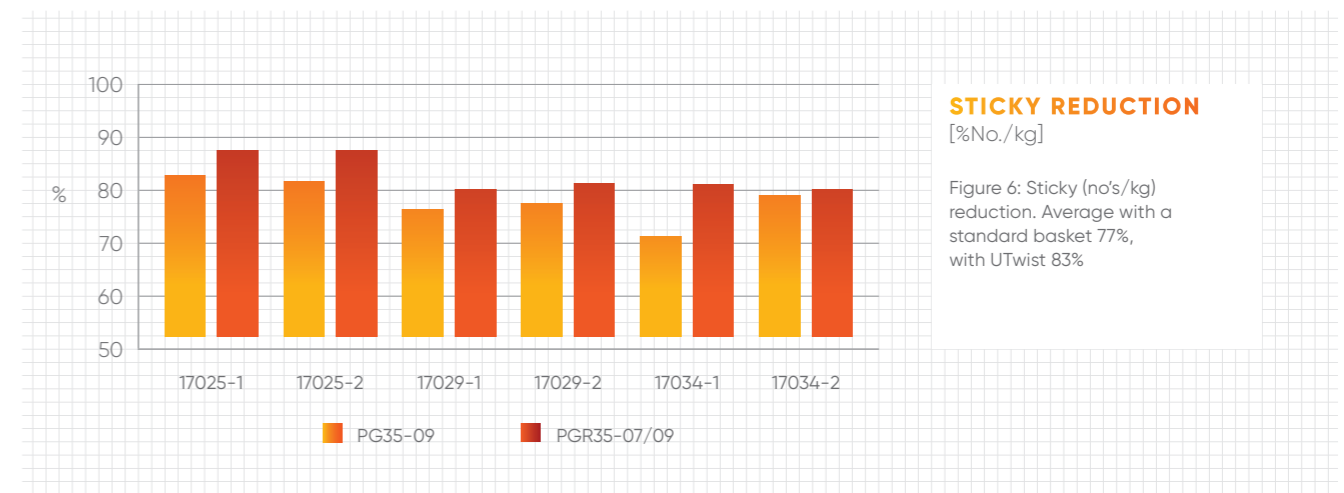
The design allows setting the wire profile height low enough to ensure good accept quality by capturing rejects, and yet high enough to maintain throughput without plugging, ensuring high runnability. This feature has been tested and verified at ANDRITZ's pilot plant and is now installed in approximately 60 mill applications.

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**REDUCTION OF IMPURITIES**  
(# 0.15 slot plate)  
Figure 5: Reduction of impurities (measured with 0.15 mm slot plate). Average with a standard basket 84%, with UTWist 89%



**STICKY REDUCTION**  
[%No./kg]  
Figure 6: Sticky (no's/kg) reduction. Average with a standard basket 77%, with UTWist 83%



**STICKY REDUCTION**  
[%mm²/kg]  
Figure 7: Sticky (mm²/kg) reduction. Average with a standard basket 90%, with UTWist 94%

# MEGGA TRENDS

by Raimo Laitinen, ANDRITZ

Megatrends are big, long-term changes that have a clear direction. They may consist of a group of smaller trends and phenomena. The most important ones are technological development, population growth and urbanization, shifts in economic power, and increasing environmental awareness caused by resource stress and climate change. For the pulp and paper industry, these megatrends emerge as both opportunities and challenges.

## 1 Technological advancements are changing how we shop, access information, communicate, and produce things.

The explosive growth of e-commerce is becoming an increasingly important driver for packaging materials demand. Individually delivered goods require significantly more packaging material than store-delivered goods. On the other hand, there is no denying that digitalization has put pressure on graphic paper demand. Global total and per capita consumption peaked in 2007 and has been in decline ever since.

Digitalization is revolutionizing the pulp and paper production processes. Industrial IoT solutions for quality measurement, predictive maintenance, and optimization offer many exciting opportunities for mill performance improvement.

## 3 Global competition has moved production from the West to low-cost regions in Asia. This has shifted the global economic center of gravity to the East and is fueling the explosive growth of the middle class.

Fast economic growth in Asia is boosting incomes and increasing demand for paper products in the new manufacturing locations.

Growing middle class is probably the most important positive driver for the traditional pulp and paper products for the next decades. It is estimated that about 140 million people are joining the middle class annually and this rate is accelerating. An overwhelming majority of new entrants into the middle class will live in Asia.

## 2 World population is expected to grow from 7.6 billion to 9.8 billion by 2050. There will be approximately 2.5 billion more people living in cities than today.

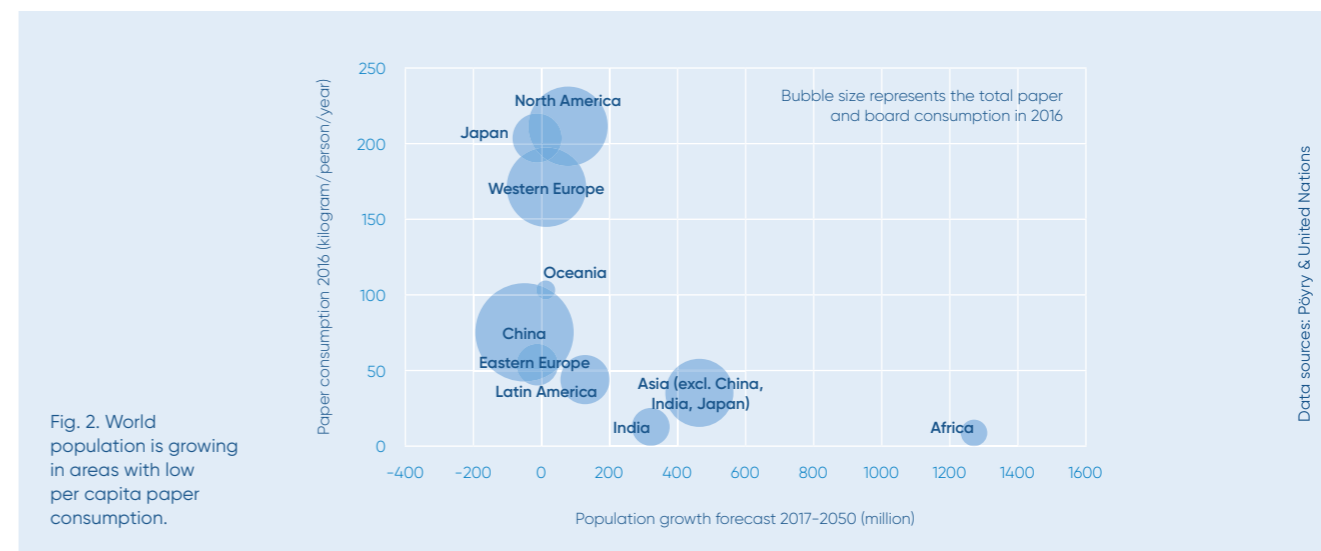
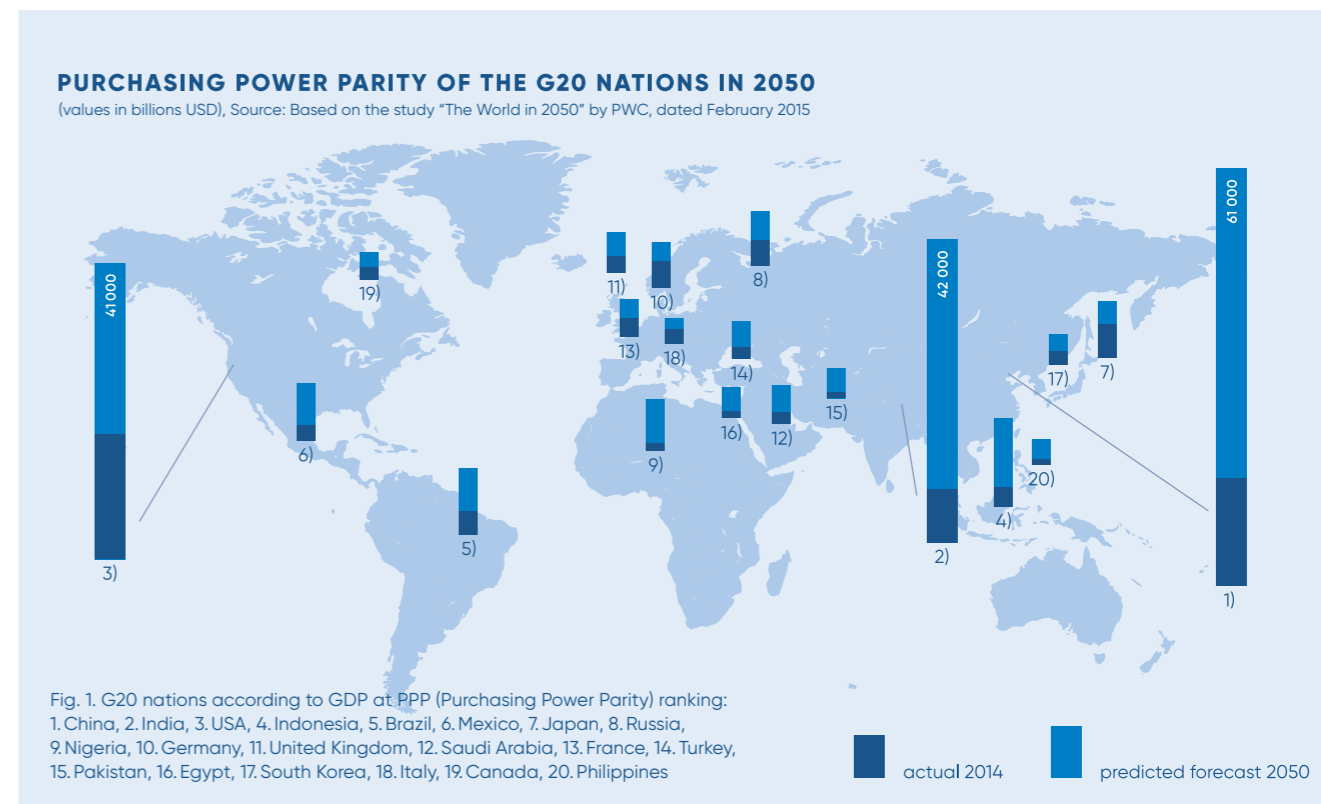
Accelerating urbanization, which correlates with higher incomes, drives demand for pulp, paper, timber, and textiles. Urban areas also typically have higher waste paper collection rates, which provide greater opportunities for recycled paper and board producers.

Population growth without economic growth would not have a very dramatic impact on world paper consumption, because world population is growing fastest in the poor regions with very low per capita paper consumption (see Figure 2).

## 4 Increasing environmental awareness is supporting demand for renewable, recyclable products.

Climate change is seen by many as the main threat to the well-being of our planet. This combined with competition for finite resources and ocean pollution caused by plastics is improving the status of all recyclable and renewable products, raw materials, and energy sources.

The pulp and paper industry has emerged as a solution provider for many of today's environmental issues and its image has improved considerably. Wood-based material and products are substituting fossil-fuel-based products in packaging, textiles, chemicals, construction materials, energy generation, and as fuels.



**PULP AND PAPER DEMAND**

Challenges/Opportunities: Population growth, Urbanization, Growing middle class, E-commerce, Environmental awareness.

Impact: Digitalization of media, communication, and data management.

Author: Raimo Laitinen  
Director Business Intelligence  
ANDRITZ Pulp & Paper

Helping  
to save  
the planet

# PIECE BY PIECE

Rejected waste – it is  
amazing what can be  
found in the reject piles.



Waste paper  
arriving at  
Sun Paper

"We decided around three years ago that we needed to consider installing a really good reject handling system to help improve the management of the rejects, and then of course in came the landfill regulation as well."

#### SOMETHING NEW, SOMETHING BETTER

Sun Paper is one of those hugely successful Chinese pulp and paper enterprises that has seemingly risen from nowhere to become a giant. Founder and president of the company, Li Hongxin, started selling paper from the back of a motorbike in 1982

and now heads a company that is in the Top 50 of the world's largest pulp and paper companies. And Sun Paper prides itself in only installing the very best when it comes to technology across its mills and plants.

Ying says, "At Sun Paper, we always like to do something new, something better and, of course, something our competitors are not doing."

"We took a trip to Europe to have a look at ANDRITZ reject line references and were very impressed – ANDRITZ is the obvious leader in this field."

#### THE NEW LINE - THE ONLY ONE IN CHINA

In June 2014, Sun Paper ordered a reject line from ANDRITZ that would process 200 tonnes of light rejects per day from both pulping lines on PMs 31 and 32. The line started up in the summer of 2016.

The pulping system for PM 32 was also delivered by ANDRITZ at the same time, which helped when it came to installation. The reject line was later upgraded to include a heavy-duty ANDRITZ Fransson Shredder FRX2000, which was installed in June 2017.

Sun Paper's Honghe mill, based in Shandong Province, China, needed a tailor-made handling system to process rejects from two OCC production lines feeding its PM 31 and PM 32 paper machines. ANDRITZ successfully delivered one system in 2016 which has been quickly followed by a second.

When the Chinese central government makes rules or laws, it enforces them far and wide and with extreme speed and effectiveness. Along with many other environmental restrictions brought in lately regarding industrial emissions and levels of pollution, it also banned the use of landfill, causing pulp and paper producers across the country to look long and hard at production processes. And particularly at the way rejects from recovered paper production are managed.

One of those companies right in the middle of all the environmental reforms taking place in China is pulp and paper giant Sun Paper. Not that there is any anxiety or concern surrounding its environmental credentials – the company has always prided itself on being ahead of the game when it comes to environmental performance. But what was becoming a problem was the quality of recovered paper and the amount of contamination that comes with it.

Guangdong Ying, Vice President and Chief Engineer at Sun Paper says, "We have plenty of customers wanting our product, we are approaching production of around 2 million tonnes a year of high quality packaging board. But the problem is the quality of the recovered paper, the sorting system in China is not really good yet, and needs improvement. A lot of truck loads come in to our mill with all sorts of contaminants, plastic and metals and even kitchen waste.

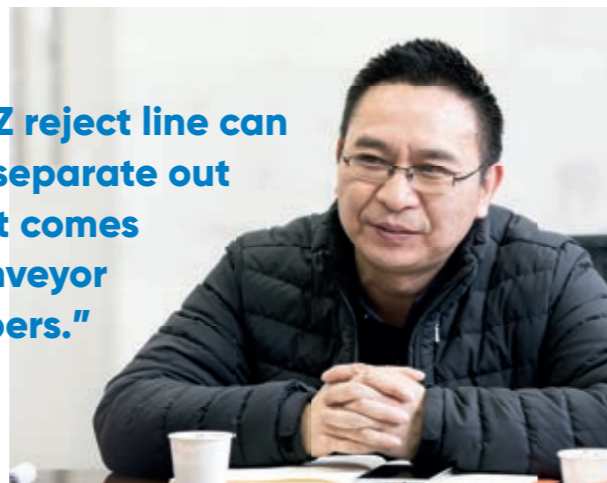


"At Sun Paper, we  
always like to do  
something new,  
something  
better."

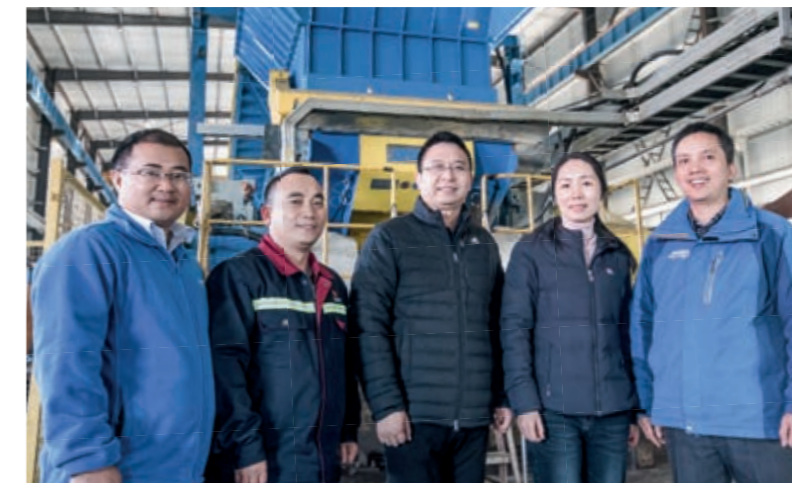
**GUANGDONG YING**  
Vice President and  
Chief Engineer  
Sun Paper

**GUOLING FU**  
Production Director  
Sun Paper

**"The ANDRITZ reject line can pretty much separate out anything that comes down the conveyor from the pulpers."**



ANDRITZ Fransson Shredder FRX2000



From left to right: Zhu Zhipeng, ANDRITZ Pulping, Fiber and Recycling Division; Lilian Zou, Pulping Manager, Sun Paper; Guoling Fu, Production Director, Sun Paper; Chen Fang, Sales & Marketing Director, ANDRITZ Pulping, Fiber and Recycling Division; Li Feilong, Senior Project Manager, ANDRITZ Pulping, Fiber and Recycling Division

Chen Fang, Sales & Marketing Director, ANDRITZ Pulping, Fiber and Recycling Division, says, "The reject line from ANDRITZ is pretty much perfect for what Sun Paper needed for the waste-to-value process and, of course, avoiding any landfill use. The reject system basically sorts and converts the mill waste rejects either into something that can be sold – for example, metals – or into waste that can be burnt in the boiler, therefore creating energy."

The scope of supply at Sun Paper included coarse and fine shredding systems, a

ballistic separator, reject compactors, sand separators, as well as coarse and fine metal separators including ferrous and non-ferrous metal separation.

#### NO MORE LANDFILL

"The initial start-up went according to plan," says Li Feilong, ANDRITZ Pulping, Fiber and Recycling Division, Senior Project Manager, "although it must be said the reject line was a bit of a steep learning curve as this was a first for the ANDRITZ team in China, as well as for Sun Paper.

"However, from the system coming in to running was just one week and from commissioning to start-up was just 24 hours!"

The later addition of the ANDRITZ Fransson FRX2000 shredder helped to increase the capacity of the line with its innovative CoverCross knife system and pusher technology.

"The ANDRITZ reject line can pretty much separate out anything that comes down the conveyor from the pulpers," says Guoling Fu, Production Director, Sun

Paper. "The line at Sun Paper can dewater, fractionate, shred, and separate waste paper contaminants such as plastic films, textile scraps, tying wires, and pulper rags.

"Ultimately, this means that we can separate the impurities either for burning in the boiler or selling for scrap as in the case of metals. Most importantly for us, it means nothing goes to landfill."

Needless to say, Sun Paper is very happy with the new reject line and has ordered

a second one, which will be starting up later this year.

Ying concludes, "We only have one Earth; it's our common home and we must keep it clean!"

As the SPECTRUM team returned to Beijing after our visit to Sun Paper in Shandong Province, the sky was blue and the air was clear; the Chinese newspapers were declaring that the government's war on pollution was reaping rewards. Clearly, the massive operation being undertaken

by the Chinese government, along with companies like Sun Paper using top technology to reduce environmental impact, is beginning to pay dividends, bit by bit and reject by reject.

#### CONTACT

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The complete ANDRITZ reject line processes 200 tonnes of light rejects per day from both pulping lines on PMs 31 and 32.

## ANDRITZ SCOPE OF SUPPLY:

- One Coarse Ferrous Metal Separator ReMet1500BE
- One Ballistic Separator ReBal40
- Two Reject Compactors ReCo70C
- One Coarse Shredder, Rotary Shear UC1300
- One Fine Ferrous Metal Separator ReMet1200BP
- One Non-Ferrous Metal Separator ReMet1500EC
- One Reject Compactor ReCo70F
- Two Sand Separators ReSed340F-16
- One ANDRITZ Fransson Universal Shredder FRX2000



Set among thickly bamboo-forested hills, interspersed by valleys with clear running streams and impressive waterfalls, the Guizhou Chitianhua Paper Industry's tissue mill is one of the most environmentally important production facilities in the rapidly growing Taison Group. ANDRITZ recently supplied the mill with two *PrimeLineST* tissue machines including complete stock preparation to keep the growth on track.

Situated quite some distance away from any mass industrial developments or highly populated conurbations is Taison Group's Guizhou Chitianhua Paper Industry's tissue mill near the town of Chishui in southwestern China. The Taison Group has a number of major board and tissue production facilities in China, and has a growth plan that will see it become one of the nation's top five producers by 2020. General Manager at Guizhou

Chitianhua tissue mill, Wang Hongwei, says, "The Taison Group will reach a total capacity of 5 million tonnes this year; however, with our ongoing expansion plans throughout the group, we will reach 8 million tonnes a year by 2020, making us one of the largest producers of paper, board, and tissue in China."

The group is not limited to domestic expansion; it also recently acquired

Swedish company Nordic Paper Holdings, which includes four specialty paper mills in Scandinavia.

**TISSUE – UNPRECEDENTED GROWTH**

Tissue is of major importance to the group's expansion plans, as China sees an unprecedented growth in demand. According to Wang Hongwei, consumption of tissue is growing at around 6% per year.

The Chitianhua mill was originally owned by the Chinese government, which was struggling to make it profitable producing printing and writing paper using bamboo as raw material. The mill was sold to the Taison Group in 2015, and was immediately converted into producing tissue using bamboo as the main fiber source.

"This is the perfect area for a mill producing tissue out of bamboo, as we have a virtually unlimited source of raw material," says Wang Hongwei. "We are producing bamboo pulp here at a full capacity of 250,000 tonnes a year, consuming some 1 million square meters of local fiber which comes from land we rent from the government. Bamboo is a fantastically sustainable

source of fiber as basically the more you cut, the more it grows."

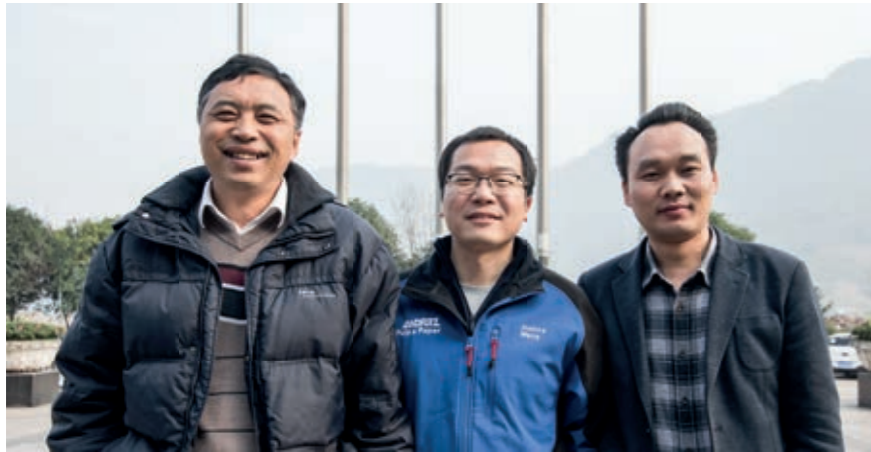
Legend has it that in 1769 AD Li Litai, a migrant from Fujian province, brought four bamboo plants to the town of Chishui, and 100 years later there was total forest coverage. The prolific plant species now provides some 200,000 local inhabitants with a way to make a living, making the Chitianhua mill very popular in the area. In fact, the Chinese government has awarded a special certificate to the mill in recognition of social and environmental efforts it has made since tissue production began here.



**A** The *PrimeDry Steel Yankee* is made entirely of steel, has a diameter of 20 feet, and hence is among the largest in the world.

**B** Excess water from the tissue machine is handled in two *DiscFilters Savedall*, where micro fibers in white water are recovered. This system minimizes fiber loss and lowers fresh water consumption in the mill.





Left to right: Wang Hongwei, General Manager, Guizhou Chitianhua Mill; Wang Junling, Start-up Engineer, ANDRITZ; and Hongwei Sheng, Department Administration Manager, Guizhou Chitianhua



The stock preparation system consists of two lines. One is for LBKP market bale, and the other one for bamboo self-made slurry pulp.



The fully integrated mill makes tissue using bamboo as its main source of fiber. ANDRITZ also supplied the original fiberline.



**IDENTICAL TWINS – TM5 AND TM6**

When the Taison Group took over the mill, ANDRITZ was chosen as supplier for two identical tissue machines, *PrimeLineSTs* with design speeds of 2,000 m/min and a width of 5.6 m each. "ANDRITZ is clearly seen as the No. 1 supplier by the Taison Group," says Wang Hongwei. "The management at the group wanted the very best and most modern machines, which is why ANDRITZ was chosen.

"Another reason ANDRITZ was selected was for its vast experience in producing tissue out of bamboo pulp," adds Hong.

The mill uses about 70% bamboo pulp as raw material with the other 30% made from softwood market pulp.

Along with the two *PrimeLineST* tissue machines, ANDRITZ also supplied two complete stock preparation lines. Wang Junling, ANDRITZ (China) Pulp and Paper Technology Start-up Engineer, says, "Using bamboo as a raw material to produce tissue throws up a number of challenges regarding stock preparation, in particular, regarding refining. Bamboo pulp has shorter fibers and is therefore weaker than wood fiber. To make sure we meet the raw material requirements at the mill, TwinFlo-Strong refiners with higher motor power, lower flow, and matched refiner fillings were installed."

The tissue machines were the first of their

kind delivered in China to combine high performance *PrimeDry* Steel Yankees with steam-heated hoods. The Yankees are made entirely of steel and have a diameter of 20 feet – among the largest in the world for tissue. Both Yankee cylinders are manufactured at the ANDRITZ steel Yankee business center in Foshan, China, which offers customers state-of-the-art manufacturing, local field service, and quality management.

The maintenance of steam-heated hoods challenged the efficiency of tissue machines in the past. To solve this problem, ANDRITZ delivered a new design: The *PrimeDry* Hood ST is equipped with

double-width nozzle boxes for easy maintenance, where each nozzle has its own cleaning port. The hood offers optimized impingement pattern and an open area for efficient drying at minimum dust accumulation.

Along with the stock preparation line and tissue machine, ANDRITZ also supplied automation with its tailored system for tissue *PrimeControl*, including DCS and QCS, as well as all erection and commissioning services.

Contracts were signed for TM5 and TM6 in December 2015 and commissioning took place respectively in July

and September 2017. TM5 started up in August 2017 followed by TM6 in October.

Hongwei Sheng, Chitianhua's tissue production expert has already had a lot of experience with ANDRITZ machines at the mill, and was brought in specially to oversee the start-ups and successful continuing operation of the two tissue machines. Sheng says, "I was previously at our operations in Hengan, so I already had a lot of experience with starting up and operating ANDRITZ *PrimeLine* machines, also with Yankee cylinders.

"What was new for me was the incorporation of the steam-heated hoods on TM5

and TM6 and, of course, the bigger sized Yankee at 20 feet in diameter."

Sheng reports that the start-up of both machines went very well and according to plan, "This is the biggest tissue project in the Taison Group, and is a very important one for us – it had to go right! These machines are basically identical and we successfully started up TM5 in August last year, quickly followed by the TM6 in October.

ANDRITZ supplied two identical tissue machines, *PrimeLineSTs*, with design speeds of 2,000 m/min and a width of 5.6 m each.



**WANG HONGWEI**  
General Manager  
Guizhou Chitianhua  
tissue mill



**"The management at the group wanted the very best and most modern machines, which is why ANDRITZ was chosen."**



The two tissue machines are currently unique on the Asian market because they combine a high-performance Yankee with a steam-heated hood.

"We are now producing 260 tonnes a day of the highest quality tissue in the group, with both machines producing 130 tonnes a day each," adds Sheng.

And what difference has the extra-large Yankee made, added with the steam heated hoods? Sheng says, "As well as maximum output and high-quality products, energy consumption is a very important issue for us. ANDRITZ suggested that with the combination of the steam heated hoods and the increased size of the Yankee, we could get more capacity, longer drying time, and reduced energy costs. And yes, so far we really are noticing a clear difference in comparison to other lines in the group."

Wang Junling says of the start-up from ANDRITZ point of view, "This project was

a challenging one, as the customer demanded a quick start-up, so everyone had to work very hard to make the target. The *PrimeLine* technology was also new to a lot of the people at the mill, so there was a steep learning curve.

"However, starting up the two machines at once proved to also have advantages. What we learned on the start-up of TM5 meant that we were able to start up TM6 four days ahead of schedule!"

**ONWARDS AND UPWARDS**

General Manager Wang Hongwei says that there is still a lot of further scope for expansion at the mill, "Our bamboo pulping operation is running at full capacity of 250,000 tonnes a year, and we are only using half of that pulp on TM5 and TM6, the rest of the pulp is sold onto the

market. Our plan is to use all that pulp at this mill for our own products, making us even more of a cost leader and capturing even more market share.

"ANDRITZ, of course, will also be joining us in our success!"

To underline the Taison Group's expansion plan, it has already ordered another four tissue lines from ANDRITZ.

**CONTACT**

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# GETTING TECHNICAL

**STOCK PREPARATION:**

The system comprises two lines – one for LBKP market bales, one for bamboo self-made pulp.

**THE LBKP LINE:**

Market bales are dissolved in the FibreSolve FSV pulper to allow high consistencies of up to 7.5%. Slushing is done by the impact effect of the pulping rotor and the friction within the pulp itself, but without damaging the fibers. HD cleaning removes coarse particles such as grit and sand. Flakes are destroyed and fiber-flocks separated by means of deflaking.

**THE BAMBOO LINE:**

Pulp cleanliness is the most critical part. ANDRITZ designed special screening and refining stages to meet the very high demands. TwinFlo-Strong refiners make the most out of the difficult-to-handle bamboo fibers in order to keep the fiber length and enable ideal fibrillation with less cutting of fibers.

**APPROACH SYSTEM**

ModuScreen HBE screens are the key equipment of the approach flow system in the felt and wire layer and ensure lowest energy requirements with minimum pulsations and superior protection of the tissue machine.

**FIBER RECOVERY**

Two DiscFilters Saveall handle excess water from the tissue machine and recover micro fibers in the white water to minimize fiber loss and lower fresh water consumption in the mill.

**BROKE SYSTEM**

In a continuous process the under machine pulper FibreSolve FSU disintegrates broke to a consistency of up to 3-4%; HD cleaning and deflaking remove impurities and fiber bundles. A vertical trim pulper, type FibreSolve FSVc, processes the trim at the rewinder.

**TISSUE MACHINES:**

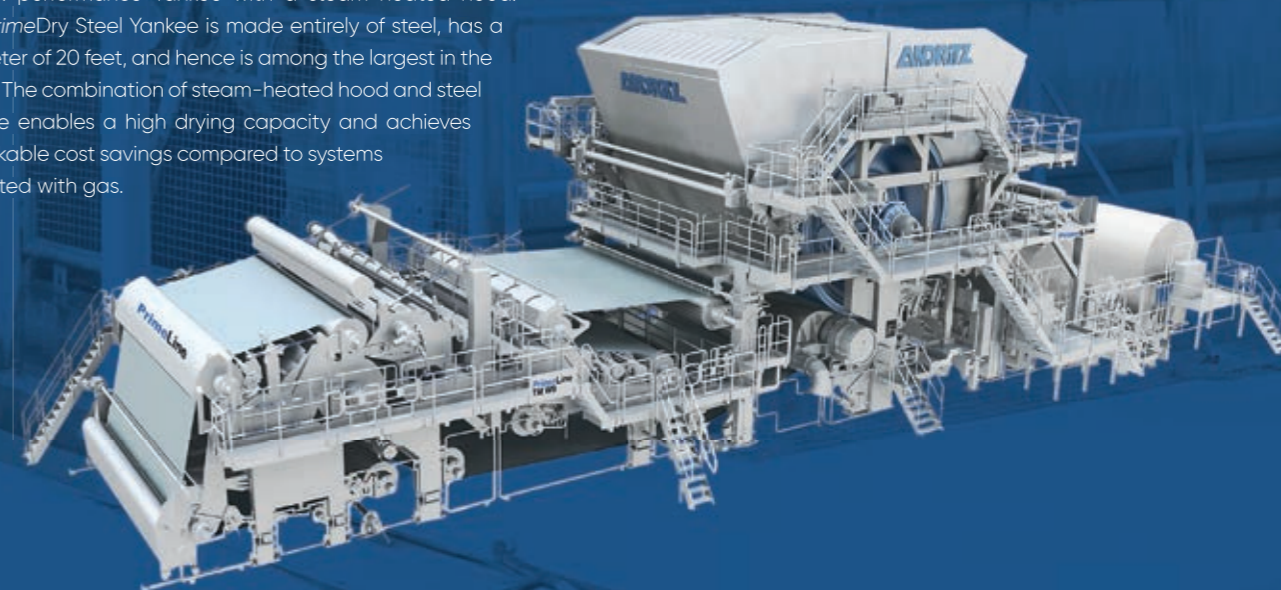
ANDRITZ delivered two *PrimeLine*ST W20 tissue machines, with automation, DCS, and QCS. The two tissue machines are currently unique on the Asian market because they combine a high-performance Yankee with a steam-heated hood. The *PrimeDry* Steel Yankee is made entirely of steel, has a diameter of 20 feet, and hence is among the largest in the world. The combination of steam-heated hood and steel Yankee enables a high drying capacity and achieves remarkable cost savings compared to systems operated with gas.

**KEY COMPONENTS**

- *PrimeFlow* 2-layer with dilution control
- *PrimeForm* Crescent Former
- *PrimePress* Single Press
- *PrimeDry* Steel Yankee 20ft
- *PrimeDry* Hood ST
- *PrimeReel* Advanced
- *PrimeDustEx* W (Wet Dust Removal System)

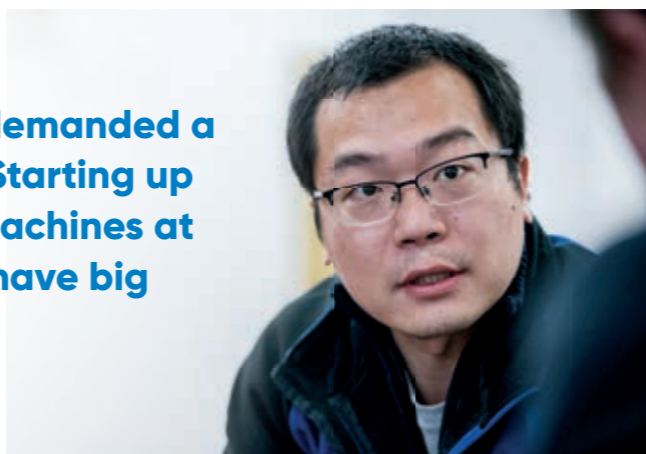
**AUTOMATION**

ANDRITZ supplied automation with its tailored system for tissue, *PrimeControl*, including DCS and QCS, as well as all erection and commissioning services. Delivery of cabinets has naturally been conducted ready-to-connect and pre-tested. 1,400 I/Os were allocated according to the process areas. The DCS is equipped with diagnostic capabilities and enhanced with OPE, an online diagnostic system that provides dedicated access to the DCS with remote connection, which will reduce downtime and increase responsiveness and accurate diagnosis in critical situations. FAT was offered in a time period of one week. Before and during start-up, ANDRITZ experts conducted training for on-site operators as well as for DCS engineers.



**WANG JUNLING**  
Start-up Engineer  
ANDRITZ

**"The customer demanded a quick start-up. Starting up the two tissue machines at once proved to have big advantages."**



# ONE TEAM ONE GOAL

It sits like a gleaming city surrounded by a sea of green. Fibria's Três Lagoas pulp mill is now one of the world's largest pulp making facilities. With the new Horizonte 2 line starting up at the mill in August last year, the company is on target to produce over 7.25 million tonnes a year of top-quality, prime eucalyptus pulp.

Something extraordinary has taken place at Fibria's Três Lagoas pulp mill in Brazil over the last three years. Two groups of immensely skilled people from Fibria and ANDRITZ were brought together as one team, and with one goal: to design, create, and build Horizonte 2, the world's largest pulp line, using only the very best-in-class, supersized technology.

The line started up in August 2017, and is already breaking records for a single line pulp mill. The mill at Três Lagoas is now set to produce over 3.25 million tonnes of pulp a year, making it one of the world's largest pulp production sites.

"This was the first time that Fibria had ever engaged a sole supplier to carry out any of its projects," says Júlio César Rodrigues da Cunha, Fibria's Project and Engineering Director, "and we must admit there were a couple of minor worries to begin with in using just the one supplier, especially on a project of this scale. But it soon became clear there was no need for concern as ANDRITZ gave us absolute transparency on everything relating to the islands and lines they were supplying. This spirit of cooperation continued throughout the project and was particularly effective when we encountered any challenges."







**MARCELO CASTELLI**  
CEO, Fibria

**“With this project we have the best technology available, installed in the largest single pulp line in the world.”**



ANDRITZ teamed up with Fibria to build Horizonte 2 Project – the world’s largest pulp mill with a single fiberline. The ANDRITZ scope in this full turnkey project included everything from the woodyard to the drying machines and the whole recovery island.

Joel Starepravo, Project Director for ANDRITZ, says, “This was the biggest pulp project in the company’s history, and I have to admit for me it was the biggest challenge I have had in my entire life. From ‘day zero’, we wanted this project to be the absolute benchmark, and we were amazed at the full cooperation we were given, even main board members of Fibria and ANDRITZ got involved. The motto of the project *One Team, One Goal* was absolutely evident from the top down and from start to finish of the project.”

**THE TRÊS LAGOAS MILL**

The mill itself is just outside the city of Três Lagoas located in Brazil’s Mato Grosso do Sul state, which is around the size of Germany in area. Viewed from the air, the land around the city is mostly flat and predominantly dedicated to the growth of eucalyptus, giving the impression that it is completely surrounded by lush, well-manicured lawns.

Fibria started the first line in Três Lagoas, Horizonte 1, in 2009, now producing around 1.3 million tonnes of pulp per year, and such

was the success of the first line that it was decided to immediately begin planting eucalyptus in readiness for a second line.

“We have several different clones of eucalyptus that we manage ourselves in Fibria,” says da Cunha, “and we are harvesting our trees in around six years, which is very fast.”

Da Cunha adds that across the whole of Fibria, the nurseries are planting six seedlings per second to satisfy the need of eucalyptus at its mills.

The pulp itself is transported from the mill to Porto Santos, some 1,250 kilometers away on the Atlantic coast, first by truck to a hub located 160 kilometers away and then by rail to the coast for export.

**THE PROJECT**

The run-up to the order being placed for Horizonte 2 was a hectic period, as is usual in the awarding of such huge engineering and technology contracts. Da Cunha comments, “During the negotiation period, we had all the suppliers staying in hotels so that we could discuss all

the demands of the project, and had decided that all the contracts for this project would be awarded in that particular week. There were a lot of people here from all over the world, and it was an intensive period.

“Originally we were negotiating a 26-month implementation plan for the project with talks going on day and night. At the beginning of day three, the ANDRITZ negotiating team came in with a big surprise; they announced that ANDRITZ would complete the project in

25 months, and, crucially, it would also increase the capacity of the line by 200,000 tonnes a year – as long as it was awarded the full turnkey project.

“It was an offer we could not refuse,” says da Cunha.

The order for the supply of Horizonte 2 was placed in July 2015 with the scope of supply including everything from the woodyard to the drying machines, and crucially for all involved in the project, it would be the largest single line in the world, with

**JÚLIO CÉSAR RODRIGUES DA CUNHA**  
Project and Engineering Director, Corporate Engineering Fibria

**“We had the mill delivered on time, in budget and with an excellent ramp-up.”**





A



B

**A** From left to right: Rogerio Pachecho, Fiberline Site Manager, ANDRITZ; Newton Kozak, Fiberline Project Manager, ANDRITZ; Joel B. Starepravo, Project Director, ANDRITZ; Alexandre Figueiredo, Commissioning and Start-up Manager, Fibria

**B** This ANDRITZ HERB Recovery Boiler is the largest in Latin America and the second largest in the world.

an initial planned capacity of 1.95 million tonnes. Start-up was to be in 25 months from the signing of the contract.

The complete scope of supply included: the wood processing plant, hardwood fiberline, two pulp drying lines, evaporation plant and recovery boiler, white liquor plant with single-line recausticizing plant and two lime kilns, chloride and potassium removal system, and a liquid methanol plant for the production of biofuel.

Says da Cunha, "When any major challenges came up during the project, we immediately created a War Room. This, of course, was not a place where we all came to fight; this was where project directors and team leaders from both companies came together to collaborate and concentrate intensively on any problems at hand, to see where we could reduce the hold-ups and find other areas where we could speed things along. The meetings included all senior Fibria and



The pulp drying plant is designed for a specific plant capacity of more than 390 tonnes per day and meter of working width, which has been very well-proven for ANDRITZ pulp drying plants all over the world.

### REAL TEAM SPIRIT

As the project kicked off, the *One Team, One Goal* philosophy immediately began to pay off, and became a vital added ingredient, particularly when challenges presented themselves. The main problem that occurred was a delay of the recovery boiler, potentially holding up the project by six weeks. There was also some damage to a lamella package in one of the evaporators when a cable snapped during installation, necessitating some emergency engineering. Another added problem was the delivery delay of one of the four huge DD-Washers, due to a road being washed away in a rain storm.

ANDRITZ people instrumental to the project on the ground, as well as senior management from both companies.

"This intensive problem-solving activity really worked well; we brought down what looked like a six-week delay on the recovery boiler to just seven days at first oil fire. We also brought in new lamellas to the site in record time, and even organized the building of a new road to get the DD-Washers here on time. This problem solving was all down to our collective collaboration at those meetings."

Starepravo adds, "This was the great thing about being open and transparent from the very beginning. We shared any problems we had with Fibria as they happened, then the senior management and all the key players jumped into action; we created an hourly and daily strategy, and together we managed to solve any problems and still get an early start-up."

"The team work was amazing during this project," says Jean William de Moraes, Project and Engineering Manager, Corporate Engineering, Fibria. "And this shared goal has been a critical factor for the success of the project. At the meetings, far from being a lot of worry and stress, there was an absolute sense that we were all in this together, right from the senior management of both companies across the whole project to

the people on the ground. Everybody was pulling together on this project, like a family would."

One of the key areas *One Team, One Goal* philosophy succeeded was in the implementation of the ANDRITZ "Safety First" program, which demands strict control over all operatives and contractors at the site. The program involves intensive regular training, security briefings, and compulsory site induction training. Da Cunha says, "Safety for us at Fibria and for ANDRITZ during the project was

the number one attention point. It was made absolutely clear to everybody on site right from the start that everything must be done only in the very safest way possible. We had a number of dedicated safety people on site during the project, and the result was that we created a record benchmark in safety that was even better than the benchmarks when running a stable operation."

### A PULP MILL – SUPERSIZED

One of the major obstacles the project leaders had to overcome was the sheer

size of some of the equipment involved – after all, this is the largest pulp mill with a single fiberline in the world; it has to have the equipment to go along with it.

The scope of supply for Horizonte 2 at Três Lagoas included the largest DD-Washers ever supplied and the largest digester in the world.

Starepravo says, "We had to think of the logistical challenges way in advance, especially when it came to getting equipment to the mill from the port – some 2,600 kilometers away – having to deal with some of the poor infrastructure that Brazil has in certain regions. The DD-Washers, in particular, were demanding to bring to the mill from the port because of the sheer diameter of them. There was only one road we could use.

"We managed to get three of the DD-Washers to the mill perfectly and then there was a sudden deluge of rain and the only road was washed away!"

Again, the *One Team, One Goal* mission and spirit was put into place, with Fibria sending one of its own experienced road building teams to fix the road and make sure that the DD-Washer could arrive on time at the mill.



Alexandre Figueiredo, Commissioning and Start-up Manager, Fibria

**"The motto of the project *One Team, One Goal* was absolutely evident from the top down and from start to finish of the project."**

**JOEL B. STAREPRAVO**  
Project Director  
ANDRITZ



In terms of largest and highest capacity equipment ever, the list at Horizonte 2 is impressive:

- World's biggest horizontally fed HHQ-Chippers (400 m<sup>3</sup> solid-under-bark per hour)
- Highest single fiberline capacity (6,120 adt/d)
- Largest black liquor evaporation plant in the western hemisphere (evaporation rate 1,950 t/h)
- Largest recovery boiler in Latin America - second largest in the world
- Most energy efficient and largest white liquor plant in the world (18,900 m<sup>3</sup>/d white liquor production)

#### COMMISSIONING AND START-UP – NO SURPRISES

When it came to commissioning and start-up, the well-planned execution of the project came to the fore as Fibria reports that there were “no surprises” at all in the commissioning and start-up phases, with everything going according to plan.

Alexandre Figueiredo, Commissioning and Start-up Manager, Fibria, says, “We managed to start up the mill three weeks before the original schedule; one of the



The new hardwood fiberline ensures low operating costs, low emissions, extremely high washing efficiency, and excellent fiber quality. The capacity (6,120 adt/d) is the highest in the world for a single fiberline.

key reasons for this was the commissioning phase, which went exactly according to plan. We faced no big issues, problems, or surprises related to the start-up.

“In the commissioning of the fiberline, we made all the digester tests one month before the schedule and, despite the DD-Washers being the biggest ever supplied, again there were no surprises in the commissioning or the start-up.”

One new added resource of expertise utilized with some success during the commissioning and start-up of Horizonte 2 was the ANDRITZ Metris Customer Support Center, located in Kotka, Finland. This enabled experts to collaborate closely and in real time with the commissioning and start-up teams

on the ground at the Fibria site. Using video wall technology, along with the very latest in modern communications systems, data gathering, and diagnostic tools, dedicated experts at the center provided support for commissioning and process tuning at the site. The Customer Support Center can also be utilized during production ramp-up, aiding stable production, as well as being a vital resource for the troubleshooting of technical and process issues.

Roberto Furtado, Overall Commissioning and Start-up Manager, ANDRITZ, says, “There are several factors that can be put down to the successful start-up of Horizonte 2. First of all was the integration with Fibria; it was so important for us to have a customer that we could really

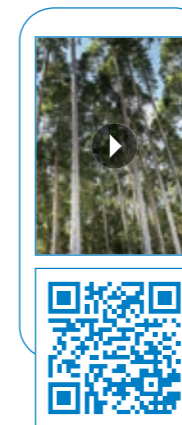


Mauricio Miranda Pereira, General Mill Manager, Três Lagoas, Fibria

collaborate with on a deeper level, particularly when there were occasional challenges. We really did have the commitment of the whole team across the mill.

“The occasional problems we had could easily have resulted in delay, but because of the dedication of the teams and the drive to make this project a success, we always managed to recover any time lost. In the fiberline, from our point of view the commissioning went perfectly, again down to good planning and team work, and the drying line also started up without a hitch.”

All in all it seems that Fibria and ANDRITZ are delighted with the results achieved with the Horizonte 2 project, proving that the *One Team, One Goal* philosophy really does work when it is put into place with dedication and



For more information about Fibria's Três Lagoas pulp mill, view the video on your smartphone.

Scan this QR-Code!

integrity from all the players in the team. Mauricio Miranda Pereira, General Mill Manager, Três Lagoas, Fibria, concludes, “It was very clear to us as this project progressed that ANDRITZ has incredibly knowledgeable people in all the process areas, and despite one or two little problems at the beginning, there was fantastic transparency and sharing all the way throughout the erection, construction, commissioning, and start-up phases.

“Even now we have the ANDRITZ board and senior management asking for figures and looking for performance details; it is as if the *One Team, One Goal* continues on into the future.”

#### CONTACT

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## MARCELO CASTELLI: “A SEAMLESS OPERATION”

Marcelo Castelli, CEO of Fibria, talked to SPECTRUM at Fibria's headquarters in São Paulo about the unprecedented growth of the company, the strategy it implements, and the success of Horizonte 2.

“Historically, our growth has always been based on the consistent fundamentals of operating in a global commodity market; to always use the best in class technology and to be focused fully on efficiency, safety, and reliability,” says Castelli. “Our mills being located where they are in South America mean we are in the perfect region to apply this strategy and to grow and produce high quality pulp – and, of course, we are also able to deliver our products to every point around the world.



“Our growth strategy is driven by our optimism for the future demand of pulp – with the world population growing to 7 billion, a burgeoning middle class in emerging regions, and a remarkably sustainable product, we believe there is an excellent long-term future for our industry. And when it comes to expansion and investment, we always aim to bring in the right partners and, most importantly, get things right the first time.”

Castelli comments on the appointment of ANDRITZ as the sole supplier to the Horizonte 2 project, “Putting all our eggs in one basket, so to speak, is not some-

thing we do frequently when investing in large projects but during negotiations ANDRITZ came up with an excellent offer in terms of extra capacity and a shorter delivery schedule that

made an agreement very appealing. We have also had a number of successful projects completed by ANDRITZ at our other mills, so there was already a positive history.”

It seems those consistent fundamentals Castelli talks about were closely adhered to during the latest project at Horizonte 2 in Três Lagoas. Since the line started up, it has broken all sorts of records, including production and cost per tonne, and it has even created a new benchmark when it comes to safety in delivering a project of this scale.

And how did the Horizonte 2 project go from Castelli's standpoint? “From the outset it was very important to us that the right atmosphere and attitude was created for this project. At Fibria we like to work as one seamless organization, including when working with partners. When we awarded the contract to ANDRITZ, we created the motto:

*One Team, One Goal* – as these words expressed our sentiments exactly. This motto was adopted enthusiastically and successfully by all the teams of people from both ANDRITZ and Fibria throughout the project.”

It certainly seems as if the *One Team, One Goal* motto has hit the mark when it comes to combined success – latest reports from the mill suggest that Horizonte 2 is well ahead of the start-up curve and is likely to go over the design capacity of 1.95 million tonnes. Castelli concludes, “We are delighted with the Horizonte 2 performance so far; this result will further our position in the market and will give us even more production capacity than first expected.

“With this project we have the best technology available, installed in the largest single pulp line in the world, and we are aiming to create the best reference in the world in terms of dollars per tonne inside the fence.”



## GETTING TECHNICAL

# ANDRITZ'S COMPLETE SCOPE OF SUPPLY TO FIBRIA'S HORIZONTE 2, TRÊS LAGOAS

## WOOD PROCESSING

A complete wood processing plant with four chipping lines, each consisting of the world's biggest horizontally fed HHQ-Chippers with a capacity of 400 m<sup>3</sup> solid-under-bark per hour. The scope also includes the chip screening station, chip storage with a round pile stacker-reclaimer, which also provides chips to the first pulp production line, and bark handling. The unique HHQ-Chipper contributes towards providing the highest and most uniform chip quality, which significantly increases fiber yield both in woodyard and in fiberline operations.

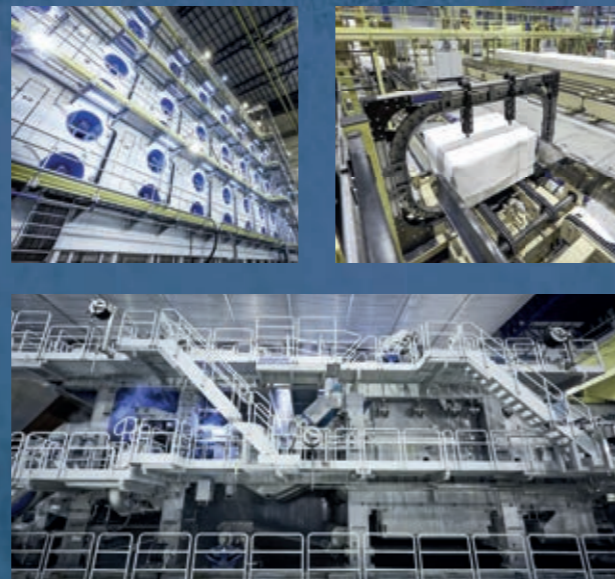


## FIBERLINE

A hardwood fiberline comprising a TurboFeed chip feeding system, Lo-Solids continuous cooking, screen room and bleaching, and DD-Washers, which ensure low operating costs, low emissions, extremely high washing efficiency, and excellent fiber quality. The capacity (6,120 adt/d) is the highest in the world for a single fiberline.

## PULP DRYING

Two energy-efficient pulp drying lines (working width of 8,004 mm and design capacity of 3,060 adt/d each) based on the high-capacity Twin Wire Former technology and airborne dryers. The approach system includes a full cascade screening plant and ensures homogeneous pulp feed to the subsequent process stage. The pulp dewatering machine comprises a dilution-controlled headbox, Twin Wire Former, and press section with combi-press and PrimePress X shoe press. The drying plant is designed for a specific production of more than 390 tonnes per meter and meter of working width, which has been well-proven for ANDRITZ pulp drying plants all over the world. The ANDRITZ airborne dryer is the most energy efficient of its kind.



The ANDRITZ Cutter/Layboy provides the pulp bales to be further processed in the high capacity baling lines, where the final pulp bales are produced.



## EVAPORATION PLANT

The largest black liquor evaporation plant in the western hemisphere (evaporation rate 1,950 t/h), which concentrates black liquor to a dry solids content of 80% for efficient combustion in the HERB recovery boiler. The plant is equipped with the latest of ANDRITZ's innovations in secondary condensate quality enhancement for 100% reuse in other departments of the mill. Furthermore, the evaporation plant is integrated with the recovery boiler, which has an energy-efficient boiler feed water heating system.

## RECOVERY BOILER

The largest recovery boiler in Latin America with a peak capacity of 8,250 tds/d. The ANDRITZ HERB recovery boiler is equipped with state-of-the-art combustion technology to minimize the emissions and maximize green energy production. It is capable of burning and destroying all the harmful non-condensable gases and the methanol produced in other process areas of the mill. The HERB recovery boiler supports and provides steam and power for the complete pulp mill and generates a large electricity surplus, which is to be distributed through the national grid.



## WHITE LIQUOR PLANT

Energy-efficient and largest white liquor plant in the world (18,900 m<sup>3</sup>/d white liquor production) meets the highest environmental standards and provides top performance and excellent availability under any process conditions. The white liquor plant consists of the single-line recausticizing plant and two lime kilns (840 t/d each), designed to burn oil, natural gas, and syngas.



In addition, ANDRITZ has delivered a chloride and potassium removal system to enhance the chemical recovery process and a liquid methanol plant for production of biofuel.

# Key Equipment: ENHANCED SERVICES FOR ANDRITZ DD-WASHERS

The last issue of SPECTRUM included an article about the evolution of the DD-Washer from the 1980s to today. With installations in 24 countries, the DD-Washer is clearly preferred for fiberline washing applications. To support this installed base, ANDRITZ has developed a full range of monitoring, diagnostic, and support services to reduce lifecycle costs and keep availability high.

Virtually all the DD-Washer systems ever delivered are still in operation. Many of the advances made over the five generations of washers are available as retrofits or upgrades to these installed systems.

## RETROFITS AND UPGRADES TO INCREASE PERFORMANCE AND EXTEND SHUTDOWN INTERVALS

An almost universal trend in mills today is to extend the period between planned shutdowns for maintenance. There is always a trade-off: intervals too short may subtract from maximum production; intervals too long may lead to degraded performance or even a catastrophic component failure.

Improvements in materials of construction in the DD-Washer have been steadily adopted over the years. Intensive R&D for sealing and other critical components is done in three pilot machines running 24/7. Chances are that any component in an older DD-Washer will benefit from these improvements in wear when replaced. For parts of the machine that are not designed for replacement, there are services for on-site coating and cladding with replaceable wear surfaces.

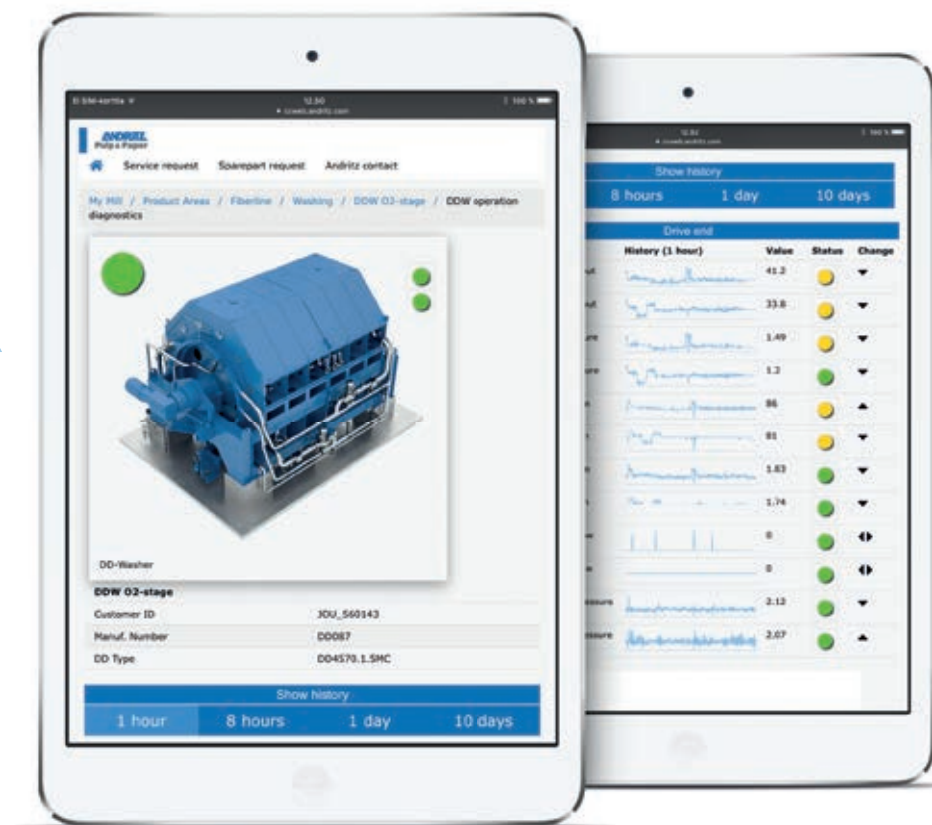
Washing efficiency is a key parameter for cost-effective pulp production. If a mill has continually increased production over the years without upgrading

or reevaluating operational setpoints for the washer, it is possible that the operation is no longer optimized. However, there are rather simple retrofits, such as upgrading the wash water distribution system, to keep washing efficiency high or even improve it by as much as 20%, even at the higher loadings. Efficiency can also be improved by readjusting wash water and filtrate flows between washing stages. In addition, adding a high-pressure oscillating shower to the screen plate will often eliminate losses in throughput or efficiency if plugging is an issue. A retrofit to optimize the cake height is also possible for older generation drums.

## IIoT SERVICE TOOLS

In addition to equipment upgrades, the ANDRITZ Service division has developed modern tools to monitor, enhance, and extend the life of DD-Washers. These services are available on a contract basis.

These service tools take advantage of recent advances in the Industrial Internet of Things (IIoT), including smart sensors and data analytics. Sensors can be installed in the washer system to continually measure sealing water pressure and flow, sealing air pressure and flow, the rotation speed of the drum, drum positioning, the running life of the end seal, etc. This gives insight into the condition of the end seal, which is one of the critical consumable parts of the washer. The user interface to this information is a simple DD-Washer Dashboard using traffic light indicators (red, yellow, green). The information is displayed on a handheld tablet for maintenance teams and optionally a DCS screen for operators and is available via a Metris app at any time and anywhere.



In addition, there are new monitoring tools for early detection of drum leaks, for detecting scaling on the perforated screen plate, and for monitoring the thickness of the end seal to predict when it should be replaced.

By interfacing these tools with the ANDRITZ Metris platform – our brand for digital IIoT solutions – mills are able to benefit from mobile functionality, remote maintenance solutions, real-time data, and mill optimization using OPP (Optimization of Process Performance) software. Decision support capabilities from the Metris platform could include creating indexes for

each DD-Washer with regards for scaling, washing consistency, washing efficiency, and rotational torque to predict the behavior of the equipment and the washing process.

ANDRITZ's combination of operational, shutdown, and lifecycle services ensures safe and optimal performance of the DD-Washer – no matter when or where installed.

## CONTACT

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For more information about the evolution of ANDRITZ DD-Washers, view the SPECTRUM – Issue 36 on your smartphone.

Scan this QR-Code!



PASI HÄRKÖNEN  
Product Manager  
ANDRITZ

**"Our service concept, combining mill audits, shutdown services, and effective IIoT service tools, is a powerful way to let the mills focus on production while we ensure the runnability of the DD-Washers."**

# A DAY IN THE LIFE OF...

## .... FREDRIK B. ROSÉN

**Workplace:** RISE Research Institutes of Sweden  
**Profession:** Market Strategy & Business Development  
**Bioeconomy Division**

With a background in both physics and business administration, Rosén works for RISE in Sweden's capital, Stockholm. RISE is a research and development institute with a dedicated Bioeconomy Division focused on pioneering developments for the forest products industry.

Rosén is married to Linda and has three children aged 12, 7 and 2, and lives outside of the city. The family spends its spare time at their country cottage and on a motorboat on Stockholm's archipelago. A man of many talents, Rosén is also something of a carpenter and enjoys having at least one renovation project on the go at his country cottage in the countryside outside of Stockholm.

The Bioeconomy Division at RISE focuses on optimizing the traditional products and processes in the forest products industry at the same time as looking forward to new and innovative possibilities in the future. The institute's scientists and researchers look into potential new areas across the board of the industry; from making carbon fiber out of lignin, to developing new products using nanocellulose, as well as working on ways to reduce energy use across all processes and adding new features to existing paper products.

RISE gave permission to the SPECTRUM editorial team to share a DAY IN THE LIFE of Fredrik Rosén in February 2018.





## MONDAY, FEBRUARY 12, 2018

### A DAY IN THE LIFE OF FREDRIK B. ROSÉN

#### RISE RESEARCH INSTITUTES OF SWEDEN

#### 07:30 // BREAKFAST WITH THE KIDS

It's an early start most mornings for the Rosén household, as wife Linda, a dentist, takes off for work early. Fredrik makes breakfast for their three children and helps get them ready for school. After dropping off his youngest at preschool, it's then directly to the office by car, or if it's sunny, he'll go into work on his bike. A real family man, Rosén hopes that it will be a fossil-fuel-free world when his children grow up.



#### 08:00 // ARRIVAL AT THE OFFICE

The main core of Rosén's job is to help the industry identify new opportunities where the forest can be used as a raw material. A lot of the work carried out at RISE involves taking new ideas, scaling them up, and making them commercially viable.

Rosén clearly loves his job and believes this is a really exciting time to be part of this industry, particularly when it comes down to the sustainability aspects. He says, "You only have to look at how some of the big brands are pushing for fiber-based packaging. Take, for example, Apple; it has already made the commitment to only use paper in its packaging and get rid of all plastic.

"With all the other huge potential for renewables from the forest to take over from fossil-based products, this makes it a fantastic industry to be a part of."

08:00



#### 09:30 // A QUICK CHECK OF THE PILOT PLANT

Today, Rosén has a steering committee meeting with a major international containerboard and packaging producer. The company is running trials of a new board product on the pilot machine at RISE. The institute works with many companies throughout the paper and board industries, turning ideas into reality. The pilot machine is equipped with an ANDRITZ top-former, specially developed together with RISE.

One of Rosén's early tasks today is to meet with the pilot machine technicians for a final check to make sure everything is ready and in place for the trials later in the day. This is also the perfect opportunity to go through and discuss the current archived results.

09:30



#### 10:30 // MEETING WITH DS SMITH

The road to new and exciting products starts by sharing ideas and putting trial plans into action. Today, Rosén collaborates with the DS Smith R&D team and RISE product experts to talk about ideas for the next revolutionary packaging solutions. Building close innovation partnerships with the industry is very important for RISE. DS Smith and RISE have a long-term partnership that involves a lot of work and new dynamic products for the packaging industry.



#### 13:00 // GET TOGETHER TO TALK ABOUT GLOBAL TRENDS

While hands-on industry R&D is important for RISE, equally important is understanding what is happening in the markets and with consumers across the globe. The institute produces a number of Global Outlooks that are very well received in the industry, including the latest one "A Cellulose Based Society." Today, Rosén discusses the next upcoming project with Peter Alberius, RISE's Head of Global Business Development.

The Global Outlooks are designed to examine and survey the trends that are shaping the future of the forest products industry globally and to find out how the consumer perceives forest fiber materials.

13:00



#### 15:00 // MOVE TO THE TESTING FACILITY TO CHECK THE LATEST RESULTS

Next on the agenda today is to move over to the test facility where Rosén meets Jesper Berthold, RISE's Research Manager, Packaging Development & Testing. Here, all the new, innovative products that come off the pilot machine are tested for all the usual properties, including strength, bulk, and brightness, but also of course anything new that may change the features of the material. Today Rosén and Berthold discuss the latest products that will be going into the lab for testing.

18:00



#### 18:00 // HIT THE GYM

After a busy and varied day, it's time to hit the gym and then go home to the family, ready to start a whole new day again tomorrow.



View video footage of this report online:

[www.andritz.com/ditlo-rosen](http://www.andritz.com/ditlo-rosen)



# GOING LIVE

## Videowall technology for pulp mills



### Monitoring woodyard and fiberline operations at pulp mills just got a lot smarter with ANDRITZ Decision Support Walls.

In all aspects of our lives, we are becoming much more used to information being delivered on demand and with as much choice of visual effects and data display as possible. Information is King, and the clearer, more concise, and effectively illustrated, the better, as it all goes to helping us manage our time more efficiently.

The ANDRITZ Decision Support Wall (DSW) brings the latest in Industrial Internet of Things (IIoT) and smart technology right into the heart of the pulp mill control room for monitoring woodyard and fiberline operations. The DSW comprises a bank of screens delivering high definition (HD) quality live videos from processes and equipment, which can also

provide live data recording and reporting facilities together with advanced alarm triggering, instantly highlighting any problems or potential problems.

#### THE TRAFFIC LIGHT SYSTEM

Along with the DSW, ANDRITZ is introducing a process diagnostics display with key performance indicator (KPI) values where

process status is illustrated with colors and values that are controlled by the Metris tool rule base. The Traffic Light system is a new addition to help monitor and maintain the efficient running of the woodyard. When a green light is being displayed on the system, all is running well; when a yellow light appears, it means the operator needs to do something: for example, when monitoring the condition of knives in the chipper.

Essentially, the Traffic Light system alerts an operator to a problem before it becomes a

major issue and therefore gives the opportunity for early action and is an excellent tool to assist in preventative maintenance.

For the woodyard there are detailed, HD video displays for ANDRITZ chipper and crusher equipment as they are running, along with Smart Woodyard products like ChipperEKG and CrusherEKG online process monitoring combined with advanced diagnostics. There are interactive tools for operations and maintenance, which can also include video

transmitted from a helmet camera or smart glasses. Real-time information being fed back includes KPI calculations for availability, production, quality, and energy consumption.

The system can also "publish" data from any operator interfaces that includes information supporting operators in their daily job, like ANDRITZ WoodScan, Bark-Scan and ChipScanLT in the woodyard, as well as DD-Washers and K4000 chip level measurement in the fiberline.

The DSW can be used for a variety of different purposes; for instance, selecting the "Morning Meeting" will enable all operators in the control room to have instant KPIs displayed, along with alarm statistics and a shift logbook allowing a view of any vital information at the click of a mouse or touch of a screen.

There can also be an instant internet connection with the experts at ANDRITZ where any information can be shared and viewed for process optimization or problem solving purposes.

#### CONTACT

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## SCENARIOS OF THE DECISION SUPPORT WALL IN ACTION:

### 1. SOLVING PROBLEMS

- While conducting a field tour of the fiberline, a service technician has been alerted to vibration issues on a pump. On returning to the control room, the service technician, together with two control room operatives gather at the DSW.
- The explosion view of the equipment under review is opened from the material library to allow closer inspection.
- The group examines the detailed material, along with the vibration data and a plan is put into place to solve the problem.

### 2. REMOTE TROUBLESHOOTING WITH ANDRITZ EXPERTS

- A bearing is repeatedly overheating and the operators decide to contact ANDRITZ to help solve the reoccurring problem.
- They share the recorded DCS views, recorded equipment data, and video clips.
- ANDRITZ experts access exactly the same information the mill control room has. With the same technology, we also have Decision Support Walls in our remote control rooms (so called Customer Support Centers).
- Together the two groups solve the problem utilizing the DSW via real-time collaboration with access to all history and data.
- The operators add a "start monitoring" command on the bearing to make sure the problem is solved.

### 3. COMMUNICATING WHILE IN THE MILL

- A service technician goes into the mill for a routine equipment inspection and wants to check something with the control room.
- Using a helmet camera, a live video stream is sent to the control room operators.
- The stream automatically appears on the DSW, allowing the operators to view exactly what the field technician is enquiring about.
- The service technician communicates via radio phone and receives immediate answers from the control room.





# OKI

All Set to Take on the World

Asia Pulp & Paper (APP) has often made it abundantly clear that its ambition is to be the No.1 supplier of pulp and paper around the world. The company's latest 2.8 million tonnes a year pulp development, OKI, is a signal that those ambitions remain firmly in place. ANDRITZ supplied what is now the world's largest recovery boiler to the mill, which is right at the center of the greenfield development in the province of South Sumatra, Indonesia.



The recovery boiler at OKI is the world's largest boiler today. The unit could easily supply power to a European city of 1 million inhabitants with an output of 10,000 – 12,000 MWh per day.



The steam drum in the OKI recovery boiler is the largest in operation today. It weighs 270 tonnes with a length of 23 m.

APP's OKI mill has seemingly sprung up from out of nowhere to become what is now one of the world's largest pulp mills and is a real force with which to be reckoned in the global pulp and paper industry. It is a hugely ambitious and impressive development near Palembang, the provincial capital.

General Manager of the OKI mill development, David Kerr, says of the positioning of the mill, "There is an old cliché in our business: there are three reasons for where you put up a pulp mill: location,

location, location. In the case of OKI the location is very close to our natural resources, raw material, and close to our market. It is also in a perfect position for obtaining our skilled labor force from the Palembang region."

The mill uses two types of plantation fiber as its main source of raw material for pulp, mainly due to their fast-growing nature and end-quality properties. Kerr says, "We use two species of acacia here, crassiparva and mangium, which grow to maturity in five to six years and have

great physical properties when refined and developed. In fact, our pulp suits all end uses for products, printing and writing, packaging board, and tissue – it is an extremely versatile pulp."

#### OKI'S JEWEL IN THE CROWN – THE WORLD'S LARGEST RECOVERY BOILER

Dominating the whole mill complex and visible along the skyline for some miles before arriving at OKI is the jewel in the crown at the mill – the ANDRITZ supplied HERB Recovery Boiler, which is the world's

largest by some measure. The design capacity of the boiler is about 50% more than any other recovery boiler operating around the world today with a total capacity of 12,000 tonnes of black liquor dry solids per day (tds/d). To give an idea of the daily recovery boiler output at OKI, the unit could easily supply power to a European city of 1 million inhabitants with an output of 10,000 – 12,000 MWh per day. Ordinarily, two recovery boilers would have been needed for a mill with such a large capacity, which would have led to higher capital expense.

The boiler also has the world's top steam data – 515°C at 110 bar as well as the latest technologies and features for maximizing power to heat ratios, allowing the mill to maximize green power generation.

So why go for such an ambitious target? Kerr explains, "The newer recovery boilers being designed nowadays are extremely reliable and have many interlocks and permissives that guarantee safe operation. In addition, this boiler at OKI gives us economies of scale because of its size – basically it gives us much more efficiency at a lower cost.

"We went for the HERB technology because ANDRITZ has a proven track record with its recovery boilers and it has been shown that they get excellent performance and energy-saving results."

Faizur Rahman, ANDRITZ's Start-up Manager for the OKI project, says, "In general, the pulp manufacturing process is a highly energy-intensive one. The mill's capacity of 8,000 tonnes of pulp per day calls for an energy-efficient operation to minimize operating cost. The proven HERB technology from ANDRITZ supplied with this OKI boiler brings huge savings by producing higher specific steam output thus

maximizing power to heat ratio. The green power from this boiler more than meets the entire demand of the mill – in fact, there is a large surplus of generated energy that OKI can use for further expansion purposes."

This surplus energy will undoubtedly be put to good use. APP is installing four new woodyard lines to add to the nine it already has at the OKI mill, as well as a

**"This recovery boiler project was really phenomenal for ANDRITZ, because it is the world's largest boiler."**

**FAIZUR RAHMAN**  
Start-up Manager  
ANDRITZ



large tissue manufacturing complex in the near future at the mill.

The boiler's features also include collection and burning of all foul gases emanating from the pulp mill operation. This makes the mill an environmentally-friendly unit.

#### THERE WERE CHALLENGES

Contracts were signed for the boiler after the pre-engineering phase in November 2013 with the liquor firing and start-up taking place in December 2016. ANDRITZ took on all the project management, as well as engineering, including pressure parts, the boiler building, the main steam pipe, main auxiliary equipment, piping and ducting, and all training and commissioning.

Obviously with such a large project, there were challenges, but that is what comes with such high ambition, and both OKI and ANDRITZ took on the project with relish. In terms of dimensions, the recovery furnace floor area is around 500 m<sup>2</sup> and the building height is approximately 100 m. The steam drum alone weighs some 270 tonnes and is

the largest in operation. The total length of the tubing to construct the boiler at the site is over 800 kilometers.

Of the construction, Kerr says, "Any greenfield pulp mill project has its own unique challenges; fortunately, we had a great team of skilled Indonesians working with international experts who made the project a tremendous success."

Rahman adds, "When we started up with the commissioning of this boiler, we were given a very tight schedule. In order to meet the customer's demand, we had to revisit our standard commissioning plan to execute various activities in parallel without affecting quality. ANDRITZ management provided additional resources and OKI responded by providing sufficient skilled manpower in different disciplines to accomplish the task."



**DAVID KERR**  
General Manager  
OKI

**"This boiler at OKI gives us economies of scale because of its size – basically it gives us much more efficiency at a lower cost."**

#### STARTING UP TO SMOOTH OPERATION

Kerr says of the start-up, "The OKI mill was started up in two phases; the recovery boiler came online with the first fiberline and as we tuned and brought it up to speed the recovery boiler followed very closely. Then shortly after we started the second fiberline and we ramped up the recovery boiler to near full capacity. It actually all went very smoothly."

Rahman adds, "Initially, the boiler was operated on a low load for about five months since only one fiberline was started up. This meant that we had to devise suitable operating parameters to minimize the impact on performance and equipment. This we did successfully with the support of the ANDRITZ recovery boiler experts in Finland.

"With commissioning of the second fiberline, the boiler load was ramped up steadily and we have achieved up to 90% capacity now, this also went very smoothly."

#### ALWAYS MORE WORK TO DO

As OKI continues on its journey to reach full capacity and take on new expansion, there is always ongoing work to be done. Kerr says, "The mill is now running at near full capacity and we are focusing on fine-tuning each individual area throughout the mill to get the best performance. It is our continuing aim at OKI to make the best products at the highest rate of

production and at the lowest cost. We are well on our way to achieving those aims."

As for the world's largest recovery boiler, work continues to keep it as the most efficient as well. Rahman concludes, "We are now tuning up the boiler operation at a higher load, and also observing the performance for optimizing at

the micro level. Added to this ongoing optimization work, we are implementing the ANDRITZ Advanced Process control system for the boiler."

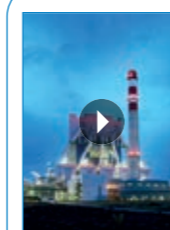
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#### COMPONENTS AND TECHNOLOGY

ANDRITZ also supplied major components and technology for the nine complete chipping lines installed in the woodyard at the OKI mill. The scope of supply included equipment for nine debarking lines including horizontally fed XL size HHQ-Chippers with feeding and discharge systems, wood breakage recovery systems, and log receiving decks with unique sand and stone separation features.

ANDRITZ also supplied 10 special bark crushers that ensure good particle size for the boiler operation specifically designed for acacia bark, which is stringy and can be difficult to handle.



For more information about OKI and the world's largest recovery boiler, view the video on your smartphone.

Scan this QR-Code!



## THE SPECTRUM ROUND TABLE

Getting to the heart of industry matters



# THE FIBER REVOLUTION

## Is the industry ready to replace fossil-fuel-based products?

SPECTRUM recently brought together industry professionals from leading research organizations, associations, and companies to discuss the opportunities and challenges being presented to pulp and paper producers in the replacement of plastic products with paper and board. Over the following pages are excerpts from the enthusiastic panel discussion that was held at the Confederation of European Paper Industries' (CEPI) headquarters in Brussels, Belgium.

**What are you and your organizations working on right now when it comes to replacing plastics with fiber-based products?**

**ELINA PÄÄKKÖNEN:** We are working on lots of different projects at VTT when it comes to fiber replacing plastic, but one of the most exciting ones my particular team is currently working on, is in the development of foam forming to replace EPS (expanded polystyrene foam). Foam-formed, fiber-based products are perfectly able to replace numerous products that are currently made out of polystyrene – for instance, cushioning materials used in various packaging. The beauty of a foam-formed fiber product is that it contains only fibers, water, a surfactant, and air, meaning it is at once both renewable and recyclable – unlike polystyrene.

**FREDERIK ROSÉN:** At RISE, we carry out a lot of surveys globally in the area of packaging, and it is clear that consumers the world over are demanding products that are good for the environment. However, we can't escape the fact that plastic has properties that paper does not have – at least not yet. At RISE, we are doing a lot of research into changing the fundamental properties of paper, for instance, introducing stretchability, much like is seen in the plastic product cling film. One of the partners we are researching with has developed a technology that can be retrofitted to a paper machine that will allow paper to stretch. The fact is, if the industry wants to take market share from plastic, it must work on much more than just flat surfaces and cardboard boxes.

**ESA TORNIAINEN:** At Paptic, we are noticing that our customers, particularly in the packaging sector, are keen and ready to replace plastic products with renewable ones. We are busy bringing our novel wood fiber alternative in packaging to the market and we are getting a very favourable response to how our product looks and feels when compared to plastic, especially when it comes to shopping bags. Brand owners are now taking action, actually faster than what was expected a couple of years ago, and there is an urgent need for sustainable materials that fit to the existing value chains of packaging.

**BERNARD DE GALEMBERT:** Working for CEPI, I take much more of a "helicopter view", as we are not dedicated to products or output. It is our aim here at the confederation to create an environment where the pulp and paper industry is at the core of the bioeconomy and link it directly to the circular economy, encouraging policy makers to enable opportunities for fiber-based products to blossom. We are no longer talking



Paptic shopping bags are a renewable, recyclable, and reusable alternative to plastic.

### FROM THE INDUSTRY

**Elina Pääkkönen, M.Sc (Tech)** – Research Scientist, VTT Technical Research Centre of Finland Ltd.

**Frederik Rosén, MBA, M.Sc** – Vice President, Market Strategy & Business Development, RISE Research Institutes of Sweden (formerly Innventia)

**Esa Torniainen** – Founder, Chief Business Development Officer, Paptic Ltd.

**Bernard De Galembert** – Innovation and Bioeconomy Director, Confederation of European Paper Industries (CEPI)

### FROM ANDRITZ:

**Johan Engström** – Chief Technology Officer, ANDRITZ

### MODERATOR:

**Mark Rushton** – Pulp & Paper Industry Consultant



For more information about the fiber revolution, view the video on your smartphone.

Scan this QR-Code!





Elina Pääkkönen, M.Sc (Tech)  
Research Scientist, VTT Technical Research  
Centre of Finland Ltd.



Frederik Rosén, MBA, M.Sc  
Vice President, Market Strategy & Business  
Development, RISE Research Institutes of  
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Esa Torniainen  
Founder, Chief Business  
Development Officer, Paptic Ltd.



Bernard De Galember  
Innovation and Bioeconomy Director  
Confederation of European Paper Industries  
(CEPI)



Johan Engström  
Chief Technology Officer  
ANDRITZ



Mark Rushton  
Pulp & Paper Industry Consultant

about decarbonizing the industry here in Europe, we are now talking about defossilizing – creating all sorts of renewable products from the side streams at mills. We are great believers at CEPI that the pulp and paper industry is the most sustainable industry there is and, therefore, has a major role to play in climate change mitigation.

**JOHAN ENGSTRÖM:** At ANDRITZ, the bioeconomy and circular economy have been characteristic themes in our R&D work – particularly in designing technology that will help our customers to be able to make new products out of wood-based fiber and especially on utilizing the side streams by converting them to valuable products, chemicals, and bioenergy. Lignin, methanol, and sulfuric acid are examples of new bioproducts in addition to tall oil and turpentine. Today, it is possible to create almost anything from wood, including textiles and nonwoven products. ANDRITZ has developed a continuous cooking process for dissolving pulp. Dissolving pulp made of wood fibers is then used, for example, in the textile industry. This is a more sustainable alternative compared to cotton and oil-based materials. Renewable bio-based raw material, recyclability, and biodegradable products are, of course, very important features in the battle against plastic pollution and climate change.

**Is the pulp and paper industry ready to replace plastic in all its shapes and forms?**

**ESA TORNIAINEN:** Think about it – more than 10 million tonnes of plastic waste ends up in the ocean every year; this is something the whole human race should be ashamed of. Yes, we as the industry are ready and see this as a good business opportunity. But it is much more than that; if we have the means and know-how to replace plastic, it is our responsibility to do so as a matter of urgency. Brands are, of course, an important vehicle in all this; actually, this plastic crisis is a great opportunity for them to shift to fiber-based packaging and communicate to the consumer how responsible they are – and how seriously they are taking environmental concerns.

**FREDERIK ROSÉN:** The pulp and paper industry has a huge potential to gain from this shift; however, it historically has focused on big volumes and mass production. It is true to say that if there is not hundreds of thousands of tonnes involved, the industry is not really interested. This is where the dynamic will have to change; we will see new, smaller start-up companies being formed around mills, as well as closer to markets, as entrepreneurs create new products. These new entrepreneurs

should come from the pulp and paper industry, but it could also be that outside companies come in that have the ideas, skills, and enthusiasm to create new products. After all, this is a fabulous raw material they have to work with.

**JOHAN ENGSTRÖM:** The fact is, the raw material and the technology are already there to convert from fossil oil to wood-based products, it really is a case of the pulp and paper industries implementing the technologies. New technology to enable this conversion to take place even faster is being worked on by suppliers to the industry constantly, for instance, in barriers and coatings for food packaging, which is where R&D in the area of nanocellulose is becoming instrumental. In fact, nanocellulose is already now being used in commercial applications enabling much stronger, lighter materials to be used in packaging. Micro crystalline cellulose (MCC) is an interesting raw material for many applications, including pharmaceutical, rheology modifying, and animal feed uses.

**BERNARD DE GALEMBERT:** We at CEPI have made a list of all the products that can be replaced with fiber, which we call the "Science Fiction" list. The fact is, the sky is the limit with what can be done; for instance, I like to dream that a complete iPad 10 could be made of fiber-based products; carbon fiber for the body, printed electronics for the motherboard, and a nanocellulose-based touch screen. But packaging is definitely the major growth pathway the industry will take first, and is taking; just look at all the conversions that are taking place from graphic papers to packaging machines. Another encouraging sign for the industry in Europe, in particular, is that we see national policy makers taking the messages about plastic forward and turning it into legislation, regulation, and incentives.

**ELINA PÄÄKKÖNEN:** Just in the last year, there has been a lot going on as the consumer has become aware of the problems that plastic waste has been causing around the world. This has, of course, resulted in the consumer having a preference for fiber-based products. The industry has to begin now to develop and change to meet the need and certainly should be planning ahead to handle this increased demand. Already, brand owners are asking for these new, more sustainable products as a major shift occurs in consumer preferences.

**Final thoughts from the panelists?**

**BERNARD DE GALEMBERT:** We have the perfect alignment of stars for the future of the pulp and paper industry. We know that there is a solution to the littering of the earth and seas by replacing plastic products with fiber-based biodegradable ones, and I am extremely optimistic that the industry can cope with all the new demand. Our next challenge is to attract more young talent to join what really is the most sustainable industry on the planet.

**FREDERIK ROSÉN:** Who will be the pulp and paper industries' Elon Musk in the future, the bold person that takes this industry into the next dimension? We have the most fantastic material to work with; we can even build rockets out of it. As an industry, we must be bold and not afraid to scale our ambitions right up to the limit.

**ELINA PÄÄKKÖNEN:** This is without doubt the most exciting time to be a researcher in the forest products industry. The best part of my job is talking to consumers and brand owners about the fantastic products we are working on that are not only highly effective, but are from completely renewable resources, as well as being 100 percent recyclable. How could they not be impressed?

**ESA TORNIAINEN:** The forest industry is, for sure, the most innovative and sustainable place to work at the moment. The great public does not necessarily see it that way, but we have to be bold and take our new products and applications based on wood to the market and show them what an amazing industry we are.

**JOHAN ENGSTRÖM:** We can make anything out of this fantastic material, and we are at the beginning of an important new era for our great industry. We have seen what is done in the labs and now we need to bring it to the market. As has already been said, "the sky is the limit".

The SPECTRUM ROUND TABLE on the Fiber Revolution is the second in a series of regular round tables.



**"Who will be the pulp and paper industries' Elon Musk in the future?"**

**FREDERIK ROSÉN, MBA, M.SC**  
Vice President  
RISE Research  
Institutes of Sweden

# ULTRA HIGH DISPERSING

## Cleaner stock at the highest level of performance

Due to the contaminants in recycled fiber, dispersion is a key process step. The previous state-of-the-art dispersion operated with an inlet feed consistency of 25–30%. To improve energy efficiency, chemical costs, and removal efficiencies, ANDRITZ engineers have been innovating on an Ultra High Dispersing process and soon will be installing the first units.

When dispersion was first introduced for wastepaper recycling, the goal was to reduce the size of contaminants so that they were no longer visible. Today's requirements for dispersion are much higher: reduce contaminant size, improve the physical properties of fiber, detach inks so they can be more easily removed in downstream processes, and condition mixing in bleaching chemicals.

Different dispersers are available – from low-speed “kneaders” to high-speed machines with plates similar to a refiner. These machines operate at inlet consistencies up to 30%, with the dewatering accomplished by twin-wire presses or screw presses (most common) installed upstream of the disperser.

### THE HIGH COST OF HEATING WATER

Effective dispersing requires the stock to be heated. Steam can be injected through a heating screw flanged directly onto the disperser or installed separately or also directly ahead of the dispersing zone.

The higher the consistency of the stock, the higher the proportion of pulp in the slurry (compared to the amount of water). Higher consistencies lower the specific heat capacity of the stock – which lowers the energy input required. Because there is less water to heat, the economics of raising inlet consistency are quite dramatic.

Take, for example, a dispersion process that heats the stock to 90 °C from 45 °C (Table 1). A 10% increase in inlet consistency lowers the total mass per kilogram of pulp from 3.6 to 2.6, the specific heat capacity from 3.36 kJ/kg to 3.7 kJ/kg, and the specific heat from 540 kJ/kg to 364 kJ/kg.

This equates to a 33% reduction in specific steam demand, which at today's rates can mean a savings of 150,000 EUR per year at a line with a capacity of 300 t/d processing Mixed Office Waste (MOW).

### THE ULTRA HIGH DISPERSING SYSTEM

The system patented by ANDRITZ for Ultra High Dispersing is straightforward and easy to implement. It is effective for compact dispersers (white grades) and pressurized units (brown grades).

Ultra High Dispersing makes modifications to the plug screw feeder – adding a dewatering zone – to increase the inlet consistency to the disperser. Typically, little or no modifications are necessary to the disperser itself.

By using the conical plug zone of the feeder as a dewatering zone and adding a screen basket for dewatering surface, the feeder takes on the role of additional dewatering equipment after the screw press.

### DISPERSION PROCESS

CONSISTENCY	[%]	28%	38%
Total mass/kg pulp	[kg/kg]	3.6	2.6
Specific heat capacity	[kJ/kg K]	3.36	3.07
Specific heat	[kJ/kg]	540	364

Table 1. Dispersion process – heating from 45 to 90 °C

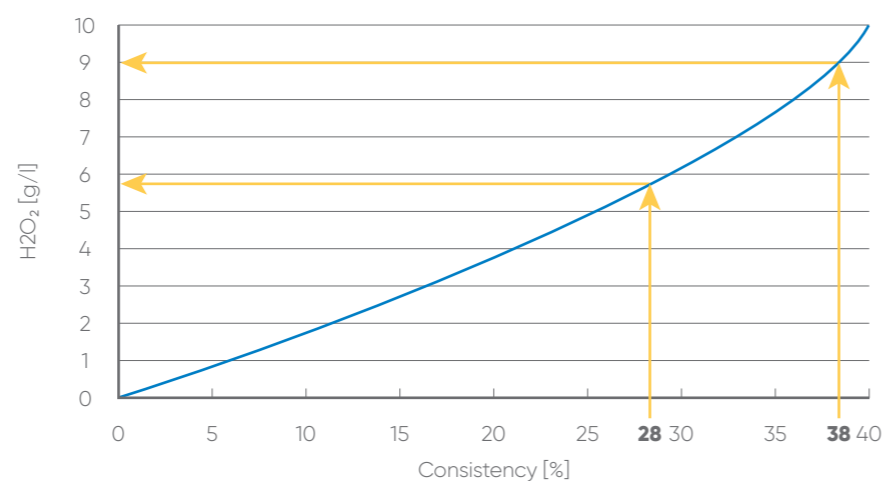


Figure 1. Peroxide concentration (at 1.5% H<sub>2</sub>O<sub>2</sub> dosage)



Typical 3D representation of pressurized dispersing

### ADVANTAGES IN BLEACHING

In addition to energy savings cited above, Ultra High Dispersing lowers bleaching chemical costs. This can be seen in Figure 1. A 10% increase in stock inlet consistency increases the H<sub>2</sub>O<sub>2</sub> concentration in bleaching by about 50%. Now, the papermaker has options: a faster bleaching reaction and savings in chemicals to achieve a certain bleaching target, or increasing the brightness target for the same chemical cost. If the decision is to keep the brightness target the same, the cost savings in chemicals approaches 140,000 EUR per year (against a line with a capacity of 300 t/d processing MOW).

### STOCK QUALITY

The increase in inlet consistency increases the apparent viscosity of the stock so that higher shear forces are generated inside the disperser gap, which increases the dirt/stickies removal efficiency. Figures 2 and 3 show the improvements possible in dirt removal and stickies removal respectively.

### SUMMARY

For many years, there have been only minor improvements to the dispersing process. The advent of Ultra High Dispersing sets a new milestone to save papermakers energy, chemicals, and other operating costs while improving the quality of their stock.

### CONTACT

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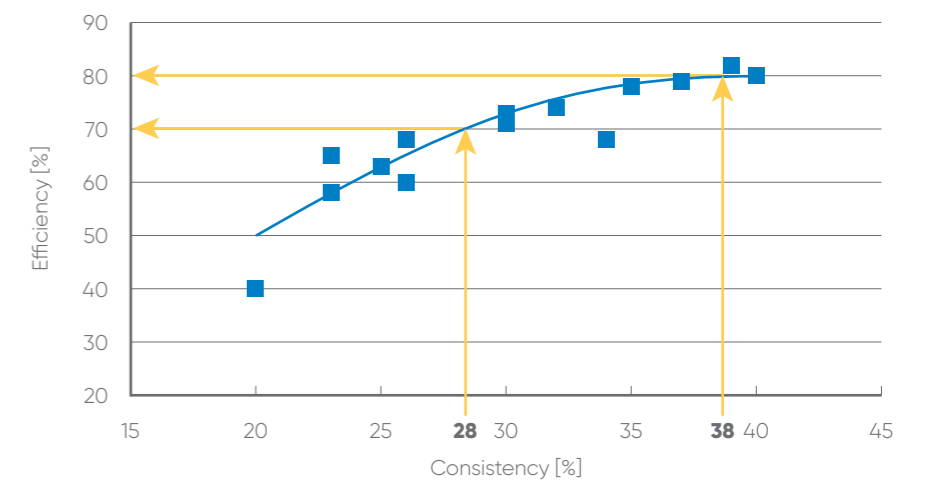


Figure 2. Dirt removal

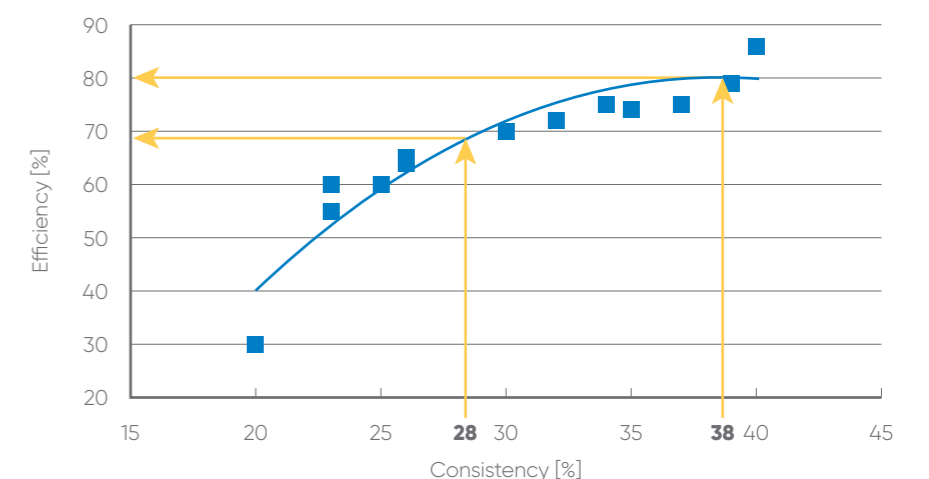


Figure 3. Removal of stickies

# A holistic approach MINIMIZING MERCURY, SO<sub>x</sub>, AND PARTICLE MATTERS

Harmonization of EU-wide limits on emissions of dust, NO<sub>x</sub>, SO<sub>x</sub>, and mercury is currently driving the majority of the investments at large-scale combustion plants. The tightening of these limits will place a major challenge on many existing plants. To make effective use of capital, it will be necessary to integrate new and

perhaps innovative equipment into an established, existing plant. This requires a special expertise.

ANDRITZ's experience is that every plant has the potential to reduce SO<sub>x</sub>, NO<sub>x</sub>, dust, and mercury through a combination of *reasonable* operation adjustments and *limited* additional equipment. However, since additional capital is quite often scarce, it is important to take a holistic approach in order to arrive at a successful, reliable, and cost-effective outcome.

### A HOLISTIC APPROACH TO MINIMAL MERCURY

Mercury emissions are an environmental concern due to the toxicity and persistence of mercury that accumulates in waterways. To meet stringent limits, ANDRITZ has taken a holistic approach to look at the combustion process as a whole, taking into account not only the various oxidation reactions in

the flue gas itself, but all the sources and sinks in the entire flue gas cleaning path. Accurate information about the driving factors influencing mercury oxidation, absorption, and adsorption after the boiler outlet is combined with knowledge of the fly ash removed in the ESP as well as potential byproducts such as gypsum and sewage sludge.

With this data and the right interpretation of the data, mercury flows can be influenced and controlled with known technologies. In simplest terms, the mercury removal process, within the flue gas path, combines three main process activities (see Figure 1).

For each of these main process activities, ANDRITZ has the capability to develop a technical solution that is tailored to the existing equipment and operations. Core capabilities are shown in Figure 2.

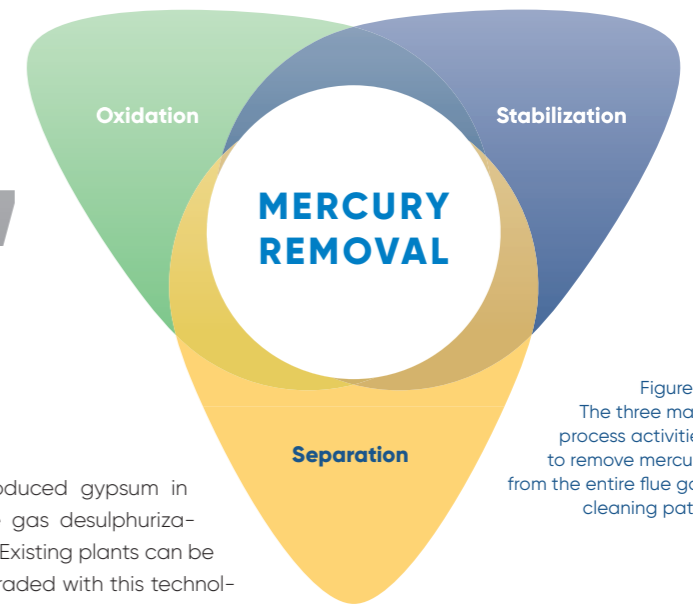
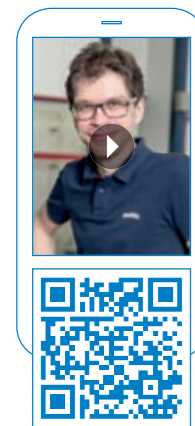


Figure 1. The three main process activities to remove mercury from the entire flue gas cleaning path.



For more information about the mercury control technology, view the video on your smartphone.

Scan this QR-Code!

## REFERENCES

PROJECTS	BOILER	INSTALLED UNITS	SO <sub>2</sub> EMISSION MG/M <sup>3</sup> <sub>STP</sub>	DUST EMISSION MG/M <sup>3</sup> <sub>STP</sub>	FOCUS
Niederaussem Block G (GER) – RWE	660 MW	1 x Ø 18,5 m	200	< 7	Energy saving
Niederaussem Block H (GER) – RWE	660 MW	2 x Ø 18,5 m	200	< 7	Energy saving
Taiyuan (CN) – Datang	300 MW	1 x Ø 13,5 m	50	< 6	SO <sub>2</sub> removal
Nanjing (CN) – Tongfang	120 MW	3 x Ø 8,4 m	35	≤ 5	Dust removal
Tusimice II (Cz) – CEZ	200 MW	2 x Ø 14,5 m	200	< 20	SO <sub>2</sub> removal Dust removal

Table 1. FGDplus technology references

Of ANDRITZ's core capabilities (see Figure 2), in particular, the bromine-based oxidation is an important part of the puzzle. This technology, offered exclusively by ANDRITZ, is the most cost-effective solution currently available on the market, even when used, such as sorbent dosing before the ESP.

In addition, the new regulations also provided a window of opportunity by rethinking established technologies. Here ANDRITZ patented a special hydrocyclone technology for the primary dewatering

of the produced gypsum in a wet flue gas desulphurization plant. Existing plants can be easily upgraded with this technology, which closes an open gap and will be a game changer in some cases.

Drawing upon holistic knowledge of all relevant processes for mercury control (oxidation to stabilization to separation), ANDRITZ has created models for specific applications. These models are created for long-term view, not just a snapshot in time. Modeling is essential

for a realistic assessment of the overall process in terms of re-emissions into the stack, targeted sink transfer, and sustainable operational safety.

### FGDplus

FGDplus is an ANDRITZ developed and patented technology to improve SO<sub>x</sub> and

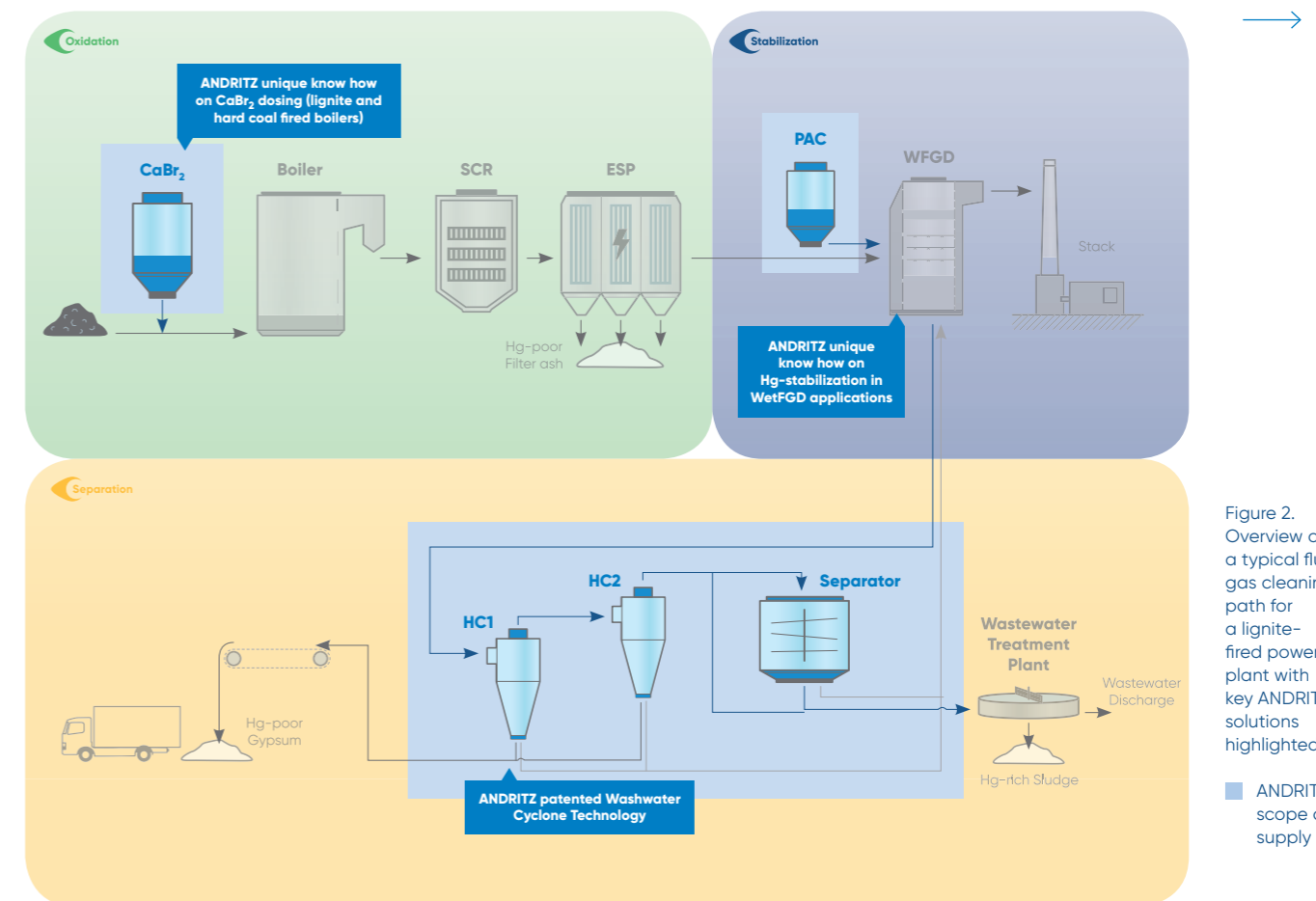


Figure 2. Overview of a typical flue gas cleaning path for a lignite-fired power plant with key ANDRITZ solutions highlighted.

■ ANDRITZ scope of supply

dust removal. After several years of R&D and optimization, the first installations of this technology began in 2014 (see Table 1).

During the development of the FGDplus technology, particular attention was given to creating a robust system that could also prevent the build-up of materials. These features are well proven in all the bituminous coal- and lignite-fired plants in which the technology has been installed.

For all installations to date, the FGDplus elements are constructed of PPH, allowing the units to operate reliably at high inlet temperatures up to 190 °C.

The higher operational reliability, when compared to other air pollution control technologies, is a function of not only the design features, but also the layout and optimized piping design.

Follow-on development work has included testing of the FGDplus technology in

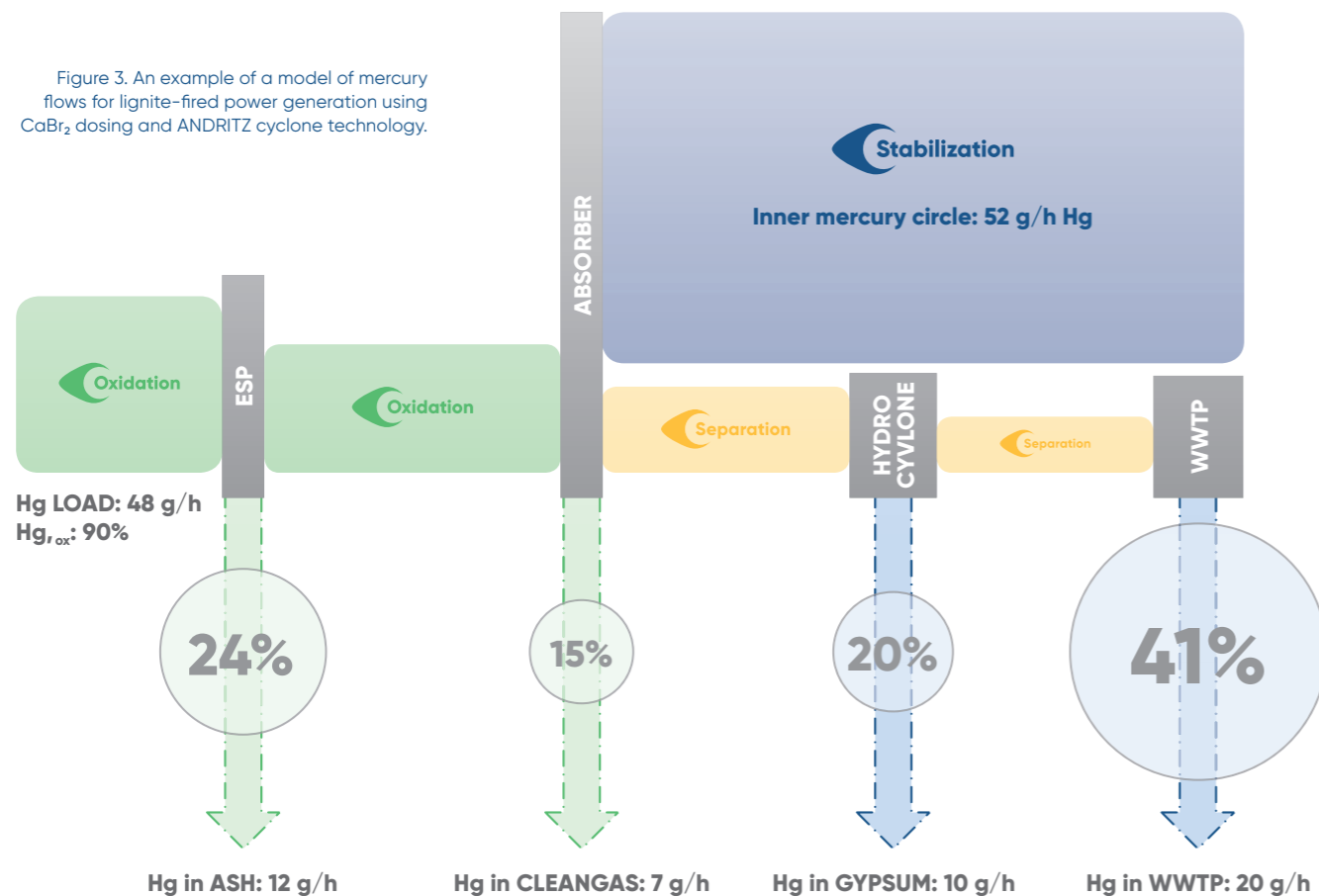
a large industrial pilot plant (up to 50,000 Am<sup>3</sup>/h), allowing engineers to develop precise design models by plotting all inlet parameters under actual operating conditions. This comprehensive model is the basis for making detailed predictions of SOx removal efficiencies, pressure drop, as well as the operating parameters for auxiliary equipment.

The unique design features of FGDplus technology set it apart from other approaches. An operation with almost no material build-up, especially under critical operating conditions, is a key advantage. Energy savings, reduced maintenance costs, and only minor adjustments to local conditions are major benefits.

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Figure 3. An example of a model of mercury flows for lignite-fired power generation using CaBr<sub>2</sub> dosing and ANDRITZ cyclone technology.



**GERHARD SCHIEFER**  
Head of ANDRITZ AUTOMATION



## Enhanced. Embedded. Eco-friendly.

*PrimeControl E* automation hardware and software for tissue producers is on display at the *PrimeLine* Tissue Innovation and Applications Center in Graz.

The *PrimeLine* Tissue Innovation and Applications Center (TIAC) in Graz, Austria is built around the world's most flexible pilot machine – capable of being configured in eight different ways for conventional, structured, and premium tissues. In order to be able to accomplish this, there is a very high degree of automation to monitor and control the valving, process flows, and machinery on-the-fly. This automation system is known as *PrimeControl E*.

The "E" in *PrimeControl E* stands for Enhanced operability and maintenance, Embedded drive and quality control systems, and Eco-monitoring for energy and resource efficiency.

**Enhanced operability and maintenance.** *PrimeControl E* provides the utmost flexibility in monitoring and controlling stock preparation and the machine – including different forming, pressing, and drying configurations for conventional, textured, structured, and premium products.

An important aspect of the flexibility is the use of standard networks and protocols along with the integration of several vendor-specific bus systems in one centralized control system. Also included are simulation capabilities for training purposes; automatic reporting/instant messaging of information; onboard web-based engineering documentation (e.g., circuit diagrams); and a control library of modular, standardized software objects. Alarm management and online configuration of alarm task checklists provide a tool for faster and better service of maintenance activities. The capacity of the system is enlarged by utilizing the Metris Platform foundation, which optimizes performance based on proprietary algorithms with artificial intelligence.

For enhanced maintenance, the system's integrated condition monitoring functionality helps identify impending faults or malfunctions – and then gives access to dedicated online documentation. Interconnectivity with mobile devices (smartphones and tablets) allows maintenance people to monitor overall equipment effectiveness and respond to alarm situations wherever they are. There is even Augmented

Reality (AR) functionality to provide specific information about an asset at the point of service on the mill floor.

**Embedded drive system and quality control system.** This unique combination in one automation system increases productivity, quality, and stability of production. Integrating drive control and quality control leverages key synergies, which result in shorter start-up times or changeovers after a grade or configuration change.

**Eco-monitoring.** ANDRITZ integrated a millwide Resource Management System (RMS) that monitors, tracks, and traces the tissue machine's resource demands and energy flows. The system typically monitors 70–80% of the total resource costs in the mill. With energy and resource efficiency integrated into the *PrimeControl E* system, mill personnel gets a detailed overview of costs and energy balances to help optimize energy consumption.

The interconnected data from *PrimeControl E* provides a good foundation for Metris OPP (Optimization of Process Performance) services. OPP has Big Data analysis capabilities to sift through historical process and machine data to detect anomalies and deviations and predict future events – allowing ANDRITZ and mill control experts to create counter-measures to stabilize production.





# INFORMATION IN THE PALM OF YOUR HAND

Mobile capabilities of the Metris Platform can be scaled to the information needs of each customer.

It wasn't that long ago that laptops and emails gave engineers, supervisors, and technicians freedom from having to sit in front of a DCS screen in order to monitor a mill's processes or access key data. Freedom at last!

But, the idea of sitting at a desk and waiting for a laptop to fire up is "old school" now. Instant-on smartphones or tablets are "new school" tools that are changing the way workers get their jobs done.

## MOBILE AS A STRATEGY

PwC Global's 21<sup>st</sup> annual survey of CEOs drove home this mobile trend. The survey found that 81% of CEOs from 77 countries see mobile technologies as being strategically important for their companies. Nearly 90% said that a clear vision of how digital technologies, including mobile, can create competitive advantage is key to the success of their investments.

ANDRITZ's contribution to this mobile information delivery comes in the form of its flagship product, Metris OPP (Optimization of Process Performance). With OPP, the vast amount of data generated by mill sensors and control systems is a valuable "raw material" for optimization. OPP looks for data interrelationships and patterns that a human being with a spreadsheet would need years to uncover. Then, intelligent algorithms create control models to exploit these patterns.

Developers of the Metris Platform are creating an increasing number of mobile applications (apps) that address specific mill needs – to untether managers and operators from the control room monitors so that they can collaborate across the mill. Bottlenecks can be avoided and opportunities to increase throughput become more visible.

## BENEFITS

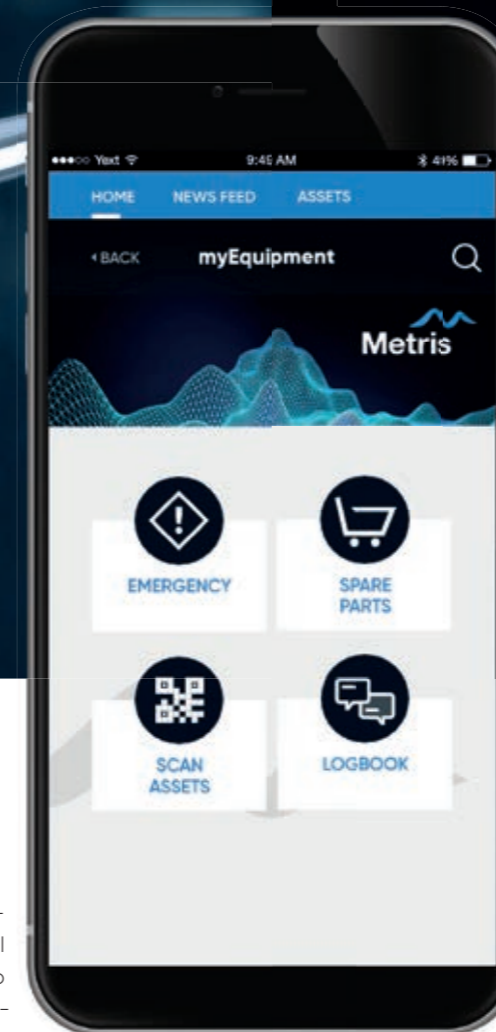
One of the targets is to mobilize mill activities that require quick accessibility to data via the handheld apps. Supervisors can see alarms in real time on their iPhone or Android devices no matter where they are. Business managers have real-time production and cost data in hand. Maintenance technicians have logbooks, checklists, repair procedures, and other documentation instantly available for each asset they are looking at. Information can be easily exchanged among team members or from one shift to another by smartphone.

## LATEST RELEASES

The latest apps released by the Metris development team are designed to display key information in a simple, graphical way using dashboards accessible from mobile devices. Several key apps are available. Work is progressing on many

Big Data competence integrated in mobile solutions by ANDRITZ

Metris OPP mobile apps – myEquipment for operation support



others, including a special service app to solicit quotations for replacement parts, maintenance documentation, and other service functions.

## KEY APPS AVAILABLE NOW:

**The My Equipment app** is a mobile asset monitoring platform that gives important real-time insight on the status of valves, motors, control loops, etc. It can be integrated with the Logbook app to report issues. An operator or maintenance person can use the smartphone to scan a barcode or QR code on the asset to obtain quick status information.

**The Checklist app** is beneficial during equipment commissioning, inspections, or planned shutdowns. It gives visual

feedback of progress or key issues and can be customized to display specific checklists or

items to execute for specific individuals or teams. It has desktop integration so that data is shared between field personnel and maintenance planners.

**The Logbook app** records important events and information generated by users. The data can then be mined and used to train new personnel, find solutions for recurring problems, etc. Team members can share updates and can upload photos and videos of equipment. Managers utilize the app to make announcements available to target groups of users.

**The Data Analytics app** provides mobile data visualization, making it possible to perform data analysis in the field. Users

can display process trends in graphical format, check real-time values, and have access to manuals or report related to a specific piece of equipment.

**The Condition Monitoring app** helps identify situations where a machine needs service in order to avoid unexpected downtime. It can collect data from on-machine sensors (e.g., acoustic and vibration data) and display the data time and frequency using Fast Fourier Transform calculations – automatically recognizing specific data patterns that can predict potential failures.

## CONTACT

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## New Orders

### Arkhum Tissue, Russia

PrimeLine™ W6-XT tissue machine, incl. stock preparation

### Albayrak Group, Varaka mill, Turkey

New OCC line and approach flow system

### APP Pindo Deli, Indonesia

OCC line including reject handling system

### Bailonggang wastewater treatment plant Shanghai, China

Six EcoFluid bubbling fluidized bed boiler lines including the entire flue gas cleaning

### Cariboo Pulp & Paper, Quesnel, BC, Canada

Package Boiler Replacement – E&I Engineering

### Chengdu Engineering, China Light Industry, China

Stock preparation system incl. ANDRITZ Disc Filter

### Dongguan Shanglong Paper, China

OCC line with FibreFlow Drum pulper system

### Electricity Authority of Cyprus (EAC)

Vasilikos Power Station, Cyprus  
Reconstruction of a damaged seawater flue gas desulphurization (SWFGD) plant

### Ence Energia & Celulosas, Navia, Spain

Rebuild of existing recovery boiler and white liquor plant, upgrade of evaporators and modernization of the fiberline

### Georgia-Pacific, Halsey, OR, United States

Papermill DCS Replacement – Replacing Bailey Infi-90 DCS with Rockwell and Ignition System

### Georgia-Pacific, Halsey, OR, United States

Mill wide MCC Replacements Engineering

### Heinzel Group, Zellstoff Pöls, Austria

Repeat order of a complete paper machine; PrimeLine MG paper plant, stock preparation line, approach flow system, and automation equipment

### Holmen Paper, Hallstadvik, Sweden

Refurbishment of dewatering equipment for new TMP washing stage

### International Paper, Springfield, OR, United States

Process Control Engineering Support

### Naberezhnye Chelny Paper, Russia

New soft calender, upgrade of size press to film press and guide rolls for complete dryer section

### Nippon Paper, Iwakuni, Japan

Cooking plant upgrade

### Pori Energia,

Pori, Aittaluoto power plant, Finland  
EcoFluid bubbling fluidized bed (BFB) boiler with flue gas cleaning system and other auxiliary equipment

### Shandong Wamat Paper, China

OCC line with reject handling

### Shanying Huazhong Paper, China

Reject handling system

### Siensol, Changzhou, China

Flue gas cleaning plant for a sludge incineration plant

### Skeena Sawmills, Terrace, BC, Canada

New Pellet Mill E&I Engineering

### Södra, Mönsterås, Sweden

Bio-methanol cleaning and purification plant

### Södra, Mönsterås, Sweden

Chip handling upgrade, Improved chip steaming with chip bin central steaming and new steaming vessels

### Stora Enso, Oulu, Finland

Fiberline digester top modernization

### Stora Enso, Uimaharju, Finland

Two new evaporation units, additional surface condensers and the related piping and erection work

### Stora Enso, Varkaus, Finland

Fiberline flash steam handling upgrade  
Replacing three flash tanks with new efficient flash tank

### Suzhou Taison Paper Industry, China

TM13&15: two tissue machines, PrimeLineST W8, incl. stock preparation

### Walsin Lihwa Corporation

Kaohsiung, Republic of China (Taiwan)  
Multi-effect evaporator unit

### WestRock CP, Tacoma, WA, United States

Recovery Boiler #4 BMS and ESP Upgrade – Engineering and Integration

### WestRock CP, Tacoma, WA, United States

New Chip Screens Room DCS Controls

## ANDRITZ starts up Universal Shredder FRX at Stora Enso, Poland

International technology Group ANDRITZ has successfully started up an ANDRITZ Universal Shredder FRX and a metal separator supplied to Stora Enso Narew Sp. z.o.o., situated in Ostrołęka, Poland.

The FRX Shredder, which is part of the ANDRITZ Fransson's product line, processes rejects from the pulping processes of two existing board production lines. Start-up of the new shredder, which processes around 60 tonnes of rejects per day, was finalized in February 2018.

The well-proven shredder, size FRX2000, features powerful pre-shredding of a broad range of raw materials. Its innovative knife system and pusher technology guarantee consistent quality and high throughput. The shredder has been installed upstream the existing ANDRITZ reject treatment system, which is part of the 455,000 tonnes per year board production line for which ANDRITZ also delivered the complete OCC line.

Stora Enso Narew Sp. z.o.o., headquartered in Ostrołęka, 120 kilometres northeast of Warsaw, operates in the pulp and paper industry. Its core products are industrial papers for corrugated boards and boxes.



## ANDRITZ successfully starts up tissue machine in Brazil with the world's largest steel Yankee

ANDRITZ has successfully started up the PrimeLineST W22 tissue machine with steel Yankee dryer and steam-heated hood delivered to Carta Fabril, for its mill in Anápolis, Brazil. Due to the outstanding and short commissioning period, paper production on the new tissue machine started well ahead of schedule.

The PrimeDry Steel Yankee delivered by ANDRITZ has a diameter of 22 ft. and thus is the largest in the world for tissue applications. The combination with the steam-heated hood enables highly efficient drying with substantial energy savings. The steam-heated hood is equipped with an innovative, automatic cleaning system to ensure easy maintenance and safe operations.

The ANDRITZ PrimeLineST W22 has a design speed of 2,100 m/min and a width of 5.55 m. It will produce tissue with grammage of 15 g/m<sup>2</sup> that is used for two-ply toilet paper. The scope of supply also included the complete stock preparation plant, which is designed to process 100% Eucalyptus as main raw material. The centerpiece of the line is the ANDRITZ Papillon refiner, which treats fibers gently in the cylindrical refining zone in order to achieve superior fiber properties at low energy consumption.

Read more about the successful start-up at:

[ANDRITZ.COM/SPECTRUM/NEWS-CARTAFABRIL](http://ANDRITZ.COM/SPECTRUM/NEWS-CARTAFABRIL)



## Project Start-ups

### Carta Fabril, Anápolis, Brazil

PrimeLineST W22 tissue machine with steel Yankee dryer and steam-heated hood; incl. stock preparation. PrimeDry Steel Yankee has a diameter of 22 ft. and thus is the largest in the world for tissue applications

### CETI, Tourcoing, France

Flat oven for Air-Through-Bonding process

### Christof Project, Faisalabad, Pakistan

PowerFluid (CFB) boiler

### Energoinstal S.A., Jastrzebie-Zdrój, Poland

PowerFluid (CFB) boiler with flue gas cleaning system

### Fujian Nanfang, Nanping, China

Complete spunlace line

### Hangzhou Pengtu Chemical Fibre, Hangzhou, China

Complete spunlace line

### KapStone Kraft Paper, North Charleston, SC, United States

Primary and secondary superheaters

### Navigator Pulp Figueira SA, Figueira da Foz, Lavos Portugal

Major Fiberline modernization in cooking, brown stock washing, oxygen delignification and bleaching processes. Upgrade includes three new DD-Washers

### Sappi, Saiccor, South-Africa

Fiberline bleach plant rebuild

### Stora Enso, Ostroleka, Poland

ANDRITZ Universal Shredder FRX

# DID YOU KNOW THAT...



## ... ANDRITZ OFFERS A FULLY INTEGRATED AUTOMATION SOLUTION FOR BALE FINISHING?

The bale finishing system is controlled by a local programmable logic controller (PLC) automation system called BaleMatic™, especially developed by ANDRITZ. It is the fully integrated solution for automation from dryer to forklift truck. The strength of ANDRITZ BaleMatic™ automation solutions is the extensive know-how in process technology, automation, and design engineering.

Get more information at:  
[ANDRITZ.COM/BALEMATIC](http://ANDRITZ.COM/BALEMATIC)

## ... ANDRITZ ACQUIRED NOVIMPIANTI, ITALY?

ANDRITZ has signed a contract for the acquisition of Novimpianti Drying Technology S.r.l., a company owned by Novigroup S.r.l. and based in Lucca, Italy. Novimpianti has approximately 40 employees and generates annual sales of approximately 10 MEUR.

Novimpianti is a global supplier of engineered equipment and services for air and energy systems to the paper industry's leading manufacturers.

For ANDRITZ, the acquisition of Novimpianti further strengthens its product offerings in the field of air and energy systems, mainly for tissue and paperboard machines.



## ... ANDRITZ IS A HIGH-QUALITY ROLL SUPPLIER AND HAS EXTENSIVE ROLL SERVICE EXPERTISE?

The experience we have gathered over the decades is based on manufacturing the rolls for thousands of twin-wire presses and sludge dewatering machines installed around the world, as well as for numerous paper/board machines and fast-running tissue machines.

ANDRITZ has workshop facilities equipped with state-of-the-art machines and tools and can also provide experienced technicians for each roll processing and machining step.

Get more information at:  
[ANDRITZ.COM/ROLL-SERVICE](http://ANDRITZ.COM/ROLL-SERVICE)

