

SPECTRUM

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MAGAZINE OF PULP & PAPER 



BIO-GENERATION

Portucel Soporcel's green energy
(Page 4)

LUCKY STARS

Yueyang Paper's large stock prep plant
(Page 10)

NARROW GAP

Cardella's gap former opens possibilities
(Page 24)

BRAINY KILN

Mondi SCP employs new automation tools
(Page 28)

ANDRITZ
Pulp & Paper

CONTENTS

3 MANAGEMENT MESSAGE

4 BIO-GENERATION



10 LUCKY DIP



14 DOLPHINS & REJECTORS



16 NON-STOP FILTER CHANGE



22 CRUCIAL SOLUTIONS



24 CLOSING THE GAP



28 KILN WITH BRAINS



32 EXPANDING SUN



36 MAINTENANCE ALTERNATIVES



42 NEWS FROM THE WORLD OF ANDRITZ

ANDRITZ NEWS

Östrand and Obbola to improve environmental footprints with ANDRITZ.

SCA chose ANDRITZ PULP & PAPER to deliver a new lime kiln with fuel handling and white liquor filtration equipment for the Östrand mill, and some new recausticizing technology for the Obbola mill, both in Sweden.

The Östrand delivery is part of SCA's BioLoop project, in which the mill will change its systems from oil to renewable fuels in order to enhance the general environmental friendliness of the mill. The new lime kiln will be fueled by wood dust, which will also lead to lower chemical costs. The scope of supply also includes wood dust burners for the existing power boiler.

The Obbola delivery, for SCA Packaging, will include a LimeGreen™ green liquor filter, a LimeFree™ centrifuge for dregs processing, and a lime mud filtration system. This delivery also includes process electrification and instrumentation, as well as modification of the existing control system.



Forced to focus.

One thing about a crisis: it forces us to focus on what is most important.

In our personal lives, the serious illness of a loved one snaps our attention to focusing on their care. In our business lives, the crisis of a severe drop in market demand, or wildly accelerating raw materials prices, snaps our attention to what is necessary as the other things are allowed to fall by the wayside.

There are indicators – especially in certain regions – that the worst of the economic crisis is behind us. As the recovery gains momentum, we cannot afford to lose focus.

Focus on people.

As engineers, we often focus on technology. But we cannot forget that our technology is created by people, operated by people, and maintained by people. Our focus

must be on providing safe, challenging, and rewarding environments for our most important assets.

Focus on energy.

Rising energy costs and, more importantly, the security of long-term energy supplies, focus our attention on self-sufficiency, conservation, and alternatives to fossil fuels. Good examples are the Portucel Soporcel Group's biomass generation projects (page 4) in this issue. And, the energy-saving Ro-Tec Dolphin® rotor used at NSI's Bruck mill (page 14).

Focus on efficiency.

Slashing operating costs and increasing efficiency have been key to survival for most mills. One of the focus areas for efficiency improvements is maintenance. The story about UPM Augsburg's mill (page 16) tells of a service innovation that saves time and money. An interesting discussion about the

role of service (page 22) offers more food for thought.

We have prepared this issue to be distributed at PulPaper in Helsinki – one of the industry's meeting places. While trade exhibitions are not our major focus, we look forward to every opportunity to meet with customers and discuss solutions for the challenges we all face.

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A tale of two mills: bio-generation comes naturally to Portucel

Energypul, Portucel Soporcel group's subsidiary for power production, is taking advantage of available biomass to generate additional "green" revenue for the company at two mills. Two new biomass boilers, recently supplied by ANDRITZ, are performing extremely well according to mill management.

The Portucel Soporcel group is one of Portugal's largest generators of energy from renewable forest biomass. In the years between 2000 and 2008, the group reduced its fossil CO₂ emissions by 58%. With a focus on renewable energy, Portucel Soporcel group started up two ANDRITZ biomass-fueled power plants (one in Cacia and the other in Setúbal) which produce a net of around 167 GWh/a.

What is unique is that *none* of the energy generated by the boilers is used by the mills. This is not permitted according to Portugal's directives for "green energy" credits, so the electricity is sold directly to the national grid.

"Even without these boilers, we are energy self-sufficient at Cacia," says José Manuel Nordeste, Mill Manager at the Cacia pulp

mill. The situation is a bit different at Setúbal, according to Pulp Mill Manager Óscar Monteiro Arantes. "The installation of a new and very large paper machine at our site requires some extra energy produced at a new combined heat/power plant (CHP)," he says. "However, the extra margin we receive for green energy still makes it attractive."

Ideal locations

The Setúbal site is situated just 4 km from the port town of Setúbal, making transportation of finished goods very efficient. The mill produces 525,000 t/a of bleached pulp (primarily from the preferred *Eucalyptus globulus* fiber).

Cacia is midway up the nation of Portugal, about 8 km from Aveiro and very close to the sea. "Cacia is in the heart of our country's eucalyptus forests," says Nordeste.

"The proximity of this raw material is a key advantage for us." Cacia's production of 280,000 t/a is primarily designed for special applications such as décor papers, specialty coated papers, and tissue.

"Portucel can actually trace its roots back to the start of the Cacia mill in the 1950's," Nordeste says. "By 1957, a team of experts made the Cacia mill a world pioneer with the production of sulphate bleached eucalyptus pulp. Our people have an innovative spirit, combined with knowledge that has been accumulated over decades."

Value-added pulping + energy

The Portucel Soporcel group is responsible for about 65% of Portugal's total electricity produced from renewable forest biomass. "Renewable energy is a key focus in the world," Nordeste says, "and is a major focus for us. It is important for us to be players in

this industry to ensure that order is maintained in the market. Forestry resources are our lifeblood. There is a potential threat if we let others control the resource, or simply burn it, before we can add value to it."

The interest in boiler technology and services has been on the rise in the Iberian Peninsula, according to Anssi Marttila, ANDRITZ's Pulp Engineered Services Area Manager for the region. "We have worked for many years in cooperation with Portucel Soporcel group on their strategic investments and ongoing service," he says. "This has given us the opportunity to continuously improve our service and spare parts availability – and to truly have a local presence in Portugal. With abundant resources and the business incentives improving, this will continue to be an active area for us."

The ANDRITZ biomass boiler project consisted of the supply of two identical boil-

ers with a total production capacity of 49.75 MWth. According to Jukka Kari, Project Manager, the boilers are mid-size (58 t/h, 93 bar, and 472° C). Portucel Soporcel's scope included the civil/structural work and part of the electrification and automation. "ANDRITZ basically provided everything above the foundations from the fuel feeding conveyor to the main steam header in the turbine-generator plant," Kari says. Contracts were signed in February 2008 and the boilers were mechanically complete in the fall of 2009.

Value-added at Setúbal

The group has made considerable investments in upgrading the mill in Setúbal, which was originally started up in 1964. Arantes estimates the total recent investment to be EUR 700 million for a new paper machine, new combined heat/power plant (CHP), fiberline and boiler retrofits, and the new biomass boiler.



▲ The recovery boiler at Setúbal was recently rebuilt. This was a large retrofit project. Each economizer section (shown here being removed from the boiler) was 25 m high and weighed 22 tonnes.

MILL SITE SETUBAL, PORTUGAL



▲ By removing biomass waste from the forest floor, Portucel Soporcel group is actually reducing the risk and impact of fires. The mill uses about 150,000 t/a of biomass as fuel at the Setúbal mill.



An interior view of the ANDRITZ biomass boiler. ▶



"We started up the boiler without difficulty. There is good flexibility to burn different biomasses with different moistures."

Óscar Arantes, Pulp Mill Manager, Setúbal

Arantes (left) with José Henriques of Exporatlas, ANDRITZ's agent in Portugal.

PORTUCEL SOPORCEL GROUP

With annual production capacity of 1.55 million tonnes of paper and 1.35 million tonnes of pulp, the Portucel Soporcel group is the European leading producer of Uncoated Woodfree paper, as well as the largest European producer of bleached eucalyptus kraft pulp.

The group has three mills in Portugal – Setúbal, Figueira da Foz, and Cacia. The origins of the group date back to the 1950's at Cacia producing raw pine pulp. In 1976, Portucel (Empresa de Celulose e Papel de Portugal) was incorporated as a result of the nationalization of the cellulose industry. With a view to restructuring the paper industry, Portucel acquired Papéis Inapa in 2000 and Soporcel in 2001. In 2004, Semapa of Portugal acquired a majority stake of Portucel.

Over the years, the group has pursued a strategy of developing its own brands, including Navigator, which is the world's best selling brand in the premium office paper segment.

Thanks to the use of renewable forestry biomass fuel, Portucel Soporcel group is Portugal's leading producer of energy from this source.



“One of the strongest references for ANDRITZ was the new recovery boiler they installed at this mill in 2006. This recovery boiler works perfectly – like a Swiss watch!”

José Nordeste, Mill Manager, Cacia

The new ANDRITZ recovery boiler at Cacia (left) replaced two old units (center) and has enabled the mill to expand its production. ▼



“We use about 150,000 t/a of biomass as a fuel here at the mill,” Arantes says. “About eighty percent of our logs are debarked before entering the mill. We use special harvesting and binding equipment to gather forest waste and put it into small bundles for transport.”

In addition to providing green energy, the removal of forest waste has another large benefit: a reduction in forest fires. “In the summer, this region is hot and dry, which increases the risk of forest fires considerably,” Arantes explains. “By removing the waste from the forest floor, we actually reduce the risk and impact of fires. We do not remove everything however. Our forestry experts know well where they can remove biomass without damaging the soil.”

As for the boiler itself, Arantes has this to say: “ANDRITZ kept all the contract milestones on-time or ahead of schedule. We started up the boiler and the start-up was without difficulties. It went into service quite smoothly, which is a good indication of the cooperation between ANDRITZ and our own project team. The design of the boiler is good. There is good flexibility to burn different biomasses with different moistures.”

Recovery boiler retrofit

An ANDRITZ recovery boiler installed at Setúbal in 1990 was due for a retrofit. Portucel Soporcel group decided to have part of the boiler bank rebuilt, in addition to replacing portions of the economizers and a portion of the superheater for this 2,200 tds/d unit. ANDRITZ won the bid.



Standing in front of the new Cacia biomass boiler are (left to right) António Gomes, Site Project Director, José Henriques, ANDRITZ agent, and José Nordeste, Cacia Mill Manager.





"We see all kinds of contaminants in the incoming biomass. You need a very robust and reliable boiler system to handle it."

António Gomes, Site Project Director

"This was a large retrofit project," says Timo Lamberg, Project Manager for ANDRITZ. "We installed 856 new tubes in the boiler bank, and both the first and second economizer sections."

The economizer sections were massive, about 25 m high and weighing 22 t per assembly block. "In order to dismantle the very large sections and put in the new ones, we had to rent one of the largest construction cranes in the region, this one coming from Spain," Lamberg says.

Shutdown for the retrofit work began in October 2008 and the recovery boiler was commissioned in November.

Excellent reference at Cacia

The recovery boiler at Cacia also played a key role in deciding the biomass power boiler project for ANDRITZ, according to Nordeste.

"One of the strongest references for ANDRITZ was the new recovery boiler they installed at this mill in 2006," Nordeste says. "We would not be able to make the other improvements to the fiberline and the rest of the mill without this boiler operating well, as our two old units were at end-of-life. This recovery boiler works perfectly – like a Swiss watch!"

"You can make big mistakes in handling and burning eucalyptus bark," Nordeste says. "It comes in long, stringy strips and must be cut correctly. Our first biomass (bark) boiler started in 1987, so it is nothing new to us."

Another challenge is that the mill never knows what it is receiving with the biomass, according to António Gomes, Site Project Director and now the mill's Production Manager. "We see all kinds of incoming contaminants in terms of metals, concrete, and other things," he says. "You need a very robust and reliable boiler system to handle it."

MILL SITE CACIA, PORTUGAL



View from above: the ANDRITZ biomass boiler plant at Cacia, with the Vouga River in the background. ▼



▲ Flexibility in handling varying fuels and moistures is key. Depending on the season, Cacia's biomass moisture ranges from 45% to 60%.

Flexibility in handling varying fuels and moistures is also key. "We needed a very flexible boiler to handle the range of biomass and the ranges of moisture," he says. "Depending upon the season, we go from 45% moisture in the spring to 60% in the winter."

As with Setúbal, the boiler project proceeded without a glitch. The boiler was mechanically complete in September 2009 and was commissioned and started up in a very smooth fashion.

The assessment of ANDRITZ? "To me it is quite simple," Nordeste says. "The equipment works well. The ANDRITZ people know what they are doing and the process knowledge is there. And, if something goes wrong, ANDRITZ has the willingness and capacity to make it right."

FIND OUT MORE AT
www.spectrum.andritz.com

"SOFT SENSORS" AND A NEW WAY OF SEEING

The Cacia power boiler utilizes a new diagnostic tool introduced by ANDRITZ. Linked via a remote connection to the mill's distributed control system, ANDRITZ specialists take measurements and create a database of trends in order to optimize the boiler's performance.

Heikki Lappalainen, Product Manager for Automation and Diagnostic Applications in Varkaus, Finland, explains: "In a Formula One race, the crew takes measurements of speed and time and combines this with their knowledge to determine when to bring the car in for fuel, tire changes, or other adjustments. We do that with production equipment."

The unique service from ANDRITZ combines actual measurements with expert knowledge to arrive at what Lappalainen calls "soft sensors" – predictions about fouling degree, efficiency, or other factors. "If Portucel Soporcel wanted us to, we could use the computer system to predict and give them guidance when to bring their

boiler in for a pit stop," he says laughing. "Another way to say that is we can predict the optimum time between shutdowns, or how to operate the boiler most effectively until a planned shutdown."

These are not short-term, operational predictions, but rather longer term trends. "We collect data for three to six months to build a database," Lappalainen says. "Then, working with the customer, we can focus on one piece of equipment (such as the power boiler) or one particular situation. The focus at Cacia now is how to optimize the heat transfer from flue gas to steam."

ANDRITZ provides remote diagnostics for boilers, digesters, bleaching systems, and other production equipment. "Mill operators optimize day-to-day and handle the hour-to-hour situations," Lappalainen says. "We look at longer term optimization and give the operations people some new tools."

Operator in the Cacia control room. An ANDRITZ service provides remote diagnostics and longer term trend optimization for the biomass boiler. ▼



A project under lucky stars

The timing of Yueyang Paper Co.'s new mill in Hunan Province was excellent. At its start, Yueyang took advantage of lower commodity costs and a favorable currency exchange rate. After start-up, financial pessimism in China diminished and the market is recovering nicely. "Honestly, we have been really lucky," says Guo Yongwei, Chief Engineer.



"The technology, the R&D ability, and the equipment manufacturing capacity of ANDRITZ met exactly the requirements of Yueyang Paper."

Guo Yongwei, Chief Engineer and Vice Commander, Yueyang Paper

Yueyang Paper Co., a member of the Hunan Tiger Forest & Paper Group, placed an order with ANDRITZ PULP & PAPER for a complete deinking line, stock preparation systems, and paper machine approach systems for their new mill in April 2008.

The fiber preparation technology prepares quality stock for two new 5.3 m wide paper machines at the mill producing environmentally friendly copy paper and premium offset printing paper. The furnish is a combination of deinked mixed office waste (MOW), mechanical pulp, and bleached kraft. In addition to the technology, ANDRITZ delivered control engineering, erection supervision, and start-up services.

Start-up of the production lines took place in July 2009. The new PM10 started operation in August. Currently, PM10 is being fed an 80:20 mixture of deinked pulp (DIP) and bleached softwood kraft. The deinking line cleans and brightens American sorted office paper and local office waste paper to about 82% ISO brightness.

The bleached kraft comes to the mill from parent company Tiger Forest & Paper, or from the market, depending on which is the most cost-efficient. ANDRITZ provided all the major production systems for Tiger's 400,000 t/y chemical pulp mill in Huaihua City, Hunan province (see story in SPECTRUM No. 19/1-2009). In addition, Yueyang Paper can also use high quality mechanical pulp from a 200,000 t/y mill in Hunan province, the site of ANDRITZ's first P-RC APMP line in 2003 (see story in Issue 2/2004 of FiberSpectrum) instead of bleached kraft.

The second machine, PM9, is furnished with a 70:30 mixture of bleached hardwood and softwood kraft pulps. ANDRITZ also pro-

vided stock preparation equipment and approach systems that refine BSK and BHK, and prepare the stock for the two PMs.

"Generally speaking, the whole process from technical negotiations and international bidding to erection and commissioning went quite smoothly," says Guo, who is also the Administrative Vice Commander of the Yueyang Paper and was the project director during construction. "This all was realized even though the project time was short."



ANDRITZ delivered totally three SelectaFlot flotation stages to obtain maximum final pulp quality. ▶

Taking a DIP! ANDRITZ's Friedrich Hoppl, the on-site leader of the start-up team, explains that both professional and personal friendships have developed as a result of the deinking project.

Friedrich Hoppl, on-site leader of the start-up team from ANDRITZ



ANDRITZ PULP & PAPER supplied a complete deinking line, stock preparation systems, and paper machine approach systems for Yueyang Paper's new mill.

"Most important part of the whole project"

"Generally speaking, the DIP line is the most important part of this total project," says Zhou Xunfu, Project Manager of the DIP project. "The runnability of the line and quality of the deinked pulp is critical for the paper machine. For this reason, ANDRITZ is a very important partner."

Zhou notes that the line is "extremely easy to operate. We were able to make quality pulp from the start-up and we only need four operators per shift to run the entire line. The operating efficiency is really high."

According to Zhou, the equipment has been running well since start-up in the summer of 2009. The guarantee run was completed in March 2010, and customer takeover of the entire line occurred April 1, 2010. "Despite some minor problems at start-up, we would already rate the system as perfect," Zhou says. "The quality of the pulp helps us meet all the requirements of PM10 and the older paper machines. The ANDRITZ team has been patient and dedicated. For me, it has been truly a pleasure to listen, learn, and even challenge their expertise."

“The runnability of the line and quality of the deinked pulp is critical for the paper machine. For this reason, ANDRITZ is a very important partner.”

Zhou Xunfu, Project Manager of the DIP plant from Yueyang Paper Company



Liu Yiwen, Vice Director of the DIP Department, has similar feelings. “Based on the way the line is running now, we are confident of success in the performance test. We know that, under the supervision of ANDRITZ experts, we can achieve all the guaranteed performance very soon.”

“A fantastic group to work with”

“Yueyang really has a nice team here,” says ANDRITZ’s Friedrich Hoppl, the on-site leader of the start-up team. “Friendships have been developed, not only professional, but personal ones. They are more than customers. I would say that we are colleagues. All the time we keep open communications and dialog.”

Chen Zuqing, the Project Manager for the DIP plant from ANDRITZ China, also remarked about the excellent cooperation. Chen was responsible for overseeing the locally manufactured equipment, while his colleague, Gerhard Knes from Austria, was Project Manager for the engineering and imported equipment.

“I feel that the confidence, comradeship, and expertise we have at ANDRITZ most certainly can be seen and felt by the customer,” Chen says. “This leads to progressive and efficient operations, no matter how challenging.”

The choice of ANDRITZ

“Why did we choose ANDRITZ as the supplier for our new deinking system?” asks Guo. “First, it is supplying the most advanced technology for deinking systems with references around the world. I visited the deinking line for our customer Shandong Chenming, as well as the mill in Jiangxi Chenming, where the DIP line is more or less the same that we wanted to build. These installations really gave us a good impression.

“The technology, the R&D ability, and the equipment manufacturing capacity of ANDRITZ met exactly the requirements of Yueyang Paper. And finally, ANDRITZ could offer a really nice price-to-performance ratio. “Based upon the project and the performance, we made the right decision.”

A new project already in plans

“We are already planning a 500,000 t/y increase in our production,” Guo says. “At the present, we are confirming the technical concept for the project and making the general layout. Our longer range plan is to build this mill to a base of 1.5 million t/y papermaking capacity.”

He also hopes that also ANDRITZ continues its R&D work in energy savings. “Savings



“The reject of coarse and MC screening is more or less free of fiber. We can reach a yield over the whole line that exceeds 70%.”

Gerhard Knes, Project Manager from ANDRITZ (right) with Chen Zuqing, Project Manager for the DIP plant from ANDRITZ China

SCOPE OF SUPPLY

3-loop deinking line with 500 t/d capacity:

- Bale handling
- FibreFlow® drum pulper
- DuoClean system
- ModuScreens for coarse and fine screening
- SelectaFlot deinking
- Thickening/dewatering
- RotoWash de-ashing
- CompaDis dispersing
- HC bleaching
- Sludge dewatering equipment
- MC pumps
- Advanced basic engineering
- Erection supervision
- Training
- Commissioning
- Start-up and optimization services



▲ ANDRITZ installed a second cleaning line to help Yueyang meet its high targets for dirt speck removal.

in power, steam, and water consumption really help the industry reduce costs, and make our products more competitive in the market. Another consideration for us is how to further reduce effluents and emissions. The Chinese government is getting stricter and this brings a lot of pressure to pulp and paper companies.”

In China, the older standards for effluent measured four variables. The new standard has grown to eight items. “There are differences in the COD concentration,” Guo says. “The old standard was 410 ppm (parts per million). Then it was reduced to 150 ppm, and it will be further reduced to 90 ppm in the standard that goes into effect in 2011.”

production is a big challenge in China. “We are applying for a certificate for green products from the State, as we are using deinked pulp for high-grade environmental-friendly copy paper.” Guo says. “We can also use the green paper concept in marketing, but the technology needed for green paper is new and high, it is a real challenge.”

Overall, Guo and Yueyang Paper are extremely satisfied with the project. The ANDRITZ line is running smoothly, and it needs less operators. “It will be really nice as we control the consumption of energy, water, and raw materials as per design in the near future.”

FIND OUT MORE AT www.spectrum.andritz.com

Nearly 20 years of cooperation with ANDRITZ

Guo says that he has been cooperating with ANDRITZ since 1991. “The first project I was involved in was the first poplar APMP line,” he says. “Notably, it was the first APMP line in China.”

ANDRITZ sent an expert from their laboratory in North America to Yueyang Paper. “He worked here with us until we found the roots of the problems and solved them completely,” Guo says. “Thanks to this improvement, we were awarded second prize by the National Scientific and Technological Progress.”

Much hope on green paper production

According to Yueyang, using recycled deinked pulp for high-grade copy paper



ANDRITZ team members give...thumbs up! From left to right: Chen Zuqing, Gerhard Knes, Friedrich Hoppl, Chen Fang, Marketing Director, Heinz Kleinbichler, Start-up Engineer, Ewald Halbedel, Process and Control Engineer, Alexander Gscheider, Start-up Engineer and Huang Zhao, Sales Engineer. ▼

Dolphin-assisted therapy for screens

Moving to 100% recycle for newsprint presented challenges for the Bruck mill's DIP department. The mill teamed with ANDRITZ Fiedler to meet these challenges. Improvements in cleanliness, runnability, and energy consumption have been above expectations.



"At the end of the day, the paper machine is our best online measurement tool. The improved runnability of the paper machine is our best proof of success."

Peter Nuspl, Technology Pulp

Excellent results at a glance: viewing handsheets after screening – before (top) and after the screen basket/rotor change. ▼



A challenge for the DIP team

Primary drivers for the decision were cost and quality. Today it is possible to run 100% deinked pulp on PM3. "The quality requirements are set by the paper machine," says Peter Nuspl, Technology Pulp. "Then, we on the fiber processing side have to decide how best to meet these requirements."

"It was a major challenge for the DIP team," says Patrick Wohlmuth, Assistant Pulp at Bruck, who is responsible for the fiber processes in the deinking lines.

Coarse screening in need of therapy

The three-stage coarse screening system in the DIP plant was a challenge due to the stickies that were passing through. "We contacted ANDRITZ Fiedler because of their experience and reputation in screening," says Wohlmuth.

Uwe Wolf, a Regional Product Manager at ANDRITZ Fiedler, explains the overall goal:

"We know from experience that effective screening is the right combination of screen basket and the rotor. It is not enough to have the right slots and profile in the basket. The rotor and basket work as a team."

The first step was to introduce the new Bar-Tec® Rejector screen basket to the Bruck mill. "The new screen basket removes impurities already in primary screening," Wolf says, "thanks to its special profile wire and a diagonal slot geometry. This puts less demand on the downstream screening stages."

Wohlmuth and his team at Bruck installed one trial Bar-Tec® Rejector basket in DIP Line 2 to see how it would work. This single replacement of an existing drilled basket reduced impurities by 32% and increased the removal of stickies by 23%. Based on this trial, Bruck ordered the replacement of the existing drilled baskets in all the coarse screens for DIP Line 1.

First test on a three-stage system

"We had only tested the Bar-Tec® Rejector basket in single installations at several mills," Wolf says. "Bruck would be the first attempt at equipping a complete screening stage with the new design."

"There is always some degree of risk when you install any new technology," Nuspl replies. "But we were confident that ANDRITZ, and especially Uwe Wolf, would meet this challenge since we have done several projects together."

Dolphin-assisted

To optimize the performance of the new basket, ANDRITZ Fiedler recommended combining it with the new Ro-Tec Dolphin® rotor. Innovative R&D led ANDRITZ to create a unique rotor with foils that resemble the nose of a dolphin. This rotor is proving itself successful in nearly 100 installations



Patrick Wohlmuth, Assistant Pulp (left), Uwe Wolf, a Regional Product Manager at ANDRITZ Fiedler (center), and Peter Nuspl compare the samples taken before and after the screen upgrades. ▼



"Our requirements regarding stickies and energy were completely fulfilled, and the maintenance and cleaning intervals of the screening line have remained the same."

Patrick Wohlmuth, Assistant Pulp

Peter Nuspl (left) and Patrick Wohlmuth (center) of Bruck talk with Uwe Wolf of ANDRITZ Fiedler beside a Bar-Tec® Rejector screen basket.

around the world – improving screening capacity and dramatically reducing energy consumption.

So in August 2008, the combination of Bar-Tec® Rejector screen baskets (slot width 0.40 mm) with Ro-Tec Dolphin® rotors were installed in the first and second stages of coarse screening at Bruck. They replaced drilled baskets (hole diameter 1.8 mm) and the original rotors.

"With two new baskets and rotors, a good portion of the impurities was removed," Wohlmuth says, "but the vibration screen in the third stage had serious quality problems." Bruck removed this screen in March 2009. It was replaced by a spare pressure screen which was equipped with the Bar-Tec® Rejector/Ro-Tec Dolphin® combination.

The proof is on the machine

The coarse screening at Bruck improved far beyond expectations. The effective stickies removal is much higher than the 50% guaranteed value – and at the same throughput, energy consumption has been reduced by 10%. "Our requirements regarding stickies and energy were completely fulfilled, and the maintenance and cleaning intervals of the screening line have remained the same," says Wohlmuth.

On the paper machine side, downtime for cleaning the wet end and for paper breaks caused by stickies have been reduced by 10-15%. "At the end of the day, the paper machine is our best online measurement tool," says Nuspl with a smile. "The improved runnability of the paper machine is our best proof of success."

Roland Magerböck, Bruck's Maintenance Project Manager, had the task of layout and dimensioning of piping for the three-stage screening system. ▼





Disc filter segments with new filter bags installed.

Mobile filter bag exchange: high-speed disc filter maintenance

The old way of changing out filter bags a few at a time by shipping segments back to a supplier is time-consuming, slow, and expensive. ANDRITZ developed a new solution – the Mobile Filter Bag Exchange Unit – which comes right into the mill. When UPM Augsburg was faced with the major task of changing out all the filter bags on five disc filters at once, it seemed an opportune time to try ANDRITZ's new solution.

The paper mill in Augsburg was established in 1849 and became a part of UPM in 2001. The mill produces up to 530,000 tonnes of uncoated and coated papers for rotogravure and web heatset offset printers on two paper machines.

The Augsburg mill utilizes five ANDRITZ disc filters: three for dewatering in the DIP plant and two as saveall fiber recovery units at PM3, a 9.6 m wide modern machine for the production of LWC grades. The DIP plant furnishes both paper machines and was started up together with PM3 in 2000.

"We made sure everything was in place for a smooth non-stop changeout. The cooperation with ANDRITZ was excellent and very successful."

Bernd Schindler, Engineering Manager at UPM Augsburg



End-of-life

A disc filter is a slurry-filled tank with a rotating horizontal shaft inside. Mounted on the shaft is a row of discs. Each disc is made up of individual segments which are covered with a woven material. This covering is known as a filter bag. The filtration process is continuous. As each segment is submerged in the slurry, vacuum is applied, which pulls the liquid in the slurry through the filter bag and into the segment. The liquid filtrate is removed from the segment and solids form on the surface of the filter bag. The solid cake dries and is removed from the filter bag as the disc rotates and the cycle starts again. This continuous action wears out the filter bags over time.

In total, the five ANDRITZ disc filters at UPM Augsburg have 1510 segments – which means 1510 filter bags. Normally, a filter bag has a useful life of four to five years, depending upon the application. At Augsburg, however, the filter bags were made of a temperature-resistant Kynar® polyvinylidene fluoride, which in the company's experience could achieve an up to nine-year life.

Even so, the filter bags were now at their nine-year limit. As Fiber Production Manager Wolfgang Krodel explains: "Through regular inspections, we knew that most of the filter bags had come to the end of their useful life. Dewatering performance of the disc filters was deteriorating to such an extent that the bags needed to be replaced."

Flying Box vs. Mobile Exchange Unit

In many mills, the filter bag changeout process consists of a supplier sending the mill a "Flying Segment Box" containing up to 20 filter segments with new filter bags installed.



"This has to be some kind of a record speed. We have never attempted anything of this scale within UPM before."

Wolfgang Krodel, UPM Augsburg's Fiber Production Manager

The mill then removes an equal number of segments that are damaged or need new filter bags from their disc filter and ships these back to the supplier in the same Flying Segment Box. This exchange goes on until all the filter bags are replaced. As you can imagine, this can be a costly and time-consuming process: packing, unpacking, shipping both ways, waiting. It is accepted for small segment repairs or filter bag replacements on a one-by-one basis.

Given the situation of 1510 replacements at UPM Augsburg at the same time, the Flying Segment Box approach was not going to be possible. At 20 units per box, this would require 76 boxes to be shipped. So, alternatives were considered.

"Their timing was excellent, because we had been experimenting with this Mobile Filter Exchange concept internally," says Jürgen Hirschberger of ANDRITZ. Hirschberger



“The solids content in the filtrate from the DIP plant is now one-tenth of what it was with the old filter bags.”

Markus Grimm, Fiber Production Superintendent at UPM Augsburg

became a project manager for the UPM project once the mill became comfortable with the idea of an on-site non-stop filter bag changeout process. He was joined in project management by Hubert Hermann at ANDRITZ, an experienced hand in the field.

“The idea behind the Mobile Filter Exchange is quite simple,” Hermann says. “The unit containing our machines and tools is actually quite compact. We bring it to a mill site, set it up, and are ready to go into continuous production. We reduce maintenance and shipping costs quite a lot and the customer gets significant increases in equipment performance right away after a shutdown because all the filters are refreshed.”

Although ANDRITZ supplied the original disc filters to UPM Augsburg, this was not the deciding factor for their selection. The service team presented the Mobile Filter Exchange concept for handling this large maintenance task in an efficient way. Based upon experience, UPM Augsburg believed in the ANDRITZ approach. “We would not have the confidence to go through with a campaign like this with just any supplier,” Krodel says. “With ANDRITZ, we chose the right partner.”

Putting a plan into practice

At the end of 2009, the ANDRITZ service team received the order and moved into action. The mill had the following expectations: it was highly likely that the ambitious goal of

completing maintenance work on all 1510 segments within a single, tightly scheduled shutdown would not be possible. So, the target was to change out enough disc filter bags during the shutdown to at least be able to run the DIP plant and the paper machine afterwards.

ANDRITZ project managers Hirschberger and Hermann drew up a plan to perform the work during two time slots, with the ambition of carrying out the work during one shutdown only. If that were the case, the service team from Graz would only have to make one trip to Augsburg.

It took about one month to design and test the Mobile Filter Bag Exchange Unit. The line was tested at ANDRITZ’s facility in Graz, Austria and service people simulated the sequence of disassembly, cleaning, installation, and reassembly to determine exactly the time schedule and number of people required for the job.

Then the special challenge: coordinating the work within the very tight schedule specified by the shutdown. The disc filters are part of two different lines (DIP and PM3), which had staggered shutdown periods. The paper machine was shut down first and the ANDRITZ team began work on the two saveall disc filters.

Twenty-four hours later, the DIP line was shut down, and the service team moved its mobile assembly operation to complete as many disc filter segments as possible in the remaining 36 hours of the shutdown. Then, the DIP line would go back in operation to supply stock to PM2, which had continued production. After this, work was resumed and completed at PM3.

Four filters, 1260 segments, 50 hours

ANDRITZ succeeded in replacing filter bags on four of the five disc filters – a total of 1260 segments – within 50 hours. “This has to be a maintenance record,” says Krodel. “I cannot think of there ever being such a non-stop replacement campaign of this scale anywhere within UPM.”

According to Krodel, the main concern was to complete the work on the two saveall disc filters with PM3 and two of the three filters in the DIP plant (loops 1 and 2) in time so that the mill could resume production. Changing of the remaining 250 filter bags on disc filter 3 (used in the third loop of the DIP plant for removing impurities from the preceding bleaching stage) was scheduled for the Christmas shutdown.

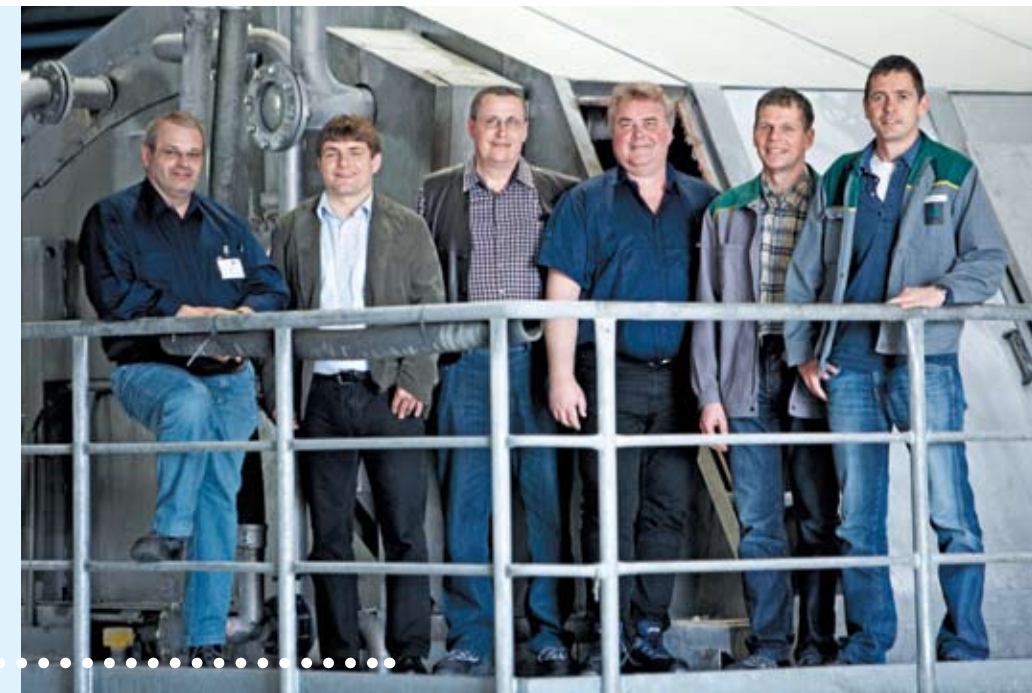
All involved in this unique maintenance project had positive impressions from the experience. Hirschberger praised the close cooperation with colleagues at Augsburg. “Bernd Schindler, Engineering Manager at

the mill, made sure that we had everything at the ready: electricity, compressed air, steam, machine room crane, lifting platform, and so on,” Hirschberger says. Markus Grimm, Fiber Production Superintendent at UPM Augsburg, says that filtrate from the disc filters in the DIP plant now contains only 100 mg solids per liter, where this figure was 1000 mg/l with the old filter bags.

Hermann says, “Non-stop changing of the filter bags on this scale was certainly a first for ANDRITZ. We learned a great deal about how to operate the Mobile Filter Bag Exchange Unit and we are ready for the next challenge.”

The mobile exchange concept was such a success that ANDRITZ plans to use it at other mills in the future. “We are well-equipped for prompt repairs to disc filters,” Hermann says. “The unit itself is small and our people are very mobile. We are ready and waiting for our next assignment!”

(left to right) Hubert Hermann, ANDRITZ Project Manager, Jürgen Hirschberger, ANDRITZ Project Manager, Wolfgang Krodel, Fiber Production Manager at UPM Augsburg, Harald Spiess, ANDRITZ Spare Parts Engineer, Bernd Schindler, Engineering Manager at UPM Augsburg, and Markus Grimm, Fiber Production Superintendent at UPM Augsburg. ▶



◀ Three ANDRITZ disc filters in the DIP plant at Augsburg. The two remaining units are installed as saveall fiber recovery filters for PM3.





Removing old filter bag



Mechanical cleaning of segment



Steam cleaning of segment



Segment repair



Installing new filter bag



Mobile shrinkage oven



Closure of the shrinkage oven



Fitting new filter bags

UP-TO-SPEED: MOBILE FILTER BAG EXCHANGE

The mobile assembly line concept was developed and tested in Graz. UPM Augsburg became the first mill site to use the mobile exchange and was very successful. The Mobile Filter Bag Exchange Unit consists of the following stations:

1. Disassembly and inspection of the disc filter segments (with special equipment and tools for disassembly)
2. Removal of the old filter bags and cleaning of the segments with steam (cleaning booth)
3. Repair of damaged segments (welding equipment, etc.)
4. Installation of new filter bags
5. Shrinking the bags on the segments to fit (mobile shrinkage oven that holds 40 segments at a time)
6. Mounting of seals and reinstalling the segments in the disc filters
7. Inspection of the assembled disc filter unit

The proven Mobile Exchange Unit concept and our excellent team are ready to set a further maintenance record – also in your mill.

“New solutions are crucial...”

The worldwide economic crisis has made a huge impact on all of us. We recently talked with customers about how the crisis is forcing businesses to change – and what is required of suppliers now.

It appears that in this new economy, the focus in the Pulp & Paper industry goes beyond about how to produce the best product – and now considers how to swiftly adjust production, manage inventories, change grades, accommodate lower-quality fibers, save energy, etc. In other words, how to survive in a rapidly changing world.

Part of that survival is the reduction of operating costs and attempted improvements in efficiencies without the luxury of large capital investments. Two recent discussions with customers – Jorma Latva-Kokko of Stora Enso Publication Papers and Ilkka Poikolainen of Metsä-Botnia – show us how quickly this business changes!

Hit extremely hard

“The pulp and paper industry has been hit extremely hard,” says Jorma Latva-Kokko, Manager for Furnish Concepts for Publication Papers at Stora Enso. “I have never experienced anything like this in my 20 years in the industry. The principles and cornerstones have changed.”

Latva-Kokko is talking with Thomas Bachhofner, ANDRITZ’s global head of Paper Engineered Services. Bachhofner agrees that companies are being forced to make adjustments “on the fly”. The problem with this, he says, is that “we are not 100% sure what we are adjusting to.”

Latva-Kokko agrees. “We are adapting, but nobody knows where this is going to end. Traditionally, we based our thinking just on how to provide the best possible paper. Now we are thinking differently. Prices, inventories, investments, availability of capital, are all proving to be challenges. There are new things to focus on.”

More mill closures, less capital

“While the industry should be preparing for an upswing, the storm has not settled yet,” Bachhofner says. “Regrettably, this means that further mill closures will occur. After this is all done, it will be clearer what we need to concentrate on.”

According to Latva-Kokko, the measures depend on each individual mill and its long-term potential. “We need to ask ourselves if we really need all the process stages, and do we need to be as thorough as before? This is how the industry has developed over decades. These are the types of questions that we are dealing with today at Stora Enso.”

“We have been pushing to deliver simplified and standardized products,” Bachhofner says. “Perhaps now these will have more appeal. There are many opportunities in sourcing and manufacturing which were not available even 10 years ago.” He cites the standardization ANDRITZ is achieving in

service and engineered wear products as examples. Of special note are the SMART line of standardized parts (pulper screen plates, screw press baskets and shafts, etc.) which have excellent quality and are manufactured in a standardized way to reduce component costs. “Standardization has cost benefits down the line,” Bachhofner says. “Smaller spare parts inventories, standardized maintenance procedures, easier changeouts.”

Energy still key

“Energy is the most important aspect of all our mills,” Latva-Kokko says. “How to get it at a reasonable price, and how to ensure that it is used in the most efficient way.”

However, he admits, more accurate information is needed. “There is good knowledge how to more efficiently consume energy in our processes,” Latva-Kokko says. “But where we are lagging is that we do not know exactly how to change our energy consumption patterns, especially in mechanical pulping. For example, only 10-20% of the energy for TMP goes into the actual fiber treatment – the rest is heat and waste. We have not progressed to the point where we can increase energy efficiency to 50% for example and how to avoid wasting this energy. We need to know exactly how much energy is needed for a specific product, and how we can use it efficiently.”



Bachhofner warns against expecting a single solution to dramatically improve energy efficiency. “It is a combination of technologies and processes tailored to each mill,” he says. “For example, chip pretreatment, using LC refiners in secondary and reject positions, adding low-energy Durametal® refiner plates, replacing old rotors in the screenroom with energy-saving Dolphin® rotors, and a host of other things.”

He also suggests that maybe the solution is to find out which fiber properties are needed for a specific paper type. “Refining is usually done to a certain average value,” Bachhofner says. “Perhaps one does not need all the strength values that are put into the average production.”

Can we still be partners?

“Much of what we are doing today is rather short-term in order to survive,” Latva-Kokko says. “This affects the suppliers as we are buying less but expecting closer partnerships with suppliers like ANDRITZ. We are now cash-strapped, but someday we hope that these strategic partnerships will develop into strategic investments.”

“The bottom line of this discussion is that we have to do things better than before,”

Bachhofner says. “It involves both opportunities and risks. In the long-run, everyone can win, if the willingness to cooperate closely is sincere in both companies.”

Turning partnership into practice

In the middle of Finland, at Metsä-Botnia’s Äänekoski mill, another conversation is taking place. Botnia has a working partnership with ANDRITZ using a concept called Overall Production Efficiency (OPE®). It is a cooperation model in which both partners seek to maximize the mill’s productivity and minimize costs.

“Botnia and ANDRITZ found several areas to develop cooperation,” explains Harri Qvintus, ANDRITZ Senior Vice President responsible for Pulp Engineered Services in Northern Europe. “This has the involvement and commitment of Botnia’s top management. They set the targets for the organizations.”

“About two years ago, we started OPE® at the Äänekoski mill to save energy and chemicals in the kraft fiberline,” says Ilkka Poikolainen, Production Manager. “It has been a fruitful cooperation. For example, in the winter our bottleneck has been digester runnability due to insufficient chip presteaming. ANDRITZ suggested small improvements and utilized their simulation program to solve the majority of our problems. Not much capital was employed. We

accomplished this even though we have raised the capacity of this mill about 60% from when the line was built in 1985.”

Another continuously developing area is cost efficiency. The wood raw material costs are the major variable costs in pulping. “So we have an ongoing project to increase the yield,” he says. “Together with ANDRITZ we are trying to optimize the digester to find the best solution.”

Botnia is also working with ANDRITZ to fine-tune the equipment to avoid disruptions and unplanned shutdowns. “Each shutdown costs us dearly,” Poikolainen says. ANDRITZ is also working in the mill’s recaustizing area to reduce losses.

“We continuously check our costs,” says Poikolainen. “We have in-depth cost accounting, so we know that OPE® is delivering bottom-line results. ANDRITZ’s knowledge of processes and equipment is combined with our intimate knowledge of this mill to the benefit of both companies. At Botnia, we focus on improved pulp quality at lower costs. ANDRITZ has the same focus even when there is not a large capital project on the horizon.”

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“Traditionally we have focused on making the best possible paper. Now there are new challenges.”

Jorma Latva-Kokko, Manager for Furnish Concepts, Stora Enso Publication Papers

“The storm has not settled yet.”

Thomas Bachhofner, Senior Vice President, Paper Engineered Services



“Both partners are seeking to maximize the mill’s productivity and minimize costs.”

Harri Qvintus, Senior Vice President of Pulp Engineered Services, Northern Europe (pictured left)

“It has been a very fruitful cooperation.”

Ilkka Poikolainen, Production Manager at Botnia’s Äänekoski mill



Narrowing the *gap* in Lucca

Italian producer Cartiere Modesto Cardella is first to install a new gap former for packaging grades from ANDRITZ. The investment positions Cardella well as the market demand for lightweight corrugating medium increases.



“When market demand starts to increase for under 100 g/m² basis weight medium, we’ll be ready to cater to it.”

Modesto Cardella, Managing Director and Member of the Board

From left: Mario Bernasconi of ANDRITZ, Mario Cardella, Chairman of Cartiere Modesto Cardella and his son Modesto, Managing Director.

MILL SITE LUCCA, ITALY



A brand new gap former has been fitted on PM4 at Cartiere Modesto Cardella’s San Pietro a Vico (Lucca) mill in Italy. The technology from ANDRITZ promises to upgrade the performance of the entire line. “With this new installation, we now have more than one iron in the fire,” says Modesto Cardella, a member of the company’s executive board. “When market demand starts to increase for under 100 g/m² basis weight medium, we’ll be ready to cater to it.”

One part of this story began in March, 2008 when Cardella commissioned ANDRITZ PULP & PAPER to supply a new two-layer PrimeFlow TW headbox with PrimeProfiler F consistency profiling and a PrimeForm TW gap former. ANDRITZ also modified the pickup suction roll framework and did the basic engineering for the approach flow and whitewater systems.

But, according to Mario Cardella, Chairman of the mill’s board and Modesto’s father,

the story actually began in 1977, the year PM4 was built. “In the mid-1990’s, PM4 was no longer able to deliver the formation and profile the market required for top-quality paper,” Mario says. “So, in 1995 we renovated the machine, which also set the stage for future investments.” Today, PM4 has a design speed of 1,200 m/min and a wire width of 3.18 m. Containerboard with a 90–170 g/m² basis weight range is produced from 100% recycled fiber.

“It is not our style,” says Modesto, “to routinely make changes to our equipment, but rather to focus on projects that will last for years to come. That is why we made the investment in the PrimeForm TW gap former.”

A question of lightness

The strategy behind the investment is to enable the Lucca papermaker to meet the demands of a newer European market trend – basis weights below 100 g/m². In a

gap former, the jet generated by the headbox is directed into the narrowing gap between two forming fabrics. Water is removed in both directions, which tends to produce a sheet in which the fines content and appearance of the two sides is very similar. Because the sheet becomes “set” very rapidly within a gap former, the uniformity of the jet from the headbox is critical.

“The installation of a two-layer headbox and the gap former is a big step that permits PM4 to manufacture paper in a style unusual for us,” Modesto says. “On our smaller PM3 machine, we will continue to produce a product consistent with the standard requirements of the Italian market. So with the two machines, we are ready to supply virtually any type of demand.”

Careful consideration

Once the strategy and goals were set internally, Cardella needed to decide which machine manufacturer to work with. The

choice was ANDRITZ. “For us it was an opportunity, because it permitted us to establish a special relationship with the supplier,” Modesto explains. “We knew that it would be ANDRITZ’s first installation on packaging grades. We knew this project would get their focused attention and utmost commitment. Of course, we already knew of their expertise and product quality, and these things also swayed our decision. But it was not merely a technical choice.”

Since this was a new product, ANDRITZ performed comprehensive pilot trials to prove the roll-shoe forming technology – the PrimeForm TW.

Made to measure

This project was developed by Cardella and ANDRITZ together. “Their technology adapted perfectly to our requirements,” Modesto says. “The machine had to fit into an existing space that was rather low and tight. There were also constraints due to the controls that had to be taken into account. The gap former was therefore tailor-made on the basis of these requirements.”

“The positive aspect is that we now have access points on the line that we did not have before,” Modesto continues. “The



“A positive environment was created from the very start.”

Christoph Draxler, Start-up Engineer from ANDRITZ

quality and the design of the equipment are world-class, especially as far as the auxiliaries and the drive side arrangement are concerned.”

For example, the main water runoff channels are leaning against the cantilever and therefore move together with the machine. This solution came from ANDRITZ’s gap former for tissue machines, but has shown itself to be extremely useful for the Lucca paper mill as well. “It was not easy to overcome all the design and space challenges, but with the team of well-trained engineers, there were no real difficulties.”

Start up and go!

According to Modesto, results were forthcoming from the first day. “We were able to produce paper right away from the start-up on January 28. We had some initial problems with the press settings, but a few hours later, we were able to start production. From then on, everything went smoothly.”

“For our part,” says Christoph Draxler, the ANDRITZ Start-up Engineer, “we can say that a positive environment was established, from the start, from the management down to the machine operators. It was a little surprising how quickly the machine achieved stable running condition.”

The gap former parameters are currently being optimized on PM4, but already the machine is producing a 100 g/m² sheet at speeds above 800 m/min and is being ramped up toward its maximum design speed of 1,200 m/min. “Very definitely over and above our expectations,” Modesto reports. “We are very satisfied.”

“Little by little, we are discovering the characteristics of the machine,” says Andrea Moretti, Manager of the San Pietro a Vico mill. “One month after start-up we are performing paper tests in cooperation with ANDRITZ. We are intent on discovering all the nuances that the gap former is contributing to our production process. Thus far, we have seen that when we are running under stable operating conditions, we achieve the very best mechanical paper properties



“We achieve the very best mechanical paper properties and excellent uniformity.”

Andrea Moretti, Mill Manager



▲ The PrimeForm TW is smoothing production because PM4 is now less affected by variations in the furnish or by operator actions.

and excellent uniformity. Before the gap former, there were considerable variations. Still, it is a bit too early to talk about performance levels.”

More to explore

The *PrimeForm TW* is smoothing production of the entire line because there are less parameters to be kept under critical control. Mario Cardella explains: “The whole line is more stable in that it is less sensitive to fluctuations of whatever enters the machine. With the web being built by centrifugal force – and centripetal force in the first section – the machine is less affected by variations in the furnish or by operator actions. Even though we have not yet assessed all the improvements the gap former will enable us to achieve, we know, for example, that there has been no increase in power consumption. This development is very promising, but we will only be able to talk about real energy savings once we have maximized the use of all the various instruments.”

Exchanging ideas

The Lucca installation has turned out to be a great training experience for the supplier as well. “There has been an exchange of information helpful to both parties,” Modesto says. “We were very demanding, often forwarding detailed requests, and ANDRITZ backed us up all the way. They did not just

supply the machinery. They were anxious to understand our requirements and offer ways to improve the installation. For our part, we contributed all the details relating to paper management, production, and maintenance, and their engineers translated all this information into a useful product.”

The human aspect of such installations can never be taken for granted. “Working with their engineers was stimulating,” Modesto says. “We very much appreciated the determination which distinguishes the Austrian character, because results proved the validity of their approach. Over all, we managed to blend together our Mediterranean temperament and their Central European character.”

“Working with ANDRITZ was a positive experience from all points of view,” says Moretti. “We were also pleased with the technical training received by our personnel.”

What would Cartiere Modesto Cardella do differently if it could turn the clock back? “Nothing,” concludes Modesto Cardella. “We are more than satisfied with our experience and are very pleased to have had the chance to work on this project together.”

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PAPER FOR CORRUGATING SINCE 1946

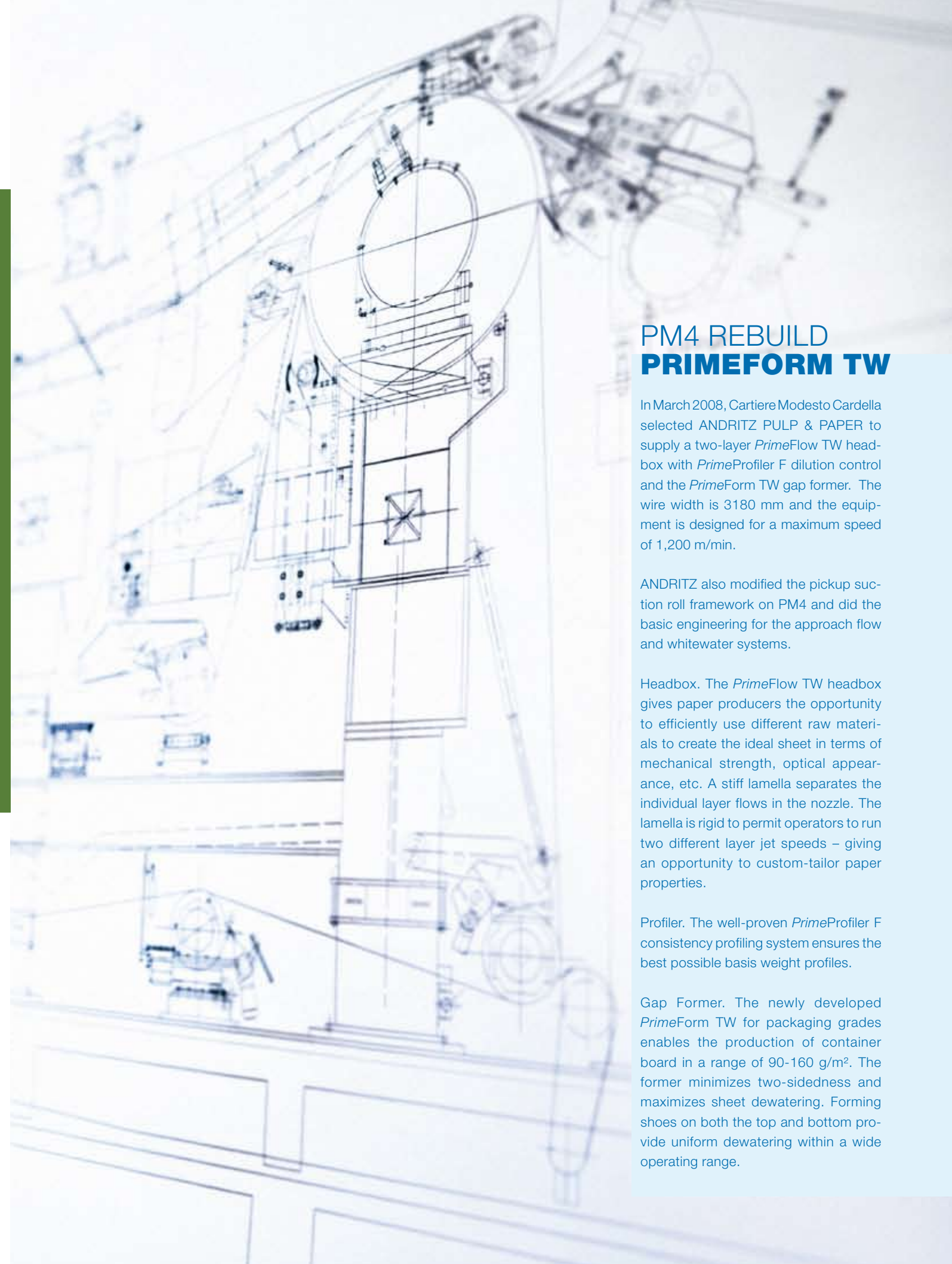
Cartiere Modesto Cardella was the brainchild of four Italian brothers – Francesco, Modesto, Pasquale, and Giovan Bernardo. In 1946, they opened the mill at San Pietro a Vico (Lucca). In 1953, Modesto became the sole owner and began implementing an investment strategy which continues to distinguish the firm.

In 1966, after Modesto died, his son Mario took over, carrying on his father’s work and continuing to reinvest profits. In 1977, the new PM4 was installed. In 1995, both production lines were revamped.

Today, Mario is Chairman of the Board and has been joined by his children Modesto, Rosaria, and Cristiana, all of whom are board members.

The mill produces paper for corrugating machines, with a total potential capacity of 170,000 t/a. PM3 has a working width from 2.5 to 2.55 m and the width of the newer PM4 is 2.65 to 2.8 m. About 80% of sales stays in Italy, while the remainder goes primarily to the Mediterranean Basin.

Cartiere Modesto Cardella’s strategy is to meet the demands of a European market trend toward basis weights below 100 g/m² on PM4 while still continuing to meet the Italian market requirements on PM3. The new gap former from ANDRITZ helps support this strategy. Furnish is 100% recycle. ▼



PM4 REBUILD PRIMEFORM TW

In March 2008, Cartiere Modesto Cardella selected ANDRITZ PULP & PAPER to supply a two-layer *PrimeFlow TW* headbox with *PrimeProfiler F* dilution control and the *PrimeForm TW* gap former. The wire width is 3180 mm and the equipment is designed for a maximum speed of 1,200 m/min.

ANDRITZ also modified the pickup suction roll framework on PM4 and did the basic engineering for the approach flow and whitewater systems.

Headbox. The *PrimeFlow TW* headbox gives paper producers the opportunity to efficiently use different raw materials to create the ideal sheet in terms of mechanical strength, optical appearance, etc. A stiff lamella separates the individual layer flows in the nozzle. The lamella is rigid to permit operators to run two different layer jet speeds – giving an opportunity to custom-tailor paper properties.

Profiler. The well-proven *PrimeProfiler F* consistency profiling system ensures the best possible basis weight profiles.

Gap Former. The newly developed *PrimeForm TW* for packaging grades enables the production of container board in a range of 90-160 g/m². The former minimizes two-sidedness and maximizes sheet dewatering. Forming shoes on both the top and bottom provide uniform dewatering within a wide operating range.

A kiln with brains

Here is a common problem: one piece of production equipment becomes a serious bottleneck. So, the discussion centers around *rebuild or replace*. Mondi SCP's mill in Slovakia thought of a third option: *automate*. With the help of ANDRITZ Automation, Mondi eliminated a bottleneck – and the payback was clear within a few months.



▲ Vladimir Krajči, Recovery Line Manager (left) and Peter Scholtz, Recovery Line Production Manager.

From the top of a recovery boiler, you can get a sweeping view of a mill's operations. At Mondi SCP's mill in Slovakia, you get something more: a view of the Váh River running alongside, ski slopes and snow-capped mountains on the horizon, and the town of Ružomberok surrounding the site. This mill is truly embedded in the community – and in harmony with the surrounding natural beauty.

Surprisingly, what you *don't* see from the recovery boiler is the lime kiln. You would think it would be easy to spot a 100 m long rotating cylinder. Where did it go?

"It's right here," says Vladimir Krajči, Recovery Line Manager, pointing to a roof-covered structure. It is just very unique." Krajči explains that the old kiln is "part Russian style, part Western style" and that he has never seen another kiln like this one. One part of the "Russian" contribution was the full-length roof which shields the kiln from view. The "Western" contribution is the firing end and flue gas recirculation system.

Nothing more to do mechanically

The kiln had become a big bottleneck for the operators at Ružomberok. Through technical improvements and changes in

operating procedures, it had been coaxed from its original 250 t/d rating to 350 t/d – on a good day. However, dusting, plugging, and near-constant ring formations led to a production curve that resembled a yo-yo.

"We have five shifts, which means five operators," says Peter Scholtz, Recovery Line Production Manager. "One operator would adjust the feed end temperature to avoid plugging. After the shift change, the next operator would see rings forming and would have to take the kiln offline for a few hours to blast the rings. The next operator would over-adjust excess oxygen, and the next operator would be dealing with residual calcium carbonate tests that were too low."

Mondi SCP's mill in northern Slovakia is in harmony with nature – nestled among mountains, rivers, and the small community of Ružomberok.



To compensate, the mill purchased a significant quantity of lime. Unfortunately, there was a significant difference in the behavior of the purchased lime and the lime produced in the mill which caused fluctuations in the white liquor plant that then rippled through the fiberline.

Extra energy consumption in the form of natural gas was also costing money. Then, too, there was a motivational problem: operators were tired of having to blast away ring formations or enter the kiln to attend to other problems.

"We had done everything we could mechanically," Krajči says. "We felt there was nothing more that we could do, other than replace it."

"Took us by surprise"

Inquiries went out. ANDRITZ was asked to propose a kiln replacement or whatever technical solution they might have to eliminate the starting and stopping of the kiln.

Instead of a replacement kiln, ANDRITZ proposed a KilnACE® automation solution. "We didn't know much about ANDRITZ Automation's capabilities at the time, but we decided we would politely listen," says Branislav Benčo, Head of DCS for the recovery area. It turned out to be a good discussion.

"ANDRITZ took us by surprise," Benčo says. "The more we learned about KilnACE®, the more we liked the concept. The technology runs on a standard PC and uses an open communications standard which could

◀ Thanks to the tight control of kiln temperatures and excess oxygen provided by KilnACE®, Mondi SCP has significantly reduced purchased lime and has reduced specific energy consumption. Here, Vladimir Krajči inspects the firing end of the kiln.



▲ One of the kiln operators oversees operations from the control room. The BrainWave® layer of KilnACE® is utilized 100% of the time.

be easily linked to our Distributed Control Systems. Where other automation suppliers said that we would need additional instruments, or a special control system, or months of programming, ANDRITZ felt that our instrumentation was fine and they could have the control up and running in only a few weeks.”

“On top of this,” Krajči says, “ANDRITZ offered a trial period so that we could see for ourselves how much improvement we could get.”

BrainWave® layer is unique

Sava Kovac, Principal Developer for Advanced Control Solutions for ANDRITZ Automation, was put in charge of the project to ensure great results for Mondi. Kovac explains that KilnACE® consists of two layers: a BrainWave® controller to stabilize the process, and the ACE® layer which does optimization.

According to Kovac, BrainWave® is different than other controllers on the market. “It outperforms other control technologies because of two main components: an adaptive model and a predictive controller,” he says. “Adaptive control means that it learns based upon past performance. It doesn’t have to wait for an error to occur and then react – it can predict the process response.”

Of the many features, the one that interested Benčo most was MIMO. “MIMO stands for multiple input, multiple output,” he says. “It coordinates the control of multiple variables so they don’t interfere with each other. I don’t know of any other controller that can do this. Just like our operators get better with experience, so does BrainWave®.”

Impressive results

“BrainWave® stabilized the temperatures and excess oxygen in very short order,” Benčo says. “But our operators were skept-

tical and tended to run the kiln in manual like the old days. We also had some technical issues to clear up. But I can tell you now that operators use the control 100% of the time.”

“The ANDRITZ control is able to hold the kiln temperature in a narrow window so my operators can run high production and avoid the severe ringing we experienced before,” Scholtz says. “Solving this problem was the primary goal of the project. Even though we use about 20% noncondensable gases, including stripper off-gases in our fuel mix, the control can handle the variations in heating value.”

“There are economic benefits, quality benefits, and human benefits,” Krajči remarks. “We purchased the ANDRITZ control package based upon an estimated six months payback. I can tell you that the payback was a lot quicker. The economics come from a

significant reduction in purchased lime, a reduction in specific energy consumption, and a big reduction in production stoppages to blast ring formations. These events are much more rare now.

“Equally important to me is the fact that my operators are no longer stressed and have a much safer environment working around the kiln now. They rely on the control system and trust it. Things are running steady-state now and there is a smooth transition from shift to shift.”

ACE in the future?

ACE® is an “expert operator” layer that sits above BrainWave® and manages everything about the kiln operation: production rate, temperature targets, and excess oxygen targets to maintain a certain quality and throughput. The only input from the operator is the lab test for residual calcium carbonate. Unlike a “black box,” ACE® advises the operator at all times about what it is doing or planning to do.

The Ružomberok mill is using the Brain Wave® layer of KilnACE® 100% of the time to stabilize the kiln operation. The main goal of this project was to maximize production and eliminate production stops.

“We are very happy with the present situation,” Krajči says, “so we are currently not running all the ACE® modules that we could. At our mill, the kiln temperatures must be highly constrained to prevent plugging at the feed end (low temperature limit) and ringing (high temperature limit). There is little room to adjust parameters for residual carbonate control, so it’s not clear how much more we could benefit from the other ACE® functions.

“But,” he says as he winks, “we intend to give it a try soon and see if we can improve upon an already good situation.”

FIND OUT MORE AT
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“ANDRITZ Automation took us by surprise with their solution.”

Branislav Benčo, Head of Distributed Control Systems for the recovery area



“There are economic benefits, quality benefits, and human benefits.”

Vladimir Krajči, Recovery Line Manager

Vladimir Krajči (left) and Peter Scholtz with the “part Russian, part Western” kiln in the background.

China's Sun sets sights on expansion

China's forests are unevenly distributed across the country, making fiber supply still a critical issue for its pulp and paper producers. While the supply of chemical pulp is comparatively low, Sun Paper's new ANDRITZ chemical pulp line in Yanzhou is helping the company become more self-sufficient as they renew their expansion plans.



"Sun Paper has made investments to increase pulping self-sufficiency locally and plans to grow operations in Indochina."

Ying Guangdong, Deputy General Manager & Chief Engineer, Sun Paper Group, Yanzhou, Shandong Province.

A recent joint UN/EC publication documents a significant challenge for China's papermakers. The nation has the fifth largest forest area in the world, mostly in the northeastern and southeastern regions of the country. Still, this represents just over 20% of the country's land area – placing China at the 139th position in the world. To meet the growing needs of its 1.3 billion people, China has the challenge of expanding production from its own forests, while

managing the impact of being heavily dependent on imported fiber.

This development can easily be verified by listening to one of ANDRITZ's major customers in China. Ying Guangdong, Deputy General Manager and Chief Engineer of the Sun Paper Group, Yanzhou, Shandong Province, has several investment plans for the coming years – investments to increase pulping self-sufficiency while growing Sun Paper's business to Indochina, especially to Laos and Vietnam.

Sun Paper is largest

Shandong Sun Paper Industry is the largest privately owned and managed paper business in China, as well as the largest producer of premium coated packaging board. Its paper and board products are sold throughout China, and exported to more than 20 countries in southeast Asia, Africa, and the US.

The company's many paper machines (with a new one now being started up) have total annual capacity of 2.5 million tonnes. A significant part of the pulp comes from two ANDRITZ P-RC APMP mechanical pulp lines, with a third under construction. And now, a new ANDRITZ chemical pulp fiberline has been started up.

World-class start-up

After successful delivery of the second P-RC APMP pulping line and effluent evaporation system, Sun Paper ordered a 500 bdmt/d chemical pulp fiberline from ANDRITZ in June 2008. An additional order for recausticizing and woodyard equipment from ANDRITZ, which completed the kraft mill project, came shortly after. By mid-November 2009, the systems were started up in what Sun Paper calls "world record time" – only 17 months after signing the



MILL SITE
YANZHOU, SHANDONG, CHINA



▲ LimeWhite™ for white liquor filtration in the white liquor plant.

The new fiberline at Sun Paper uses ANDRITZ Drum Displacer® washers (also shown above) for brown-stock and post-oxygen washing. ▶



Sun Paper ordered a 500 bdmt/d chemical fiberline from ANDRITZ PULP & PAPER in June 2008.



contract. The start-up was smooth and design capacity was reached in less than three weeks.

According to Ying, the start-up of the fiberline was very successful. "There were not many difficulties, thanks to the good preparation work conducted," he says. "ANDRITZ made some adjustments to the DD washer so we could increase capacity considerably."

"The operation has been smooth, and the output has increased some 20% over the design capacity," Ying says. "We have also achieved an alkali recovery rate of more than 97% and reached the target of zero emissions of black liquor. The mill is energy self-sufficient and we also supply steam for some small paper machines."

Moreover, the quality of pulp has been excellent, according to Ying. The brightness guarantee is for 88 ISO, while the actual results have been 90 ISO.

Tough bidding

ANDRITZ received the order from Sun Paper amidst a hard international bidding competition. "Our main competitor had a strong position already at this mill, but we were able to receive the order with a package that included key equipment manufactured in Finland and the rest in China," says Jorma Oikkonen, ANDRITZ's Project Manager for the fiberline.

According to Ying, Sun Paper chose ANDRITZ mainly because of the price-performance ratio and the ability of ANDRITZ to provide a portion of the equipment locally. He notes that the line was built in the midst of the economic downturn, so that construction costs were somewhat lower. After the line started production, market

pulp prices have risen significantly. "By this project, we saved considerable money, and our dependence on international pulp pricing has been reduced significantly," he says.

The package includes the latest technologies from ANDRITZ: TurboFeed® chip feeding, DownFlow Lo-Solids® continuous digester, DD washers, and ECF bleaching. Coupled with this is LimeGreen™ for green liquor filtration, LimeFree™ for dregs handling, LimeWhite™ for white liquor filtration, and a LimeDry™ filter.

In China, and perhaps other parts of the world, there has been a tendency to think of continuous cooking systems only for large greenfield chemical pulp lines. In fact, there

are digesters operating around the world producing near 4,000 t/d. But, the cooking technology combined with DD washing is still very competitive for smaller capacity lines, as demonstrated by the 500 t/d line at Sun Paper.

"Sun Paper's schedule for installation was very challenging," Olkkonen says. "We were able to put our best resources on supervising the erection, and our customer put all their efforts into the erection work. We installed the complete fiberline in six months, which is a world-class installation time."

Good cooperation makes a successful project

According to Olkkonen, Sun Paper had a very experienced project team, and the



▲ Lower section of ANDRITZ Diamondback chip bin

◀ ANDRITZ DownFlow Lo-Solids® continuous digester

engineering staff was skilled. "I know Liu Yanbo, the Project Director, from an earlier project in Rizhao, so the cooperation was easy from the very beginning," he says.

"ANDRITZ has a deep experience in pulp making and running projects," Liu says. "They have many excellent technologies, especially for controlling emissions and effluents. Our successful cooperation is based on very good communications. We know ANDRITZ's capabilities and they know exactly what we need. If we see a problem, ANDRITZ offers a solution. Then we discuss it together. This is what we mean by teamwork."

Liang Hongjin, Production Manager, also has good experiences from the project. "First, the equipment has run for three months since start-up in a very stable and efficient way," he says. "The pulp quality is consistently good. We still need to put more effort into optimization and maintenance. We discuss with and learn from ANDRITZ. I feel very satisfied with our cooperation."



"The team for the project has been excellent from all members. The ANDRITZ team trained our operators with their expertise, knowledge, and experience," Ying says with respect.

"I have learned a lot in this project to fully appreciate the complexities and details of a successful installation," says Wendy Wang, an ANDRITZ project assistant. "It has been a learning experience to work with the various professionals from the customer and within our own international organization, each with his or her own expertise and area of responsibility."

Self-supplied pulp reduces pressure

"Our main objective was to improve our self-supply capacity of pulp," Ying explains. "With purchased pulp, we are captive to fluctuating prices and the cost of transportation, which impacts our margins. Through

"The pulp quality is consistently good. We still need to put more efforts into optimization and maintenance."

Liang Hongjin, Production Manager



this chemical fiberline project, we reached our target of self-producing 250,000 t/y each year, reducing the external cost pressures. We can also better control the pulp brightness and strength."

He says that before this project, the company produced chemical pulp in two old lines with an annual capacity of some 50,000 t. Together with the P-RC APMP systems, Sun Paper can now produce 600,000 t of pulp each year.

Indochina will be Sun Paper's next target

According to Liu, one more reason for Sun Paper to build the pulp mill was that they did not have modern pulp mills before, and they wanted to gain experience for building new mills in other locations in the future.

Preparations for a Laotian project are completed, and Sun Paper will open the project for bidding in the near future. The project will be in Savannakhet, close to the border of Vietnam. "We have talked about the preliminary schedule with ANDRITZ experts," Liu says. He says that the most important things to consider are the solution and the technology, and after them comes the price.

The raw material for the new project will be eucalyptus from South China and some eucalyptus and acacia from Vietnam, Thailand, and Indonesia. According to newspaper reports, the company plans to establish eucalyptus plantations in the Savannakhet province, but these plans are still in the planning phase.

FIND OUT MORE AT www.spectrum.andritz.com

"We installed the complete fiberline in six months, which is a world-class installation time"

Jorma Olkkonen, ANDRITZ's Project Manager for the fiberline



"We know ANDRITZ's capabilities and they know exactly what we need. If we see a problem, ANDRITZ offers a solution."

Liu Yanbo, Project Director



Maintenance solutions offer new alternatives

In June 2007, ANDRITZ acquired a stake in a unique company, Sindus Human Technology, which specializes in maintenance services. Sindus fits well with ANDRITZ's own Overall Production Efficiency (OPE®) concept for maintenance. These combined offerings for maintenance grow in value and importance.



"It all comes down to if maintenance is a core activity. If not, outsourcing should be explored."

Humbert Köfler, Member of the Executive Board, ANDRITZ PULP & PAPER - Service and Units

An idea whose time has come?

Maintenance outsourcing is a common practice in many industries, but has been slow to take off in the Pulp & Paper industry. According to Humbert Köfler, a member of ANDRITZ's Executive Board, responsible for Service and Units: "Mills are being forced by the economy to take a fresh look at everything. It all comes down to if maintenance is a core activity. If not, outsourcing is something that should be explored."

In Europe, and especially in the Nordic countries, several pulp and paper producers have chosen to outsource maintenance. In South America, mills widely use external contractors to maintain instruments, electronics, and in some cases, for mechanical maintenance. However, contracting for specialized maintenance can create overlapping costs and unclear responsibilities, according to Aulis Katajamaki, who has overall responsibility for millwide maintenance at UPM's Fray Bentos, Uruguay mill.

"Maintenance with separate specialist organizations is typically more expensive and requires more time on the part of mill personnel to coordinate," Katajamaki says. "It is more difficult to set performance targets since there is no single organization with total accountability."

An alternative is a full outsourcing package from ANDRITZ, such as that utilized in Fray Bentos. The main difference between the services in place at Fray Bentos and those provided by "general" technology or service companies is ANDRITZ's value-added in having intimate knowledge of the processes and equipment, as well as advanced diagnostic tools. "Combining knowledge with local experience gives customers a package with substantial cost savings and better maintenance performance," Katajamaki says.

With the idea of creating a unique combination of capabilities, ANDRITZ began acquiring Sindus Human Technology of Brazil in 2007. Today, Sindus ANDRITZ is wholly owned and is expanding its capabilities outside of South America.

Andrés Sommer (left), ANDRITZ's Manager on-site at Fray Bentos. ANDRITZ has a long-term contract with UPM to provide complete outsourced maintenance for this 1,000,000 t/a pulp mill in Uruguay. ▼



Sindus ANDRITZ has been providing outsourced maintenance to mills for the past 18 years. The very first contract written is still in force today, after several renewals. "If customers don't see the value in what we are doing, they don't renew," says Luis Binotto, Senior Vice President of Maintenance Solutions for ANDRITZ. "Our contracts agreed upon Key Performance Indicators (KPIs). Financial incentives and penalties are structured so that we are obligated to document and demonstrate the value we add."

Example of value-added

After two years of internal development, Sindus ANDRITZ offered a process control optimization service to its customers. It is a combination of special software (called OPP™); plus the company's knowledge of instruments, automation and control systems; plus the knowledge of mill processes.

"It is a very powerful tool," Binotto says. "It allows us to monitor several things online: the current state of the control (valves, mo-

tors, alarms, bypasses, analyzers, and control loops), the condition of the asset, potential failures, and the impact on process performance.

"Armed with this knowledge, we do condition-based maintenance of the assets. It also has integrated diagnostics which are very useful for highly complex plants – reducing the time it takes to diagnose a problem from days down to minutes."

The OPP™ software collects information from the DCS and PLCs to give a complete millwide vision. "We identify opportunities to improve the control and work on any area that the customer defines as a priority," Binotto says. Sindus ANDRITZ estimates that its customers are saving about US\$ 40 million per year using this service. "There is no other approach that could provide faster results at this investment level," Binotto says.

Best millwide example

Köfler feels that ANDRITZ has the possibility to be the best maintenance supplier for single-line continuous processes. "These operations rely upon excellent maintenance," he says. "Equipment availability is critical for continuous production."

The best example of ANDRITZ's millwide maintenance capabilities is the UPM mill in Fray Bentos, Uruguay. The single-line pulp mill was designed to produce over 900,000 t/a of bleached pulp and the actual production is over 1,000,000 t/a.

For new capital projects such as Fray Bentos, ANDRITZ maintenance engineers join the project team well before the mill is built – creating a long-term maintenance plan, entering maintenance routines and spare parts into a millwide database,

"We identify opportunities and work on any area that the customer defines as a priority."

Luis Binotto, Senior Vice President of Maintenance Solutions for ANDRITZ

and staffing a maintenance organization to take care of the customer's assets.

"We are here to execute proactive maintenance using our knowledge of equipment and processes," says Andrés Sommer, ANDRITZ's manager on-site. "One of the most important factors in achieving our good results has been excellent cooperation with the UPM production team. UPM also recognizes the value of having us in the mill every day with our access to all the information within the global ANDRITZ organization."

The original target when the mill started up in 2007 was for Fray Bentos to have better productivity (in terms of maintenance cost per ton of pulp produced) than is the norm today in Finland. The targets have been met and the UPM Uruguay mill and the maintenance model is a benchmark for new pulp mill investments.

A variety of packages possible

"We have the ability to provide a series of outsourcing options that other companies cannot supply," Köfler says. "We can maintain instruments only, automation only, mechanical only, do preventive maintenance planning, handle spare parts outsourcing – up to complete mill maintenance outsourcing."



"We know the machinery and what has to be done to keep high availability. We know the equipment lifecycles. We know the processes and how to improve performance. We have the right people. We have the right tools."

"Everything is in place – values, people, methods, tools, and measurements – to have a sustainable business here."

FIND OUT MORE AT
www.spectrum.andritz.com

Sindus ANDRITZ employee at work in a mill in Brazil. The company has provided outsourced maintenance to mills for the past 18 years. ▼



ANDRITZ MAINTENANCE SOLUTIONS

OUTSOURCING EXPERIENCE

TECHNOLOGY & INNOVATION

MAINTENANCE SPECIALIZATION

PROCESS & MACHINERY KNOWLEDGE

Highlights of NEW ORDERS

| COMPLETE LINES |
|--|
| BMC/Georgia Biomass Production Waycross, Georgia, USA Woodyard for pelletizing plant <i>Complete pelletizing plant (for the production of 750,000 t/y of Southern Pine wood pellets) from ANDRITZ FEED & BIOFUEL.</i> |
| Vyborgskaja Cellulosa Vyborg, Russia Two-line debarking and chipping plant for pelletizing plant, wood chip dryer plant – four CMBD belt dryers |
| Zhumadianshi Baiyun Paper Zhumadian, Henan, China Complete washing, screening, and bleaching system for a new fiberline <i>Including 7 GFFMax wash filters</i> |
| SCA Östrand Sundsvall, Sweden LimeKlin™ system for a new line; LimeDry™ lime mud filter and LimeWhite™ white liquor filter upgrade to an existing line |
| CMPC Laja, Chile EPC delivery of new High Energy Recovery Boiler (HERB) and evaporation plant |
| Nippon Paper, Gotsu Mill Gotsu, Japan Fluff pulp drying line |
| Nanning Phoenix Pulp & Paper Nanning, Guangxi, China PrimeLine™ M6 <i>Complete line including stock preparation</i> |

| KEY EQUIPMENT, UPGRADES, AND MODERNIZATIONS |
|---|
| Shandong Sun Paper Industry Joint Stock Yanzhou, Shandong, China Third P-RC APMP system with a capacity upgrade to 150,000 t/a; a complete stock preparation, thick stock screening and approach system for a new paper machine; an MVR (Mechanical Vapor Recompression) evaporation plant; and a slewing screw reclaimer for a chip silo in the woodyard |
| SCA Obbola Umeå, Sweden LimeGreen™ green liquor filter, Lime mud filter, LimeFree™ dregs centrifuge <i>EPS delivery</i> |
| Billerud Karlsborg Kalix, Sweden LimeGreen™ green liquor filter |
| Rottneros Vallviks Bruk Vallvik, Sweden Evaporation plant upgrade |
| Packaging Corporation of America (PCA) Counce, Tennessee, USA Rebuild of two existing recovery boilers |
| Moorim P&P Ulsan, South Korea Recovery boiler retrofit, evaporation plant upgrade, and ash leaching system |
| Kolicevo Karton Domzale, Slovenia PrimeFlow SW single wire former, PrimePress X shoe press, PrimeForm SW and HB hybrid former |

| KEY EQUIPMENT, UPGRADES, AND MODERNIZATIONS |
|---|
| Smurfit Kappa Hoya, Germany PrimeCoat Film film press, PrimeAir Glide airturn system, PrimeFeeder <i>Largest film press from ANDRITZ with a width of 7600 mm</i> |
| Indah Kiat Pulp & Paper Jakarta, Indonesia Two PrimeDry TopSide air dryers |
| Indah Kiat Pulp & Paper Perawang, Indonesia Three chippers for Acacia |

| PANELBOARD |
|--|
| Hezhou Xin Rong Xing Forest Hezhou, Guangxi, China Pressurized refining system for MDF with 624 t/d capacity |
| Luyuan (Shaowu) Wood Industry Shaowu, Fujian, China Pressurized refining system for MDF with 456 t/d capacity |
| Taihe Dongdun Timber Industry Taihe, An Hui, China Pressurized refining system for MDF with 384 t/d capacity <i>Second line for Dongdun Group</i> |

Highlights of NEW START-UPS

| COMPLETE LINES |
|--|
| Shandong Sun Paper Industry Joint Stock Yanzhou, Shandong, China Key equipment for chip handling: four CantiScrew™ screw reclaimers and chip screen; main equipment for fiberline and recausticizing; and site services. |
| Kamabumprom Krasnokamsk, Perm Region, Russia RotaBarker™ de-barking line with horizontally fed HHQ-Chipper™ for BCTMP process <i>First RotaBarker™ started in Russia</i> |
| Södra Cell Värö, Sweden AWP Wash Press, evaporation plant, recovery boiler retrofit <i>Second order for new AWP Wash Press</i> |

| COMPLETE LINES |
|---|
| Portucel (Empresa Produtora de Pasta e Papel) Setúbal and Cacia, Portugal Two biomass power boilers |
| MCC Paper Yinhe Linqing, Shandong, China 300 admt/d P-RC APMP system |

| KEY EQUIPMENT, UPGRADES, AND MODERNIZATIONS |
|--|
| Cartiere Modesto Cardella San Pietro, Italy PrimeForm TW gap former <i>First PrimeForm TW gap former for packaging grades</i> |
| Palm Paper King's Lynn, Norfolk, Great Britain Sludge dewatering components |

| PANELBOARD |
|--|
| Fengkai Weilibang Wood Industry ChangGang, Guangdong, China Pressurized refining system for MDF with 840 t/d capacity <i>Largest MDF refiner in China, Fifth line installed at Weihua Group</i> |
| Yingang Hubei Wood Based Panel Suizhou, Hubei, China Pressurized refining system for MDF with 864 t/d capacity <i>Second installation for Yingang Group</i> |
| Guangxi Yizhou Kaili Wood Industry Yizhou, Guangxi, China Pressurized refining system for MDF with 600 t/d capacity |

NONWOVENS TECHNOLOGY

ANDRITZ recently acquired Rieter Perfojet, a French company that manufactures machinery and systems for the production of nonwovens. The company is now called ANDRITZ Perfojet.

Perfojet products are used successfully all over the world for the hydroentanglement of nonwovens. This technology employs jets of water to entangle the fibers, which creates integrity. Softness, drape, conformability, and relatively high strength are major characteristics of this production method. The addition of Perfojet fits well with the capabilities of ANDRITZ Küsters, which also has operations in the nonwovens sector.

ANDRITZ Perfojet's Managing Director, Didier Vulliet (left), and Frédéric Noëlle, R&D Manager, are shown in the technical center laboratory in France examining the excellent properties of a spunlace nonwoven produced on the company's neXline system. ▶

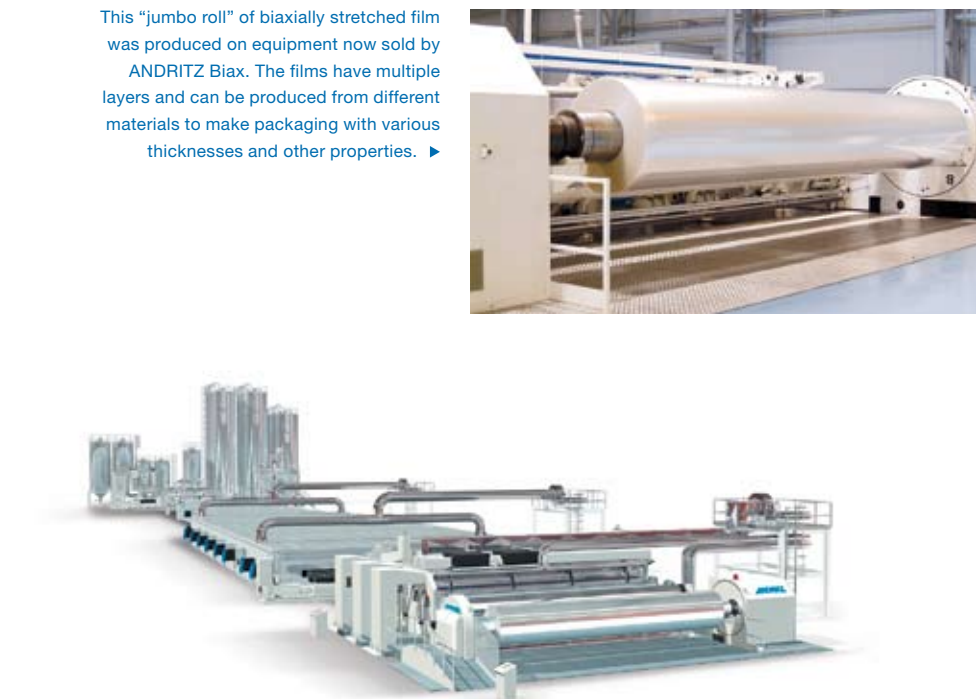


The neXline production line from ANDRITZ Perfojet ▶

BIAX BUSINESS SHOWS PROMISE

Earlier this year, ANDRITZ acquired certain assets of the insolvent DMT Group, headquartered in Salzburg, Austria, and its subsidiary in France. The company, now ANDRITZ Biax, is one of the world's leading manufacturers of systems for the production of biaxially stretched (Biax) plastic films. These films are used for many applications: particularly as packaging material for the food industry.

ANDRITZ Biax supplies equipment and turnkey plants for the production of biaxially oriented plastics films from Polypropylene, Polyethylene Terephthalate, Polystyrene, and other materials. ▶



This "jumbo roll" of biaxially stretched film was produced on equipment now sold by ANDRITZ Biax. The films have multiple layers and can be produced from different materials to make packaging with various thicknesses and other properties. ▶

Thinking of the next generation: P-RC APMP



For you. The P-RC APMP* process is advanced technology for producing high quality chemi-mechanical fibers at the lowest operating costs. It saves money, saves energy, and in some applications enhances fiber properties.

* Pre-conditioning Refiner Chemical Alkaline Peroxide Mechanical Pulp

For your children and grandchildren.

We take our commitment to delivering safe and environmentally sound technologies very seriously. Our P-RCAPMP systems conserve energy and wood resources – reducing CO₂ emissions and contributing to sustainable production in your community.