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pulp & paper

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Dear pulp and paper customers,

Last year Metso created a new strategy under the leadership of our newly-appointed CEO. One of the key outcomes of the fundamental strategy review was the decision to create a new segment called Pulp, Paper and Power. Internally, this segment is known as "Bio-Metso", which encapsulates the underlying "work as one to be number one" vision by helping our customers utilise renewable raw materials and turn them into recyclable products and renewable energy.

In addition to serving you in the pulp and paper industry, we are now focusing on serving the power generation industry as well. For many in the pulp and paper industry this is a very natural extension, as energy is already seen as a business. For others it may be a potential new business opportunity, in addition to a way of achieving energy self-sufficiency in today's mills.

The segment has also developed a more integrated operating model, which will allow us to serve you more holistically in the future. We will integrate our sales and services interfaces towards our customer base, allowing them to leverage all the capabilities of Metso through a single point of contact. Metso is also in a unique position with the widest portfolio of leading technology ranging from high-end paper, tissue and board machinery, complete pulp

mills, including the power generation sector and the new addition of bioenergy power plants. This means that we can serve you better by providing strategic options for where to direct your business.

Metso has a wide portfolio of power plants of different sizes, starting from saw mill or pellet plant co-located power plants to the world's largest bioenergy multi-fuel power boilers, including fuel handling and flue gas cleaning, not to mention our large-scale recovery boilers for pulp mills. We are also in the process of introducing a variety of new technologies, thus enabling the creation of new bio-products for the market. Some of the most interesting ones are lignin extraction at pulp mills, which also increases the capacity of pulp lines, bio-oil that can be used to replace heavy oil, bio-coal to create green fuel for coal-fired power plants and bio-gas through the gasification process.

For the pulp and paper industry, these may be very relevant strategic directions that can be followed, either by becoming a bioenergy player where relevant or by leveraging the access to biomass to become a producer of bio-fuels for the energy industry. I believe these are very exciting opportunities and I am looking forward to meeting many of you soon to discuss what we can do together in green energy.

Jyrki Holmala
President
Power business line

in this issue

PUBLISHED BY METSO PAPER, INC.

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LAY-OUT AND ART WORK

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Printed on MultiArt Silk 115/250 g/m²
Supplement MultiArt Silk 150 g/m²

Printed on March 2, 2012

Reproduction permitted quoting
"Results pulp & paper" as source.

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Addresses

Metso Paper, Inc. customer data

ISSN 1798-0933



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Today's demand for better quality and increased use of recycled fiber both require higher-quality process water for good machine runnability. Read more on page 12.

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News in brief

Reporting latest orders

Metso signs roll service agreement with Holmen Paper

Metso has signed a roll service agreement with Holmen Paper for their Hallsta Paper Mill in Sweden.

According to this three-year agreement, which became effective as of September 1, 2011, Metso will be responsible for all mechanical roll services at the Hallsta Paper Mill. Roll grinding and part of the mechanical roll maintenance will be carried out at Metso's workshops in Borlänge and Karlstad, Sweden. A Metso maintenance engineer will be based at the Hallsta mill to serve as a link between Metso and the mill. Metso's workforce will also include two maintenance technicians.

"We have high hopes for this agreement, and not just regarding the quality of roll grinding and maintenance efficiency. We also expect it to have a positive effect on productivity," says **Daniel Peltonen**, Technical Manager at the Hallsta Paper Mill.

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Pulp line for production of chemical cellulose for Sappi's Ngodwana mill in South Africa

Metso will supply Sappi's Ngodwana mill in South Africa with a new fiberline for chemical cellulose. Start-up is scheduled for the first half of 2013.

Metso will design and supply the main equipment for the new fiberline, from cooking to bleaching. The batch cooking plant is to be designed according to the prehydrolysis process, and TwinRoll wash presses will be used in all washing positions.

The equipment to be supplied, together with Metso's experience and know-how of this type of special pulp, will enable Sappi to produce high-quality chemical cellulose pulp for the growing market.

The new fiberline will produce around 215,000 air-dried tonnes of chemical cellulose hardwood pulp per year. In addition to the new cooking plant and fiberline, Metso will also supply equipment to upgrade wood handling, evaporation and recausticizing, and a new ash leaching system.

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CMPC Tissue orders tissue line

Metso will supply a complete tissue production line to CMPC Tissue S.A. of Santiago, Chile. The tissue line will be installed at CMPC's Talagante mill in Chile and started up during 2013.

Metso's delivery will comprise a complete tissue production line with stock preparation equipment and an Advantage DCT 200+ tissue machine including an OptiFlo II TIS headbox, a Metso Yankee cylinder, an Advantage AirCap hood, an Advantage WetDust dust management system and an Advantage SoftReel reel. The produc-

tion line will be optimized to enhance final product quality and save energy.

The delivery will also contain an extensive Metso automation package including a Metso DNA process automation system for machine, process and drive controls as well as a Metso IQ quality control system.

The new 5.6-meter-wide production line will produce 50,000-60,000 tonnes of high-quality facial, toilet and towel grades a year. The raw material for the new line will be virgin and DIP pulp.

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Metso rebuilds fiberline for Daio Paper in Japan

Metso was recently awarded a contract to rebuild Daio Paper Corporation's hardwood kraft fiberline at the Mishima mill, located on Shikuko Island, in Japan. Start-up of the rebuilt line is scheduled for the end of 2012.

Metso will supply the main equipment for the rebuild. "Replacing old machinery with low availability and high maintenance costs with Metso's modern, state-of-the-art machinery will boost the production capacity of the fiberline to 1,700 air-dried tonnes per day of bleached hardwood kraft pulp," says **Håkan Öhlen**, Sales Manager, Metso.

Metso's scope of delivery will include a new screening room, an oxygen delignification stage and five latest-generation TwinRoll Evolution wash presses. Two of the presses will be installed as brown stock washers, two as post-oxygen washers and one as a D-stage washer.

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Recovery boiler single-drum conversion at Stora Enso's Imatra Mills

Metso and Stora Enso Corporation have signed an agreement on the single-drum conversion of the recovery boiler at Stora Enso's Imatra Mills. The conversion will be completed in the fall of 2012.

The upper and lower drum of the recovery boiler and the steam generating bank between them will be replaced with a new drum and separate boiler bank elements needed for heat recovery. At the same time, the second stage of the economizer will be rebuilt.

"The conversion will significantly extend the boiler's lifetime and allow a possible capacity increase in the future. In addition, the conversion will improve the boiler's availability, ensure safe operation and reduce maintenance costs. Further advantages offered by a single-drum conversion compared with replacing the existing design are a shorter downtime and the reliability of the solution," says **Jouni Koskinen**, Sales Manager, Boiler Conversions, Metso.

The recovery boiler was built in 1987 and its current capacity is about 1,700 tonnes of dry solids per day.

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Complete tissue machine for Fabrica De Papel San Francisco in Mexico

Metso will supply a complete Advantage tissue machine for Fabrica De Papel San Francisco S.A. de C.V., in Mexicali, Mexico. The tissue production line will start up in the second quarter of 2013.

Metso's scope of delivery will comprise a complete 2.6-m-wide Advantage tissue machine equipped with an OptiFlo II TIS headbox, a Metso Yankee cylinder, an Advantage AirCap yankee hood, sheet control, tail threading equipment, an Advantage WetDust dust management system and an Advantage SoftReel reel.

The delivery is a repeat order from Fabrica De Papel San Francisco. They already successfully operate two Advantage tissue machines at their Mexicali facility, one of which started up in 2006 and the other in 2009. The company's PM 4 set a world speed record of 2,160 m/min in 2009 and their PM 5 achieved a record-breaking rapid start-up in 2009, reaching a production speed of 2,100 m/min only 12 days after start-up.

The new tissue line will use 100% recycled fiber as raw material and will increase the company's existing production of bathroom tissue, napkin and towel grades by 30,000 tonnes per year.

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Reporting start-ups

AK GIDA SAN ve TİC A.Ş starts up Metso-supplied tissue line in Turkey

The new Metso-supplied tissue line at AK GIDA SAN ve TİC A.Ş in Turkey was successfully started up on August 29, 2011. The tissue line was installed at the company's new mill in Pamukova, which is located in Sakarya Province. AK GIDA SAN produced tissue in a brand new plant with a complete Metso tissue machine for the first time on August 29.

With 500,000 m² of production area, AK GIDA SAN ve TİC. A. Ş. currently produces some 400 different dairy products at the Pamukova facilities. The tissue plant covers 170,000 m². The new tissue line will produce 60,000 tonnes of high-quality facial, handkerchief, toilet and towel grades a year at a speed of 1,600 m/min to 2,000 m/min. The raw material for the new line is virgin fiber. The production line is optimized to save energy and enhance the final product quality.

The Metso delivery comprised a complete tissue production line including a stock preparation system and an Advantage DCT 200 tissue machine. The tissue machine is equipped with an OptiFlo II TIS headbox, a press, a Metso Yankee cylinder, an Advantage AirCap hood, an Advantage WetDust dust management system and an Advantage SoftReel L reel. The stock preparation system comprises OptiSlush VM and HP pulpers, OptiFiner refiners and ProMS machine screens.

In addition, the delivery contained an extensive automation package with Metso DNA machine and process controls, Metso



The first tissue jumbo roll produced at AK GIDA SAN ve TİC A.Ş.

consistency measurements, Metso IQ quality controls with IQ Fiber Measurement and a Neles valves package. Complete engineering, installation supervision, training, start-up and commissioning were also included in the delivery.

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Zhanjiang Chenming Pulp & Paper started up fine paper line

The Metso-supplied fine paper production line (PM 1) for Zhanjiang Chenming Pulp & Paper Co., Ltd. successfully came on stream on September 1, 2011 at the company's greenfield pulp and paper mill in Zhanjiang City, Guangdong Province, China.

The 11.15-m-wide PM 1 has an annual dimensional production capacity of close to 600,000 tonnes of wood-free uncoated printing paper in the basis weight range of 45-120 g/m². The design speed is 2,000 m/min.

Geng GuangLin, Director and Deputy General Manager of Zhanjiang Chenming Pulp & Paper Co., Ltd. is satisfied with Metso and with the cooperation during the project.

Metso's delivery included a complete OptiConcept paper machine from headbox to reel, a comprehensive Metso automation system package, air and chemical systems and two WinDrum Pro winders.

The new paper machine comprises an OptiFlo Pro headbox, an OptiFormer shoe and blade gap former and an OptiPress two-shoe nip press. The paper machine includes a SymRun drying section with OptiDry Twin and OptiDry Horizontal impingement drying units for improved runnability and increased drying capacity. The new PM 1 also comprises an OptiSizer film sizer, an OptiSoft SlimLine double-soft nip calender, an OptiReel Plus reel and an OptiCart parent reel cart.

"The new PM 1 features a lot of new technology. Right from start-up, the operation of the line has met the targets. In particular, the paper quality has been good," says Mark Singler, Metso's Paper Technology Manager.

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Reporting agreements and acquisitions

Metso strengthens its service with new partner in Czech Republic

Metso has entered into a partnership agreement with ZANAP, a service provider for the pulp and paper industry based in Frýdek-Místek, Czech Republic. The agreement strengthens Metso's position as a leading service and technology provider in Europe. ZANAP provides maintenance, repair and retrofit services for the pulp and paper industry in Central Europe and will thus complement Metso's existing service capability in the area.

ZANAP has extensive experience of working with Metso. As an authorized service partner, ZANAP's trained and competent team of service experts will work exclusively for Metso in the pulp, paper and fiberboard industry.

"Our objective is to enhance customer satisfaction by offering customers access to a knowledgeable and well-trained service team with the necessary knowledge and skills for boosting overall operational availability," says **Robert Mohr**, Head of Metso's Pulp, Paper and Power, Central Europe North Region.

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Metso acquires Fabco Inc.

Metso acquired Fabco Inc. (Fabrication Company of Maine), located in Winthrop, Maine, USA. The acquired business, employing 20 persons, was affiliated with Metso as of November 1, 2011.

The acquisition complements Metso's current services, technology and product offering to the pulp industry in North America, and is in line with Metso's strategy to increase business in the services sector.

Fabco Inc. has been manufacturing and servicing filtration components for the pulp and paper industry for over 30 years. The filtration solutions are offered for different parts of the paper mill, i.e. the wood yard, pulp mill, paper machine, and waste water treatment. Some of the key manufactured products are disc filter sectors, drum filter covers, belt press belts, sector covers, vibrating & polishing filter screens and recausticizing products.

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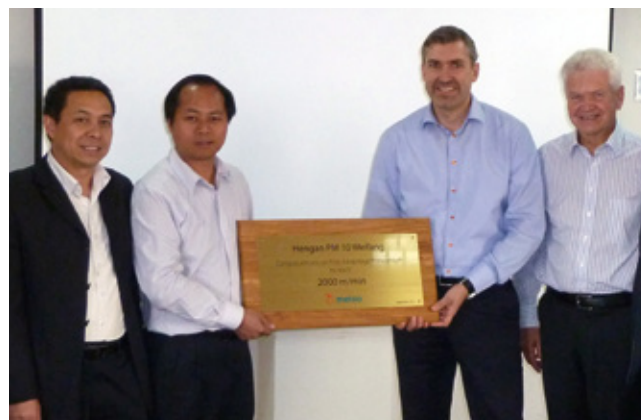
Reporting records

2,000 m/min speed record at HengAn mill with the Advantage ViscoNip press

The Metso-supplied Advantage DCT 200 tissue production line, equipped with the unique Advantage ViscoNip long-nip press, has been running at a record breaking average speed of 2,000 m/min for more than one month at the HengAn mill in Weifang, Shandong Province, China.

"We would like to express our appreciation to fellow workers at Metso and our company for working together as one to reach this outstanding result," says **Wu Hanxing**, General Manager, Shandong HengAn Paper Co.,Ltd. "This press unit provides high machine speed and continuous production due to no downtime, giving our company an even stronger position in the market."

HengAn also has an Advantage ViscoNip press in their PM 8 line at their mill in Changde City, Hunan province, and their PM 6 line at their Anhui mill in Fujian Province.



Anders Björn, President, Metso Paper Karlstad AB presents **Wu Hanxing**, General Manager, Shandong HengAn Paper Co.,Ltd with an award for the 2,000 m/min speed record by the Advantage ViscoNip press on the PM 10 tissue machine in Weifang. **Ren Rongwang**, Vice Chief Engineer, HengAn Group (far left) and **Leif Forsberg**, Senior Vice President, Metso (far right) were also present.

The Advantage ViscoNip press also creates substantial savings in drying energy consumption. The Advantage DCT 200 tissue line at the Weifang mill creates savings in energy consumption corresponding to EUR 750,000 a year.

The ViscoNip pressure unit conforms to the shape of the Yankee, and produces a uniform nip load over a very wide range of linear loads from 70 to 160 kN/m. Compared with a rigid roll or metal shoe against the Yankee, the Advantage ViscoNip press is flexible and accommodating. It delivers the pressure where it is needed, in a uniform manner. This press technology delivers a more uniform profile compared with a suction roll press and the higher sheet adhesion results in improved softness and bulk.

The ViscoNip technology was launched in 2005, and a growing number of press units are now being operated by tissue makers around the world, making the ViscoNip unit something of an industry standard.

Three more Advantage ViscoNip press units will be started up during 2012 in China: at Fujian HengLi Paper PM 2 in Nanan City, at Xiamen Xinyang Paper PM 1 in Xiamen City, and at Garven Sanitary Products PM 1 in Fyzhou city, all three in Fujian Province.

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The European Union has set a target for increasing the use of renewable energy for heat and electricity production and as a transport biofuel, to a level where these would account for 20% of final energy consumption by 2020. The plan is to meet the majority of this target with bioenergy. To reach the EU target, bioenergy amounting to an annual 220 million tonnes of oil equivalent (Mtoe) will be needed, which corresponds to around 500 million tonnes of dry biomass. Bioenergy use is currently at around 100 Mtoe. At the same time, the EU has set the target of reducing energy consumption and greenhouse gases, and this will create additional opportunities for increasing renewable energy. It is essential to increase the use of biomass fuels for the production of heat and electricity and also for cooling systems, in which the benefit obtained from the fuel is at its best.

Are biomass resources sufficient to meet Europe's energy needs?

The VTT has studied European bioenergy resources under the EUBIONET III project. According to the study, the annual technological and economic bioenergy potential is approximately 157 Mtoe, excluding biodegradable waste. Herbaceous biomasses and forest residues offer the greatest untapped potential. Forest residues, whose potential is around 40 Mtoe, are not usually suitable as industrial wood raw material. The challenge is to increase not only the use of forest residues from final felling but also thinning residues and to reduce production and logistics costs.

Many studies suggest that herbaceous biomasses hold great potential (80-180 Mtoe/a), but their harvesting, logistics and use in power plants all present challenges. For this market there is no established, cost-effective harvesting technology for anything other than straw. Herbaceous biomass poses a challenge in electricity production due to the fuel's chemical and physical properties. Combustion-related problems may include problems like bed agglomeration, boiler deposition and high-temperature corrosion.

Sustainable development is also a key consideration in the production and transport of bioenergy. With respect to herbaceous biomass, questions regarding land use and greenhouse emissions are the most important. There is also debate about the competition between bioenergy, food and feed production. There are around 50 criteria and certification systems in use around the world. Some of the criteria contradict each other and are difficult to verify. The criteria consist of environmental, economic and social con-

siderations. There are no uniform criteria for solid and gaseous fuels. The EU Renewable Energy Directive sets sustainable development criteria for transport biofuels. According to the EUBIONET III study, market actors consider greenhouse gas emissions, energy balance and water consumption to be the most important criteria. Sustainability criteria can also reduce the potential of bioenergy.

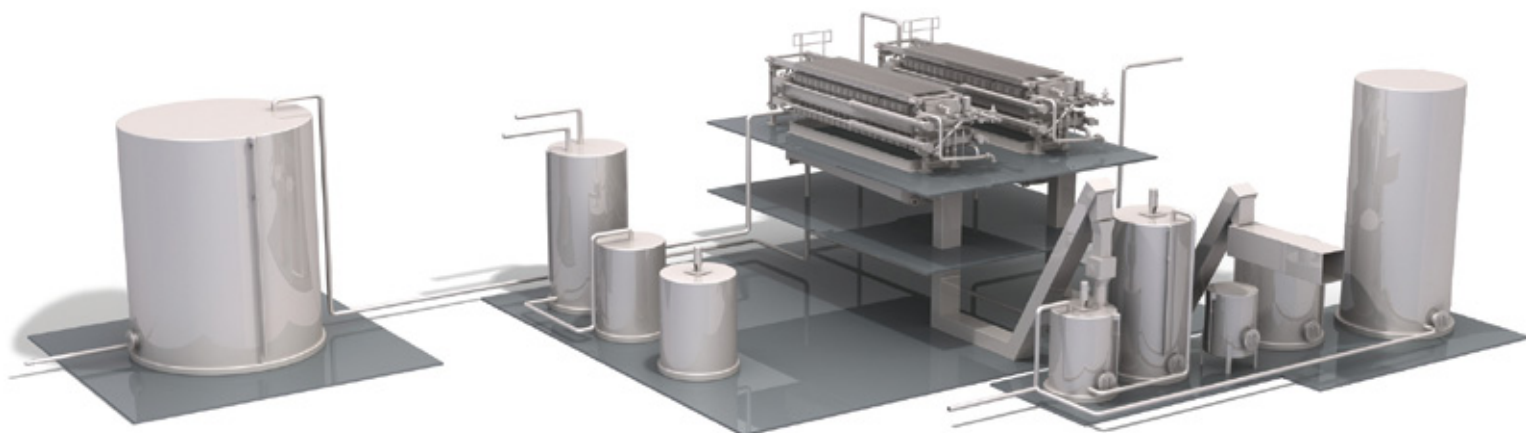
Are biomass fuel imports the solution for Europe's increasing bioenergy need? Yes, in those countries whose own bioenergy resources are insufficient for meeting the target set. In these countries, such as the Netherlands, Belgium and the United Kingdom, the sustainable use of bioenergy is subsidized. The most important imported fuel is wood pellets, which are used in pulverized fuel combustion boilers as a mixed fuel with coal. North America and Russia account for over 80% of Europe's wood pellet imports, which amount to almost 2 million tonnes. Around 16 million tonnes of wood pellets are used globally, of which Europe uses 11 million tonnes. Pöyry has estimated that in 2020, the global pellet market will be around 58 million tonnes, and imports to Europe will increase to 20 million tonnes. New import countries such as Brazil and South Africa will also be involved.

In many projects, new biocommodities are also being developed, including torrefied biomass, which is a coal substitute with properties very similar to coal. Torrefied biomass can be transported over long distances at low cost, and it keeps quality better than unrefined biofuels such as bark, sawdust and wood chips. The first factories are starting up in Europe and North America.



Eija Alakangas
Principal Scientist
VTT Technical Research Centre of Finland

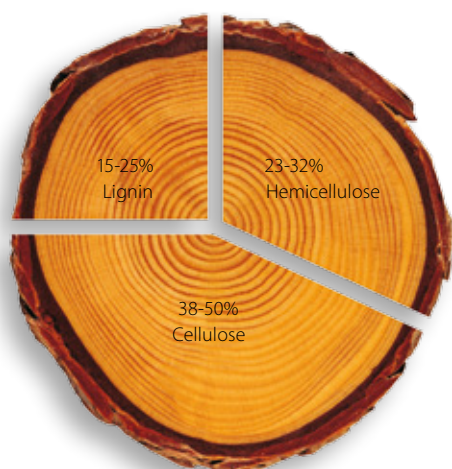
According to various studies, there are sufficient theoretical bioenergy resources that are not being utilized in Europe and especially on other continents. High-quality biomass resources such as woody biomass are being utilized the most. Around 40% of wood that arrives in forest industry plants ends up in bioenergy production. Looking at the regional availability for use in heat or power plants, the availability of biomass fuels is often limited, or different user sectors may be competing for the same raw material, or the price is too high. It is very important to find a suitable biomass fuel for each market sector, taking the other user sectors into account. Large power plants can make use of low-quality raw materials that are lower priced. Small plants require high-quality fuel, which is usually wood-derived. □



LignoBoost increases production

When annual pulp production is limited by recovery boiler capacity it is possible to produce extra tonnes of pulp by separating lignin from black liquor. Lignin is a renewable material with an exciting future. From a short-term perspective (0-5 years), the most obvious use of the continuous bulk production of lignin is as a biofuel – by the pulp mill itself or by companies wanting to move away from fossil fuels. But there is also a good possibility that lignin will be much more valuable in the future. Lignin could very well become a globally used base material with many different uses.

TEXT Andreas Liedberg and Susanne Gerdin



As much as 15-25% of wood is lignin. Investing in lignin extraction will have a direct positive effect on pulp production.

Most of today's market pulp mills are self-sufficient in steam, from the black liquor alone, and have great potential to be energy suppliers to other industries and consumers. The energy surplus in mills can be exported in different ways, for example, as electricity, biofuels (bark, lignin etc) and heat for district heating. The most favorable alternative for each mill depends on its situation and has to be evaluated on a per-case basis.

Lignin as a solid biofuel places certain demands on the design of the process system, just as all solid fuels do. A lot of different aspects, such as silo storage design, feeding into and out of the silo, drying of the product, and managing the explosion risks and moisture effects, must be taken into consideration.

Lignin as a biofuel

Once processed, lignin works well as a fuel, as demonstrated by several tests. It has

been used in burners together with bark and pulverized wood. Södra Cell Mönsterås pulp mill in Sweden, for instance, carried out a full-scale trial where 37 tonnes of lignin was burnt as the lime kiln fuel. At one point in the three-day trial, lignin was the only fuel being used. Another trial was carried out at Fortum's Värtaverket heat and power plant in Sweden. In this trial, 4,000 tonnes of lignin was used in four campaigns over the course of 13 weeks. During eight of these weeks, 8-15% of the total energy output came from lignin instead of coal. However, estimates indicate that it should be possible to mix more than 30% lignin into the fuel with optimized equipment.

Lignin can also be mixed into liquid fuels, like fossil fuel oil (to at least increase the amount of biofuel used), tall oil pitch or other liquid fuels. There are limits as to how much lignin can be mixed into these types of solid/liquid slurries, but using only simple equipment it has been possible to mix as much as 45% lignin into fuel oil or tall oil pitch.

Lignin as a base product for several industries

Using lignin as fuel is only the first step. Lignin can also be refined into a wide range



Per Tomani, Research Manager,
Biorefinery processes, Innventia AB.

LignoBoost is a complete process solution supplied by Metso. A LignoBoost plant is roughly 25x20x14 meters in size and includes all the equipment necessary for lignin extraction.

LignoBoost has been developed through research cooperation between Innventia and Chalmers University of Technology. In May 2008 Innventia sold LignoBoost to Metso, which together with Innventia has refined the technology and developed a product that is now ready to enter the market. Metso and Innventia are collaborating in the research and development of LignoBoost and the use of lignin as biofuel. "We see LignoBoost as an extremely important piece of the puzzle in the development of modern kraft pulp mills for biorefineries and producers of valuable new products. Lignin can be used as a high-quality biofuel and it has the potential to be a bio-based raw material for chemicals and materials," says Innventia's **Per Tomani**, one of the inventors of the LignoBoost process.

and creates new sources of income

of products. It has been transformed into low-cost carbon fiber, which has a strong potential to grow in demand as new vehicles will need to be lighter in order to consume less fuel. Activated carbon is another product with potential to be made from lignin.

Stricter requirements on emissions of e.g. heavy metals will increase the demand for activated carbon as well. The plastics industry is another huge market where lignin could be used as a base chemical. One example here is phenols or mixes of phenols. Global production of phenols in 2006 was 8,000,000 tonnes. Phenols are currently made from fossil substances.

Lignin – a new global commodity?

Investing in lignin extraction will have a direct positive effect on pulp production. Lignin also produces a renewable fuel that in the future has the potential to become a base substance with a wide range of uses and a global market. □

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First commercial LignoBoost plant to Domtar in North America

Metso will supply the world's first commercial installation of LignoBoost technology to Domtar in North America. The equipment will be integrated into the Plymouth North Carolina pulp mill. The LignoBoost process separates and collects lignin from pulping liquor. This order is an important breakthrough for Metso's patented LignoBoost technology and will provide the Plymouth mill with numerous benefits.

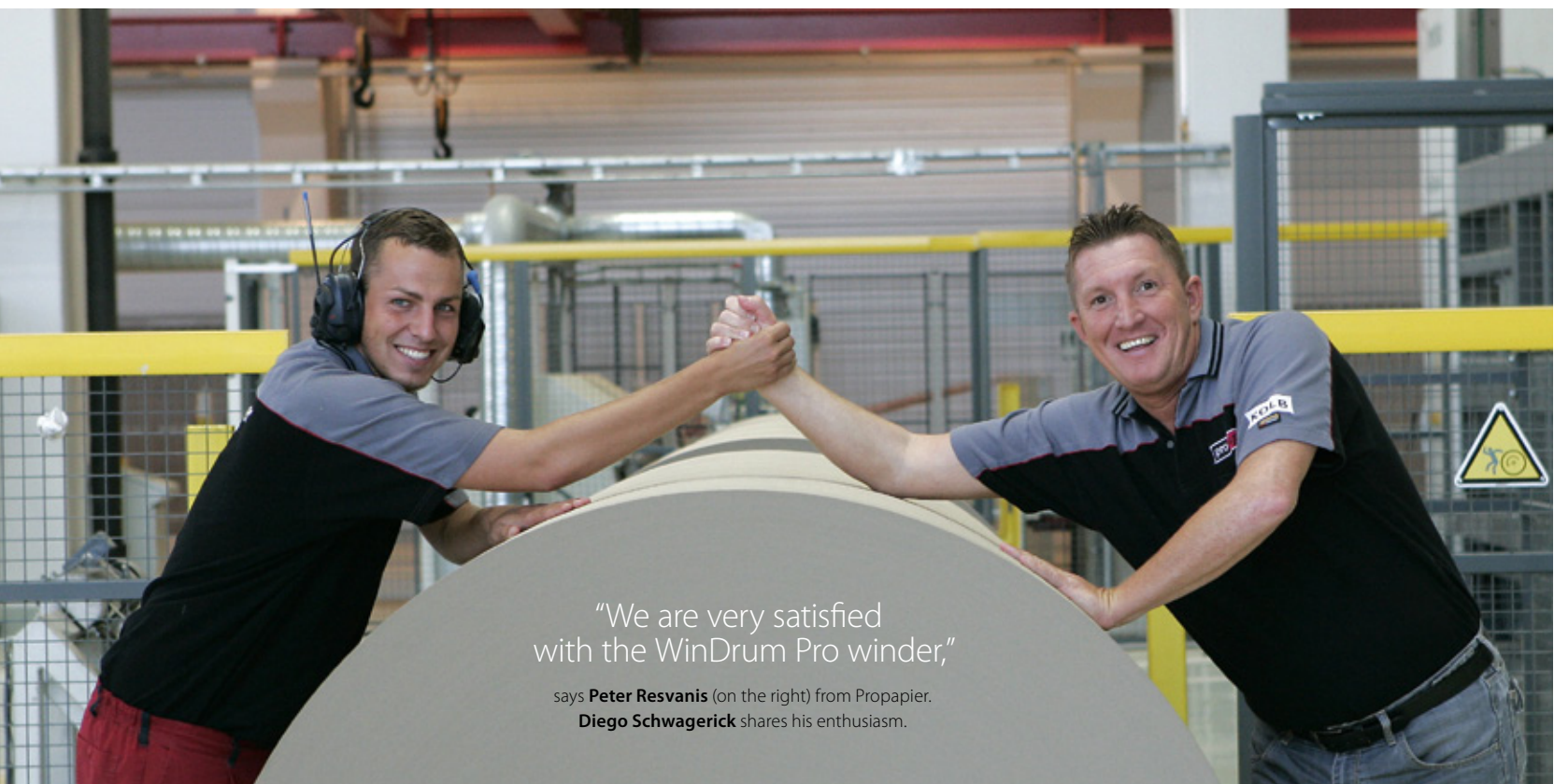
Removing a portion of the lignin produced by a mill reduces the burden on the recovery boiler and allows an increase in pulp production capacity. The recovered lignin can be used for internal and external applications.

"This project is a potential game changer for the pulp & paper industry because it will provide pulp mills with a new, more profitable value stream from a product that has always been burned in a recovery boiler," says

Gene Christiansen, General Manager – Business Development Innovations at Metso's Power business line for North America in Charlotte, NC.

The LignoBoost project is based on the 24 tonne per day demonstration plant in Bäckhammar in Sweden. The Bäckhammar plant has been owned and operated by Innventia since 2006. In 2008 Metso acquired the LignoBoost technology from Innventia and since then the companies have been working together to commercialize the process.

The LignoBoost plant at Domtar will be in commercial operation in early 2013.



"We are very satisfied with the WinDrum Pro winder,"

says **Peter Resvanis** (on the right) from Propapier. **Diego Schwagerick** shares his enthusiasm.

PROPAPIER

2,300 tonnes per day through one single WinDrum Pro winder

TEXT Hugh O'Brian

"We are very satisfied. We have honestly never looked back or wished we had installed two winders instead of one. The advantages of a single winder, including lower capital investment, simplified material flow, handling of parent rolls and spools, and manpower savings, give us very clear benefits. We have been able to run over 2,300 tonnes per day on the WinDrum Pro without any problem. So for us, with the high-quality paper we can make on PM 2, it was an easy decision to use only one winder. It was also an easy decision to choose Metso as there was no real alternative that we were comfortable with," Propapier's Peter Resvanis states.

"Of course, not everything was simple," admits Resvanis. "We were a bit nervous when PM 2 started up so incredibly well,

as has been documented in other reports, and we had all these parent rolls coming at the winder so quickly. Normally you have time to learn about the winder because the PM start-up curves are usually flatter. But PM 2 was making paper within hours and A-quality 90 g/m² testliner and fluting at high speed after only two weeks."

"So we had to run the winder at top speed from day one and we learned as we went. Our excellent cooperation agreement with Metso meant that all we had to do was snap our fingers and their very competent winder experts would arrive to work out the initial challenges together with us."

Since start-up, PM 2 has continued to run extremely well, setting several world speed records, with the first being in November 2010 at 1,620 m/min for 90 g/m² corrugat-

ing medium, with an efficiency of 94%. In April 2011, the next world record was set at 1,650 m/min for 80 g/m². Resvanis says speeds are increasing all the time with 1,700 m/min in sight and 1,800 m/min being the ultimate target. And the WinDrum Pro winder has kept up every step of the way.

Numerous features add up to high throughput

The numerous advanced technical features of the WinDrum Pro are helping it to keep up. Resvanis certainly appears well informed as he runs through the details of the WinDrum Pro technology. "There is the 15 second set change, the 45-50 second parent roll change, optimized acceleration/deceleration, the gap opening between the drums, two unwind stands, and a per-

Perhaps the best example of the throughput and efficiency of the WinDrum Pro winder is Propapier's giant PM 2 at Eisenhüttenstadt, Germany. When Propapier built the new greenfield mill and 10.2-m wide containerboard machine in 2010, it took the brave decision to install only one winder instead of two. "The results have been excellent," says Propapier's Production Director **Peter Resvanis**. The WinDrum Pro unit is now the most effective winder in the world.



The winder 'that does it all.'

fect core handling solution that includes core grooving. It also has very advanced vibration controls. So, it is not one single feature which makes the difference but all of these details which work together to give the high throughput. This allows us to run 2,800, 2,900, even 3,000 m/min on the winder, with no trouble. We require perfection and the WinDrum Pro provides it."

Resvanis also says that they have very low downtime with a planned shutdown of about four to six hours per week for clean-up, and typically two or maybe three web breaks on the winder per day. Likewise, there are no problems with tension variation, knives or edge cutting. "Nothing," he says simply.

Perfect paper coming off the line

Key factors in the ability to run so fast, explains Resvanis, are the paper properties and extremely flat profiles that PM 2 produces. Of particular importance are roughness, permeability and slipping angle. "PM 2 has given us an almost perfect sheet as far as profiles and properties. We have used these to run the winder very fast."

Another factor that he points to is the housekeeping and cleanliness of the board machine and, in fact, the entire mill. "We have taken a fine paper approach to making board. Board mills have typically been pretty dirty. We don't want this. We want an extremely clean environment, much like a well-run fine paper mill. This certainly pays off for us in terms of production efficiency and high quality." Indeed, "perfect" is the word Resvanis uses to describe the quality of the containerboard coming off PM 2 and the winder.

He also wants to give his colleagues credit for the success. "All my team mates at Propapier have worked hard with a very positive attitude and this has made the project so successful. We are also very fortunate to have experts in corrugated board geometry at our sister company, Proteam. The team spirit within the company, as well as the cooperation with Metso, has been excellent." □

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In summary, **Peter Resvanis** concludes: "The decision to choose the Metso WinDrum Pro winder technology was really very easy. There was no other company that we felt could give us credible technology, support and guarantees. We are sure that we have a lead on our competitors of three to four years and this certainly gives us a competitive advantage. We intend to keep that advantage by continuing to use state-of-the-art technology in the best, most effective way."



Optimized water management

saves natural resources and money

TEXT Tuija Kuula

Paper cannot be made without water. By reducing their consumption of fresh water and raw materials, papermakers can promote sustainable production while also saving energy and money without compromising product quality.

Paper mills have significantly reduced their use of fresh water over the past few decades. This is due to many reasons, including the limited availability of fresh water, increased cost of effluent and fresh water treatment, tighter environmental legislation, or even the desire to improve a mill's public image in some cases.

This lower fresh water consumption has been facilitated by the reuse of process water, but also by a better understanding of process chemistry. Nearly every mill recognizes water emissions as a problem area. However, these environmental loads can be reduced by modifying and developing traditional papermaking processes.

Good water management improves mill efficiency

Today's demand for better product quality and the increased use of recycled fiber both require higher-quality process water for good machine runnability. Our focus has to shift from individual process components to the overall quality of process water.

The goal is to master the whole paper-making line (machinery, equipment and processes) in detail. You have to understand the big picture all the way from fresh water treatment and internal water circulations up to the purification of effluent. Water management means planning, developing, disseminating and managing the optimal use of water, under applicable water policies and regulations, throughout an integrated paper and pulp mill complex. The primary challenges in water management include environmental legislation, cost-effectiveness, and runnability. Optimized water management helps to support an efficient papermaking process.

Whether and how to close your water systems depends on the types of technology you are prepared to use. Along with the economics of the investment, you also need to consider potential disadvantages low fresh water consumption might entail.

Every papermaking line has its own minimum level of fresh water consumption that can be achieved with conventional process solutions. This level is reached when process engineering is based on the best available technology.

The closing of water systems has to be carried out without any negative effects on paper machine runnability, final product quality, or the environment. This means that the water used needs to be as close to fresh water in quality as possible.

Reducing fresh water consumption by 1,500 m³ per day?

The less water you use, the more you help to conserve the environment and save in water treatment costs. By using Metso's ultrafiltration technology, you can purify your paper machine's clear filtrate and use it instead of fresh water. Fresh water consumption will be reduced, as well as the amount of waste water. If fresh water needs to be heated, savings will also be achieved through lower heating costs and related airborne emissions.

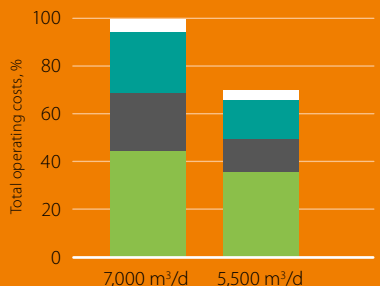
Fig. 1 shows how a 25% reduction in total water-related costs can save one million euros per year. Actual savings naturally depend on local unit costs.

Water management concepts for a variety of needs

The key to water and effluent cost savings is an efficient water management concept. Metso has developed a full range of water management concepts for different paper grades and fresh water consumption levels. They are all based on extensive know-how accumulated through our reference projects, process evaluations and simulation studies at many paper and board mills around the world.

continued overleaf...

Significant reduction
in water-related costs



■ CO₂ emission costs 20 EUR/t
 ■ Waste water treatment costs 0.5 EUR/m³
 ■ Fresh water treatment costs 0.5 EUR/m³
 ■ Fresh water heating costs 0.9 EUR/m³ (30 EUR/MWh)

25% reduction in total water-related costs = EUR 1 million/year

Fig. 1. Example of savings achieved when the use of fresh water is reduced by 1,500 m³ per day.

Steps to savings in water costs

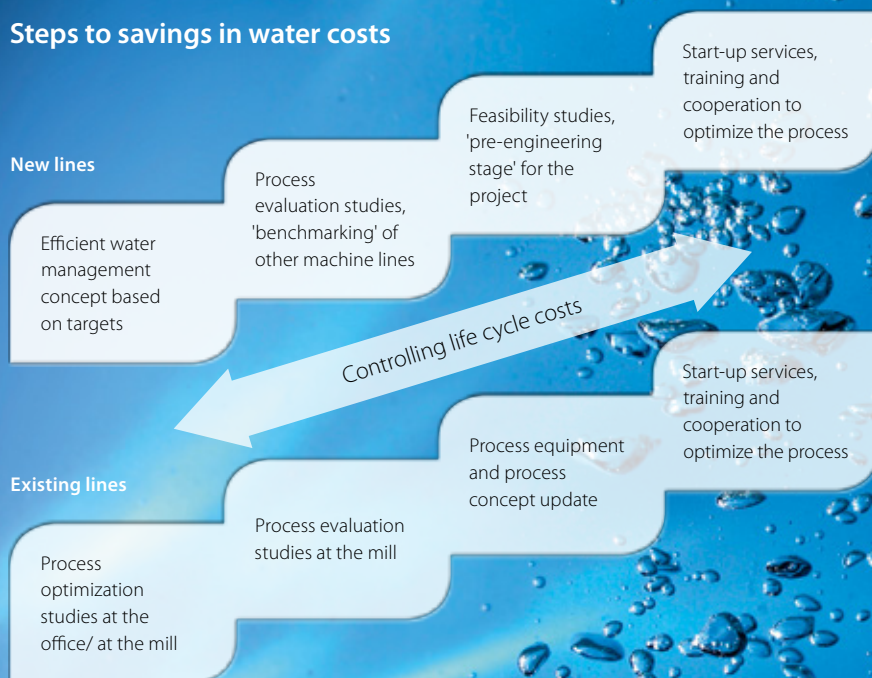


Fig. 2. Steps to water-related cost savings.

Process evaluation studies and the benchmarking of similar machine lines have enabled Metso to evaluate a multitude of targets, technologies, successful solutions, and possible improvements. This prior experience is invaluable when carrying out a feasibility study or the pre-engineering stage for a project.

Step by step toward cost savings

Fig. 2 explains how to proceed with new or existing papermaking lines. Water management has an effect on the whole paper-making line. The paper machine and stock preparation must always be considered as one integrated system.

With existing papermaking lines, we need to know the background of a problem before we can solve it. This means gathering information from different processes and considering a variety of solutions from every possible angle. If you do not understand the overall system, your efforts to solve a specific problem may actually create more problems.

Process evaluation studies at the mill, including the taking and analysis of samples, are carried out when process chemistry needs to be clarified. Process chemistry can provide an indication of what might be wrong.

It is up to you to decide whether you want to address possible problems maintaining your present fresh water consumption, or whether you want to reduce your fresh water consumption while retaining your current machine runnability, or perhaps even improving it. It does not matter whether we are talking about a new or existing papermaking line since the process concept, equipment and process connections employed should always be based on the targets set. This is the best way to control lifecycle costs.

Optimized process conditions and major savings cannot be achieved immediately after start-up. They are attained a bit later when the process conditions are stable and water treatment processes are operating at their maximum capacity. A long-term cooperation agreement with Metso enables paper mills to succeed and meet their growing challenges by offering a fruitful basis for implementing ongoing improvements and controlling their lifecycle costs.

Less fresh water may mean more problems

Especially many liner and fluting mills have closed their water cycles in recent years, now using about 4 to 6 m³ of fresh water for each tonne of paper they produce.

However, this reduction in fresh water consumption comes with some problems, which start to appear right at this level of closure.

The paper produced and white water may acquire an unpleasant odor. Corrosion and slime build-up may also occur. Most of these problems are caused by the growth of microorganisms in the white water system, which feed on organic compounds accumulating in white water due to increased closure.

One common solution to these problems has been to dose white water with more biocide in order to prevent the growth of microorganisms in the system. Although this solution works, it increases chemical costs.

Internal kidneys purify white water

Metso's solution is to treat white water with ultrafiltration technology or microfloation, so-called internal kidneys, to reduce the accumulation of harmful substances and prevent their uncontrolled growth in the water system. The term "internal kidney" refers to the functional similarity of human kidneys and the in-mill treatment process. The idea is to incorporate an internal kidney system directly in the paper mill's white water circulation.

The purpose is to reject unwanted compounds in white water that would otherwise affect the production process. In the past, some white water was discharged from the process and replaced with fresh water. With today's ultrafiltration technology white water can be returned back in the process, which reduces both fresh water consumption and the amount of waste water generated.

Superior liner and fluting concept

Metso's liner and fluting concept also includes microflotation for press section waters to remove fines and pitch that would otherwise accumulate in the water system.

One important part of Metso's solution to purity problems is to have an internal biological treatment plant, which operates as an internal kidney for the whole process. Efficient biological treatment is needed, with a sufficient amount of biofiltrate recy-

cling back to stock preparation, in order to maintain a constant process water balance and control COD and Ca levels.

Ultrafiltration technology removes all bacteria, colloids, and solids from white water. In our latest references, liner and fluting mills have been able to limit their fresh water consumption by about 1,500 to 2,000 m³ per day by replacing warm fresh water for the forming section's high-pressure showers with ultrafiltrate.

In these cases, the mills chose our reduced fresh water consumption concept with ultrafiltration technology, microflotation and biofiltrate recycling (see Fig. 3). This concept gives them good runnability, combined with a low fresh water consumption level.

Competitiveness and sustainability go hand in hand

The success of Metso's water management concepts is based on a proprietary coun-

tercurrent application, internal kidneys at the paper mill and stock preparation, and a comprehensive set of water treatment and handling expertise. Computer simulations with mathematical models have been an important tool in evaluating different concept alternatives.

Metso provides papermakers solutions and know-how that cut production costs and save natural resources. Our key objectives are to enhance papermakers' competitiveness, product quality and machine runnability. Metso also recognizes its responsibility for the way process water affects papermaking and the environment. □

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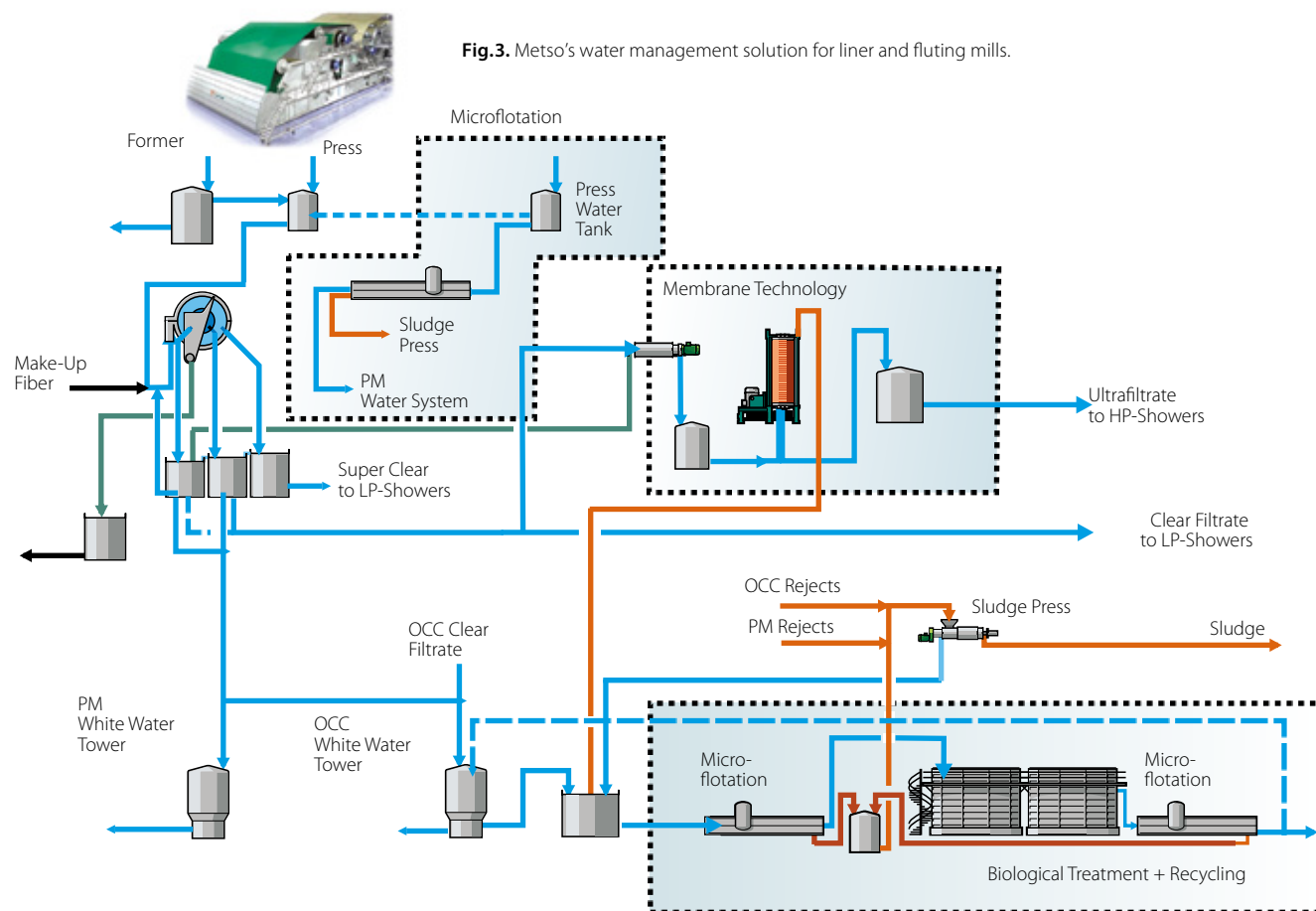


Fig.3. Metso's water management solution for liner and fluting mills.

KLIPPAN

Sweden's oldest paper mill

TEXT Kenneth Mattsson

During the summer of 2011, the paper machine at the Klippan paper mill in southern Sweden was restarted after a major rebuild. The project included a complete new Advantage DCT 60 former with an Advantage OptiFlo II TIS 1600 headbox. In addition, some parts of the short circulation and felt sections were also upgraded.

The Advantage DCT 60 machine is the second smallest in Metso's Advantage DCT concept program. The successful installation at Klippan once again proves the flexibility of this concept, which works very well despite the fact that the machine at Klippan is relatively narrow and manufactures unique and highly demanding products. Dismantling of the old equipment and assembly of the new sections was undertaken during the three-week summer shutdown. The machine started up as planned at the beginning of August.

"Start-up after the rebuild was incredibly smooth," says Klippan's Project Manager **Stig Bond**.

The PM is reported to be much easier to operate and keep clean, with a color changeover time of under 10 minutes. The start-up curve was very good and production was increased by 10% during the first month alone.

Goals achieved and exceeded

The Klippan mill had high targets and numerous key requirements when the rebuild was being planned. The main objectives were higher production and lower energy costs. In addition, the mill wanted better formation, the ability to run lower basis weights and fast cleanup because of the frequent color changes.

"The goals we set have been achieved and even exceeded," says Production Manager **Roger Johansson**. **"We have gone from 24 tonnes/day to 30 tonnes/day net production. The mill's electricity consumption has gone down by 20% compared with previously, which is remarkable considering that earlier we were running 50% white and now it is 90% colored."** He adds that the formation and basis weight profile are also much better, which means the PM can now run lower basis weights.

The OptiFlo II TIS headbox operating with colored furnish.



Unique production dating back to the 16th century

Klippan is Sweden's oldest paper mill. It was established in 1573 by **Sten Bille**, the uncle of the famous Danish astronomer **Tycho Brahe**, after Brahe started inventing a way of improving the manufacture of paper at the nearby Herrevad Abbey. At that time paper was made from rags. Klippan was also Denmark's first paper mill, as Klippan and the whole province of Skåne in southern Sweden were part of Denmark at that point. In the 1700s the operation was moved to its current location on the Rönne River. In 1832, Sweden's first continuous paper machine was installed at Klippan, and it remained in operation until 1981.

During the mill's heyday in the 1960s there were eight paper machines manufacturing postage stamp paper, copy paper and other specialty grades. Today, the only machine in production is PM 9, a relatively small machine making colored tissue paper of very high quality. Klippan's business concept is to sell jumbo rolls of colored tissue paper for napkins. Since the company does not have any converting lines and does not produce any finished

produces colored tissue of very high quality



Rolf Mårtensson, Shift Leader, Klippan mill (to the left) and **Stefan Carlsson**, Project Manager, Metso, inspecting the results of the transformation to the Advantage DCT technology during the shutdown in summer 2011.

tissue products, it is one of the few independent suppliers of jumbo rolls of colored tissue.

Klippan's paper is sold mainly in the EU, and about 60-70% of its paper goes to that market. The mill also has customers in other parts of the world such as Russia, Eastern Europe, New Zealand, China and Australia, to name a few. Business is today reported to be good for Klippan Tissue, and order books are full. 



Jumbo rolls of different colors waiting to be sent off to various destinations around the world.

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Cashing in on that pulping “sweet spot”



Metso's advanced controls help chemical pulp mills to operate at that optimum, low-variability point, where stable quality, smooth process operations and low cost come together. The raw material and energy savings can generate a considerable return on investment and reduce the carbon footprint at the same time. It all adds up to a more sustainable and profitable operation.

TEXT Mark Williamson

It's often said that a stable pulping process is an efficient pulping process. There's a lot of truth in that, since operators can manage a fiberline or recovery line with more self-confidence and concentration if it's running smoothly, with minimum variation. But operating a pulping process to minimize material consumption and reduce costs is a lot more than just wishful thinking as it is not an easy task. After all, chemical pulping and recovery plants

are complex and interdependent multi-stage operations with variable-quality wood chips as a raw material and many other disturbing variables. Moreover, upsets caused by chip quality are often unforeseen, so trying to predict upsets without enough information is guesswork. As an added complication, the chemical reactions take place over several hours and adjustments made in one shift are often not seen until the next shift comes in. Then, more often than not, the process settings will have changed.

Experienced shift operators often know how to handle upsets and deal with them, most of the time by instinct and learned skills. But even experienced operators, and certainly those with less experience, need process and product quality information immediately at their fingertips and the automation tools to achieve that elusive “sweet spot” for process operations. That's where stable quality, smooth process operations and lowest costs come together. To achieve this equilibrium point, operators need an early detection and warning system which sees changes as they are happening, and reacts quickly and decisively.

Early warning and reaction

Today, Metso analyzers and advanced process controls (APCs) have assumed that role of the early warning and reaction system by measuring and managing each of the unit operations in the pulping and recovery line, responding to process upsets in the most direct and timely way, and leaving the overall process management to the operating crews. This allows them to focus on the most efficient and profitable state of operation.



The control center of Zellstoff Rosenthal's “green” pulp mill.

This stability of operation is achieved in several ways

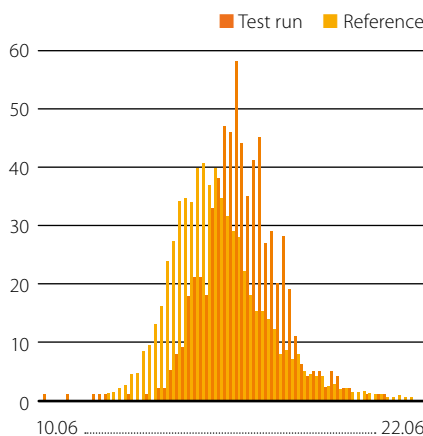
- Process analyzers frequently measure the state of the chemical reaction processes and fiber quality and provide a profile of their development throughout the line. With frequent updates, faster reaction to upsets and more precise control is possible.
- Model-based process controls regulate the chemical reaction rates of pulping and recovery processes in the presence of disturbances. Measured input conditions determine the actions taken so that the end result is process and product quality stability. In many cases the advanced controls emulate the best operating practices, as if the best operator were on duty twenty four hours per day.
- Since the controls work tirelessly and consistently, the operating conditions from shift to shift are steady and shift transfers are made without disturbances. The communication between shift operators improves considerably.
- Start-ups, shutdowns and transitions in fiber species are handled seamlessly with minimum upset.
- Energy generation and heat transfer processes are managed for maximum energy output and minimum energy waste.

With these stabilizing tools in place, operators can then manage operating targets to stabilize the pulp quality, increase yields and minimize the raw material and energy costs that are critical to the economic viability of a pulp mill. Some typical case studies for APCs are presented:

Variable chips make uniform pulp

Variation in wood chip quality is one of the most important disturbances that affect the kraft pulp digesting process, and one which pulp makers struggle to deal with the world over. Uneven wood chips can contribute to irregular cooking conditions and variable pulp quality. In order to effectively deal with these chip quality issues and other process instabilities, Cenibra in Belo Oriente, Minas Gerais, Brazil commissioned Metso Continuous Cooking Optimizer systems on fiberline 1 and fiberline 2, which together produce 1,170,000 tonnes per year of ECF bleached eucalyptus pulp.

The continuous digester systems were intended to even out disturbances in the pulping processes and reduce Kappa number variability, thereby stabilizing pulp quality. With this steadiness, it was possible to increase pulp yield, thus reducing the cost of wood per tonne of pulp. And the goals have become reality, as the pulp quality control objectives of Cenibra have been fully met by complying with the control targets, thus opening up the possibility of reduced specific wood consumption or increased pulp production.



Kappa number variability (on the x-axis) from the continuous digester on line 1 has been significantly reduced, allowing the Kappa target to be increased.

Minimizing bleaching costs

In the chlorine dioxide bleaching stages, adding more chemical past a certain optimum point no longer produces a corresponding brightness response. In many cases the chemical dosage is kept above this optimum limit in order to ensure that the brightness target will be achieved. This is typically what operators do in a manually controlled operation. When the standard deviation of brightness is reduced due to more effective process control, this "safety margin" can be cut. This results in significant chemical savings.



Bleaching costs for eucalyptus pulp are among the lowest in the world at Veracel Celulose's Brazilian mill. Credit goes to Metso's process analyzers, shown here, and advanced process controls.

Veracel Celulose's 900,000 tpy ECF eucalyptus pulp mill in Bahia State, Brazil reports excellent cost savings in the bleach plant while maintaining very precise quality control of their final product. The mill claims its consumption of chlorine dioxide is near the lowest in the world. The credit for this goes to Metso's process analyzers and advanced process controls.

Chlorine dioxide consumption has been reduced in a controlled way ever since the mill start-up. Initial control evaluation tests confirmed that the chlorine dioxide consumption was reduced by 7.4% in the D stage. Those initial results have been improved even further to achieve at least 11% savings from start-up.

De-bottlenecking

Over a period of several years Zellstoff Rosenthal's 330,000 tpy ECF bleached kraft pulp mill in Germany has made significant efficiency and productivity improvements

by employing Metso advanced process controls in the recovery and fiberlines. First, the optimization control of the causticizing process increased the Effective Alkali (EA) of the white liquor by 4.6%. Next, lime kiln controls cut lime kiln energy consumption by 3% and increased reburned lime production by 20%. The optimized control of the D stage in the bleach plant lowered chemical consumption and stabilized the process. All of these controls de-bottlenecked the pulping and recovery processes and supported increased mill production, not to mention the chemical and energy savings.



The lime kiln optimization controls at Zellstoff Rosenthal cut energy consumption by 3% and increased reburned lime production by 20%.

More green energy

Recovery boiler optimization control was the most recent addition at Zellstoff Rosenthal. With the new controls, liquor burning capacity was pushed up by 2.8% to 2,030.7 tonnes of dry solids per day. Consequently, the boiler’s steam generation jumped by 2.2%. The variation of the superheated steam temperature dropped by 55.7%, thereby improving the turbine efficiency and increasing gross energy production by 1.57 MW. The energy produced by the recovery boiler is regarded as “green energy”, providing an extra bonus when sold to the national grid.

Using steam efficiently

Metso’s intelligent sootblowing optimization application was installed at a Nordic pulp mill to improve the availability of the recovery boiler. Sootblowing optimization is based on boiler tube fouling indicators, which are calculated for different boiler sections. As a result, tube cleaning is done only

in boiler sections where it is needed, using the most effective sootblowers. The fouling management of the boiler was enhanced and the steam consumption was reduced by over 9%. This reduction in steam consumption contributed to the mill’s sustainability program, as they are actively working to cut greenhouse gas emissions.

Reducing the carbon footprint

In yet another APC application, Cenibra in Brazil realized a 90% reduction in vented steam after Metso’s Steam Network Manager APC was installed. Fuel costs are down and the carbon footprint of the power boilers has been slashed by the equivalent of 2,200 tonnes per month in CO₂ emissions.

The fundamental objective of Steam Network Manager is to guarantee both steam quality and steam availability – not too little for the pulp mill processes and not so much that it has to be vented. Steam availability is ensured by regulating the steam balance of the steam network, by ensuring that the steam production of the boilers matches the steam consumption of the turbine-generators and of the mill processes that demand process steam at any instant in time. The APC controls many different unit operations and valves in order to balance supply and demand.

Benefits	Results
Liquor burning capacity	+2.7%
Steam production	+2.2%
Superheated steam temperature	+5 °C
Variation (1-sigma)	-55.7%
Total power generation	+2.4%
Flue gas NOx	-17.9%
Flue gas TRS	-68.4%

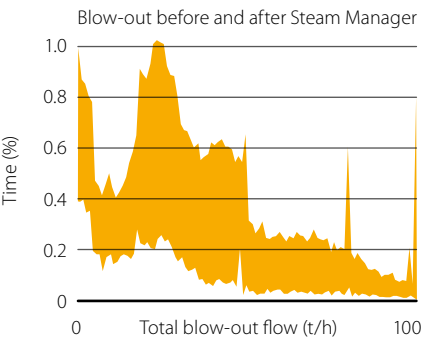
The multiple benefits of recovery boiler APC included increased “green” energy generation and lower emission levels.

Benefits	Results
Decreased sootblowing steam consumption	9.15% decrease
Decreased emissions during winter months	2,400 tonnes lower CO ₂ emissions
Decreased natural gas consumption during winter months	26.8 TJ energy savings
Sootblowing condition monitoring	Continuous data collection for enhanced maintenance

Recovery boiler sootblowing advanced control demonstrated convincing results.

More sustainable

For well over 20 years now Metso has been providing Advanced Process Controls to pulp mills all over the world. These stabilizing controls, many based on Metso process and pulp quality analyzers, have helped mills to find the ideal operating point, thereby improving product quality and saving raw materials and energy. The raw material and energy savings can generate a considerable return on investment and reduce the carbon footprint at the same time, thus providing a more profitable and sustainable operation. □



The commissioning of the Steam Network Manager (APC) system at Cenibra has paid off handsomely as vented steam has been reduced by an astounding 90% and the steam supply has been stabilized.

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Active and open dialog produces great results

Close cooperation between a paper mill and Metso is an effective way to improve papermaking processes. No problem is too small for us, and ongoing dialog can be remarkably beneficial for both parties.

TEXT Marjaana Lehtinen



"The best solutions and results often emerge through discussions between the customer and Metso," says **Jukka Muhonen** of Metso.

"Papermakers often struggle alone with their process problems, unable to find their root causes or fix them," says **Jukka Muhonen**, Development Manager for Metso.

"However, this need not be the case. Many problems can be solved by consulting us and making use of our extensive expertise."

When trying to find solutions to process problems, it is essential to understand the real problem in detail. This means having as much information about the process as possible. For example, in analyzing issues related to the forming section, pictures from a web inspection system, paper samples, dryness measurements, and process data collection systems are all effective ways to gather the information needed. If you try to find a solution with inadequate or improper information, any related results will also be inadequate or improper.

Once problems are identified, charting the real risks and opportunities associated with each creates a solid basis for decision-making.

"At its best, cooperation is based on a relationship where Metso shares its extensive understanding of the capabilities and limitations of the customer's existing

process. The paper mill, in turn, shares its problems and development needs openly," Muhonen continues. "Metso's great advantage is that we have developed many innovative concepts that can be applied to existing processes, too."

Removing paper defects saved a customer relationship

To see the benefits of open dialog, let's look at a real customer case. A paper mill was receiving complaints from a printing house about paper defects that caused breaks on the printing machine and consequently lowered its efficiency.

The paper mill had traced the problem to the operation of the headbox and the forming section but it was not able to find a solution. The former's operating window was extremely narrow; it was restricted by susceptibility to defects at one end and sheet crushing at the other. Some paper grades were also more prone to these phenomena than others. Due to these quality defects, the paper mill was in danger of losing one of its major customers.

The mill turned to Metso, whose specialists from its process, engineering and R&D

departments tackled the problem in close cooperation with the mill's own production experts. Through fruitful dialog, they came up with a completely new solution to the problem.

This solution involved a forming roll shell modification that facilitated a 15 to 30 percent increase in headbox flow. All other running parameters of the headbox and forming section were also checked in order to improve paper quality. This allowed the customer to widen the former's operating window, get rid of paper defects, and keep the mill's biggest customer happy with its paper quality.

"The solution was made possible by Metso's experience and the opportunities provided by pilot machines in the testing of new ideas," adds Muhonen. "This case was a good example of how ongoing dialog that involves systematic analysis leads to great ideas and solutions." □

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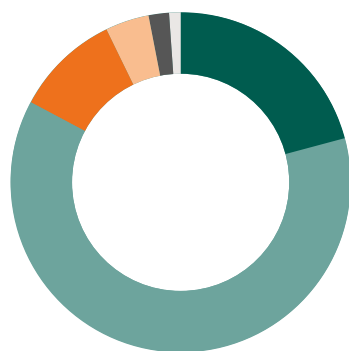
TEXT Kare Väisänen

Understanding the total cost of doctoring and how to reduce it can have a major effect on total production costs.

Effective doctoring at lowest total cost

Mills often mistake doctor blade costs for their total doctoring costs. They are easy to calculate, and it is easy to compare different suppliers to find the most economical solution. But the total cost of doctoring includes much more than that.

Blade costs can be as little as 20% of total doctoring costs, as demonstrated by the example in Figure 1 where the biggest single cost related to doctoring is energy, which accounts for about 60%.



■ Material costs 21%
 ■ Energy costs 62%
 ■ Compressed air costs 10%
 ■ Ordering costs 4%
 ■ Capital costs 2%
 ■ Other costs 1%

Figure 1. A case example of total doctoring costs at a paper mill.

Cheap is not necessarily economical

Choosing the cheapest doctor blade supplier will produce savings that are easy to see. However, the total cost of doctoring depends on many features of the doctor blade materials selected. One of them is the relationship between (laboratory tested) blade wear rates and the blade price (see Figure 2). Figure 2 also shows the total annual cost of the blade materials examined.

Once again, the cheapest blade is not necessarily the most economical one. This low price approach can be applied to some doctoring positions, but other things also affect blade selection and total costs. For example, it is good to keep in mind that 10% savings in blade costs may translate to roughly 2% savings in total doctoring costs.

Real savings in energy consumption

Energy consumption plays a particularly large role in blade selection at the dryer section. This is an area where real savings can be achieved. Thanks to their patented ECO resin composition, Metso's ValEco blades offer the most economical solution for dryer section doctoring (see Figure 3). While blade selection can save about 2% of total doctoring costs, as discussed above, energy consumption may easily be cut by some 20%. This amount more or less equals the total annual cost of doctor blades. And these savings can be achieved simply by selecting a low-friction blade material.

Every doctor blade can be considered a brake that slows down the speed of a rotating roll. More power is needed to offset this friction. The higher the blade load, the stronger the braking effect you have to overcome with electric power. This is why blade loads should always be as low as possible, yet high enough to keep the surfaces doctored clean.

The wet end of a paper machine always employs showers with doctors. Appropriate blade material selection will help to minimize the need for these showers and related costs.

Water removal must be effective, yet gentle

Many mills use compressed air to enhance the removal of water from roll grooves and/or holes. However, the compression of air requires a lot of energy, which can easily cost EUR 40,000 per position annually. Replacing this solution with Metso's new ValDual blade, which combines traditional foil blade and doctor blade technology, will avoid the additional costs associ-

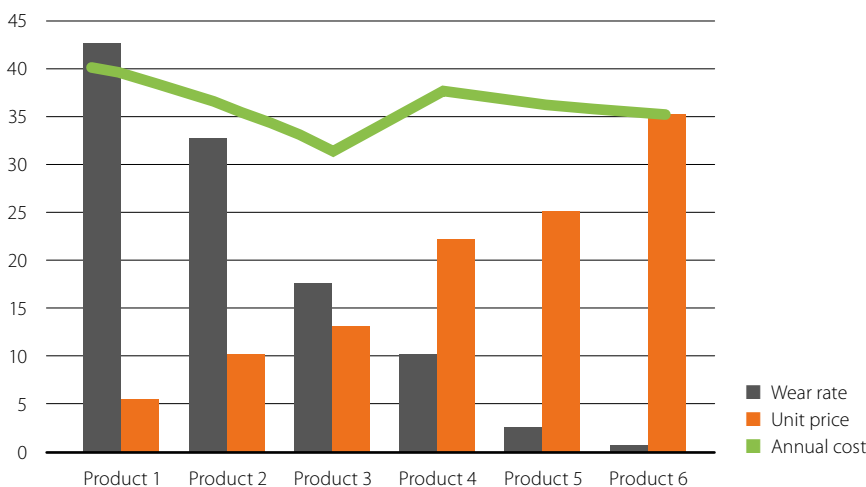


Figure 2. Relationship between wear rates and unit costs for various blade materials.

ated with compressed air. The patented geometry and durable but gentle material of ValDual enable it to remove water effectively even from soft covers without damaging them.

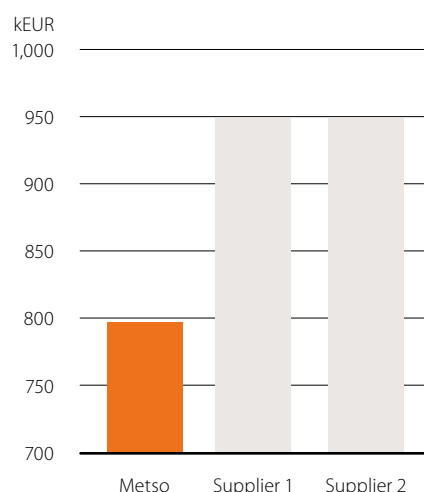


Figure 3. A study conducted by a paper mill compares the performance of doctor blades from different suppliers. Annual energy consumption is calculated in euros using local energy prices.

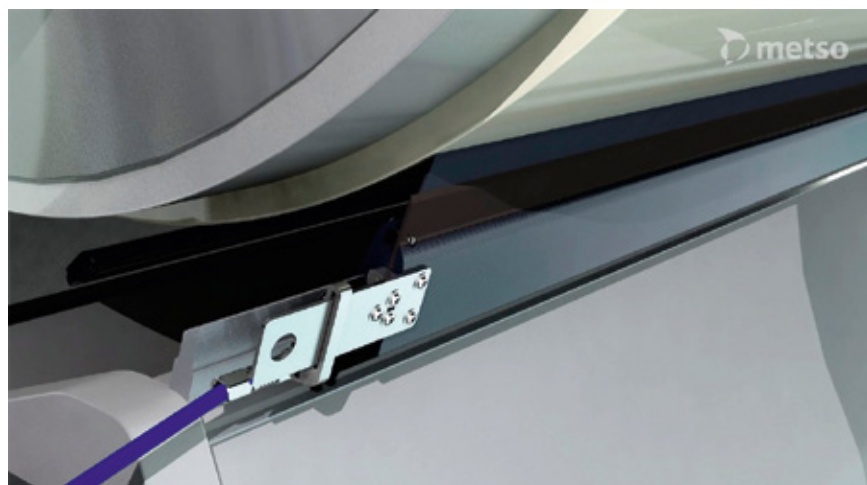
Roll cover and doctor blade must match

Metso has extensive OEM expertise in papermaking machinery and processes. This know-how helps to create a perfect match between Metso doctor blades and roll covers.

Some doctoring positions require the longest possible blade lifetimes, while others call for gentle treatment of the roll cover. Either tending or abrasive blade materials are needed depending on the roll position. However, the key requirement for all roll positions is a good doctoring result.

Blade recycling cuts costs

In some positions doctor blades are replaced regularly before they actually



A typical dryer section doctor.

wear out. These blades can be reground at Metso's workshop and reused at the dryer section. Upgraded blades will thereby be available at the cost of simple regrounding.

Approximately 30% of used blades can typically be recycled, which represents significant savings in doctoring costs. The resulting reduction in the amount of waste generated also produces further savings.

Down with operating costs

Every time you order goods, the related inquiries, purchase orders, receiving and storage cost you money. One cost factor that every mill tries to reduce these days is the amount of capital tied up in inventory.

There are ways to lower or even avoid these costs, such as consignment stock or Vendor Managed Inventory. No matter where the customer's mill is located, Metso is able to offer a concept that includes blade deliveries, carrying either all or part of the capital costs related to doctor blades. Why? Because this usually also means savings for Metso and consequently lower customer prices.

Improved doctoring safety brings savings

Safety is another factor that drives the development of doctoring tools and accessories. Over the years, Metso has introduced safe blade storing systems, automatic storage solutions, tools to help in blade changes, measuring devices, analytical tools, blade disposal equipment, and many others.

Everybody knows that the value of safety cannot be measured in money. However, this fact is often understood only after an accident happens.

Most economical doctor blade supplier

Metso's understanding of doctoring costs and its cost-cutting selection of superior products, safety-improving accessories and OEM technical support make Metso the most economical blade supplier and doctoring partner for paper and board mills worldwide. □

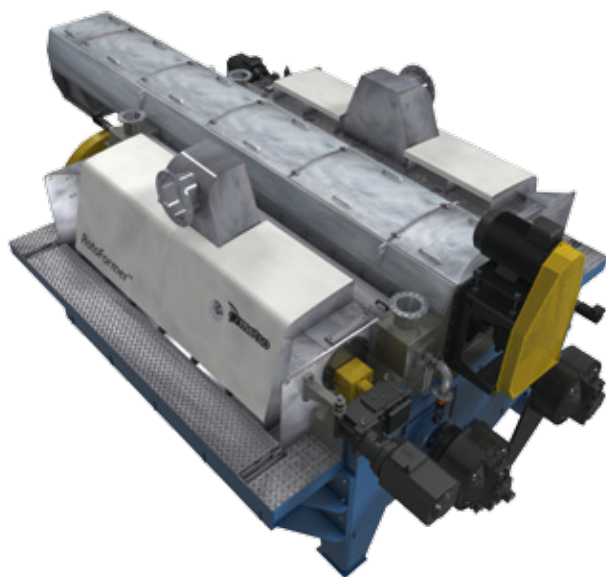
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TEXT Gunnar Vesterlund

RotoFormer was originally developed for TwinRoll Evolution, the latest generation of TwinRoll presses from Metso. Now this new pulp inlet device is available for upgrading the DPA, DPB and TRP TwinRoll presses.

RotoFormer

The No. 1 performance upgrade for your TwinRoll press



The RotoFormer is delivered as a finished unit that is easily installed on both sides of the existing press.

Upgrading to RotoFormer yields a number of benefits. The increased vat angle of the press and improved pulp distribution and formation provide significantly greater capacity for a broad range of inlet consistencies while delivering greater washing efficiency. Upgrading to RotoFormer also minimizes the risk of plugging in the inlet device.

RotoFormer consists of a pulp inlet box and a rotating screw. The inlet box is open toward the roll surface. The screw maintains the flow of the pulp in the inlet box and its function is to distribute and form the pulp for optimal consistency and throughput.

The special design of RotoFormer allows a pulp feed consistency between 3% and 11%, enabling capacity increases of up to 30%.

An upgrade includes RotoFormer, a new and improved spray pipe, longitudinal air seals and upgraded air pressurized end seals for presses with water adjusted end seals.

RotoFormer benefits

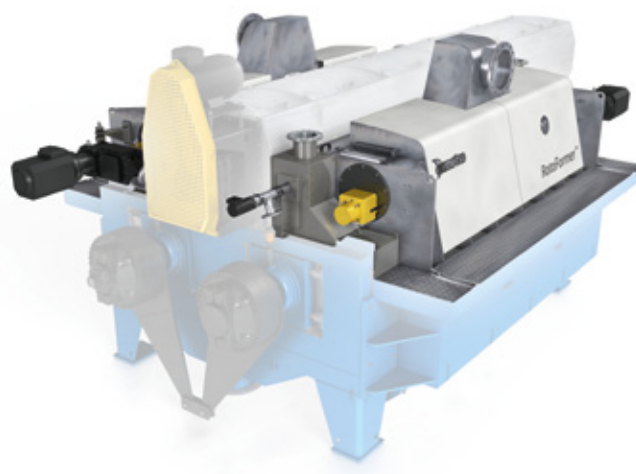
Enables capacity increases of up to 30% resulting from

- increased vat angle
- higher pulp inlet consistency of up to 11%

Greater washing efficiency resulting from

- excellent pulp distribution and formation

Minimized risk of plugging



The RotoFormer is delivered complete with drive, spray pipe and seals.

Upgrade information

RotoFormer is easy to install. It is bolted to existing holes on the press. Almost no modifications are needed for the DPB and TRPB presses, but some adjustments of the vat are necessary for the DPA and TRPA presses.

Installation takes approximately three days for the DPB and TRPB presses, and five days for the DPA and TRPA presses. The main press drive and the pre-breaker drive may need to be upgraded to handle a capacity increase. □



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Metso's **Linda Almquist** and **Jörgen Lundberg** together with the project leader, **Christoph Trunk** (not pictured), were responsible for the successful RotoFormer installation at Zellstoff Pöls AG in Austria.

TEXT Pekka Saarikivi, Paavo Sairanen and Heli Anttila

DOWNGRADING ENERGY CONSUMPTION BY Upgrading runnability systems

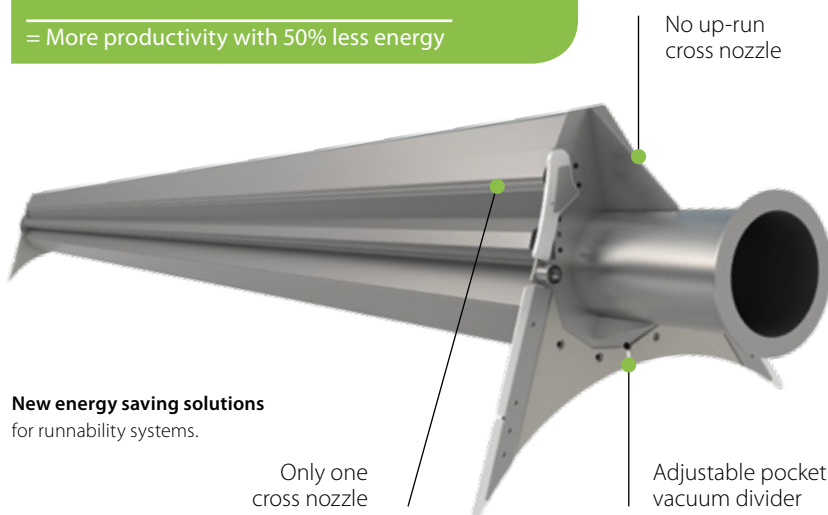
The design of new HiRun and SymRun Plus runnability systems halves the energy consumption of blow boxes. The same excellent energy saving solutions are now offered in both new blow boxes and as an upgrade service package for existing runnability systems. New features are applicable for different types of bottom rolls in single-felting. HiRun and SymRun runnability systems are now available for all kinds of drying section configurations, for example sectored vacuum felt rolls and perforated bottom rolls without an exterior air system.

Savings through new design

HiRun and SymRun blow boxes utilize a proven blowing technology to improve sheet support at the single-tier dryer groups of high-speed paper and board machines. In spite of widely-known excellent references from hundreds of production machines there is always room for improvement. Development has focused especially on reducing energy consumption and creating solutions that could be adapted to both new blow boxes and as an upgrade service package for existing blow boxes. The first installations are already running and performing well with great results.

Metso's runnability system rebuilds and upgrades enable:
Higher speed + Lower draws + Better efficiency

= More productivity with 50% less energy



New energy saving solutions
for runnability systems.

Savings through on-site upgrades

All the new technical improvements are also available as an easy upgrade package for existing HiRun and SymRun blow boxes. These upgrade services are carried out at the mill site concurrently with regular blow box overhauls. Depending on the original design of the blow box, more than 10 blow boxes can be upgraded in a two-day shut down.

On-site upgrades have great potential in larger runnability rebuilds as well. For example, upgraded HiRun blow boxes use much less air so the freed capacity in the existing air system can be used for additional new HiRun blow boxes.

Savings through operations

New blow box designs consume only half of the electrical energy of the old-type blow box design. But energy consumption also depends on how the system is run and operated. Adjusting the system to avoid oversized vacuum levels and balancing the system to have the correct vacuum in the correct position results in remarkable savings. This kind of set-up and fine-tuning of the system is always included in the scope of runnability services and blow box deliveries.

Savings through maintenance

Competent maintenance of runnability systems is profitable. Dirt, grease and dust are the main reasons for runnability problems and decreased energy efficiency. A fan energy saving of up to 70% can be gained by complete runnability system maintenance, runnability system upgrade and fine tuning carried out at the same shut down. Payback times, calculated from saved electrical energy for such an investment, have been less than one year. On top of that, many other benefits like improved tail threading, increased speed and fewer breaks shorten the payback time to a few weeks. □

Existing concept

Boundary layer at the bottom roll causing pressure build-up in the closing nip

Extra air-blowing needed on the up-run side to compensate for this

New design

Vacuum levels optimized in an innovative way

Pocket area divided into separate zones

Vacuum levels optimized with an adjustable pocket vacuum divider

No blowing nozzle on the up-run side

On-site upgrade service for existing boxes

Benefits

Optimized vacuum levels in single-felting

Excellent sheet runnability

Low fan-power demand

Total energy saving of up to 50% is possible

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TEXT Leena Silakoski and Juha Korvenniemi

Metso has further developed its nonwoven and hybrid felts to better meet today's customer demands for energy savings and better machine runnability. Nonwoven and hybrid felts are well-known for their fast start-up and high nip dewatering. Their sophisticated TMO versions also ensure excellent runnability.

Save energy and improve total lifetime performance with nonwoven and hybrid TMO felts

Felts play a major role with regard to efficiency and cost savings. As the process is complex it is important to analyze the whole process, not only one part of it. When purchasing a felt going for a cheaper option might, in the worst case, result in additional costs during the felt running time. It is better to analyze a felt's real effect on machine efficiency by looking at the felt costs per produced paper tonnes and the savings (e.g. energy reduction and saved production time) that can be achieved with certain felts.

Energy savings through the right press felt choices

Big savings can be achieved by reducing energy costs in the paper machine. Electricity usage in the press section is huge and adds up to hundreds of thousands of euros every year. About 20-30% of electricity usage is related to Uhle boxes. Their friction increases the energy consumption of drives, and the Uhle box vacuum increases vacuum energy consumption.

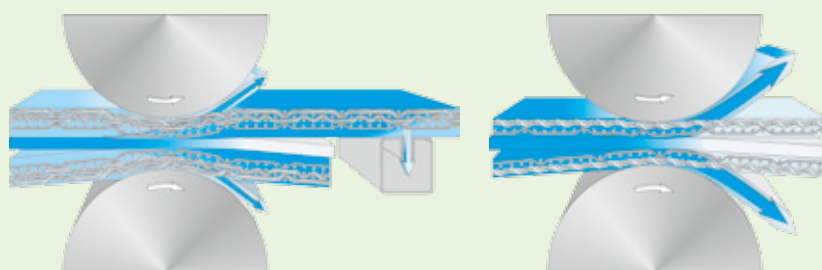
Energy can be saved by using nonwoven and hybrid felts, which maximize nip dewatering meaning that minimized or no vacuums are required in the Uhle boxes.

Standard nonwoven and hybrid felts: AquaMaster and EcoMaster

AquaMaster's immediately saturating structure allows a very fast start-up and maximal nip dewatering. As all the water is removed in the nip, Uhle boxes do not increase sheet dryness. Rewetting is minimized with a special layer.

EcoMaster is the combination of a woven and nonwoven structure. Its nip dewatering properties are excellent, but Uhle boxes can be used if necessary. Additional benefits compared with nonwoven felts include its smooth surface, insulation against marking, dimensional stability and less plugging.

Many machines already use AquaMaster and EcoMaster felts and run with maximized nip dewatering, which saves a lot of energy with closed vacuum pumps or blowers.



The water removal of conventional laminated felts compared with nonwoven and hybrid felts.

Nip and Uhle box dewatering

- Felt water content higher after nip
- Open and medium heavy weight felts
- Longer felt start-up time
- Typical felts: conventional laminated

Nip dewatering

- Felt water content equal or lower after nip
- Dense, thin and light weight felts
- Fast felt start-up
- Typical felts: nonwoven, hybrid AquaMaster / EcoMaster

Nonwoven / Hybrid felts

= Energy savings

Nonwoven / Hybrid + TMO

= Energy savings and improved lifetime performance

New: high-end TMO nonwoven and hybrid designs

Saving energy is not enough when the aim is to achieve efficient running. It is also important to improve runnability and total lifetime in other ways. In addition to good and even runnability, a minimal number of breaks, a high dry content and a maximal running speed are also important. A fast start-up and unchanged felt behavior are very important for the machine to run continuously at full speed. Minimal felt wear and a non-plugging structure ensure good life potential. A longer lifetime means fewer felt change shutdowns and savings in purchasing costs.

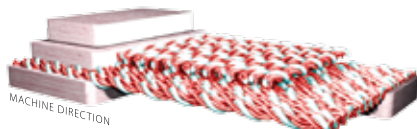
The sophisticated hybrid base TMO (TransMaster Open) felt has proven to be superior in this respect. It is a special felt for very demanding machines, such as high-speed printing paper machines.

Impregnated resin treatment ensures TMO's even performance throughout its lifetime. This treatment makes the felt structure dense and non-compacting, and perfect for a fast start-up and immediate nip dewatering. The structure remains unchanged throughout the lifetime with no late life related problems such as edge flipping or plugging. Improved mechanical resistance gives the TMO felt long life potential and makes it durable, also under high nip pressures, even if the base fabric is nonwoven or hybrid.

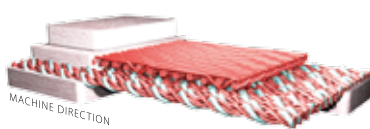
The savings gained through making the right felt choices are significant. The picture on the next page shows an example of felt costs compared with savings achieved with the right felt choices.

The hybrid TMO felts are increasingly used in many of the world's fastest newsprint and fine paper machines, especially in pick-up and 1st press positions, to ensure trouble-free running. □

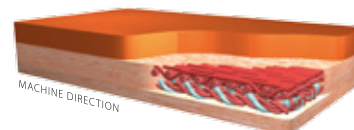
Different felt styles



AquaMaster, Metso's nonwoven felt.



EcoMaster, Metso's hybrid felt.



TMO, Metso's hybrid base TransMaster Open felt.

Nonwoven felt benefits

- Fast start-up
- High nip dewatering

Hybrid felt benefits

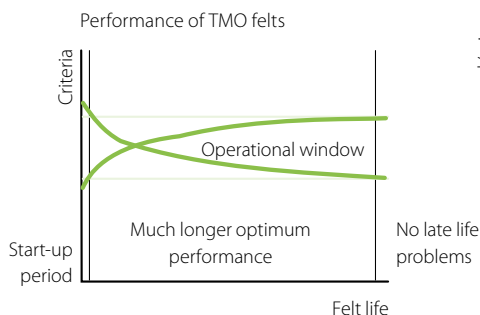
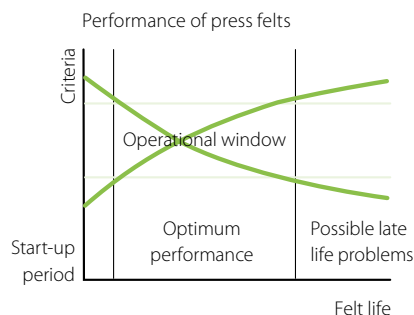
- Fast start-up
- High nip dewatering
- Smooth surface
- Improved dimensional stability
- Longer life potential

TMO benefits

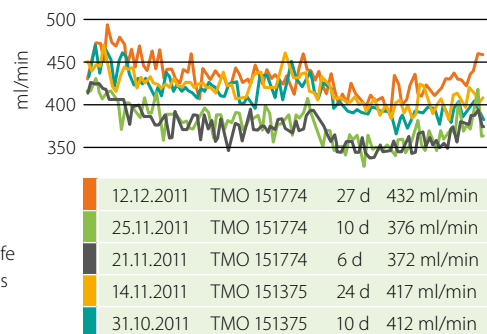
- Shorter start-up time
- High nip dewatering
- Better mechanical resistance
- Even performance through lifetime
- No late life related problems like edge flipping or plugging
- Longer life potential

TMO lifetime performance

Lifetime of conventional press felt and TMO



Even performance throughout TMO's lifetime



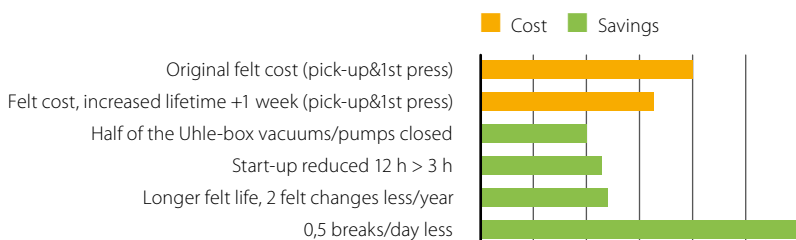
On the left a typical felt life cycle. On the right, TMO's life cycle with an increased operational window.

TMO's non-changing permeability level during its lifetime. Measurements have been carried out with the Felt Perm device.

Savings

Theoretical example of felt costs and savings potential which can be reached with hybrid TMO

Cost of the felts compared to production savings (Eur/year)



Theoretical example: newsprint machine, SymPress II + 4th press, speed 1,700 m/min, paper 45 g/m², paper on reel 8.7 m. Felt size: Pick-up: 380 kg, 1st press: 280 kg, felt lifetime 5 weeks (= 11 felts/position/year).

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Value-added roll maintenance

TEXT Mark Williamson

Papermaking machinery is undeniably a long-term investment, since machines are expected to last for many decades – with a few rebuilds along the way to upgrade to modern, more efficient technology. Therefore, it is not surprising and quite natural that many paper producers are taking a longer term view when planning the roll maintenance services that are essential for maintaining high product quality, machine efficiency and productivity. Many are turning to Metso to provide services over extended periods with multi-year contracts. The contracts cover the planning, logistics and execution of high quality roll grinding, recovering, balancing and reconditioning at Metso workshops. These service centers, located near customers, are equipped with state-of-the-art roll refurbishing and diagnostic equipment, and staffed by experienced experts.

Metso's newest service center for the pulp and paper industry is located in Zibo, in the Shandong province in Northern China. Assembly operators Chongju Tian (left) and Hui Zheng inspect and overhaul a Sym CD roll.

But the scope and intent of these agreements go far beyond the physical requirements of refurbishing a roll to a preset quality specification at an agreed time, although that is still a definite requirement. Today's contracts reflect a mutual commitment between the customer and Metso to make roll maintenance more effective in a cost-efficient way. Indeed, the mutual goals often involve extending the running time of rolls on the machine and actually improving their operation, reducing wear of their covers or components, or reducing energy consumption or other operating costs. In some cases rolls can be retrofitted with new technology "add-ons" which can actually make the roll perform better than new, extending its lifetime and making better paper more efficiently.

More than "roll workshop" services

With roll maintenance the emphasis is nowadays on actually adding value to the basic and traditional "roll workshop" services. A Metso roll maintenance customer once reported, "We are not just buying hours of maintenance time. Metso brings depth of paper machinery knowledge, skills, diagnostic procedures and service methods to add value. The end result is the good performance of our papermaking equipment." That idea is being carried out in an increasing number of paper mills.

There are some significant advantages in the cost of maintenance as well, since the work and cost is meticulously documented and controlled, and focused on well-defined objectives. With a longer term relationship between the customer and Metso, the unique history of a mill's roll inventory is known precisely and many opportunities to make improvements and lower costs are discovered. Improved operating efficiency and lower costs add up to higher valued maintenance over the lifecycle of the machinery.

Of course, each market area is different with various customer needs and agreements that must be customized to the local needs. A few examples from around the world are presented below.

obvious and hidden costs. This requires an intimate knowledge of customer maintenance requirements and history over several years.

The quality of repaired or refurbished rolls has an associated value in their performance on the machine. Put another way, the adverse cost of poor quality must be avoided. This value of quality is well controlled by Metso since it contributes to higher uptime on the machines, better paper quality, less costly reworking on site and therefore lower lifecycle costs.

Mill operating costs can be trimmed by upgrades, e.g. LocSeal vacuum roll sealing systems and properly selected doctor blade materials. Sheet breaks and threading times can be reduced by EdgeBlow upgrades. Regular site visits, audits and recommendations help customers to uncover areas where operating costs and production efficiency can be improved.

All of these cost savings and performance improvements add up to a significant return for Metso's customers. When asked about the value that customers receive for Metso roll services, **Ed Vandeveire**, Head of Agreements for North America, made the following comments:



Metso has 23 roll workshops around the world.

This is the Cernay service technology center in France.

Focus on lifecycle costs

The service organization in North America has been focusing on managing the total customer costs associated with every activity in the lifecycle of a product – including purchasing, inventory management, transportation logistics, roll installation time, as well as on-site labor and parts cost. These can include non-



Ed Vandeveire, Head of Agreements for North America, says,

"New roll modernization designs help to save not only downtime but also energy costs."

"As new roll modernization designs are developed older rolls can be upgraded to extend roll run time, enhance runnability and performance, and in some cases reduce horsepower requirements saving the customer not only valuable downtime but also energy costs – both of which increase our customer profit levels.

"Metso roll shops have direct access to all Metso and Beloit OEM drawings, bills of materials and design specifications, assuring the rolls are restored to at least original design specifications with minimal re-engineering required and allowing the fastest possible return time. Furthermore, extending roll cover life to match the roll scheduled maintenance reduces the number of times rolls need to be removed from the machine, reducing the yearly roll related shutdown time."

Costs reduced in the long run

In another example, Metso has signed a multi-year agreement with a British paper manufacturer covering the mill's complete inventory of rolls. The initial one year contract – now extended by three years – started with a mill audit which evaluated existing roll condition and recovering needs and recommended a service and replacement schedule for the contract period. The contract includes all mechanical roll service, recovering services, roll transportation to and from the nearby Metso workshop, and onsite inspection during machine shuts. Metso fully documents the service and recovering work so there is full traceability of all activities and costs.

During the scheduled maintenance only the most critical roll parts are inspected and consumables changed, based on known wear patterns and earlier experience. The contract also includes periodic machine audits in which abnormal wearing patterns and other performance-related problems are noted and corrective actions are recommended.

On top of that, roll reconditioning work restores the roll to an as-new condition. Reconditioning is a very important part of a longer term maintenance program since roll tolerances, shapes and dimensions change over years of operation. Furthermore, roll modernization – incorporating the most recent technology – improves roll performance so that it is better than it was when the roll was new, and contributes to increased reliability, lower maintenance costs, and better machine productivity and quality. This roll modernization offering is an important part of Metso's continual improvement program which it offers to customers to keep abreast of the most recent technology advancements.



"A roll maintenance agreement clearly defines the costs over the life of the contract, so it is easy to budget."
says Alex Small, Product Manager for Roll Service in the UK. "Customers know exactly what to expect."

Alex Small, Product Manager for Roll Service in the UK, presents his view of the value of roll maintenance agreements to customers: "Our customers are able to reduce costs in the long run and, by extending service intervals, they will get their money back very quickly. And, after a contract is put in place there will be zero downtime for roll-related problems."

Small emphasizes that a roll maintenance agreement clearly defines the costs over the life of the contract, so it is easy to budget. "Customers know exactly what to expect and it is therefore very simple and easy for the mill to administer," he adds.

More than ten years of cooperation

Metso's installed base of machinery in China has grown by leaps and bounds over the past ten years and, along with Metso's customer base, the roll maintenance capability has grown dramatically. The first service center was established in Wuxi over ten years ago. Today, it is joined by two additional roll service centers in Guangzhou and Zibo. These centers offer full roll regrounding, reconditioning, recovering and modernization services.

Metso's contracted roll maintenance services started in 2001 – the same year the Wuxi center opened – with the signing of a roll grinding contract with Shanghai Prosperous Paper (SPP) Co., Ltd. In 2011, the tenth annual extension of that SPP contract was signed.

Peter Chou, General Manager of SPP, expresses his thoughts on the value of this important contract and cooperation with Metso over the years. "We save a lot of time and costs through the grinding agreement. Metso has a lot of professional experts globally and we have learned a lot from them." The main targets of the roll grinding agreement were high production rates, production cost savings and better end-product quality.



Xie Daorong, Area Vice President of Metso's China Service, says "The contractual roll grinding business for Metso has grown to include more than ten customers today."

Xie Daorong, Area Vice President of Metso's China Service, says the contractual roll grinding business for Metso has grown to include more than ten customers today. Cunlong Qian, Sales Manager for Eastern China describes the value these customers see in Metso maintenance. "We offer professional service based on our wide technology offering, rich experience and global support. Compared with maintenance on a case-by-case basis, I believe we can save costs based on the agreements, as well as provide faster delivery in urgent situations."

He agrees with Alex Small when he says, "In addition, these agreements can save a lot of time in commercial negotiation. Both sides just follow up the agreements and accomplish the related processes." □

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DryOnyx H coating

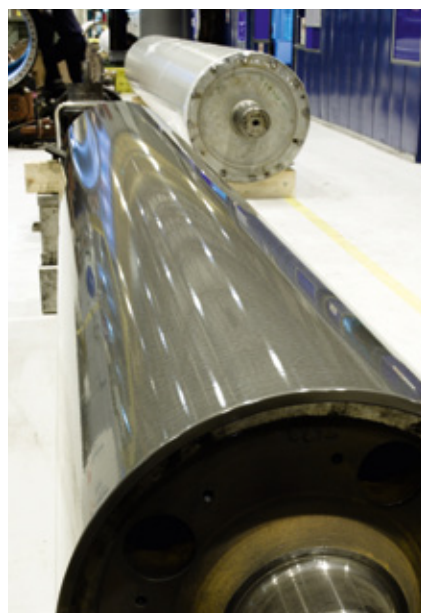
Excellent sheet release and wear resistance

Metso's new DryOnyx H release coating takes cylinder cleanliness and sheet release to new levels.

TEXT Marjaana Lehtinen

Runnability problems, sheet picking, and dusting caused by poor dryer cylinder release are challenges troubling many paper mills. Dirty dryer cylinder surfaces that reduce drying capacity and lead to sheet moisture profile deviations are also often encountered. The solution to problems like these is Metso's DryOnyx H release coating for doctored drying and cooling cylinders. It continues the good work of DryOnyx Z and DryOnyx ZL – with improved features.

The supporting base layer is now a highly wear resistant new-generation carbide coating, which provides superior durability compared to its predecessors. Quadrupled wear resistance extends the lifetime of the coating significantly and reduces recoating costs as there is no need to build up a completely new supporting layer.



New release coating DryOnyx H.

The highlight of this new coating is its release layer, made of a unique fluoropolymer exclusive to Metso. It has been optimized for excellent release and doctoring properties, as well as stable operation due to its good resistance to wear and flaking.

Ideal for onsite coating

DryOnyx H is designed for efficient onsite application. The benefits of onsite coating application include reduced shutdown time and low cylinder temperatures, made possible by a special release polymer that cures under powerful UV light. Time-consuming cylinder heating is no longer needed, and such adverse effects of heating as cylinder deformation, balancing changes and head sealing damage can be completely avoided.

DryOnyx H has very low surface energy, which results in improved release and cleanliness. This innovative polymer also maintains its hardness at high dryer cylinder operating temperatures, which means less wear and longer coating lifetimes.

Low doctoring friction

Another major benefit is the coating's good doctorability. Thanks to special additives used in the new release polymer matrix, its friction coefficient is 80% lower than that of previous coating versions. The resulting benefits include more stable doctoring, less heat build-up at the tip of the doctor blade, a better cleaning result, longer coating and doctor blade lifetimes, as well as lower drive power consumption.

Also new: GuideOnyx H

In addition to DryOnyx H, Metso also offers a GuideOnyx H coating for doctored dryer section lead rolls and paper guide rolls. It works especially well in positions after sizing and coating stations and improves their cleanliness. □

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KOTKAMILLS PM 2

"The best release coating we have ever had."

One of the users of DryOnyx H is Kotkamills Oy in Kotka, Finland. Its PM 2 produces coated magazine paper and has a design capacity of 185,000 tonnes per year. Its wire width is 5,970 mm and current operating speed 1,400 m/min.

PM 2 has been using release coatings on the first dryer section cylinders for years – partly supplied by Metso, partly by others.

"Metso's previous DryOnyx ZL release coatings delivered in 2007 have served their purpose, which was to prevent the web from sticking to the cylinder. And they are still in good condition", says **Esa Elonen**, PM 2 Production Manager. "The cylinders stay clean, and there are no problems with doctoring."

In December 2010, Metso supplied a new DryOnyx H release coating for PM 2's first dryer cylinder. The existing coating, dating back to the early 1990s, was in very bad condition. The target for the refurbishment was to improve cylinder cleanliness and minimize the sticking of the web to the cylinder surface.



According to **Mikko Vaulamaa**, the DryOnyx H coating stays cleaner than other release coatings, and there are no spots where dirt builds up.

Impressive results with DryOnyx H

"Doctoring has gone well. The blade now wears evenly and its lifetime has almost doubled compared to what it used to be. With Metso's ValEco 4.1, the blade's lifetime is 15 days on average", says **Mikko Vaulamaa**, PM 2 Mechanic Supervisor. "The coating stays cleaner, and there are no spots where dirt builds up, which was the case with the old coating. The dirt build-up in doctoring is minimal, and the web releases well from the new coating."

"We are satisfied with the new coating. It's the best release coating we have ever had", concludes **Timo Koskela**, PM 2 Daily Supervisor, Production.

Automation plays a big role in health care product manufacture

TEXT Soili Städter



Paul Hartmann Ges.m.b.H. in Grimmerstein, Austria, manufactures an extensive product portfolio of wound management supplies and bandages. The company has invested in Metso's refiner and automation system to gain a clear advantage.

Over the years, cooperation with Metso has proven to be very fruitful. Metso's sales and project team consists of professionals with extensive refiner and automation knowledge. Metso's **Michael Kremsner**, Sales Manager, and **Eva Koch**, Sales Manager, appreciate the customer's professionalism and interest in finding new technical solutions for their demanding process.

Being able to obtain several products and solutions from the same supplier is

advantageous for the customer. "Since you deal with the customer and contact persons on a regular basis and get to know them, you can devote yourself better to the company and its needs," says Eva Koch. She was responsible for the automation project, and has thorough knowledge of all the extensive measuring and control solutions. **Johannes Wiederkum** confirms that everything was taken care of in the best possible way, and Metso's personnel were always easy to contact. The customer is currently

Paul Hartmann Ges.m.b.H. manufactures quality products for health care.

discussing the features and usability of the consistency controls with Eva Koch.

Automation to contribute to the well-being of people

Paul Hartmann delivers tailored, high-quality products, such as bandage products for hospitals, social service providers and doctors. The company cannot afford to produce faulty or defective goods, as it is all about the well-being of patients. Metso maintains the same uncompromising quality standards when offering tailored solutions to its customers. In this particular delivery, the automation system consisted of about 15 I/Os.

"Our quality requirements are constantly increasing. Actually, that was one of the reasons why we invested in the refiner; we wanted to achieve better strength in the cellulose wadding. The contacts we created with Metso eventually led to the investment in the automation system. Metso was able to combine refiner and automation know-how to solve our quality problems," explains Wiederkum.

Many benefits through Metso DNA

The start-up of the Metso DNA automation system took place in March 2011. The work was successfully completed in only two days. According to Wiederkum, the project work with Metso was incredibly successful. After only six weeks, the production was running like a dream. Since then, there have been no problems or alarm situations.

"The automation system is new to all of us. But the handy control components make it easy to use," says **Thomas Böck**, Technology, who is responsible for the projects, service and technical issues.

Product quality and energy optimization is an accomplishment

Johannes Wiederkum is convinced that the combination of the refiner and the automation system has provided the mill with several benefits. "We have had some problems with the strength of certain products, but we cannot afford to have such difficulties. If customers are not satisfied with our products, they will look for another supplier to replace us. Now we have increased the material strength by up to 30-35%."

Wiederkum explains that you also have to think about the downstream converting

systematically control the energy use and demand, and clearly save money."

Environmentally-friendly solutions for the future

Environmental and occupational safety issues are emphasized at the HARTMANN Gruppe. The production sites have been certified according to ISO 14001 and validated with the European Union's Environmental Management Audit Scheme (EMAS). These are significant tools to ensure environmental protection and for adopting measures to ensure its operability. Environmental goals are set every year, and these are completely supported by the company management.

The investment plans were thoroughly checked already at the early investment phase. Automation can be categorized as



"We had our first contacts with Metso a few years ago. In 2009, we invested in a second-hand refiner and since the experiences were so positive, we decided to buy another refiner, an RF-0, and an automation system the following year," says **Johannes Wiederkum**, who is responsible for the technology, installation and maintenance of the facilities and projects.

The material strength has gone up by 30-35% which means **Thomas Böck** (on the left) and **Johannes Wiederkum** are very pleased with the results.

August Gauster, Foreman, who is in charge of pulp pad production, emphasizes that the new automation system runs without problems. He adds that you can really notice the results of the automation in the end products: "We are very satisfied with the obvious improvements."

From manual production to automation

"It has been a big step for the personnel to go from manual production to an automated process. Despite the change, there were no complaints at the mill," explains Wiederkum. There are three shifts at the mill, and each of these consists of three persons. Metso trained the personnel during the start-up phase. Paul Hartmann has paid special attention to the motivation of the users. "The personnel were encouraged early on by the new opportunities, and the new way of working is now accepted by everybody," says Wiederkum.

plants. It is clear that there should not be any quality issues. The freeness quality is much better now and that is also crucial for after-treatment.

"Energy can be optimized a lot in the grinding process," says Wiederkum. "We observe the process, and when the freeness and tear strength are in balance, the grinder energy can be optimized. You can

an energy-saving and environmentally-friendly investment. After all, energy savings and quality improvements have clearly been achieved through this project.

Both Paul Hartmann and Metso are professionals in their fields, and both appreciate the importance of environmentally-friendly solutions. □



Johannes Wiederkum

says that the new refiner equipped with the automation system has provided the mill with several benefits.

Michael Kremsner Sales Manager

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The new Metso BCTMP pulp line at Shouguang Meilun Paper

One of the most energy-efficient in the world

TEXT Erika Forsberg

Metso delivered a complete pulp manufacturing line for high-quality coated paper to Shouguang Meilun Paper Co., Ltd. in Shouguang, Shandong Province in China. The line, which has been in operation since September 2011, is equipped with state-of-the-art Metso technology and has very high energy efficiency.

The Metso delivery included machinery, electrical and process control, engineering, installation supervision and commissioning. The pulp line has a production capacity of 500 tonnes/day. The raw material is mainly poplar and eucalyptus from the mill's own plantation and from nearby suppliers. Chips are also imported from Thailand, Indonesia and Vietnam.

The new line

The new BCTMP line (Bleached Chemi-Thermo-Mechanical Pulp) comprises an RGP 82 CD refiner followed by two-stage bleaching and final refining carried out in conical OptiFiner refiners. The line produces pulp of excellent quality.

Cost-effective mill

Without compromising quality, the Meilun BCTMP line produces pulp in an extremely energy-efficient way. Bleaching in two stages also reduces chemical consumption when targeting high pulp brightness.



"We are very pleased with the new pulp line, it is energy-efficient, easy to run, effective and very flexible. We can maneuver the line to switch from one quality to another in a few minutes, for instance, from art paper to newsprint quality. It makes our mill very cost-effective and significantly enhances our productivity.

"We want to give special thanks to the Metso personnel who were assigned here during construction and start-up. We will definitely continue to work with Metso in the future," says the production manager at the mill.

Chenming Paper Group

Shouguang Meilun Paper is part of Shandong Chenming Paper Holdings Limited, one of the largest paper manufacturers in China. The group consists of more than ten subsidiaries with a production capacity of four million tonnes per year.

The RGP 82 CD refiner with OptiFiner refiners.

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The project team members involved in the BCTMP pulp line delivery are happy with the results. From the left, **Wang Fengtan**, Project Manager, Mechanical Pulping; Product Sales Manager **Mattias Johansson** from Metso; and **Song Qingming**, Production Manager, Mechanical Pulping.

The new BCTMP line produces pulp of excellent quality.



Metso around the world

Recycling

HKS Scrap Metals upgraded its Metso scrap shear

After using a Lindemann scrap shear type LU intensively for 21 years, the Dutch firm HKS Scrap Metals decided on a comprehensive machine upgrade to be carried out by Metso Recycling Services. The motor and controller and the old operating terminal were replaced, and new piping was installed.



Since the five-week-long renovation was completed, production capacity has almost doubled. "The shear will keep going for another 20 years," says **Marco Disco**, Technical Director of HKS. "The results have exceeded our expectations!"

Automation

New Fiber to Print solution ensures optimum printing results



Today's papermakers recognize that what happens before the headbox has a major impact on paper and board quality. By the time fiber furnish reaches the machine, it is too late to correct the mistakes made in pulping, for example. That is why Metso offers combined process performance control and

product quality management, coordinated across the whole production process.

Metso's new Fiber to Print solution links a complete suite of process control, quality management and environmental solutions that collectively optimize the whole chain from pulp production to end product. They include the analyzers and controls that stabilize the process, QCS quality control, automated laboratories, and advanced controls for end product management and productivity optimization. To complement the Fiber to Print solution, Metso has introduced new online surface & structural measurements and camera-based web inspection systems.

Fiber to Print is based on data collection and management across the whole process. All the collected data is time-synchronized into one quality report.

Significant reductions in chemical use can be achieved through mill-wide brightness optimization, which coordinates pulp bleaching with final paper brightness. Printing house claims can be significantly reduced by applying new developments in online measuring of the structural and surface properties of the paper. Camera-based web inspection and online scanning by optical and imaging-based technologies, coordinated with upstream wet-end analyzers, now provide new and improved tools to predict paper or board print quality earlier than ever.

Mining and construction

Karelpriodresurs, Russia – at the pinnacle of quality

Russia's requirements for aggregates quality, as specified in several nationwide standards, are currently among the strictest in Europe. But thanks to Metso's portable crushing and screening plants and Metso DNA automation, Karelpriodresurs is not only easily exceeding these quality demands, but is also producing growing quantities of aggregates.

Only the best granite and gabbro deposits, processed into highly cubical end products, can meet the Russian quality standards. Therefore, Karelpriodresurs carefully studies the rock quality before opening its quarries. Every new plant is run using Metso's modern, three-stage crushing and screening process.



The Metso DNA automation control cabin is placed so that the operator **Sergey Horyy** can not only follow the crystal clear process screens, but also see most of the plant.

The company's target is to open one portable plant every year. With its four existing plants, Karelpriodresurs aims to produce up to 6 million tonnes of high-quality aggregates in 2012. The fifth quarry will be opened this year in the Leningrad region.

For the first time, the whole portable plant process at Kaalamo, Russia, is being steered by the new Metso DNA automation system.

Power

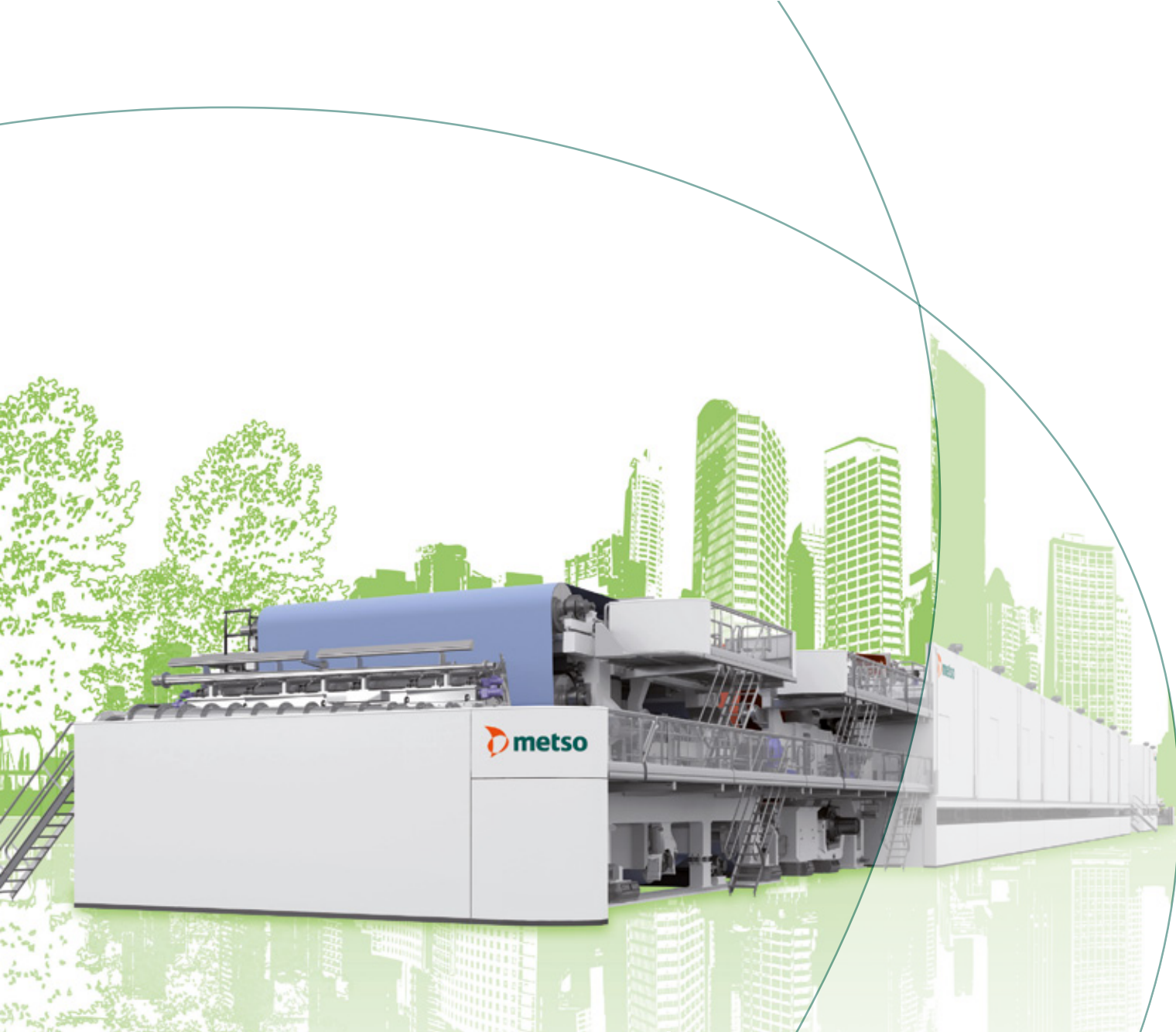
World's largest recovered fuel fired boiler to Mälarenergi's heat and power plant in Sweden

Metso will supply Mälarenergi's combined heat and power plant (CHP) in Västerås, Sweden, with the world's largest recovered fuel fired boiler. The new boiler with a fuel input of 167 MW will utilize circulating fluidized bed (CFB) technology and it will serve as a base unit to meet the district heating power needs of Västerås and Hallstahammar municipalities.

The modernization is a significant investment for the city of Västerås as the existing CHP plant is in need of a comprehensive upgrade. The principal fuel for the new boiler will be recovered fuel prepared from municipal waste, and the new boiler also has possibility to burn biofuel. Compared with current boilers, the new system will give the plant a more flexible fuel mix.

"The modernization is an important investment for Mälarenergi and the city of Västerås, as well as for our customers," says **Kenneth Jönsson**, President, Mälarenergi AB. "The investment will give us a greater fuel mix flexibility. We chose Metso because they fulfilled our requirements regarding price, technology, availability and experience."

The modernized CHP plant will be commissioned in the middle of 2014. □



ECONOMY

SAFETY

ENVIRONMENT

Setting new standards for paper and board making

Metso's **OptiConcept M** is a totally new way to design, build and operate a paper machine. Its goal is to increase competitiveness by focusing on maximum efficiency with minimal costs. Increased energy efficiency, savings in raw materials and chemicals keep costs and environmental impact low. And its patented industrial designs ensure a safer, cleaner and healthier working environment.



www.metso.com/opticonceptm

