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Forward

VALMET'S CUSTOMER MAGAZINE | 2/2015

Suzano's Imperatriz pulp mill
sets new standards for

**GREEN
ENERGY**

in Brazil

Valmet 

Unique offering to our customers

Valmet finalized the acquisition of process automation systems from Metso on April 1, 2015. Thanks to this important strategic step, we can now provide a unique offering with a range of process technologies, automation and services. This combination brings added value to our customers and increases Valmet's competitiveness.

The feedback from our customers on this step forward has been highly positive. Furthermore, the whole Valmet team is excited and energized to deliver even better service than before to our customers. This we do by integrating automation seamlessly into our offering and by combining a worldwide network of automation experts with our strong technology and service teams.

Our automation solutions are an integral part of pulp, paper and energy production and they are also widely used in marine and other process industries. Their key function is to help improve production performance as well as material and energy efficiency. Together with our customers we continuously develop new, sustainable solutions to save raw materials, energy and water and at the same time optimize end product quality. Please enjoy some of the most recent highlights of our latest endeavors in this magazine!



ANU SALONSAARI-POSTI
SENIOR VICE PRESIDENT
MARKETING AND COMMUNICATIONS



Our automation solutions are an integral part of pulp, paper and energy production.



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Valmet has completed the acquisition of Process Automation Systems

Valmet has completed the acquisition of Process Automation Systems business from Metso, announced on January 15, 2015. Valmet has received the necessary approvals from the competition authorities.

The acquired business forms Valmet's fourth business line, Automation. **Sakari Ruotsalainen**, M.Sc in Engineering, has been appointed President of Automation business line.

"The acquisition was completed according to our plan, and we welcome approximately 1,600 new colleagues to Valmet. We are now a technology and service company with full automation offering. The unique combination of Valmet's technology, process know-how and automation offers good possibilities to move our customers' performance forward and serve our customers even better," says **Pasi Laine**, President and CEO of Valmet.

New online tool for choosing optimal roll covers

Valmet has launched a new and intuitive roll cover online tool. This interactive application enables users to locate and select the correct roll cover for any paper, board or tissue production line roll positions, as well as for pulp drying machines.

The new online tool will serve Valmet's customers even more efficiently by collating Valmet's entire roll cover and coating product range and presenting the products in one user-friendly view along with all related product information. You can find the application at www.valmet.com/rollcovers.

Agreement for key technology to Metsä Fibre's bioproduct mill finalized

Valmet and Metsä Fibre have finalized the agreement for the supply of key technology to Metsä Fibre's new Äänekoski bioproduct mill in Finland. Valmet's delivery includes recovery boiler, pulp drying line, gasification plant, lime kiln and a mill wide Valmet DNA automation system.

The construction of the bioproduct mill will start immediately and the production at the new mill is scheduled to begin during the third quarter of 2017.

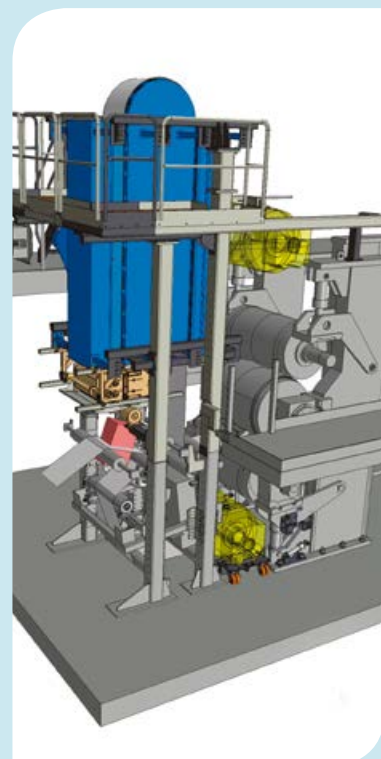
"The bioproduct mill will strengthen Metsä Group's leading position in northern softwood pulp market and will improve our profitability. We have had long term and successful cooperation with Valmet which is a strong supplier of equipment of this scale," says **Ilkka Hämälä**, CEO of Metsä Fibre.

NEW AQUA COOLING CALENDERING TECHNOLOGY - FIRST DELIVERY TO STORA ENSO

Valmet has launched a new and patented calendering technology to the market. The new aqua cooling technology improves the calendering results compared to usual paper production conditions.

In most cases the best calendering results are achieved when the web is cool and stiff, like in pilot trials for example. With aqua cooling technology, pilot-type environment is brought to production-level, by cooling down the web before the calendering nip. This is enabled by applying a small amount of water with a moisturizer, and evaporating it with an air dryer.

Stora Enso has decided to invest in the new technology at their BM 4 packaging board machine in Ingerois, Finland. The target of the rebuild is to improve board quality, while also increasing bulk saving potential. The rebuild includes new web moisturizing and evaporation cooling equipment. The rebuilt production line will start up in September 2015.



VALMET AND KAWANOE ZOKI TO DELIVER ADVANTAGE DCT TISSUE LINE TO DAIO PAPER

Valmet and Kawano Zoki are jointly supplying a complete Advantage DCT tissue making line to Daio Paper in Japan. The project is proceeding according to plan. Recently a delegation from Daio visited Valmet's workshop in Karlstad to inspect the Steel Yankee Dryer.

The new production line is planned to start-up at Daio's Kani mill outside Nagoya in the second half of 2015 and will add 26,000 tonnes of premium quality tissue to the company's annual production.

"Valmet and Kawano Zoki have a wide experience of low basis weight tissue production which is common in the Japanese market. We are convinced that Kawano Zoki's expertise combined with Valmet's Advantage DCT state-of-the-art technology is the best choice for our operations", says **Ichiro Toyomatsu**, General Manager, Plant Engineering Department, Daio Paper.

The joint delivery is a result of Kawano Zoki's and Valmet's long-term license agreement.

Valmet's Tissue Technology Award granted for modification of hardwood pulp



Valmet's Tissue Technology Award has been granted to **Abdus Salam** from Research Associate of North Carolina State University, USA.

The USD 25,000 award was given to Mr. Salam for his work focused on modified hardwood pulp for tissue production.

The objective has been to develop a method to provide unique tissue characteristics using only natural materials. By modifying hardwood pulp, it can be cross-linked with a biodegradable product to greatly improve the absorbency properties. The modified product is elastic, very soft, highly porous and durable. It has also antimicrobial properties.

"I believe the research related to modifying hardwood pulp can significantly contribute to the personal health care sector as well as the global economy," says Abdus Salam, winner of the Tissue Technology Award.

eServices offers easy access to delivery status and order history

Valmet's eServices online tool now allows registered users to quickly see a mill's order and quotation history for the past two years. eServices is a mobile-friendly tool that assembles Valmet's spare part product data and parts services into a single interface. Our customers can use eServices to easily find spare and wear part product information, check delivery times, make inquiries, and get troubleshooting help.

eServices is also a handy tool for planning shutdowns, as registered users can also use it to easily view their delivery status. "The ability to see if ordered parts are on schedule, or to get a list of previous quotations regardless of Valmet unit, is a service we were not able to offer before," explains **Michael D. Nelson**, head of spare parts for Valmet in North America.

Go to eservices.valmet.com and register now!



Vesa Simola to head Valmet's EMEA area

Vesa Simola (M.Sc. (Eng), age 47) has been appointed Area President of Valmet's EMEA (Europe, Middle East and Africa) area as of 1 August, 2015.

He joins Valmet from Stora Enso, where he is currently employed as Senior Vice President, Consumer Board Division. During his career Vesa has gained international experience in general management covering sales, production, R&D and supply chain by working in a global paper company. He has vast experience of managing international customer relationships, leading organizations, generating sales and driving profitability.

Hannu Mälkiä, the current EMEA Area President has decided to retire in June 2015.

CUSTOMER'S VOICE

Moving forward together

MEGA-EFFICIENT

Suzano's Imperatriz pulp mill sets new standards for green energy in Brazil. TEXT Paulo Aguiar



In 2011, after years of careful planning and conducting numerous studies, Suzano Pulp and Paper decided to go forward with the most ambitious and challenging project of the South American pulp industry in a decade: to build the most energy-efficient, mega mill in the world – to be constructed near the city of Imperatriz, in the north of Brazil.

Valmet was selected to accomplish the task, supplying the main technology for pulp production and recovery. The scope of the supply included: wood preparation with three high-capacity chipping lines, a cooking system, a fiberline with press technology, two pulp drying lines and five baling lines, an evaporation plant, recovery and a power boiler. Valmet's contract also included the construction and erection of its equipment and the automation system for the entire mill.

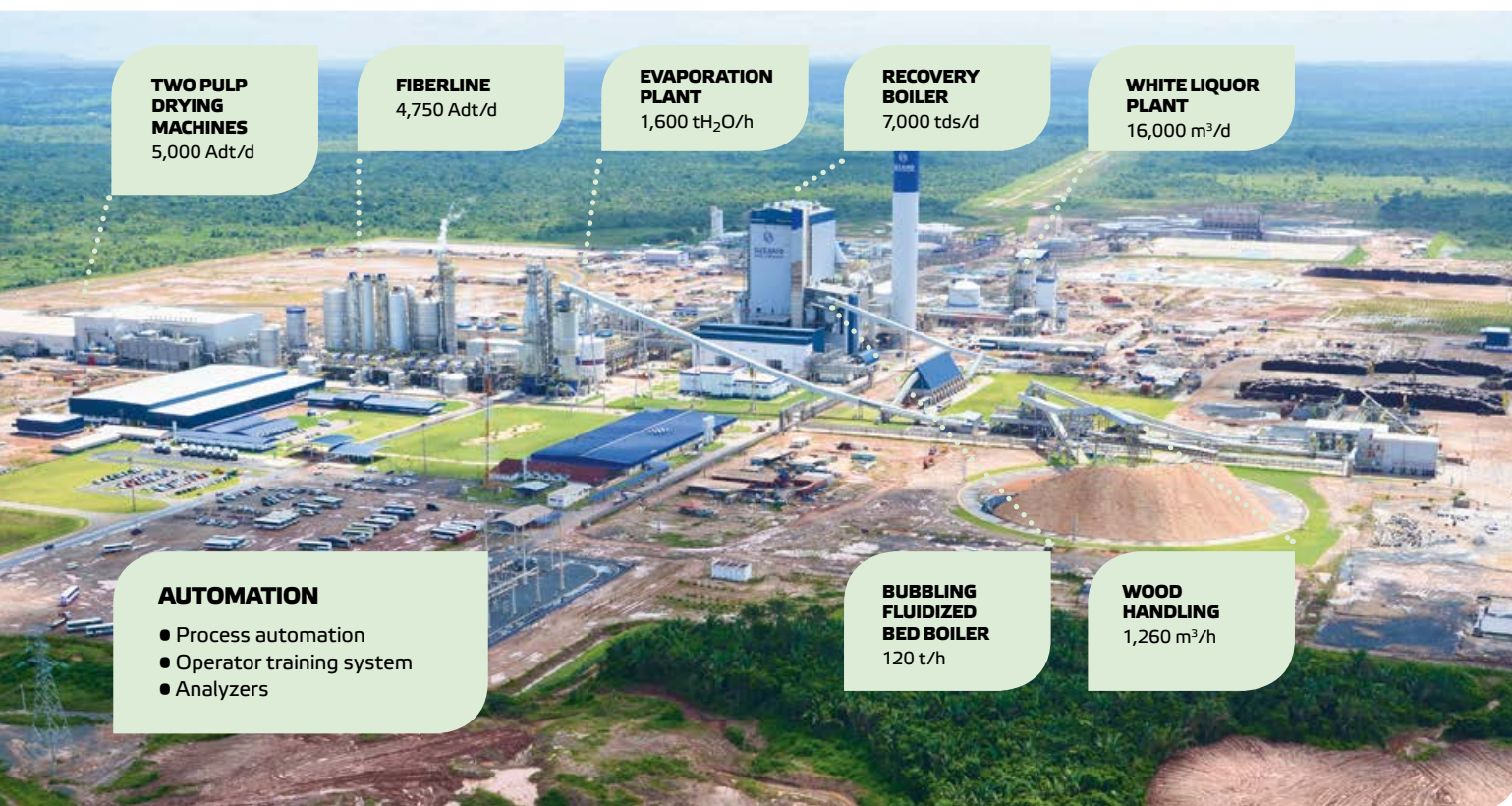
Opportunities and challenges in a new frontier

The city of Imperatriz is located in Maranhão state in the north of Brazil. The state is one of the less developed in the

AT THE PEAK OF THE CONSTRUCTION PHASE, THERE WERE OVER 11,000 WORKERS INVOLVED. 7,000 OF THEM WERE EMPLOYED BY VALMET.

country, and Suzano's investment was the first of its kind in the region.

The city is located 600 km from Itaquí harbor and very close to the equator. The climate in the region is similar to that found in the Amazon forest, with temperatures close to 30 °C throughout the year and two well-defined seasons: the dry season (winter) and the rainy season (summer), marked by six months of heavy rain. Such a climate brought great challenges to the workers during the construction period. At the peak of the construction, there were over 11,000 workers involved with 7,000 of them employed by Valmet.



Valmet's complete delivery to Suzano pulp mill.



↑ EVERYTHING IN CONTROL

Valmet's extensive automation package includes process controls and optimization, machine and quality controls as well as analyzers.



← SURPLUS ENERGY

"We have been supplying to the national grid an average of 80 MW of surplus energy, based on liquor and biomass sources", relates José Alexandre de Moraes, Industrial Operations Director of Suzano.

"A project of this size had never been executed in this part of the country in such a short timeframe," points out **Edmund Schwarz**, Valmet's Project Director. "The roads were not prepared to transport such heavy equipment, sometimes weighing up to 200 tonnes such as the boiler drum, or measuring more than six meters in width, such as the evaporation effects. The heavy rain and high moisture during the summer also demanded extra efforts during the construction phase."

On the other hand the region does have efficient logistics with a railway connecting the mill to the harbor. All exported pulp will be transported by trains and shipped to customers in the USA, Europe and Asia.

"The location of the mill was chosen in an area where land was freely available for tree plantations and there was no competition with food production. Being close to the equator saves four days of transportation to our customers in the USA and Europe, saving fuel and CO₂ emissions," says **Adriano Canela**, Suzano's Project Director.



↑ **TWO PULP DRYING LINES**

The two pulp drying machines with Valmet pulp dryers have a capacity of 5,000 tonnes a day.

Resources saved thanks to efficient technology

At the end of 2013, Suzano and Valmet had achieved the completion of the mill and the first bales were produced. At the same time, Brazil was facing an energy crisis caused by an unusual lack of rain in the previous season. The country is heavily dependent on hydro power generation, representing 87% of Brazilian energy capacity. With low levels of water in the reservoirs and with the national grid using power stations fueled by natural gas to generate electricity, there was an opportunity for Suzano to contribute with a more sustainable source of energy.

“We have designed our mill to have a surplus of energy. In the design of our system we have selected the most efficient technology available in order to save steam and electricity for internal use and to make available as much energy as possible for power generation,” says **José Alexandre de Morais**, Suzano’s Industrial Operations Director. “We have been exporting an average of 80 MW

THE SUZANO PULP MILL HAS A TOTAL CAPACITY OF 1.5 MILLION TONNES PER YEAR OF BLEACHED HARDWOOD MARKET PULP.

of electricity based on liquor and biomass sources, with the advantage of having our forest as a source of energy, capturing CO₂ in the process”.

Such a surplus of energy is only possible due to the choices made by Suzano to have the most efficient technology installed in its mega mill.

Green surplus energy benefits the outside society

“Valmet’s compact cooking G2 digester, employed at the Suzano mill, is the most efficient digester on the market, consuming less than 350 kg of steam per tonne of pulp produced (50% of other market technologies). Combined with our press technology in the fiberline, which consumes very little steam and water, it generates only 10 m³/tonne of effluent at a low temperature. Most of the energy stays in the process, reducing the internal consumption of the mill”, adds **Paulo Aguiar**, Valmet’s Senior Sales Manager for pulp technology. “In addition, Valmet’s drying machines have been operating with a steam and electricity consumption 20% lower than with other technologies on the market”.

Fernando Scucuglia, Sales Manager for recovery and energy adds, “The recovery boiler supplied to Imperatriz is not only the biggest in operation in the world, but also one of the most efficient. With high power features it can generate more energy for the same amount of dry solids burned in other boilers.”

Along with the further improvements in other processes of the mill, Suzano is generating enough power for its own consumption and a surplus of 2.0 GWh per day. This is enough electricity to supply a city of a million inhabitants* with green energy from 100% planted trees. ■

** According to Brazilian energy ministry, an average family has 3.2 persons and consumes 169 kWh/month of energy.*

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In the design of our system we have selected the most efficient technology to save steam and electricity.



FIBERLINE
 The fiberline comprises four bleaching stages and two pulp drying machines.

IN THE SPOTLIGHT

Fernando Carroquino

Industrial Director of SAICA Paper

– Thoughts about energy efficiency, lightweighting and containerboard markets.

TEXT Marika Mattila PHOTOS Joonas Nieminen, Movya Oy

SAICA – a world leader in manufacturing recycled packaging papers - has been making paper since 1943. The company's latest containerboard line, PM 11, is one of the most advanced and most sustainable lines of its type in the world, fitted with the very latest technology. It has been designed with all the know-how of SAICA's experienced teams and supplied by Valmet.

Fernando Carroquino, Industrial Director of SAICA Paper, shares his thoughts about the challenges containerboard makers are facing, especially from energy efficiency, lightweight and sustainability points of view.

Differentiation is a must for successful operation

“One of the main factors for containerboard makers in staying competitive is to understand your customer's needs. We, as papermakers need to be able to produce products that the customer requires and we should be able to do that at the best levels of efficiency possible. We should be able to produce something different and provide efficient solutions with low production costs and reduced delivery times for our customers. For us this means that we need to have highly flexible production lines. For these reasons, we demand the same attitude from our partners, like Valmet, to be able to take risks and do things differently – and to differentiate themselves.”

Containerboard market in constant change

“Lightweighting will stay on the agenda. We believe that gram-mages will continue to decrease and we will see more lightweight papers on the market. There are clear demands from our customers to reduce packaging weight and transport costs.

A further element that changes the market is the ever increasing use of online shopping. Some years ago we used to have boxes for twenty units. Today boxes that are designed for just one unit are required

because people buy over the Internet and they buy just one item at a time. Furthermore, printing requirements are changing due to retail ready packaging, where high quality printed boxes are needed with easily recognizable branding. At SAICA we have a team for developing boxes based on our customers' requirements. The customer comes to us with an idea and we have the team to prepare a design for the box required. We have the necessary tools to print, cut and produce the box so that by the end of the day the customer has a new box design and a clear idea of what we are able to provide – a tailor made product.”

Energy efficiency number one factor in investments

“Energy efficiency factors are number one when making investment decisions. It's extremely important mainly because of the paper market. The prices are falling, production costs are increasing and this gap becomes higher year by year. The main production costs are made up of the recycled raw material (OCC)

and energy. The price of OCC is fixed by market, so energy consumption needs to be reduced.

First, it is important to have good stability and runnability. PM 11 is improving in these areas and we expect to reach our targets pretty soon. The second point is to be able to exploit high technology. Paper machines are like cars: if you have an old car, fuel consumption is high. But nowadays you can buy cars with very low fuel consumption. Obviously we need our partners, like Valmet, to analyze how the latest technologies can help us to reduce energy consumption in our papermaking lines. The third, and the most important point is to have a skilled team with deep levels of know-how working in very close cooperation with the technology supplier.

The ability to measure each piece of equipment using automatic control systems is the key for us in decreasing our energy consumption. We utilize Valmet's EnergyOperator online monitoring tool on a daily basis for our energy consumption management.

The most important energy efficiency areas in PM 11 are the vacuum system, the gap former and the hood. We have been able to reduce vacuum related energy consumption by optimizing the Uhle boxes and with fabrics. The compact gap former for containerboard is very good in terms of dewatering and this helps us to reduce energy consumption a lot. Dewatering is high because of the gravity and pressure and due to this we are using less vacuum compared to other former types. What has also been a big improvement is the way Valmet manages the hood ventilation – considering the hood as a one element, not by area by area. Valmet

has changed our philosophy. Now we work with pre-dryer and after-dryer sections and we analyze these two units as a whole.”

Sustainability is a key issue

“Sustainability is a key issue for pa-

permakers like us. PM 11 is definitely our most environmentally sound production line. We have reached all our targets related to emission levels. Water consumption is good and energy consumption targets have been achieved as well. However, we still strive to improve every day.

One beneficial factor regarding PM 11 at Partington in the UK is the central location of the mill. We have reduced transport costs and the environmental impact a lot due to the geographic location. Obviously this has been the right investment decision in terms of sustainability.” ■

SAICA was founded in 1943 in Zaragoza (Spain). At present, the company is one of the leaders in the manufacturing of paper for corrugating with a production capacity of 2.5 million tonnes per year.



“Energy efficiency factors are number one when making investment decisions”, points out Fernando Carroquino.

PM 11 is definitely our most environmentally sound production line. We have reached all our targets related to emission levels.



Kimberly-Clark Bajio, Mexico:

EFFICIENT
OPERATIONS
ADVANCED
TECHNOLOGY
DEDICATED
PEOPLE

The reasons behind Kimberly-Clark's decision to build their new tissue making line in Bajio mill were its good infrastructure, well trained personnel and consistent record of achieving good results.

TEXT Katarina Åhsberg

CLEAN AND EFFICIENT

The Bajio mill is remarkably clean. The Advantage DCT 200 tissue line from Valmet started up on June 30, 2014 but still looks brand new.

Kimberly-Clark's Bajio mill in Mexico houses four tissue machines, a de-inking plant, several converting lines and a staff of just over 1,000 people. Their most recent tissue machine installation, TM 4, started up in 2014. The reasons behind the decision to build the new line in Bajio mill were its good infrastructure, well trained personnel and consistent record of achieving good results.

Bernardo Aragón Paasch, Director of Operations at Kimberly-Clark Mexico (KCM), is satisfied with how the new tissue line project has evolved.

“We consider this project a world-class benchmark all the way from execution to installation, start-up and performance.”

“The Bajio project fulfilled our expectations and the machine is reliable and delivers as promised. Our long term partnership with Valmet includes seven tissue machine projects. Their people are skilled, familiar with our operations and know how to execute projects well. They understand our needs and what it takes to achieve our goals.”

With more than 60 years in the Mexican market, KCM is built on a solid basis with high flexibility on the manufacturing side. They use various pulp mixes where the main part consists of recycled fibers from their own deinking plant. The product portfolio is split between consumer products (85%), away from home (8%) and exports (7%). Bathroom tissue and diapers are the big two.

“We are a multi-brand and multi-tier company producing a number of different products and qualities. Our tissue machine TM 4, which can produce high quantities at good quality and low cost, is a perfect fit for us.”

“Dedication, trust and team spirit”

Asking Bernardo Aragón what is most important for KCM when selecting a tissue machine supplier he first replies: “Well, we obviously need a very good price on the tissue machine and on the asset as a whole. We also need excellent performance and reliable technologies.”

But in addition to leading technology with excellent performance, and being built to last a great number of years, there are also other values important for a good project. Values like dedication, trust and team spirit.

“We believe in working closely with a vendor who can provide support with engineering, construction and start-up processes, and who has a strong commitment to the start-up date. What particularly impressed me in this project was how we managed to meet the very tight start-up schedule.”

Significant energy savings

TM 4 is the first tissue machine equipped with an Advantage ViscoNip press within the KC organization and it is also the first in Mexico.

“We are mainly using the flexibility in linear load to reach the maximum sheet dryness and reduce drying energy. Energy savings are very important for us. We mostly run at 150 kN/m and have reduced the overall energy consumption by 15% compared to other conventional machines,” **Laurentino Rodriguez**, Mill Manager, says.

A “push button” tissue machine

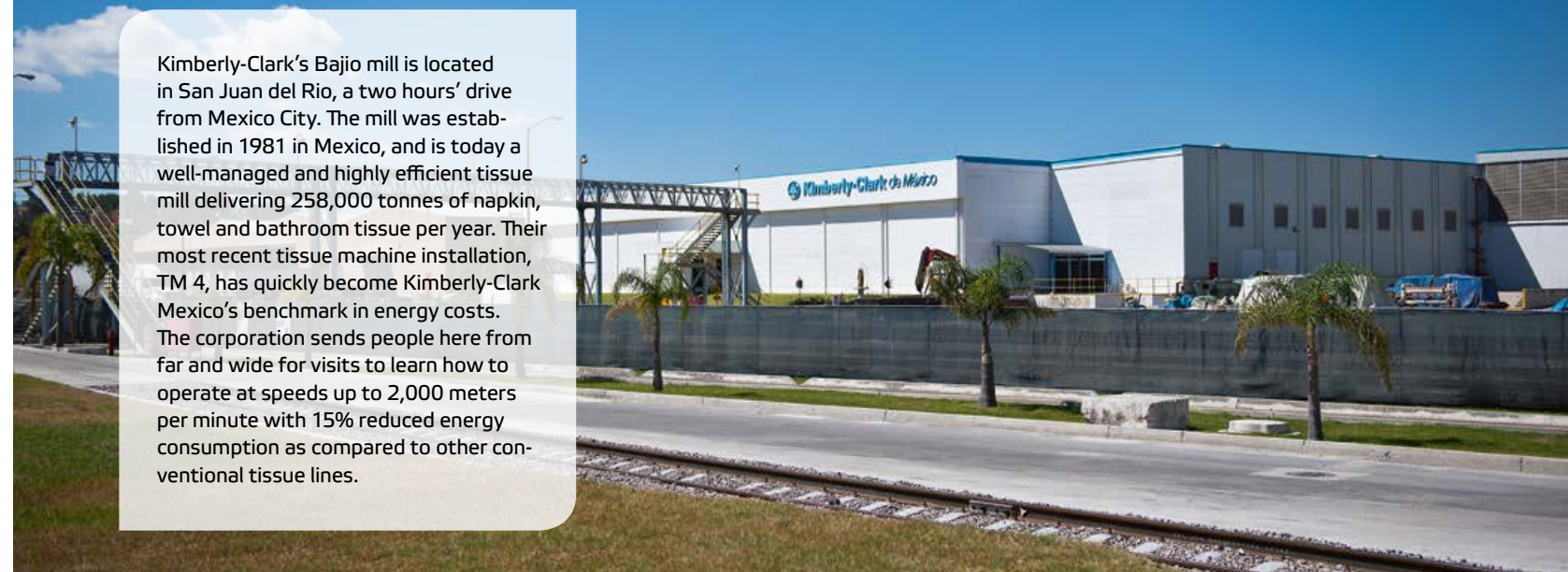
“We are learning fast and the new features are working well. I really like the ViscoNip for the savings in steam

↓ A DEDICATED TEAM
The TM 4 machine crew.



↑ THE BEST MOMENT

“When we started the machine, there were no problems at all, and the first roll was dense, had good stretch and a controlled basis weight,” says **Marco Jimenez**, in charge of TM 4 operations.



Kimberly-Clark’s Bajio mill is located in San Juan del Rio, a two hours’ drive from Mexico City. The mill was established in 1981 in Mexico, and is today a well-managed and highly efficient tissue mill delivering 258,000 tonnes of napkin, towel and bathroom tissue per year. Their most recent tissue machine installation, TM 4, has quickly become Kimberly-Clark Mexico’s benchmark in energy costs. The corporation sends people here from far and wide for visits to learn how to operate at speeds up to 2,000 meters per minute with 15% reduced energy consumption as compared to other conventional tissue lines.

and gas but also the new hood for improving safety,” says Process Engineer **Marco Jimenez**, who is today in charge of the TM 4 operations.

The new line operates continuously at speeds of 1,900-2,000 m/min with very good formation and moisture profiles. TM 4 has a stable production of around 170 tonnes of tissue per day, depending on type of product and quality of the pulp. The grade is mostly bathroom tissue made from a mix of 80% recycled fiber and 20% virgin fiber, but also some towel tissue for export.

“The performance tests, which were completed in less than three months after start-up were very straightforward and exceeded our expectations when it comes to speed and output, as well as energy and water consumption. The machine has an efficiency rate between 93 and 95 percent. This is a “push button” machine, it’s so easy to stop and start-up again. The project execution went very smoothly and was based on respect and trust in each other. I would say, team spirit is a key to success. We consider ourselves more like friends than as customer and supplier,” states **Jose Luis Dominguez**, KCM Project Manager.

A world class benchmark

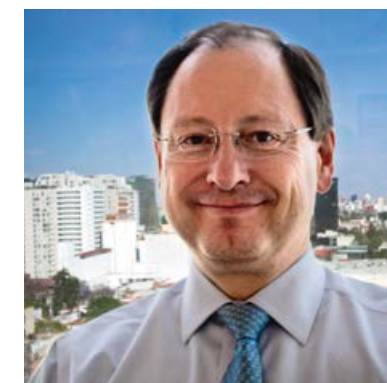
Working closely together also involves efficient information sharing. To keep the teams updated it is of utmost importance to have instant access to the latest versions of manuals, drawings or training material.

Laurentino Rodriguez says: “We had good communication between the teams during the whole project. All the information needed was always available and easy to find on the Valmet web portal.”

He concludes his impression of the TM 4 project, “The machine matches our goals and so do Valmet. We are very happy, with the project, the machine and the operations. We consider this project a world class benchmark all the way from execution, to installation, start-up and performance.” ■

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↑ **JOSE LUIS DOMINGUEZ**
KCM Project Manager

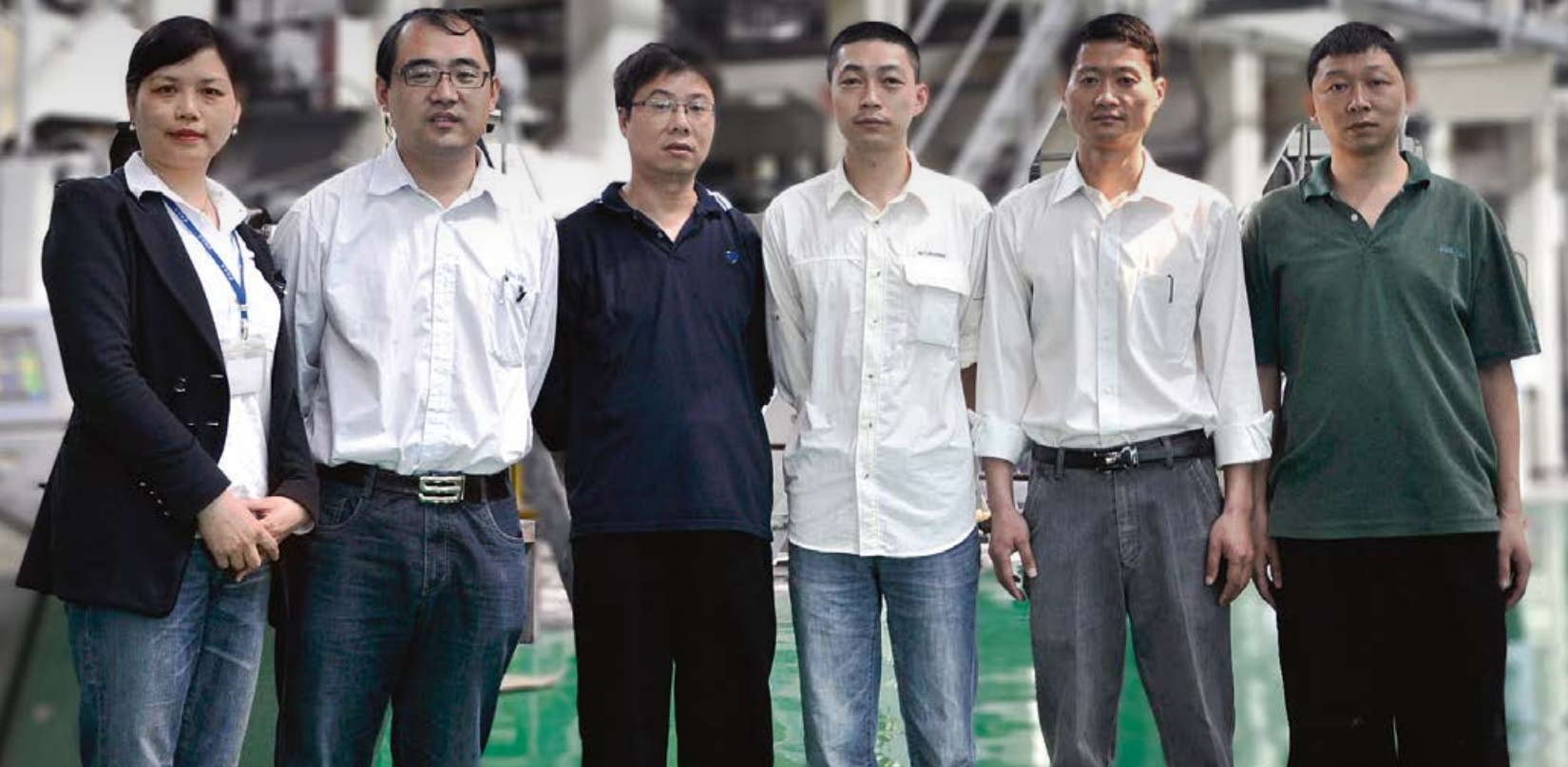
↔ **BERNARDO ARAGÓN PAASCH**
Director of Operations



← **LAURENTINO RODRIGUES**
Mill Manager

Air dryer nozzle upgrade at Dongguan Jianhui cartonboard mill:

SAVING COSTS AND ENERGY



IMPROVED CONDITIONS
Dongguan Jianhui Paper staff appreciate the cooler machine hall: the new nozzles leak less hot air. Left to right: Qunfei Zhang, Wang Bo, Zong Kaibo, Xu Qin, Zhang Shijun and Bi Donghai.

Wider coat weight control window saves costs

“In addition to the major energy savings achieved and the short return on investment, we have been able to widen the coat weight control window and control all our coating stations in a more flexible way with different grades and machine speeds,” says **Wang Bo**, Production Manager. “We can put less coat weight on the top coating and more on the pre-coating and middle-coating. This lowers coating color costs by nearly RMB 20 per tonne.”

More drying capacity, better coating layer quality

Due to the production increases over the years, the drying capacity in some coating stations was limited. The nozzle upgrade removed this problem, and also allowed the mill to improve coating layer quality, as coating color no longer sticks onto the roll surface.

With Valmet’s help, the mill also optimized the air dryer control system. Now the process settings can be monitored and controlled automatically. To save more energy, frequency control was added to the exhaust fan motors. No changes were made to the coater layout or control system.

Improved working environment

Another benefit the PowerFloat Plus nozzle has brought is less hot air leaking into the machine hall since the distance between the web and nozzle is smaller.

In summertime, the average temperature in South China is about 33 °C. The new nozzles now reduce the machine hall temperature and improve the working environment for the staff.

Decreased energy consumption by up to 40%.

Payback period of less than one year

Open communication and good cooperation contributed to a very smooth project. The shutdown took only four days, and the paper machines reached their target production immediately after start-up.

“I can honestly say that we are very satisfied with Valmet. We want to thank Valmet for the support we got,” says Wang Bo. “During the sales stage, Valmet audited the site and calculated the energy savings, drying capacity increase and return on investment to convince us of and help us better understand the benefits. During the project, Valmet gave us technical support to optimize our internal investment costs. The payback period for this project is well under one year. Meanwhile, we have started to receive energy-saving subsidies from the Guangdong government, which makes our investment more valuable.” ■

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Switching to efficient Valmet PowerFloat Plus air dryer nozzles at the coating section has decreased energy consumption by up to 40%, increased drying capacity and improved coating quality at Dongguan Jianhui’s PMs 1 and 2.

TEXT
Qunfei Zhang

When started up back in 2004 and 2005, Dongguan Jianhui Paper’s PM 1 and PM 2 were among the first white lined chipboard (WLC) lines in the South China market. Since then, competition has tightened and new lines have been built. At the same time, the Chinese government has been setting stricter targets for environmental protection and energy efficiency.

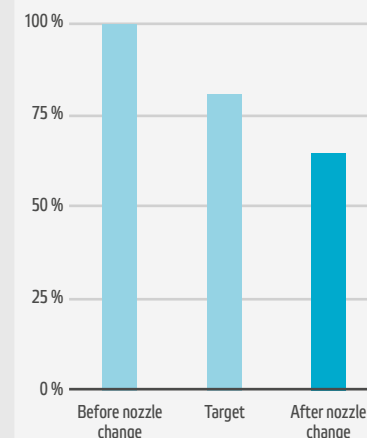
Jianhui Paper’s PM 1 and PM 2 produce white lined chipboard (WLC) in a basis weight range of 250–400 g/m². In the past ten years, the lines have been continuously developed, and their original total annual output has been increased from 600,000 to 800,000 tonnes. The machines currently have a 30% share of the South China WLC market.

To meet the requirements set by the Guangdong government, Jianhui Paper decided to upgrade the nozzles of the air dryers on the coating sections of PMs 1 and 2. The mill chose Valmet’s latest PowerFloat Plus nozzle technology in order to improve energy efficiency and increase the competitiveness of the line.

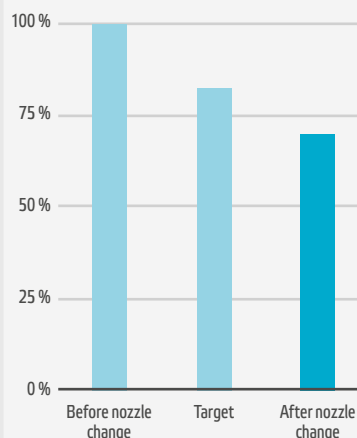
Energy savings of over 40%

The results have exceeded the mill’s original expectations of 20% energy savings. The average energy savings have been more than 30%, with some grades saving more than 40%. The payback time for the investment is less than one year.

PM1 STEAM CONSUMPTION WITH NOZZLE CHANGE



PM2 STEAM CONSUMPTION WITH NOZZLE CHANGE



ENVIRONMENTAL ASPECTS

“We hope to cooperate more with Valmet on energy-saving and environmentally friendly solutions in the future, too.” says Wang Bo, Deputy Manager of production department of Dongguan Jianhui Paper.

Energy from wave power? This is reality in Portugal where AW-Energy has successfully completed a project to produce electricity from waves. The process is controlled with Valmet DNA distributed control system.

TEXT Soili Städter



Welcome,

Wave energy

Wave energy is a form of renewable energy. Globally, it has a huge potential, although only a few projects have been realized so far. The Finnish company AW-Energy has invented a new technology called WaveRoller. Currently, a wave farm consisting of three WaveRollers is in use in Portugal, producing energy from the waves of the Atlantic Ocean. The created energy is then transferred via a subsea cable to the national grid.

One step closer to commercialization

The success story of the WaveRoller began with the idea that came to the Finnish professional diver **Rauno Koivusaari** when he was exploring a shipwreck. This idea led to several prototypes, laboratory tests and finally to experimental devices tested in real ocean environments.

The WaveRoller for AW-Energy installed at a Portuguese pilot 300 kW demonstration power plant has received independent performance verification based on a study conducted by the technical advisory to the renewable energy industry, DNV GL. This means that AW-Energy has been successful in getting the wave power industry one step closer to commercialization.

Reliable automation is the key in demanding conditions

“In the demanding conditions on the bottom of the Atlantic Ocean, the automation has to be extremely reliable,” explains **Jouko Rantala**, Product Manager from Valmet. “From a control engineering point of view, the system is rather complicated. Converting energy from waves and supplying it directly to the public electrical network needs very fast and complicated control algorithms. Identifying the challenges in the underwater environment is a good starting point for efficiently operating with

In the demanding conditions on the bottom of the Atlantic Ocean, the automation has to be extremely reliable.



minimized service requirements.”

The control room in Portugal is unmanned, and AW-Energy is using a remote round-the-clock connection from Finland to Portugal. Valmet has been heavily involved in the planning of the system's operation. The performance of Valmet DNA control system has enabled the fine-tuning of the control program to its utmost. Furthermore, Valmet's information system constantly follows and analyzes the prevailing wave conditions. According to Rantala, Valmet's experience with hydraulics, coupled with control expertise, was essential to the success of the project.

First automation solution of its kind

Since the project is implemented on the bottom of the ocean, compliance with precise safety requirements is needed to protect the equipment from salt fog, air moisture and other

factors. There are cables connecting the control room on the coast and to the WaveRoller unit in the sea. The process stations and I/Os are located at the bottom of the sea. The operational redundancy guarantees that the whole system will operate, even in critical circumstances. All necessary data on the display is sent via Ethernet route to AW-Energy office in Finland.

The graphical user interface in the control room includes all necessary process displays with values and alarms. Valmet's trend and event archive allows access to the collected process history. For instance, information about the amount of electricity produced can be followed. With help of this technology, process disturbances can be revealed immediately.

The factory acceptance testing (FAT) was done partly by Valmet in Tampere, Finland, and partly by the customer in Kotka, Finland. **Jussi**

Åkerberg, Development Manager, Power-Take-Off, AW-Energy, is very pleased with the cooperation with Valmet and emphasized the importance of the thorough testing phases. Although the project was very challenging, both parties continued to be very innovative to solve all the problems faced. According to Åkerberg, all technical issues and their solutions need to be considered in advance.

Clean energy without CO₂ emissions

Based on the knowledge of AW-Energy, electricity can now be produced with the help of ocean waves. Wave energy has a huge potential. And both AW-Energy and Valmet have been pioneering a now established project under the waves.

No mistakes are allowed in projects on such a level. **John Liljelund**, Managing Director from AW-Energy, explains: "A wave energy plant has to operate with the highest possible reliability, since it is difficult to access it for maintenance. We chose not to accept any basic industrial automation solution, but rather wanted a reliable, duplicated process automation system. It's great that Valmet has joined us in entering this new and challenging area, and helped us develop a novel concept for renewable energy." ■

↑ **WAVE ROLLER**
Wave energy device under water.

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↓ **JUSSI ÅKERBERG**
Development Manager,
Power-Take-Off,
AW-Energy



ENERGY FROM WAVES
Wave energy converter deployment day.



Successful operator training with simulators

Simulator training speeds up learning curve at CMPC Guaiba pulp mill. **TEXT** Rikard Henriksson

In June 2013, Valmet (at that time Metso) and CMPC Celulose Riograndense S.A. signed a contract for supplying the key technology for CMPC's new pulp production line in Guaiba, Brazil. As part of the complete automation system Valmet delivered operator training simulators which have proven to be a great success.

The simulators are designed for all mill process areas including the fiber line and pulp drying units, the complete recovery line, the chemical plant, as well as two water treatment plants.

"Using Valmet's operator training simulators not only helps us with training our operators, but also enables us to test

new control loops before starting practical operation," says **David Nascimento**, who is responsible for training coordination at CMPC in the Guaiba mill.

The simulator, which is connected to a copy of the real control system that is used at the mill, has been used as an important tool in verifying the distributed control system programming prior to start-up and for on-site training.

Improved operator reaction time and safety

On-site training has been conducted on a daily basis since September 2014. Approx-

VALMET'S TRAINING CONCEPT INCLUDES:

- WebAcademy – Online training portal**
 - Self-paced online training
 - Individual user accounts
 - Tracking and reporting
 - Customized pages and assessments
- Classroom training**
 - Experienced process or commissioning engineers
 - Commissioning & Start-up
 - Follow-up and refresher Training
- Virtual site – Training simulators**
 - Fully dynamic process simulations
 - DCS-based or standalone
 - Generic or customized

imately 50-60 operators have participated in the training, which continued up until the end of February 2015. So far, CMPC has spent a total of approximately 2,000 man hours with the simulator and the feedback has been very encouraging.

David Nascimento continues: "The training simulator has contributed to reducing operator reaction time, especially when compared to what is possible with normal classroom training. In addition, the simulator has also helped us to reduce hazards in terms of both personal injury and equipment. All of this taken together makes it possible for us to speed up our learning curve."

The training provided by Valmet also includes maintenance training for CMPC in order to create confidence in the continued use of the training simulator. ■

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HIGH PERFORMANCE RELIABILITY WITH

refining rebuild

High performance reliability is what both Powerflute's corrugated boxes and Valmet's OptiFiner Pro refiners have in common. The world's largest, new-generation high-capacity refiner started up at Savon Sellu, a Powerflute operated paper mill at Kuopio, Finland in late 2014. **TEXT** Kaisamaija Marttila

“What is the single most important thing you need from a corrugated box with your brand name on it?” asks **Tapio Laukkanen**, Technology Manager at Savon Sellu. “Reliability,” he quickly continues, “because you must be able to trust it to protect the fresh produce inside, whatever the conditions.” In order to ensure world-class stiffness, optimized moisture resistance, lightness and cleanliness the mill in Kuopio uses virgin birch fibers as raw material. In addition to the lignin conserving pulping process (NSSC) they use, refining also plays a

significant role in creating the properties of the end product.

High-tech refining for high-tech fibers

“The starting point was that we needed to replace our old disc refiners at the first low consistency refining stage because they had reached the end of their lifecycle,” explains Laukkanen. “But during the investment project we realized that the whole refining process needed rethinking in order to ensure capacity. We didn't settle for the easy solution, but tried to see the forest for the trees, so to speak: we changed our refining approach and optimized the refining process as a whole,” he says.

Now, after the rebuild, the Powerflute fibers are refined in a low energy, two stage, low consistency refining process that optimizes the stiffness values (CMT and CCT) while providing fluting with both flexibility and strength. The second refining stage was equipped with two of the largest available OptiFiner Pro refiners for high capacity. At the same time, the old refiners equipped with new refiner segments were moved to the first stage. Additionally, a new OptiFiner Conflo refiner was installed beside the existing refiners in the first stage in order to meet capacity demands.

Sustainable results

“The new OptiFiner Pro refiners have been working very well. We are now able to control the refining process much more accurately and the process tolerates more variation,” Laukkanen explains. “We believe that the unique refining principle of the OptiFiner Pro gives us an advantage because the refining efficiency is good and the fiber is refined better. If we gain energy savings at the same time, well, that's an added bonus,” he continues with a smile. In this respect, Laukkanen says, the bonus is up to 30% less energy used, while achieving the same freeness values as before.

“Our primary goal is to improve end product quality and for that we are continuing our good co-operation with Valmet. The design of the new refiner segments and running speeds in the first refining stage still require optimization to fully meet the requirements set by the raw material, but the potential of the OptiFiner Pro refiners is evident before of our eyes,” enthuses Laukkanen.

Life-cycle costs matter

“When deciding on the investment, we made careful life cycle cost calculations for each solution. We wanted to compare both

investment and maintenance costs together over the next ten years,” says Laukkanen. “It is a bit early to say, but we believe that with proper preventive maintenance the maintenance cost will be lower with the OptiFiner refiners.” With a refiner segment life of six months, the mill has already witnessed proof of the reliability of the new system compared to the old one.

Better performance, lower costs

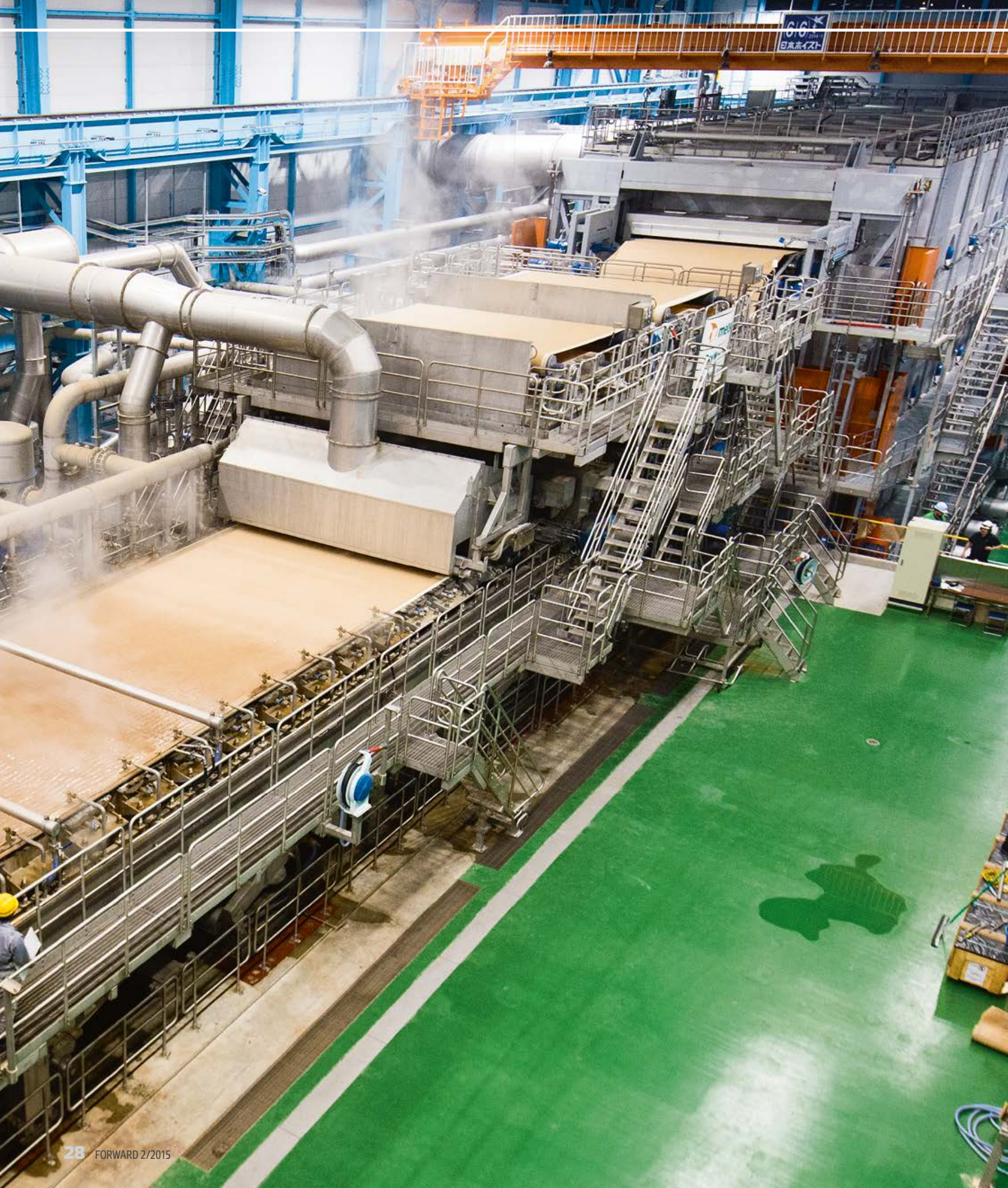
“We aim to grow stronger,” explains Laukkanen about the future plans for Savon Sellu. “Our investment aims to improve end product quality and reduce production costs so we will remain competitive in the market. But the common competitor for all board producers is actually plastic,” Laukkanen notes. “The recyclability of our product is an advantage and we see benefits in making our product lighter keeping the same strength properties. This investment in refining enables us to do these things and optimize our processes at the same time as we use less energy, control the process better and need less maintenance.” ■

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THE GRAND ONE

The world's biggest OptiFiner Pro refiner saves energy at Savon Sellu. Juha-Pekka Huhtanen (Valmet, left), Tapio Laukkanen and Antti Jegoroff (Savon Sellu).



Boosting production in

PULP DRYING

In October 2012, Hyogo Pulp decided to invest in a new pulp drying line for its Tanigawa mill. The company is the only producer of unbleached kraft market pulp in Japan.

TEXT Michio Imai and Gaurav Ghosh
PHOTOS Masaharu Menjo

Hyogo Pulp decided to go for a Fourdrinier type (no top former) pulp drying machine based on Valmet's references for unbleached

pulp drying. The project was completed as scheduled. The first equipment was delivered on site to Hyogo Pulp's Tanigawa mill, located in Hyogo Prefecture, 435 kilometers southwest of Tokyo, in January 2014 and the first dry sheet was produced in November 2014.

From local to regional

The company's initial plan to acquire a pulp drying line started in early 2010 when major customers for unbleached kraft pulp in Japan had moved from the Kansai area to the north Kanto region. At the same time 50% of the end product was being shipped to China, South Korea and Taiwan.

Yuji Ikawa, President of Hyogo Pulp Industries, says: "We had planned to invest in a pulp drying

machine in the past decades, but that had not been feasible because the increase in energy costs would have been a great deal larger than the reduction in transportation cost to the customers. The project finally became possible due to the birth of Valmet's energy-efficient machine and process system, in addition to changing market factors, i.e. customers locating far away."

"We chose Valmet as our preferred supplier because we believed the equipment supplied would be able to meet standard uniform quality and would be adaptable so we could produce various grades of unbleached kraft pulp. Valmet also has a strong local presence. Its Japanese staff possess a wealth of experience in construction and in starting up pulp drying facilities. We believed in Valmet's credibility in technical support for optimal operation and maintenance systems."

The mill operates a single-line continuous digester, a pulp washing system, four HC stock storage towers and a newly installed pulp drying line with three wet lap machines.

Hyogo Pulp's main rationale for a new pulp drying unit

- Uniformity of finished product and meeting new customer demands
- High logistic cost of wet lap pulp
- Longer storage in warehouses compromised product quality

Delivery scope

Valmet delivered the entire pulp drying line including stock screening, wet end, airborne dryer, cutter-layboy and pulp baling systems. The customer carried out the civil work. Valmet also managed erection, training, and supervision during and after start-up.

The drying line is dimensioned for a capacity of 770 adt/d. The trim width of the drying machine is 3,900 mm and the design speed 200 m/min. The Fourdrinier-type machine is furnished with combi and shoe presses for optimum dryness prior to the airborne dryer. There are 30 drying decks and one cooling deck.

The cutter layboy cuts the pulp into sheets, which are then stacked into bales (250 kg). The baling, wrapping, marking and conveying system is totally automated.

Mr. Ikawa mentions: "So far the new equipment appears solid and robust. My impression is that the production capacity of these machines will be greater than the original design. After starting up, we faced some difficulties in producing some kinds of softwood pulps, but improvements and adjustments to various machines and parameters were swiftly carried out in order to

overcome the difficulties."

"Now the speed of production has increased along with improvements in the operation techniques used by the operators. We hope the full design capacity can be achieved in several months."

The project was awarded to Valmet on an EPC basis only excluding civil engineering work. This was Valmet's first turnkey pulp dryer project in Japan.

Plans for expansion ahead

Mr. Ikawa further says: "In line with our future business development plans, now that we have established a pulp drying system to meet our customers' needs, we would like to expand the business to the whole of East Asia, in addition to China, South Korea and Taiwan, and of course, Japan.

Drying resolves the issue of high transportation costs and quality deterioration. It also halves the handling and storage cost on the customer's side, and with the new drying of the pulp this then allows for an expansion of the sales area."

While all the energy required for the drying lines is covered by the existing recovery boiler power



generation system, the amount of surplus power supplied back to the local community decreased accordingly. For this reason, the mill is currently planning to install a new biomass boiler system.

With a successful project completed, cooperation with the customer will continue with continuous support and service, to be able to take the customers' performance forward. ■

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HYOGO PULP IN A NUTSHELL

Hyogo Pulp Industries, Ltd. is a family-owned company, founded in 1955. It is located in Tanba city, Hyogo Prefecture, in Japan. The company produces unbleached kraft pulp with an annual capacity of 200,000 tonnes. It is the only producer of this pulp grade in Japan and is also leading the unbleached kraft pulp market in East Asia. The company employs 140 persons and provides biomass-based energy to a regional energy company.

START-UP CEREMONY

Mr. Ikawa (President of Hyogo Pulp, left) and Mr. Seppo Pakkanen (Start-up manager, right).



Sharing know-how improves
WINDER PERFORMANCE

Today's winding processes are highly automated with fewer operators and maintenance people involved. To enable even better winder performance, Valmet has developed a new way to systematically work together with the customers. **TEXT Kai Odé and Marjaana Lehtinen**

Better equipment availability, quality, process safety, best practice operations as well as optimized balance between maintenance costs and performance – this is what papermakers are after in their winder operations. Valmet's winder agreement services can help the papermaker achieve these goals.

Traditional audits and condition tests are making way for closer cooperation. This means making

Each winder service agreement is tailored to meet customer-specific production or maintenance needs or both.

maintenance plans together, moving from single deliveries towards shared actions and targets. Valmet's specialists support customers by creating or updating equipment maintenance plans, specifying the needed maintenance parts and by benchmarking the consumption of consumables, such as slitter blades.

Tailored agreements for each mill's needs

Each winder service agreement is tailored to meet customer-specific

production or maintenance needs or both. To enable Valmet to understand the customer's current winder performance and operations, it is important to study and discuss the existing performance values, fault history data, possible bottlenecks, costs, maintenance plan status, resource status and future targets related to the winding equipment. This process creates a basis for the agreement contents and key performance indicators (KPIs). The latter can be set for material management, equipment/components, winding process, quality, costs or tasks.

Valmet's winder services

- Process & capacity optimization
- Mechanical roll service, onsite re-coating
- Spare parts, consumables, stock optimization
- Maintenance planning
- Personnel training (process and maintenance)
- Modernization plans, grade changes
- Capacity improvements through new innovations; Double unwind, Fast-Posit, Fast set change
- Troubleshooting
- Project management, benchmarking, data analysis
- Development related to improving work processes & tools

→ Pasi Häyrynen, Plant Manager, SAICA Paper UK, (left) and Antti Veistinen, General Maintenance Manager, Valmet Mill Maintenance Outsourcing, see numerous benefits brought by further developing the preventive maintenance task descriptions and grading the tasks related to the winder.

More focus with the upkeep program

At the beginning of the cooperation, Valmet creates or updates a winder-specific upkeep program together with customer. It describes the service tasks on a shift, daily, weekly, monthly or yearly basis and the responsibilities for them. A detailed list of tests and periodical service work is included, too. The upkeep program is available for Valmet winders and for other suppliers' winders as well. The winder's maintenance plan, fault history and other existing equipment specific KPIs will be utilized to define the equipment's present condition. The upkeep program can be tailored according to customer needs with regard to personnel know-how and available resources.

This makes it possible to optimize the use of needed resources in the winder area. Additionally, the mill personnel's skills develop, enabling them to take care of the basic maintenance tasks defined in the upkeep program. ■

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TAKING COOPERATION ONE STEP FURTHER AT SAICA PAPER UK

Since the start-up of its OptiConcept machine PM 11, SAICA Paper mill in Partington, UK, has outsourced all its maintenance operations to Valmet. As the complete lightweight containerboard production is handled by one winder, a WinDrum Pro, there is enormous pressure on its high performance and availability.

To remove possible bottlenecks, the mill and Valmet have successfully worked on improving winder maintenance operations. "We have been able to boost winder runnability, availability and speed," says **Pasi Häyrynen**, Plant Manager, SAICA Paper UK.

Grading preventive maintenance tasks

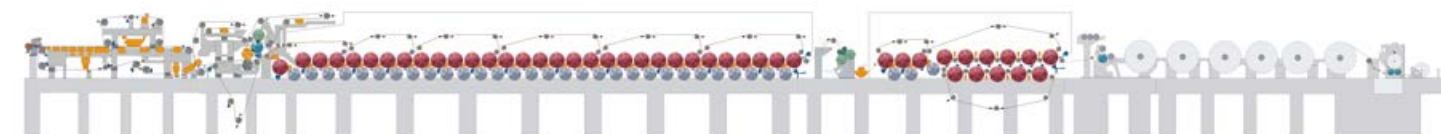
SAICA Paper UK and Valmet have now taken maintenance planning one step further by further developing the preventive maintenance task descriptions and grading the tasks related to the winder into four classes based on the competence level needed. In Grade 1, the operators check, for example, vibration, temperature or leaks. In Grade 2, there are tasks, such as lubrication, to be carried out by Valmet's maintenance team or a subcontractor. In Grade 3, the more demanding tasks involve technical knowledge provided by Valmet's mill maintenance team. The tasks in Grade 4 call for Valmet winder specialist.

"Once this new philosophy has been fully implemented, it will further improve winder availability. We will also be able to increase the average winder speed," Häyrynen continues. "It will also add to the capabilities of our own mill staff and that of Valmet. As the task descriptions are much clearer, everybody knows what to do. This will improve overall efficiency related to winder operations"

Systematic maintenance brings better performance

Both SAICA Paper UK and Valmet share the same goals: to produce the planned tonnes and avoid unplanned shutdowns. "As there is a target to increase production line speed every year, more attention has to be paid on the winder," adds **Antti Veistinen**, General Maintenance Manager, Valmet Mill Maintenance Outsourcing, who heads the approximately 40-member maintenance team at the mill.

"This is exactly what we will do with the new systematic proactive maintenance approach. By taking better care of the equipment, it will perform better and we can secure the set targets," he says.



← **COMMON UNDERSTANDING**
Liu Wenwei, Valmet Project Manager; Xu Quanzhong, Zhejiang Jingxing PM 16 Mechanical Manager and Liao Changlv, Zhejiang Jingxing Project Manager.

with very good stability. Not many suppliers were able to fulfill both of these requirements, but Valmet was able to provide us with a production line featuring good runnability, stability and controllability. Valmet is also able to deliver low operating costs even at speeds of 1,000 m/min,” says **Liao Changlv**, Project Manager of Zhejiang Jingxing Paper. “Competition in the Chinese corrugated market is tough. We pay attention to any methods that can help us to minimize production costs, especially in terms of low electricity, water and steam consumption. The new PM 16 OptiConcept M production line brings us improved produc-

saying, “We require a partner, who has top level R&D capabilities and who can offer us novel technologies to support changing market demands. It’s great to utilize advanced technology to improve energy efficiency, for example.” Chen Ke agrees with Liao Changlv and continues: “We need to cooperate with companies like Valmet, who are paying more attention to research and development and who have the ability to build a long and stable partnership with us.”

“I’m especially impressed by two technological highlights of the machine. One is the fabric insertion unit. With this solution no cantilevering beams are needed and the whole wet end is more compact. The drive side is more accessible and fabric changing is easier. The other is the VacuMaster high-vacuum suction box that replaces the suction roll in the forming section and offers great energy saving potential,” says Mr. Liao.

PM 16 also features novel technology in the sizing section based on spray application. According to Mr. Liao, “We made the right decision to choose spray sizing for lightweight fluting production. The most significant advantages are its stability and there is no need to invest in spare applicator rods. We also achieve longer roll lifetimes, clean operation and ensured machine runnability.” Costs can also be saved. “The OptiSizer Spray has special benefits for the production of corrugated papers. Up to several million RMB of material expenses can easily be saved,” summarizes Chen Ke.

Quick project completion - out of the ordinary
PM 16 was an exceptionally quick



Chen Ke, Mill Manager of Zhejiang Jingxing Paper.

project. It took only 17 months from the day the contract was signed to the start-up, and only 5 months and 13 days from the start of installation to machine start-up. Chen Ke describes the project execution, “Start-up was very smooth and stable and on top of everything, one month ahead of schedule. Sellable paper was produced right after start-up and the overall market feedback on our lightweight fluting paper has been very positive. We feel that this OptiConcept M line is more economical and more practical to operate than other production lines.”

“The highly skilled Valmet team contributed to the project in all phases and the team’s performance was beyond our expectations. Our Pinghu site is located very close to Valmet Wuxi Service Center. For this reason we are also confident of having highly efficient and convenient service from Valmet in the future”, states **Xu Quanzhong**, Mechanical Manager of Zhejiang Jingxing Paper. ■

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Moving forward in Chinese CONTAINERBOARD MARKET

Zhejiang Jingxing Paper is moving forward with Valmet’s OptiConcept M technology.

TEXT Marika Mattila and Sara Li

Investments in lightweight containerboard production need to deliver high efficiency and advantages in sustainability. This is what Zhejiang Jingxing Paper were looking for when they decided to invest in a new containerboard making line for their Pinghu site in Zhejiang Province in China. With the increasing demand for lightweight packaging papers, the company chose to complete their product range with low grammage, high-strength corrugated papers.

Tough demands for producing lightweight grades
Zhejiang Jingxing Paper PM 16 produces very low grammage fluting grades in the basis weight range of 70 – 120 g/m². Producing such lightweight papers requires higher levels of runnability from the paper machine compared to other grades. “We wanted to invest in a papermaking line that produces lightweight papers at high speed and especially



↑ **BRAND NEW PRODUCTION LINE**
On October 21, 2014, Zhejiang Jingxing Paper started up their new Valmet-supplied containerboard production line, PM 16, at the Pinghu site in Zhejiang Province in China.

tion due to its high speed, improved efficiency and superior production capacity,” summarizes **Chen Ke**, Mill Manager of Zhejiang Jingxing Paper. **Clear advantages in exploiting novel technology**
To remain competitive and stay on the top in lightweight paper production requires novel solutions and technologies. Mr. Liao confirms this view by

When Södra Cell Mönsterås realized they were losing about four tonnes of accept fiber each day during softwood pulp production they quickly started to look for a solution to fix the problem.

TEXT David Wold

Fiber savings with SCREEN ROOM REBUILD

“We definitely had a problem and we selected Valmet to solve it because of the professional impression their staff left us with while discussing the problem with us,” says **Karin Dernegård**, Technical Process Manager at Södra Cell Mönsterås mill.

Valmet rebuilt the third screen and replaced the cyclone cleaners with a fourth screen in a conven-

al screen room of the pulp mill. A screen basket with a dilution belt was added to the third screen. Furthermore, a number of the cyclone cleaners were replaced with an OptiScreen Fine screen to screen fine rejects. Thanks to these improvements the mill reached 75% savings in accept fiber, losing now only one tonne of accept fiber per day.

One screen – two stages

Before the addition of the new screen basket in the third screen, high consistency pulp gathered at the reject end of the screen, which led to a high tendency for thickening. Great amounts of water had to be added after the screen to enable effective utilization of the cyclone cleaners in the following fine-screening stage. “But often with softwood pulp, adding more water was not enough to prevent clogging of the cyclone cleaners. And this meant that operators had to spend a lot of time

cleaning them,” says Dernegård.

The new screen basket overcomes this problem by using the lower part of the screen basket as a second stage. The integrated dilution belt, separating the two stages, dilutes the primary stage reject to the correct feed consistency for the secondary stage. A new additional screening stage was added to the system without adding a new screen, piping, motors or chests.

“In effect the secondary stage is a fourth screen, which alone would have improved accept pulp quality considerably. But adding a new OptiScreen Fine, which is now in principal a fifth screen, enabled the mill to remove the cyclone cleaners altogether,” says **Annika Zetterlund**, Product Sales Manager for screening and refining at Valmet.

Profitability from environmentally friendly practices

“Saving this much accept fiber each

SÖDRA CELL MÖNSTERÅS IN A NUTSHELL

Södra Cell Mönsterås, located in Sweden, is the largest pulp mill in the Södra Group and one of the world's largest producers of TCF (Totally Chlorine Free) bleached kraft pulp. The mill's capacity is 750,000 tonnes of pulp per year. The raw material consists of just over three quarters softwood and around one-fourth hardwood. Around half the wood becomes market pulp and the other half energy.

day can result in a payback time of one year or less,” says Dernegård. Both Dernegård and Zetterlund agree that the 75% reduction in fiber loss impacts the mill's profitability positively, and because less water is used, production is more environmentally friendly.

But these aren't the only benefits they claim. With new screen baskets, the runnability in the screen room has improved. The time spent on maintenance has also been reduced due to the elimination of stoppages for cleaning the cyclone cleaners. This pleases the operators who also claim their jobs have been simplified. “Although this screening solution from Valmet has been in operation for only a rather short time, we're very pleased with the results so far,” says Karin Dernegård. ■

KARIN DERNEGÅRD
The technical process manager at Södra Cell Mönsterås

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Saving this much accept fiber each day can result in a payback time of one year or less.

Safety

IS HARD-WIRED INTO INNOVIO-PAPERS' NEW BALE DEWIRING SYSTEM

InnovioPapers switched to a fully automatic dewiring and recipe handling system for pulp bales. This improved their batch pulper feeding by maximizing operator safety, also resulting in improved productivity.

TEXT Bryan Ralph

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Long-term relations, thorough calculations and focusing on a completely automated solution were all decisive factors when InnovioPapers decided to buy a new stock preparation system from Valmet. The new equipment was installed and successfully started up recently at the company's paper mill at Nijmegen in Holland.

Long-term partnership with Valmet

"Valmet came into the picture in 1998," says Rene Van Wieringen, Business Development Manager at InnovioPapers: "We have had a good past experience with Valmet and we have built up our relationship for over 15 years."

In 2010, the mill began to look at ways of enhancing stock preparation for feeding a batch pulper. Each batch was made

up of 10-14 bales, consisting of up to four different pulp qualities, and the only automatic element in the feeder system was bale destacking. At that point in time, dewiring of the bale units and single bales was all done manually.

Supplier choice based on thorough calculations

"We looked at all kinds of installations from different suppliers and made numerous reference visits," recalls Rene Van Wieringen. "What we soon realized was that the quality of the units and bales is very important for the overall efficiency of the installation."

After a period of thorough research and conducting numerous calculations, InnovioPapers opted for a system solution from Valmet. Rene Van Wieringen explains there were three main reasons for the decision:

"We were impressed by Valmet's compact

combined bale unit destacker and wire cutter, which we saw during a reference visit to a Valmet installation in Germany. We also noticed that Valmet had introduced a new wire cutting system for single bales in France. The system was highly efficient and caused low levels of damage to packaging and pulp bales. Consequently there was less fibre dust, so it was also a cleaner solution. Additionally, Valmet was the only supplier who could deliver an installation with a high capacity output of 120 bales per hour, which other suppliers couldn't achieve."

Smooth installation during a six-day shutdown

Rene Van Wieringen explains: "We only wanted to stop production for six days, so we worked together with Valmet to get as much of the system erected as possible in six weeks before the stoppage. This cooperation

meant that everything was in place and the six days could be spent on the biggest challenge, which was upgrading to the new automation system and integrating it with the old system."

Savings in man hours; improvement in safety

During the operation, the new system has achieved and exceeded all expectations relating to efficiency, safety and flexibility.

"The savings in man hours have been highly significant and much better than we anticipated. We now have one operator, rather than two for machine supervision and fork lift operations. We calculated the potential savings thoroughly from every possible angle, but we were still surprised that there is less operator involvement than we had expected. Operation requires around 70% of the time required for a full

time job, so the operator actually has time for other duties as well."

The savings in forklift truck hours alone are about 50%, down from around 4,000 hours per year to 2,000 hours since using the new system.

Noticeable improvement has also taken place in safety. "There has been a big improvement in safety. Areas around the machines are fenced off and emergency systems are fully integrated in the new control system. Automatic wire-cutting means wire-related accidents involving operators have now been eliminated."

Efficient bale and recipe handling

"One of the big advantages of an automatic system is that we can run very precise recipes, with a great deal of flexibility, due to the new recipe handling system. We can now

automatically handle complex recipes of up to four different grades from the six storage lines that serve the pulper feed conveyor. It was all done manually before. Overall we have much better control of recipes, stock and usage because the Valmet system accounts for every bale."

The system is also hitting the pre-set productivity targets. "We could see even at the acceptance test, 4-5 weeks after commissioning, that we were achieving the target capacity and paper machine production of 88 bales per hour."

"Our estimate of achieving only 10% reject bales has proven to be the case. Additionally, as soon as the initial technical problems were solved, our 98.5% technical performance target for accepted bales was also achieved. So there have been no disappointments and no surprises. We are very satisfied with the new solution," concludes Rene Van Wieringen. ■

With the increasing importance of sustainability, the International Maritime Organization and the EU are tightening their regulations for seagoing vessels. SO_x scrubbing is an attractive way to meet these demands and to minimize the operational costs of ships. Valmet has developed scrubber technology with unique features to provide a more sustainable operating environment for the shipping industry.

TEXT Marjaana Lehtinen

VALMET'S EXHAUST GAS SCRUBBERS:

Boosting SUSTAINABILITY

According to the new sulfur directive, as of January 1, 2015, the sulfur content of fuel used in the shipping industry must be lowered to 0.1 percent on the Baltic Sea, the North Sea and the English Channel (SECA area). Globally, a limit of 0.5 percent will apply from 2020. In practice, this means that ships will either have to switch to lower sulfur containing fuels or start cleaning their emissions, for example, by using exhaust gas scrubbers.

Valmet system suitable for thousands of vessels

The new SO_x directive applies to all ships, both existing and new builds. It has been estimated that there are about 2,000 ships needing an upgrade to meet the new limits. In 2020, approximately 80,000 commercial vessels will be affected by the new global SO_x limits.

“For a new ship, the layout can be modified on the drawing table to conveniently accommodate a scrubber. In a few years, an exhaust scrubber will be standard equipment on most new ships,” explains **Juha Laukka**, Product Manager for Valmet’s Environmental Systems. “For a retrofit, a plug-and-play approach is often used, meaning that the scrubber system is built into a ready-made construction that can be quickly attached onto a ship during a 2-3 week dry-docking.”

Short payback time

An exhaust gas cleaning system is an alternative to using low-sulfur fuel. “Low-sulfur fuel costs approximately twice as much as traditional high-sulfur fuel, which means higher operating costs. The larger the price difference is, and the more the ship sails in areas with sulfur restrictions, the more savings are gained with a scrubber and the payback time becomes shorter. An estimated payback time for a typical scrubber installation is from six months to four years,” Laukka says.

In a few years, an exhaust scrubber will be standard equipment on most new ships.

Strong expertise behind world-leading scrubbing technology

Valmet has delivered exhaust gas scrubbers for container and general cargo vessels and for cruise ships. “We have sold 24 systems for 62 engines, for approximately 490 MW in total power, so far”, Laukka tells.

Cleaning with fresh or sea water or both

Today, there are three basic types of exhaust gas scrubbers on the market: an open loop scrubber which uses sea

water as wash water, a closed loop scrubber, in which wash water is circulated and alkali – usually caustic soda – is added to the circulation in order to capture sulfur and a hybrid scrubber. The hybrid scrubber is a combination of both the other types of scrubbers and it can operate in both modes. “We were the first company to introduce the hybrid solution to the market. The user can decide which mode is used in which environment just by pushing a button. In this way, emissions from the ship can always be kept within regulatory limits in a cost efficient manner,” Laukka continues.

In Valmet’s dual water hybrid mode, sulfur is removed from exhaust gas in two phases. First the exhaust is washed with sea water to utilize locally available natural alkalinity. As a second step, the closed loop mode with added chemicals ensures that emissions into the air are always within the set limits regardless of the quality of the sea water. “The main benefits of this solution are the lower consumption of chemicals, fresh water and electricity,” Laukka points out. ■

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Careful mill and plant shutdown planning and communication mean less time spent on the actual maintenance work. This results in shorter shutdown times. TEXT Marjaana Lehtinen

Proper planning ensures a successful shutdown

An annual five-to-ten-day shutdown typically eats up a third of a mill's or plant's annual maintenance budget. Furthermore, there are always risks involved that may either cause additional costs or postpone the scheduled start-up of the plant. With Valmet's detailed shutdown planning and in-depth project management experience, possible risks can be minimized and the planned tasks can be accomplished on time and on budget.

"Our maintenance people have a vast experience of all kinds of situations that may be encountered while planning and carrying out shutdowns. If something unexpected comes up – which is often the case – we are able to find good, alternative solutions. Our people can see if something is not going well and take the required corrective action," points out **Jaakko Reivo**, Project Manager, Site Operations, Valmet, who has been involved in over 100 shutdowns around the world since the late 1980s.

Planning on a rolling basis

The key to a successful shutdown lies in its detailed planning and scheduling ahead of time. Without this essential step it would be impossible to carry out all the required overhaul work, check-ups and measurements needed during the shutdown.

"Planning for the next major shutdown should start right after the previous one has ended. Planning should be carried out on a rolling basis; planned tasks should be added to the shutdown plan as soon as possible and unplanned tasks added as they come up," says **Timo Harjunpää**, Manager, Sales & Global Operations Development, Valmet.

Valmet offers shutdown services either as part of its outsourcing or as a separate service. At sites that have outsourced their maintenance operations to Valmet, shutdowns are carried out by Valmet's onsite maintenance team, and are supported by resources from Valmet's local or global specialist network, as well as local and global suppliers.

Cooperation, communication and control

"Shutdown planning starts with a meeting between the customer's production people

and our maintenance team. At the meeting we identify the tasks required and schedule them in the computerized maintenance management system (CMMS). We then allocate the required spare parts and resources to the shutdown. We discuss in detail how long each job will take and who will carry it out," Harjunpää explains. "Not everything can be done at the same time, so there has to be some form of prioritization."

It's also important to involve the customer's sales team to discuss the shutdown schedule. For example, in paper sales there are more deliveries in some months than in others, meaning that paper production must not be down at that time.

There are also other stakeholders to take into account, and maintenance work needs



to be in sync with other possible upgrade or new investment projects. "It is highly important that all the relevant information is placed openly on the table for everybody to see what else is being done. This way everybody has access to hydraulics, electricity and the crane, to mention but a few examples. Communication and openness are essential," Jaakko Reivo adds.

Good planning also calls for an estimate about the shutdown costs, and at a later stage, close control to stay within the set budget.

In shutdown planning, there is always a freezing point, after which no new tasks will be added to the to-do list.

Safety first

Site safety is extremely important already at the planning stage. In a major shutdown, there may be hundreds of people involved, including external workers with no prior site experience. This inevitably increases safety risks, and for this reason safety training is always included in the schedule. Furthermore, major lifting with cranes has to be carefully scheduled to ensure safety.

Well planned, more than half done

According to an old saying, if something is well planned it is already half done.

With maintenance, however, being well planned means more than merely being half done according to Reivo. ■

Valmet's shutdown service also ensures timely spare parts

With scarce resources and a thin maintenance organization, there's often not much time to think about the spare parts needed for a major shutdown. Hasty choices may prove to be the wrong ones, and required spare parts may arrive too late.

Valmet has now expanded its shutdown service to cover spare parts as well. This enables the customers to plan, maintain and optimize their spare part deliveries and minimizes the risk of emergency purchases and maintenance delays.

Benefits:

- All required spare parts will arrive in good time
- Lower freight costs
- Fewer unplanned shutdowns
- Eliminates emergency parts purchases

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COOPERATION is key in developing new technologies



ENERGY TECHNOLOGY IN FOCUS
The R&D Center in Tampere, Finland, is the only industrial-scale energy technology R&D center in Finland.

The needs of pulp, paper and energy producers are driving Valmet's R&D efforts to further develop existing technologies and processes and to create innovation for new business opportunities.

TEXT Outi Nurmi

Customer needs are driving Valmet's R&D efforts to further develop existing technologies and processes and to create innovation for new business opportunities. Among these needs are sustainability and renewability, reduced raw material consumption, increased recycling and usage of waste streams, as well as developing new products and revenues from existing processes. In order to succeed in this Valmet collaborates in R&D closely with the customers, industry organizations, research institutes and universities to discuss, share information and execute development projects together.

"Developing new technology is something you can't often successfully do alone. Transforming an idea into a fully commercialized technology and solution is a long path and requires investments in money, time and expertise. Having broad, open cooperation across boundaries is a must. By working together with our customers and other partners we are able to utilize synergy benefits, complement competencies and divide risks," explains **Jussi Mäntyniemi**, R&D and Technology Director from Valmet's Pulp & Energy business line.

Valmet has constantly widened its cooperation network to bring it closer to the customers elsewhere and therefore strengthen the company's ability to meet local needs. An increased local presence provides access to new knowledge and enables to engage more closely with customers in projects aiming at commercialization. In the Americas, Valmet has focused strongly on pulp and paper process development in collaboration, for example, with the University of Toronto in Canada and the Federal University of Viçosa in Brazil. Valmet also recently started new activities with the Indian Institute of Technology Madras (IITM).

Fruitful cooperation with VTT Technical Research Centre of Finland

A good example of fruitful cooperation is Valmet's long-term collaboration with the VTT Technical Research

Centre of Finland. Valmet and VTT have worked together on many development projects over the years and one of the most distinguished achievements is the development and commercialization of pyrolysis technology for bio-oil production.

VTT carried out the first pyrolysis laboratory studies back in the 1980s, followed by the first actual pyrolysis project in the next decade. In 2007, Valmet, UPM and VTT formed a technology development consortium and the first cold model tests were conducted at Valmet's R&D Center in Tampere, Finland. Soon, Fortum also joined the development consortium.

The bio-oil development work reached its peak with a deal to construct the first commercial-scale plant between Valmet and Fortum in March 2012. This plant was com-

mmissioned in 2013 and now operates as part of a current combined heat and power plant. The plant produces 50,000 tonnes of bio-oil a year, which corresponds to the heating needs of more than 10,000 single-family homes. Initially, bio-oil is being used to replace the heavy fuel oil used in Fortum's heating plants.



Multi-sized pilot plants play important roles

"On the way to developing an idea into becoming a fully commercialized piece of technology and to have a controlled scale up, it is essential to have a number of different sized pilot plants. These range from laboratory models to full-scale plants. This is possible only if we engage in wide cooperation with different partners as we have done in the pyrolysis development project," says Mäntyniemi.

Three different sized pilot plants in pyrolysis development

VTT opened its new Bioruukki pilot center in Espoo, Finland in March, 2015. In the first phase Bioruukki involves gasification and pyrolysis pilots, the latter delivered by Valmet.

Valmet has fifteen technology centers with modern pilot facilities to study the feasibility of inventions and to further develop the performance of the products for its customer industries. The R&D Center in Tampere, in Finland, has been in operation since 1990 and it is the only industrial-scale energy technology R&D center in Finland. "We have unique equipment for testing combustion and pyrolysis technology on an industrial pilot scale. So far, we have produced 165 tonnes of pyrolysis bio-oil in several projects together with our customers," describes **Marko Palonen**, who heads the Tampere R&D Center. ■

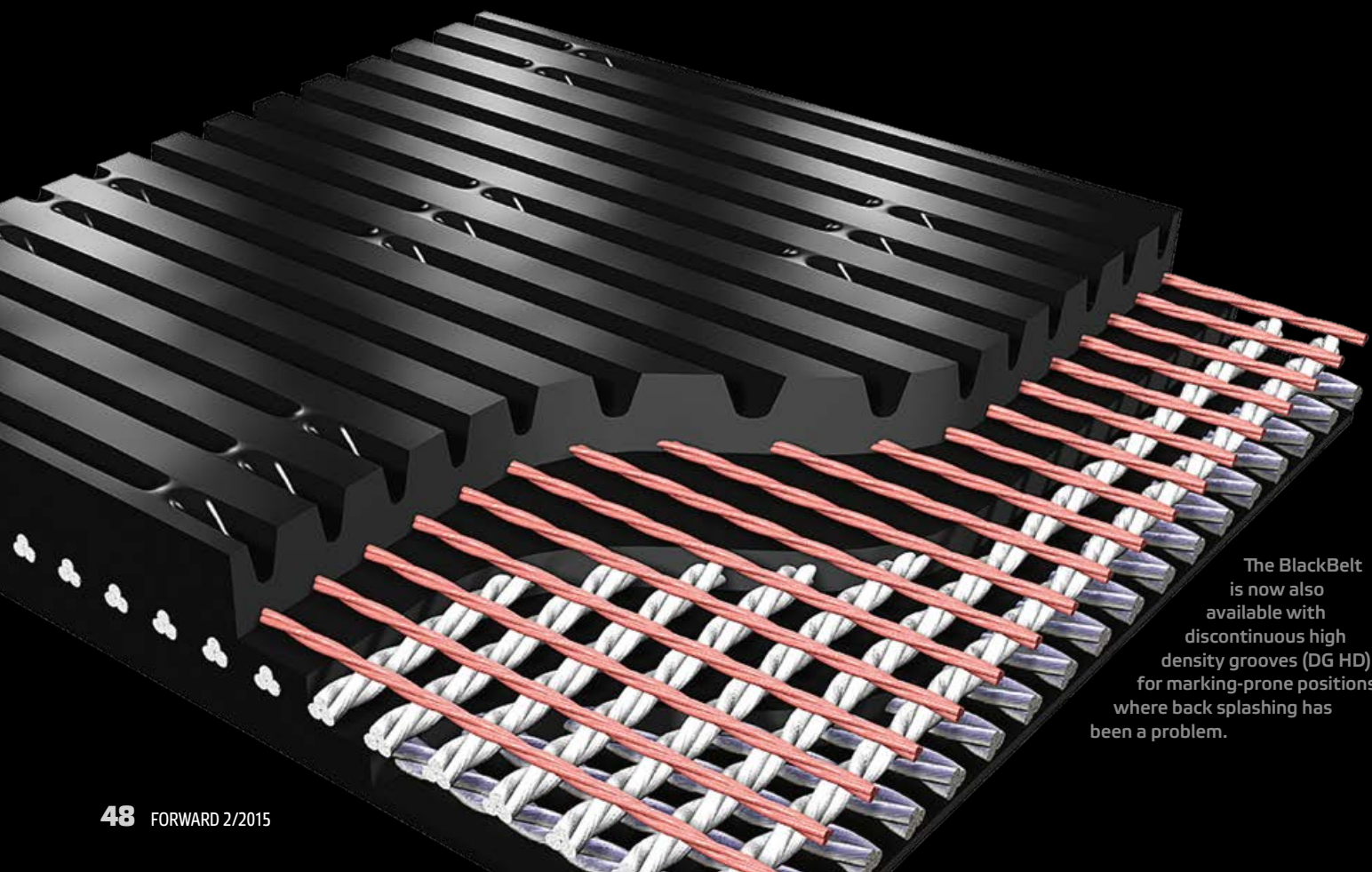
SYNERGY BENEFITS

"By working together we are able to utilize synergy benefits, complement competencies and divide risks," explains **Jussi Mäntyniemi**, R&D and Technology Director from Valmet's Pulp and Energy business line. (Photo VTT)

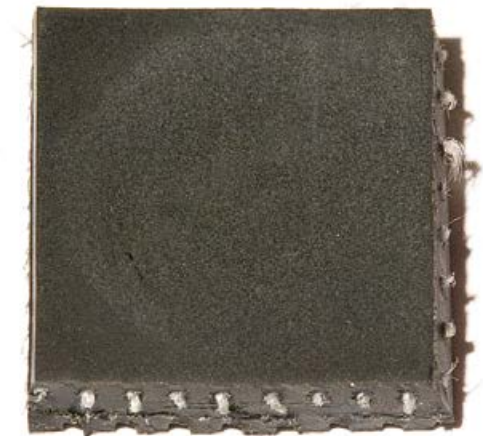
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Proven by tests: BlackBelt has highest impact strength

The most important property of a shoe press belt, used in paper and board machines, is its toughness, in all probability. Tough material survives in even the hardest and fastest impact situations. In tests made at Tampere University of Technology, Valmet's BlackBelt showed the best impact resistance compared to other belt designs. TEXT Satu Hagfors and Marjaana Lehtinen



The BlackBelt is now also available with discontinuous high density grooves (DG HD) for marking-prone positions where back splashing has been a problem.



Nobody wants an unscheduled belt change in the press section of a paper or board machine. However, they do occur, and one of the most common reasons for an unscheduled shoe press belt change is cracks. When an external object hits the belt harshly it may cause a crack or a hole. Sometimes the paper side may be intact, but there may be a crack on the oil side. This is especially harmful and in the worst cases can lead to inside delamination, immediately resulting in poor web moisture profiles. This in turn causes off-spec paper quality and eventually, in many cases, leads to an unplanned belt change. Additionally, it takes time and a lot of work to clean up belt fragments left in the shoe roll.

"When the material used in the belt has sufficient toughness and good impact strength you can avoid cracks both on the paper and oil side," says **Satu Hagfors**, R&D Manager, Valmet.

Wads create extreme pressure on the belt surface

Valmet's belt specialists studied what happens to belts in fast impact situations. For this they used a modified Split Hopkinson Pressure Bar testing method at Tampere University of Technology, in Finland.

In this test, a metal striker is shot onto the belt sample at a specified speed. A force cell under the sample measures the force that goes through the sample. If the sample

breaks, more force goes through it and a higher force will be measured.

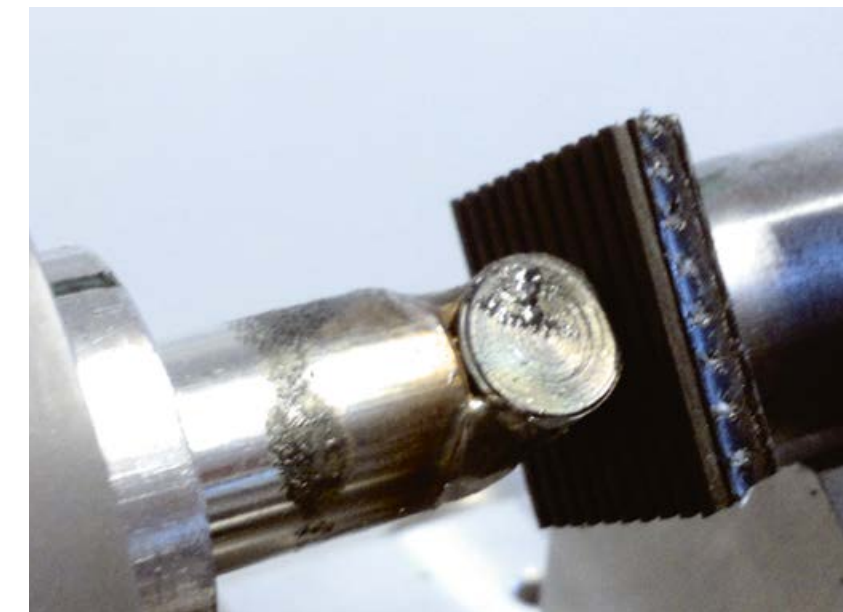
In a paper machine, the highest peak pressure during normal operating conditions at the end of the shoe is below 10 MPa. "In the testing, an impact of 10 - 30 times higher pressure can be created with a small striker on the belt surface. This same phenomenon could occur in real situations if some extra material, for example a paper wad, passes through the shoe press nip. If this happens it would be no surprise that the belt sustains damage because of such high

↑ IMPACT RESISTANCE

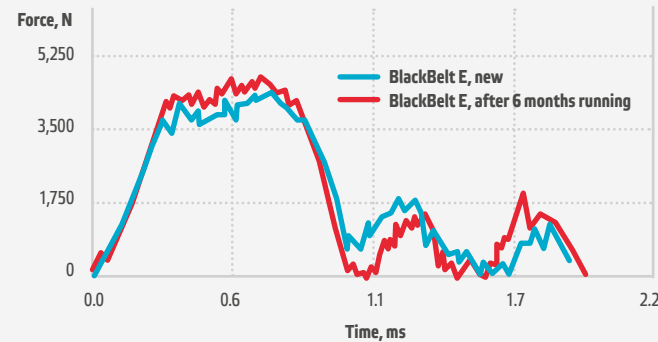
In case the belt material does not have sufficient impact resistance, the oil side can be cracked although the paper side is intact. This creates a risk of inside surface delamination.

↓ IMPACT TESTING

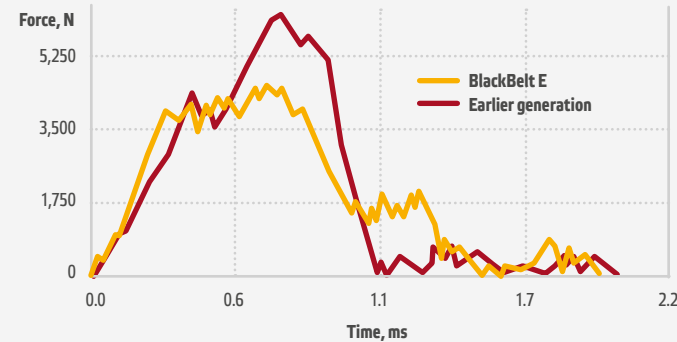
A bar shaped striker hits the belt sample at a specified speed.



BlackBelt E as new and after 6-months running time



BlackBelt E vs. earlier-generation belts



Force curves of a new BlackBelt E and after six months on a shoe press running under a 1,200 kN/m load.

The force curves of the BlackBelt E vs. an earlier-generation belt. The impact energy does not damage the BlackBelt E in the same way as it does for the earlier-generation belts. Less force passes through the sample while it remains intact.

pressure and impact,” Hagfors explains.

The test showed significant differences between various belt materials and structures. The samples with the lowest measured forces remained intact, whereas the samples

with higher measured forces showed cracks on one or both sides of the sample. Some samples even broke in two during the test. The BlackBelt E (E for Extreme) showed excellent impact resistance compared to

several other belt designs. This property also seemed to remain consistent throughout the belt’s lifetime.

Optimized material improves belt toughness

The tests clearly showed that the latest BlackBelt E designs have better impact strength than Valmet’s earlier-generation belts and those of other manufacturers. The BlackBelt material is dynamically more durable. In fact, the material was originally developed for rollercoaster wheels to provide the highest possible levels of safety in carrying people to high places at high speeds.

According to Hagfors, the secrets behind the BlackBelt’s success in the tests lie in its high-performance polyurethane composition that boosts impact strength and toughness.

“Because the material is tough enough, it does not crack so easily. In addition to paper side toughness, we have also improved the layer structure on the oil side.” ■

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Optimized reinforcement structure for every belt

In developing the BlackBelt one of the first steps was optimizing the belt elastomer material. Once this was completed, the next step was to optimize belt reinforcement. It was at this stage that Valmet went even further and expanded its BlackBelt product family. In addition to the **BlackBelt E** structure – which is best suited for fast newsprint and packaging grade machines – Valmet also developed new belt structures for other machines.

“By introducing new structures, we also want to offer belts for other shoe presses that have their own requirements,” Satu Hagfors emphasizes.

The new **BlackBelt G** has triple-layer reinforcement with flexible yarn on the paper side. It has been especially designed for shoe presses with a small radius. The new **BlackBelt F**, with double-layer reinforcement, features high flexibility and is suitable for positions where a thinner caliper is required.

All members of the BlackBelt product family are available with the following surface options: smooth, discontinuous grooves (DG), semi grooved (SG), grooved, high density grooved (HD) and discontinuous high density grooves (DG HD).



Valmet’s Pulp Analyzer (Valmet MAP).

ONLINE FIBRILLATION MEASUREMENT:

a breakthrough in real-time sheet strength management

Valmet’s fiber microscope measurement is enabling a paradigm shift in how low consistency (LC) refining is controlled. The target is to achieve final sheet properties in a cost-effective way.

TEXT Ossi Laitinen, Ismo Joensuu, Kevin VanPembrook, Marko Loijas and Tommi Niskanen

Fiber physicists have known for many years that fiber fibrillation created in LC refining is the key factor in creating high bond strength between fibers and a strong sheet of paper. But those offline microscopy studies in the laboratory do

not reflect the real-time variability of sheet strength in a papermaking process. Now, with online high definition imaging in Valmet’s Pulp Analyzer, it has been proven that these microscopic measurements can be used to predict sheet strength and open the door to real-time control. This

is welcome news to papermakers who are trying to make a uniformly strong sheet with lower basis weights, higher ash levels and less desirable and non-uniform recycled fiber in the furnish.

Measurements validated

Researchers at the University of Oulu, Finland confirmed that the online Valmet Pulp Analyzer with High Definition Image Analysis is a reliable tool for estimating the degree of external fibrillation in kraft and TMP pulp. Moreover, the fibrillation measurement and its relationship to sheet strength properties has been validated at several mills as a sensitive measurement of the refining conditions in stock preparation systems.

Valmet's Pulp Analyzer (Valmet MAP)

Fibrillation degree is measured by a high definition image analyzer that is an upgrade to previous generations of fiber analysis modules in Kajaani MAP and Metso MAP analyzers. The analyzer also measures many other fiber properties including fiber length distribution and fractions, fiber width, kink, curl, coarseness, vessel cells and shives. The analyzer also includes a freeness measurement module.

Soft-sensor predicts strength

The online measurement has been shown to respond to changes in refining conditions (Figure 2) and to show trends and significant variability in fibrillation that would translate to changes in sheet strength (Figure 3). This variability can come from normal refining condition changes including refiner plate wear, consistency variations and chemical factors like pH.

Once the validity of the measurement was established, the next step was to use the fibrillation data to see if final sheet strength properties could be predicted with certainty. To this end, a modeling tool for paper strength properties



FIGURE 1
A high-definition image clearly shows fibrillation.

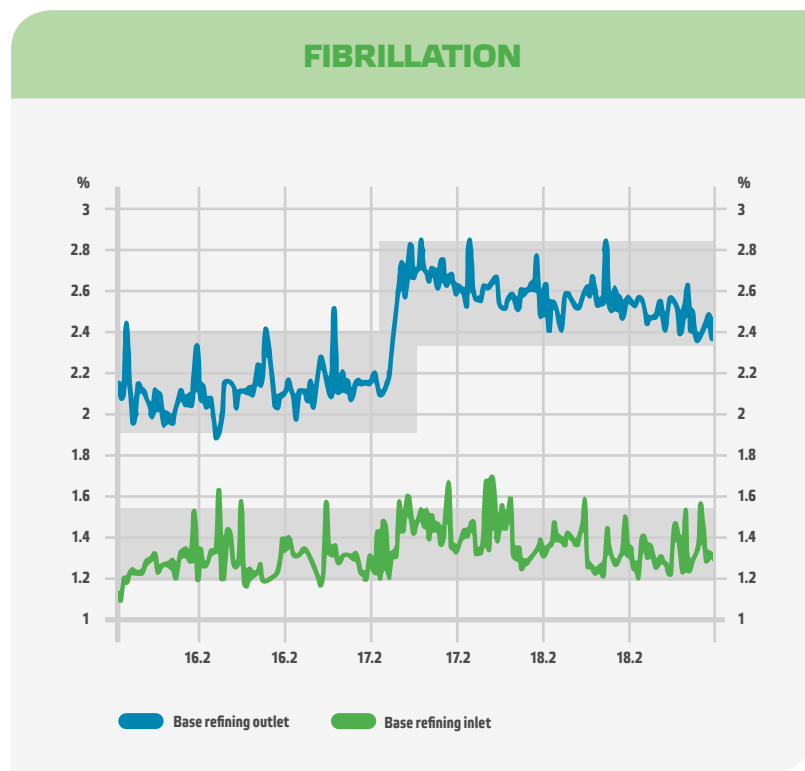


FIGURE 2
Fiber fibrillation is manipulated by refining using the online measurement.

based on the analyzer fibrillation and other online fiber measurements has been developed. Freeness and other fiber properties still play an important role in strength prediction, but fibrillation has significantly improved the model stability.

The result is that predicted strength properties compare very well to laboratory tests (Figure 4). The elongation test in tissue has also been modeled. Additionally, it has been shown that there is a strong correlation to formation index.

Better furnish control enables cost-effective papermaking

Papermakers have always relied on freeness, but have long suspected it didn't tell them everything. That missing on-line information is now available and will no doubt change the way refining is managed in stock preparation.

Conventional control using freeness to control specific energy may have to be updated with new and more effective models based on fibrillation. Fibrillation control represents a step above traditional horsepower days per tonne and freeness control since it can make online compensation for consistency, plate wear and changes in stock chemistry to produce a paper sheet that has consistent strength. With that consistent strength achieved by the fibers, papermakers can run lower basis weights, higher ash contents and can tolerate lower-quality recycled furnish with the optimum fiber blend consuming the right amount of energy. With more cost-effective furnish, a significant return on investment is possible. ■

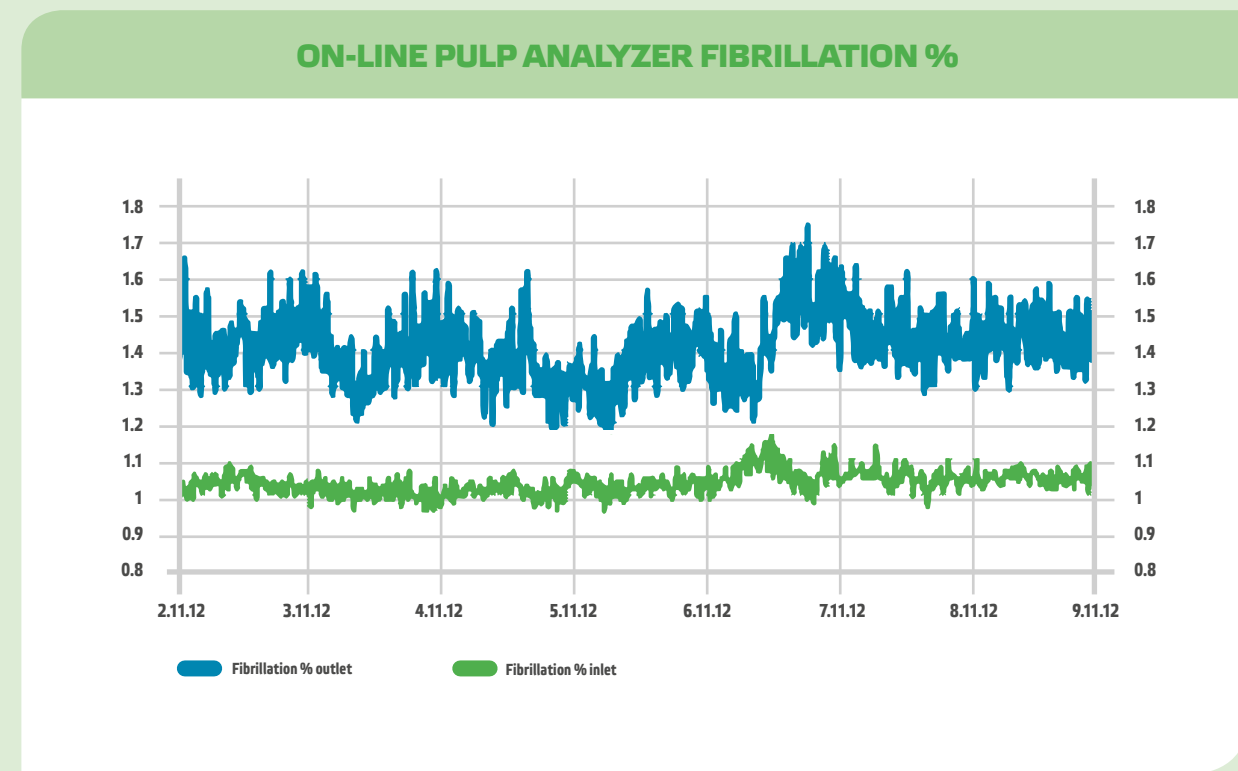


FIGURE 3
In a 2-stage SWK refining system variations in fibrillation over seven days are 40%.



FIGURE 4
Tensile, z-direction tensile and CD tear have been predicted with models using fibrillation. Predicted values (in yellow) track lab tests (in green) very well.

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Precise roll grinding

with 3D roll shape measurement

Every customer has their own particular dimensional tolerances for board and paper machine roll grinding. A fast, reliable and accurate 3D grinding process is vital to meet those specific needs. Valmet's experts take advantage of the latest 3D technology to guarantee precise profile and roundness shapes. **TEXT** Heikki Kettunen, Minea Hara

When a worn-out paper or board machine roll is in need of grinding, the first step is thorough measurement. Grinding machines with conventional two-point measuring devices struggle to produce a true roll shape, since geometric imperfections on the rotating roll corrupt the measured surface shape. As a result, grinding machine operators cannot really see what they are getting from grinding.

An accurate four-point measurement system is necessary to provide a precise 3D picture of the roll shape. Getting accurate grinding results also needs 3D compensation of the grinding head based on the 3D measurement.

Grinding the roll on its own bearings

In addition to providing a smooth surface, roll grinding permits smooth roll rotation in paper machines. If you grind the roll on its own bearings, the rotation and the shape of the surface is a mirror image of

the irregularity of the bearings. While it is normally much faster and easier to grind the roll on its own bearings, it requires a tool to compensate for these irregularities. This tool is proper 3D measurement of the roll in combination with 3D-compensated grinding. The use of 3D grinding results in a perfect roll, meaning that the only uncontrolled element in final use is the precision of the bearings.

Extended roll running times and minimized vibration

Advances in roll grinding techniques are providing better roll cover performance for Valmet's customers. Implementing advanced 3D grinding in combination with state-of-the-art technology brings clear benefits in terms of maintenance work and the end uses of rolls. The quality of roll grinding has a major impact on maximizing roll running times and minimizing vibration.

Using 3D measuring allows roll grinding tolerances to be set and tuned according to the customer's particular needs. Maximum running time for covers can be achieved



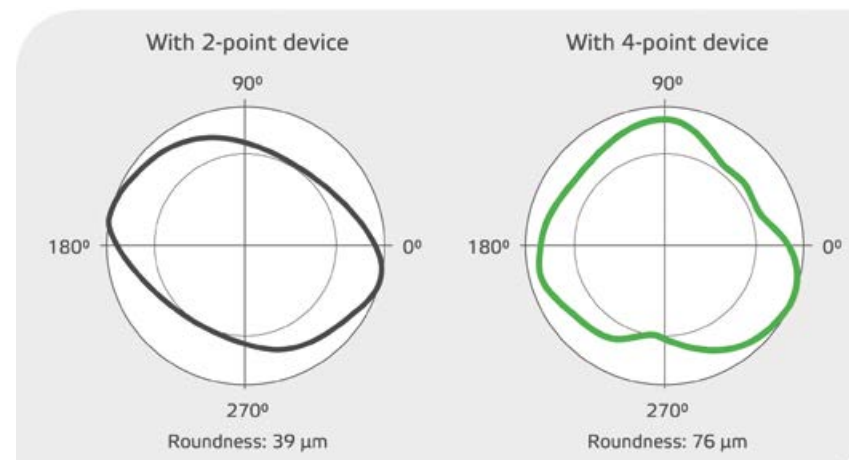
without spending unnecessary time on roll grinding.

Tailor-made, cost-effective solutions for all kinds of rolls

Valmet applies the latest 3D grinding technology and expertise all over the world, meaning that grinding quality targets are always met and the result is fit for purpose. By transforming local competence into global expertise, Valmet's reliable 3D grinding methods means we are able to meet every customer's individual surface finish requirements. ■

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Roundness profile measurement



Unlike a conventional two-point measuring device (left), a modern four-point (right) measurement system is capable of providing a precise 3D picture of the roll shape.

3D TECHNOLOGY

Grinding machine operators take advantage of the latest 3D technology in Valmet's roll service centers around the world.



Aino Leppänen, a researcher at the Department of Chemistry and Bioengineering at Tampere University of Technology (TUT) in Finland, successfully completed her doctorate in technology after carrying out research into kraft recovery boilers with Valmet. Leppänen's first experience of Valmet boilers was a commissioned piece of research for a master's degree thesis on recovery boiler fouling. This research led to her doctoral dissertation titled "Modeling Fume Particle Dynamics and Deposition with Alkali Metal Chemistry in Kraft Recovery Boilers." The dissertation was examined in January 2015 and she was awarded the doctorate in technology for her excellent research.

In her doctoral dissertation, Leppänen combined different computational methods to investigate the fouling of kraft recovery boilers in cooperation with Valmet. "Because the kraft recovery boiler is the most important unit in the pulp-making process, its reliable operation is important for the whole pulp mill. If we can understand the fouling phenomena better, the boiler design and its operational parameters can be adjusted to avoid unscheduled shutdowns which

In her doctoral dissertation, Aino Leppänen combined different computational methods to investigate the fouling of kraft recovery boilers in cooperation with Valmet.



"The main objective in my doctoral dissertation was to present the use of a combined heat transfer and chemical kinetics simulation tool for a large wood particle under two thermal conversion processes, torrefaction and fast pyrolysis", Lauri Kokko explains.

Congratulations for newly awarded doctoral degrees

Writing a doctoral dissertation takes time, sweat and energy, but hopefully not blood and tears. Let's meet two people recently awarded doctoral degrees in technology whose academic work closely links with Valmet's existing and new technologies. **TEXT** Marjaana Lehtinen and www.tut.fi

stop the whole pulp-making process and can cause losses up to millions of euros every day," she explains.

The most challenging part of operating a recovery boiler is to handle the high ash-content of the black liquor. "Despite the long history of recovery boilers, some boiler phenomena are still incompletely understood, such as fine particle formation. One reason for this is the difficulty of capturing and measuring particles from the hot and corrosive flue gases," Leppänen says. She developed a computational tool that has brought new insight into the behavior of ash-forming elements.

"It was motivating to work on a practical real-life topic and not just with theory. I got valuable advice from the experienced members of my Valmet steering group," she adds. Her work with Valmet continues by further developing the method.

Valmet's in-house pyrolysis expert

Lauri Kokko defended his doctoral dissertation in November 2014 at TUT. The pyrolysis-related work was titled "A Method for Finding Suitable Particle Sizes for Thermal Conversion Processes by Using a Simulation Tool Focusing on Wood Particle Heat Trans-

fer and Chemical Kinetics".

Kokko has years of experience with biomass conversion technologies, first working at TUT in the Biorefine project with Tekes (the Finnish Funding Agency for Innovation) and then in several projects for UPM and Valmet. Since 2012, he has been employed as part of Valmet's bio-oil solutions team, currently as a pyrolysis specialist. Because pyrolysis is one of Valmet's key focus areas in commercializing new biomass conversion technologies, his doctoral dissertation was a perfect match with company needs.

"My main objective was to present the use of a combined heat transfer and chemical kinetics simulation tool for a large wood particle under two thermal conversion processes: torrefaction and fast pyrolysis. The two processes were selected because they seemed to be promising ways of improving the properties of wood-based bio fuel," Kokko explains. "Wood-based biomass is abundant but its low energy density limits its use as a renewable energy source."

The calculation methods used in Kokko's study have been successfully applied to R&D efforts relating to Fortum's new bio-oil production plant supplied by Valmet in Joensuu, Finland.

A win-win situation in every respect

These two dissertations are examples of how Valmet cooperates with universities to improve the performance of its existing products and develop new solutions. "We have had close cooperation with universities for decades. We are continuously expanding our R&D networking to other regions, too, so we can be closer to our global customers," says **Matti Rautanen**, Manager, R&D Networks, Pulp and Energy business line, Valmet.

With a broad product portfolio, active R&D and limited in-house resources, more specialist knowledge is always needed, and Valmet highly values cooperation with top researchers at various R&D centers and universities. "By splitting technological challenges into smaller research tasks, we promote research and provide opportunities for students for their master's theses or doctoral dissertations. This also increases the interaction between Valmet's specialists and researchers," Rautanen continues. It is a win-win situation for all parties. Academic cooperation presents an excellent recruitment channel, as well. ■

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Driving for a **CIRCULAR** economy

Global population growth, an increasing share of middle class consumers and a pressure on resources are changing the current economic model. TEXT Vesa Puoskari

Jocelyn Blériot, Executive Officer, Communications & Policy Lead from the Ellen MacArthur Foundation states that one of the main drivers towards a circular economy is the exhaustion of easy-

to-access resources and that this is creating high pressure in terms of availability, and high price volatility in the commodity markets.

In addition, the traditional economic model based on mining natural resources, manufacturing and selling products to consumers, and then discarding the waste, has turned out to reach its limits.

“The model worked well as long as the demand was small enough and there were plenty of resources available in the market. This is not the case any longer and for this reason the current situation is pushing the model towards a comprehensive change,” estimates Blériot.

According to Blériot the circular economy is a global model that helps



There are a lot of new opportunities in biological materials such as biogas, biofuels and extraction of biochemical feedstock that are based on agricultural waste.

decouple economic growth and development from the consumption of finite resources.

“The aim is to keep products, components and materials at their highest utility and value. The circular economy concept suits this purpose very well.”

In this economic view, value is created in the manufacturing sector by remanufacturing, refurbishing, reusing and maintaining products, before resorting to recycling materials. “In this way there are a lot of new opportunities in biological materials such as biogas, biofuels and extraction of biochemical feedstock that are based on agricultural waste,” he adds.

The Ellen MacArthur Foundation's 2012 report *Towards the Circular Economy* stated that moving to this new model could be worth up to USD 630 billion in material savings per year for Europe alone.

The foundation works in educa-

tion, business innovation and analysis to accelerate the transition to a circular economy. Jocelyn Blériot is one of the founding members of the charity.

Design for re-use

The model requires a new approach when designing end products. The design has to concentrate on re-using and remanufacturing in order to create multiple useful lives for the products.

“Currently, objects are intended to have just one life. If the target lies in multiple useful lives and exploiting materials in the productive loop again then objects have to be designed in a different manner as well,” says Blériot.

He notes that there is not enough transparency when it comes to knowing exactly what kinds of materials products include.

“The next phase would be to improve the recyclability that can be done by rationalizing the use of re-

source streams and finding the right materials. Everybody across the value chain has to know exactly what kind of components the product includes and what can be done with that part.”

Blériot admits that the transition towards a circular economy will take time as the current linear system has become highly optimized.

“In addition, there are issues concerning materials because many chemicals and plastics derived from petro-chemical resources are difficult to replace. We also need more research work into molecules for new materials that could be recycled endlessly,” he evaluates.

“We find that that the biggest challenge is in changing the mindset, as companies will have to reinvent themselves. The circular economy is about doing business in a totally new manner as we are talking about transforming the whole economic model.”

“Our work highlights that busi-



nesses can already achieve many benefits and opportunities in a circular economy,” emphasizes Blériot.

Access above ownership

The whole process is based on the growth of the global population and increasing exploitation of raw materials. According to current estimations there will be around 8.3 billion people living on the planet while the consuming middle class will amount from three to four billion by 2030.

system works for them.

“The best thing that consumers could do is to open their minds towards new models. For example, it is important to realize that you do not necessarily need to own a product in order to benefit from the service it provides. Instead of owning things consumers could opt to use commodities by renting or borrowing them.”

“For instance, you do not have to own a car when you could use sharing services in its place. Again, we are talking about a mental shift here,” he emphasizes.

However, Blériot points out that consumers alone are not responsible for changing the system towards becoming a circular economy.

“Part of the problem is pointing the finger at consumers and trying to convince people to take responsibility in changing the system. This is slightly deceptive and can be counter-productive because people realize that changing their behavior won't really help and they start disengaging.”

He adds that consumers can do their part when the whole

Measuring success

Currently, The Ellen MacArthur Foundation is developing the first metric tool, called Circularity Indicators, together with Granta Design and with support from the European Commission's LIFE+ program.

“There will be indicators both on the product level and at the company level. We will publish an online tool that will be available for the public to evaluate the circularity of products. Another tool will be commercialized and will be more in depth, for companies that would like to evaluate their progress in circularity.”

Blériot emphasizes that the circular economy is a very important topic because it is really about changing the system of our industrial model. It is a cross-cutting agenda and therefore requires high level collaboration and dialogue, notably between policy-makers and the business community, but also with academia and wider society stakeholder groups.

“The change needs effort, perspective and certain degree of courage to make the right decisions, but there is a clear first-mover advantage and opportunities there for taking... we can already see a lot of uptake. It is important to provide a tight rationale and fact-based analysis, to avoid circular economy becoming a buzzword. This has to be taken seriously and not just as a fleeting trend that passes by with time,” concludes Blériot. ■

“We find that the biggest challenge is in changing the mindset. The circular economy is about doing business in a totally new manner.”



PRODUCTS FROM BIOMASS AND WASTE

Valmet stands in the front line of circular economy with new solutions to exploit sidestreams and waste. They can be used as new raw materials and as a source for energy production. **TEXT** Vesa Puoskari

Vice President IPR **Jouko Yli-Kauppila**, from Valmet, describes the circulating fluidized bed (CFB) gasification as a great example of a rapidly developing combination of technologies and services that are capable of converting biomass, recycled materials and waste into usable forms of energy very efficiently.

The process works by partially combusting biomass or waste at high temperatures using a controlled amount of air. The resulting gas product is a versatile energy carrier offering a range of benefits.

“Reducing CO₂ emissions in an efficient, economic and viable way is an especially important issue in energy production. From this perspective, gasification technologies are highly relevant as they enable partial or complete replacement of fossil fuels with renewable fuels,” Yli-Kauppila adds.

Another advantage of waste gasification is that the process provides much better electrical efficiency compared to the direct combustion of waste materials.

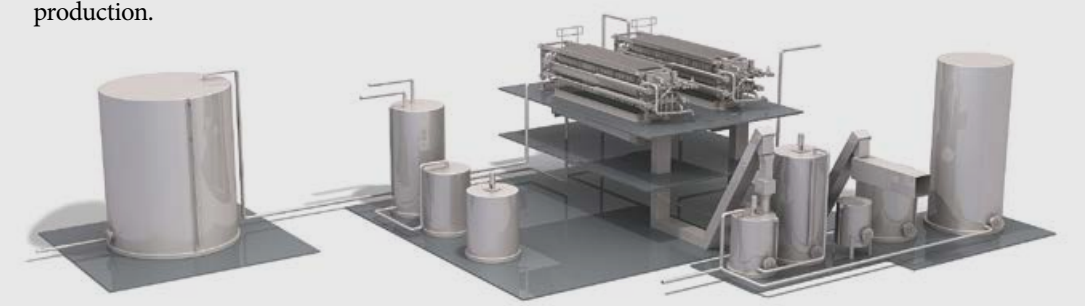
“Materials that would otherwise have been disposed of, such as unclean plastic, paper, cardboard

and wood and other problematic waste, are also used in this process,” Yli-Kauppila notes.

Gasification technology enables the generation of biomass-based power in an existing coal boiler. Currently, there are four large-scale CFB gasifiers in operation or under delivery. Two of them are located in Finland and the others are under delivery to the OKI Pulp & Paper Mills in Indonesia.

Extracting lignin from the pulp making process

Another important innovation is the LignoBoost system, which is used to separate and collect lignin in operating pulp mills. The aim is to decrease the share of the lignin in the black liquor and increase boiler capacity to enable up to 20-25% more pulp production.



The LignoBoost system extracts lignin in operating pulp mills.

Biorefineries with the LignoBoost system will further reduce the CO₂ emissions of a mill by replacing a significant amount of fossil fuel with dried lignin fired in the lime kilns.

Yli-Kauppila says that technology will create new business opportunities for selling lignin to external customers.

“Lignin is an important and a very flexible raw material that can be used in several end products. For example it can be used to replacing oil-based materials in plastics production. Currently, we are carrying out a research and development study on how to use lignin as a raw material in different applications.”

Recycled wood fibers

The production of high quality printing paper, board and tissue products from recycled fiber is becoming increasingly challenging with the deterioration of collected waste paper from urban communities.

“Mills today have to handle more furnish variability and more non-fiber material contamination, yet recover and make full use of all incoming fiber to reduce landfill.”

Producing quality board grades with low quality raw materials, such as old corrugated containers and mixed waste is placing high demands on recycled fiber processing.

Valmet’s fiber recycling technologies offer innovative solutions, from pulping to stock preparation, offering efficient impurity removal, high yield, controllable ash content and high brightness gain.

Combining fiber-recycling technology with Valmet’s modularized board machine concepts allows producing high quality board with good strength properties in a cost and energy efficient way. ■



Around the world

What is happening in the global pulp, paper and energy industries? *Around the world* demonstrates some of the events and projects where Valmet has worked together with its customers to move their performance forward.



Innovative process and quality vision technology from Valmet

Valmet launched its next generation machine vision solution, Valmet IQ Process and Quality Vision, at Paper-Con 2015 event in Atlanta, USA. The new solution contains the key elements of advanced process and quality vision system; Valmet IQ Web Inspection System and Valmet IQ Web Monitoring System.

Energy from waste in Sweden

The world's biggest waste fired boiler of 150 MW started up in late 2014 in Västerås. In Nybro, there are two 20 MW boilers delivered; one in operation since 2014 and the other under construction.

Biofuelled power now produced in Jönköping

Jönköping Energy in Jönköping, Sweden, has inaugurated its new 100 MW biofuelled power boiler on April 15.

Natural gas from biomass in Gothenburg

A plant for production of synthetic natural gas from biomass, the first of its kind in the world, has been taken over by the customer at GoBi-Gas in Gothenburg, Sweden.

Key technologies for grade conversion to Kotkamills

Valmet will supply key technologies for extensive grade conversion for Kotkamills Oy in Finland. The existing printing paper production line will be converted to produce high-quality folding boxboard and barrier board grades. The start-up of the rebuilt machine is scheduled for the second quarter of 2016.

Meet Valmet in Shanghai

Come to meet Valmet at the China Paper Exhibition on October 14-16 in Shanghai, China.

New equipment installations going on for Siam Cellulose

Construction work for a new recovery boiler and evaporation plant upgrade for Siam Cellulose Co., Ltd. are being carried out in Thailand.

OptiConcept M containerboard line for Yuen Foong Yu in Taiwan

Yuen Foong Yu (YFY) Packaging Inc. has ordered an Opti-Concept M containerboard production line for the company's Xin Wu site in Taoyuan County in Taiwan. The new production line will produce high-quality fluting grades out of 100 percent recycled raw materials. The start-up of the new machine is scheduled for the third quarter of 2016. Valmet's delivery includes complete boardmaking line from headbox to reel and a new winder.

World's largest evaporation plant shipped to Indonesia

Equipment deliveries for the new pulp mill of OKI Pulp & Paper Mills in Sumatra, Indonesia, are under way. One of the most recent shipments comprised equipment for the world's largest evaporation plant, with a design capacity of 2,900 tonnes of evaporated water an hour.

Meet Valmet in New Delhi

Come to meet Valmet at the Paperex exhibition on November 1-4 in New Delhi, India.

New tissue capacity for Hayat Kimya

Hayat Kimya's new Advantage DCT 200TS tissue line, PM 5, in Mersin, Turkey, was started up in March 2015. This was the second start-up in three months, as Hayat Kimya's PM 4 at the new Alabuga mill in Tatarstan, Russia was started up in December 2014. Hayat Kimya has now four tissue lines supplied by Valmet and one more to start up in 2016. The customer's first tissue machine PM 1 will also be rebuilt with Valmet Advantage DCT technology.



Filter fabric production extended in Portugal

Valmet inaugurated the extension of its filter fabric production and R&D center in Ovar, Portugal. The unit manufactures filter fabrics for solid, liquid and dust filtration as well as felts and accessories for the laundry industry.



Meet Valmet in Sao Paulo

Come to meet Valmet at the ABTCP exhibition on October 6-8 in Sao Paulo, Brazil.

CMPC's new pulp line now in operation

The new pulp line of CMPC Celulose Riograndense Ltda (CMPC) has been started-up on May 3rd, 2015. The new line is an expansion to the existing Guaíba pulp mill in Brazil. Valmet's delivery covered the main process islands of the pulp line, from the cooking plant to baling, including the complete fiberline, pulp drying and baling, evaporation, recovery boiler, causticizing, lime kiln and an integrated automation solution and operator training simulator for all process areas. Valmet also delivered a non-condensable gas treatment system.

About Valmet

Valmet is a leading global developer and supplier of services and technologies for the pulp, paper and energy industries. Our 12,000 professionals around the world work close to our customers and are committed to moving our customers' performance forward – every day.



CO₂
-16%

Improved environmental performance

In 2014, Valmet's CO₂ emissions decreased by 16%, energy consumption by 9% and municipal water consumption by 14%. A key improvement contributing to lower CO₂ emissions in 2014 was the replacement of coal boilers with a natural gas heating system in our Xian workshop in China. Coal is no longer used as a fuel in any Valmet location. Valmet's long-term target for 2020 is to reduce energy consumption and CO₂ emission by 20% from 2005–2009 average.

68%

Active employee participation

In 2014, 68% of Valmet employees responded to the OurVoice engagement survey, which is an important tool in creating an engaged and performance driven community. Overall, the results indicated positive changes in the areas that we've focused on, such as customer orientation, quality and our performance drive. In 2014, we also launched common values which form the basis of our cooperation with each other, with customers and with other stakeholders. Over 6,000 Valmet employees participated in the values creation process.

TOP
10%

Leadership in sustainability

In 2014, Valmet was included in the Dow Jones Sustainability World Index among the top 319 companies globally. Valmet has also been listed in CDP's Nordic Climate Disclosure Leadership Index (CDLI) among the top 10% of the organizations. The index includes the best Nordic companies that have publicly reported on their actions on climate change mitigation.

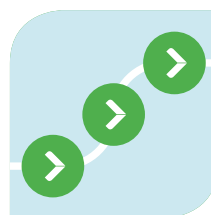
MEMBER OF
Dow Jones Sustainability Indices
In Collaboration with RobecoSAM

CDP
DRIVING SUSTAINABLE ECONOMIES

Beyond the numbers

Valmet strives to take a responsible approach throughout its business operations and sustainability is strongly embedded in its mission and strategy. In spring 2014, we defined a sustainability agenda to crystallize the sustainability focus areas and targets which create added value to Valmet and its stakeholders. The agenda focuses on five core areas which each have a specific roadmap and targets. Already in 2014 we showed good progress on many fronts.

Read more about the actions behind the numbers from the sustainability highlights from 2014!



Enhanced sustainable procurement

Valmet has defined a Sustainable Supply Chain as one of its sustainability focus areas, with the aim of improving supply chain management and transparency to ensure responsible operations throughout the entire value chain. In 2014, we launched four initiatives to integrate sustainability criteria more strongly into our supply chain management. The initiatives include a Sustainable Supply Chain policy, supplier sustainability risk assessments, supplier sustainability audits and training for procurement personnel. The aim is to have the new initiatives fully in place and operating globally by the end of 2015.

LTIF
5.5

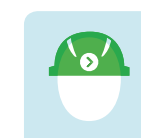
Good progress in safety

Valmet monitors a lost time incident rate (LTIF) as one of the key performance indicators for occupational health and safety. In 2014, we again improved our performance and closed the year with an LTIF of 5.5 which is a 15% improvement on the previous year. One of the key initiatives during the year was the launch of five new minimum safety standards for high-risk activities.

Valmet's sustainability focus areas:



Sustainable supply chain



Responsible operations (HSE)



People and performance



Cost-effective sustainable solutions



Corporate citizenship

Forward

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Valmet's customer magazine

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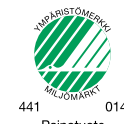
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Valmetin hiojat hyödyntävät viimeisintä 3D-teknologiaa lähes kaikissa Valmetin telahuoltokeskuksissa.

Hionta telan omilla laakereilla

Hiottu telapinta mahdollistaa telan tasaisen pyörimisen paperikoneessa. Mikäli tela voidaan hioa sen omilla laakereilla, pyörimisliike ja pinnan muoto ovat peilikuvia laakereiden epätasaisuudesta. Telan hionta sen omilla laakereilla on tyypillisesti nopeampaa ja helpompaa, mutta vaatii oikean työkalun, jotta nämä epätasaisuudet voidaan kompensoida. Tällainen työkalu on telan 3D-muotomittaus yhdistettynä 3D-ohjattuun hiontapäähän. Tällöin voidaan saavuttaa paras mahdollinen hiontatulos, ja loppukäytön ainoa hallitsematon tekijä on itse laakereiden tarkkuus.

Pidemmät telojen ajoajat ja pienempi värähtelytaso

Telahiontateknologiassa tapahtuneet edistysaskeleet näkyvät heti Valmetin asiakkaiden telapintojen paremmassa suorituskyvyssä. 3D-hionnan yhdistäminen viimeispään teknologiaan tuo selkeitä etuja niin huoltotöiden vähentyneessä määrässä kuin telojen loppukäytössä. Telahionnan laadulla voidaan maksimoida telojen ajoajat ja minimoida niiden värähtely.

3D-mittaus mahdollistaa yksilöllisten toleranssien tarkan määrittelyn asiakkaan erityistarpeiden mukaan. Näin telapintojen ajoaikoja voidaan pidentää ilman, että telan hiontaan käytetään tarpeettomasti ylimääräistä aikaa.

Räätälöityjä ja kustannustehokkaita ratkaisuja kaikenlaisille teloille

Valmet soveltaa uusinta 3D-hiontateknologiaa ja osaamistaan ympäri maailmaa, joten hionnalle asetetut laatuvaatimet voidaan täyttää aina tarkoituksenmukaisesti. Pystymme täyttämään jokaisen asiakkaan yksilölliset vaatimukset muuttamalla paikallisen tietotaitomme osaksi maailmanlaajuista osaamista – myös 3D-hionnassa. ■

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Täsmällistä telahiontaa 3D-mittauksella

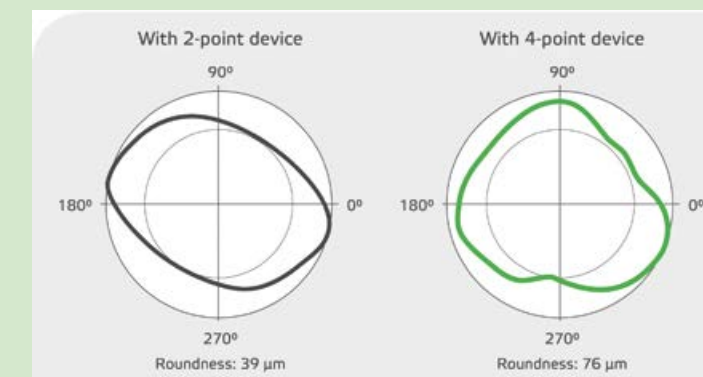
Valmetin asiakkailla on yksilölliset tarpeet telahionnan mittatoleransseille. Tavoit-teisiin voidaan päästä nopeasti, luotettavasti ja täsmällisesti vain 3D-hiontamenetelmällä. Valmetin telahionnan asiantuntijat käyttävät uusinta 3D-teknologiaa taatakseen äärimmäisen tarkan poikkiprofilin muodon ja telan pyöreuden.

Epätasaisuuksien havaitseminen

Kuluneen telapinnan hionta alkaa läpikotaisella mittauksella. Tavanomaiset

kahden pisteen mittalaitteet eivät kykene kuvaamaan telan muotoa oikein, koska pyörivän telan geometriset epätäydellisyudet vääristävät helposti pinnan mittaustulosta. Tällöin hiomakoneen operaattori ei voi tietää, minkälainen lopputulos hionnasta todellisuudessa saadaan.

Telan todellisen 3D-muodon mittaamiseen tarvitaan äärimmäisen tarkka nelipistemittalaite. Mahdollisimman tarkkaan hiomatulokseen vaaditaan lisäksi 3D-mittaukseen perustuva hiontapään 3D-ohjaus.



Tavanomaisen kahden pisteen mittalaitteen (vasemmalla) sijaan moderni neljän pisteen (oikealla) mittausjärjestelmä kykenee mittaamaan telan tarkan muodon kolmiulotteisesti.

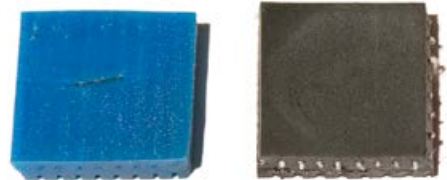
FIN



Testeissä tutkittu:

BlackBelt on paras iskusitkeydessä

Jos beltin materiaali ei ole tarpeeksi sitkeää, öljyvuoli voi murtua vaikka paperipuoli pysyykin ehjänä.



Paperi- ja kartonkikoneiden kenkäpuristin- hinnan eli beltin tärkein ominaisuus on luultavasti sitkeys, koska sitkeä materiaali kestää jopa nopeissa iskutilanteissa. Tampereen teknillisen yliopiston testeissä Valmetin BlackBelt osoitti erinomaista iskunkestävyyttä verrattuna moniin muihin beltityyppeihin.

Murtumat ovat yksi yleisimmistä syistä kenkäpuristinhihnojen suunnittelemattomiin vaihtoihin paperi- ja kartonkikoneilla. Murtuma tai reikä saattaa aiheutua ylimääräisen kappaleen iskeytyessä voimalla belttiin. Joskus paperipuoli on ehjä, mutta öljyvuoli on murtunut.

”Kun beltin materiaali on tarpeeksi sitkeää ja iskukestävää, voidaan välttyä murtumilta niin paperi- kuin öljypuolella,”

sanoo tutkimus- ja tuotekehityspäällikkö **Satu Hagfors** Valmetilta.

Mälli voi aiheuttaa kovan paineen beltin pinnalle

Valmetin beltiasiantuntijat ovat tutkineet Tampereen teknillisessä yliopistossa, mitä belteille tapahtuu nopeissa iskutilanteissa. Testissä metallinen iskupää ammutaan beltinnyytteeseen ennalta määritellyllä nopeudella. Näytteen alla oleva voima-anturi mittaa näytteen läpi kulkevan voiman. Jos

näyte hajoaa, saadaan korkeampia voimalukemia, kun suurempi osa iskun voimasta läpäisee näytteen.

Paperikoneen normaaliolosuhteissa korkein kuormitus kenkäpuristimessa on alle 10 MPa. ”Pienen iskupään nopea iskeytyminen beltin pinnalle voi aiheuttaa 10–30 kertaa korkeamman kuormituksen. Samoin käy, jos jotain ylimääräistä, esimerkiksi paperimälli, menee kenkäpuristinnipin läpi. Ei siis ole mikään ihme, että beltin vaurioituu noin kovan kuormituksen alla”, Hagfors sanoo.

Testit osoittivat selvästi, että uusimmat BlackBelt E -tyypit ovat iskusitkeydeltään parempia kuin Valmetin edellisten sukupolven tai muiden valmistajien beltit. BlackBeltin materiaali on dynaamisesti kestävämpää. Se kehitettiin alun perin vuoristoratojen rulliin, joilta vaaditaan äärimmäistä luotettavuutta kuljetettaessa ihmisiä korkeissa paikoissa suurilla nopeuksilla.

Optimoitu materiaali parantaa beltin sitkeyttä

Hagforsin mukaan BlackBeltin testimenestys perustuu sen polyuretaanikoostumukseen,

joka lisää iskunkestävyyttä ja sitkeyttä. ”Tarpeeksi sitkeä materiaali ei murtu niin helposti. Paperipuolen sitkeyden lisäksi olemme myös parantaneet öljyvuolen kerrosrakennetta.”

Optimoidut lujiterakenteet erilaisiin kenkäpuristimiin

Kun elastomeeri oli optimoitu, Valmet ryhtyi optimoimaan beltin lujitteita ja samalla laajensi BlackBelt-tuoteperhettä. Nopeille sanomalehti- ja pakkauspaperikoneille parhaiten sopivan **BlackBelt E** -rakenteen lisäksi tarjolla on nyt uusia beltirakenteita myös muunlaisille koneille.

Uudessa **BlackBelt G** -tyypissä on kolmi-kerrosrujite, jossa on joustava lanka paperipuolella. Se on suunniteltu erityisesti läpimitaltaan pienille kenkäpuristimille. Uusi kaksikerrosrujitteinen joustava **BlackBelt F** sopii puolestaan positioihin, joissa tarvitaan ohuempaa kaliiperia. ■

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Iskupää osuu beltinnyytteeseen ennalta määritellyllä nopeudella.





Hyvä suunnittelu varmistaa onnistuneen seisokin

Mitä enemmän aikaa käytetään seisokin suunnitteluun ja kommunikointiin, sitä vähemmän aikaa kuluu varsinaiseen työhön ja sitä lyhyemmän aikaa kone tai laitos seisoo.

Noin 5-10 päivää kestävä vuosiseisokki vie yleensä kolmanneksen tehtaan tai laitoksen kunnossapidon vuosibudjetista. Työhön sisältyy aina riskejä, jotka voivat aiheuttaa lisäkustannuksia tai siirtää käyntiinajoa. Valmetin yksityiskohtainen seisokkisuunnittelu sekä pitkä kokemus projektinhoidosta auttavat minimoimaan mahdolliset riskit, ja näin suunnitellut työt saadaan tehtyä ajallaan ja budjetin mukaisesti.

”Meillä on valtavasti kokemusta ympäri maailmaa, ja ymmärrämme töiden vaatimukset. Jos jotain odottamatonta tapahtuu, meiltä löytyy heti kymmenittäin ratkaisuvaihtoehtoja. Pystymme näkemään tunteja etukäteen, mikäli jokin ei menekään suunnitellusti, ja tekemään korjaavia liikkeitä”, toteaa Valmetin työmaatoimintojen projektipäällikkö **Jaakko Reivo**, joka on ollut mukana yli sadassa seisokissa eri puolilla maailmaa 1980-luvun lopulta lähtien.

Rullaavaa suunnittelua

Seisokin onnistuminen riippuu paljon tarkasta suunnittelusta ja aikataulutuksesta, sillä muuten on mahdotonta saada tehtyä kaikkia tarvittavia kunnossapitotöitä, tarkastuksia ja mittauksia seisokin aikana.

”Seuraavan ison seisokin suunnittelu pitäisi aloittaa heti edellisen päätyttyä. Suunnittelua tehdään rullaavasti; suunnitellut työt kiinnitetään seisokkiin ja suunnittelematomat työt lisätään sitä mukaan, kun niitä ilmenee”, kertoo myynti- ja toimintojen kehityspäällikkö **Timo Harjunpää** Valmetilta.

Yhteistyötä, kommunikointia ja kontrollia

”Seisokkisuunnittelu alkaa asiakkaan tuotannon ja Valmetin kunnossapitotiimin palaverilla. Siinä tunnistetaan

tehtävät, aikataulutetaan ne kunnossapitojärjestelmään sekä varataan seisokissa tarvittavat varaosat ja resurssit. Arvioimme kuhunkin työhön tarvittavan ajan ja sovimme kuka mitäkin tekee”, Harjunpää jatkaa. ”Koska kaikkea ei voida tehdä yhtä aikaa, asioita täytyy priorisoida.”

Keskusteluihin seisokin aikataulusta on syytä ottaa mukaan myös asiakkaan myynnin ja muiden sidosryhmien edustajia. Lisäksi kunnossapitotyöt on sovittava yhteen mahdollisten parannus- tai investointiprojektien kanssa. ”Kaikki tieto pitää laittaa avoimesti pöydälle. Näin jokainen saa käyttöönsä esimerkiksi hydraulikan, sähkön ja nosturin niitä tarvittaessa. Kommunikointi ja avoimuus ovat tärkeitä”, Jaakko Reivo lisää.

Hyvä suunnittelu pitää sisällään myös arvion seisokin kustannuksista ja tarkan budjettikontrollin seisokin aikana.

Turvallisuus ensin

Turvallisuuteen kiinnitetään paljon huomiota jo suunnitteluvaiheessa. Isossa seisokissa saattaa olla mukana satoja työntekijöitä, myös ulkopuolista työvoimaa, jolla ei ole aiempaa kokemusta työskentelystä tehtaalla tai laitoksessa. Tämän vuoksi turvallisuuskoulutus sisällytetään aina seisokkiaikatauluun.

Jäädystyspistettä on noudatettava

Seisokkisuunnitteluun kuuluu aina jäädystyspiste, jonka jälkeen uusia töitä ei enää oteta mukaan. Yllätyksinä tulevat täysin uudet työt jäävät tehtäväksi muulloin.

Vanhan sanonnan mukaan hyvin suunniteltu on puoliksi tehty. Jaakko Reivon mukaan kunnossapidossa hyvin suunniteltu on kuitenkin vielä paljon enemmän. ■

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Seuraavan ison seisokin suunnittelu pitäisi aloittaa heti edellisen päätyttyä.

Maailman suurin OptiFiner Pro -jauhin säästää energiaa Savon Sellun tehtaalla. Kuvassa Valmetin Juha-Pekka Huhtanen (vas.) sekä Savon Sellun Tapio Laukkanen ja Antti Jegoroff

Luotettavuutta ja tehokkuutta jauhatuussuunnalla

Powerflute-konserniin kuuluvan Savon Sellun valmistamille pahvilaatikoille ja Valmetin OptiFiner Pro -jauhimille on yhteistä korkea luotettavuus. Siksi sopii hyvin, että maailman suurin uuden sukupolven suuren kapasiteetin jauhin käynnistyi Savon Sellun tehtaalla Kuopiossa vuoden 2014 lopulla.

”Mikä on kaikkein tärkein asia, jota yrityksen brändiä kantavalta pahvilaatikolta vaaditaan?” kysyy Savon Sellun teknologiapäällikkö **Tapio Laukkanen**.

”Luotettavuus”, hän vastaa itse nopeasti. ”On pystyttävä luottamaan siihen, että laatikko suojaa sisällään olevia tuotetuotteita kaikissa olosuhteissa.” Tehdas käyttää aallotuskartongin raaka-aineena neitseellistä koivukuitua, mikä varmistaa laatikoiden erittäin hyvän jäykkyyden, optimaalisen kosteudenkestävyyden, keveyden ja puhtauden. Massa valmistuu ligniiniä säästävissä NSSC-prosessissa, mutta myös jauhatuksella on merkittävä rooli lopputuotteen ominaisuuksien tuottamisessa.

Korkean teknologian jauhatusta korkealaatuisille kuiduille

”Meidän piti korvata matalan sakeuden jauhatuksen ensimmäisen vaiheen vanhat levyjauhimet, sillä ne olivat tulleet elinkaarensa päähän”, Laukkanen kertoo. ”Projektin aikana kuitenkin tajusimme, että koko jauhatusprosessi on mietittävä uusiksi kapasiteetin varmistamiseksi, joten päädyimme optimoimaan koko jauhatuksen.”

Lai-teusinnan jälkeen kuidut jauhetaan nyt matalaenergisessä kaksivaiheisessa matalan sakeuden jauhatusprosessissa, joka optimoi aallotuskartongin puristuslujuuden mutta tekee siitä joustavan ja vahvan. Toiseen jauhatusvaiheeseen asennettiin kaksi suu-

rinta saatavilla olevaa suuren kapasiteetin OptiFiner Pro -jauhinta. Vanhat jauhimet saivat uudet jauhinsegmentit, ja ne siirrettiin ensimmäiseen vaiheeseen. Lisäksi ensimmäisen vaiheen vanhojen jauhinten viereen asennettiin uusi OptiFiner Conflo -jauhin lisäämään kapasiteettia.

Kestäviä etuja

”Uudet OptiFiner Pro -jauhimet ovat toimineet erittäin hyvin. Pystymme nyt hallitsemaan jauhatustasapainoa paljon tarkemmin, ja prosessi sietää enemmän virhetilanteita”, Laukkanen kertoo. ”Uskomme, että OptiFiner Pron ainutlaatuinen jauhatuseriaate tuo meille etuja korkean jauhatustehon ja kuidun paremman jauhautumisen ansiosta. Bonuksena säästyy samalla energiaa.” Prosessi kuluttaa energiaa jopa 30 prosenttia vähemmän freeness-luvun pysyessä ennallaan.

”Ensisijainen tavoitteemme on parantaa lopputuotteen laatua, ja aiomme jatkaa hyvää yhteistyötä Valmetin kanssa. Uusien jauhinten segmenttien rakennetta ja ensimmäisen jauhatusvaiheen ajonopeuksia on vielä optimoitava, jotta ne täyttävät täysin uuden raaka-aineen vaatimukset. Uskomme vahvasti OptiFiner Pro -jauhinten mahdollisuuksiin”, Laukkanen sanoo. ■



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Versuche auf der Pilotanlage

Eine zuverlässige Grundlage für erfolgreiche Unternehmensentscheidungen

Die Technologiezentren von Valmet in der ganzen Welt verfügen über ein umfassendes Angebot an Prüf- und Pilotanlagen. Viele Kunden haben das Angebot von Valmet zur Durchführung von Pilotversuchen bereits genutzt und damit Mittel und Werkzeuge erhalten, die mit ihren Investitionen verbundenen Risiken auszuschließen.

Manfred Tiefengruber, Leiter Papierproduktion bei Sappi im österreichischen Werk Gratkorn, nahm zur Vorbereitung der Modernisierung der PM 11, im Frühjahr 2014 an Pilotversuchen im Papier- und Karton-Technologiezentrum von Valmet teil.

Mit Pilotversuchen gewinnt man Vertrauen in die gewählten Lösungen

„Nach Pilotversuchen halten Sie ein Stück Papier in der Hand, das Sie darin bestärkt, die richtigen Entscheidungen im Hinblick auf das technische Konzept und die nach dem Umbau zu erwartende Qualität getroffen zu haben. Umbauten sind immer einzigartig, besonders bei uns, mit unserem sehr breiten

Spektrum an Basisflächengewichten“, meint Tiefengruber.

Flexible Konzeptvariationen ermöglichen Vergleiche

Unabhängig ob das Sortenprogramm geändert oder aber die Effizienz des bestehenden Prozesses verbessert werden soll, es handelt sich immer um eine größere Investition, die nicht leichtfertig getroffen werden sollte. Zur eigenen Beruhigung und zur Absicherung der Investition ist es wichtig, in bekannte und geprüfte Lösungen zu investieren. Valmet bietet umfassende Versuchsmöglichkeiten für den gesamten Produktionsprozess und unterstützt die Kunden bei der sorgfältigen Prüfung aller Grundvoraussetzungen für eine Investitionsentscheidung.

„Der größte Vorteil der Pilotversuche war, dass wir zwei Lösungen mit völlig unterschiedlichen technischen Konzepten vergleichen konnten. Das bedeutete, dass wir sie bewerten und die richtige Entscheidung treffen konnten. So etwas kann man nicht in einem Besprechungsraum erreichen. Es war relativ



einfach, die Konzepte auf der Pilotanlage zu verändern – es dauerte nur wenige Stunden“, stellt Tiefengruber fest.

An den Versuchsanlagen von Valmet können Papier- und Kartonhersteller Versuche mit Einstellungen durchführen, die diejenigen ihrer Anlagen abbilden, oder aber Testläufe in der Konfiguration ablaufen lassen, die sie bei sich installieren wollen. Valmet ermutigt die Kunden sogar, ihre eigenen Basismaterialien, vom Zellstoff bis zum Strich, mitzubringen. So erhält man ein realistisches Testergebnis, das aufzeigt, was für die Prozesse und Bedürfnisse des Kunden wirklich geeignet ist. ■



„Nach Pilotversuchen halten Sie ein Stück Papier in der Hand, das Sie darin bestärkt, die richtigen Entscheidungen getroffen zu haben“, sagt Manfred Tiefengruber, Leiter Papierproduktion bei Sappi im österreichischen Werk Gratkorn.

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Gute Planung für einen erfolgreichen Großstillstand

Je mehr Zeit in die Vorbereitung und Kommunikation eines geplanten Großstillstandes investiert wird, desto weniger Zeit braucht man für die tatsächliche Arbeit. Und das führt zu kürzeren Stillstandszeiten von Maschinen oder Anlagen.

Für einen jährlichen Großstillstand von fünf bis zehn Tagen Dauer werden normalerweise ein Drittel des jährlichen Instandhaltungsbudgets eines Werkes oder einer Anlage veranschlagt. Doch es gibt immer Unvorhergesehenes, das zu zusätzlichen Kosten oder einer Verschiebung der geplanten Inbetriebnahme führt. Mit einer detaillierten Stillstandsplanung und der langjährigen Erfahrung von Valmet im Projektmanagement können mögliche Risiken minimiert und die geplanten Aufgaben rechtzeitig und ohne Kostenüberschreitung ausgeführt werden.

„Wir verfügen über umfangreiche Erfahrung weltweit und verstehen die Anforderungen, die an diese Arbeit gestellt werden. Tritt etwas Unerwartetes auf, können wir umgehend dutzende alternativer Lösungen anbieten. Unsere Mitarbeiter können bereits Stunden vorher absehen, ob etwas falsch läuft und entsprechend eingreifen“, erläutert **Jaakko Reivo**, Projektleiter vor Ort bei Valmet, der seit den späten 1980er Jahren bei mehr als 100 Großstillständen mitgearbeitet hat.

Fließende Planung

Der Schlüssel für einen erfolgreichen Großstillstand ist eine genaue Planung mit festgelegten Fristen, sonst ist es unmöglich, alle notwendigen Instandhaltungsarbeiten, Wartungen und Messungen in diesem Zeitraum durchzuführen.

„Die Planung für den nächsten großen Stillstand sollte beginnen, sobald der vorherige abgeschlossen ist. Die Planung erfolgt fließend, die geplanten Aufgaben werden an den Stillstand angepasst und ungeplante Aufgaben werden ergänzt, wenn sie sich ergeben“, meint **Timo Harjunpää**, Leiter Vertrieb und Entwicklung weltweit bei Valmet.

Die drei K: Kooperation, Kommunikation und Kontrolle

„Die Stillstandsplanung beginnt mit einer Besprechung von Produktionsmitarbeitern des Kunden und unserem Instandhaltungsteam. Die Aufgaben werden festgelegt und mit dem Computer-Instandhaltungs-Managementsystem (CMMS - computerized maintenance management system) geplant. Die notwendigen Ersatzteile und Hilfsmittel werden für den Stillstand bereitgestellt. Wir besprechen, wie lange jede Arbeit dauert und wer sie ausführt“, erläutert **Harjunpää**. „Da nicht alle Arbeiten gleichzeitig erledigt werden können, müssen Prioritäten gesetzt werden.“

Es ist gut, auch den Vertrieb und andere Bereiche in die Planung mit einzubeziehen. Und die Instandhaltungsarbeiten müssen mit möglichen Modernisierungen oder neuen Investitionsprojekten abgestimmt werden. „Alle Informationen sind offen auf den Tisch zu legen. Auf diese Weise hat jeder Zugang zu Hydraulik, Stromversorgung und Kränen, um ein paar Beispiele zu nennen. Kommunikation und Offenheit sind wesentlich“, fügt **Jaakko Reivo** hinzu.

Eine gute Planung beinhaltet ebenso eine Kostenschätzung des Großstillstands und später eine detaillierte Kontrolle der Kosten, um die Budgetvorgaben einzuhalten.

Sicherheit hat Vorrang

Schon bei der Planung wird viel Wert auf die Sicherheit gelegt. An einem Großstillstand können hunderte Mitarbeiter beteiligt sein, einschließlich externer Mitarbeiter ohne genaue Kenntnisse der Anlage. Da dies die Sicherheitsrisiken erhöht, wird auch immer ein Sicherheitstraining eingeplant. Auch größere Arbeiten mit Kränen müssen sorgfältig geplant werden, um die Sicherheit zu gewährleisten.

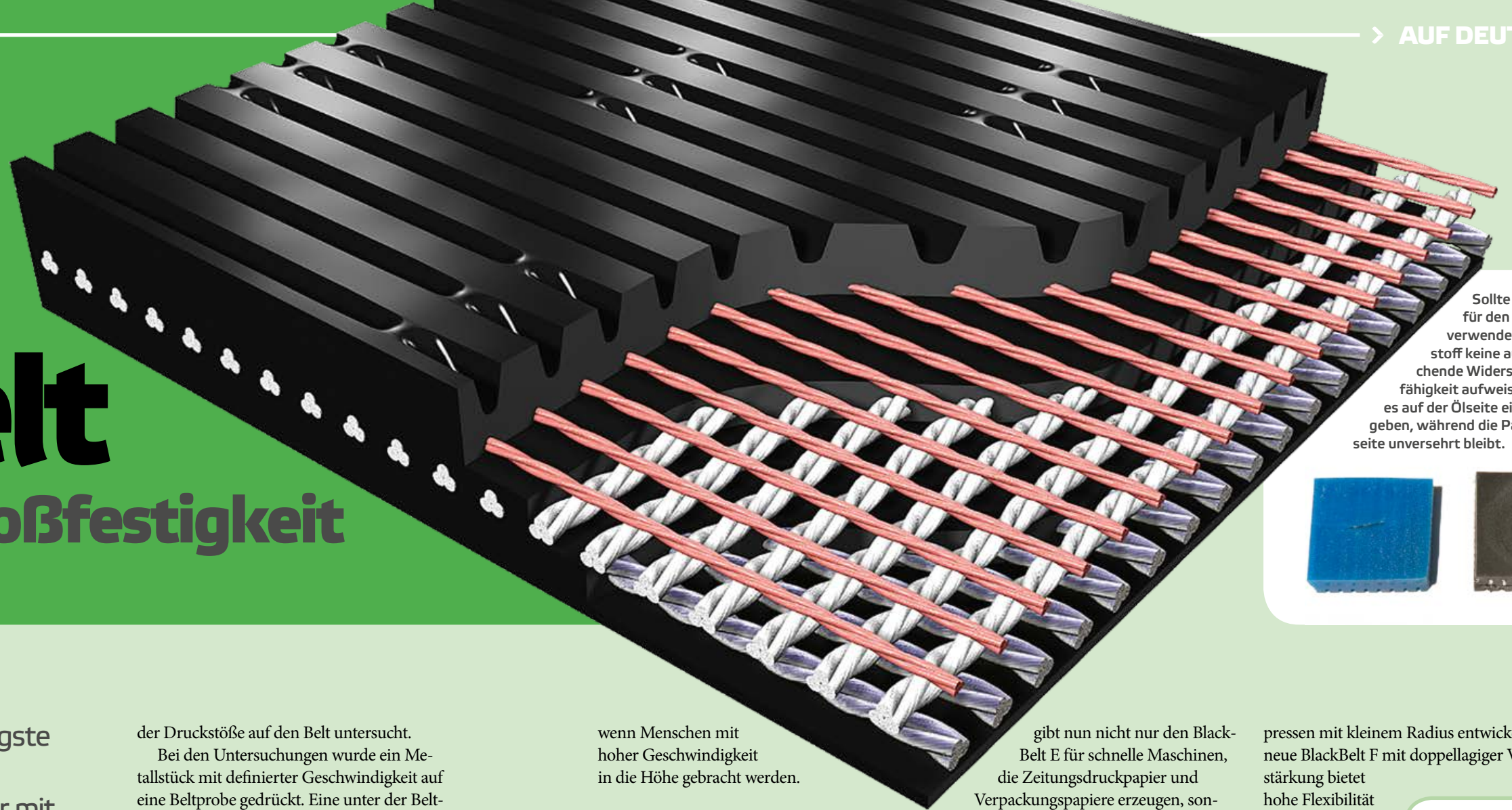
Einhaltung der Planungsfrist

Bei der Planung von Stillständen gibt es immer einen Zeitpunkt, nach dem keine neuen Aufgaben mehr in der Aufgabeliste aufgenommen werden. Nach diesem Zeitpunkt ist es einfach nicht mehr möglich, ganz neue Aufgaben einzuplanen.

Wie man so schön sagt: „Gut geplant ist halb getan.“ Und, so **Reivo**, „eine gute Planung bedeutet in der Instandhaltung sogar noch viel mehr“.

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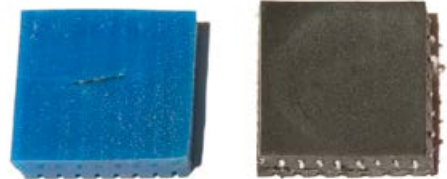
Die Planung für den nächsten großen Stillstand sollte beginnen, sobald der vorherige abgeschlossen ist.



Prüfungen zeigen:

BlackBelt hat die höchste Stoßfestigkeit

Sollte der für den Belt verwendete Werkstoff keine ausreichende Widerstandsfähigkeit aufweisen, kann es auf der Ölseite einen Riss geben, während die Papierseite unversehrt bleibt.



Widerstandsfähigkeit ist sicherlich die wichtigste Eigenschaft eines Schuhpressenbelts. Widerstandsfähige Werkstoffe können sogar mit schnell aufeinander folgenden Stößen belastet werden. In Prüfungen an der Tampere University of Technology zeigte der BlackBelt von Valmet im Vergleich zu einigen anderen Belts eine ausgezeichnete Stoßfestigkeit.

Der häufigste Grund für ungeplante Wechsel der Schuhpressenbelts auf Papier- oder Kartonmaschinen sind Risse. Sie treten normalerweise auf der Papierseite des Belts auf, nahe am Rand der Schuhpresse, da dort die Verformungsspannung bzw. die Materialermüdung sehr hoch ist. Zuweilen ist auch die Papierseite noch in Ordnung, aber es gibt einen Riss auf der Ölseite. „Wenn der für den Belt verwendete Werkstoff eine ausreichende Widerstands-

fähigkeit und eine gute Stoßfestigkeit aufweist, können Risse sowohl auf der Papier- als auch auf der Ölseite vermieden werden“, sagt **Satu Hagfors**, Leiter F & E bei Valmet.

Ein Papierbatzen kann einen sehr hohen Druck auf die Oberfläche des Belts ausüben

Die Beltspezialisten von Valmet haben an der Tampere University of Technology die Auswirkungen schnell aufeinander folgen-

der Druckstöße auf den Belt untersucht. Bei den Untersuchungen wurde ein Metallstück mit definierter Geschwindigkeit auf eine Beltprobe gedrückt. Eine unter der Beltprobe angebrachte Kraftmessdose ermittelte die Kraft, die auf den Belt einwirkt. Wenn die Probe reißt, steigt die gemessene Kraft.

Auf einer Papiermaschine beträgt der maximale Druck unter normalen Bedingungen am Ende des Schuhs 8 bis 10 MPa. „Während der kurzzeitigen Einwirkung eines kleinen Gegenstandes auf die Belloberfläche kann der Druck um das 10- bis 30-fache ansteigen. Dieses Phänomen tritt in der Praxis auf, wenn zusätzliches Material wie ein Papierbatzen den Schuhpressennipp passiert. Es ist also kein Wunder, wenn ein Belt unter solchem Druck beschädigt wird“, meint Hagfors.

Die Prüfungen zeigen deutlich, dass die neuesten BlackBelt E eine höhere Stoßfestigkeit aufweisen als die Valmet-Belts früherer Generationen und die Belts anderer Hersteller. Der Werkstoff von BlackBelt ist dynamisch langlebiger. Ursprünglich wurde der Werkstoff für Achterbahnräder entwickelt, um höchstmögliche Sicherheit zu bieten,

wenn Menschen mit hoher Geschwindigkeit in die Höhe gebracht werden.

Optimierter Werkstoff verbessert Widerstandsfähigkeit des Belts

Laut Hagfors besteht das Geheimnis hinter dem Erfolg von BlackBelt bei den Tests in der leistungsstarken Polyurethan-Zusammensetzung, die Stoßfestigkeit und Widerstandsfähigkeit erhöht. „Wenn das Material zäh genug ist, dann reißt es nicht so leicht. Neben der Widerstandsfähigkeit auf der Papierseite haben wir aber auch die Schichtstruktur auf der Ölseite verbessert.“

Optimierte Verstärkungsstruktur für jeden Belt

Nach der Optimierung des Elastomermaterials wurde in einem zweiten Schritt die Beltverstärkung optimiert. Tatsächlich hat Valmet noch viel mehr getan und erweiterte die gesamte BlackBelt Produktfamilie. Es

gibt nun nicht nur den BlackBelt E für schnelle Maschinen, die Zeitungsdruckpapier und Verpackungspapiere erzeugen, sondern auch neue Beltdesigns für andere Maschinentypen. Der neue BlackBelt G besitzt eine dreilagige Verstärkung aus flexiblen Fäden auf der Papierseite. Er wurde speziell für Schuh-

pressen mit kleinem Radius entwickelt. Der neue BlackBelt F mit doppellagiger Verstärkung bietet hohe Flexibilität und eignet sich für Positionen, in denen eine geringere Dicke erforderlich ist. ■

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Das stabförmige Stück trifft mit definierter Geschwindigkeit auf die Beltprobe.

Der weltgrößte Refiner OptiFiner Pro spart Energie bei Savon Sellu. Juha-Pekka Huhtanen (Valmet, links), Tapio Laukkanen und Antti Jegeroff (Savon Sellu).

Hohe Betriebssicherheit der Valmet Refiner

Hohe Zuverlässigkeit - das haben sowohl die bei Savon Sellu hergestellten Powerflute Wellpappenschachteln als auch der OptiFiner Pro Refiner von Valmet gemeinsam. Daher passt es sehr gut, dass der weltgrößte Hochleistungsrefiner der neuesten Generation bei Savon Sellu im finnischen Kuopio Ende 2014 in Betrieb genommen wurde.

Was ist das allerwichtigste bei einer Wellpappenschachtel mit Ihrem Markennamen darauf?“ fragt **Tapio Laukkanen**, Leiter der Technologie bei Savon Sellu. „Zuverlässigkeit“, und er fährt schnell fort, „denn Sie müssen sich darauf verlassen können, dass die Verpackung das frische Produkt im Inneren schützt, egal unter welchen Bedingungen.“ Um eine erstklassige Steifigkeit, optimale Feuchtigkeitsbeständigkeit, geringes Gewicht und Reinheit zu gewährleisten, werden in der Papierfabrik als Rohmaterial nur Birkenfrischfasern verwendet. Und neben der Lignin erhaltenden Zellstoffherstellung (NSSC) spielt auch die Mahlung eine wichtige Rolle, wenn es darum geht, die Eigenschaften des Endproduktes zu sichern.

Modernstes Mahlung für modernste Fasern

„Wir mussten die alten Scheibenrefiner der ersten Niedrigkonsistenz Mahlstufe ersetzen, weil sie das Ende ihrer Betriebszeit erreicht hatten“, erklärt Laukkanen. „Aber während des Projektes stellten wir fest, dass der gesamte Mahlprozess überdacht werden musste, um die Kapazität auch zukünftig sicherzustellen. Und so führte das am Ende dazu, dass wir den gesamten Mahlprozess optimiert haben“, berichtet er.

Nach dem Umbau werden die Powerflute Fasern jetzt in einem zweistufigen Niedrigkonsistenz Mahlprozess mit geringem Energieverbrauch gemahlen. So werden CMT- und CCT-Festigkeit optimiert, gleichzeitig aber auch die Flexibilität und Festigkeit des Wellenstoffs sichergestellt. Die zweite Refinerstufe wurde mit den zwei größten verfügbaren Refinern OptiFiner Pro für hohe Durchsatzmengen ausgerüstet. Die alten Refiner wurden mit modernen

Refinersegmenten ausgestattet und in die erste Stufe gesetzt. Zudem wurde die erste Mahlstufe um einen neuen OptiFiner Conflo Refiner ergänzt, um die geforderten Durchsatzmengen zu erreichen.

Nachhaltige Vorteile

„Die neuen Refiner OptiFiner Pro arbeiten sehr gut. Wir können nun die Mahlung viel genauer steuern und das Verfahren toleriert größere Schwankungen“, berichtet Laukkanen. „Wir glauben, dass uns das einzigartige Mahlprinzip des OptiFiner Pro Vorteile bringt, da die Mahleffizienz gut ist und die Faser besser gemahlen wird. Wenn wir dabei auch noch Energie einsparen, ist das ein zusätzliches Plus“, fügt er lächelnd hinzu. In diesem Fall besteht das Plus in bis zu 30 % weniger Energie bei gleichem Mahlgrad wie vorher.

„Unser erstes Ziel ist die Verbesserung der Endproduktqualität und dafür setzen wir die gute Zusammenarbeit mit Valmet fort.“ Die Auslegung der neuen Refinersegmente und die Drehzahlen in der ersten Mahlstufe müssen noch weiter optimiert werden, um dem Ausgangsmaterial voll und ganz gerecht zu werden. Doch das Potential der Refiner OptiFiner Pro ist deutlich zu erkennen“, meint Laukkanen. ■

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Slipmaskinsoperatörerna drar nytta av den senaste 3D-tekniken på Valmets valsservicecentra världen över.

sidan av att få en bra mantelyta, är att de ska rulla med så låga vibrationer som möjligt i pappersmaskinerna. Om man slipar valsens i dess egna lager blir rotationen och mantelns form en spegelbild av felaktigheter i lagren. Då det normalt är lättare och snabbare att slipa valsens i sina egna lager, behövs ett verktyg för att kompensera för dessa fel. Ett sådant verktyg är en noggrann 3D-mätning av valsens i kombination med en 3D-kompenserad slipning. Då denna slipmetod ger en perfekt rund vals blir följden att den enda faktor som påverkar valsens rotation är noggrannheten hos lagren.

Förlängda valskörtider och minimerad vibration

Förbättrad valsslipningsteknik gör att Valmet kan erbjuda sina kunder valseläggningar med bättre prestanda. Användningen av avancerad 3D-slipning i kombination med toppmodern teknik ger tydliga fördelar när det gäller underhållsarbete och valsarnas slutliga användningsområden. Kvaliteten på valsslipningen har stor inverkan på maximeringen av valsarnas körtider och vibrationsminimeringen.

Genom att använda 3D-mätning kan sliptoleranserna vid slipning av valsens ställas in och finjusteras enligt kundens specifika behov. Maximala körtider för beläggningar kan uppnås utan att mer tid än nödvändigt behöver läggas på valsslipningen.

Skräddarsydda, kostnadseffektiva lösningar för alla typer av valsar

Valmet använder sig av den senaste 3D-slipningstekniken och kunniga medarbetare världen över, vilket gör att vi alltid uppfyller kvalitetsmålen för slipningen och att resultatet blir det förväntade. Genom att omvandla lokal kompetens till global expertis gör Valmets tillförlitliga 3D-slipmetoder att vi kan tillgodose varje kunds specifika krav på ytfinish. ■

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Valsslipning med hög precision med valsformsmätning i 3D

Varje enskild Valmet-kund har sina egna formtoleranser för valsslipning. En snabb, tillförlitlig och exakt 3D-slipningsprocess är avgörande för att möta dessa specifika behov. Valmets experter använder sig av den senaste 3D-tekniken för att garantera exakta profil- och rundhetsformer.

Konsten att upptäcka ojämnheter

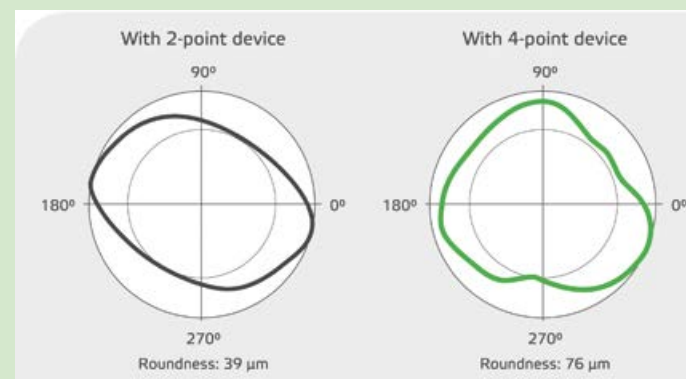
När en sliten vals är i behov av slipning är det första steget en noggrann mätning. Slipmaskiner med konventionell tvåpunktsmät-

ning kan inte generera en verklig valsform eftersom geometriska defekter på framför allt lager leder till felaktiga resultat för ytformen. Följden blir att slipmaskinsoperatören inte kan se vad resultatet av slipningen blir.

För att få tillgång till en tredimensionell bild av valsens form krävs ett noggrant fyrpunktsmätssystem. För att få bra och optimerade slipresultat krävs sedan 3D-kompensation av sliphuvudet baserat på 3D-mätningen.

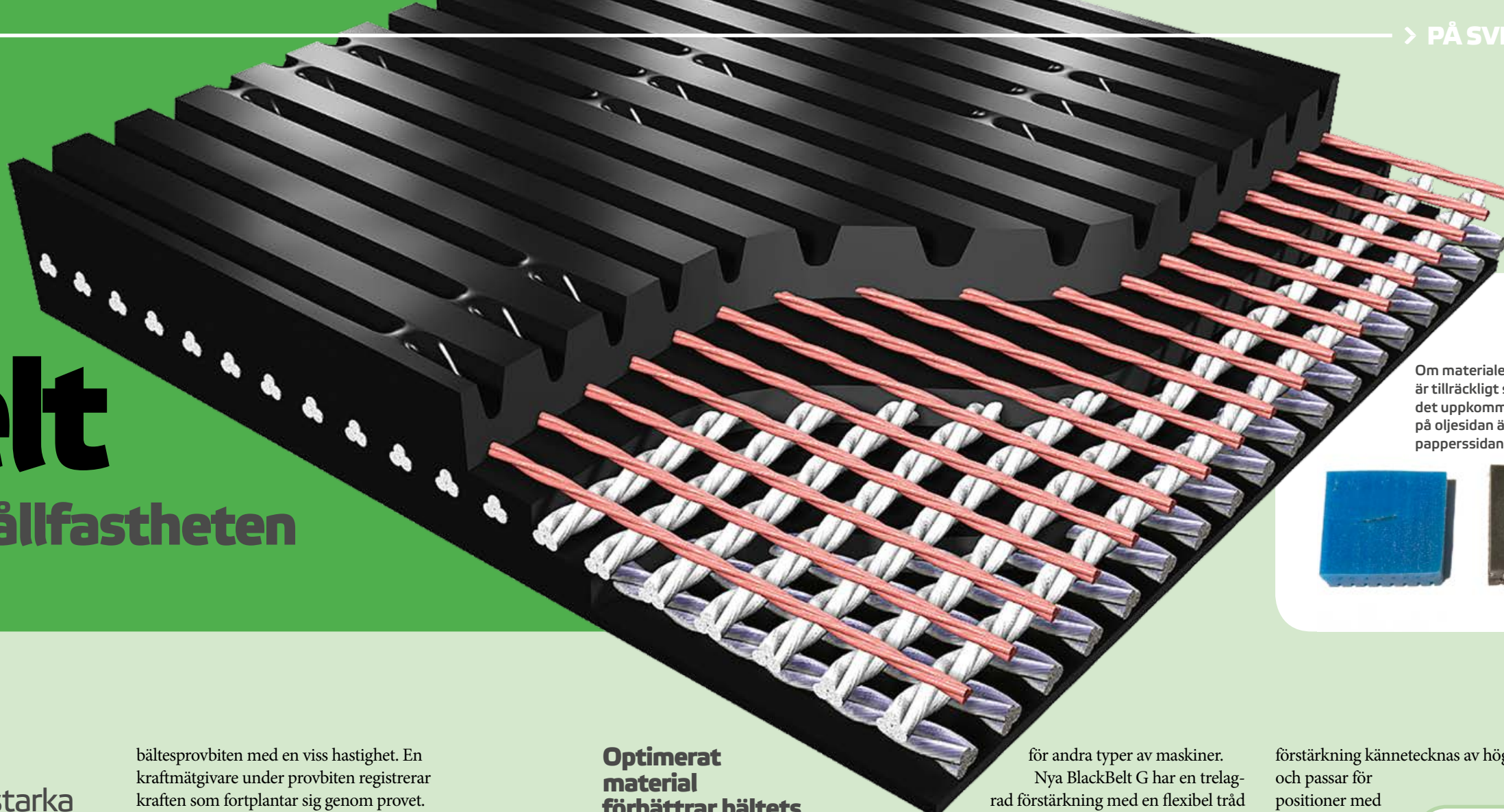
Slipning av valsens på dess egna lager

En anledning till att valsar slipas om, vid



Till skillnad från en konventionell tvåpunktsmätning (till vänster) kan man med ett modernt fyrpunktsmätssystem (höger) få fram en exakt 3D-bild av valsytan.

SWE

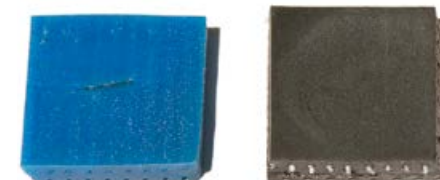


Tester visar:

BlackBelt

har den högsta slaghållfastheten

Om materialet i bältet inte är tillräckligt slitstarkt kan det uppkomma sprickor på oljesidan även om papperssidan är intakt.



Slitstyrka är förmodligen den viktigaste egenskapen hos ett skopressbälte. Slitstarka material klarar även slag med hög hastighet. I tester gjorda vid Tekniska universitetet i Tammerfors visade Valmets BlackBelt prov på utmärkt slagåtlighet jämfört med flera andra bälteskonstruktioner.

De vanligaste orsakerna till ett oplanerat byte av skopressbältet på pappers- och kartongmaskiner är sprickor. Sprickorna uppstår vanligtvis på bältets papperssida, nära bältets kanter, på grund av hög deformationsspänning eller materialutmattning. Ibland kan bältet vara intakt på papperssidan men det kan finnas en spricka på oljesidan.

“När materialet som används i bältet är tillräckligt slitstarkt och har en hög slagå-

tlighet går det att undvika sprickor både på pappers- och oljesidan”, säger **Satu Hagfors**, chef för FoU på Valmet.

En papperskladd kan skapa ett extremt tryck på bältets yta.

Valmets specialister på skopressbälten har på Tekniska universitetet i Tammerfors studerat vad som händer med bältena när de utsätts för slag med hög hastighet.

I testet skjuts ett slagstift av metall mot

bältesprovbiten med en viss hastighet. En kraftmätgivare under provbiten registrerar kraften som fortplantar sig genom provet. Om provet går sönder, går mer av kraften genom det och kraften som uppmäts blir högre.

På en pappersmaskin är det högsta trycket i slutet av bältet under normala driftförhållanden 8–10 MPa. “Om ett litet slagstift träffar bältets yta kan detta skapa ett tryck som är 10–30 gånger högre. Samma fenomen kan observeras i praktiken om extra material, exempelvis en papperskladd, passerar genom skopressnyppet. Det är med andra ord inte så konstigt att bältet tar skada vid ett sådant tryck”, säger Hagfors.

Testerna visade tydligt att de senaste BlackBelt E-konstruktionerna har högre slagåtlighet än tidigare generationer av Valmets bälten samt bälten från konkurrerande tillverkare. BlackBelt-materialet har en högre dynamisk slitstyrka. Materialet utvecklades ursprungligen för att användas på hjulen till bergochdalbanevagnar, detta för att erbjuda högsta möjliga säkerhet när det gäller transport av människor på hög höjd och i höga hastigheter.

Optimerat material förbättrar bältets slitstyrka

Enligt Hagfors ligger hemligheten bakom BlackBelts framgångar i den avancerade polyuretanstrukturen som kraftigt ökar slagåtligheten och hårdheten.

“Om materialet är tillräckligt starkt spricker det inte lika enkelt. Förutom att göra bältet extra starkt på papperssidan har vi även förbättrat lagerstrukturen på oljesidan.”

Optimerad förstärkningskonstruktion för varje bälte

Efter att elastomermaterialet som bältet är tillverkat av hade optimerats var nästa steg att optimera förstärkningen av bältet. I det här steget gjorde Valmet faktiskt mer än så och utökade även BlackBelt-serien med två nya produkter. Utöver strukturen hos BlackBelt E, som lämpar sig bäst för snabba tidningspappers-, kartong- och linermaskiner, finns det nu även nya bältesstrukturer

för andra typer av maskiner. Nya BlackBelt G har en trelagrad förstärkning med en flexibel tråd på papperssidan. Bältet har utvecklats speciellt för skopressar med liten diameter. Nya BlackBelt F med sin dubbellagrade

förstärkning kännetecknas av hög flexibilitet och passar för positioner med krav på tunnare bälte. ■

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Slagstiftet, som har formen av en stäng, träffar bältesprovbiten med en förinställd hastighet.

Södra Cell Mönsterås är en av världens största producenter av TCF-blekt sulfatmassa. Massabruket producerar och levererar massa med en hög och jämn kvalitet till pappersbruk världen över. När bruket insåg att man förlorade närmare fyra ton acceptfiber varje dag i samband med barrvedsproduktion började de söka efter en lösning på problemet.

Fiberbesparingar med **OMBYGGNAD AV SILERIET**

"Vi hade definitivt ett problem och vi valde Valmet för att få hjälp med att hitta en lösning, beroende på det professionella intryck vi fick av deras personal när de diskuterade problemet med oss", säger **Karin Dernegård**, Technical Process Manager på bruket.

Valmet byggde om den tredje silen och bytte ut cyklonrenarna mot en fjärde sil i ett traditionellt sileri. En stavsilkorg med ett spädbälte lades till den tredje silen. Dessutom byttes ett antal cyklonrenare ut mot

en OptiScreen Fine-sil för silning av finrejekt. Förbättringarna har gjort att bruket nu förlorar cirka ett ton acceptfiber om dagen, vilket ger en acceptfiberbesparing på 75 %.

En sil – två steg

Tidigare hade man problem med intjockning i den nedre delen av silkorgen i den tredje silen. Stora mängder vatten behövde då tillsättas efter silen för att möjliggöra ett effektivt utnyttjande av cyklonrenarna i det efterföljande finsilningssteget. "Men med barrvedsmassa räckte det ofta inte att tillsätta mer vatten för att förhindra att cyklonrenarna sattes igen. Och detta resulterade i att operatörerna fick lägga mycket tid på att rengöra dem", säger Dernegård.

Den nya korgen löser detta problem genom att använda den nedre delen av silkorgen som ett andra steg. Det integrerade spädbältet, som separerar de båda stegen, späder ut rejektet i det första steget till rätt maskoncentration för steg två. Ett nytt, extra silsteg lades till i systemet utan att man behövde lägga till en ny sil,



↑ EN POSITIV EFFEKT

Både Karin Dernegård och Annika Zetterlund är överens om att den 75-procentiga minskningen av fiberförlusterna har en positiv effekt på brukets lönsamhet, och eftersom det går åt mindre vatten i processen blir produktionen mer miljövänlig.

rörledning, motorer eller massakar.

"Steg två fungerar i själva verket som en fjärde sil, som bara den skulle ha förbättrat kvaliteten på acceptmassan betydligt. Genom att lägga till en ny OptiScreen Fine, som nu i princip fungerar som en femte sil, kunde bruket ta bort cyklonrenarna helt och hållet från systemet", säger **Annika Zetterlund**, Product Sales Manager för silning och raffinering på Valmet.

Lönsamhet genom miljövänliga metoder

"Att spara in så här mycket acceptfiber om dagen kan göra att vår investering betalar sig på ett år eller ännu snabbare. Ombyggnaden har inte påverkat renheten. Smutshalten är fortfarande mycket låg, vilket är viktigt för oss", säger Dernegård. Både Dernegård och Zetterlund är överens om att den 75-procentiga minskningen av fiberförlusterna har en positiv effekt på brukets lönsamhet, och eftersom det går åt mindre vatten i processen blir produktionen mer miljövänlig.

Men detta är inte de enda fördelarna. Med de nya silkorgarna har körbarheten i sileriet förbättrats. Tiden som läggs på underhåll har även minskat till följd av att stoppen för att rengöra cyklonrenarna har kunnat elimineras. Operatörerna är mycket nöjda med detta och konstaterar också att deras arbete har blivit enklare. "Även om Valmets silningslösning bara har varit i drift relativt kort tid är vi mycket nöjda med resultatet så här långt", säger Karin Dernegård. ■

→ **KARIN DERNEGÅRD**
Technical Process Manager vid Södra Cell Mönsterås

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En så här stor acceptfiberbesparing kan ge en återbetalningstid på mindre än ett år.



SÄKERHETEN ÄR INBYGGD i det nya automatiska systemet för avtrådning av massabalar

Övergången från manuell avtrådning av massabalar till ett helautomatiskt avtrådnings- och recepthanteringssystem har revolutionerat matningen av upplösaren på InnovioPapers, ett pappersbruk i holländska Nijmegen, genom att maximera säkerheten för operatörerna och öka produktiviteten.

2010 började bruket att titta på olika sätt att förbättra mäldbredningen för matning av upplösaren. I varje sats ingick upp till 10–14 balar med som mest fyra olika massakvaliteter, och det enda automatiserade momentet i inmatningssystemet var nedstaplingen av balarna – avtrådningen av balenheter och enkelbalar gjordes för hand.

Noggranna beräkningar

“Vi studerade alla möjliga typer av installationer från olika leverantörer och gjorde flera referensbesök,” minns **Rene Van Wieringen**, chef för affärsutveckling på InnovioPapers. “Vi förstod ganska snabbt att kvaliteten på enheterna och balarna är väldigt viktig för installationens totala effektivitet.”

InnovioPapers valde en systemlösning från Valmet. Rene Van Wieringen förklarar att tre faktorer låg till grund för valet:

“Vi var imponerade av Valmets mycket kompakta kombinerade nedstaplare och avtrådningsenhet. Vi såg även att Valmet hade lanserat ett nytt avtrådningssystem för

enkelbalar som var effektivare och orsakade mindre skador på emballaget och massan. Som en konsekvens av detta bildades det också mindre fiberdamm, så det var en renligare lösning. Valmet kunde också leverera utrustning med en utmatningskapacitet på hela 120 balar i timmen. Det var det ingen av de andra som var i närheten av.”

“Vi ville stoppa produktionen i högst sex dagar. Därför arbetade vi tillsammans med Valmet för att sätta samman så mycket av systemet som möjligt under de sex veckorna före driftstoppet. Samarbetet gjorde att vi kunde arbeta med den största utmaningen under de sex dagarna, som var att uppgradera till det nya automationssystemet och integrera detta med det gamla systemet.”

Överträffade förväntningar

I drift har det nya systemet levt upp till eller överträffat förväntningarna på effektivitet, säkerhet och flexibilitet.

“Antalet sparade mantimmar har varit högre än vi beräknade. Istället för två operatörer, som var fallet tidigare, är det nu en operatör som övervakar maskinen och gör lyften med gaffeltruck. Operatören behöver utföra färre manuella moment än vi först

beräknade, eller motsvarande cirka 70% av en heltidstjänst, så operatören har tid över till andra arbetsuppgifter.”

Antalet timmar som gaffeltruckarna används har nästan kunnat halveras, från omkring 4 000 timmar om året till 2 000.

“Säkerheten har förbättrats rejält. Maskinerna är inhägnade och nödsystemen är helt integrerade i det nya kontrollsystemet. Den automatiska avtrådningen har gjort att incidenter där operatörer skadar sig i samband med avtrådning har kunnat elimineras.

“En av de stora fördelarna med ett automatiskt system är att vi kan köra högspecifiserade recept med stor flexibilitet tack vare det nya recepthanteringssystemet. Vi kan nu hantera komplexa recept med upp till fyra olika kvaliteter från de sex lagringslinjerna som servar transportören till upplösaren. På det hela taget har vi mycket bättre kontroll över recept, lager och användning, eftersom varje bal registreras i Valmet-systemet.”

Systemet gör även att vi når de satta produktivetsmålen. “I samband med garantiprovet 4–5 veckor efter driftsättningen kunde vi till och med se att vi nådde upp till målkapaciteten på 88 balar i timmen, som är det som krävs för att säkra produktionen vid pappersmaskinerna.”

“Vår uppskattning om 10 % rejektbalar har visat sig stämma, och när de initiala tekniska problemen väl hade åtgärdats nådde vi upp till en teknisk prestanda på 98,5 % för godkända balar. Med andra ord har det inte funnits några besvikelser eller överraskningar. Vi är mycket nöjda med den nya lösningen”, sammanfattar Rene Van Wieringen. ■

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POOR

Segurança é intrínseca ao novo sistema automático de remoção de arames dos fardos de celulose



EM PORTUGUÊS

A mudança da remoção manual de amarras de fardos de celulose para um sistema completamente automático de remoção de amarras e manuseio de receitas trouxe outra perspectiva à alimentação do pulper em lotes da InnovioPapers, uma fábrica de celulose em Nijmegen, na Holanda.

“Houve grande melhora em segurança. As áreas em torno das máquinas estão isoladas e os sistemas de emergência são completamente integrados ao novo sistema de controle. O corte de arames automático se traduz na eliminação de incidentes com arames envolvendo operadores”.

“Uma das maiores vantagens de um sistema automático é que podemos rodar receitas muito definidas com grande flexibilidade, devido ao novo sistema de manuseio de receitas. Podemos lidar com receitas complexas de até quatro gramaturas de forma automática de seis linhas de armazenamento que atendem a esteira de alimentação do pulper. Em termos gerais, obtemos um melhor controle das receitas, massa e uso, pois o sistema Valmet contabiliza cada fardo”.

O sistema também está atingindo as metas de produtividade preestabelecidas. “Já no teste de aceitação, 4-5 semanas após o comissionamento, podíamos ver que estávamos atingindo a meta de capacidade para garantir a produção da máquina de papel em 88 fardos/hora”.

“Nossa estimativa de 10% de fardos rejeitados foi comprovada e, uma vez que os problemas iniciais foram resolvidos, o desempenho técnico de 98,5% para os fardos aceitos foi atingido. Portanto, não houve decepções e nenhuma surpresa. Ao contrário, estamos satisfeitos com a nova solução”, comemora Rene Van Wieringen. ■

** A partir de 1º de Abril, parte da Valmet, sujeito à aprovação pelas autoridades competentes.*

Em 2010, a fábrica começou a buscar formas para melhorar o preparo de massa para alimentar o pulper em lotes. Cada lote era composto de 10-14 fardos com até quatro tipos de qualidades diferentes de celulose e o único elemento automático no sistema de alimentação era o desempilhamento de fardos. Nesse período, a remoção de amarras das unidades de fardos e dos fardos unitários era feita manualmente.

Análises detalhadas

“Analisamos vários tipos de instalações de diferentes fornecedores e fizemos várias visitas de referência”, lembra **Rene Van Wieringen**, Gerente de Desenvolvimento de Negócios na InnovioPapers. “Rapidamente, percebemos que a qualidade das unidades de fardos é muito importante para a eficiência geral da instalação”, destaca o executivo.

A InnovioPapers optou por uma solução em sistema da Valmet. Rene Van Wieringen explica que houve três motivos principais para essa decisão:

“Ficamos impressionados com a compacta combinação de desempilhador e cortador de arames de fardos da Valmet. Também vimos que a Valmet introduziu um novo sistema de corte de arame para fardos simples que foi mais eficiente e causou menos danos à embalagem de celulose. Conse-

quentemente, houve menos pó de fibra, portanto a solução era mais limpa. A Valmet também oferecia o fornecimento de uma instalação com alta capacidade produtiva de 120 fardos/hora, volume não alcançado por qualquer concorrente”.

“Nós só queríamos parar a produção durante seis dias, então trabalhamos em conjunto com a Valmet para montar o máximo do sistema possível, seis semanas antes da parada. Essa cooperação permitiu que os seis dias fossem utilizados para o maior desafio, que era o upgrade do novo sistema de automação e sua integração com o sistema antigo”.

As expectativas foram superadas

Em operação, o novo sistema atingiu e superou as expectativas relacionadas à eficiência, segurança e flexibilidade.

“A economia de homens-hora foi maior do que o esperado. Agora, temos um operador, em vez de dois, para a supervisão da máquina e das operações da empilhadeira. Existe menor envolvimento do operador, em torno de 0,7 de um posto de período integral. Agora, o operador de fato tem tempo para outras funções”, destaca o executivo.

As economias em horas de empilhadeira foram de 50%, caindo de 4.000 horas/ano para 2.000 horas/ano.

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Um bom planejamento garante uma parada bem-sucedida

Quanto maior o tempo gasto no planejamento e na comunicação da parada, menor tempo será gasto no trabalho em si.

Geralmente, uma parada anual de cinco a dez dias consome um terço do orçamento de manutenção de uma planta ou fábrica. Sempre existem riscos envolvidos que podem gerar custos adicionais ou postergar a partida agendada. Com o planejamento detalhado da Valmet, bem como sua grande experiência em gestão de projetos, os riscos em potencial podem ser minimizados e as tarefas planejadas podem ser executadas no prazo e conforme o orçamento. “Temos ampla experiência global e entendemos as exigências estabelecidas para o trabalho. Se algo inesperado surgir, conseguimos obter dezenas de soluções alternativas. Nossa equipe é capaz de prever com horas de antecedência se algo não está certo e, assim, tomar as ações corretivas necessárias”, destaca **Jaakko Reivo**, Gerente de Projetos, Operações Locais, Valmet, que já participou de 100 paradas no mundo inteiro desde o final dos anos 1980.

Planejamento baseado em sequenciamento

A chave para uma parada bem-sucedida está no planejamento e no cronograma detalhado, caso contrário seria impossível realizar todo o trabalho de reforma, check-ups e medições necessárias durante a parada.

“O planejamento da próxima grande parada deve começar logo após a conclusão da anterior. O planejamento é realizado de forma sequencial; as tarefas planejadas são incluídas na parada e as tarefas não planejadas são acrescentadas conforme surgem”, disse **Timo Harjunpää**, Gerente, Vendas e Desenvolvimento de Operações Globais, Valmet.

Três Cs: cooperação, comunicação e controle

“O planejamento da parada começa com uma reunião entre o pessoal de produção do cliente e a nossa equipe de manutenção. As tarefas serão identificadas e agendadas no sistema de gestão de manutenção computadorizado

(CMMS) e as peças sobressalentes e recursos necessários serão alocados à parada. Discutimos quanto tempo irá durar o trabalho e quem o realizará”, explica Harjunpää. “Como nem tudo pode ser feito ao mesmo tempo, precisa haver priorização”, adiciona o executivo.

Também é bom envolver o pessoal de vendas e outras partes interessadas para discutir o cronograma de parada. O trabalho de manutenção precisa estar sincronizado com upgrades potenciais ou novos projetos de investimento. “Todas as informações precisam ser esclarecidas. Dessa forma, todos têm acesso à hidráulica, eletricidade e guindaste, por exemplo. A transparência na comunicação é essencial”, acrescenta Jaakko Reivo.

Um bom planejamento também exige uma estimativa dos custos de parada e, mais tarde, um controle bastante efetivo do orçamento para que a parte financeira do projeto seja mantida.

Segurança em primeiro lugar

Muita atenção é prestada à segurança no site já no estágio de planejamento. Em uma grande parada, pode haver centenas de pessoas envolvidas, inclusive mão-de-obra externa sem experiência anterior no site. Como isso aumenta os riscos de segurança, treinamento sempre é incluído no cronograma. Além disso, grandes içamentos com guindastes precisam ser agendados com cautela para garantir a segurança.

O ponto de congelamento deve ser respeitado

No planejamento de uma parada, sempre há um ponto de congelamento em que nenhuma tarefa nova será acrescentada à lista de ações. Não é possível acrescentar tarefas. Afinal, vale o velho ditado: “Um bom começo é metade do caminho”. E Reivo acrescenta: “No caso da manutenção, o bom planejamento é muito mais do que metade do caminho”. ■



No pico da construção, existiram mais de 11 mil trabalhadores envolvidos. Cerca de 7 mil deles eram colaboradores da Valmet.



MEGA EFICIÊNCIA

A Suzano estabelece um novo padrão de energia limpa no Brasil.

Em 2011, após anos de planejamento e estudos criteriosos, a Suzano Papel e Celulose decidiu implementar o projeto mais ambicioso e desafiador da indústria de celulose na América do Sul na década: construir uma mega fábrica com a maior eficiência energética do mundo na cidade de Imperatriz, no norte do país.

A Valmet foi escolhida para realizar a tarefa, fornecendo as principais tecnologias para produção de celulose e áreas de recuperação. O escopo de fornecimento incluiu o pátio de madeira com três linhas de picadoras de alta capacidade, sistema de cozimento, linha de fibras com tecnologia de prensa, duas linhas de secagem de celulose e cinco linhas de enfardamento, planta de evaporação, caldeira de recuperação e caldeira de força. O escopo da Valmet também compreendia o fornecimento e montagem dos equipamentos e do sistema de automação de toda a fábrica.

Oportunidades e desafios em uma nova fronteira

A cidade de Imperatriz está localizada no Maranhão, no norte do país. O Maranhão é um dos estados menos desenvolvidos no Brasil e o investimento da Suzano foi o primeiro desse tipo na região.

Imperatriz fica a 600 km do porto de Itaqui e muito próxima da linha do Equador. O clima da região é bastante parecido com o encontrado na floresta Amazônica com temperaturas próximas a 30°C durante todo ao ano e duas estações bastante definidas: a estação seca (inverno) e a chuvosa (verão), marcada por seis meses de chuva pesada. Esse tipo de clima criou grandes desafios aos trabalhadores durante a construção da fábrica que no pico possuía mais de 11.000 pessoas trabalhando na construção, sendo 7.000 representando a Valmet.

“Um projeto desse porte nunca foi realizado nessa região em tão curto prazo”, destaca **Edmund Schwarz**, Diretor de Projetos da Valmet. “As estradas não estavam preparadas para transportar equipamento pesando até 200 toneladas, como o tambor da caldeira, sem contar os equipamentos com mais de seis metros de largura, como os da evaporação. A chuva pesada e a alta umidade du-

rante o verão também exigiram mais esforços durante a fase de construção”.

Por outro lado, a região possui um sistema de logística eficiente com via férrea ligando a fábrica ao porto. Toda a celulose exportada será transportada por trens e enviada para clientes nos Estados Unidos, Europa e Ásia.

“A localização da fábrica foi escolhida em uma área em que não havia concorrência com a produção de alimentos, além de haver terra disponível para plantações de árvores. Devido à proximidade com a linha do Equador, ganhamos quatro dias de transporte para nossos clientes nos Estados Unidos e Europa, economizando combustível e emissões de CO₂”, disse **Adriano Canela**, Diretor de Projetos da Suzano.

Quebrando recordes de energia

Ao final de 2013, a Suzano e a Valmet concluíram a fábrica e os primeiros fardos foram fabricados. Na mesma época, o Brasil estava enfrentando uma crise energética causada pela incumprida falta de chuva nas estações anteriores. O país é fortemente dependente da geração de energia hidrelétrica, que representa 87% da capacidade energética brasileira. Com o baixo nível dos reservatórios e com a rede nacional usando estações de energia alimentadas a gás natural para gerar eletricidade, houve uma oportunidade para a Suzano contribuir com uma fonte de energia mais sustentável.

“Nós desenvolvemos nossa fábrica para termos um excedente de energia. Para isso, era importante escolhermos a tecnologia mais eficiente para economizar vapor e eletricidade internamente deixando o máximo de energia



TUDO SOB CONTROLE
O completo pacote de automatização da Valmet incluiu controles de processo e automatização, controles de qualidade e analisadores.

ELETRICIDADE PARA EXPORTAÇÃO
“Estamos exportando uma média de 80 MW de excedente de energia gerada por licor e biomassa”, detalha José Alexandre de Morais, Diretor de Operação Industrial.

O projeto foi desenhado para contemplar a mais eficiente tecnologia, economizando vapor e eletricidade.

disponível para geração de eletricidade”, detalhou **José Alexandre de Moraes**, Diretor de Operações Industriais da Suzano. O plano original da exportação foi ajustado: “Estávamos exportando em média 80 MW de fontes de licor e biomassa com a vantagem de ter nossa floresta como fonte de energia, capturando CO₂ no processo”, detalha o executivo.

Esse excedente de energia só foi possível devido às escolhas feitas pela Suzano para ter tecnologia mais eficiente instalada em sua mega fábrica.

“O digestor G2 de cozimento compacto da Valmet, utilizado na fábrica da Suzano, é o digestor mais eficiente do mercado, consumindo menos de 350 kg de vapor/tonelada de celulose produzida (50% a menos comparado a outras tecnologias de mercado). Combinado com nossa tecnologia de prensa na linha de fibra, o equipamento consome pouquíssimo vapor e água, e gera somente 10 m³/tonelada de efluentes a baixas temperaturas. A maior parte da energia permanece no processo, reduzindo o consumo interno da fábrica”, acrescenta **Paulo Aguiar**, Gerente de Vendas Sênior da Valmet em tecnologia de celulose. “Além disso, as secadoras da Valmet têm operado com consumo de vapor e eletricidade 20% menor que as outras tecnologias disponíveis no mercado”.

Fernando Scucuglia, Gerente de Vendas de recuperação e energia acrescenta: “A caldeira de recuperação fornecida para Imperatriz não só é a maior em operação do mundo, como também uma das mais eficientes. Com características de alta energia, a caldeira consegue gerar

mais energia com a mesma quantidade de sólidos secos queimados”.

Com todos esses processos altamente otimizados da fábrica, a Suzano está gerando energia suficiente para consumo próprio e um excedente de 2,0 GWh por dia. Essa eletricidade é suficiente para abastecer uma cidade com um milhão de habitantes* com energia limpa de 100% de árvores plantadas.

Tecnologia Valmet instalada em Imperatriz

A fábrica de celulose tem capacidade total de 1,5 milhão de toneladas ao ano de celulose de mercado de fibra curta branqueada. A tecnologia fornecida pela Valmet inclui pátio de madeira com três linhas de 420 m³/h cada, uma linha de fibras com quatro estágios de branqueamento e duas máquinas de secagem de celulose com capacidade diária de 5.000 toneladas/dia. A ilha de recuperação inclui uma planta de evaporação de seis efeitos com capacidade de evaporação total de 1.600 toneladas de água por hora. A caldeira de recuperação é uma das maiores no mundo com capacidade para queimar 7.000 toneladas de sólidos secos ao dia. A planta de licor branco consegue produzir 16.000 m³/dia de licor branco e possui dois fornos de cal com capacidade de produzir 600 toneladas de cal/dia. O fornecimento da Valmet também inclui uma caldeira de leito fluidizado que produz 120 toneladas de vapor por hora alimentada por biomassa florestal. ■

**De acordo com o Ministério de Energia brasileiro, uma família média tem 3,2 pessoas e consome 169 kWh/mês de energia.*

