

SPECTRUM

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MAGAZINE OF PULP & PAPER 

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ANDRITZ
Pulp & Paper



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On the cover: Pulp drying plant at Montes del Plata (page 16).

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First impressions.

Joachim Schönbeck has joined ANDRITZ as a Member of the Executive Board. Among other responsibilities, he will be responsible for ANDRITZ PULP & PAPER's capital business. We asked Mr. Schönbeck to write the Management Message for this issue to introduce himself to SPECTRUM readers.

Dear Readers:

It is a pleasure to be part of the ANDRITZ Group and I look forward to meeting many of you personally. By way of introduction, I am an engineer by training and have spent my entire business life in companies such as Mannesmann, Siemens, and the SMS Group supplying capital equipment to a lot of different industries and customers.

My first weeks at ANDRITZ are exciting for me – all filled with first impressions as I travel around. My first impression of ANDRITZ people is very positive. These people are extremely competent, customer-oriented, and experts in their areas.

My first impression of customer mills is also very positive. A mill's goal is to produce a promised amount of product (or more) at a promised cost (or less) – and to do this safely, with concern for employees and environment. In a 24/7 operation every tonne of production lost is a tonne that cannot be recovered or replaced. As a supplier, we must keep this in mind at all times.

There is a high level of professionalism and organization in our industry. The focus is on quality, efficiency, safety, and protecting the environment, always while keeping costs in check. While there are specifics of the pulp and paper industry that I need to learn, and am eager to learn, there are also many similarities to the industries I know well:



- **The need to lower investment and operating costs.** This is an opportunity for us to develop new and innovative products and processes, and become more efficient in manufacturing.
- **Attrition of experienced staff.** As older and more experienced workers retire, this is an opportunity for us to refine our technologies so they can be easily mastered by less experienced people – and by building intelligence and diagnostics into the base products.
- **Expanding role of IT technology.** There is an opportunity for us to create new IT-based tools to help mill people identify situations before they become problems – and then provide guidance and diagnostics on the spot.

These, and the "universal" challenges (energy costs, water consumption, waste reduction, etc.) require us at ANDRITZ to continue to innovate. It has been said that "the enemy of a good idea is the better idea," meaning that we can never rest on our laurels. We can always do better – and we will.

I will be reaching out to as many customers as I can to learn more about your business and how we can support you.

Sincerely,

Joachim Schönbeck
 Member of the Executive Board
 ANDRITZ PULP & PAPER – Capital Systems

The Lee-way of making business

leeway (noun): the freedom to do something the way you want to do it.

The Lee-way (adjective): the speed with which a company transforms itself from a manufacturer of ladies' handbags into one of the world's largest containerboard producers.

Critics of the paper industry sometimes refer to it as a slow-moving car driven by stodgy old men. These critics have obviously not seen the man behind the wheel of the sleek race car that is Lee & Man.

Edmond Lee is neither stodgy nor old. The 34-year-old CEO is spurred on by youthful energy, tempered with the intellect and maturity implanted by his father, Patrick Lee, who founded the company.

If and when Edmond Lee sleeps is not readily apparent. He comes from a family of achievers (his older brother Raymond is Chairman). We caught up with him at his office in Dongguan. Stepping from behind his desk, he shakes hands with a smile, motions us to sit, and talks openly about his business. Without checking his watch or appearing impatient, he is gracious and engaging. Our discussion covers a wide range of topics.

A fashionable start

"Our company began as a manufacturer of ladies' handbags in the 1980's. We're still in that business today. We could not find enough boxes to package our products in, so we decided to start our own box plant. By the mid-1990's it was very difficult to import paper – the quality was not stable

and the price was high. So we decided to make paper. That is how we got into the paper industry."

Baptism by fire

"In 1998, when I was 18 years old, my father convinced me that packaging grades had tremendous potential. I wanted to get some technical background, so I attended the University of British Columbia in Canada. I graduated in 2003 with an Applied Science in Chemical Engineering degree. At school, I was taught the basic theory, but not how to operate the equipment.

My first job coming back to China was the start-up of PM4. This was our first machine purchased from Europe, and it was very sophisticated. Nobody in China was running a shoe press or automatic tail threading at that time. We had daily shutdowns until we learned how to control the machine. That is what I call on-the-job training! Step-by-step, we raised the efficiency of the machine from a low start to 95%+."

A shifting landscape

"We are a young company, founded in 1994, yet today we are one of the largest containerboard producers in the world. At first, our business was driven by China's ability to export, with packaging growth tracking a healthy GDP growth of 7-8% each year.

“Everything that we can make ourselves, we save 20-30%. So, our strategy is to make as much as we can inside the company.”

Edmond Lee
Chief Executive Officer
Lee & Man

Data from the Chinese paper association for last year tells a different story – only a 2% rise in packaging consumption. With a slower domestic growth, and with light industry shifting to neighboring Southeast Asian countries, we are investing overseas to grow. We have to adapt.

I don't see any new machines on the horizon. We produce about 5 million tonnes of product per year, and I think that is the way it is going to remain for a while. We added duplex board and white-top to our mix, and will probably look to tissue for some growth. But packaging remains our main focus."

Waste paper supply

"We purchase about 5.8 million tonnes of recovered paper per year. About 30% comes from China. Just because the waste paper comes from China does not mean it is cheaper. We have about 40 of our own collection centers, mostly in Central China because there is a good supply and fewer mills."



▲ Billy Chan, General Manager of Lee & Man's Chongqing mill, stands in front of the ANDRITZ PrimePress X shoe press on PM16.

Overview of the ANDRITZ OCC system which is part of the new PM20 project at Chongqing. PM20 is producing testliner. ANDRITZ supplied a new design LC pulper, screens, cleaners, and refiners. ANDRITZ just recently received an order from Lee & Man to supply a 2-loop ONP (Old Newsprint) line for paper machine PM13 in Chongqing, China. The scope of supply includes a deinking system with drum pulping for a line capacity of 300 t/d. ▼

Vertical integration

"Everything that we can make ourselves, we save 20-30%. So, our strategy is to make as much as we can inside the company. A good example is our chemical plants – we are producing chemicals for dry strength, sizing, calcium carbonate (through a joint venture with Omya), sodium hydroxide, and we are exploring the possibility to make cationic starch."

Working with ANDRITZ

"My first experience with ANDRITZ was in 2003 with the PM4 project. We purchased an Ahlstrom (now ANDRITZ) paper machine approach system for the new machine. The system worked well. The first stock prep line we purchased from ANDRITZ was for PM12 in 2006. Followed by PM15 in 2007, which included our first FibreFlow drum pulper. The drum is operating well. We also use a lot of ANDRITZ pumps and agitators.



◀ Thomas Ferk, ANDRITZ Product Engineer (left), with Zhu Zhipeng, ANDRITZ China Site Supervisor, in the OCC plant.

the performance of this technology. It saves us about 0.4 tonnes of steam per tonne of paper. The energy savings are huge. And, it improves strength because there is lower moisture going into the drying section.

Upgrades and energy

"A lot of suppliers inside China are learning (or should I say copying?) the technology of the major suppliers. That is a fact of life. Since the Chinese market is no longer focused solely on new machines, the activity is in rebuilding and upgrading – something we have been doing since 2010. We are focused on efficiency and cost control. The major suppliers must continue their R&D to stay ahead – especially in the area of power and steam savings. If you have anything new to save energy, I will try it on one of my lines. If it is successful, I'll put it on all my machines."

"We are very happy with the PrimePress X shoe press. The energy savings are huge."

Edmond Lee
Chief Executive Officer
Lee & Man

is important because it helps them provide excellent technology at competitive costs. They learn fast. It is apparent that they have put a lot of effort in their operations in Foshan."

PrimePress X shoe press

"We installed two ANDRITZ shoe press modules on our packaging grade machines at Chongqing, and are replacing a shoe press on PM16 with ANDRITZ technology right now. We are very happy with

Since 2007 we have purchased several deinking systems. Our most recent investments for deinking technology are ANDRITZ systems for PM13 and PM17, because I want to make white top liner on those machines.

The latest project is PM20, a new testliner machine at Chongqing that is just starting up and will produce 400,000 t/a. ANDRITZ provided the majority of the 1,000 t/d OCC processing line (including a new design low-consistency pulper, screens, cleaners, refiners, etc.) and delivered the complete PM approach system.

ANDRITZ is certainly one of the major suppliers. They have shown a commitment to China – localizing manufacturing here and investing in technical resources. They have progressed the fastest, in my opinion. This

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◀ Rotor inside the FibreSolve FSR pulper with 130 m³ vat.

COMPACT steps to reach higher goals

Hebei Yihoucheng was a pioneer in feminine products in China, manufacturing women's sanitary napkins since 1998. Later, it began converting parent rolls from Chinese tissue producers. Now it has taken the bold step of producing its own tissue with a *PrimeLineCOMPACT* tissue machine from ANDRITZ – the first in China. Erection of a “twin” second machine is underway with start-up slated for 2015.

In tune with a growing market

Hebei Yihoucheng was founded by Bai Hongmin, who is the company's President and CEO. As Ms. Bai describes the company's beginnings, “We started early producing feminine sanitary products because we saw a need and an opportunity. The increased demand for these products has met our predictions.”

Thanks to its early start, Hebei Yihoucheng carved out an admirable niche for its “Lady Star” brand in the North China region where its manufacturing facility is located. Hebei Province is home to 72 million people and this does not include the cities of Beijing and Tianjin (32 million additional people) which are surrounded by the Province.

The company's products are sold through a wide distribution chain (700 distributors) to major retail stores. “Today, supermarkets dominate, offering a selection of tissue and hygiene products,” says Tian Yuwei, General Manager. “However, internet retailing is seeing the most dynamic growth.”

High-tech zone

At one time, this area of China was home to hundreds of small tissue mills. In an effort to get control of energy consumption and environmental impact, the Chinese government is effecting the closure of many small mills. The goal is to produce the tonnage on larger, more modern, and more efficient machines.



◀ (Left to right): Bai Bingchen, ANDRITZ China General Manager Sales for Tissue; Tian Yuwei, General Manager for Hebei Yihoucheng; and Günter Offenbacher, ANDRITZ Director of Sales for Tissue and Drying; on the first *PrimeLine COMPACT* tissue machine. Erection of a second machine has begun.

Baoding, where Hebei Yihoucheng is located, is designated a High-Tech Industry Development Zone. The mill certainly fits the profile with its modern production, converting, and warehousing facilities. In addition to feminine sanitary products, the plant now produces wet wipes, pet pads (nursing pads), and tissue products. “We have invested in top-notch folding and packaging machines,” Ms. Bai says. “We have become one of the largest wet wipe manufacturers in North China.”

Up until 2013, when you walked through the mill, you would see converting lines processing parent rolls purchased from Chinese tissue producers. All that changed in August 2013, when the company signed a contract with ANDRITZ to deliver two new tissue machines, with all the auxiliaries. TM1 was successfully started up in May 2014.

“Our people were able to start up and ramp up very fast with ANDRITZ's training and guidance.”

Tian Yuwei
General Manager
Hebei Yihoucheng





◀ The first of the twin PrimeLineCOMPACT machines at Hebei Yihoucheng – TM1. Working width is 2.85 m and design speed is 1,600 m/min.

A star tissue brand

Hebei Yihoucheng's tissue is marketed as the "Lady Star" brand. While the Chinese market is strong by global standards (mainly aided by rising income levels and growing acceptance) the number of producers serving this market has increased considerably. The plan had always been to add parent roll production to the company's capabilities. It was just a matter of timing. "We produced hygiene products for a long time," says Ms. Bai. "Even though the tissue segment is much more competitive today, we felt it was the right time to add our own tissue production, which will secure our future by controlling costs and quality."

Carefully considered

The selection of the right supplier, with the right technology, for this first tissue machine was an important decision for Hebei Yihoucheng.

All of the major machine suppliers were, of course, evaluated. "I knew of ANDRITZ, but was not that familiar with their specific technologies," Mr. Tian says. "Their experience base in China was a key influence for us. We visited several locations in China with Bai Bingchen (ANDRITZ China General Manager Sales for Tissue) to check references. Mr. Bai was able to demonstrate that ANDRITZ has the most advanced machine technology, the best energy-saving solutions, and the best automation package."

Overall site design will accommodate four machines. "The first two machines will be 2.85 m wide CrescentFormers, operating at 1,600 m/min," Mr. Tian says. "The next two are planned to be 5.6 m wide, 2,100 m/min machines."

A COMPACT beginning

Hebei Yihoucheng chose the PrimeLine-COMPACT design for its first two machines. COMPACT machines are primarily narrow width with optimized stock preparation and a tailored automation system. "Since we are new to tissue production," Mr. Tian says, "we wanted to start simply. We need to see what the market will accept before we make our next investments."

"Newcomers or mills who do not buy machines frequently appreciate the standard-



▲ Tian Yuwei, General Manager at Hebei Yihoucheng (left) inspects the quality of "Lady Star" tissue with Günter Offenbacher, ANDRITZ Director of Sales for Tissue and Drying.

ized, modular approach of the COMPACT line," says Günter Offenbacher, ANDRITZ Director of Sales for Tissue and Drying. "Our whole-plant solution from stock prep to parent roll shortens the start-up curve and has our customers making marketable tissue products in the shortest time. This accelerates the economic payback."

"As a business owner, I was attracted to the COMPACT approach," Ms. Bai says. "It ensures us a certain production quantity and quality. The delivery of the complete line from one supplier – stock preparation, machine approach, pumps, the machine, drives, and automation – was a big plus."

The company placed orders for "twin" COMPACT machines. The first started up in May of this year; the next follows in 2015. Work has begun on delivery of the second machine.

Water and energy: critical factors

The facility is the only tissue mill in China using natural gas boilers to create process steam. "While our energy production is clean, it is also considerably more expensive than coal-fired steam production," Mr. Tian says. "Energy savings are extremely important to us, and the ANDRITZ technology is helping us here."

Mr. Tian cites one example in the Steel Yankee delivered with his COMPACT

"The delivery of the complete line from one supplier – stock preparation, machine approach, pumps, the machine, drives, and automation – was a big plus."

Bai Hongmin
President and CEO
Hebei Yihoucheng



▲ ANDRITZ delivered the complete stock prep and machine approach system including pulping, thickening, pumps, and agitators. The process includes two FibreSolve pulpers for incoming kraft pulp bales, refining, deflaking, disc filter, screens, and fan pump.

machine. "The performance of the Steel Yankee exceeds the performance of cast iron," he says. "It has a much higher evaporation rate and improves drying with less energy consumption. The energy savings are quite noticeable."

In addition, the machine is equipped with a PrimeDry head insulation package. Offenbacher explains, "Tissue machine Yankees often show significant heat losses at the head. The savings in steam using head insulation is in the range of 2-5%."

The mill location is not near a river, so the conservation and reuse of water is critical. "The ANDRITZ stock prep system, including the disc filter, has helped us save fresh water," Mr. Tian says. Hebei Yihoucheng also invested a considerable amount of money to install modern effluent treatment systems. The effluent meets the most stringent Class A national standards.

Perfectly matched fiber preparation

Other than cost, there are also some measurable advantages of the COMPACT concept: ability to select capacity according to need and plant-optimized stock preparation in terms of sizing and layout. Stock preparation for either virgin or recycled fibers can

be selected. Hebei Yihoucheng uses purchased imported virgin fiber for its furnish.

ANDRITZ delivered the complete stock prep and machine approach system, including pulping, thickening, pumps, and agitators. The process includes two FibreSolve pulpers for incoming kraft pulp bales, refining, deflaking, disc filter, screens, and fan pump.

Absolutely the right decision

"The COMPACT design has a modular design that is suitable for virtually every tissue producer," Offenbacher says. "It is part of a complete portfolio of technologies we offer. For buyers who want proven quality in a streamlined, cost-effective package, the COMPACT system is something to consider."

The COMPACT approach reduced the time it took to install and bring the machine along the start-up curve. "Even though our people are not veteran operators, they were able to start up and ramp up very fast with ANDRITZ's training and guidance," says Mr. Tian. "Within days we were producing excellent paper. We started in the 15 to 17.5 grammage range and, based on early success, our operators are quite confident to produce other grades."



▲ Conservation and reuse of water is critical at this mill. The ANDRITZ stock preparation system, including the disc filter (above) helps save fresh water.

"Our decision to move into tissue production is based on market demand and is a natural evolution for our company," Ms. Bai says. "We did not consider it a risk, but a matter of good economics. We absolutely made the right decisions – to begin producing our own parent rolls and to partner with ANDRITZ."

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A win- win- win proposition

Thanks to an interesting collaboration between two pulp and paper mills and an energy company, a community in Sweden now has a more cost-efficient source of district heating. The energy company avoided a huge investment and the mills have a new revenue stream. The win-win-win for SCA, Sundsvall Energi, and local residents is also a winning project for ANDRITZ.



▲ Ortviken's 250 m³ tower for wood powder storage. It includes special equipment and protective systems to conform to ATEX explosion risk directives.

Pulverizing a boiler

Swedish lesson for the day: this is a story about converting *pannor* (boilers) from *olja* (oil) to *träpulver* (wood powder) at SCA's Ortviken mill near Sundsvall. The conversion reduces dependence on fossil fuels and cuts emissions, and it generates revenue from a new source. The results, as they say in Swedish, so far have been *utmärkt* (excellent).

There is also a "back-story" which makes the project more interesting: involving a race to innovation, community collaboration, cost avoidance, and fast-track project management – all good things.

◀ Most of the wood pellets (left jar) are produced at SCA's Härnösand plant about 40 km away. Two hammermills (capacity 12 t/h each) pulverize the pellets into powder (right jar). In the boilers, the powder/air mixture behaves very similarly to an oil/air mixture.

Life after publication papers

Ortviken is the fifth largest publication paper mill in the world. As everyone knows, publication grades are under tremendous pressure these days. "We are convinced that we have a life beyond publication papers," says Kristina Enander, Mill Manager. "Perhaps it will be in composites, bioplastics, packaging papers, or liquid biofuels."

To stimulate thinking about future possibilities, Ortviken hosted an internal competition called "Race to Innovation." Two teams had 72 hours to brainstorm new ways to use virgin wood fiber. As they came up with ideas, they rushed to a room where company engineers, R&D specialists, and patent lawyers stood at the ready to answer questions and keep the ideas realistic. The 18 best innovations were displayed. The innovations, while kept secret from outsiders, were inspirational to those who worked at the mill.

Energy innovation

While the "Race to Innovation" focused on fiber utilization, it also inspired innovation about energy utilization. That is where the collaboration between SCA and Sundsvall Energi (the power and heating company owned by the municipality) comes in.

Per Asplund, Manager of Projects and Engineering for SCA Underhåll (SCA's main-

tenance group for Ortviken and the nearby Östrand mill), explains. "There is pressure here in Sweden for energy companies to reduce fossil fuel use," he says. "We mills feel the same pressure. Mills can often obtain very good economics by switching from oil to biomass, since biomass is a core material for us. That is, once we absorb the capital costs for making the conversion."

The capital cost for converting an oil boiler to biomass on the Sundsvall Energi side was a staggering SEK 950 million (EUR 105 million) – a cost that would be borne by consumers and taxpayers, since the company is owned by the municipality.

Seeing an opportunity for collaboration, SCA proposed that its two "local" mills could increase their supply of energy to the Sundsvall district heating network. This would help Sundsvall Energi avoid a huge investment cost. In turn, Ortviken would have a sound financial basis for converting two standby oil boilers into biomass boilers. Clearly a win-win for SCA and Sundsvall Energi. And a third "win" for the taxpayer/consumer.

Sundsvall Energi and SCA signed a BioCooperation agreement ("BioCoop") in December 2012. SCA invested SEK 380

million (EUR 42 million) and Sundsvall Energi invested SEK 100 million (EUR 11 million), mostly to extend district heating pipelines to the two mills.

BioCoop benefits

"We installed equipment at Östrand and are now able to recover heat from six different points in the mill," Asplund says. "At Ortviken, we installed a new facility for biomass receiving and powdering, and we converted two boilers to burn the wood powder. We now deliver heat in the range of 80-120° C to Sundsvall Energi on demand."

These actions have the potential to bring annual oil consumption down by 25,000 m³ and reduce carbon emissions by about 70,000 t/a. SCA's total heat deliveries have risen from 110 to almost 400 GWh. This generates additional revenue from recovered process heat and biomass-fired steam heat, and avoids the higher cost of oil.

Östrand as a reference

While the economics of substituting wood powder for oil are attractive, there are some complexities, according to Halvard Sundström, ANDRITZ Service Manager in Sweden and key sales contact for this project. "Wood powder is difficult to handle with conventional systems," he says. "Our

“We had to be ready for the winter season. ANDRITZ had the experience to hit the ground running, which really was a big plus for us.”

Thomas Johansson
BioCoop Project Manager
SCA Underhåll





▲ Inside the plant: part of the distribution system for splitting the pulverized wood powder between the two boilers.



▲ ANDRITZ's rebuild of the first boiler, which included the installation of four multi-fuel burners for oil or wood powder, started up before Midsummer. The second boiler, also a 100 MW unit, was rebuilt during August-September. ANDRITZ installed three new multi-fuel burners to accompany the one oil burner for bark. Connections and upgrades for the electrostatic precipitators were completed in November.

wood processing experts in Örnsköldsvik, Sweden have the engineering knowledge and process expertise to design and build the plant for converting pellets to powder and convey the powder, including the special equipment and protective systems needed to conform to ATEX directives (EU rules protecting employees from explosion risks)."

ANDRITZ's scope for the Ortviken plant included an integrated solution for wood pellet receiving and storage as well as the systems for milling pellets into powder, conveying, distributing, and dosing powder to the boilers. ANDRITZ also performed the rebuild of the two boilers, including adding new multi-fuel burners.

According to Thomas Johansson, Project Engineer for SCA Underhåll and Project Manager for BioCoop, Ortviken selected ANDRITZ in good part because of its performance during a BioLoop 2011 project at Östrand. ANDRITZ supplied a new lime kiln which could be fired by wood powder, multi-fuel burners for a biomass boiler to accommodate wood powder, and delivered the plant for pellet receiving, powder preparation, storage, etc. Schedules and

budgets were met, and the mill was very happy with the results. (See *Spectrum* No. 25, 2012)

Get it done before winter

The project deadline was tight – less than one year from decision to operating plant. "We had to have everything in place and operating by December 2013 in order to be ready for the winter season," Johansson says. "With its experience at Östrand, ANDRITZ had done considerable pre-engineering and was ready to hit the ground running as soon as we had Board approval, which really was a big plus for us."

The critical path in the project was the civil engineering, which was handled by SCA. "To get a flying start on the project, we began the site preparation in advance of the decision," Johansson says. "We basically copied the Östrand hammermill building design so we could get started on pre-fabrication. This gave everyone a fixed target for equipment layouts, construction, and erection."

Two other structures were also built – one for powder storage (250 m³ capacity) and one for the dosing system. Mattias Johansson,

ANDRITZ Project Manager, recalls going through several iterations of equipment and piping layouts to arrive at the best solution. "It is a compact space," he says, "and there are special considerations such as long-radius bends with outside reinforcement, redundancy for ease of maintenance, design of the pneumatic systems, and adding rupture disks in the storage tower in case of an explosion."

ANDRITZ had relationships with good subcontractors (for example with the dosing equipment) which ensured a very strong



overall package. "When it came to project execution," Thomas Johansson says, "the engineering of the boiler rebuilds, which was done by ANDRITZ's Varkaus team, was very important and well executed."

Rebuild of the first boiler (Boiler #2), a 100 MW oil-fired unit, began in May 2013. In addition to the rebuild, ANDRITZ installed four new multi-fuel burners to allow the boiler to fire either oil or wood powder. "We started up the boiler in June before Midsummer, which was our goal," Thomas Johansson says.

“Converting two boilers to biomass at Ortviken makes good economic sense. Plus, it has the potential to lower the annual oil consumption in the Sundsvall area by 25,000 m³ and reduce carbon emissions by about 70,000 t/a.”

Per Asplund
Manager of Projects and Engineering
SCA Underhåll



▲ (Left to right): Halvard Sundström, ANDRITZ Service Manager in Sweden; Thomas Johansson, SCA Project Manager; and Mattias Johansson, ANDRITZ Project Manager

The second boiler (Boiler #3) was rebuilt during August-September. It is also a 100 MW unit and is the mill's primary bark boiler. ANDRITZ installed three new multi-fuel burners to accompany the one oil burner for bark. Connections and upgrades for the electrostatic precipitators were completed in November.

"Östrand began delivering energy to the district heating network in November, and we followed in December – right on schedule," says Thomas Johansson. "On the coldest day, we used 500 t/d of wood powder. Our total consumption of pellets is planned for about 35,000 t/a."

According to Mattias Johansson, "It was a tight schedule, but proceeded very smoothly. The SCA team including Thomas, Jan Persson (installation), Patrik Pettersson (automation), and Thomas Mörtsjö (electrification) were great to work with."

Part of the business chain

"We have biomass within our own business loop – giving us better control over supply, quality, and costs," Asplund says. Most of the wood pellets fueling Ortviken's boilers are produced at SCA's Härnösand plant

about 40 km away. The increased demand from both Östrand and Ortviken evens out SCA BioNorr's seasonal pellet business.

Two hammermills at Ortviken (capacity 12 t/h each) pulverize the pellets into powder. Moisture content of the powder is about 6%. The wood powder is transported between buildings via slightly over-pressure pneumatics (20 m/s of air). In the boiler, the powder/air mixture behaves very similarly to an oil/air mixture.

After the conversion, SCA will produce half of Sundsvall's district heating. "Our plan is that Sundsvall Energi will obtain about 16 MW of recovered heat from Östrand and up to 40 MW of recovered heat from Ortviken's flue gas condensers, and up to 80 MW of fresh steam produced by our boilers," Thomas Johansson says. "The upside for us is, if we have a lot of bark, we can produce that steam using that waste fuel first, then switch over to wood powder. Either way, it is a new source of revenue for us."

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Greenfield Montes del Plata mill inaugurated in Uruguay

Montes del Plata, the pulping company owned jointly by Stora Enso and Arauco, officially inaugurated its greenfield mill near Punta Pereira, Uruguay on September 8, 2014. The design capacity for the mill is 1.3 million tonnes of bleached eucalyptus pulp per year. ANDRITZ delivered key production lines for the mill as shown. ANDRITZ was also responsible for the civil construction, erection, commissioning, and start-up of these production lines.





WOODYARD

ANDRITZ technology for log receiving, two chipping lines, bark processing, chip storing and reclaiming (shown here), chip screening, and chip conveying to the cooking plant. The total processed wood amount is 4,800,000 m³ sub per year.



FIBERLINE

The fiberline includes a DownFlow Lo-Solids digester with TurboFeed chip feeding, brownstock washing, screening, post-oxygen washing, and bleaching. In total, there are eight DD washers in the fiberline. Daily design capacity is 4,090 admt/d at 92% ISO brightness. Shown here are the bleaching towers, high density pulp storage, and DD washers.



PULP DRYING PLANT

The ANDRITZ pulp drying plant consists of two parallel lines including pulp screening/cleaning, TwinWire pulp machines, airborne sheet dryers, and cutter/layboys. Shown here are the two airborne sheet driers which each produce 2,170 t/d of dried pulp.



AUTOMATED BALING LINES

Three automated lines produce baled, wrapped, and palletized units ready for shipment to Montes del Plata's global customers.



EVAPORATION PLANT

The seven-effect plant has an evaporation capacity of 1,466 t/h. Integrated in the design are systems for stripping and methanol liquefaction, processing of bio-sludge and ClO₂ plant brine, and removal of chlorine and potassium from the black liquor. A Duct Stripper is utilized to improve condensate quality.



RECOVERY BOILER

Design capacity of the recovery boiler is 5,710 tds/d at 495° C and a pressure of 96.8 bar.



WHITE LIQUOR PLANT

The recausticizing plant (green liquor filters, white liquor filter, LimeDry, and dregs filter) is designed to product 13,370 m³/d of white liquor. The LimeKiln has a capacity of 1,100 t/d of burnt lime.



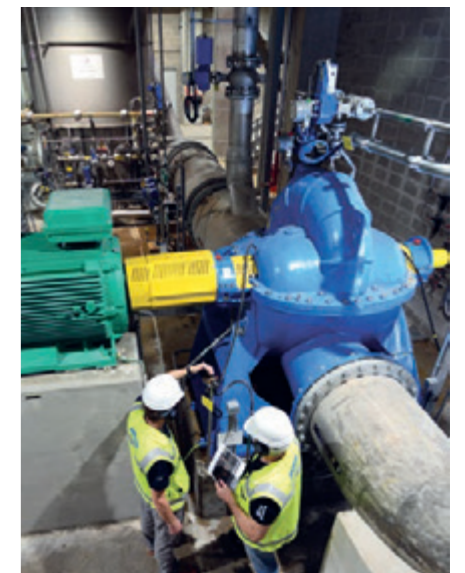
POWER BOILER

The Bubbling Fluidized Bed power boiler from ANDRITZ burns bark, debarking wood losses, screening rejects, and odorous gases. Steam flow on biomass is 65 t/h at 455° C and a pressure of 94.8 bar.



ACE OPTIMIZATION AND IDEAS SIMULATOR

ANDRITZ was responsible for the automation, electrification, and instrumentation in each process area with the exception of the DCS. Included in the delivery were Advanced Control (ACE) optimization software, web-based training tools for operators and maintenance personnel, and the IDEAS Simulator for DCS checkout and operating "virtual" training.



PROCESS PUMPS

ANDRITZ delivered all the centrifugal process pumps including medium consistency as well as fan pumps (shown here). All pumps are latest generation ANDRITZ technology with the highest efficiencies.

Quality conversion

down

under



To future-proof its markets, Pan Pac of New Zealand decided to convert a large part of its standard TMP production to BCTMP. It chose ANDRITZ to design, deliver, and install the new line – which today has one of the largest two-stage peroxide bleach plants in the world.

Two tectonic plates meet underneath New Zealand. From time to time these plates move. Earthquakes don't happen often, but Kiwis (as New Zealand's residents are called) have adapted to the threat of them. It is a small price to pay for the pleasures of living in this exquisite country.

The city of Napier, on the east coast of the North Island, is famous for its Art Deco architecture. Napier was rebuilt after an earthquake in 1931 when Art Deco was the fashion.

Blame the internet

Pan Pac is a timber and pulp mill about 15 km from Napier. It is owned by Oji Paper of Japan. Pan Pac's production includes solid lumber, wood chips, and 720 t/d of mechanical pulp which has been feeding Oji's newsprint machines in Japan since 1973. The fiber source is primarily long fiber (*Pinus Radiata*), sustainably managed in accordance with FSC certification.

Tony Clifford, Pan Pac's General Manager, Pulp Division, explains, "Basically we were contract manufacturing for Oji in Japan. We had two ships dedicated to moving TMP to Japan doing a roundtrip each month."

But Pan Pac and Oji realized that straight TMP production was not the direction for the future. The rise of the internet and the slow demise of newspapers and Japanese comic-style graphic novels signaled the decline of standard newsprint. Oji has a long-term view and was willing to invest substantially in an upgrade to BCTMP (Bleached Chemi-Thermo Mechanical Pulp) to help future-proof the mill's production and its markets with improved pulp for higher value-added paper grades.

"Recognizing there would be a decline in the demand for newsprint grade pulp, we started planning for this change," says Clifford. "Although the demand for TMP has not declined at the speed we forecast, we need alternatives such as BCTMP."

In December 2010, the Board approved a project to convert roughly two-thirds of the

TMP pulp to high-grade BCTMP. The project included a two-stage alkaline peroxide bleaching facility from ANDRITZ and a new effluent plant with two stages of biological treatment.

Accommodating design

As with other countries in the Pacific Rim, industrial design and construction in New Zealand must take into account staunch seismic building codes, according to Bruce Ayling, Pan Pac's Manager of Engineering and Development. "For example, any tower or large tank is designed to withstand horizontal forces," he says. "This is to reduce the potential for a tower tipping over if the earth moves underneath it, or a tank rupturing because of unexpected horizontal pressures."

Designing and installing bleach plants is part of ANDRITZ's usual business, but this project was noteworthy because it was going to be the largest two-stage peroxide bleaching line for long fiber, and because it was an upgrade to an existing plant where there were extremely challenging space

limitations. Accommodating the seismic design considerations was also part of the challenge.

"ANDRITZ knew there would be stringent design requirements when the contract was negotiated, but probably did not know how difficult the design was going to be," Ayling, who managed the project for Pan Pac, says. "But their team quickly got their heads around the seismic code complexities and came up with effective solutions. We are very happy with the result."

A local engineering company, LHT Design, worked closely with ANDRITZ. Of special note are the two bleach towers – 25 m high and weighing 650 tonnes each when full. Pan Pac made a colossal underground concrete and reinforced steel raft for the tanks to stand on. ANDRITZ designed a steel cradle on four legs to hold the tanks in place. The legs were each bolted to the concrete raft with eight huge bolts (2 m long and 90 mm in diameter), strong enough to withstand horizontal pressures and long enough to provide some flexibility.

ANDRITZ designed a steel cradle on four legs to hold the bleach tanks in place in case of a seismic event. ▶



Big things in small spaces

The bleach plant includes a two-stage peroxide system (medium consistency and high consistency) which provides high brightness with low chemical consumption. Included in the scope was a screen room (including reject refining), extraction washing stages, and a chemical farm located alongside the mill. The delivery was performed turnkey by ANDRITZ.

According to Josef Liendl, Sales Manager for ANDRITZ, there are several key products in the line. One of note for its uniqueness is the HC Mixer, which helps to achieve very high brightness with low chemical consumption. "The mixer fluffs the pulp to create more surface area without impacting strength or other pulp characteristics," Liendl says, "creating an ideal environment for thorough, intimate mixing."

Pan Pac wanted their new plant to be located within an existing building as much as possible. Equipment that would not fit in the building was to be close by and compact. Ayling explains, "We wanted to keep everything compact so our people can quickly and efficiently get to all parts of the mill from the control room. This also helped



“Our new BCTMP is a super product of value to our markets. Demand is exceeding our ability to supply.”

Doug Ducker
Managing Director
Pan Pac

us minimize piping and cable runs to keep our costs down.”

Pan Pac prepared 3D layouts to evaluate clearances and space requirements. They worked collaboratively with ANDRITZ to make sure that equipment could be installed within the space limitations.

“ANDRITZ was receptive and obliging and provided good support to ensure the process was kept as simple as possible within the space constraints,” Ayling says.



◀ Six new ANDRITZ pulp screw presses are key to achieving the proper consistencies for bleaching and washing.

The unique HC Mixer helps to achieve very high brightness with low chemical consumption. ▼



Keeping it running

Construction began in January 2011. The installation job was intense and involved a number of different activities that needed to be spliced together. To add to the challenge, the existing pulp mill remained operational.

“The existing TMP plant was in production right through the construction period,” says Ayling. “There was less than a week of total downtime to perform all the tie-ins and changeovers.”

According to Ayling, organizing the logistics of this was challenging, with people and product coming from Austria, China, and Japan – as well as a large contingent of specialist local tradesmen.

“On any large engineering job, little things that had not been anticipated create challenges,” says Maurice Garvie, ANDRITZ Project Director. “We had our challenges, but there was an excellent spirit of cooperation. It is really a tribute to the people at Pan Pac. They created a work environment where cooperation and fairness came first, which was a sound basis for addressing each challenge as it appeared during the project.”



▲ The team, left to right: Bruce Ayling, Manager of Engineering and Development, Pan Pac; Koji Aoyama, Technical Director, Pan Pac; Doug Ducker, Managing Director, Pan Pac; Josef Liendl, ANDRITZ Sales Manager; Tony Clifford, General Manager Pulp, Pan Pac; Danny Eagleton, Projects & Development Pulp, Pan Pac

Ayling says, “There was total commitment to solve problems. The ANDRITZ team was great to work with. There was a lot of pressure, but we also enjoyed it.”

At times there were several ANDRITZ people with different areas of expertise at the mill. It did not appear to be difficult to get people to head “down under,” especially during the Austrian winter. Napier, besides being quaintly Art Deco, is also famous for its wine, sun, sailing, and fresh Southern Ocean seafood.

A new market

The BCTMP plant was running by April 2012. According to Clifford, “At present, we are producing to demand – 160,000 tonnes BCTMP and 120,000 tonnes TMP annually. We have flexibility to change the production ratios between TMP and BCTMP according to market demand.”

Since BCTMP is a higher quality and bright pulp, it can be used to make fine white cartonboard for packaging and is also food safe. “Food-grade board must be 100% virgin fiber, which ours is, so there is a good match there,” says Clifford.

“Our objective has been to convert logs from sustainable forests into wood products and fiber utilizing New Zealand resources – electricity, technology, and the skills of our people,” says Doug Ducker, Managing Director. “Initially our products were used solely in Japan, but now they are being used on a more global level. We have one of the world’s largest market mechanical pulp mills in the world at a capacity of around 280,000 t/a. Our new BCTMP is a super product of value to our markets. Demand is exceeding our ability to supply.”

The TMP still goes to Oji mills in Japan, but the BCTMP is sold on the open market. About 80% is exported to China, with the balance to Indonesia. As Clifford says, “Our investment to produce BCTMP gives Pan Pac access to new markets, establishes a new direction for us, and is the source of new vitality. And we increased pulp sales by 50,000 tonnes last year. We can sell every tonne of pulp that we produce.”

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For the sake of good cooperation

On April 11, 2014, a magnificent ceremony to celebrate the expanded pulp business was held at Pan Pac’s facilities in New Zealand. Mr. Shinoda, Chairman of Oji Holdings, and Mr. Yajima, President of Forest Resources and Environment Marketing Company and the Chairman of Pan Pac, were in attendance.

In his speech, Mr. Shinoda highlighted the close relationship between Oji and Pan Pac, the background for the investment in BCTMP production, and a commitment to further business expansion in New Zealand.

Steven Joyce, New Zealand’s Minister for Economic Development, acknowledged Pan Pac’s contribution to the development of the country as a bridge between Japan and New Zealand.

A collaborative opening of a sake barrel – one of the highlights of the celebration – was an excellent expression of the cross-cultural relationship between the companies and countries.



▲ Sake barrel opening, left to right: Doug Ducker, Managing Director, Pan Pac; Steven Joyce, NZ Minister for Economic Development; Craig Foss, NZ Minister of Commerce; Yasuaki Nogawa, Japanese Ambassador to New Zealand; Kazuhisa Shinoda; Chairman of Oji Holdings

Fiber for fabrics ... and the future

Oji Paper is one of the leading paper company's in Japan, and has considerable global reach. Oji's long tradition of innovation in pulp and papermaking now includes a quality alternative to cotton for clothing – dissolving pulp for rayon textile production. The Yonago mill began commercial production of dissolving pulp in early 2014 after ANDRITZ technology was utilized for the conversion. It is another step in securing the future and sustaining the economic momentum of the company.



▲ Shinji Doigaki, Oji Yonago's Pulp Section Manager

The Yonago mill is located 200 km west of Kyoto, between the famous Daisen Mountain to the east and the Hino River to the west. The fiberline at the mill was retooled in late 2013 for continuous dissolving kraft pulp (DKP) production. "This smaller line was well suited for conversion to DKP because our traditional products are facing a declining market," says Shinji Doigaki, Pulp Section Manager. "Our 1,200 t/d pulping line will continue to produce bleached pulp for coated base paper as before."

ANDRITZ assisted in modifying the original liquor-phase digester (ANDRITZ technology installed in the late 1990's) to a vapor-phase design with a new TurboFeed chip feeding system and a Diamondback pre-steaming vessel. An ANDRITZ pre-hydrolysis vessel (PHV), necessary for the production of high-quality viscose pulp, was installed. The DKP is now fed to a new 2.4 meter wide ANDRITZ pulp drying plant, producing both rolls and sheets for Asian markets with a design capacity of 300 adt/d.



“Wood pulp for textiles is an important strategic product for us,” says Masaki Chiba, who leads dissolving pulp development at Oji Paper. “Also, the conversion of hemicelluloses, by-products from the pre-hydrolysis process, into furfural (a high-value solvent) creates another revenue stream.”

Diversification yet with things in common

Oji’s management and R&D team saw the potential for diversification from their pulp and paper base, but with much in common from a manufacturing standpoint. The new pulping process uses eucalyptus chips as the fiber source and centers on the addition of the PHV for high-purity pulp.

“Clothing is often made from a blend of materials, such as cotton, rayon, and polyester,” Chiba explains. “Designers want a certain feel to the touch and a look to the eye. Our wood-based fibers are ideal to help achieve the desired functionality – especially for coats and jackets which keep you warm, but are lighter weight.”

Taketo Okutani, also part of the dissolving pulp team with Oji Paper comments, “Textile consumption will grow as the population increases. That’s why we have confidence in dissolving pulp as a strategic offering for the future.”

“When Oji Paper first called us to discuss the production of dissolving pulp with our continuous cooking technology, they made us aware of the strategic importance that this conversion has for them,” says Chiaki Kawakami, President of ANDRITZ Japan. “They set high expectations for quality and efficiency right from the start. This is an important order for us and allows us to support Oji in their innovations. It is a great opportunity for us and we enjoy the challenge of working with their team to meet the demanding requirements of their customers.”

◀ The pre-hydrolysis vessel (PHV) from ANDRITZ enables the production of high-purity pulp by isolating the hemicelluloses. These hemicellulose by-products serve as a new revenue stream as they are converted to furfural, an oil refining solvent, at the mill’s pilot plant.



▲ Oji Paper top managers feel scarves with high rayon content in Ginza, Tokyo, where Oji Paper’s headquarters is located. Left to right: Taketo Okutani, Masaki Chiba, Chiaki Kawakami (ANDRITZ), Tsukasa Watanabe and Motohiro Matsumura

“Wood pulp for textiles is an important strategic product for us.”

Masaki Chiba
Director, Dissolving Pulp Development
Oji Paper

Removing hemicelluloses the continuous way

Dissolving pulp has high cellulose content (> 92-97% compared to 85-90% for paper pulp). The pulp gets its name from the fact that the cellulose fiber is dissolved in a caustic solution to form viscose, which is extruded through spinners to form rayon filaments.

The production processes for dissolving pulp and paper pulp are quite similar as both use wood chips as the raw material. But for the production of dissolving pulp, a pre-treatment step is added to remove most of the hemicelluloses in the wood to achieve extreme pulp purity. Otherwise, the hemicelluloses will precipitate during the rayon production process, plugging up the filament spinners.

ANDRITZ technology for the production of dissolving pulp is based on many years of experience with chemical pulp fiberlines and intensive R&D in the area of hemicellulose removal. The key to dissolving pulp production is efficient removal and recovery of hemicelluloses from the fiber source. In earlier systems, which were usually batch-processed, it was difficult to achieve high efficiency, plus the ability to precipitate the by-products from hydrolysis was cumbersome.

All that changed with the introduction of the PHV – the pre-hydrolysis vessel – a new technology developed by ANDRITZ for hemicellulose removal with continuous cooking. “ANDRITZ re-designed the cooking process to include auto-hydrolysis for efficient hemicellulose removal,” says Ryo Yoshida, ANDRITZ Project Leader. “With the PHV, the instability issues are gone and the operating costs are lower compared to the batch process. In addition, the

development of our chip feeding system (Diamondback and TurboFeed) contributes to stable operations.”

Adds Doigaki of Oji, “The PHV helps to provide a new future for the Yonago mill. With better selectivity of the hydrolysis reactions and a purer stream of hemicellulose by-products, we can make a higher quality product.”



◀ Left to right: Hidekazu Yamamoto, ANDRITZ and Suguru Nakamura, Oji Yonago

The Diamondback vessel maintains a steady flow of pre-steamed chips to the cooking system. The efficient removal of air around and within the chips enables fast and efficient impregnation. There are no moving parts in the Diamondback bin.



▲ Katsuhisa Iizuka (left) and Shinji Doigaki from Oji Paper next to the new 300 t/d drying machine for dissolving pulp.



◀ Oji's Masao Fujiwara inspects a dried sheet of dissolving pulp. High-purity pulp is a must for yarn producers, whose processes are impacted by the slightest level of contaminants. Sight inspection and a series of lab test are conducted for all production.

Creating the hemicellulose value stream

The hemicelluloses in wood chips are decomposed and isolated in the pre-hydrolysis process. The chips in the PHV are subjected to high heat and pressure. After isolating the hemicelluloses, the wood fiber is made into pulp in traditional chemical pulping equipment. The only difference is that the dissolving pulp has extremely high cellulose purity.

The hemicellulose hydrosate isolated in pre-hydrolysis process undergoes further processing into furfural at a pilot plant in the mill, and can also be sold as an oil refining solvent. Oji has high expectations for this important potential value stream.

"We could burn the hemicelluloses in our recovery boiler," Doigaki says, "but producing furfural holds greater economic benefits for us."

The necessity for steady chip flow

Oji Yonago chose the ANDRITZ Diamondback technology to closely control chip retention time in the pre-steaming bin. There are no moving parts in the bin, making it essentially maintenance-free. The Diamondback design efficiently removes air around and within the wood chips to optimize the chip impregnation process. A simple yet effective TurboFeed chip pumping system moves the impregnated chips to

the top of the cooking reactor without the need for a high-pressure feeder. A special impeller arrangement inside the chip pump does not degrade the fiber and preserves strength.

Says Oji's Doigaki, "Simpler is almost always better. The ANDRITZ chip feeding has a simpler design. We have had some challenges stabilizing the chip flow to the DKP line, but we have good collaboration with ANDRITZ to arrive at solutions."

Yoshida of ANDRITZ comments, "Oji Yonago has a great approach to problem solving. They worked closely with us to fully optimize the continuous pulping system,



ANDRITZ delivered the entire pulp drying system, including a twin wire press, two-nip heavy duty presses, an airborne dryer, cutter layboy, baling line, and the reel and winder. Design production rate is 300 t/d. Trim width is 2.4 m. Either bales or rolls can be produced, based on customer needs. ▶

which is pioneering technology. This mill is only the second in the world using continuous pre-hydrolysis with hardwood fiber."

Pulp drying smooth from the start

As part of the conversion project at Yonago, ANDRITZ delivered the pulp drying plant which includes a twin wire machine with two-nip heavy-duty presses, an airborne sheet dryer, the cutter/layboy, a baling line, and the reel and winder. Design capacity is 300 t/d. Trim width is 2.4 m.

One grade of the dissolving pulp is shipped in bales, while the high-grade product is shipped in rolls. Of course, the Yonago mill's target is to produce as much high-grade product as possible.

According to Katsuhisa Iizuka, Oji Yonago's Chief Engineer in the Engineering Department, "There have been several challenges in starting up this line, but we are working through them in a good way. Oji and ANDRITZ are working cooperatively to resolve the small issues. None of these issues affect the quality of our product. It is good and getting better."

Adds Yoshida of ANDRITZ, "There has been a steady flow of pulp into the drying machine and the cutter. The dryer is equipped with automatic tail feeding and sequencing systems, so any downtime is minimized in case of a disturbance."

Naoki Hasegawa, Pulp Department Manager at Oji Yonago emphasizes Oji Paper's commitment. "These new capabilities reinforce our commitment to sustainability through innovation, providing good jobs, and ensuring safe operations," he says. "Sustainable and green manufacturing practices are key to the future."



"This is an important order for us and allows us to support Oji in their innovations."

Chiaki Kawakami
President
ANDRITZ Japan

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▼ (Left to right): Katsuhisa Iizuka, Oji Yonago; Naoki Hasegawa, Oji Yonago; Ryo Yoshida, ANDRITZ; and Shinji Doigaki, Oji Yonago



LESS is more



When the time came to replace a worn screw press shaft at LEIPA Georg Leinfelder's Schwedt mill in Germany, the target was mainly to maintain output volume and quality. But, the new Low Energy Screw Shaft (LESS) did better – dramatically slashing energy consumption as well.

At first glance, the replacement of a shaft in a 20 year-old screw press seems straightforward. Some work was done on the press in 2009 to extend its lifespan, but it was clear that major rework was going to be necessary – sooner rather than later.

LEIPA had a history of good experience with ANDRITZ, who was the manufacturer of the press. After an evaluation of the options, ANDRITZ was awarded the contract to supply the new shaft. *So far, still straightforward.*

The goal: quantity and quality

LEIPA's Schwedt mill produces about 500,000 t/a of lightweight coated (LWC)

magazine papers, 240,000 t/a of packaging papers.

The furnish is recycled fiber. The ANDRITZ screw press was installed at LEIPA's DIP #1 line, which supplies pulp for white-top liner and LWC.

In today's tough market, wastepaper processing and deinking must be as efficient as possible while still ensuring a high-quality product. It was important to Sebastian Stockfisch, who heads up Schwedt's wastepaper preparation/deinking operations, that the upgraded screw press would deliver at least the same quality and throughput as before. *It is at this point where the story is less straightforward – because ANDRITZ*

▲ Sebastian Stockfisch, Head of the Wastepaper Preparation Plant, in front of the upgraded screw press in the DIP #1 line.

had some new ideas on the drawing board for the screw press shaft replacement.

LESS is impressive

ANDRITZ engineers had a new concept in mind for a Low Energy Screw Shaft (LESS). The shaft would deliver a new compression curve, producing the desired throughput and dryness while turning more slowly. Same throughput at a lower speed equates to reduced power consumption.

To ensure both performance and reliability, the shaft would be coated with a newly developed Teflon-based material applied to a replaceable steel base layer. This combination would reduce sticking/plugging, allowing the pulp to progress unimpeded along the screw shaft.

Another idea was conversion to a tangential inlet to inject incoming stock in a direction counter to the screw's revolutions. This

Anna Mayer, ANDRITZ Global Product Manager for Paper Mill Services, and Ulf Scott, ANDRITZ Sales Manager for Paper Mill Services, discuss the operation of the Low Energy Screw Shaft (LESS) with DIP plant operators at LEIPA. ▶



would reduce the "roll-with" effect, increasing the output consistency of the stock.

All of these ideas, the ANDRITZ team believed, would deliver some pretty impressive results by ensuring throughput and dryness – at reduced power consumption.

A confident leap of faith

At the time of the discussions with LEIPA, these ideas were still on ANDRITZ's drawing board. "We were looking for a home for our first installation," says Ulf Scott, ANDRITZ Sales Manager for Paper Mill Services. Hubert Riemer, a Product Manager for ANDRITZ at the time, planned the upgrade project.

LEIPA agreed to take that leap of faith. According to Riemer, "LEIPA Schwedt gave us the freedom to install and optimize the design. They were mainly interested in the dryness and throughput, and less concerned about the energy savings."

"We were open to experimenting and testing if we could keep the quality and quantity of pulp that we had before," Stockfisch explains. "I personally perceived the risk as low, because ANDRITZ is very experienced with screw presses. I was pretty confident that LESS would work. I wasn't certain how much energy would be saved. If we achieved some savings, that would be an added bonus."

If only he had known.

Saving energy, helping the environment

Since this was a first-ever installation of a

"I was mainly concerned with throughput and dryness. If we achieved some energy savings, that would be an added bonus."

Sebastian Stockfisch
Head of the Wastepaper Preparation Plant
LEIPA, Schwedt

Low Energy Screw Shaft, ANDRITZ was conservative in its savings calculations, estimating a possible 15% reduction in specific energy consumption. In fact, the results exceeded expectations. The press, with a single hydraulic drive, has been operating at full capacity since July 2013 – and consuming 50% less power than before the upgrade!

Under-promise, over-deliver

ANDRITZ's Anna Mayer, Global Product Manager for Paper Mill Services, says that not all LESS installations will achieve this level of energy savings. "The LEIPA Schwedt project is a best-case scenario," she says. "The mix of wastepaper at the

mill creates a pulp that dewateres well and is ideal for the upgrade. Plus, the hydraulic drive technology (two pumps with electro-mechanical drives) gives operators much more flexibility in managing power flow."

The LESS design can be used on all types of screw presses. "It is great for modernizations and rebuilds," Mayer says. "Each application should be evaluated on its own merits, but 30% energy savings would be a good number for evaluating payback. Savings up to 50% might be possible with the right process parameters and when hydraulic drives are used."

Safety and stability are another couple of under-promised benefits that came along as part of the ANDRITZ package. Stockfisch commented on the upgraded control system at the mill which is used for (among other things) power management of the screw press. "There are safety interlocks built-in so that the screw does not get stuck anymore," he says. "System pressure was difficult to control with the previous system, but is no longer a factor."

Summing up, Stockfisch says, "This project was excellent. It is a relatively small item in terms of the whole mill layout, but in today's paper market, it helps us *PRESS* another cost out of our mill."

(Probably no pun intended)

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▲ (Left to right): Anna Mayer, ANDRITZ; Thomas Erchen, LEIPA; Sebastian Stockfisch, LEIPA; and Ulf Scott, ANDRITZ

Fast. Tight. Right.

It was a fast-track project to deliver a new biomass power boiler for Graphic Packaging International's Macon, GA mill in the USA. It was also a challenge to design and erect the boiler amidst existing structure in a working mill. Yet, the result is a boiler perfectly attuned to mill needs – and an excellent reference for ANDRITZ's new power boiler design in North America.



◀ The output of the ANDRITZ BFB boiler is 350,000 lb/hr (159 t/h) at 1275 psig (89 bar) and 900° F (482° C). The fuel is wood residuals. The boiler can also combust up to 7.5 t/h of clarifier sludge from the paper mill.

“ We purchased the best technology for our operations now and in the foreseeable future.”

Jim McGahee
Director of Engineering & Boiler Project Manager
Graphic Packaging International,
Paperboard Division

“ The main driver for us was the economics of self-generating power from renewable biomass,” says Jim McGahee, Director of Engineering for Graphic Packaging's Paperboard Division and the Project Manager for the biomass boiler. “We are a forest-based company that fully utilizes and protects this sustainable resource. This boiler is also a hedge against rising energy costs.”

The Macon mill used to generate a little over 50% of its power, purchasing the rest from the electric utility. Now, the mill is 100% self-sufficient electrically, with the ability to sell excess power. The new boiler also allowed Graphic Packaging to retire an old coal boiler and remove about 40 MW of coal-fired emissions from the atmosphere.

Music to the ears

The town of Macon has a rich musical heritage. Little Richard, Otis Redding, and

The Allman Brothers were hometown musicians. McGahee and his project team leaders Phil Hardin and Dan Ash do not claim to have musical skills. But they were able to orchestrate and self-manage a large and complex project – which included a new 40 MW turbine-generator and air pollution control equipment – and keep everyone in harmony.

“Planning and coordination were critical,” says Hardin, who was Construction Manager. “It required full cooperation from the many contractors working in a limited space. Working together, we were able to manage it quite well and meet the project schedule.”

The need for speed

The timeline for the Macon project was aggressive. “We had to put the project on a fast-track to meet the milestones,” McGahee explains.

The selection of ANDRITZ was a bit of a “leap of faith” for Graphic Packaging since this was the first power boiler for ANDRITZ's North American office, according to Aku Rainio, ANDRITZ Product Manager. But ANDRITZ completed a very successful EPC recovery boiler delivery at the Macon mill in 1993-94, and several other projects at the mill over the years.

Jarmo Orantie, the Project Director for the recovery boiler, was also Project Director for the power boiler. “Working with Jarmo and his team, people who know us and our mill, was a big plus for us,” Hardin says.

The team from Graphic Packaging checked references at several European power boiler installations of ANDRITZ (Estonia, Spain, and Portugal) before making a decision. “We were impressed with what we saw,” McGahee says. “We were also impressed that ANDRITZ was so flexible in tailoring

their design to our requirements. We all knew this was not going to be a typical installation.”

Demolish in – build out

A single large (800-ton) crane was the only option for the erection of the boiler modules and large equipment due to the limited space at the mill. The decided course of action was to “demo in, build out” according to Hardin. The only location to place the crane was the spot where the new turbine-generator would be erected. “We had to rotate the boiler 180 degrees in order to place the steam drum where the crane could make the lift,” he says.

The boiler was erected on top of some of the steel structure from the old recovery boiler. A “hole” was created under an existing pipe bridge – the only space available to bring in trucks, people, and equipment. “It was kind of like building a ship in a bottle,” Hardin says.



▲ (Left to right): Phil Hardin, Construction Manager, Graphic Packaging; Dan Ash, Senior Product Engineer for Utilities, Graphic Packaging; Timo Bungert, ANDRITZ Sales Manager; and Jim McGahee, Director of Engineering for Graphic Packaging's Paperboard Division and Project Manager for the biomass boiler.

Graphic Packaging gave ANDRITZ Plant Design Engineer, Tapani Heikkilä*, the weight and size limits for the lifting equipment and Heikkilä designed the modules to fit within those limits. "Tapani had the perfect vision of how the boiler would come together," says Timo Bungert, ANDRITZ Sales Manager. "He made drawings to show how each module could be lifted into place in a proper sequence."

This sequencing was critical, according to Jeff Brown, ANDRITZ Project Manager.

"There was little laydown area at the erection site, so each module was transported by truck from a location on the other side of the mill and then lifted into position."

According to Hardin, "Normally, you would put the boiler bottom down, build the upper part of the furnace, and then lift the bottom in place. Not here. We needed the space under the boiler to allow access for staging and lifting the fans, ducts, economizers, and other components. So, the bottom was brought in last. We eliminated a corner

support for our stair tower to make access easier. It was this kind of innovative thinking that permitted us to erect a boiler quickly and save money in the process."

Regulations in flux

To add to the challenges, US environmental regulations were being rewritten when Macon's power boiler was being designed. Different drafts of standards for the Boiler MACT (Maximum Achievable Control Technology) had been sent out for comment by the government, but the final version had not been released. "Waiting for the final MACT standards was not a good option for us," McGahee says. "So we worked with ANDRITZ to design-in the flexibility to meet low numbers for mercury, or CO, or NOx, or particulate size, or whatever."

Bubbling is best

Graphic Packaging's first biomass boiler (stoker fired) was installed in 1980. "Today, the bubbling fluidized bed is the best technology for our low-Btu, high-moisture fuel," McGahee says. "We purchased the best technology for our operations now and in the foreseeable future."

The fuel is wood residuals that would normally have been left in the forest. The boiler

“Our operators report that it is a sweet running unit.”

Dan Ash
Senior Product Engineer, Utilities
Graphic Packaging International



▲ Due to the tight location, the boiler was erected in a unique way. A corner stair support was eliminated so that erectors could bring in the boiler bottom last after other modules were lifted into place.



▲ The Graphic Packaging project team. Kneeling (l to r): Louis Tanner, Maintenance Superintendent and Matt Brown, Senior Process Control Engineer. Standing (l to r): Frank Huchison, Utilities Superintendent; Jim McGahee, Director of Engineering; P.K. Rao, Senior Project Engineer; Dan Ash, Senior Product Engineer; and Phil Hardin, Construction Manager.



▲ An ANDRITZ recovery boiler was delivered on an EPC basis in 1993-94 and established a good reference for ANDRITZ at the mill.



▲ Fuel feeding ports in the boiler



◀ Single steam drum

system also has the capability to combust up to 7.5 t/h of clarifier sludge from the paper mill. Natural gas is used as the start-up fuel. About 23% of the total biomass used at the mill comes from in-house wood processing for the pulp mill. The rest is procured in the open market. In total, the two power boilers consume about 120 t/h of biomass.

It was a snap

The ANDRITZ boiler passed its hydrostatic test the very first time. Only five steam blows were required to clean the steam piping to the turbine. "This proves that the fabrication of the boiler in Europe, and the storage/transport was well managed," McGahee says. "And that the erectors kept everything very clean with excellent quality control."

Boiler start-up was in August 2013. "It started up in a snap, really quick," says Dan Ash,

Senior Product Engineer for Utilities at the mill. "Our dream was that this boiler would start up as easily as the recovery boiler. We were not disappointed."

Short learning curve

"The learning curve for the BFB is much shorter than with the stoker boiler," Ash says. "This is partially due to the boiler's operating flexibility and level of automation. It burns smoothly and we don't have the swings that we do with the stoker. Our operators report that it is a sweet running unit. Even with the high-moisture fuel, it operates better than the stoker unit."

This unit has very low emissions. "This was an important point in our selection of technologies and vendors," Ash says.

Generating paper

"Our priority is to generate paper, not gener-

ate electricity," McGahee says. "This boiler gives us flexibility to even generate process steam if required. Being able to choose our fuel, steam, and power source gives us flexibility."

McGahee, Hardin, and Ash say that by self-managing the project, the economic return has been substantial. "This project has a very low installed cost," they say. "We put this project up against any in the country in terms of installed cost per MWh."

* Editor's note: Tapani Heikkilä passed away in January 2014. He worked for ANDRITZ for many years and was a talented engineer and a wonderful colleague. He is missed by all who knew him.

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NEWS

Eldorado sets **NEW WORLD RECORD** for pulp production

Aided by ANDRITZ production technology – 5,300 admt/d

After having set a world record for pulp production in March (5,156 t/d), Eldorado Brasil topped its own best by achieving a new record in August – 5,300 tonnes of dried pulp in a single day.

The mill in Três Lagoas, Brazil, is currently the largest single line pulp mill in the world. It was designed for 1.5 million tonnes per year, but is already exceeding that rate of production. Estimates now are for 1.7 million tonnes. The new record translates to 400 t/d per meter of working width on the drying machines – certainly world-class

throughput. In addition to production, the mill has achieved milestones in the sustainable reduction of steam and electrical power in the drying plant – as well as reductions in fiber loss and fresh water consumption.

ANDRITZ delivered the woodyard, fiberline, pulp drying/baling plant, and white liquor plant, as well as some automation and simulation tools. The bleached eucalyptus market pulp is exported to all regions of the world.



Iggesund Paperboard wins PPI Bio Strategy Award

Mill reduces fossil carbon dioxide emissions by more than 190,000 tonnes per year with biomass combined heat and power plant.

Following a series of investments to improve energy solutions over the last four years, Iggesund Paperboard was awarded the Bio Strategy of the Year prize at the 2014 PPI Awards dinner held October 8, 2014 in Boston, MA USA. The PPI Awards honor leadership, vision, innovation, and strategic accomplishments within the pulp and paper industry.

The Bio Strategy award was sponsored by ANDRITZ. Other finalists in the category included Domsjö Fabriker, Domtar, Dravacel Ltd., Fox River Fiber, and Smurfit Kappa Kraftliner Piteå.

“We’re very pleased with the award but even more with the major move we’ve made from fossil fuel to bioenergy,” said Arvid Sundblad, Vice President Sales and Marketing for Iggesund. “Of course that’s because we’re assuming our own responsibility for the climate issue but also

because it will give us more stable energy costs over time.”

At its Workington Mill in the UK, Iggesund implemented a dramatic shift from fossil natural gas to biomass. A new biomass boiler was completed in the spring of 2013 and has led to a reduction of the fossil CO₂ emissions from the mill by more than 190,000 tonnes per annum, equal to taking more than 65,000 cars off the road. All fossil CO₂ emissions from production have been eliminated, and excess green energy is delivered to the national grid.

At the heart of the Workington Mill’s power plant is an ANDRITZ biomass boiler, state-of-the-art in design, and operating at high temperatures and pressure. Efficient combustion is a trademark of ANDRITZ’s bubbling fluidized bed (BFB) technology. With accompanying flue gas treatment, the boiler restricts airborne emissions to a very



▲ Bertil Stromberg, from ANDRITZ presented the award to Neal Hausel of Iggesund Paperboard.

low level. Thermal output of the boiler is 150 MW. The turbine-generator produces 50 MW of electricity. Steam from the turbine is extracted and reused to heat the drying cylinders on the board machine.

A sub-project called “Grow Your Income” encourages local farmers to start growing energy crops. Iggesund offers funding to support the establishment, harvesting expertise, transport to the mill, and indexed long term contracts, thus providing a new source of income for local farmers.

ANDRITZ also delivered a recovery boiler to the Iggesund mill in Sweden, which allowed the mill to become energy self-sufficient.

Pell City becomes SKF Preferred Service Partner

Following an intensive on-site audit and extensive employee training, ANDRITZ’s Pell City service facility in the USA was named an SKF Preferred Service Partner – Pulp and Paper. ANDRITZ is the first service provider to earn partnership status in this SKF pilot program, which was created to help customers identify shops that follow best-in-class practices.

The official SKF audit was conducted in July 2014. In late August, 10 Pell City employees completed a week-long training session with SKF that focused on mechanical issues related to bearings and seals. The Pell City facility will implement electronic documentation forms and advanced coordinate measuring machines to improve inspection accuracy and scope.

As Rob Forstrom, SKF Pulp & Paper Strategy Manager, explains, “ANDRITZ’s commitment to excellence and continuous improvement is refreshing. It is a pleasure to work with a company that is so dedicated to improving and is taking all the right steps to do so.”



Highlights of **new orders**

COMPLETE LINES AND SYSTEMS

Siam Cement Group, SCG Paper
Wangsala, Kanchanaburi, Thailand
Complete green liquor semi-chemical pulp fiberline including continuous digester and DD washer
First installation of the ANDRITZ DD washer technology for SCG Paper, and the first DD washer in Thailand

Stora Enso Packaging (Tiger project)
Guangxi, China
Complete wood handling line for a greenfield mechanical pulp plant and board machine

Riikinvirta
Leppävirta, Finland
Complete waste-to-energy power plant with a circulating fluidized bed boiler, waste fuel treatment and flue gas cleaning systems, a steam turbine, electrification, automation, and auxiliary systems

Hebei Yihoucheng Commodity
Baoding, Hebei, China
PrimeLineCOMPACT II tissue machine with steel Yankee, stock preparation, automation, and drives
Repeat order (TM1 has started-up)

Guangdong Shaoneng Group
Shao Guan, Guangdong, China
PrimeLineCOMPACT II tissue machine with steel Yankee, stock preparation, automation, and drives
Partial use of mill's own bamboo pulp

Lee & Man Group
Chongqing, China
ONP line with capacity of 300 t/d

Sun Paper
Yanzhou, Shandong, China
Complete reject handling line for two paper machines; two OCC processing lines; rebuild of stock preparation and machine approach systems

KEY EQUIPMENT, UPGRADES, AND MODERNIZATIONS

UPM Kymi mill
Kouvola, Finland
Capacity increase and quality improvements to cooking and brownstock handling (including new DD washer) and pulp drying plant

Stora Enso
Varkaus, Finland
Rebuild of fiberline, evaporation, recovery boiler, recausticizing, and recycled fiber processing systems

Confidential Customer
USA
New Lo-Solids continuous digester including TurboFeed chip feeding system and fiberline modifications

Smurfit Kappa
Piteå, Sweden
ANDRITZ Waplans debarking drum for a new woodroom

OKI Pulp & Paper Mills
Indonesia
Crushers for woodyard

CELCACIA - Celulose de Cacia
Cacia, Portugal
Cooking upgrade; systems for collecting and incinerating odorous gases; rebuild of pulp drying plant

Moorim Pulp & Paper
Ulsan, South Korea
Bleach plant upgrade

Chuetsu Pulp & Paper
Takaoka, Toyama, Japan
New LimeFree for white liquor plant

Mondi Frantschach
St. Gertraud, Austria
Cooking upgrade with Downflow Lo-Solids system including TurboFeed chip feeding and Pressure Diffuser for brownstock washing

KEY EQUIPMENT, UPGRADES, AND MODERNIZATIONS

Mondi
Świecie, Poland
Conversion of recovery boiler to state-of-the-art biomass boiler

Weyerhaeuser
Flint River, GA, USA
Recovery boiler modernization
First ANDRITZ flue gas cooler in North America

Zellstoff Pöls
Pöls, Austria
Complete refurbishment of the LK2 black liquor recovery boiler plant

Jyväskylä Energiantuotanto
Jyväskylä, Finland
Upgrade of 295 MW BFB boiler with new emissions reduction system and heating surfaces
New application of emissions reduction system for power plants

Danalakshmi Paper Mills
Tamil Nadu, India
DIP line upgrade incl. two SelectaFlot flotation stages

Zhejiang Chuancheng Paper
Zhejiang, China
Dispersing, disc filters, and refiners for kraftliner and corrugated medium production

FIBRIA – Barra do Riacho
Aracruz, Espírito Santo, Brazil
Mechanical and civil maintenance contracts
Largest ANDRITZ service contracts in Brazil

Suzano
Suzano, São Paulo, Brazil
Process optimization

Highlights of **start-ups**

COMPLETE LINES AND SYSTEMS

Celulosa y Energia Punta Pereira
Colonia, Uruguay
Greenfield market pulp mill start-up with ANDRITZ delivering all major production systems

E.ON Climate & Renewables
Blackburn Meadows, UK
Waste wood-fired EcoFluid BFB boiler and related systems

PMP IB (Changzhou) Machinery & Technology
Yangzhou, Jiangsu, China
Stock preparation, paper machine approach, and broke lines for tissue

Fujian Liansheng Paper
Longhai, Fujian, China
Stock preparation lines – virgin, MOW/ONP, MW, and ONP – for board and testliner; paper machine approach; UTM pulping; sludge and reject handling
Largest project from ANDRITZ for Liansheng

Guangdong Guanbao Hi-Tech
Zhanjiang, Guangdong, China
Stock preparation, paper machine approach, and broke lines for special paper

Pindo Deli Paper Perawang Mills
Riau, Indonesia
Stock preparation, white water system, and paper machine approach system for two tissue machines
Includes ANDRITZ's largest approach screen

Fuyang City Dongda Paper
Fuyang, Zhejiang, China
DIP line, OCC line, and paper machine approach

Ningbo Asia Pulp & Paper
Ningbo, Zhejiang, China
Two DIP lines

COMPLETE LINES AND SYSTEMS

Chongqing Lee & Man
Chongqing, China
1000 bdm/d OCC line with FibreFlow drum pulper and approach system for board machine; plus stock preparation and approach systems for two tissue machines

Jiangsu Xinyuan Reconstituted Tobacco
Huaian, Jiangsu, China
Complete stock preparation for tobacco line

Siam Kraft Industry
Bangkok, Thailand
OCC line

Chongqing Wellmind Paper
Chongqing, China
Stock preparation, white water system, and approach system for tissue machine

Jiangmen Xinghui Paper
Jiangmen, Guangdong, China
Fiber preparation lines – ONP/OMG, MW, and BKP – for white-line chip board; approach system; UTM pulper; broke handling

Mondi Štětí
Štětí, Czech Republic
PM7 with a new PrimeFlow headbox, shoe press module, PrimeUnit MC micro-creping unit, PrimeCal X shoe calender, rewinder, and hood for the drying section

Hebei Yihoucheng Commodity
Baoding, Hebei, China
PrimeLineCOMPACT II tissue machine with stock preparation, paper machine approach, broke lines, and automation
First PrimeLineCOMPACT machine in China

Shandong Sun Paper
Yanzhou, Shandong, China
PrimeLineTM W8 tissue machine PM27 with steel Yankee, ReEvaporation system, stock preparation, paper machine approach, and broke lines
Met very tight project schedule; high energy efficiency; follow-up order received for new machine

KEY EQUIPMENT, UPGRADES, AND MODERNIZATIONS

Klabir
Telêmaco Borba, Brazil
Two lines of slasher decks for eucalyptus and pine (7.2 m log length)
Very short erection time (43 days)

Mondi
Ruzomberok, Slovakia
LimeKiln

Stora Enso
Oulu, Finland
Fiberline modernization including new pre-steaming chip silo and DD washer

Quesnel River Pulp
Quesnel, BC, Canada
Low-consistency refining package
Replacement of HC secondary and reject refining with TwinFlo LC refining

Naberezhnye Chelny
Tatarstan, Russia
Rebuild of PM K-28 paper machine including complete wet section with two new PrimeFlow headboxes, dilution control, two new PrimeForm Fourdrinier formers, new PrimePress X shoe press, web stabilizers, QCS system, two new approach systems, broke pulper, and process pumps
Saleable paper was obtained on the second reel after start-up



Old or new – does it matter?

It's the expertise that really counts



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ANDRITZ offers second-hand solutions for the pulp and paper industry providing mills with the technical and process support with used equipment. The goal of this new ANDRITZ service is

to help customers locate, supply, install and even start up used equipment, regardless of who was the original manufacturer. The benefit of ANDRITZ's approach is in adding the full expertise and backing of a

technology company, which reduces the risks for mills buying used equipment.

For more information, please visit: <http://secondhand.andritz.com>