

SPECTRUM

NO. 26 / 2-2012

MAGAZINE OF PULP & PAPER



LOW-CAP, NO-CAP

Special section – expert interview
(Starting on page 6)

METSÄ MAINTENANCE

Unique maintenance concept at two Finnish mills
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IGGESUND'S NEW HERB

World's highest efficiency recovery boiler
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ANDRITZ
Pulp & Paper

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BELTS FOR BULK

Conventional wisdom has it that calendering a paper web always results in significant loss of bulk. ANDRITZ has developed a new smart gradient calendering technology – the PrimeCal Y – which preserves bulk, and saves energy and raw materials. The PrimeCal Y design has a pre-heating zone (a soft belt with a heated roll) followed by a soft or hard nip. In this way, paper properties can be improved with lower roll surface temperatures and lower line loads.

The next issue of Spectrum will have more information about this exciting new calendering technology.

For further information, please contact: belcalender@andritz.com



On the cover: Markus Pichler of ANDRITZ (left) holds pulp produced by the existing P-RC APMP line and Qi Dianxun (MCC Yinhe Co.) holds wood chips that feed the line at Yinhe. Read the story starting on page 18.



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LOW-CAP AND NO-CAP SOLUTIONS

Our special focus section in this issue is on ways to improve mill operations that require little or no capital investment. Money alone cannot solve a problem. So, we thought it would be interesting to explore solutions that are not dependent on large capital investments.

Yes, it is nice to read about large green-field projects – and dream that "someday" it might happen at my mill. Until that day comes, there are always opportunities to improve operations by removing bottlenecks and increasing availability.

Human Capital in addition to Economic Capital

Human ingenuity and inventiveness are alive and well in our industry. Ilkka Hämälä, CEO of Metsä Fibre, sets the stage for the low-cap/no-cap section by giving his view on the "maintain plus continuously improve" concept that his company has been an early adopter of. Then we see practical examples of the work at two of his mills.

Another story showcases an innovative service (Mobile

On-Site Repair) which brings the specialists and equipment for a screw press rebuild and upgrade right into the mill.

We continue our reporting by traveling to China, Indonesia, Sweden, Slovenia, and Uruguay to bring you case studies of customers partnering with us to improve their mill operations. You can read about the world's most efficient recovery boiler, a unique relocation/rebuild of used equipment, a new hydrid former for a liner machine, a stock prep modernization, plus updates on two greenfield projects: one in China and one in Uruguay.

What will the New Year bring?

Time passes so quickly that the holiday season is almost upon us. We want to take this opportunity in our last issue of Spectrum for this year to wish you peace, fulfillment, good health, and good prospects in the New Year. As always, we are here to help with a range of services and solutions.



Karl Hornhofer

Karl Hornhofer
Member of the Executive Board
PULP & PAPER – Capital Systems

Humbert Köfler

Humbert Köfler
Member of the Executive Board
PULP & PAPER – Service and Units

◀ Karl Hornhofer (standing) and Humbert Köfler.

NEWS



PROUGH AWARDED RICHTER PRIZE

TAPPI recently recognized the late James Robert (Bob) Prough as the recipient of the 2012 Johan C.F.C. Richter Prize. The Prize is in recognition of outstanding technical contributions in pulping and was named for the "father of continuous pulping" who held over 750 patents.

DIAMONDS ARE A MILL'S BEST FRIEND

ANDRITZ has formulated a new metal alloy composition for its MDF refiner plates that gives up to 50% longer plate life. Diamond Series (D-Series) plates balance the precise amount of carbides to achieve wear-resistance, durability, and structural integrity.

The beauty of this new alloy composition is that it is harder, without being more brittle. Edge rounding (wear of the plate bars) is now reduced – maintaining a sharp edge and the correct bar height on both rotor and stator.

Before its release, the D-Series was tested in over 20 MDF and Fiberboard trials in different countries.

Imagine the benefits of combining the D-Series with ANDRITZ spiral plate technology. The spiral pattern maintains a constant cutting angle to save up to 20% energy compared to conventional parallel patterns. D-Series + Spiral = a money-making combination.

In presenting the Prize posthumously to Bob's wife Margaret, colleague Eric Wiley, ANDRITZ Senior Sales Manager, said, "I know Bob would be the first to say that there were many people involved in these achievements and that they were a group accomplishment. But everyone knew that the creative genius and the driving force behind these successes was Bob Prough."

Margaret Prough accepted the Richter Prize for her late husband. With her (left to right) are Norman Marsolan, TAPPI Board Chairman; Eric Wiley, ANDRITZ Senior Sales Manager; Peter Hart, Pulp Manufacturing Conference Chairman; and Larry Montague, TAPPI President and CEO. ▼



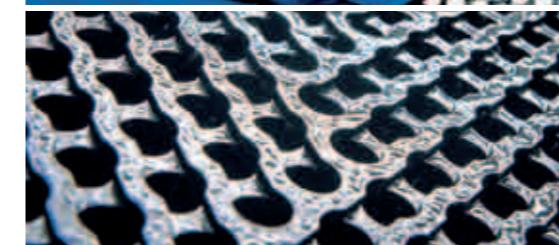
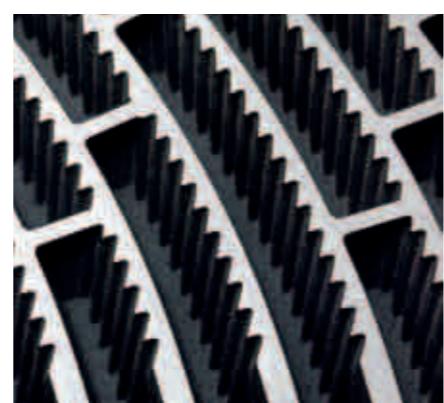
GATORS TO THE RESCUE

Mills searching for cost-effective ways to improve refining efficiency, reduce specific energy consumption, and improve pulp strength have a new ally in the LE-Gator refiner plate.

In most refining applications, the largest amount of energy is applied to the inner portion of the refiner plate. This area operates at a relatively large gap and is filled with mostly coarse fibers. This creates frictional energy which does not efficiently develop the fiber. By contrast, the outer portion of the plate operates at a smaller gap and the ratio of friction/compression is conducive to efficient fiber development.

Earlier attempts to "move the energy outwards" on the plate met with failure. It was always a struggle to keep the fiber near the periphery of the plate due to high centrifugal forces. The unique design of the LE-Gator is why it is the first plate to significantly increase fiber concentration near the plate periphery. Now, energy can be shifted to the most efficient area of the refining zone.

There are several different LE-Gator patterns to tune the refining process to achieve different objectives. The plates are in use in many locations in North America and mills are experiencing stable refiner loading, energy savings or pulp strength improvements, and longer plate life.



FISHBONES TAKE THE WATER OUT

Have you ever observed how some automobiles can maneuver safely on rain-slicked streets while others have to slow down or risk skidding out of control? The answer is in the fishbone grooves in the tire pattern – grooves which "dewater" the tire by creating fast drainage and improved operator control.

What would happen if we applied this fishbone design to our own dewatering products, we wondered?

Performance of any twin wire press depends heavily on the interaction of the "wedge zone" in the press and the press nips. If this interaction can be aided by a new design dewatering board, the result will be increased stability and dewatering performance.

The special angled grooves of the new Fishbone dewatering boards help achieve four things:

- Increased open area (20% more than conventional profiles)
- Optimum wire width stretching (from the middle to the edges to avoid wrinkles and get maximum drainage)
- Improved dewatering (due to cross-channels which spread the filtrate flow over the entire wire area)
- More gentle dewatering to improve press stability



IMPRESSIVE IMPRESSAFINER

The world's largest MSD Impressafiner is currently starting up at JSC Solikamskbumpprom in Russia. This unit has a production capacity of 1,000 t/d and is part of a TMP line which ANDRITZ recently upgraded to Advanced TMP (ATMP) technology. The MSD Impressafiner is a key module in an ATMP line within the RT-pretreatment stage.

WORLD'S LARGEST STEEL YANKEE STARTS UP

Two ANDRITZ tissue machines (PM 15 and PM 16) with the world's largest Steel Yankees for tissue recently started up at Hengan Group's Jinjiang mill in China. The PrimeDry Steel Yankees have a diameter of 4.9 m and a shell length of 6.2 m.

This brings to four the number of ANDRITZ tissue machine start-ups this year for Hengan. Two PrimeLine W8 machines at the Chongqing mill and two PrimeLine W6 machines at the Jinjiang mill were started up ahead of schedule. All four deliveries in-

cluded the supply of ANDRITZ stock preparation lines and machine control systems.

Hengan Group's Chief Engineer Zhang Qunfu says, "We have nine ANDRITZ machines in operation. The new PM15 and PM 16 machines, which started up ahead of schedule, are the icing on the cake."

And now, ANDRITZ received an order from Hengan for four more machines with Steel Yankees (Changde and Chongqing mills). When started up in 2014, Hengan will be operating a total of 13 ANDRITZ tissue machines.



LOW-CAP / NO-CAP SOLUTIONS

INTERVIEW



**"Not just maintain.
Continuously improve."**

Spectrum: How important is maintenance to your mills' operations?

Hämälä: The importance to our mills' profitability and efficiency cannot be overstated. Maintenance effectiveness and equipment availability is critical to continuous and stable production.

Spectrum: If it is critical to success, why would you consider outsourcing it?

Hämälä: While maintenance is critical to us, it is not core to us. We are professionals in the pulp business – product development, pulp production, customer management, etc. – and here we want to be the best. These activities are at our core.

This leaves a range of activities, important and critical, that are not within our core. We can't be the best pulp producers in the world AND the best maintenance organization in the world. There have to be companies better than us in maintenance who have this as a core competence.

Spectrum: When did outsourcing first become a considered alternative?

Hämälä: When we built the greenfield Rauma mill in 1996, we thought about all the things we have been doing traditionally in the pulp industry – sometimes for decades. We asked ourselves if these things could be done better and cheaper in another way. Our decision

for Rauma was to outsource activities that were not within our core competencies. Then, we had serious, but good, discussions with the unions. We proposed an operational model with a very small maintenance group, plus operators with skills to also do preventive maintenance and handle small disturbances during their shift. This was a big change of traditional thinking, but we got the union's support.

Spectrum: What was your early experience with maintenance outsourcing?

Hämälä: The early experience was positive at Rauma. Good enough to convince us to develop our other mills, which were operating in the tradition-

al way, to the same targets. To expand upon the Rauma concept, we chose to outsource all of our mill support services. We now have two main outsourcing contracts at each mill: maintenance (the biggest) and one for the other support services (cleaning, waste management, security, transportation, etc.). We contract with one service provider who coordinates all the subcontractors for the other support services at each site.

Spectrum: The maintenance agreements at your other mills – how do they differ from the earliest program at Rauma?

Hämälä: At Rauma, we did not have a strategic partner-

ship with a maintenance provider – it was more purchasing manhours from the Finnish company YIT to perform maintenance tasks, with our own people doing the maintenance management. Then at Kemi we selected YIT again, but this time formed a joint venture called Botnia Mill Services. The maintenance management and planning were inside the joint venture, not on our payroll. We eventually expanded this model to all of our mills.

Spectrum: You took a bit different approach in Uruguay. What was the experience there?

Hämälä: Fray Bentos (Uruguay) was like the Kemi experience, but on steroids. Not only were we building a new, big mill, we were building it in a country that had no infrastructure to support pulp production. We decided to use the Botnia Mill Services concept in Uruguay because we were happy with it and had experience. But we chose ANDRITZ as our strategic partner because they supplied the machinery for the whole mill. They knew how to maintain the equipment and how to continuously improve it as well.

Spectrum: What enhancements have you made in the newest maintenance agreements?

Hämälä: YIT does very solid maintenance work, but they don't have the inside information about the machinery. Since we were also using ANDRITZ's OPE (Overall Production Efficiency) service at our mills – higher level activities such as remote monitoring of the process, trend analysis for pre-

ventive maintenance planning, how to upgrade machines – we thought it would be good to combine the two. Why not utilize ANDRITZ's skills, data, and process knowledge along with YIT's skills in doing the actual maintenance?

We encouraged ANDRITZ and YIT to form a consortium at our Joutseno mill. They recognized that it would be a strategic benefit for them to cooperate and they don't compete with each other. The result is a "maintenance plus development" partner who not only keeps the mill running, but also improves it on a regular basis.

Spectrum: What do you notice about maintenance activities when you visit a mill?

Hämälä: When I visit Joutseno, I see an attitude that goes beyond just keeping the equipment running. Equipment availability is important of course, since any mill suffers in terms of efficiency, quality, environmental load, and cost whenever there is an unplanned stop.

But the attitude is, "If we are going to touch a machine, we should make it better than it was before." The focus is on improving the mill all the time.

Spectrum: What I see today is that our overall mill performance has improved with the consortium.

We have a small team of engineers responsible for running the mill. We also have the teams from ANDRITZ and YIT. When I talk with the teams, I never sense any kind of fric-

tion or finger pointing. They all come together and say, "Here is the problem, how are we going to solve it?"

Spectrum: From the CEO's "helicopter view", what do you see as the main advantages and disadvantages of outsourced maintenance?

Hämälä: The main thing is that we are not purchasing manhours, we are purchasing results. We can measure and see the positive development: a well-operating mill whose performance is improving all the time.

One of the major advantages is resource planning. When a mill is running well, you don't need lots of maintenance people on staff. But when you have a disturbance or a shutdown, you need lots of people. An outside partner has skilled people at nearby locations – and has the flexibility to shift resources while keeping their overall headcount lower.

Spectrum: If outsourcing is so successful, why doesn't every mill in the world do it?

Hämälä: I am not naive enough to think that what works for Metsä Fibre will work for every pulp company. Each company

has to define its own operating strategy.

One extreme is to produce everything yourself and supply all the services you need. One of the drivers for this may be lack of trust. The thinking is that if they do it all themselves, nobody will fool them. The other extreme is to only manage the customer relationship and buy everything else on the outside. And there are dozens of scenarios in between.

We at Metsä Fibre have defined our strategy and have selected our partners based on it. We trust our partners and are willing to let them make a reasonable profit. We develop shared targets. This way they are in a position to develop opportunities together with us.

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LOW-CAP / NO-CAP SOLUTIONS

FOCUS



Mill maintenance: cooperation is the key

Our interview with Ilkka Hämälä (page 6) gives you a CEO's "helicopter view" of outsourced maintenance. But how is it viewed, and how does it work, at the mill level? We visited two Metsä Fibre mills (Äänekoski and Joutseno) to get the "on-the-ground view" of two different maintenance partnerships that ANDRITZ is involved in.

THE ÄÄNEKOSKI EXPERIENCE

The first ANDRITZ OPE (Overall Production Efficiency) agreement at Äänekoski in 2004 began in the white liquor plant. Cooking followed in 2005 and in 2007 the work was extended to the other fiberline processes of washing, screening, and oxygen delignification.

"We chose the fiberline and white liquor plant to focus OPE on because they have traditionally been our bottlenecks," says Camilla Wikström, Mill Manager.

"Before I came here three and one-half years ago," Wikström says, "ANDRITZ's OPE work in the white liquor plant helped us reduce kiln energy consumption and cut the amount of purchased lime. Today, we're working on small upgrades to our Ecofilters (white liquor filters) to improve throughput and white liquor quality. So there has been a pattern of continuous improvement."

Not a sidestream – part of our daily work

Botnia Mill Services (BMS), a company majority owned by the Finnish YIT, performs



the daily maintenance at Äänekoski as it does at all Metsä Fibre mills. "What we look to ANDRITZ for is their expertise in specific processes and equipment," Wikström says. "They have global experience with equipment, processes, and best practices that we can learn from. We expect them to come to us with new ideas and better ways of doing things."

The cooperation grows each day. "We want ANDRITZ to be present in the mill, not just monitor our systems remotely. Their involvement is not a sidestream operation, but part of our daily work. They work side-by-side with our production people and BMS."

Kalevi Kurki, ANDRITZ's Customer Service Manager, confirms. "It is important to be present," he says. "We can run simulation models and tune control loops remotely, and arrive at a solution. But without dialogue with the operators and managers, this has little value. Personal interaction is required."

Practical examples of success

In addition to the work in the white liquor plant, Wikström cites improvements in the cooking plant as a direct result of the OPE service. "When I came here, there was an ongoing discussion about digester problems in the winter time."

ANDRITZ's OPE team recommended solutions in two areas: small technical solutions for the digester and a different way of running it to improve its performance. "These were things that ANDRITZ pointed out and showed us supporting data," Wikström says. "Quite small things, but they made a big difference."

Then in 2010, ANDRITZ upgraded the digester with new screens and some other changes which improved the throughput and the in-digester washing. "We now get about 100 more tonnes per day through our fiberline," Wikström says. "Last winter we did not have discussions about digester problems, so it is no longer a big issue."

Record-setting performance

"At the end of the day, we are buying production and availability," Wikström explains. "The last two years here we have set production records (501,000 t/a in 2010 and 503,000 t/a in 2011). This year, we are on target to set a new record as well. The best year before 2010, production was 460,000 t/a. For the most part, this has been accomplished with small changes, not large capital investments."

Wikström is proud of her team and their accomplishments. "Our operational availability during the last three years has been 98-99%, which is excellent. We do not have separate targets for ANDRITZ – we only have mill targets. This I think is a very important part of our success. We come up with solutions together. Cooperation is the key."

"At the end of the day, we are buying production and availability."

Camilla Wikström
Äänekoski Mill Manager
Metsä Fibre



"It is important to work side-by-side with the mill team. Personal interaction is required."

Kalevi Kurki,
ANDRITZ Customer
Service Manager (right)
with Wikström at the
base of the continuous
digester where ANDRITZ
helped throughput and
washing performance,
especially during the
difficult winter months.



LOW-CAP / NO-CAP SOLUTIONS

FOCUS



JOUTSENO EXPANDS THE SCOPE

"Every business has certain things it needs to focus on," says Henrik Söderström, Vice President and Mill Manager at Joutseno. "We focus on being excellent in the pulp business. We look for partners who are excellent in the other things we need – like maintenance."

ANDRITZ's maintenance cooperation at Joutseno started in 2003 with the white liquor plant. Today it has expanded to a consortium with BMS and the activities are millwide. "In May of last year, we encouraged these two companies to form a consortium to expand their individual capabilities," Söderström says. "The difference with this consortium is that their service is now for the whole mill. In a way, we are the test for this concept inside Metsä Fibre, and I was very much in favor of doing this."

The targets against which the performance of the consortium is evaluated are quite sim-



▲ Consortium managers and Joutseno managers meet on a regular basis to review progress, adjust priorities, and plan future maintenance/development actions.

◀ Consortium member Botnia Mill Services (BMS) performs all process maintenance in the mill. ANDRITZ adds the capabilities for process development and optimization.

ple: availability, production, safety, and cost efficiency. "There are, of course, other metrics that we follow, but these are the ones we base compensation on," Söderström explains. "Having common targets ensures that everyone is thinking in the same way."

The whole idea is to utilize the synergies of each partner better than before. Not to im-

ply that "better than before" was negative. Söderström, like many of his colleagues at Metsä Fibre, believes that everything can be continuously improved. "Joutseno has been a very efficient and well-operating mill," he says. "Our availability has been satisfactory, but there is always room for performance improvement. During the last couple of years, our operational availability

has increased by more than two percentage points on a twelve-month rolling average basis." This is good news to Söderström. "Even a one percent improvement in operational availability is huge," he says. "We are talking about millions of euros."

Availability drives production and profits

Metsä Fibre defines "operational availability" as the number of minutes that chips are feeding the digester compared to the number of minutes that the digester is available to operate. This allows for planned shuts and other planned downtime.

"Availability drives maximum production," Söderström explains. "Every time the mill goes down there is increased risk for environmental emissions or a work accident. Each start-up and shutdown takes away from the speed of production. When our mill is not operating well, there is the obvious impact on the revenue side, but also huge impacts on the cost side. For example, our energy costs can triple because we have to use more natural gas instead of black liquor. Also, we may have to downgrade pulp to a lower quality."

Practical example

"One good example is the work done in our white liquor plant," Söderström says. "As recently as one year ago, the performance of the CD-Filter was a frequent topic of discussion at our morning meetings. We asked ANDRITZ to focus on it. One year later, the topic of white liquor filtration problems never comes to my ears. There were many practical actions taken."

Juha Titoff, ANDRITZ's Reliability Manager and the manager on-site at Joutseno, explains, "I was a key person in the original design of the CD-Filter, so correcting the situation at Joutseno got my attention. We collected data and modeled the process and came up with a solution. By modifying the operation of the filter, implementing new preventive maintenance procedures, and making modifications to the filter discs, we were able to eliminate the problems."

"There are other practical examples, for example decreasing problems during the winter time in the debarking and chipping line," Söderström says.

"These results are important in understanding the service we offer," says Harri Qvintus, ANDRITZ's Regional Service Manager for Northern Europe. "It is not just equipment, just process, just maintenance, or just training. It is the experience and knowledge to put all these things together into one solution."

From department-wide to millwide

"One of the challenges of a millwide maintenance approach is that we don't become too general," Söderström says. "So we managers and our consortium partners must sit together to allocate our resources to do the most good."

Qvintus understands the challenge. "Availability, stable production, and lower costs never go out of style," he says. "But each year, some mill priorities can change or the emphasis changes – say from maximizing production to focusing on cost savings. That is why we create, together with the mill, an annual plan for short-term targets and a longer term development plan."

"It is interesting, but whenever a bottleneck is eliminated it creates both a benefit and a potential prob-

"Even a one percent improvement in operational availability is huge. We are talking about millions of euros."

Henrik Söderström
Joutseno Mill Manager
Metsä Fibre



The ANDRITZ/BMS maintenance consortium at Joutseno covers the entire mill and is a test for the concept within Metsä Fibre. ▶



"It is not just equipment, process, maintenance, or training. It is the experience and knowledge to put all these things together into one solution."

Harri Quintus
ANDRITZ Regional Service Manager, Northern Europe (left) with Juha Titoff in front of the CD-Filter at Joutseno



lem," Söderström says. "The benefit is increased throughput. The potential problem is additional stress on a downstream system, which will become the next bottleneck. By having our partners think millwide, they have the responsibility to make recommendations that give us millwide benefits – and not sub-optimize a specific process area."

Sustainable partnerships

"At the end of the day," Söderström says, "it comes down to having common interests. This ensures common efforts."

He highlights the importance of knowing your company's capabilities and the capabilities of potential partners. "All companies have a set of core competencies – the areas where they can focus to become truly excellent. When we are able to bring together different players with unique competencies – and have them all work on common targets with common efforts – we are most likely to be successful."

He pauses to emphasize a final point. "One prerequisite for this type of partnership is trust on both sides," he says. "And the proper financial incentives. The starting point has to be that everyone will profit in the long run. Otherwise, the partnership is not sustainable."

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"I was a key person in the original design of the CD-Filter, so correcting the situation at Joutseno got my attention."

Juha Titoff,
ANDRITZ Reliability Manager

LOW-CAP / NO-CAP SOLUTIONS

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Mobile On-Site Repair saves Eerbeek time and money

When it came time to rebuild the sludge screw press at Mayr-Melnhof's Eerbeek cartonboard mill, the best solution was also the closest. A Mobile On-Site Repair unit came right to the mill. The rebuild and upgrade were completed in half the normal time, no extra work was required of mill personnel, no spare shaft was needed, and transportation costs were avoided.

"Earlier, when we sent out our screw press shaft for service, it would take 10 or more days. Then ANDRITZ introduced us to a new concept they call Mobile OSR, which they had been using in Spain. It reduced the downtime to four days and we got upgraded components in the rest of the press at the same time," says Harry B. Jonker, Project Manager at Mayr-Melnhof's Eerbeek mill in the Netherlands.

Mobile On-Site Repair (Mobile OSR) can be used for all types of screw presses regardless of manufacturer, model, and size.

"To avoid longer downtime, Mobile OSR was the perfect solution for us," Jonker says. "We combined the screw press rebuild with another major overhaul we were doing at the mill, so the downtime was planned. ANDRITZ was on-site 24/7 to service and upgrade our screw press."

According to Jonker, ANDRITZ is a very reliable partner. "Not the cheapest, but then you get what you pay for," he notes. He says that the results of higher dryness and improved energy efficiency of his press was certainly worth the investment. The

production is 100 t/d of bone dry residue (sludge).

Signs of wear

A sludge screw press has a difficult job – squeezing water out of volumes of reject materials which are sometimes quite abrasive. As water adds weight, the transport and landfilling of sludge (sludge is normally hauled to a landfill or sometimes sent to local cement factories, fertilizer plants, etc.) would be much more expensive without the press. The water can be recovered and recycled in the process.



"When we select our partners, we look at reputation, expertise, and quality of products."

August Steinkellner,
Technical Director, Mayr-Melnhof Eerbeek



The press itself is a simple device. It consists of a rotating shaft with "flights" (the raised areas on the shaft that give it the appearance of a screw) and screen plates within a casing. The slow rotation of the tapered shaft presses the sludge against the outlet casing and the water is screened out. Typical dryness of the material entering the press is 18%. After retention time of about 15 minutes inside the press, the output dryness is typically 65%.

"Before the rebuild we were seeing some issues with our SCS 1008 press," says Mijndert Hillebrand, Unit Manager at Mayr-Melnhof Eerbeek. "End product dryness was declining and we were using more energy to keep production at the right level. Clearly, something had to be done."

Audit before sludge line modifications

Eerbeek called upon ANDRITZ to recommend the proper course of action. "Normally, we like to come to the mill and do an audit before upgrades or modifications," says Artur Salawa, Product Manager for Sludge Dewatering for ANDRITZ's service division. "The objective is to help the customer's process perform better in the future, whether the focus is on a single component, a machine, or an entire process."

Salawa explains the issue with Eerbeek's screw press: "The interval between rebuilds of a sludge screw press is from three to six years, depending on the material being dewatered – the more abrasive it is, the shorter the interval. In the case of Eerbeek, it had been three years since the last general service. What occurs is that the abrasive material begins to wear the flights on the screw, rounding the top edges and creating a wider gap between the flight and the outer casing. This allows more material to pass through the gap, and the material has more water in it. The result is that the motor has to work harder, consuming more power, and the final dryness is less."

Mobile OSR

A screw press rebuild involves at a minimum regrinding, repairing, or replacing the flights to bring back the efficiency of the press.

(Left to right): Harry B. Jonker, Project Manager; Artur Salawa, ANDRITZ Product Manager for Sludge Dewatering; August Steinkellner, Technical Director; and Mijndert Hillebrand, Unit Manager at Mayr-Melnhof Eerbeek. ▼



▲ The Eerbeek mill produces 140,000 t/a of folding cartonboard.

As part of the setup, a sophisticated measuring device enables precise leveling of the mobile unit and the shaft to ensure exact shaft geometries. The welding unit and the belt grinder can be used over virtually the entire length of the shaft to restore the sharp edges on the screw flight.

August Steinkellner, Technical Director at Mayr-Melnhof Eerbeek, is very pleased with the Mobile OSR solution. "When we select our partners, we look at reputation, expertise, and quality of products," he says. "ANDRITZ certainly fulfills these requirements. Reliability is also very important. By this, I mean that the partner delivers what was agreed to on time."

ANDRITZ came to Eerbeek, set up their Mobile OSR, and performed the work over a weekend, just as we planned for our maintenance shutdown. Everything was organized and in place, and the work was concluded within the promised time. This required precision planning to execute and ANDRITZ delivered."



"And now we have the perfect dryness for our deinked residue"

Mijndert Hillebrand,
Unit Manager, Mayr-Melnhof Eerbeek

The SCS 1008 screw press was rebuilt and upgraded over the weekend with the ANDRITZ Mobile OSR service. ▼



Reconditioned over the weekend

During on-site service, a single machining unit is used for welding and grinding. "Our mobile unit has aluminum profiles and a movable tool carriage that runs on rails. It can be set up within a short time, and the screw flight will be repaired rapidly," Salawa says.

"To avoid longer downtime, Mobile OSR was the perfect solution for us."

Harry B. Jonker
Project Manager,
Mayr-Melnhof Eerbeek

Close-up of the screw flight welding tip on the Mobile OSR unit. ▼



"And now we have the perfect dryness for our deinked residue," Hillebrand says. "Our residue is used as a stabilizing ingredient by cement manufacturers in the area and the moisture content is important."

All-around wear protection

While reconditioning the screw flights, ANDRITZ also upgraded the press with what it calls "all-around wear protection." These are wear components to extend the life of the screw press. "These are low-cost upgrades to not only prolong the service life of the press, but also to enhance its performance," Salawa explains.

The wear shoe components are optimized for the three zones in the press. A patented carbide alloy for the high-pressure zone reduces wear and is deformation-proof. This leads to less wear, and reduced time and effort in replacement. The wear shoes in the medium-pressure zone are coated with a patented special alloy. The low-pressure zone is protected by steel rings with hard edges.

ANDRITZ also developed special coated shaft body plates that provide high wear-resistance while preventing material from adhering to the screw shaft. The upgrade can be performed without remov-

ing the shaft from the press. The coating is applied to specific body plates that are welded onto the surface of the shaft. This means that a specific section can be replaced when worn.

Folding cartonboard since 1910

The Eerbeek mill, located in the paper-making center of the Netherlands, celebrated its 350-year anniversary last year. The production of folding cartonboard began at Eerbeek in 1910. The mill was acquired by Mayr-Melnhof in 1990. The current production is 140,000 t/a of folding cartonboard.

Most of the cartonboard products are sold to the United Kingdom, the Netherlands, Germany, and Spain, while some products go to the Middle East. "Our raw materials mostly come from the Netherlands, Belgium, and Germany. The virgin fiber-based cartonboard grades produced at the Eerbeek mill are mainly used in food, cosmetics, and pharmaceutical packaging, as well as in other high-quality applications. The FSC and PEFC certification of the Eerbeek mill are an example of how a sustainable cartonboard life-cycle can be achieved.

FIND OUT MORE AT
www.spectrum.andritz.com

ANDRITZ MOBILE OSR

- Maximizes dewatering
- Minimizes energy consumption
- Saves transport costs
- Rebuilds/upgrades at same time
- No need for spare shaft
- Longer press life due to all-around wear protection



NEW PILOT PLANT FOR TORREFIED, DENSIFIED BIOMASS STARTS UP IN DENMARK

Torrefaction of biomass ("roasting" it in an oxygen-free environment to drive out moisture and remove hemicellulose) is a proven concept – but not at the large scale required to co-fire Europe's coal burning boilers. No one has yet been successful in both torrefying biomass and densifying it in pellet form, other than at laboratory scale. ANDRITZ aims to change all that with a unique-in-the-world pilot facility just started up in Sdr. Stenderup, Denmark.

out the technology for large-scale production of torrefied biomass (think 700,000 t/a), but also to densify the torrefied fuel by pelletizing. If the concepts and technologies can be proven, it will open the door for "black" pellets (dark-roasted torrefied wood chips) to replace conventional "white" pellets (standard wood pellets of today).

ANDRITZ has also opened a pilot plant in Frohnleiten, Austria with a different technology approach. The Frohnleiten plant uses an indirectly heated drum reactor, designed for up to 50,000 t/a – a size that can be transported by truck to a decentralized site, for example near a sawmill or chipping plant.

The mechanical design of this drum is well-proven in sludge drying applications, with over 110 of these units installed.

Standing in front of the torrefaction reactor at the Stenderup pilot plant are (left to right): Jaap Kiel, Biomass Program Development Manager at the ECN Research Institute in the Netherlands; Brian Greenwood, ANDRITZ Technical Director for Biorefining; and Allan Melsen, Plant Manager. ▼

"When you drive moisture and hemicellulose out of wood biomass without burning it, you create a fuel that is very similar to coal," explains Brian Greenwood, Technical Director for Biorefining at ANDRITZ. "Power producers love it because they do not have to make costly modifications to the boiler and they can run at higher proportions of biomass instead of fossil fuels. The difficulty is that torrefied biomass has a low bulk density and needs to be densified in order to transport and store it."

This explains why ANDRITZ's new Biomass Torrefaction Pilot Plant is gaining so much attention. It is designed to not only prove

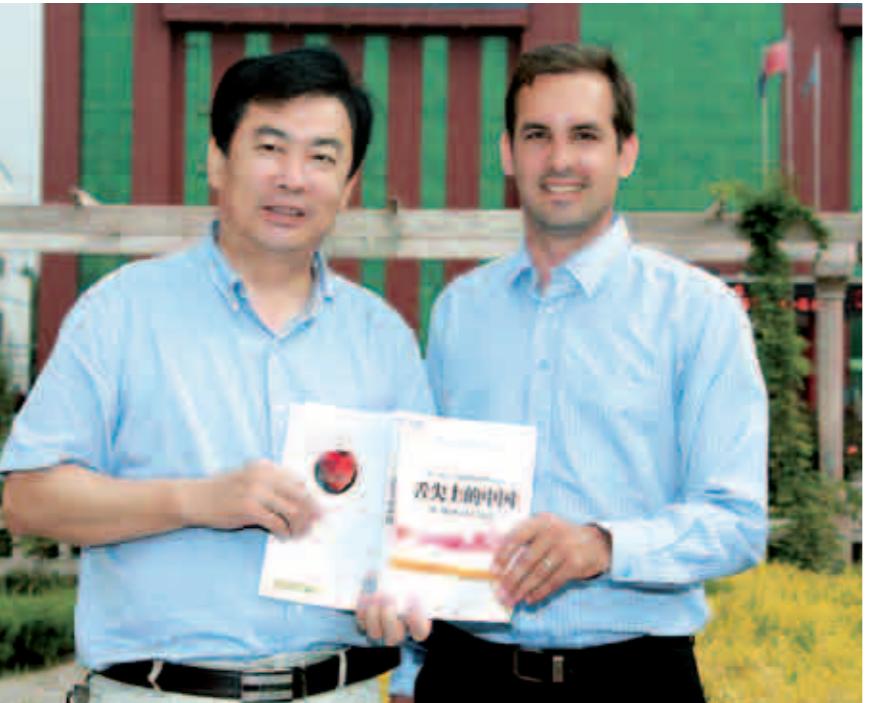


◀ The torrefaction pilot plant in Frohnleiten, Austria is based on ANDRITZ's ACB (Accelerated Carbonized Biomass) process. It uses an indirectly heated drum reactor (shown here) that is designed for up to 50,000 t/a production.



The China twist: something old, something new again

Relocated and reconfigured mechanical pulping lines combine existing equipment and new technology in a successful way. Two mills take advantage of homegrown poplar and eucalyptus fibers.



"The combination of old and new equipment from ANDRITZ will enhance our pulp quality, notably strength and opacity, which is essential for higher quality printing and writing papers."

Li Shujian,
President of MCC Yinhe

Li Shujian (left) with Markus Pichler, Senior Sales Manager from ANDRITZ

Recently, two mills in China (Shandong and Henan Provinces) made similar strategic decisions to relocate and update used mechanical pulping equipment to increase their capacities. Each sought to raise pulp and paper quality using locally grown poplar and imported eucalyptus chips. The progress to date is quite interesting.

The two companies, MCC Yinhe Co., Ltd. (Yinhe) and Henan Xinhai Paper Co. Ltd. (Xinya), selected ANDRITZ to help them adapt processes and upgrade equipment. Yinhe's mechanical pulping system was moved from their Qiqihar sister mill in Northern China. Xinya's line travelled all the way from Canada.

◀ Secondhand HC refiner for Yinhe before modification.

Each mechanical fiberline will be upgraded to ANDRITZ P-RC APMP (Pre-conditioning Refiner Chemical Alkaline Peroxide Mechanical Pulp) technology, which has become the de facto standard for hardwood mechanical pulping globally, including 20 lines in China alone.

Xinya's new fiberline will produce 350 ml CSF pulp for their newly installed second-hand board machine, expected to be in full operation by early 2013. Yinhe's refurbished line will produce 200 ml CSF pulp for culture papers, and is scheduled to be fully operational a little sooner.

Mechanical pulp momentum

Li Shujian, President of Yinhe says that, "Having an ANDRITZ mechanical pulping line in place since 2008 convinced us of the sustainability of chemi-mechanical pulping of hardwood. Once again, ANDRITZ will play a strategic role with our second mechanical pulping line, taking us to 500,000 t/a total paper production. The combination of old and new will enhance our pulp quality, notably strength and opacity, which is essential for higher quality printing and writing papers. ANDRITZ's experience with many fiber types makes it an ideal partner for our growth with Chinese forest resources."

According to Li, there was a time when Yinhe had an old straw pulping line which helped them develop a local customer base. "But with the two hardwood lines from ANDRITZ, paper quality is so much better," he says. "We have expanded our customer base due to higher quality."

Secondhand, but first-rate

According to Song Jingzhi, President of Xinya, their new fiberline will push Xinya's pulp and paper output to over

"Our decision to purchase secondhand fiberline equipment did not mean we were willing to accept secondhand performance."

Song Jingzhi;
President of Xinya

ensures we get maximum value from our forests while minimizing energy consumption and effluent," Song says.

Long traditions at Yinhe

For over 50 years, Yinhe has grown steadily. Today the mill is operating 28 paper machines of various sizes, producing 560,000 t/a of printing and writing paper, multipurpose copy paper, and packaging grades. Fiber supply is wheat straw, OCC, mechanical pulp, and kraft.

Back in 2009, Yinhe started up its first chemi-mechanical pulping line in record time, reaching a capacity of 100,000 t/a. High uptime, low energy demand, and high-quality output have been the norm throughout the life of the system.

Yinhe views expansion with mechanical pulping to be a wise integration move, because the technology is sustainable

and, compared with chemical pulping, the investment costs are quite modest.

Says Li, "Chemi-mechanical pulping is a good fit for our grade mix, allowing us to employ certain hardwood species, diminishing the use of straw pulp, and investing much less money than it would take to have installed a chemical pulping line. Soon, our two P-RC APMP lines will ensure excellent yield and quality, employing far less energy than most BCTMP operations."

Xinya's continuous growth

Xinya's Song, who has steadily built the mill for over 30 years, comments, "We seek technology that raises the bar of operating performance, while getting the most value from our poplar and eucalyptus fiber supply. Our team has proven that well-managed local forests and modern chemi-me-



▲ LC refiner in the existing Xinya mechanical pulping fiberline.

chanical pulping technology can produce high-quality pulp and paper, and contribute positively to the environment and local communities." Li Gaoyuan, Xinya's Project Manager, explains that mechanical pulping has improved in recent years with the developments ANDRITZ has made. "We have high yield and sufficient brightness, as well as pulp properties that can be adjusted to fit the needs of our paper machine," he says. "Our almost sulfur-free process water is much more biodegradable, which is good for the environment. Thanks to very low energy consumption, our operating costs are quite acceptable with the ANDRITZ technology, especially when compared to conventional mechanical pulping technologies."

New and improved mechanical pulp

According to Klaus Blechinger, Director of Sales and Marketing for the Pulping and Fiber Division at ANDRITZ, "P-RC APMP technology has steadily advanced to meet the needs and pre-conditions of the modern Chinese paper industry – which calls for low energy demand, low operating costs, a reduction of water usage and effluent discharge loads, and low investment costs."

Says ANDRITZ's Markus Pichler, Senior Sales Manager responsible for the China and Southeast Asian markets, "Conventional





"High pulp quality is essential to achieving superior paper grades. This begins with excellent chip quality."

Qi Dianxun, Director of the existing P-RC APMP line at Yinhe

Markus Pichler (left) and Qi Dianxun



▲ MSD Impressafiner in the existing Yinhe plant is the first key stage in the ANDRITZ P-RC APMP process.

"At Yinhe, start-up in late 2012 is about to happen. Our mill represents a major step forward in mechanical pulping in our region in China."

Wang Fuging,
Technology Director at Yinhe



▲ Second-stage refining will include a HC refiner operated in atmospheric mode – similar to the existing Yinhe fiberline.

BCTMP was too energy-intensive, and not good enough for today's quality standards. Even though Yinhe's and Xinya's new lines employ used equipment of traditional technology, the way they are combined with new components makes each line better than before."

Impressafiner, is a key process improvement," he says.

The MSD removes extractives (resin) and other impurities from the chips at the front-end of the process. This – together with the application of chemicals ahead of primary HC refining – makes the fibers in the primary HC refining stage more flexible and available for high refining intensity, which allows the use of LC refining in subsequent stages. "It is this strategic application of LC refining that brings an overall decrease in energy consumption," adds Wang.

Impregnation system

The impregnation stage for each of the projects in China includes a new high-compression device (MSD) to ensure effective take-up of the impregnation chemicals within the chips. At Yinhe, two MSD units are being reused. On the other hand, Xinya will start up with one new and one used impregnation stage.

Advantage: P-RC APMP evolution

P-RC APMP technology includes several important innovations. An important step is pre-treatment before refining, according to Wang Yucai, ANDRITZ's Technology Manager for mechanical pulping systems in China. "Delamination and opening up the chips in pre-treatment, using the MSD



▲ A member of the Xinya maintenance group (left) with Wang Yucai, Mechanical Pulping Systems Senior Technology Manager from ANDRITZ in China.



An existing pressurized Hymac impregnation device will be used as the second impregnation stage. ▶



consistency screening gives us the lowest shive levels. This has been the case in the existing line by combining our existing pulping process with new equipment. We expect similar, if not better, results from our second line."

Adds Yinhe's Wang Shaoguang, General Engineer, "We are using flat disc refiners throughout the entire fiberline, which helps us optimize shive removal in combination with the screening equipment."

Rejects treated for less waste, greater flexibility

Screen room rejects will be dewatered on bow screens (MicraScreens) to about 4-5 % consistency and fed to a rejects chest. Wang notes, "The rejects will be pumped to a LC Twin Flo refiner, which is generously sized to provide process flexibility."

The screened pulp will be thickened on a disc filter to about 10% consistency and will then be pumped to the storage tower and further to the paper machines.

Ramping up for starting up

At Yinhe, start-up is planned for late 2012, and Xinya will come on stream soon after. Once these new lines are up and running, this central region of China will have moved even further to become the country's center for advanced mechanical pulping.



Says Wang, "The rebuilt pressurized HC flat disc refiner can achieve superior fibrillation and low shive levels, while also allowing the recovery of valuable heat from process steam."

Xinya will have a very similar configuration. Two existing pressurized Hymac refiners will be used in parallel in the first stage and two other atmospheric Hymac refiners will work in tangent as the second-stage.

Brightness gains

Each line has the means to raise brightness with a minimal amount of chemicals. Only one peroxide bleaching stage is needed to raise the brightness of the mechanical pulp up to 72% ISO or more, which is higher than the previous level at either mill.

Comments Qi Dianxun, Director of the existing P-RC APMP line at Yinhe, "Low

HERB: the new kid on the (recovery) block

ANDRITZ calls it a High Energy Recovery Boiler. But you can call him HERB. The latest HERB was started up at the Holmen Group's Iggesund Mill in Sweden. It is helping Iggesund reach its goal of being free from fossil fuel emissions. As a matter of fact, this HERB is the most energy-efficient of any recovery boiler in the world.



At 08:00 on June 12th, Iggesund Paperboard's new recovery boiler came online. For the mill, the investment was a huge vote of confidence from Holmen's Board of Directors. For the project team, it was an opportunity to participate in helping the world's most energy-efficient recovery boiler (in terms of power-to-heat ratio) come to life. For ANDRITZ and everyone involved, the start-up was a major achievement and a resounding success.

Strategy into action

"Having your energy strategy on paper is one thing," says Iggesund Mill Manager Staffan Jonsson. "Getting the funding to implement that strategy, especially during these tough economic times, is another thing altogether. It was a real big moment for this mill and this community when the Board gave its approval."

"In my view, the recovery boiler is the heart of our pulp mill."

Staffan Jonsson,
Iggesund Mill Manager

The Holmen Group gave the go-ahead for the 238 MEUR investment at the Iggesund Mill in 2010. In addition to the recovery boiler, the investment included a new turbine-generator plus equipment for capturing and incinerating weak, sulphur-containing gases. The investment will not lead to an immediate increase in paperboard production, but the mill's pulp production is planned to gradually increase from today's 355,000 t/a to 420,000 t/a.

The start-up of HERB is a key step towards realizing the mill's long-term de-



▲ Iggesund chose the HERB design because "we wanted to take a leap forward in terms of technology."



velopment plan. "Fundamental to our sustainability are processes that use renewable raw materials, and a product (Invercote paperboard) that can be recycled,"

Jonsson explains. It is Iggesund's stated goal to be a global leader in terms of air and water purity, to be self-sufficient in electricity, and to operate on 100% biofuel.

"We're very close to our goal now," Jonsson says. "With the new ANDRITZ recovery boiler and the other new measures we are taking, overall environmental performance and energy performance has improved greatly. When we chose the HERB design, we chose to take a leap forward in terms of technology."

Strengthening the heart

"In my view, the recovery boiler is the heart of our pulp mill," Jonsson says. "It is the most important part of a closed-loop that circulates the liquor and produces the energy that keeps our machines running. When the heart is strong, the other systems can flourish."

The old heart of the Iggesund mill was actually two hearts (two recovery boilers installed in the 1960's). Unfortunately they were producing a fainter and fainter pulse, according to Iggesund Lead Project Manager, Lennart Wanberg. "We had gone through several rebuilds. Each year we had to reduce the steam pressure to stay within boilers' safety limits. We had to decide whether to rebuild or replace. While a new boiler is a major investment, it is also expensive to operate and maintain two old boilers."

At the end of their useful lives, the old boilers were operating at about 62 bar steam pressure. This compares to a design of 110 bar for HERB (at 515° C).

Symbiotic relationship

The community of Iggesund surrounds the mill and has a symbiotic relationship with it. As Iggesund Paperboard goes, so goes the community of Iggesund. Residents take pride that Iggesund has one of the highest levels of investment for paperboard mills and aims to produce a high-quality product. In the last decade, the mill has upgraded its evaporation, recausticizing, and kiln – only the recovery boiler remained.

"In today's market, sustainability is joining product quality in importance as a competitive tool," Jonsson says. "I think it was quite a brave decision by the Holmen Board to make this large investment. It is proof of the confidence they place in this mill and this community."

The investment project took about two years to complete. At its peak, 900 construction workers and specialists were on-site. Part of this was during a winter season that dumped more snow than Sweden had seen in many years.

An impressive delivery

For a project this size, considerable pre-project planning is the norm. "We looked at the technical specifications, visited references, and asked considerable questions," Jonsson says. "In all these areas we got a very good impression of ANDRITZ."

The HERB design appealed to Iggesund from the beginning. "When we worked on our energy strategy, electrical power prices were high, oil prices high, and longer term we feel they will stay high," Jonsson says. "A key factor for us was the idea of producing an additional 310 GWh of electricity per year."

"It was amazing to me to witness the quality of the welding. Out of 4,500 critical welds, only three faults were detected."

Mats Tegenfeldt,
Project Manager for the recovery boiler (left)

"We are used to running fairly big capital projects here," Wanberg explains. ANDRITZ delivered the HERB unit on a mechanical turnkey basis (Engineer-Procure-Construct excluding the civil works). Wanberg, a veteran of the mill since 1973, came to the project from heading the central maintenance activities for the mill. The appointment to lead this project was a welcome change for him. "I worked together with then project leader, Bo Skogqvist, who retired before this project was completed. This was exciting for me and I couldn't wait to get to work each day."

"We did very thorough planning to minimize any mistakes during the actual project," says Mats Tegenfeldt, Project Manager for the recovery boiler. Construction broke ground mid-2010 with Iggesund assuming responsibility for the concrete foundations and then ANDRITZ's project team carried on from there.

Hannu Ylönen, ANDRITZ Project Manager, was impressed with the level of pre-project thinking on the part of Iggesund. "We had many discussions with the Iggesund team to come to the final layout, functional, and degree of automation for this boiler," Ylönen

says. "You can see this in the functionality and safety of the finished unit. Details about the architecture, the placement of boilerhouse windows, the color schemes, the furniture in the control room were all discussed."

Now, as you walk through the various levels in the boilerhouse, you are impressed with the view that the spacious windows offer over the landscape and the Gulf of Botnia. "It is a well-considered working environment for both operations and maintenance people," Tegenfeldt says.

Facing all the usual challenges of a large capital project, Wanberg was impressed with the spirit of cooperation. Everyone on the team worked to the same target and to have the boiler ready for Holmen's President to start it up on the appointed day. "On the erection side, there were very many critical lifts – heavy and high. ANDRITZ was very

"This was an exciting project for me to lead. I couldn't wait to get to work each day."

Lennart Wanberg,
Lead Project Manager at Iggesund



▲ The Iggesund boiler is one of the most automated in the world. Shown above are some of the combustion monitoring and air control systems.



▲ Lennart Svensk, Iggesund's Senior Operator (left) with ANDRITZ Start-up Engineer Glen Treger in the control room.



Most automated recovery boiler?

The Iggesund team wanted this HERB to have a high level of automation. "We had a lot of discussions with the Iggesund project team about functionality, safety, and automation of this boiler," Ylönen says. "Lennart Olsson, Lead Process Engineer at Iggesund, and the boiler operators made a major contribution to this effort."

Working with Iggesund's Hans Larsson (electrification), Kåge Larsgården (instrumentation), and Åke Dehlin (automation), key members from the ANDRITZ team built one of the most automated recovery boilers in the world. Iggesund's Tony Andersson, a project team member, brought out the end user's point of view, particularly when the maintainability of the plant was considered.

"Our design for Iggesund's boiler reflects our experience from previous deliveries, including three previous HERB deliveries to Sweden," says Ylönen. "All boilers are most efficient at high loads, but this boiler has also has excellent low load capabilities – even down to 1,300 tds/d. We supplied a special extension to the master DCS control called Boiler ACE to optimize combustion and sootblowing at low or high loads and to minimize emissions."

Cold to warm to firing hot

It took only a week in the autumn of 2011 to make all the piping and process connections that integrated the new equipment with the rest of the mill. "We can say that it was a very smooth start-up," Jonsson says. "It was on-time, the safety record was

excellent, and the project was completed within budget. I can say that we are very pleased with the results."

Civil construction work was very challenging, considering that the winter "was one of the coldest in everyone's memory, with lots of snow," Ylönen says. "The construction of the foundations was supervised by Iggesund's Magnus Carlsson, whose work was very impressive."

Work has begun on installing a new odorous gas collection system, which will be ready in mid-2013, to further reduce the mill's emissions. The new boiler also has incorporated ANDRITZ's new ALE chlorine removal system, which leaches chlorine from the ash to keep it from recycling in the chemical recovery loop. With higher pressures and temperatures, this could be an important consideration to prevent eventual corrosion of the boiler's pressure parts. "At the moment," Tegenfeldt says, "we are in the testing phase so we have not fully implemented it yet."



Integrated mill quickly changes the business landscape in Southern China

In late 2011, the greenfield 700,000 t/a pulp mill in Zhanjiang, Guangdong Province started up, providing the parent company and next-door paper producer Chenming with a local virgin fiber supply and greater control over paper quality. ANDRITZ was the main supplier for the entire mill – from woodyard to finished pulp bales. The start-up was accomplished in world record time.

Over the past two decades, Shandong Chenming Paper Holdings Limited (Chenming), has steadily grown to become one of China's leading paper and board producers. It produces over four million tonnes per year of art paper, lightweight-coated, newspaper, paperboard, duplex, white paperboard, and printing and writing

grades. Until now, the paper furnish has relied on purchased chips or recovered fiber.

But now that its Zhanjiang Chenming greenfield pulp mill is operating, a fundamental strategic business change puts the company in an entirely different market position. Zhanjiang Chenming was a very high profile "national key project" approved by the Chinese State Council and the national government. The nation's vision of integrated pulp and papermaking at strategic locations in China is totally aligned with the company's goals.

"Zhanjiang Chenming is a good model for others in China who see the value of integrating pulp and papermaking."

Chen Gang,
General Manager of Zhanjiang Chenming

Chen Gang (left) with Chen Jieyu, ANDRITZ China Project Leader

from the forestry operations to papermaking. He has been credited for upstream investment, innovation, and a strong environmental commitment.

"In recent years, our company has developed 40,000 ha of plantation forest near Zhanjiang and 66,800 ha of forest in Hubei," Chen Hongguo says. "For the next stage, we have an accelerated plan to create an integrated industrial chain of forestry, pulp, and paper/board. Zhanjiang

WORLD-RECORD START-UP



▲ Hundreds of jobs have been created for local workers ranging from operators to maintenance staff to security personnel.



▲ Local farming traditions live side-by-side with the new pulp mill.

Chenming represents a defining step forward for our company."

Says Chen Gang, General Manager of Zhanjiang Chenming, "Our new bleached hardwood kraft pulp mill contributes significantly to the quality of Chenming's paper production capacity. This pulp mill is a good model for others to become integrated producers."

Chen Gang confirms that the ambition to supply major papermaking operations with locally grown fiber has been of great interest to Chenming for over a decade. "The

reality of the Zhanjiang Chenming mill completely changes the landscape for our company, and our customers," he says.

Key packages from ANDRITZ and a world-record start-up

Chen Jieyu, Project Leader from ANDRITZ China, says, "Our team in China was responsible for engineering and procurement, having a supervisory role for the installation of equipment for the complete greenfield mill. We coordinated with ANDRITZ experts from all over the world to ensure an on-time start up, and smooth runnability for the long-term."

Not only was the start-up on time, but it also was executed at a world-record pace. The mill erection itself took 18 months to complete. Notes Chen Jieyu, "It was challenging to monitor the equipment manufacturing and delivery times. Otherwise, it would have been impossible to meet the start-up target set by our customer."

The start-up target, September 2011, was aggressive. Quite quickly, the mill was able to send about half of its 91% ISO bright pulp into fine paper grades at the new paper mill next door. In only 121 days from chips entering the digester (faster by 26 days than record-setting projects in South America), nominal production capacity was reached on a 30-day rolling average basis. Environmental performance of the mill during the start-up period, and ever since, has exceeded expectations.

▲ View of the evaporation plant (foreground) and recovery boiler. Black liquor is concentrated to 80% dry solids before being fired in the 4,450 tds/d recovery boiler.



Teamwork allowed Zhanjiang Chenming and ANDRITZ to overcome the difficulties of a challenging physical location. Remember, this is a remote location, traditionally dominated by farming, and typhoons. Says Stephen Cheung, Technical Director with Chenming, "Whether you are standing in our ultra-modern control room, or on top of the digester looking out over the mill with a view of eucalyptus forests, it's hard to imagine that no infrastructure was here before. This mill is a tribute to the outstanding team of professionals working at the mill."

According to Chen Gang, "ANDRITZ's capability and track record in designing and

"This pulp machine is one of the best optimized in the world. It is efficient, consumes less energy, and is highly automated."

Xiong Meng,
ANDRITZ China Project Manager, Pulp Drying



connecting all the process islands in a mill is quite unique and proven. Their reputation in China with other greenfield projects was important to us. We could not have accomplished so much so quickly without a strong Chinese and international team from ANDRITZ working with us."

Scope of supply

The ANDRITZ scope included EPS delivery (engineering, procurement, and construction supervision) of the entire mill production and chemical recovery systems – from woodyard to finished pulp bales. Automation and optimization systems were also part of the delivery.

In addition, ANDRITZ supplied the stock preparation and machine approach flow systems for the new 450,000 t/a fine paper machine erected at the same location.

"We made a special effort in our system design to simplify each key process," says Chen Jieyu. "By minimizing the equipment required to achieve the desired capacity, less power is consumed, less maintenance is



▲ The debarking drums (above left) were dimensioned to handle both long and short logs. Two HHQ-Chipper lines (one shown above) deliver uniform eucalyptus chips to the digester.

required, and less capital is required. Our simplicity concept has added up to increase the productivity for the mill."

The challenge in the woodyard

When you become accustomed to imported wastepaper and chips, the process of converting eucalyptus trees into chips is an eye opener. The debarking/chipping line at Zhanjiang Chenming represented something new for almost all of its managers and operators. Much attention went into the design.

As ANDRITZ's Project Manager for the woodyard, Timo Palo, puts it, "Eucalyptus is a very demanding wood species to debark and chip. The bark is stringy and tough to dislodge from the tree. It is also challenging to chip. At Zhanjiang Chenming we created an entirely different dimensioning of the debarking drums to handle different logs, including short logs. The EucaRoller, an ANDRITZ innovation, removes the stringy bark prior to chipping. The result is efficient bark removal with minor wood losses."

Two ANDRITZ HHQ-Chippers are employed in the chipping line, providing the quantity and quality of chips required for the fiberline. Palo adds, "When compared to purchased chips, the chips from Zhanjiang Chenming's woodyard are considered superior. They are highly valued for premium paper grades."



The lime reburning kiln has a capacity of 800 t/d. ▶

Fiberline performance on a grand scale

After the chip screening operation in the woodyard, the hardwood chips are fed via a TurboFeed system into a single-vessel DownFlow Lo-Solids continuous digester (2,900 admt/d unbleached).

The DownFlow Lo-Solids cooking process is flexible by design to accommodate raw material variations while producing pulps of exceptional quality and high yield. By focusing development efforts on the key challenges of the process, ANDRITZ has developed a technology that can be adapted to any number of raw materials.

Says Chen Jieyu, "DD washers were a wise choice because of their reputation and capacity. The mill is also achieving high bright-

ness pulp and chemical savings with the two-stage oxygen delignification system."

Another plus is the cooling of the effluent from the bleach plant and cooking plant coolers which produce enough hot water for the fiberline without the use of any low pressure steam for water heating.

Chemical recovery

The seven-effect evaporation plant has a capacity of 960 t/h and is delivering 80% virgin dry solids black liquor to the recovery boiler as fuel. Chen Jieyu says with enthusiasm, "Considering this is eucalyptus, 80% dry solids black liquor is an achievement. The high dry solids black liquor increases the steam output from recovery boiler so that more power can be generated."

The DownFlow Lo-Solids cooking process is flexible by design to accommodate raw material variations while producing pulp of exceptional quality and high yield. ▶



At the top of the digester (left to right) are Stephen Cheung, Zhanjiang Chenming Technical Director; Martin Koepenick, journalist; Chen Gang, General Manager; and Fan Ningwei, Wood Handling and Fiberline Mill Manager. ▶



The recovery boiler is among the world's largest at 4,500 tds/d. Output from the turbine-generator is sufficient to power the entire mill. According to Markku Lehtinen, ANDRITZ Sales Director, "One interesting innovation is the ARC chlorine removal system, which is integrated with the evaporation plant. ARC removes chlorine from the precipitator ash, reducing the amount of chlorine in the chemical recovery loop. This is important in preventing eventual corrosion of the boiler's pressure parts."

The White Liquor Plant is a complete ANDRITZ delivery: recausticizing using the latest green and white liquor filtration technologies (LimeGreen and LimeWhite), an 800 t/d LimeFlash kiln, and a StiroX system for white liquor oxidation.

Flexibility with pulp finishing

Li Long, Project Manager for the pulp drying plant at Zhanjiang Chenming, says the mill chose a single line for the best efficiency and highest performance. "We produce pulp for the paper machine next door, and for transport to one of our other mills. So we wanted performance and flexibility."



▲ The White Liquor Plant from ANDRITZ uses the latest LimeGreen green liquor filtration systems. ANDRITZ also delivered the kiln, white liquor oxidation, and LimeWhite white liquor filtration equipment.

The ANDRITZ delivery in the pulp drying plant starts with a five-stage screening system to ensure that clean stock is fed to the pulp machine. Says Li Long, "Continuously stable and homogenous conditions are a must to produce an excellent end product."

Adds Helmut Senft, ANDRITZ's Lead Project Manager for the pulp drying plant, "The start-up was fast indeed. Already on the first day we were able to run a good quality sheet through the dewatering machines, the dryers, and the cutters. Stable plant operation was achieved within the first start-up week."

"What says more than anything about this plant is that it is the first in the world with our new generation of bale finishing equipment. It had a rapid start-up and has already achieved continuous throughput of 280 bales per hour," says Xiong Meng, ANDRITZ China's Project Manager for pulp drying.



◀ Top left: The ANDRITZ airborne pulp dryer produces the dried pulp sheets.

Left: The ANDRITZ dewatering machine (Twin Wire Former) prepares the stock for the airborne dryer. The machine is equipped with a shoe press to increase dryness and reduce energy consumption.

to start the plant more efficiently and be able to respond to process upsets quickly. Knowing how the mill will behave beforehand gives process operators more confidence.

Automation Solutions also delivered optimization systems, and advanced control ACE products, for various unit processes at Zhanjiang Chenming. ACE control systems are operating in the fiberline (cooking, washing, screening, oxygen delignification, and bleaching) as well as the recovery boiler.

"Combining everything into one integrated system for fast start-up and continuous operation was the target," says Suri Rajan of the Advanced Control implementation team. "The fast start-up is an indication we met the target."

Says Li Long, "The major advantage of ANDRITZ automation design is its simplicity and flexibility, allowing us the greatest potential for stable operations, low energy consumption, and higher production in the future."

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GREENFIELD SCOPE OF SUPPLY

Woodyard. Two debarking and chipping lines, chip screening, chip/bark storage/reclaiming, and conveying to the fiberline. Debarking and chipping capacity is 600 m³ sob/hr.

Fiberline. Downflow Lo-Solids continuous digester (capacity 2,900 admt/d unbleached) with TurboFeed system. DD washers for washing and bleaching. Two-stage oxygen delignification. Four-stage ECF bleaching with A-Stage.

Pulp machine and baling lines. Single dewatering/drying line (6.7 m at the cutter) with stock preparation and a cutter/layboy. Two automated pulp baling lines.

Chemical recovery. Seven-effect evaporation plant (960 t/h of water evaporation) with condensate stripping system. 4,500 tds/d recovery boiler. White liquor plant includes green and white liquor filtration and 800 t/d lime kiln. NCG collection system for odorous gases with incineration in the recovery boiler (with backup auxiliary boiler).

Automation. IDEAS dynamic simulator for DCS checkout and operator training. Advanced control/optimization systems (ACE systems) for the fiberline (cooking, washing, screening, oxygen delignification, and bleaching) and the recovery boiler.



Two automated baling lines are installed at the mill, representing the newest generation of ANDRITZ bale finishing equipment in the world. Each line is designed for a capacity of 300 bales per hour. ▶

The implementation team for ANDRITZ's advanced controls (in black shirts) with their counterparts from Zhanjiang Chenming in the control room. The focus has been on optimizing ACE software modules for supervisory control of the mill. ▼



Specialists in steel fabrication

ANDRITZ acquired Tiszakécskei Gépgyár Kft. (Tigép) of Hungary – specialists in producing welded components for turbo-generators, gas turbines, and other machinery. The company, now called ANDRITZ Kft., is the perfect partner for ANDRITZ's workshop in Graz, Austria to manufacture the PrimeDry Steel Yankee.

With its 400 employees specializing in steel fabrication, ANDRITZ Kft. has the experience and special equipment to produce a perfectly round steel dryer shell – bending the steel plate with a thickness up to 80 mm to form a perfect cylinder, perfecting an error-free weld on the seam, machining the internal grooves and external surfaces, mounting the shaft and condensate removal headers, and then testing, coating, polishing, and packing for transport.

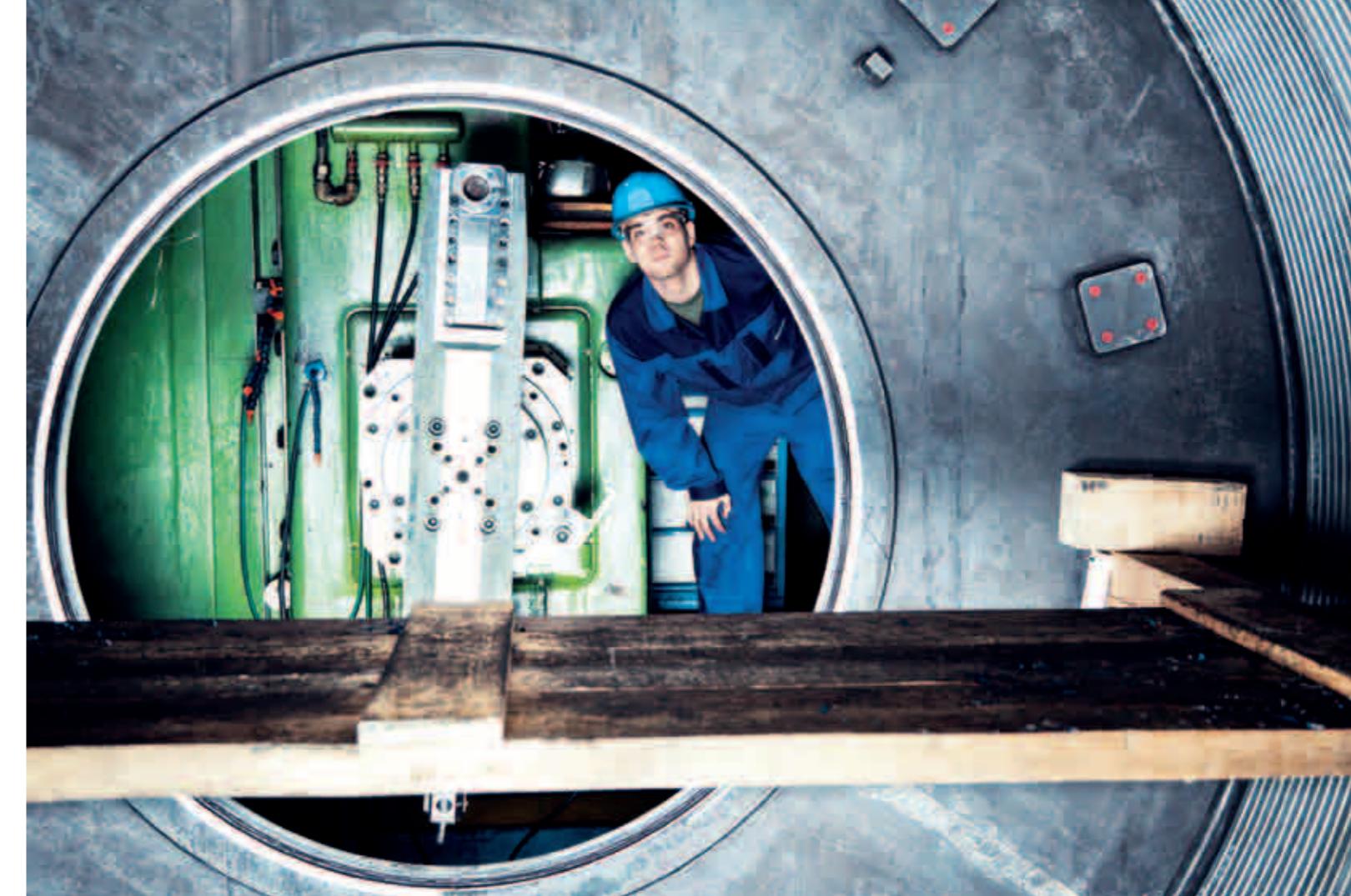
ANDRITZ Kft. is located in the town of Tiszakécske on a 150,000 m² site. The workshop is equipped with modern manufacturing technologies for sand blasting, welding, CNC machining, surface treatment, and assembly. More importantly, the skilled craftspeople have experience in all stages of production from flame cutting of the plate to the final assembly of components weighing up to 150 tonnes.

ANDRITZ Kft. serves several business areas within the ANDRITZ GROUP producing core components for hydropower equipment as well as pulp and paper machinery. Mezei Károly, Managing Director, says his team is actively engaged in increasing capacity as well as productivity increases. "We want to be among the best within the Group," he says. "The opportunities for our team to produce high-quality components for export markets are huge."

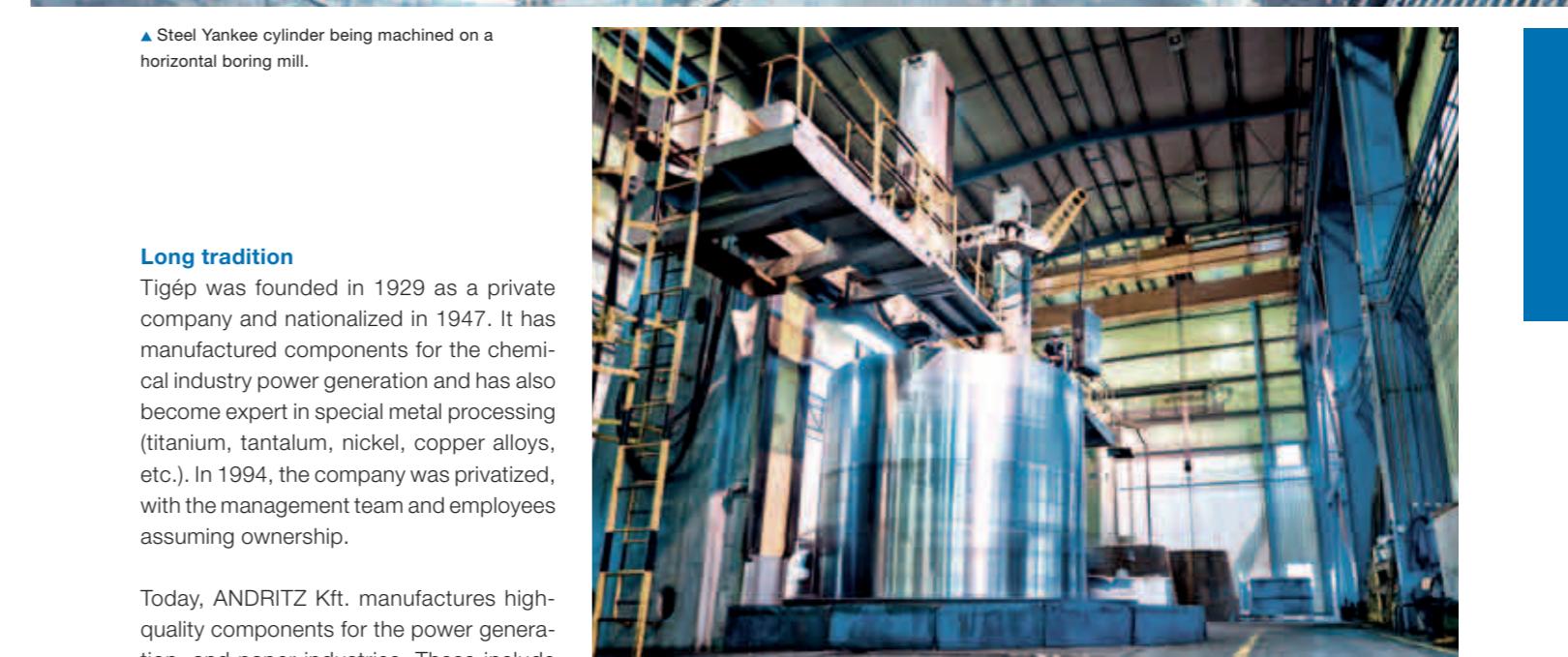
For a short period of time after acquisition, the ANDRITZ workshops in Hungary and Austria worked in unison to produce the Steel Yankee: with the ANDRITZ Kft. team fabricating the dryer shell and the ANDRITZ AG team installing the shaft and condensate removal headers, and finishing the cylinder. Now, all the work can be conducted at ANDRITZ Kft. For deliveries of very large diameters or where there are restrictions in transport, the Steel Yankees can be produced in modules and assembled on-site.



◀ (From left to right): Robert Duschnig, Technical Director; Károly Mezei, Managing Director; and Ferenc Jánoska, Financial Director from ANDRITZ Kft.



▲ Steel Yankee cylinder being machined on a horizontal boring mill.



Long tradition

Tigép was founded in 1929 as a private company and nationalized in 1947. It has manufactured components for the chemical industry power generation and has also become expert in special metal processing (titanium, tantalum, nickel, copper alloys, etc.). In 1994, the company was privatized, with the management team and employees assuming ownership.

Today, ANDRITZ Kft. manufactures high-quality components for the power generation, and paper industries. These include combustion chambers, exhaust casings, generator casings, butterfly valves, lamella packages, and dryer shells.

▲ Turning a Steel Yankee cylinder at ANDRITZ Kft.

Drums and DIPs for improved news

Korindo's PT Aspex Kumbong is a 1,200 t/d newsprint producer in Cileungsi, Jawa Barat, Indonesia (on the outskirts of Jakarta). In order to move from standard newsprint to higher value-added grades, the mill installed a new deinked pulp (DIP) line, selecting all key equipment from ANDRITZ.

What do you do when the markets for your traditional products are shrinking, and raw material prices continue to soar?

Ko Jae Woong, PT Aspex Kumbong's Mill Director, says, "The wise business strategy is to develop new markets and new products externally, and focus on reducing costs while achieving continuous improvement internally."

In pursuit of these objectives, PT Aspex Kumbong, Indonesia's largest newsprint producer, recently modernized its DIP #1 line with the help of ANDRITZ technology. With three paper machines in operation and utilizing 100% recycled fiber, the goal was to provide a higher quality, lower cost furnish for PM1 so it could move from stan-

dard newsprint to improved news and other value-added grades.

Prior to this modernization, DIP #1 was a one-loop system with a batch pulper. This was acceptable for standard news, but cleaner, brighter pulp would be needed for the higher value grades. In addition, the batch pulper was not ideal for continuous, clean production.

PT Aspex Kumbong already knew the advantages of ANDRITZ's FibreFlow drum pulper, having purchased one for each of their other two stock prep lines in the past. So, it was decided to not only modernize the deinking and cleaning processes in DIP #1, but also to replace the batch operation with a FibreFlow drum.

"We are developing new markets and new products, while reducing costs and achieving continuous improvement. At the end of the day, the paper machine is our best online measurement tool to determine the efficiency of our stock preparation."

Ko Jae Woong,
Mill Director PT Aspex Kumbong



▲ Most workers at the mill ride motor scooters, the best way to get around in Jakarta, where traffic jams can turn a normal 20 minute drive into three hours on the road.



▲ The pulp's brightness boost begins with effective ink removal in SelectaFlot deinking.

Drumming away contaminants

The FibreFlow drum pulper has two zones inside it: one to gently slush and defiberize wastepaper and one to remove trash and major contaminants from the pulp. Over 200 drums are operating worldwide.

The drum defiberizes by gently dropping and rolling the wastepaper mixed with water on a slight incline. There are no moving parts inside the drum and nothing to cut the fiber, so fiber strength properties are retained and the contaminants come out intact. Debris is rejected continuously and automatically.

"FibreFlow drums are an ideal way for us to get good fiber from cheaper ONP, OMG, and office waste grades," Chang Su Park, DIP Manager, says. "Traditional batch pulping systems can't take the abuse associated with highly contaminated materials." PT Aspex Kumbong sources its wastepaper from the U.S., Asia, Australia, and even Saudi Arabia.

Park is impressed with the FibreFlow drum's performance. "We lower our overall operating cost and we conserve energy," he says. "Equally important, we deliver quality fiber to our paper machines without the worries of unscheduled downtime. Maintenance is at an absolute minimum."

As mentioned by Park, the relationship with ANDRITZ goes back several years. The first FibreFlow drum was installed on DIP #3 in 1995. In 2006, a SelectaFlot flotation unit

All three stock preparation lines now have FibreFlow drum pulpers. The latest modernization of DIP #1 replaced a batch pulper with the drum. ▼





"Our cost of chemicals for stock preparation has gone down."

Sun Gu Kang,
DIP Production Manager,
PMs 1 & 2



The new DIP line has a total capacity of 300 t/d. ANDRITZ's scope added the FibreFlow drum pulper, two-stage HD-cleaning, the SelectaFlot pre-flotation deinking, a cleaner plant (AhlCleaners), a disc filter, CompaDis dispersing, and a bleaching tower discharge system to existing equipment at the mill.

According to Linus Pandapatan H., Regional Product Manager with ANDRITZ, the mill also took this opportunity to upgrade its screens with engineered wear components from ANDRITZ such as BarTec W screen baskets and Dolphin rotors. ANDRITZ provided the equipment, advanced basic engineering, site installation supervision, start-up, and training.

As Park says, "The modernized DIP line opens the way for new grades, helping us produce a cleaner, smoother, brighter, and lighter sheet."

Fewer screens, better results

Since the screening process has such an important effect on downstream processes, it is a critical focus area. An effort was made to reduce the number of screens – not only

decreasing energy and maintenance costs, but also producing cleaner furnish for PM1.

Screen room efficiency was raised by upgrading the screen baskets and rotors. Notes Pandapatan of ANDRITZ, "The screening system is the place to keep stickies from passing through. We know from experience that it is not enough to just have the right slots and profile in the basket. You have to select the right combination of basket and rotor – working as a team."

ANDRITZ replaced the existing basket/rotor combinations in the three-stage coarse screening and the three-stage fine screening systems. ANDRITZ introduced the Bar-Tec Rejector screen basket to the PT Aspex Kumbong mill. Thanks to its special profile wire and a diagonal slot geometry, it puts less demand on the downstream screening stages.

To optimize the performance of the new basket, ANDRITZ combined it with a Ro-Tec Dolphin rotor – a unique rotor with foils that resemble the nose of a dolphin. This rotor is proving itself successful in nearly 100 installations around the world – improving screening capacity and dramatically reducing energy consumption.

Cleaners remove small debris

Following the screening stage, ANDRITZ installed a new four-stage AhlCleaner cleaner plant to remove even small contaminants in the stock prior to deinking. Little power is required due to the low-pressure drop design. A four-stage AhlCleaner SC133VC (40/12/4/1) unit was added as well.

Pressurized rejection of impurities prevents air from entering the accept and reject flows. The AhlCleaners are equipped with two types of cones to enhance the separation of debris and heavies to maximize cleaning efficiency and minimize fiber loss.



▲ Paper machine operators noticed an immediate reduction in spots and specks, plus a brighter sheet. Critical to this accomplishment is the SelectaFlot unit.

◀ The screening upgrade included new engineered wear components from ANDRITZ. Shown inside a screen basket is Mr. Sucipto from PT Aspex Kumbong.



"The modernized DIP line opens the way for new grades, helping us produce a cleaner, smoother, brighter, and lighter sheet."

Chang Su Park,
PT Aspex DIP Team Manager

According to Mohamad Yahya, Service Manager for ANDRITZ in Indonesia, "Our high density cleaners after the FibreFlow drum remove glass, sand, and rough contaminants. Employing stainless steel cones with ceramic liners ensures trouble-free operation. Then, the low consistency cleaners use a vortex control device for dilution to reduce plugging. Fiber loss is kept to a minimum."

Floating away ink and dirt

With the start-up of DIP #1 in mid-2011, the papermakers at PT Aspex Kumbong instantly noticed a reduction in spots or specks, and a brighter sheet. Critical to this accomplishment is the SelectaFlot unit.

Comments Yahya, "The brightness boost begins with effective ink removal in SelectaFlot. The combination of ANDRITZ flotation deinking and single-stage bleaching has helped this mill move from 55% to as high as 72% ISO brightness. This en-

ables PT Aspex Kumbong to meet quality targets for their improved news and notebook grades."

Best online measurement tool

"Our cost of chemicals for stock preparation has gone down," says Sung Gu Kang, DIP Production Manager for PM 1 & 2.

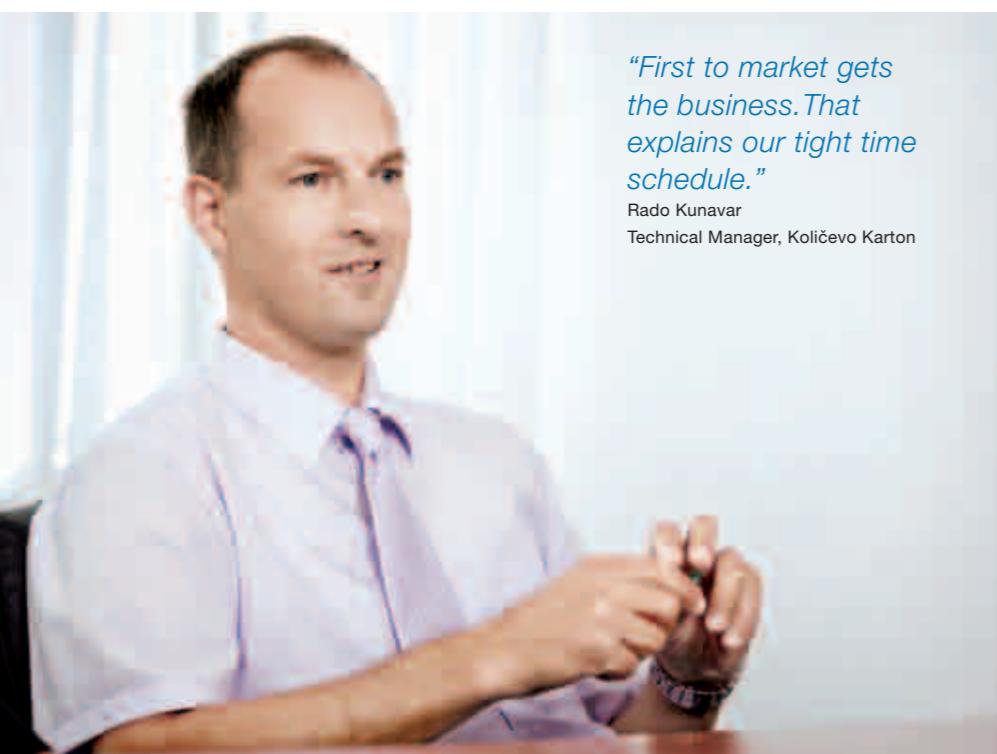
On the paper machine side, downtime for cleaning the wet end and for paper breaks caused by stickies has been reduced by 10-15%. "At the end of the day, the paper machine is our best online measurement tool to determine the efficiency of our stock preparation," says Woong with a smile. "The improved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

Says Kang, "We run a much cleaner sheet and paper machine downtime due to stickies has diminished. The whole system is easy and simple to operate."

Adds Park, "We now have the technology in place to continue to raise the quality of our grades, and that will make a big difference in the long-term."

Half-high hybrid former brings precision to Količovo

Within a span of 10 months, ANDRITZ developed, designed, and delivered a new three-layer fourdrinier wet section with a new type of hybrid former for PM3 at Količovo Karton. The most prominent feature of the new hybrid former PrimeForm HB: it is incredibly small (half as tall as a conventional former) and has only three rolls. As part of the project at Količovo, ANDRITZ also rebuilt the complete wet end.



"First to market gets the business. That explains our tight time schedule."

Rado Kunavar
Technical Manager, Količovo Karton

Everyone knew it from the beginning: the designers, the engineers, the customer, and the project team. *This was going to be a major challenge.*

The task was to install a new wet end on PM3 at this Slovenian mill and incorporate a new-design hybrid former – in only 10 months. This is another practical example of when people at ANDRITZ say, "We accept the challenge!"

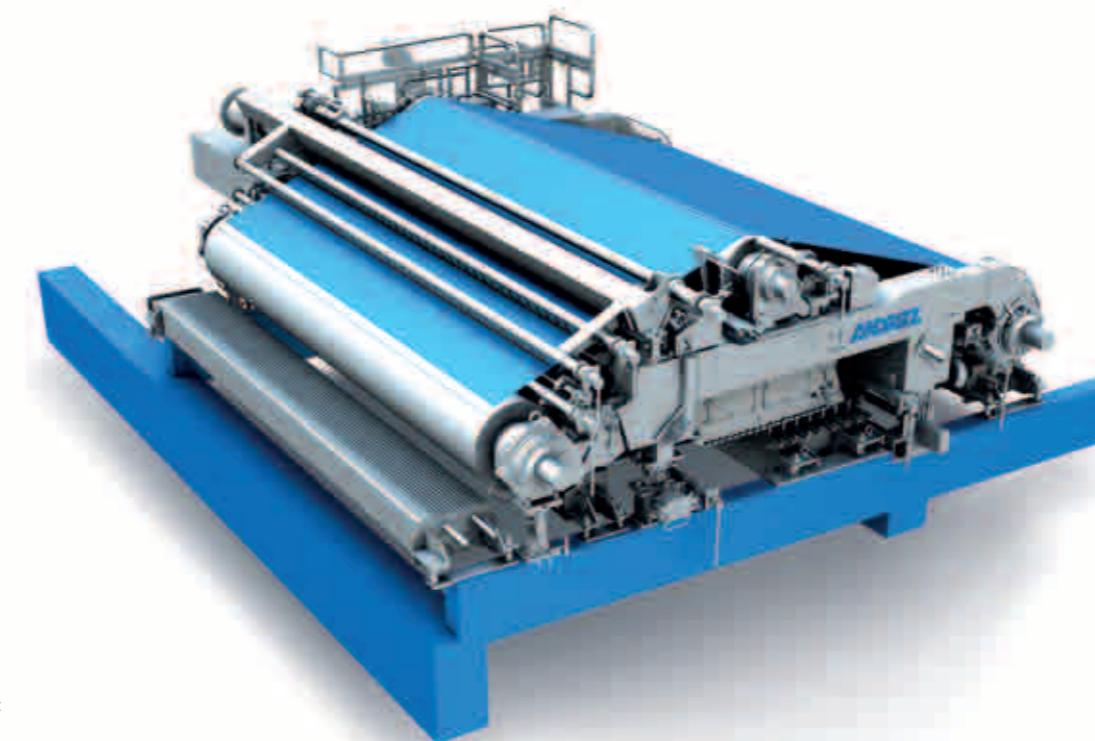
In the end, they made it: quick, short, and precise. According to Barbara Freyler, ANDRITZ Project Manager, the contract was signed in February 2011. On the 29th

of December, two days before the contract deadline, the machine started up.

"Not a bad Christmas present," says Rado Kunavar, Technical Manager at Količovo Karton. "For me it was the largest project I have been responsible for in this company. It was great to have ANDRITZ as our partner. The cooperation was excellent. I actually expected much more stress!"

A demand for GC2

The Količovo mill has been in existence since 1924 and was acquired by Mayr-Melnhof Karton of Austria in 1998. Mayr-Melnhof is the world leader in recycled coated board.



(Left to right): Barbara Freyler, ANDRITZ Project Manager; Rado Kunavar, Technical Manager at Količovo Karton; and Wilhelm Mausser, ANDRITZ Head of Design Development, in front of the rebuilt wet end. ▼



PM3, the machine to be rebuilt, was installed in 1979 by ANDRITZ. It has a trim width of 4.5 m and had eight vacuum formers for grades ranging from 210 up to 500 g/m². Before the rebuild it was producing testliner – a useful commodity grade with small growth potential.

On the other hand, Količovo's PM2 is producing KROMOPAK folding boxboard – a virgin fiber-based grade with a three-layered coating. KROMOPAK is what Mayr-Melnhof calls a "GC2" paperboard – a surface pigment coated folding boxboard. It is in high demand for packaging perfumes, pharmaceuticals, cigarettes, consumer goods, and foods (due to its virgin fiber content). "The advantage to our KROMOPAK is its high smoothness," says Kunavar. "It has excellent printing properties with intense color rendering."



"We finished two days before the deadline. It was a nice Christmas present for the mill."

Barbara Freyler
ANDRITZ Project Manager



▲ The task was to completely rebuild the wet end on Količovo's PM3 – including a new design hybrid former so it could produce a premium grade of board – in only 10 months from design to start-up.

With the demand for GC2 growing fast, Kunavar says that the mill decided to rebuild PM3 to produce these grades. "The first to market gets the business, so we wanted to do it quickly," he says explaining the time schedule. "That is why we turned to ANDRITZ."

Rethinking the former

To produce the required quality for GC2, the conventional vacuum formers on PM3 would have to be replaced by a fourdrinier wet section. According to Freyler, adding a hybrid former was the right solution since it would enable a higher level of dewatering.

"It turns out that Količovo's timing was right," Freyler says. "We had an active development program to rethink the design of hybrid formers on retrofits of fourdrinier ma-



▲ To produce KROMOPAK, the conventional vacuum formers on PM3 had to be replaced by a fourdrinier wet section. Adding the new PrimeForm HB hybrid former on the filler layer enabled the correct level of dewatering and improved formation.

chines. In addition to boosting dewatering capacity, our designers were working on solutions to improve the sheet quality – with symmetrical dewatering to improve the two-sidedness of the sheet, more equal Z-direction distribution of fines and fillers, and improved formation."

But there was only one problem. The machine hall at the mill was not tall enough for ANDRITZ's conventional hybrid former. Next challenge: cut the height of the former in half.

Problem solved. ANDRITZ engineers developed a completely new type of hybrid former, the PrimeForm HB, to meet the requirements at Količovo. "Our thinking is that there are probably other installations that will have this same space limitation so it would be a good idea to have this design," Wilhelm Mausser, ANDRITZ Head of Design Development says.

The PrimeForm HB

The PrimeForm HB on PM3 is now one of the smallest in the world. But in this case, small is mighty in that it performs precisely to specifications, according to Kunavar.

"In terms of dewatering, the incoming consistency of 1.5-2.5% is increased to 6-13% coming out of the former," he says. "We are seeing a much improved formation index and the paper tests show very good burst, crush, and bond strength."

The former has three rolls which can be adjusted on-the-fly and a design where each foil can be loaded individually to tailor the pressure pulses exactly to production requirements. The foils are ceramic. Tests have shown the ceramic foils to be superior in terms of wear-resistance, surface finish, and forming fabric life.

It is a very clean-running unit. There are enclosed doctor pans. Maintenance is easy because the top forming unit can be lifted up. There is direct access to all the ceramic foil covers and the skimmer channel.

Wet end improvements

The existing cylinder mold formers on PM3 were replaced with a three-layer fourdrinier (PrimeForm SW) which included three new PrimeFlow SW headboxes. A dilution control system was installed for the filler layer. The PrimeForm HB is utilized for the filler layer dewatering. The existing press section was upgraded with a pick-up roll to allow a closed web run to the press section.

ANDRITZ succeeded in executing the wet end rebuild, thanks to precise planning, in only 26 days. "On December 29th at exactly 8.15 pm we put paper on the reel," Kunavar says. "Forty minutes later the first reel turn-up occurred without a sheet break. It truly was a masterful job of planning and execution."

"We reduced the time on-site by pre-erecting the complete wet end equipment at our workshop in Graz," says Freyler. "The team from Količovo drove to Graz for final inspec-



▲ ANDRITZ succeeded in executing the wet end rebuild in only 26 days. The existing cylinder mold formers on PM3 were replaced with a three-layer fourdrinier (PrimeForm SW) which included three new PrimeFlow SW headboxes. The PrimeForm HB is utilized for filler layer dewatering. The existing press section was upgraded with a pick-up roll to allow a closed web run to the press section.

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tion. Then we transported the equipment to the mill to erect it on-site."

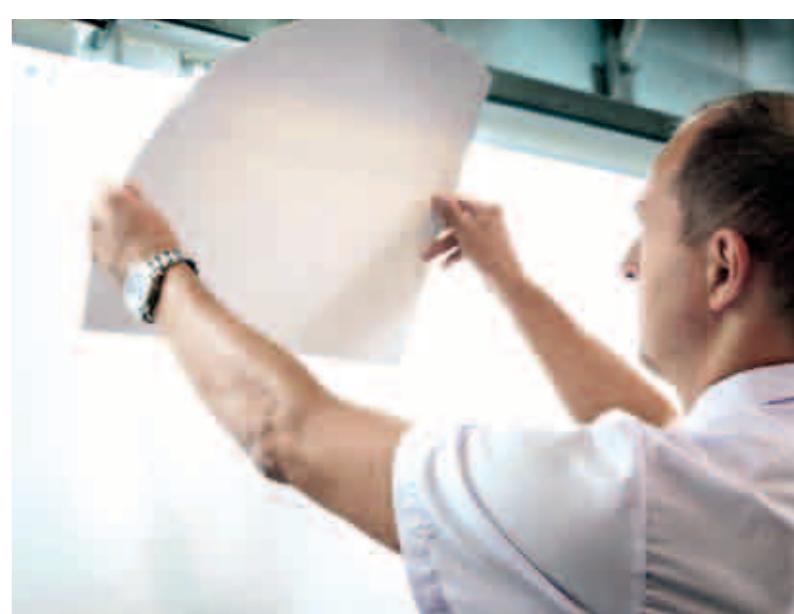
Unfortunately, the last step occurred right at Christmas time. "We had a short holiday," Freyler and Kunavar say. "Work stopped for Christmas Eve, but on the 25th of December, we were back working at the mill."

"ANDRITZ has been very flexible and open-minded during this whole project," Kunavar says. "The project has met all our expectations."

The rebuilt machine is now producing GC2 grades at a speed of about 460 m/min, which is the same speed as before the rebuild. "We have not speeded up yet because we want to fine-tune the sheet," he says. "But our aim is to ramp up to 800 m/min in the near future."

Količovo is finding a ready market for its KROMOPAK from PM3. The standard product is a high-quality blue-white board with 38 g/m² woodfree top and bottom and a 100 g/m² filler layer.

The top is triple-coated and the bottom is coated once. The machine is also producing a new product (Excellent Top) which is a yellow-white board using a 50/50 mix of hardwood and softwood pulps for the top and bottom and the same filler layer.



Količovo produces KROMOPAK – what Mayr Melnhof calls a "GC2" paperboard. It is a surface pigment coated folding boxboard with three layers of coating on the top ply. It is in high demand for packaging, pharmaceuticals, cigarettes, consumer goods, and foods. ▼

"Not just company, but also for country"

Dear Readers: Regular readers of Spectrum know that Montes del Plata of Uruguay is giving us a rare opportunity to follow the progress of its greenfield mill while it is being built. We thank Montes del Plata for allowing us to journey with them as they build, commission, and start-up a world-class 1.3 million t/a market pulp mill.



"We would like to see zero unemployment around this mill and hire local people."

Felipe Puig
Human Resources Superintendent
Montes del Plata

Dispatch #4: Punta Pereira, Uruguay

Maybe there was a similar feeling in Finnish or German or Canadian or US mills many years ago when pulp production was in its infancy. The feeling of doing something important not only for the company, but also for the country. That feeling is evident with the young engineers at Montes del Plata. They talk about it with an intensity and passion.

"Yes I am motivated to succeed professionally," explains Edgardo Piñeiro, one of those young engineers. "But I also want to make this project a success for Uruguay. We know that outsiders are watching us to see how we handle this."

You can sense the excitement and intensity in the atmosphere when you enter the Commissioning Building inside the mill's perimeter. Outside, 4,500 construction workers are engaged in a beehive of activity. Inside, about 140 young, bright minds are learning the details of starting up and successfully operating this massive mill complex. "In 2013 the construction workers will be gone," one of the students remarks. "Then it is up to us."

Recipe for success
Montes del Plata has an interesting approach to recruiting, hiring, and training. There is a flavored mix of veterans and

novices. A dash of computer training with a splash of business basics. High-tech simulations stirred in with practical hands-on sessions. Hopefully, a "recipe for success" created by Felipe Puig, Human Resources Superintendent, and his team.

Puig is concentrating on four areas (engineers, plant technicians, young local talents, and lab specialists) with specific goals for each. Thousands of résumés flowed in thanks to an aggressive and coordinated media campaign in newspapers, radio, and even television.

A textile engineer by training, Puig also worked as a consultant for one of Uruguay's large human resources consulting firms. His knowledge of process industries and his experience consulting with UPM's Fray Bentos mill are important ingredients.

27 Uruguayan engineers

A total of 19 new Uruguayan engineers were hired to join eight previously hired by the Spanish ENCE group (the company that sold its plantation and land assets to Arauco and Stora Enso). Montes del Plata received over 1,500 résumés for those



TAKING SHAPE

▲ The evaporation plant (background) and cooling towers (foreground) at Montes del Plata.

engineering positions in area and shift supervision, maintenance, laboratory, and environmental.

Joined by 93 plant technicians

After a coordinated recruitment, Montes del Plata examined 1,800 résumés to choose the 93 people who are now training to become plant technicians. "We want our operators to look at every piece of equipment and fully understand how it works before it starts up," says José Vivanco, a member of the Montes del Plata's Steering Committee from Arauco. "This is impossible once the vessels and pipes are full, so it has to be done during commissioning."

The activities leading up to that commissioning are in full swing. ANDRITZ Automation Solutions is making excellent progress in programming the mill model for the IDEAS dynamic simulator. The simulator is used first for DCS checkout and then will be a key tool for training operators in "virtual safety" according to Chandrasekhar Naidu from Automation Solutions.

Naidu explains that the IDEAS software simulates Montes del Plata's processes loop for loop. To the operator, there is no difference in "operating" the simulator and operating the mill – other than any mistakes the operator makes are harmless in



YOUNG ENGINEER EDGARDO PIÑEIRO

"I am a 2008 chemical engineering graduate from Montevideo. Before I joined this project, I knew nothing about pulp production. This is a country dependent on the cow – milk, meat, leather, etc. Pulp production is non-cow, sustainable, and different. I love it."

This project is a world-class opportunity and I want to play in the First Division. If you want to hire an operator for a drying plant in Brazil, you can choose from many experienced people. Here in Uruguay those people are not available. That is why we focus so heavily on training.

The people we are training are highly motivated and committed. I tell them our challenge is to not only meet and exceed our owners' expectations, but also to remember that Uruguay needs these types of investments. When other companies analyze the pluses and minuses of investing in Uruguay, we want them to see that the human talent here is a big plus."

YOUNG TALENT FROM CONCHILLAS MARCELA BELTRAME

"I am one of the 26 young locals hired and am 24 years old. I taught social studies and practical law courses at three area schools, spending hours riding a bus between classes. I knew nothing about pulp production, but I needed a change."

There are several attractions to working here. One, I can live and work in my community which keeps me closer to my family. Two, I am inspired by this new challenge – learning the technology and methods. And three, it will provide a good income to help my husband Pablo and I support our family in a sustainable way."

I am training in the Fiberline area and studying the process and instrumentation diagrams. I spent two months of training in the basic sciences, introduction to pulping, industrial processes, and basic business in order to get to the same technical level as the other operator trainees here."

In a couple of weeks, I will go to Brazil for four weeks of hands-on training at Veracel. This will be most interesting for me – moving from the P&IDs on paper to the actual equipment in the field. This is a once-in-a-lifetime opportunity for me and I am very excited. Pablo, who works for the company constructing our port, will take care of our two-year-old by himself for four weeks. No doubt he will be happy to see me return!"



the simulator. "It is the same concept as with flight simulators where pilots learn to fly a new aircraft, or practice emergency maneuvers without endangering assets – human or physical," he says.

Because it is an exact replica of the mill's processes, the IDEAS simulator is used to check out each loop in the Honeywell DCS before installation. "In one process area alone we detected and corrected 220 logic problems in the DCS loops," says Naidu. "By doing this now before commissioning we will ensure a smoother, faster start-up."

A special opportunity for young local talents

"We were looking for young people from Colonia and the surrounding small towns with no experience, but who had the potential to be good operators," Puig says. In total, 26 young people were hired. "This is another way we can contribute to the local communities. We would like to see zero unemployment around this mill and hire local people."

◀ DD washers on the fiberline are being set in place. The bleaching towers are in the background.



The students, average age 20, have passed a series of training courses in math, physics, chemistry, business, industrial processes (air, electricity, materials, water, etc.), and pulp production. They have now joined the other plant technicians in process training. The next step is four weeks of hand-on training with experienced operators at mills in South America.

Meeting the latest challenges

Construction progress has been a challenge, but progress is evident. The electrical tie-ins to the national grid are nearing completion and the balance-of-plant is no longer on the critical path.

Richard Turner, Montes del Plata's Project Director, calls this project "the most challenging I have been a part of" due to some very public labor actions, manpower shortages, and the failure of a few suppliers to deliver. Montes del Plata has had to take over some operations it had not planned on: the quarry company that provides rock for port construction, the central services company responsible for feeding the 4,500+ construction workers, and the human resources recruiting/hiring operation. "We started some companies that are not very core to pulp production, but are core to our project success," Turner says. "But at least this way we have control over the output."

The main sticking point now – for Montes del Plata, ANDRITZ, and everyone involved – is manpower. As part of the labor agreement that was signed at the end of August, Montes del Plata is making a "public call" for skilled workers in the country. "We are committed to hiring Uruguayans wherever it is feasible," says Turner. "So we have advertised heavily for skilled workers to join us."

As the owners had predicted at the outset, finding and attracting these skilled workers is difficult. "Unlike UPM's Fray Bentos mill, which was built at a time of high unemploy-

"The balance of plant and tie-ins are progressing. We will deliver a world-class mill."

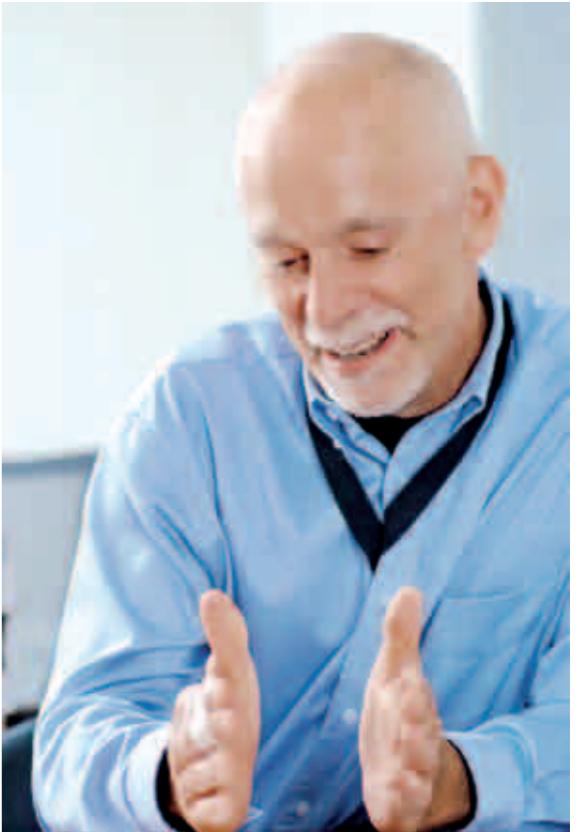
Richard Turner
Project Director



▲ A construction crane lifts sections of the airborne pulp dryer into place.

"Manpower planning and quality assurance are at the top of my list now."

Peter Outzen
ANDRITZ Project Director



ment," Turner explains, "unemployment is so low that getting people to move to our project is a challenge."

While a welder in Uruguay may not have the special skills required to weld a recovery boiler or pressure vessel, Peter Outzen, ANDRITZ's Project Director, says, "We are committed to hiring these people and have them train alongside an experienced welder. Ultimately, we need to have many more skilled workers who have experience in the pulp industry."

Outzen reflects on the last months. "We were making good progress in April, May, and part of June," he says. "Then the labor unrest here in July closed construction down and everything stopped. The tension made some of our skilled foreign workers nervous about coming back here, but we are doing our best to address their concerns."

Outzen, Turner, and various support organizations are working to meet this issue head-on. "We could easily use an additional 900 workers here now," Outzen says. "There is a massive recruiting effort in place to get these people to Punta Pereira and get them up-to-speed quickly."

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▲ Work proceeds on the recovery boiler (main structure) and power boiler (lower left).



"IDEAS is the same concept as a flight simulator where a pilot learns to fly a new aircraft in a safe, virtual way."

Chandrasekhar Naidu (left) with Greg Pulkey (center) and Mali Tenaji of ANDRITZ Automation Solutions

Outzen and his site supervisors also are engaged in an all-out campaign to monitor construction quality. "We just can't afford the time and cost to do rework at this point," Outzen says. "Every hour, every day is critical."

No one is pretending this is an easy challenge. But as both Turner and Outzen say, "We just have to dig in and do the work one day at a time. We will finish this project in good fashion and hand over a mill that is world-class."

Highlights of

COMPLETE LINES

China CAMC Engineering Hong Kong
Svetlogorsk, Belarus
Wood processing, fiberline, pulp drying, and chemical recovery systems (evaporators, recovery boiler, and white liquor plant)

Oji Paper
Yonago, Japan
Conversion of digester and drying plant (2.4 m width) for dissolving pulp line

Karlstads Energi
Hedenverket, Sweden
Complete boiler island based on BFB (bubbling fluidized bed) technology for a CHP plant

Chuetsu Pulp & Paper
Sendai, Japan
Steam-saving modifications and capacity increase of the evaporation plant (MVR pre-evaporators)

Fernwärme Wien
Vienna, Austria
Two 170 MWth oil-fired boilers

NEW ORDERS

COMPLETE LINES

C&S Paper Yunfu
Luoding, Guangdong, China
Two PrimeLineST tissue machines with Steel Yankees, incl. stock preparation plant, automation, and drives
The Steel Yankees will be the largest in the world for tissue (18 ft. dia. and 6.17 m length)

Hebei Yihoucheng
Boading, Hebei, China
PrimeLineCOMPACT II tissue machine with Steel Yankee, incl. stock preparation plant, automation, and drives

Fujian Liansheng Paper Longhai
Longhai, Fujian, China
Mixed office waste (350 t/d) and old newspapers (250 t/d) processing lines

PANELBOARD

Kastamonu Integrated Wood Industry
Alabuga – Tatarstan, Russia
1,440 t/d pressurized refining system for MDF
Largest pressurized refining system for panel-board in Russia

RENEWABLE ENERGY

Poet-DSM Advanced Biofuels
Project LIBERTY
Emmetsburg, Iowa, USA
Continuous biomass two stage pre-treatment system SteamEx technology for commercial-scale cellulosic ethanol facility

Highlights of

COMPLETE LINES

Phoenix Pulp and Paper Public
Amphur Nampong, Khon Kaen, Thailand
Complete debarking and chipping line (rubber tire debarking drum and horizontally fed HHQ-Chipper).

CMPC Celulosa
Laja, Chile
High dry solids evaporation plant and recovery boiler

Iggesund Paperboard
Iggesund, Sweden
World's most efficient High Energy Recovery Boiler

Hämeenkyrön Voima
Kyröskoski, Finland
Biomass BFB boiler with auxiliaries; biofuel feeding and ash handling

E.ON Värme Sverige
Örebro, Sweden
Biomass BFB boiler with auxiliaries, biofuel handling and ash handling

Metsä Fibre
Joutseno, Finland
Biomass gasification plant with auxiliary equipment, dryer, biofuel handling, feeding and ash handling
Product gas is replacing natural gas in lime kiln

NEW START-UPS

COMPLETE LINES

Grupo Empresarial ENCE
Huelva, Spain
Biomass BFB boiler with auxiliaries

SOPORCEL PULP – Sociedade Portuguesa de Celulose
Figueira da Foz, Portugal
New evaporation plant and retrofit of existing evaporation plant

Hengan Group
Jinjiang, Fujian, China
Two PrimeLineTM W6 tissue machines incl. Steel Yankee, stock preparation, approach system, and automation

SCA Hygiene Products
Pernitz, Austria
Rebuild and upgrade of deinking line

Shouguang Meilun Paper
Shouguang, Shandong, China
Complete 2,450 bdt/d OCC processing line
World's largest OCC line

Guangdong Lee & Man Paper
Dongguan, Guangdong, China
1,750 bdmt/d paper machine approach system

Rigesa Celulose, Papel e Embalagens
Tres Barras, Brazil
Complete 350 bdt/d OCC processing line
First OCC Line supplied by ANDRITZ in Brazil

KEY EQUIPMENT, UPGRADES, AND MODERNIZATIONS

UPM Kymmene
Kymi, Finland
Fiberline upgrade: DD washer and oxygen delignification system

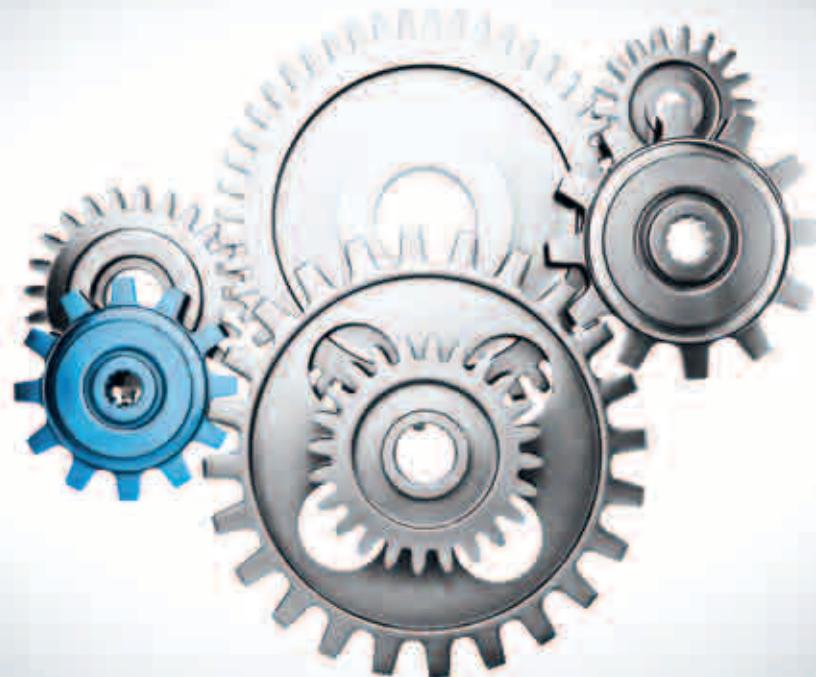
PT. South Pacific Viscose
Purwakarta, Indonesia
Dewatering equipment for wastewater treatment sludge from viscose plant

PANELBOARD

Wenan Tianhua MDF Board
Wenan, Hebei, China
600 t/d pressurized refining system for MDF
First 60" refiner manufactured by ANDRITZ in China

Shandong Heyou Group
Yucheng, Shandong, China
624 t/d pressurized refining system for MDF
Fourth system sold to customer

Good news for you. Get big returns for a small outlay.



The industry is ready for some good news. There are low-capital solutions that will really boost your bottom line. ANDRITZ is your partner to not only help you identify the best opportunities, but also provide

the services to de-bottleneck, recondition, rebuild, upgrade, and improve your operations. And the even better news is that these improvement solutions are not aimed at mills with big capital budgets. Most of our solutions

require no major investment expenses and have extremely short payback times. Yes, the industry is ready for some good news – and ANDRITZ delivers.