

# FiberSpectrum

The customer magazine of Andritz Pulp & Paper

Issue 1 – 2004



Andritz teams with Portucel for OPE® millwide reliability — Page 18

**ANDRITZ**

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# Pulp&Paper

Bernhard and I hope you enjoy reading this issue of **FiberSpectrum**. As head of the Pulp Mill Technologies sector of Andritz, I would like to direct your attention to the articles about UPM-Kymmene's Kuusankoski mill (*page 4*) and Portucel's Setubal mill (*page 18*). In addition, our Wood Processing group contributed to the success of Holmen Paper's Hallstavik operations (*page 14*). Andritz is proud to have played a major role in these projects.

The year 2003 was a difficult one for most of the industry, including suppliers. Still, we are fortunate to have been chosen for major greenfield projects, such as the Veracel project in Brazil. We are well underway with large chemical pulping and recovery projects in Chile, Germany, and Finland. Of special note is the very successful start-up in August 2003 for a new Andritz fiberline in the USA.

Within nine days, the line reached design production, has produced on-grade pulp, and the average production has been above the design rate ever since. These are exceptional results!

We thank you for your continued confidence in our people, our technology, and our service.

Sincerely,



Markku Hänninen  
Head of Pulp Mill Technologies  
[markku.hanninen@andritz.com](mailto:markku.hanninen@andritz.com)



**Markku Hänninen**

**Bernhard Rebernik**

Our strategy to create full-line competence within Andritz proves to be successful. For example, we sold two complete 3000 admt/d pulp drying lines in 2003 (China and Brazil) which include the recently acquired Fläkt Dryer technology. And, we now have the potential to supply complete mechanical pulping systems with Flash dryers.

In this issue, you will find articles of interest for tissue producers, such as the CCM project for Metsä Tissue (*page 8*). The TissueFlex™ shoe press technology is now well-proven with 10 machines in operations producing supersoft tissue quality. The most recent example is Wepa in Germany, which had an excellent start-up. TMP producers will want to read the results of Holmen Paper's RTS™ refiner upgrade project (*page 14*). And,

recycled fiber producers will be interested in the Andritz turnkey DIP line for Krsko in Slovenia (*page 24*). We continue to make investments in the service area, most recently with the acquisition of Fiedler — a major supplier of screen baskets for our industry.

We appreciate your feedback and will consider every suggestion.

Sincerely,



Bernhard Rebernik  
Head of Paper Mill Technologies  
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## Downflow Ups **Strength** *and Capacity* at Kuusankoski

*The history of Kymmene Corporation started in Kuusankoski, Finland in the year 1872. Situated on the banks of the Kymi River, the mill was well-positioned amidst water, fiber and energy resources.*

Sulphate pulp production began in 1964 and the pulp mill has steadily progressed over time — from 150,000 t/a to today's 500,000 t/a of bleached hardwood and softwood.

Today, with major modernizations to both the pulp mill and paper mill, UPM-Kymmene in Kuusankoski continues to be well-positioned as a supplier of new-generation publication papers on its five paper machines.



*Above: Auvo Kettunen, Development Manager for Cooking Processes at Andritz.  
Right: The softwood digester (left) rebuilt by Andritz produces 200,000 t/a bleached softwood pulp. It utilizes Downflow Lo-Solids® Cooking and Enhanced Alkali Profile Cooking (EAPC) to improve pulp strength and yield. The new 1000 t/d Andritz digester (right) with Lo-Level® Feed and Lo-Solids® Cooking has performed with 100% availability.*





## **New digester for hardwood line**

"We had two Ahlstrom digesters from the mid-1960's and they were running good," says Markku Laaksonen, Pulp Production Manager at Kuusankoski. "The only problem was that, due to their age, they were very badly corroded. The shells were fabricated from carbon steel. The cost of maintenance and repair was quite high."

Another factor was the paper mill's program to increase capacity, which put new demands on the pulp mill.

"The starting point for choosing the cooking process is always the same — produce high quality pulp at low costs, simply and safely," Laaksonen says. "When we got approval to purchase the new digester, we were satisfied that the Andritz single-vessel hydraulic technology would meet our goals. We thought that the Diamondback® Chip Bin and the feeding system were simple and good. We also felt we would get more yield from the Andritz system, compared to their competitors."

The new 1000 t/d Andritz digester, with Lo-Level® Feed and Lo-Solids® Cooking, was started up in September 1999 after a quick 14-month delivery time.

"Start-up of the Andritz digester was very easy," Laaksonen remembers. "We had a one-month water run before we started cooking. We ramped the temperatures up and had time to adjust the control loops, and get everything right."

Chip feeding to the digester began on 5 September and that same evening, first-class pulp was being produced.

"It is a very easy digester to run," Laaksonen explains. "Availability has been 100%. We are easily getting 1100 t/d or more. We have had very few disturbances, and no scaling problems, of which we had quite a lot with the old digester."



*Markku Laaksonen, Pulp Production  
Manager at Kuusankoski.*

## **UPM-Kymmene**

*The UPM-Kymmene Group, with sales over 10 billion euros and 36,000 employees, is one of the biggest forest industry enterprises in the world.*

*Although UPM-Kymmene can trace its roots back to the 1870's in Finland, the current corporation was created in 1995 with the merger of Kymmene Corporation and United Paper Mills Ltd. (Repola Ltd.).*

*The company focuses on magazine papers, newsprint, fine and specialty papers, converting materials, and wood products. UPM-Kymmene has production in 17 countries with total papermaking capacity of 8.6 million t/a.*

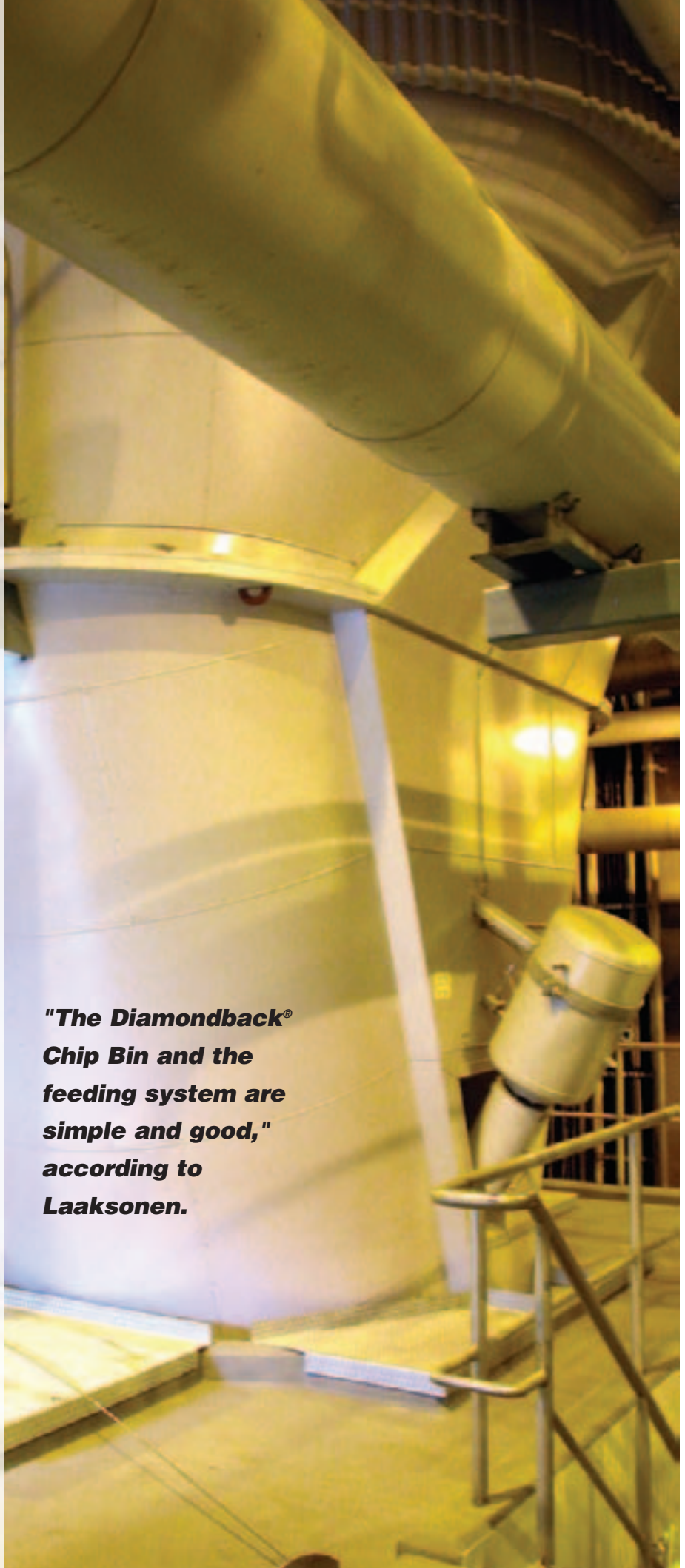
## **Downflow Lo-Solids®/ EAPC Cooking**

*The Downflow version of Lo-Solids® Cooking extends the first cooking zone to the old extraction screens of a conventional digester. This increases the total production capacity of the digester. Before the second cooking stage there is a short counter-current displacement zone (the heart of the Lo-Solids® cooking process). As with all Lo-Solids® cooking processes, the dissolved organic substances are extracted before bulk delignification occurs, while the alkali profile is optimum. Cleaner pulp is produced, tear strength is preserved, and bleaching is done more efficiently since the dissolved organics are eliminated.*

*As the cooking time is longer, and even though the alkali concentrations are lower with Downflow, cooking temperatures can be much lower compared to conventional cooking. The combination increases pulp strength.*

*Enhanced Alkali Profile Cooking (EAPC) can be used when maximum tear strength is needed. EAPC raises the alkali charge and the alkali concentration in the cooking stage so that residual alkali from the lower extraction is high. This further reduces the cooking temperature. This alkali-rich black liquor is recycled to the impregnation zone and consumed there. With a combination of Downflow Lo-Solids® and EAPC, it is easy to optimize the effective alkali profile — giving the operator the ability to select for pulp yield, pulp strength, and bleachability.*

**"The Diamondback®  
Chip Bin and the  
feeding system are  
simple and good,"  
according to  
Laaksonen.**





**Aki Korpela records the results of pulp tests. Softwood strength has improved significantly with Downflow Lo-Solids® Cooking.**

Today, the line produces 300,000 t/a of bleached hardwood pulp. Pulp properties are good. Kappa 18 is easily reached at a high viscosity around 1400 mg/ml. Total rejects have averaged 0.8% and wood consumption is down 3%. The pulp bleaches to its target 91 ISO using less ECF bleaching chemicals than before.

### **Downflow Lo-Solids® retrofit for softwood line**

Kuusankoski's old softwood digester, supplied by Ahlstrom in the 1970's, was running vapor-phase technology with a black liquor impregnation tower. Over the years, corrosion took its toll. A corroded impregnation tower was replaced in 1993.

"This digester has always experienced hanging problems on pine, due to its height and narrow diameter," Laaksonen confides. "Plus, we had some pulp strength problems in the past which caused us to buy pulp from the outside."

UPM-Kymmene chose to rebuild, rather than replace, the softwood digester in 2000 and again selected Andritz. This time, the decision was made to rebuild the two-vessel vapor-phase digester with a combination of Downflow Lo-Solids® and Enhanced Alkali Profile Cooking (EAPC) to improve pulp strength and yield.

Current pulp production for the softwood line is 200,000 t/a bleached. The kappa target is 30 and the brightness target is 87 ISO.

The newly rebuilt softwood digester started up in January 2001. Since that time, the mill has run extensive strength tests on the softwood pulp. Remarkably, strength delivery in the blowline has gone from 84.7% before the rebuild to 90.9% with Downflow Lo-Solids® Cooking.

"The quality of the pulp is good and homogeneous," Laaksonen says. "We chose the Andritz technology to get more strength in the pulp and we have achieved this. All our paper machines now use the pulp from our own line and we have stopped purchasing softwood pulp from the outside."

Since the initial rebuild, Andritz has further refined the digester to increase capacity and runnability of Kuusankoski's softwood line.

A new screen zone was installed during summer shutdown (2003) that decreased the alkali charge, lowered the cooking temperature, and further increased pulp strength.

"The digester is running very stably and pulp strength has increased," says Laaksonen. "Our aim is to get more production with stable quality out of this digester. The demand is there." ■

Find out more at  
[www.fiberspectrum.andritz.com](http://www.fiberspectrum.andritz.com)



**The modern fiberline control room for wood processing, hardwood pulp and softwood pulp lines at Kuusankoski. Esa Vanhalakka is the operator in the foreground, and Niko Saarinen is in the background.**

## Big ideas come in compact packages *in Småland.*

*Metsä Tissue's two mills in the Småland area of Sweden have been quietly at the forefront in two new and extremely interesting developments in the tissue industry: the Compact Concept Mill and the TissueFlex™\* press. Andritz played a key role in both.*



*Roland Leidefors, Machine Operator, at the wet end of the Andritz CrescentFormer machine (PM 5) at Metsä Tissue's Nyboholm mill. Metsä's Compact Concept Mill focuses on investment efficiency and production efficiency. "The operator's goal is to maximize quality and efficiency of final output, not just build parent rolls as fast as possible."*

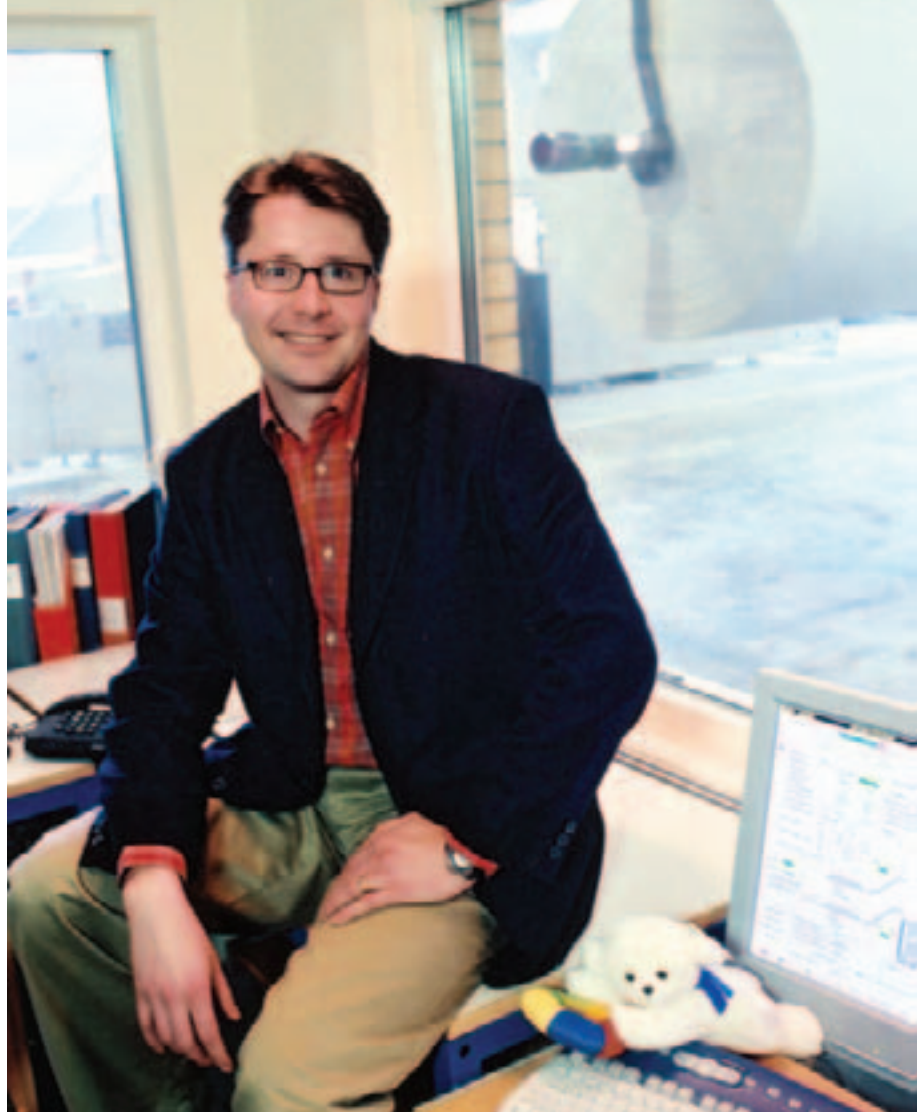


## Clear focus on markets and profits

Metsä Tissue is a recognized innovator in the European tissue business. With an annual capacity of 450,000 tonnes, it is number six in world rankings. Metsä Tissue production units are located in Sweden, Finland, Germany, and Poland. The company has a clear strategy focusing specifically on market sectors where it can achieve respectable market position.

Metsä Tissue, formerly known as Metsä Serla, has nine mills, with three located in Sweden. Beginning in 2004, the Metsäliitto Group became the principal owner of Metsä Tissue (66% share). This ownership restructuring supports Metsä Tissue's activities to further develop its business to become the world's top supplier of Tissue and Baking & Cooking products.

Jarkko Kaplin is the Supply Team Manager for Metsä Tissue in Sweden. In this role, Kaplin is responsible for production at the company's three Swedish mills. The Mariestad mill has



*Jarkko Kaplin, Supply Team Manager for Sweden. "CCM removes the traditional boundaries — not only with the production equipment, but also employee workflows and attitudes."*



*Operator Mariana Kjell, sets production targets on the control panel of the Perini converting equipment.*

a capacity of around 75,000 t/a of both consumer and away-from-home grades. The Nyboholm and Pauliström mills, located within 8 km of each other in the Småland region, have a total capacity of 45,000 t/a of converted products. The majority of this tonnage goes into consumer grades.

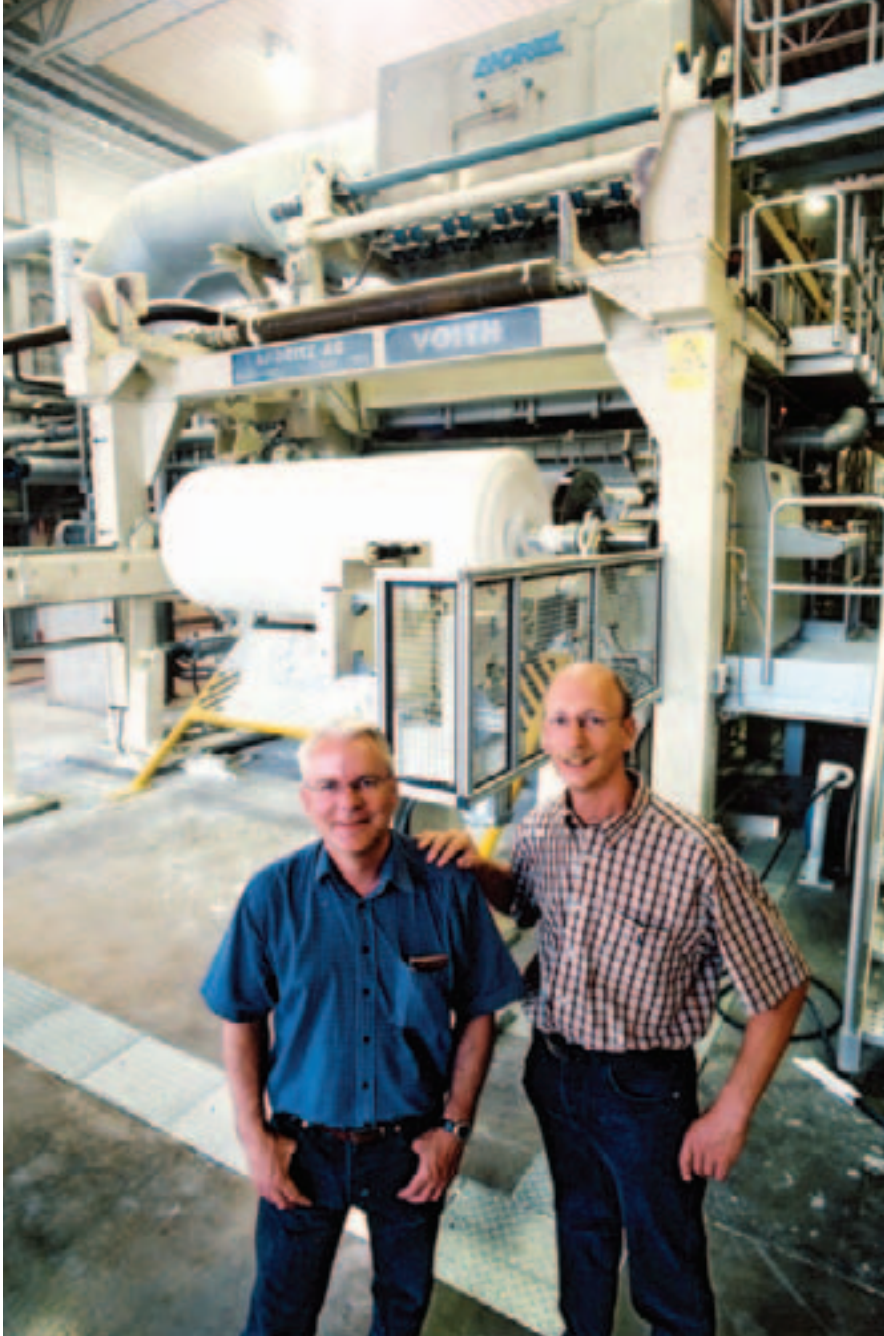
## Comfort, and quality, for every day

Kaplin explains some of the company background and strategy: "Metsä Tissue is a very focused company, with Europe as our main market area. Turnover was around 659 million euros in 2002 and about 55% of our production went to continental Europe, 35% to the Nordic countries, and 10% to other markets. We are strongest in the Nordic countries

where we have approximately 45% market share, depending on the grade. Of course, when you have a high market share, it is a tough fight to keep this level, but we have been able to maintain it based on factors such as quality, service, and delivery times — a function of our localness so to say. Quality is clearly a very important factor for us."

Indeed, the push to increase quality was the driving force for two recent investments in the Nyboholm and Pauliström units, which are collectively referred to within Metsä Tissue as "the Småland mills." During the period 1999-2000, the Småland mills underwent major investments.

Following these and later investments in converting technology, says Kaplin, the Småland mills are presently the "most complete invested operations in the company, and also produce the best quality."



*Jan Eklund, Technical Manager for the Småland mills, with Erwin Walcher, Andritz Service Engineer for Tissue Machines, at the reel of the 1000 m/min PM 5 at Nyboholm. "Andritz was willing to work with us on this concept, which wasn't exactly an off-the-shelf solution. They listened and gave us what we wanted."*

### **Pioneering a new concept**

In 1999, Metsä Tissue introduced a new concept — the Compact Concept Mill or CCM — for tissue production focused on optimizing investment efficiency and production efficiency. The idea of CCM is to get better profitability by locating the papermaking and converting operations into one seamless process. In other words, CCM blurs the traditional boundaries between the paper and con-

verting sides. "The boundaries, including employee workflows and attitudes, have disappeared," Kaplin says.

This new concept, combined with a very steady paper machine production rate, leads to higher overall production efficiency from the total assets. "The layout and employee attitude is such," says Jan Eklund, Technical Manager for the Småland mills, "that the machine operator keeps a close eye on the progress in converting. The operator's

goal is to maximize the quality and efficiency of our final output, not just building parent rolls as fast as possible."

Eklund explains some of the background: "Back in 1997 we were looking at alternatives for our future growth. We wanted a concept that was sized right for our market, where we already have a large share. We needed something that gave us premium quality, investment efficiency, and production efficiency in a small package at a good price. Therefore, we came up with the Compact Concept Mill Project.

"To be honest, I was hesitant at first when it was suggested that we build a paper machine designed for 1000 m/min and not higher. Papermakers always want something bigger and faster than what anyone else has. It is also natural in this industry to build a machine designed for one speed but then to



slowly move up the speed curve. But eventually, I was convinced that if we had the discipline to design, build, and pay for only the specific functions we needed, we could get a more rapid payback from running the mill at steady output."

Working closely with a consultant, Metsä Tissue started to define the concept in more detail. Nyboholm was chosen for this concept, says Eklund, based on the special mentality and enthusiasm that is present in the labor force.

As the project developed and suppliers were chosen, an efficiency task force team was formed. This included all of the suppliers to the project. This team met regularly to make sure that all the participants in the project were communicating and moving in the same direction with the efficiency and quality targets clearly in focus.



### **Small is beautiful, and efficient**

Metsä Tissue decided from the start that it did not want to have the world's fastest or biggest line. Using "small can be beautiful" thinking, the design team decided to keep the line simple. To keep costs down, the line would include one paper machine, one converting line, one wrapper/bundler, and one palletizer. In this single-line scenario, selection of the individual machines was critical to the success of the CCM.

The Andritz tissue machine was designed to run at about 1000 m/min. The theory was that, for this mill, the 1000 m/min speed would deliver better overall efficiency than would a higher speed machine.

Another interesting feature is the physical layout of the line. "As part of this focus on simplicity and efficiency, we also wanted to emphasize the teamwork aspect. So we gave thought to devising ways to integrate the line so there are virtually no visible boundaries between the papermaking and converting operations," Eklund says.

From the control room, the operators can see almost the entire process from the paper machine headbox through to finished product on pallets going out to the loading bay. This, says Eklund, gives the shift personnel more incentive to work together to keep the entire line running well rather than focusing on just one unit. By laying the line out in this manner, the paper machine operator has a secondary responsibility to help the converting operators, which is something that is almost unheard of in the traditional mill where there are physical boundaries, and often long distances, between the papermaking and converting operations.



## **Lambi**

**Here's a quick test for you:**

**Which company is Scandinavia's largest importer and distributor of plush animal toys?**

*(Hint...it's not Toys 'R' Us).*

*Actually, somewhat surprisingly, it is Metsä Tissue! The company gives away soft lambs (Lambi brand) as part of its brand promotion campaign. Over one million super-soft lambs are given to loyal buyers of Lambi tissue products.*

*Metsä Tissue has built the Lambi brand up to be the leading premium tissue product: bathroom tissue, household towels, all-round towels, and handkerchiefs.*

*As further indication of its success, Lambi was recently named the best tissue product in Sweden in a survey done by the Dagens Nyheter, the country's largest daily newspaper.*





*Niis-Erik Olsen, Machine Operator, on the walkway of PM6 at Paulistrom. A TissueFlex™ shoe press was added to the machine in April 2000. This TissueFlex™ at Paulstrom was among the first installations based upon the experience Voith had with shoe presses for other paper grades.*

### Smooth start-up for the line

PM 5 is a CrescentFormer machine from Andritz. The company chose Andritz after talking with all of the tissue machine suppliers. Says Eklund,

longer period," Eklund says. "It doesn't make much sense to have a paper machine that can run very fast some of the time, but doesn't keep pace all the time. Or, one that runs too fast for the converting lines."



**Quality was clearly the number one priority with the TissueFlex™ project at Pauliström. Bulk increased 13-22% and there have been important improvements in absorption, uniformity, and handfeel.**

"Andritz was willing to work with us on this concept, which wasn't exactly an off-the-shelf solution. They listened and gave us what we wanted.

"Essentially, everything that Andritz was responsible for, including stock preparation and PM 5, started well," Eklund says. "After start-up, the Andritz machine ran for 13 hours without a break. It started so well that initially the converting line could not keep up. But, we soon got everything into balance." The bottom line is that all this emphasis on simplification of the machinery and systems led to very significant savings in the purchase price of the equipment.

"The key thing is that we were looking at efficiency of the whole line over a

### Pauliström gets TissueFlex™ press for bulk

Following the CCM project, and in keeping with the emphasis that Metsä Tissue has on quality, the company added a TissueFlex™ shoe press on its PM 6 at the Pauliström mill in April 2000. This was among the first installations in the world of this tissue pressing concept. The TissueFlex™ version was developed based upon the extensive experience Voith (Andritz's cooperation partner for tissue machines) had with shoe presses for other paper grades. The principle of TissueFlex™ is to spread the press impulse out over a larger area to help retain bulk in the sheet.

Quality was clearly the number one priority with the TissueFlex™ project at Pauliström and it is clear that quality has improved. After the new press was installed, testing by Metsä Tissue showed that bulk had risen between 13 and 22%, with the largest increase coming on the lower-weight toilet grades. In addition, the mill has also seen important improvements in absorption properties of the sheet, as well as uniformity and handfeel.

Prior to the installation of the TissueFlex™, the 2.7 m wide PM 6 had two presses against the Yankee dryer. In the rebuild, the presses were replaced with the TissueFlex™ press roll against the Yankee. As was expected, after-press dryness is clearly lower now, compared to the time when the machine had two presses.

Eklund says that the TissueFlex™ has been a big asset for developing new Lambi (see sidebar page 11) qualities.

### Getting value for money

Overall, it is clear that Metsä Tissue made good investments in Småland by carefully targeting new technology to produce quality that consumers are willing to pay for. It has also been cautious about not buying more technology than it really needs. In this manner, Andritz is a key partner in providing exactly the right solutions to help Metsä Tissue meet these goals.

The people from the Småland region of Sweden are famous for being very careful with their money and resources. These investments in the Småland mills are an excellent example of how small and simple can often be the most profitable strategy. ■

Find out more at [www.fiberspectrum.andritz.com](http://www.fiberspectrum.andritz.com)



"We can't afford to re-invent the wheel at each mill." Magnus Dahlblom (left) meets with Product Improvement Team members Hannu Riekkola, Kristina Mast, Lars Lindqvist and Bo Sjöström. Dahlblom was formerly a Project Manager at Metsä Tissue's Competence Center in Raubach, Germany and is now Production Manager at the Småland mills.

## The Kingdom of Crystal



*In the middle of the 18th century, German immigrants established the province of Småland as the home of the Swedish glass-making industry.*

*A very large province in Sweden, Småland also is home to vast forests and pleasant lakes. This region has many coastal towns that stretch along the Baltic. The Mörrumsån River is noted for salmon and sea trout and Lake Vättern for char fishing.*

*Three-quarters of the Swedish glassworks are found in the counties of Kronoberg and Kalmar. The glassworks, where craftsmen can still be observed hand-blowing glass, are open to visitors. Visitors may also be invited to a hyttssill — a traditional evening of entertainment including food of fried herrings, sausages and potatoes baked around the glass furnace, served with beer and schnapps.*

## Hallsta mill relies on RTS™ to raise TMP output while cutting energy costs

*Andritz has worked very closely with Holmen Paper to get more output from their TMP 3 line through the addition of two RTS™ refiners. The results have been excellent — energy savings of more than 300 kWh/tonne and improved quality. At the same time, the refiners gave a major boost in the line's production capacity.*



*Mikael Wahlgren, Manager of Mechanical Pulp Production at the Hallsta mill, with an Andritz twin dewatering screw in the background.*

Holmen Paper's Hallsta mill in Hallstavik, Sweden started newsprint production in 1915 and has now developed into one of the world's largest and most modern production facilities for high quality wood-containing printing papers. Annual paper production capacity at the mill has risen to nearly 800,000 tonnes.

During the past 20 years, Hallsta has placed increasing emphasis on moving up the value ladder. It has progressively been making more improved newsprint, SC, and other specialty printing papers, while at the same time phasing out production of bulk grades.

As part of its multi-year, multi-million Euro upgrading process, Hallsta recently modernized numerous parts of the mill to get better quality, output, and environmental efficiency. The centerpiece of the latest round of investments was the enormous PM 11 which started up in April 2002. This new machine, at 8.6 m trim width and capacity of 330,000 t/a, is focused on MF magazine papers and improved newsprint. It replaced an older, smaller machine and created an increased demand for pulp on the order of 110,000 t/a.

To feed PM 11 and to meet the increased pulp quality requirements, major investments were made in the woodyard, TMP lines, and bleaching areas of the mill. Andritz played a key role at Hallsta by supplying major pieces of equipment in each of these areas for the modernizations.



*The new Andritz 3300 m<sup>3</sup>/d wood line at Hallsta. The Photo shows the Waplans hydrostatic bearing debarking drum (5.6 m diameter and 36 m long) with a capacity of 175 m<sup>3</sup>sub/hr. For TMP, the debarking process must guarantee a high level of chip cleanliness (typically bark content of 0.1 to 0.2%). The Andritz DrumMatic™ control system at Hallsta ensures uniform cleanliness.*

## **Wood sorting for natural brightness**

In 1999, Andritz supplied a new wood processing line to replace two older lines, which were scrapped. The new Andritz line has a capacity of 3,300 m<sup>3</sup> per day and consists of a log infeed system, debarking drum, and chipper.

The mill's woodyard plays a key role in the drive for both product quality and environmental protection. Here, spruce logs are sorted as they come into the mill based on the annual growth rings in the wood. In a method that Holmen helped create in the mid-1990's, this rough sorting is used to separate the wood into three categories. The fastest growing logs, with the highest annual growth increments, are used for the highest brightness pulp.



**Lennart Karlsson, Process Engineer.**  
*"We are very satisfied with the installation."*

In this manner, says Lennart Karlsson, Process Engineer at Hallsta, the mill saves on bleaching chemicals and reduces the environmental load. "As we moved to improved grades with higher brightness requirements, it seemed logical to attempt to use the natural brightness of the wood," Karlsson says. "So the brightest chips are used for the highest qualities, therefore saving bleaching chemicals and, of course, money."



## TMP upgrade feeds PM 11

There are a total of four PMs being fed by four pulp lines. Three lines run TMP, and the oldest line, from the early 1960's, runs stone groundwood.

Hallsta tries to focus its pulp lines so that, essentially, one line feeds one paper machine. TMP 3 is the one dedicated to PM 11. When the paper machine is running full speed (1850 m/min), it consumes around 1,050 t/d of pulp. Before the rebuild, TMP 3 was only capable of making 700 tonnes per day. Clearly, something had to be done to increase capacity.



*"We were guaranteed savings of at least 300 kWh/tonne and that adds up to a lot of money over the year." An Andritz RTS™ refiner (model S 3068) connected to a 17 MW motor operating at 2300 rpm.*

Faced with this need to produce more pulp, Pulp Mill Manager Mikael Wahlgren and his team looked at several alternatives for adding pulp capacity to TMP 3. With energy costs rising in Sweden, Wahlgren was also highly motivated to reduce specific energy costs for the TMP. Andritz worked closely with Hallsta to explore alternatives for modernizing TMP 3.

*The Andritz S 3068 refiner, with design capacity of 285 t/d was operating at 350 t/d less than a year after start-up.*



*An Andritz S 3068 replaced an old Jylhä refiner from the late 1980's. "It was a tight fit, but the Andritz refiners are compact. Saving space was an added advantage."*

## Energy savings from RTS™ refiners

Hallsta's TMP 3 is composed of four parallel lines, each made up of one primary and one secondary refiner. The equipment, before the Andritz rebuild, was composed of old Jylhä refiners from the late 1980's. In the end, the mill decided to install two new Andritz RTS™ refiners in the primary positions on two of the lines.

"Essentially," says Wahlgren, "we went with the Andritz RTS™ technology because it would save us energy."





"We were guaranteed savings of at least 300 kWh/tonne and that adds up to a lot of money over the year. The RTS™ was also a good solution because the refiners are rather compact. Since TMP 3 is tightly packed into the building, saving space was an added advantage," Wahlgren said.

The RTS™ concept is an Andritz development which adds a new dimension to the conventional TMP process — refiner speed. The refiner plates turn at around 2300 rpm, versus 1500 rpm for normal refiners. RTS™ raises the preheating temperature at a controlled retention time to prevent lignin from coating the fibers. Pulp quality is improved and the specific energy per ton of pulp produced is significantly reduced.

So far, says Wahlgren, the RTS™ refiners have worked very well, with energy consumption well below the previous levels and the pulp quality is excellent.

"We are saving 300 or more kWh per tonne and the pulp properties are as good or better than with the old refiners. Light scattering, for example, is even better with the new RTS™ refiners," he said.

### **Savings higher than expected**

Karlsson, the Process Engineer responsible for the TMP 3 line, was very involved in the installation, start-up, and continuing optimization of the RTS™ refiners. "We are very satisfied with the installation," says Karlsson. "It has fulfilled all of the goals as far as quality is concerned and we are saving more energy than Andritz guaranteed. We had been looking for 300 kWh/tonne and are sometimes getting 350 or even more. We are using around 1,600 kWh, although this varies depending on the wood quality."



*Bleach plant Superintendent, Göran Larsson, near one of two new Andritz Twin Wire presses (3.6 m working width) in the post-bleach wash position.*

### **Trials to test capacity**

Capacity and throughput on the new line have also been very good, with the mill continuing to run trials to see just how much pulp the RTS™ units are capable of making. Micael Axelfelt, Northern European Sales Manager for Andritz,

works closely with the mill on these capacity trials. In fact, he has been working very closely with the Hallsta team for more than 20 years, as he was a process engineer at the mill before joining Andritz.

The idea, says Axelfelt, is to put as much of the tonnage as possible through the low-energy RTS™ units, to gain both energy savings as well as improved pulp quality. In June 2003, the mill succeeded in producing 15 t/h — the equivalent of 360 t/d — during trials on the RTS™ line. The capacity of TMP 3 is now about 900 tonnes per day, with the disk filter being the bottleneck in the system.

All in all, the Hallsta team is very pleased with their choice of the Andritz RTS™ solution. With high quality pulp, produced at lower energy costs, feeding a new paper machine, it looks like Hallsta will remain a top player in the mechanical printing paper markets for a long time to come. ■



*Micael Axelfelt, Sales Manager for Andritz, with Joakim Lirfeldt, Maintenance Manager at Hallsta. Axelfelt was a process engineer at the mill before joining Andritz.*

Find out more at  
[www.fiberspectrum.andritz.com](http://www.fiberspectrum.andritz.com)

## Unique team **OPEns** the way for millwide reliability

**ASIP - Assistência e Serviços para a Indústria do Papel, ACE, a special-purpose corporation owned by Andritz, Siemens, ATM, and Portucel, is responsible for the millwide maintenance at Portucel's Setubal mill in Portugal.**

**This is part of Andritz's service concept called Overall Production Efficiency (OPE®) where the goal is to increase the production of a process line, or entire mill, by leveraging the overall maintenance activities.**

In the case of Setubal, the goal was not just to reduce maintenance costs, according to Henrique Figueira, Pulp and Energy Production Manager. "Our first priority was to increase the availability of the installed equipment, through better maintenance approaches and state-of-the-art procedures. We are not interested in saving money if, for instance, the availability of the equipment decreases. We want to keep availability at a high level, at the minimum cost."

Seppo Sandberg, Site Manager for ASIP and also an Andritz employee, supports the logic to this approach.

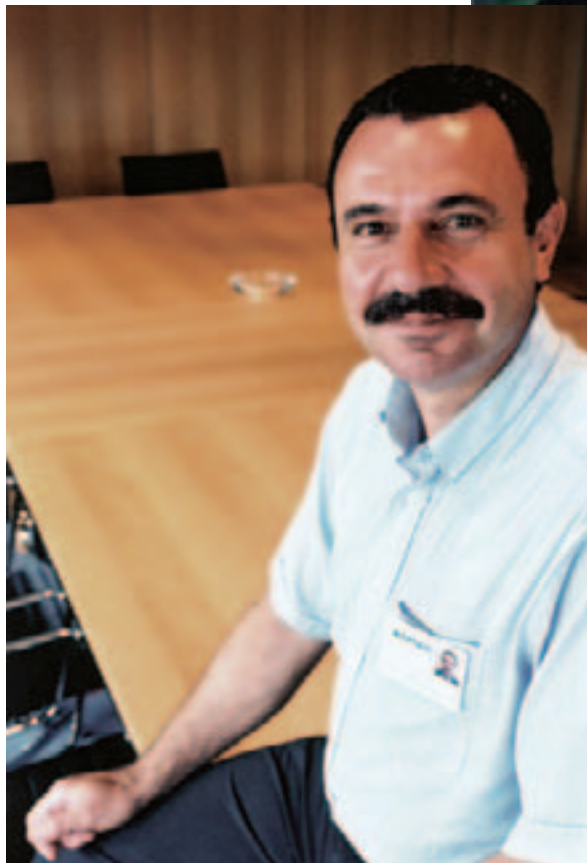
"Maintenance cost per tonne of pulp is a key performance indicator," Sandberg explains. "Each month we report on the total maintenance cost per tonne of pulp produced. ASIP's compensation is based upon achieving key performance criteria (production, quality, raw material consumption, safety, etc.) for each process area and overall."

"As the Site Manager, I have two simple targets. The first is customer satisfaction. Without customer satisfaction, the second target is not achievable. The second target is a positive financial result for my company."

### **The drive for more production**

Figueira says that the short-term goal is not only to significantly reduce maintenance costs, but to increase production for the same level of maintenance spending. This will reduce maintenance cost/tonne. The benchmark cost before ASIP began was 35 euros per tonne. Today's target is 27 euros per tonne. "The drive is for more production at a higher equipment availability," Figueira says.

"Our first attempt at outsourcing local maintenance began about eight years ago in the woodyard area," Figueira says. "We also did this for the effluent treatment plant, but only small local companies were involved at that time."



**Left: Henrique Figueira, Pulp and Energy Production Manager for Setubal.** "We want to keep equipment availability at a high level, at the minimum cost."

**Right: Seppo Sandberg (right), Site Manager for Andritz's OPE® team at Setubal, confers with a pulp production supervisor in front of the continuous digester.**





*ASIP workers replace the bearings on a back-up turbine generator at the mill.*

The first major outsourcing contract Portucel made was for the Power area. They put the Power and Woodyard areas together in one contract a couple of years ago and first selected another supplier to do the maintenance. Then the mill awarded a Fiberline maintenance contract to ASIP at the end of 2001.

"In March 2003, we made the decision to consolidate all the local maintenance for the whole pulp mill into one contract with ASIP, as we were satisfied with what had been done in the Fiberline area since January 2002," Figueira says. Pulp production of the mill is now 480,000 t/a.

"We needed a good, dedicated team with engineering backup," he continues. "That's why we selected ASIP. They have the knowledge, the procedures, and the team to achieve the goals we have placed on ourselves."

## Outsourcing — more than "labor brokers"

Portucel has had a good relationship with Andritz for years and was open to discussions about new ways of doing maintenance at a time when Andritz was developing its OPE® service concept.

"The OPE® concept here at Setubal is based upon using our process expertise, our equipment knowledge, maintenance expertise from ourselves and Siemens, and the expertise available at the Setubal mill to form a partnership," says Risto Hämäläinen, head of Pulp Mill Services for Andritz. "This is not simply labor outsourcing. We're adding as much value to the production side as the maintenance side."

"ASIP has very professional people at our mill," Figueira says. "Process and equipment experts from Andritz and Siemens, their very best specialists from Austria, Finland, and the USA visited the mill to evaluate production performance and conduct higher level process and technical studies in the fiberline, screening, recovery, and pulp drying areas."

"This is one of the added values we bring to the customer — our process expertise," Hämäläinen adds. "This was part of our initial proposal to Portucel in order to distinguish OPE® from a conventional maintenance service. All of our work, including the special studies, is designed to help Portucel get better and more production out of this mill."

"Much of the main production equipment we have here is from Ahlstrom Machinery, which is now a part of Andritz," Figueira says, "But, even if it weren't Andritz equipment, I don't think there would be any risk in getting Andritz involved in an OPE program, due to the fact that they have their background in process design, engineering, equipment design, and manufacturing of the equipment used here."

"We are working with a very enlightened management at this mill and they understand the role of maintenance in



**Roberto Lemos, ASIP's specialist for Chemical Recovery, confers with his colleague from Siemens regarding maintenance activities near the lime kiln. Lemos, a native of Brazil, has worked on projects for Andritz in South America.**

reducing the overall cost of a produced tonne of pulp," Sandberg says.

### The ASIP organization

ASIP consists of about 150 people and includes people who used to work directly for Portucel.

For strategic reasons, Portucel continues to staff the workshop and engineering functions inside Portucel. The workshops include the facilities inside the mill and also some special shops

on the outside. Engineering is responsible for analyzing process equipment, supporting capital investments, and planning for the annual shutdown. Portucel also maintains the spare parts stores.

"Our first and most important responsibility is the daily maintenance of the mill," Sandberg explains. "As a part of this, we perform predictive maintenance on equipment as we build the historical database about equipment performance. When we began working here, we had no historical data to work from."

ASIP commits about 10 people in the organization to various "engineering" functions such as making improvement studies, investigating equipment failures and compiling fault reports.

Any shutdown longer than four hours is analyzed in a Fault Report. Engineering personnel analyze what happened, what steps were taken, and propose corrective actions. The proposal indicates what resources (ASIP, Portucel, third party, etc.) are required to correct the problem.

The goal is to provide higher availability of the equipment at the same (or less) cost/tonne than Portucel had done previously.

"Even though we wear different uniforms, in the daily maintenance work

there is no difference between Portucel and ASIP people," Sandberg says. "We work together very well. Perhaps one advantage for the employee working for ASIP is the training we provide. Portucel even pays a percentage of the costs so their own people can participate in our training to keep updated on current maintenance procedures."

"I think it is a real challenge for ASIP to take people who used to work for Portucel and organize those persons to handle all the requests for maintenance that the mill generates," Figueira says. "Having the right skills in the right place at the right time is not easy."



*Juha Welling (left), ASIP's Fiberline specialist, checks the heat profile of operating equipment with a non-contacting temperature gauge. Recording the results is Lauri Welling.*



*José Eduardo takes measurements in the field to design a modification to the log delivery system in the woodyard at Setubal.*

## Millwide results

"We have monthly reports about the availability of each process area on a daily basis (time stops) and production losses in comparison with maximum sustainable production throughput," Figueira says.

Figures show that equipment availability is in general improved, together with an increase in mill Capacity Efficiency (CE).

"Provided that the current performance can be sustained, or even improved in the near future at a reasonable cost," Figueira says, "I can foresee this partnership has the possibility to be developed over a longer time."

At the end of the current three-year contract, Portucel and ASIP will sit down to evaluate the overall activities and see if all partners have the common interest to renew the contract period. "There is still a lot that can be done," Figueira says. ■

Find out more at  
[www.fiberspectrum.andritz.com](http://www.fiberspectrum.andritz.com)

## Portucel



**Portucel Soporcel Group**, with a turnover of 1,085 million euros in 2002, holds a leading competitive position among European producers. It operates three mills in Portugal: Setubal, Figueira da Foz, and Cacia.

The Group sold 606,000 tonnes of pulp and 905,000 tonnes of paper in 2002. Portucel has developed the capability to utilize more eucalyptus in uncoated woodfree sheets.

Today, with only a small amount of long fiber in the mix, Portucel produces very good quality office papers — its "Navigator" and "Discovery" brands are among the leaders in Europe for brand equity and brand quality.



*The Setubal Mill started up in 1964. First, batch digesters were utilized to produce about 100,000 t/a of bleached and unbleached eucalyptus and Portuguese pine pulps.*

*In 1979, a complete pulp line with a continuous digester was added and production increased to 260,000 t/a of fully bleached eucalyptus. In 1989, a major modernization occurred, both for quality and environmental reasons.*

*This included a new continuous digester, a new recovery boiler, and the closure of the 1964 pulping line. The mill is located in the heart of some natural preserve areas, so environmental issues are very important.*

*Since 1995, the mill has been de-bottlenecked and fine-tuning operations were implemented (e.g. increased evaporation capacity, modifying one digester to expand the*

*cooking zone, etc.). Total output of the pulp mill is now 480,000 t/a.*



## Catastrophe to “Trophy” in Slovenia



*Andritz's Christian Pedratscher (left) with Danijel Ostir, Vipap Videm Krsko's Technology & Development Manager, pictured with "lower quality" waste furnish.*

**Shortly after the formation of its Fiber Preparation Division, Andritz was awarded its first turnkey Deinked Pulp (DIP) line order by Vipap Videm Krsko Proizvodnja Papirja in Celuloze d.d., Krsko, Slovenia.**

To say that Danijel Ostir and his team at Vipap Videm Krsko, Slovenia were in a sticky situation in 1998 is an understatement.

As Head of Technology and Development for this southeastern European producer of newsprint and packaging grades, Ostir knew the mill's survival was at stake. Externally, the company had to endure Yugoslavia's civil war and a downward spiral for paper pricing. Internally, the mill's quality and environmental issues were, in Ostir's words, "close to a catastrophe."

In rapid succession, Vipap Videm Krsko lost many customers who had purchased products for more than 20 years. The company was also facing fines in the millions of euros because of high COD/BOD emissions into the Sava River from their chemical pulp mill. The mill did not have the investment capital to modernize this antiquated pulping facility (bought secondhand in the 1970's) or rebuild their paper machines. Two small deinking units they had recently installed were overwhelmed by stickies, resulting from high amounts of glues and plastic wrap in the wastepaper furnish.

To add to the turmoil, the ownership changed, not once but twice, in 1998. The original owner, ICEC, a Czech private company, was bought by the IPB bank of the Czech Republic, which then sold the mill to CSOB, another Czech bank.



## Moving toward a new beginning

Going back to the days of the original owners, Ostir and his team analyzed and prepared over 40 options for a path forward. All of this was happening in the context of "consistently poor quality" production and countless hours trying to placate customers who were threatening to throw Vipap Videm Krsko out for good.

With a grin today, Ostir can speak of these times as having a good side. "We were fighting for our lives," he says, "but we believed we could get through the mess."

But which was the right path forward? Says Ostir, "Basically, we proposed to move from wood-free to wood-containing newsprint, and still produce some graphic paper. We knew that whatever we produced, it would have to be constant quality and a competitive product."

In contrast, the mill's original owners envisioned production of a wide range of newsprint and graphic paper grades. Fortunately for Ostir and other Vipap Videm Krsko managers, IPB, and then CSOB, supported the plan they believed would serve customers, shareholders, and employees best. They put the central focus on newsprint and improved newsprint, increasing DIP and ground-



*Dragan Kranjc, VVK's Production Manager for PM 1 & PM2, is satisfied with higher production efficiency and higher quality paper, resulting from the new DIP plant and paper machine rebuilds.*

wood pulp production to a level that would replace chemical pulp completely.

This would offer management options for raw material ratios and launch an approach to raise environmental standards even higher in some parameters than those of the European Union (of which Slovenia will become a member

on May 1, 2004). They could also close the chemical pulp facility without losing any core customers.

Their pursuits are paying off. Since the fall of 2003, they have had a new deinking plant with a capacity of 160,000 t/a, and a rebuilt thermal groundwood (TGW) plant of 50,000 t/a about to come on-stream. In addition, two paper machines have been rebuilt to boost quality of news and improved news, including installation of quality control and distributed control systems. Best of all — Vipap Videm Krsko has seen the return of old customers, and orders from completely new customers.

Says Ostir, "The days of paying high fines because of pollution are over. That crippled our ability to make a profit. The new DIP line and, soon, our rebuilt TGW plant give us a fresh start. The original catastrophe for shareholders, employees, and the community is on the verge of being a big success. If there were a *trophy* for overcoming catastrophe, we should win it."



*Only one operator is needed to run the entire DIP facility. The Andritz cleaner plant can be seen through the control room window in the background.*

## Turnkey DIP from Andritz

Andritz's contribution to the Vipap Videm Krsko success is higher quality pulp, produced by the turnkey 400 t/d DIP line. The line started up in June 2003.

Andritz gives the mill the flexibility to achieve higher brightness with online bleaching. All design, engineering, equipment, instrumentation, tanks, chests, pipework/erection, start-up supervision — even assistance securing financing — came from Andritz.

Today, the headaches of stickies are gone, as the DIP line helps Vipap Videm Krsko consistently make standard and improved newsprint, using ONP, OMG, and Mixed Office Waste as furnish.

According to Christian Pedratscher, Senior Vice President & Divisional Manager for Fiber Preparation Systems with Andritz, "Vipap Videm Krsko now has the opportunity to purchase less expensive wastepaper, but run smoothly, and satisfy their customers."

Pedratscher points out that Andritz has been in the recycled fiber prepara-

tion business for decades, but never like today. "Vipap Videm Krsko represents the official beginning of our role as a complete solutions supplier, combining the capabilities of the former Ahlstrom Machinery Corporation and Andritz, where we intend to grow our market share. Our turnkey offering positions us to win other orders where mills seek to maximize the value of wastepaper and lower costs."

Evident at Vipap Videm Krsko are Andritz's recent developments, notably the SelectaFlot™ pre-/post-flotation cells, and the CompaDis™ dispersion system, which contribute to the quality of Vipap Videm Krsko's complete line. In addition, the DIP plant includes the proven FibreFlow® Drum pulper, coarse and fine screens, thickening with screw presses and disc filters, cleaner plants, HC peroxide and MC dithionite post-bleaching, and the internal water treatment system.

The FibreFlow® Drum has a 3.5 m inner diameter and a design capacity of 560 admt/d. The Drum produces strong, clean pulp continuously, and

eliminates the need for separate de-trashing equipment. The gentle pulping process produces high yields with minimal fiber damage.

Following the Drum are three stages of coarse screening with ModuScreen C6R and C4R units. Hole size for the screens is Ø 2.0 mm. The first SelectaFlot™ unit, consisting of five primary and two secondary cells is then used for pre-flotation. The patented Multi-Injector inside the SelectaFlot™ cell creates optimal bubble size for maximum dirt speck removal and optimum brightness. The energy consumption is also about 20% less than comparable cells, according to Pedratscher.

Following pre-flotation, four stages of AhlCleaner TC 133 cleaners are employed. Fine screening is accomplished in a single ModuScreen HB7R unit, slot size 0.15 mm, and thickening is accomplished with an Andritz Disc Filter and Screw Press.

After thickening, the CompaDis™ disperser combines heating and feeding in one advanced unit. The technology



SelectaFlot™



FibreFlow® Drum

was based on Andritz's long experience with HC refiners. Compared with other dispergers, the design minimizes space requirements. A second SelectaFlot™ unit, consisting of four primary and two secondary cells, follows the disperger in a post-flotation capacity. After thickening in another Disc Filter, the pulp is sent to storage (for standard news) or MC Dithionite bleaching (for improved news). Final brightness of improved newsprint is about 65 ISO.

### **The irony of trouble starting with customers**

The challenge of any deinking system is to deal with problematic furnish. The irony of the contaminant problem is that the mill's customers (printers) are often the culprits in causing problems in the mill's production. As printers use more and more glue for binding, including hot melt techniques, wastepaper is laden with materials that tend to agglomerate into stickies — producing breaks, holes,

and many complaints when the paper hits a printing press.

The deinking system from Andritz has delivered a knockout punch to this problem. The other culprit, metal objects from wire to staples, is also eliminated early.

Says Pedratscher, "Taking out all the heavy contaminants in the beginning is essential so that they don't have a chance to transfer problems throughout the process."

Even rejects now serve a useful purpose, combining with bark to become energy in the mill's new biomass boiler. The deinked waste rejects, including ash and fibers embedded in the ink, go to sludge dewatering, are pressed to 65% dry content, then are fed into the biomass burner.

### **Thumbs up at the paper machine**

According to Dragan Kranjc, Production Manager for PM 1 & 2, the new deinked

pulp system and a rebuild of the wet end are producing positive results.


"Papermaking results are much better," Kranjc says. "We see fewer particles in the sheet. Now we have fewer breaks because of the new deinking system, and rebuilding of the top wire, a new press section, and dryer section."

### **Looking to the future**

Vipap Videm Krsko is well-positioned with options to produce quality paper on a consistent basis, meet or exceed environmental levels of the European Union, and have the flexibility to adjust the ratio of deinked to groundwood, based on cost and desired properties in the sheet.

What's ahead? Says Ostir, "Optimization, finding ways to make inferior waste perform at high levels, and certainly no catastrophes!" ■

Find out more at  
[www.fiberspectrum.andritz.com](http://www.fiberspectrum.andritz.com)



**"Prior to installing the Andritz DIP system we could not handle the contaminants and maintain high efficiency or quality paper."**

*Danijel Ostir, Vipap Videm Krsko's Technology & Development Manager*



**CompaDis™ disperger**

# New Orders

## Wood Processing

### Complete Lines & Systems

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**Weyerhaeuser**  
**Valiant, OK USA**  
Woodyard  
*Duplicate of Weyerhaeuser,  
New Bern, NC project in 2002*

**Sappi**  
**Cloquet, MN USA**  
HHQ-Chipper  
*First horizontal fed HHQ-Chipper in N. America*

**Henan Puyang Longfeng**  
**Puyang City, Henan Province, China**  
Woodroom equipment for APMP

**Jiangxi Chenming Paper**  
**Nanchang, Jiagxi Province, China**  
Woodyard

**Jiangsu Dare Wood**  
**Henan Province, China**  
Woodroom equipment for MDF

**Confidential Customer**  
**Hainan Province, China**  
Woodyard containing four chipping lines

**Guangdong Weihua**  
**Meizhou City, Guangdong Province, China**  
Woodroom equipment for MDF

**Grant Forest**  
**Englehart, Ontario Canada**  
Rotary Debarker Line  
*Sister mill to Timmins, our  
first RotaBarker™ installation*

### Key Equipment

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**Brabant Van Opstal**  
**Breda, Netherlands**  
PowerScrew™ reclaimers

**Interstate Paper**  
**Riceboro, Georgia, USA**  
Stacker-Reclaimer

**Soporcel**  
**Figueira da Foz, Portugal**  
Chip screening with CS800 Screen

### Upgrades & Modernizations

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**Mondi Kraft**  
**Richards Bay, South Africa**  
Chip screening with two CS800 Screens

**Metsä-Botnia**  
**Kaskinen, Finland**  
DrumMatic™ Control System

**Iggesund Paperboard**  
**Workington, United Kingdom**  
Chip handling

## Chemical Pulping

### Complete Lines & Systems

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**Veracel Celulose**  
**Eunapolis, Brazil**  
Complete Fiberline  
White Liquor Plant  
*Biggest single-line capacity in the world*

**P.T. Riau Andalan P&P**  
**Kerinci, Indonesia**  
Cooking & DD-Washing System for Pin Chips and Fines

**UPM-Kymmene Wisaforest**  
**Pietarsaari, Finland**  
Cooking & DD-Washing System for Sawdust

### Key Equipment

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**Oji Paper**  
**Tomioka, Japan**  
X-Filter™

**Metsä-Botnia**  
**Kemi, Finland**  
Stirox™ White Liquor Oxidation

**Glatfelter Company**  
**Spring Grove, PA USA**  
LC Ozone Bleaching System  
*First commercial application of LC ozone  
bleaching outside of Asia*

**Confidential Customer**  
**Southeast USA**  
V-Max™ Drum Washer, DD Washer,  
MC® Pump Systems  
5-stage washing system

**Weyerhaeuser Canada**  
**Kamloopa, BC Canada**  
Replacement M&D Digester System

**Kimberly Clark**  
**Terrace Bay, Ontario, Canada**  
Two-Stage Bleaching System

**Shandong Tralin Paper**  
**Gaotang, Shandong Province, China**  
Coarse and Fine Screens for Multiple Fiberlines

**Confidential Customer**  
**Hainan Province, China**  
Screening Components for new Fiberline

### Upgrades & Modernizations

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**CENIBRA - Celulose Nipo-Brasileira**  
**Fonseca, Brazil**  
Lime Kiln

**Suzano de Papel e Celulose**  
**Suzano, Sao Paulo, Brazil**  
Lime Kiln

**Alabama Pine Pulp Company**  
**Perdue Hill, AL USA**  
Downflow Lo-Solids® Cooking Upgrade  
*First triple extraction Downflow Lo-Solids®  
on two-vessel hydraulic digester*

**Graphic Packaging**  
**West Monroe, LA USA**  
Upflow Lo-Solids® Cooking Upgrade  
*Repeat order, High Kappa Softwood*

**Stora Enso**  
**Varkaus, Finland**  
New DD-Washer & EoP-Bleaching Stage

**Metsä-Botnia**  
**Kemi, Finland**  
Screening & Washing Upgrade,  
White Liquor Oxidation

**Stora Enso**  
**Norrundet, Sweden**  
New DD-Washer & D<sub>0</sub>-Bleaching Stage

**Portucel Tejo**  
**Rodao, Portugal**  
Fiberline Upgrade, New DD-Washer

**Segezha Pulp & Paper**  
**Segezha, Russia**  
New Lo-Level™ Feed System,  
Screening & DD-Washer

**Sappi**  
**Tugela, South Africa**  
New DD-Washer & Atmospheric Diffuser

## Sheet Drying & Baling

### Complete Lines & Systems

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**Confidential Customer**  
**Hainan Province, China**  
Sheet Drying Line 9,3 m  
*Biggest single line Pulp Drying Plant in the  
world (3230 t/d) when starting up*

**Stora Enso North America**  
**Wisconsin Rapids, WI USA**  
4,2 m Wet Lap, incl. Baling Line and Controls  
*Biggest single line Wet Lap Plant in the world.*

**Veracel Celulose**  
**Eunapolis, Brazil**  
Sheet Drying Line 9,33 m  
*Complete line from storage tower to finished  
bale — one of the largest in the world*

### Upgrades & Modernizations

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**Mondi Kraft**  
**Richards Bay, South Africa**  
Sheet drying rebuild and capacity increase to  
1600 t/d. Two new baling lines.  
*Includes new "Autograding - Autotracking"  
technology*

**Gulf States Paper**  
**Demopolis, Alabama, USA**  
Rebuild of Pulp Dryer (Ross)

## Mechanical Pulping

### Complete Lines & Systems

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**Stora Enso Veitsiluoto**  
Kemi, Finland  
HC-Bleaching for SGW

**SCA Graphic Sundsvall**  
Ortviken Mill, Sundsvall, Sweden  
TMP Bleaching System 400 admt/d

**MD Papier**  
Plattling, Germany  
HC-Bleaching System

**Kruger**  
Wayagamack, Quebec, Canada  
350 tpd GWD Post Washing

**Kruger**  
Trois Rivières, Quebec, Canada  
52/58 Refiners for 3rd stage TMP refining

**Jiangxi Chenming Paper**  
Nanchang, Jiangxi Province, China  
HC refining and bleaching

**Henan Puyang Longfeng Paper**  
Puyang City, Henan Province, China  
330 t/d P-RC APMP System

### Key Equipment

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**UPM-Kymmene**  
Kaipola, Finland  
Reject Screw Press

**Stora Enso**  
Summa, Finland  
Steam cyclones

**Stora Enso**  
Niagara, WI USA  
HC Mixer

**Trombini Embalagens**  
Curitiba, Parana, Brazil  
HC refining

### Upgrades & Modernizations

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**Holmen Paper**  
Vargön, Sweden  
Extension of Bleach Plant

**Holmen Paper**  
Hallstavik, Sweden  
Twin Wire Press  
*12th Twin Wire Press for Holmen*

**Perlen Papier**  
Perlen, Switzerland  
Upgrade 350 t/d

**Tembec**  
Malette, Quebec, Canada  
P-RC conversion

## MDF

### Complete Lines & Systems

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**Camsan**  
Ordu, Turkey  
500 t/d Pressurized Refining System for sawdust and chips

**Tever MDF**  
Istanbul, Turkey  
Pressurized Refining System

**Shandong Liborihua**  
Shandong Province, China  
Pressurized Refining System

**Fujian Yongan Forestry**  
Yongan City, Fujian Province, China  
Pressurized Refining System

**Asia Dekor Heyuan Woods**  
Shenzhen, Guangdong Province, China  
Front-End Package consisting of Woodyard, Chip Washing, and Pressurized Refining System

**Guangdong Weihua**  
Meizhou City, Guangdong Province, China  
Refining System including Woodyard and Chip Washing

**Guangxi GuanHua Beihai WBP**  
Beihai City, Guangxi Province, China  
Pressurized Refining System

**Midland Constuction via Dieffenbacher**  
Vietnam  
Pressurized Refining System

**Yankuang Group**  
Zoucheng City, Shandong Province, China  
Pressurized Refining System

**Lian Shui Hui Tai Timber Industry**  
Jiangsu Province, China  
Pressurized Refining System

**O.o.o. Kronostar**  
Scharya, Russia  
Pressurized Refining System including Chip Washing  
*World's largest MDF Pressurized Refining System including Chip Washing*

**O.o.o. Kronospan**  
Egorievsk, Russia  
Pressurized Refining System

**Jiangsu Dare Wood**  
Fuzhou, Jiangxi Province, China  
Front-End Package consisting of Woodyard, Chip Washing, and Pressurized Refining System  
*2nd Line*

**Shanghai Wanxiang Wood Industry**  
Shanghai Province, China  
Pressurized Refining System including Chip Washing

**Harbin Shengxing Woods**  
Harbin, Heilongjiang Province, China  
Pressurized Refining System including Chip Washing

**Shandong He You Group / Yucheng III**  
Yucheng City, Shandong Province, China  
Pressurized Refining System

**Imal / Arian Sina**  
Italy / Iran  
Pressurized Refining System

**Anhui Taihu Country Board Industry**  
Taihu Country, Anhui Province, China  
Pressurized Refining System

**Henan Mengzhou WBP**  
Mengzhou City, Henan Province, China  
Pressurized Refining System

**Yunnan Jinggu Forestry**  
Jinggu City, Yunnan Province, China  
Pressurized Refining System

**Heze Jiaotong Group**  
Heze City, Shandong Province, China  
Pressurized Refining System

**Anhui Luzhou WBP**  
Suzhou City, Anhui Province, China  
Pressurized Refining System

## Fiber Preparation

### Complete Lines & Systems

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**Jiangxi Chenming Paper**  
Nanchang, Jiangxi Province, China  
DIP system for 400 t/d for LWC grades (Incl. two dispersing stages)

**Heilongjiang Black Dragon**  
Qiqihar, Qiqihar Province, China  
DIP system for 450 t/d for newsprint grades

**FS-Karton (Mayr-Melnhof Group)**  
Neuss, Germany  
DIP system for 200 t/d for top layer for board machine  
*First complete line incl. sludge dewatering in Germany*

**Nanping Paper**  
Nanping, Fujian Province, China  
DIP system for 270 t/d for newsprint grades

**Guang Dong Jian Hui International**  
Guang Dong, Guangdong Province, China  
Complete Board Machine Approach System; Refining and Broke Handling

**Nine Dragon**  
Dong Guang City, Guangdong Province, China  
Complete Board Machine Approach System

**Shandong Tralin**  
Gaotang, Shandong Province, China  
Two Complete Paper Machine Approach  
Systems

**Stora Enso Hylte**  
Hyltebruk, Sweden  
Complete FibreFlow® Drum concept

**UPM-Kymmene**  
Changshu, Jiangsu Province, China  
Complete Paper Machine Approach System;  
Disc Filter and Broke Handling

#### Key Equipment

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**Stora Enso Reisholz**  
Düsseldorf, Germany  
Saveall disc filter  
*First new Andritz disc filter with 5.7m diameter*

**M-real Stockstadt**  
Stockstadt, Germany  
Papillon refiners  
*New cylindrical refiner for bleached hardwood  
kraft pulp for coated fine paper and copy paper*

**Krempel Pressspanwerk**  
Thalheim, Germany  
Papillon refiner  
*Refining of unbleached soft wood kraft pulp for  
fibreboard/pressboard, abrasive base paper  
with new cylindrical refiner*

**M-real Hallein**  
Hallein, Austria  
Papillon refiner  
*Refining of bleached kraft pulp (beech)  
for printing and writing grades with new  
cylindrical refiner*

**Hebei Pan Asia Long-Teng Paper**  
Shijiazhaung, Hebei Province, China  
Pulp screw presses SCP1410  
LC discharge system for HC-Tower  
Gravity tables GT 308

PowerDrain PD 1500 L  
Sludge screw presses SCS 1408  
*Key components for 1,200 t/d DIP line  
for newsprint*

**Sappi Austria**  
Gratkorn, Austria  
Wet and dry broke pulper for  
writing and printing grades  
*First new pulper with new rotor design*

**Norske Skog Bruck**  
Bruck a.d. Mur, Austria  
Andritz CompaDis™ disperger for  
160 t/d for LWC line  
*New Andritz disperger without heating screw*

**Stora Enso**  
Kvarnsveden, Sweden  
Screening

**Sun Paper, Taiyang Paper Industry**  
Yanzhou, Shandong Province, China  
Stock preparation

**Chenming Shouguan Paper**  
Shandong Province, China  
Board Machine Approach System

**UPM-Kymmene**  
Changshu, Jiangsu Province, China  
Stock preparation

#### Upgrades & Modernizations

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**UPM-Kymmene**  
Steyrermühl, Austria  
Disc Filter upgrade

**Norske Skog**  
Golbey, France  
Disc Filter upgrade

**Stora Enso**  
Kemi, Finland  
Disc Filter and Paper Machine Approach  
System rebuild

## Tissue Machines

### Complete Lines & Systems

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**SCA Tissue North America**  
Florence, AL USA  
Wet-Crepe Tissue Process Line

**Swedish Tissue (LPC Group)**  
Kisa, Sweden  
Pre-engineering for CrescentFormer  
tissue machine  
*2nd TissueFlex™ Machine for LPC*

## Ventilation & Drying For Tissue and Paper Machines

### Key Equipment

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**W. Hamburger**  
Pitten, Austria  
Canopy Hood and Heat Recovery

**Ronco Group**  
Mahopany, PA USA  
Heat Exchanger and Process Air System

**Stora Enso Veitsiluoto**  
Veitsiluoto Mill, Finland  
Paper Machine Hood

**Kappa Sturovo**  
Sturovo, Czech Republic  
Rebuild of Air System and Heat Recovery

**SCA**  
Flagstaff, AZ USA  
Yankee Hood and Process Air System

**Procter & Gamble**  
Green Bay, WI USA  
Yankee Hood and Process Air System



*This new 5.5 m wide Andritz PrimeLine™ tissue machine for Kriepa Hygienepapier in Kriebstein, Saxony, Germany features the most advanced tissue technology available today.*

## Wood Processing

### Complete Lines & Systems

#### Celulosa Arauco y Constitución Valdivia, Chile

Complete wood processing system with two debarking lines for eucalyptus and pine

#### Jiangsu Dare Wood Danyang, Jiangsu Province, China

MDF Woodyard

#### Yueyang Paper Group Yueyang City, Hunan Province, China

APMP Woodyard

#### Shandong Chenming Paper Shouguang City, Shandong Province, China

APMP Woodyard

#### Weyerhaeuser New Bern, NC USA

Tree length debarking system

#### Stora Enso Baienfurt Baienfurt, Germany

Groundwood debarking line and grinder feeder extension

#### Korsnäs Gävle, Sweden

Chipping line

### Upgrades & Modernizations

#### Weyerhaeuser Canada Grande Prairie, Alberta, Canada

Portal Crane Modernizations

*Modernization of 2nd P & H crane*

#### Sappi Skowhegan, ME USA

Chip Bin Modernization with CantiScrew Reclaimer - turnkey

## Chemical Pulping

#### CENIBRA - Celulose Nipo-Brasileira Fonseca, Brazil

Lime Kiln Modernization

#### Suzano de Papel e Celulose Suzano, Sao Paulo, Brazil

Lime Kiln and Reausticizing retrofit

#### Ripasa Limeira, Brazil

Lime kiln, CPR- filter LMD, sector cooler, make-up system

#### Metsä-Botnia Kemi, Finland

Stirox, White Liquor Oxidation

#### Metsä-Botnia Kaskinen, Finland

Evaporation plant modification

#### Frantschach Pulp and Paper St. Gertraud, Austria

Evaporation plant retrofit

#### Papelera Guipuzcoana de Zicunaga Hernani, Spain

Evaporation plant modification

#### Andhra Pradesh Rayons Secunderabad, India

NCG boiler

#### Stora Enso Varkaus, Finland

DD-Washer & EoP-Bleaching stage

#### Smurfit Carton de Colombia Puerto, Isaacs, Columbia

DD-washer

#### Metsä-Botnia Kemi, Finland

Screening and Washing Modification, White Liquor Oxidation

## Mechanical Pulping

### Complete Lines & Systems

#### Holmen Paper Wargöns Mill, Vargön, Sweden

Upgrade of Bleach Plant

#### UPM-Kymmene Jämsänkoski, Finland

Jylhävara refiner rebuild

#### Zubilade Aizarnazabal, Spain

Jylhävara Refiner rebuild

#### Stora Enso Port Hawkesbury, NS Canada

Twin-66 refiner rebuild; SB170 refiner rebuild

#### Millar Western Whitecourt and Meadow Lake, Canada

Screen room upgrade

## Fiber Preparation

### Complete Lines & Systems

#### Vipap Videm Krško Krško, Slovenia

Complete turnkey Deinking Line for 400 t/d for standard and upgraded newsprint

#### UPM-Kymmene Shotton, Deeside, Great Britain

Pulping, Coarse Screenig, Dewatering, Dispersing, Sludge dewatering for 900 t/d line for newsprint.

*Biggest pulp screw press and disperger in the world*

#### Stora Enso Reisholz Düsseldorf, Germany

Saveall disc filter

*First new Andritz disc filter with 5.7m diameter*

#### Sappi Austria Gratkorn, Austria

Wet and dry broke pulper for writing and printing grades

*First new pulper with new rotor design.*

#### Norske Skog Bruck Bruck a.d. Mur, Austria

CompaDis™ Disperger for 160 t/d for LWC line

*New Andritz disperger without heating screw*

#### Papierfabrik Hainsberg Freital, Germany

Complete rebuild of headbox screens with Fiedler screen baskets and rotors

#### Neusiedler Syktyvkar Syktyvkar, Russia

Retrofit of pre-screening line with Fiedler screen baskets

## Tissue Machines

### Complete Lines & Systems

#### Kriepa Hygienepapier Kriebstein, Saxony, Germany

PrimeLine™ Tissue Machine with TissueFlex™\* Press

*Most-advanced Tissue Machine Concept*

\* Trademark of Voith, cooperation partner of Andritz in the field of tissue

#### Guangxi Guitang Guigang City, Guangxi Province, China

2 Identical Tissue Machines including Stock Preparation

*Use of up to 80% bagasse as raw material*

#### Change Hengan Paper Products Change City, Hunan Province, China

Tissue machine

*Final acceptance after only 5 months*

### Key Equipment

#### Metsä Tissue Raubach, Germany

New Yankee Dryer and Hood

#### Metsä Tissue Krapkowice, Poland

New Yankee

### Upgrades & Modernizations

#### Gomà-Camps La Riba, Spain

Tissue Machine Modernization

*1st PrimeControl Automation System*

#### Renova Torres Novas, Portugal

Major Tissue Machine Rebuild

## Ventilation & Drying For Tissue and Paper Machines

### Key Equipment

#### Gebr. Grünewald Kirchhundem-Hofolpe, Germany

New Hood for MG Paper Machine

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