Forward

VALMET'S CUSTOMER MAGAZINE | 2/2016

We invite you on a

Shared Journey Forward

Valmet

Editorial

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Inviting you on a shared journey forward

Since last autumn, I have seen a team of enthusiastic colleagues working on an inspiring challenge: how to move our services forward to bring unrivalled benefits and the best experience to you as a Valmet customer. Our core team has grown into a global network of people in different areas around the world working together to achieve this goal.

Today, we are ready to introduce to you the first results of this global effort. We want to take you on a shared journey – one where you can trust that safety is our number one priority, where you will be served by a team of highly skilled and completely reliable professionals, and where we will offer exactly the right solutions for you to reach your goals. These are the things that the Valmet team commits to, and they are our special focus areas.

Furthermore, our services offering is now easier to understand and choose from. Do you want to keep your processes and equipment running smoothly and reliably? Or do you need to optimize the performance of your production processes to get the most out of the least? Maybe you want to upgrade the competitiveness of your production to take it to the next level? Our reliability services, performance services and new technology solutions can provide the solutions to these needs.

We are energized and eager to give you the benefit of our improved services approach. The journey starts today!

ANU SALONSAARI-POSTI
SENIOR VICE PRESIDENT
MARKETING AND COMMUNICATIONS

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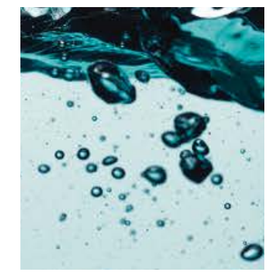


Valmet's wastewater solutions save energy and chemicals 24

In brief

Two new pulp drying lines started up at Klabin

Two new pulp drying lines have been started at Klabin's new pulp mill located in Ortigueira city, Paraná state in Brazil. The first pulp bale was produced according to schedule on March 4th, 2016. The pulp drying machine is one of the biggest in the world, with 9.5 meters width.

Klabin's new pulp mill will have the capacity of 1.5 million tonnes of pulp per year, with 1.1 million tonnes of bleached hardwood pulp (BEK) made of eucalyptus and 400,000 tonnes of bleached softwood pulp (BSK) made of pine. Part of the softwood will be converted into fluff pulp, making the mill the world's only pulp mill designed to produce the three fibers.

Lahti Energia's Kymijärvi II power plant.

New dry cake measurement improves sludge quality in wastewater treatment

The new Valmet Dry Solids Measurement is used to measure dry cake solids for dewatering control in wastewater treatment. Its safe, low-power microwave technology enables stable and accurate measurements, which can be utilized by the feedback control to optimize polymer dosage and centrifuge. This decreases energy consumption through better torque control.

Kymijärvi II demonstration project on gasification completed

Lahti Energia's Kymijärvi II power plant in Finland has achieved the set goals and the plant has been in commercial use for over 25,000 hours. Lahti Energia and Valmet have agreed on a long-term cooperation for further development, marketing and commercialization of gasification technology.

The Kymijärvi II plant is one of the most modern waste-to-energy CHP plants in Europe. This solution helps reduce the consumption of fossil fuels by replacing 140,000 tonnes of coal with renewable fuel every year.

Valmet's new Service Center inaugurated in Brazil

Valmet has inaugurated its fourth Service Center in Brazil. The center is located in Imperatriz, in Maranhão state to serve customers in the northern and northeastern parts of Brazil.

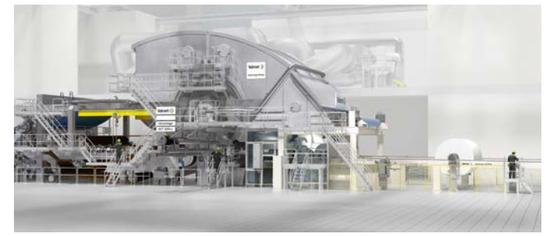
"This service center supports Valmet's strategy of being close to customers and growth markets. We can provide significant customer benefits by utilizing our full offering of process technology, automation and services, and by continuously developing our local and remote services," says **Jukka Tiitinen**, Business Line President, Services at Valmet.

The new service center focuses on serving the pulp, paper, tissue and panelboard industry. The center also incorporates a consignment stock for selected spare parts and consumables.

Over 430 Valmet's Kappa Analyzers delivered

Valmet has installed over 430 Kappa Analyzers in pulp mills around the world since its introduction in 1992. All greenfield pulp mills started up in the 2000's are equipped with Valmet's Kappa Analyzers. Today, all leading chemical pulp producers worldwide use this technology in their processes.

"We see this as a clear sign of pulp makers' trust in Valmet's proven analyzer technology and ability to understand customer needs fully and provide lifecycle support to reach optimal pulp quality," says Risto Rinne, Manager, Global Sales, Pulp & Power Analyzers, Automation, Valmet.



Repeat order for two tissue lines from Lee & Man

Valmet will supply two Advantage DCT tissue lines and related automation systems to one of China's leading paper and pulp producers, Lee & Man Manufacturing Ltd. The new lines will be installed in the Chongqing mill and start-up will take place in late 2016.

Previously the company has ordered three Advantage DCT 200HS tissue lines of which one started up at the Chongqing mill 2015 and two will start up this year.

"Our first installation in Chongqing is running very well and we are convinced that the Advantage DCT technology and the partnership with Valmet will support our market expansion in China," says **Raymond Lee**, Chairman of the Board, Lee & Man.

Three boiler plants and automation system for the new Kilpilahti power plant

Valmet will deliver three boiler plants, flue gas cleaning systems and an automation system to the new Kilpilahti combined heat and power plant in Porvoo, Finland. The new plant will produce and supply steam, electricity and feed water to Neste's refinery and Borealis' petrochemical plant.

"The plant will supply energy to an industrial process and is technically very demanding. Our solution combines Valmet expertise from boiler and flue gas cleaning technology to process automation to enable good fuel flexibility, high availability and low emissions. The boilers will be able to utilize various solid and gaseous side streams from the refinery and petrochemical plant for energy production," says **Kai Mäenpää**, Vice President, Energy Sales and Services Operations, Valmet.

Sulfuric acid plant to Metsä Group bioproduct mill

Valmet will supply a sulfuric acid plant to Metsä Group's bioproduct mill in Äänekoski, Finland, for in-house sulfuric acid production. By means of the plant the bioproduct mill can utilize the chemicals in the odorous gases of the pulp manufacturing process. This will help to reduce the wastewater load considerably. The start-up of the plant is scheduled for the third quarter of 2017.

"The sulfuric acid plant producing process chemicals from sulfur compounds from odorous gases is a remarkable step towards closed chemical circulation and further improves the environmental performance of the bioproduct mill," says Timo Merikallio, Project Director of bioproduct mill at Metsä Group.

The order includes a sulfuric acid plant consisting of a concentrated non-condensable gas (CNCG) incinerator and a sulfuric acid converting plant. The production capacity of the plant will be approximately 35 tonnes of sulfuric acid per day. This will be the world's first larger-scale sulfuric acid plant that will be in operation at a pulp mill.

Södra Cell modernizes brown stock washing plant

Valmet will supply modernization of the brown stock washing plant of the dissolving line to Södra Cell's Mörrum pulp mill in Sweden. The rebuild will increase the mill's pulp production capacity by 45,000 tonnes. The project will commence in spring 2016 and will be completed in the fourth quarter of 2017.

"The investment will enable increased production and increased opportunities to further enhance the production quality of our dissolving pulp," says **Martin Säll**, Engineer and Project Manager at Södra Cell Mörrum.

OptiConcept M boardmaking line to Pro-Gest in Italy

Valmet will supply an OptiConcept M containerboard line and a mill-wide Valmet DNA automation system for Pro-Gest S.p.a. for the company's new Mantova site in Italy. The new production line will produce high-quality lightweight recycled case material.

"At Pro-Gest we are continuously investing to improve our products and exceed quality standards, applying the latest technologies in our mills. Mantova's new machine will be setting new levels in terms of performance and efficiency. The whole team is very excited to work with the best paper machine manufacturer in the world for this high capacity and high quality paper mill," says **Francesco Zago**, General Manager and shareholder of Pro-Gest.

INTRODUCTION

to Valmet's new services approach

A new day brings new opportunities and challenges. Your day starts better when you are prepared and have someone by your side. We want you to feel that your team and ours are one crew on a shared journey forward. We want to be a valuable part of your team – one that you can always rely on.

TEXT Helena Lamberg and Minea Hara

We invite you on a

Shared Journey Forward!

At Valmet, we have now further developed the way we serve our customers on our shared journey. This way to serve is based on two things: our core commitments to you as our customer and our unique services offering.

Our core commitments are the cornerstones of creating a good service experience. Valmet's wide services offering responds to your everyday challenges, like keeping equipment and processes running reliably and optimizing the performance of industrial processes to get the most out of the least. We help you to ensure your processes are competitive thanks to latest innovations and by providing the best expertise when you need it. We also serve you through Industrial Internet and remote solutions.

Join us on a shared journey to see how our way to serve moves your performance forward!

Our core commitments to you

When working with you and your team, we aim at bringing you the best service experience through these commitments: "**Safety comes first**," "**Close to you**," "**Solutions to your needs**" and "**People you can trust**."

Safety comes first: We put safety before anything else in our daily operations. We are committed to supporting you in reaching your safety targets, because incident-free mills and plants as well as employee well-being are crucial for a safe, sustainable and productive working environment.

Close to you: We cooperate to understand your specific challenges, and we are available whenever you need our expertise. Valmet's 12,000 professionals work close to our customers, through a network of over 100 service centers and by visiting customer sites daily. Our experts are also available remotely with the help of Industrial Internet and remote technologies.

Solutions to your needs: You and your team are the experts in knowing what's right for your business. With that in mind, we work closely with you to best utilize our unique combination of process technology, automation and services to find exactly the right solution for you.

People you can trust: We know that trust has to be earned, and we work hard to reach that goal every day. In practice, this means that we keep our promises and are committed to moving your business forward. We want to understand your goals and requirements and work with you to meet them. This is why we pay special attention to open and prompt communication, listening to your needs, being responsive and delivering what has been agreed.

"By travelling together on our shared journey, we can reach the targets and beyond."

Services designed for your needs

Sharing the journey forward together with you also builds on our services, designed to move your process reliability and performance forward. When needed, we can also provide you with new technologies to take your production process to the next level. That is why we have now categorized our services offering in a new way – under "Reliability," "Performance" and "New technology."

Reliability services

Our wide variety of reliability services keep your equipment and processes running smoothly. We make sure that spare parts and components are easily available with minimal inventory costs. Reliable deliveries ensure that material is managed efficiently at your site every day.

Our maintenance and shutdown management services help you to keep your production assets in good working condition, minimizing downtime and controlling maintenance costs. We offer services for planning and implementing annual shutdowns to avoid cost and schedule overruns.

With outsourcing services, we can even take responsibility for maintenance and workshop operations and inventory management on-site.

Performance services

When you want to optimize the performance of your production process to get the most out of the least, our performance services are the ideal solution. We offer a full range of production consumables to maximize production, minimize lifecycle costs and keep your production performance reliable. Consumable agreements are always tailored specifically for each production line.

Valmet's process support and optimization services help maximize your process performance by utilizing our technology and automation expertise. You can achieve reduced energy and raw material costs, reduced process variability, optimized quality and production, and enhanced environmental performance.

New technology for process competitiveness

Adding new technology to your process at the right time keeps your production competitive and helps you take your production to the next level.

Our process and automation upgrades are always based on your targets. Competitiveness can be maintained by upgrading technology to improve safety, quality or capacity. We offer complete deliveries, including key components, automation updates, and installation with start-up and process support.

Automation project deliveries include greenfield projects, automation renewals, and extensions. Our customers are now also extensively utilizing our Industrial Internet capabilities, and we can bring you the benefits of the Industrial Internet already today.

Through remote solutions, Valmet's experts are easily available to offer support in technical challenges. When needed, they can monitor your processes and perform troubleshooting and corrections remotely. Process operations can be optimized based on the monitoring data. Mobile and centralized control room solutions mean that your operators can be as effective and efficient as possible.

We are committed to moving your performance forward. By travelling together on our shared journey, we can reach the targets and beyond. So the only question left to ask is: How far do you want to go?

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Proven results through services

RELIABILITY

Case: **ITC Bhadrachalam mill** | Location: **Bhadrachalam, India**

The customer faced problems with quality, frequent slice jamming and profile variations. They also wanted to reduce web breaks and improve their machine runnability. Valmet experts from India and Thailand thoroughly tested and reconditioned the BM 1 headbox, with the result that the dry weight profiles improved by 30% and the basis weight 2-sigma by 25%, and web breaks have fallen by 10%. Runnability was enhanced and productivity improved. Despite the adjustments being relatively small, the gains were significant, exceeding the customer's expectations.

PERFORMANCE

Case: **Metsä Fibre mill** | Location: **Kemi, Finland**

A long-term service agreement aided the plant in achieving targets for energy efficiency and emission reductions, whilst also improving the availability of the recovery boiler. Operation Manager Pekka Posti explains: "We go through our development needs with professionals from Valmet, which is at the heart of our long-term service agreement." Pekka also states that the long-term cooperation guarantees processes are continuously developed. For example, in the renewal and optimization of the sootblowing process in the recovery boiler energy efficiency and availability were improved by splitting the steam line into two separate systems. "Now we can use bled steam from the turbine for the sootblowing boiler bank and economizers, and we use high-pressure steam only in the most demanding area – with the superheaters." In addition, the project also included automatic valves to adjust the sootblowing pressure.

NEW TECHNOLOGY

Case: **Burgo kraft pulp mill** | Location: **Ardennes, Belgium**

The performance service agreement implemented with the Burgo pulp mill took advantage of Industrial Internet technology through remote system and process monitoring. The objective was to maintain and improve results after a Valmet bleach plant optimization project.

The remote process monitoring included KPIs and performance triggers as well as a data link to Valmet. The Burgo process is virtually 24/7 in the Valmet offices, where the process performance is analyzed and experienced engineers can diagnose and make recommendations to correct a problem and improve the results. Bleaching performance is monitored stage by stage, and the customer receives regular control performance reports. ■

Read more about Shared Journey Forward in the next issue of Forward magazine.

CUSTOMER'S VOICE

Moving forward together

Thorough training, rapid start-up

When a new continuous cooking plant was installed at the SCA Obbola mill in Sweden, simulator training was an important part of the project. It made a very rapid start-up possible.

TEXT Kerstin Eriksson

The background to SCA Obbola's cooking plant project was that the existing batch cooking plant from 1962 had corroded digester vessels and required a lot of maintenance. "We were in a situation with only two options: we had to either replace these vessels or build a new cooking plant," says **Erik Olsson**, Project Manager of the cooking process.

"We finally chose a new CompactCooking G2 plant from Valmet. It was by far the best in terms of energy consumption, and it also includes the possibility of a future capacity increase, which is very important. We have tried to secure for the future both in terms of capacity and process-wise. The cooking plant will hopefully stand here for 60 years, so we do not want to find ourselves in a position where it is too small," **Mats Persson**, Project Manager for the cooking project, continues.

Both the pulp quality and the working environment have improved. "The most noticeable thing in terms of quality is that we now have better tear strength," says Olsson. In terms of noise, the working environment has become much better. Resonance sounds have largely disappeared, and also the smell is gone.

"The most noticeable thing in terms of quality is that we now have better tear strength."

A new production record achieved

On October 21, 2015 the new cooking plant started up. The start-up went well, and within the first 24 hours pulp of the right quality went all the way through the fiber line and on to the paper machine. A new record in daily production was set after five days. Persson comments: "One indicator of the fast start-up was that we switched over to advanced process control very soon after the start-up." Olsson agrees: "After two days, we had almost all the circuits in the advanced process control (APC) system in operation. Then there was some fine-tuning before we had optimal functioning, but it was fast."

"Under the best operating conditions, we have kraft pulp production of between 700 and 800 tonnes. We are now trying to find the conditions where everything runs stably throughout the plant. It is still a challenge to find a good mill-wide operating strategy, but it is getting better and better," says Olsson.

Online training

As continuous cooking was new to everyone, extra effort was put into training. A total of 144 people took part in the online training, focusing on basic knowledge of the new equipment. "Everyone involved in maintenance and all employees in production participated. It did not cost so much in working hours compared to what we gained by letting everyone take part," Persson explains.

The training was conducted in several steps, starting with mapping the skills and knowledge of all the operators to determine what they already knew. The online training in WebAcademy is based on independent study where participants log in, go through the material and take tests when they have the opportunity, and as many times as they wish. "The training ended with a test that all the operators had to pass. I liked the set-up, which gave us a good understanding of the equipment," says **John Eik**, Operator. "The material is still being used. Operators frequently log in to check the material when they want to know how something looks or how it works in principle. Also, some new operators have taken the training," Olsson continues.

Realistic simulation greatly appreciated

The classroom training consisted of a general component for managers as well as in-depth, hands-on training, where the operators themselves had to practice under the guidance of Valmet trainers. "The trainer was very competent. Few courses I've taken have been so well articulated. We got answers to all our questions," says Eik.

Simulator training with VirtualSite was also included – and greatly appreciated. "Several aspects of the simulator training were good. First, we basically got to do a proper check-out in advance. Secondly, the joint factory acceptance test (FAT) was very rewarding. Both the distributed control system (DCS) and advanced process control (APC) were tested with the simulator. It was an incredibly important test in which we found several issues, much more than is possible with a traditional DCS FAT. Now we were able to address these issues before start-up," explains Olsson. "The simulator also allowed us to tune the proportional–integral–derivative (PID) controller in the DCS in advance. We estimate that we saved about two or three weeks in start-up time on this, and some things might not have been solved as easily when the plant was operating," Persson continues.

Dedicated system superusers have learned to manage the simulator and will, in case of disturbances, be able to create customized exercises so that others also can learn. The simulator will continue to be used for training new staff and summer employees. "The simulator gives you realistic training on starting, stopping and slamming on the brakes. The fact that the operators voluntarily run the simulator is the best grade you can get," says Olsson. John Eik confirms: "The simulator is realistic, and you know that one day you will have to start up the machinery after, for example, a power failure. Then it is good to know what to do."

Training time extended

Before the project started, the project team visited other mills to share their experiences. As a result of that, the training time was extended in connection with the start-up. "A month is too short for this kind of process. Operators meet the trainer for one to two weeks during the baby-sitting period, depending on how the shifts are set. During that time, it may also be that they are busy just trying to get the plant going. We really do understand the importance of taking the time for proper training. It has been a success for us," Persson concludes. ■

PHOTO: PER-ANDERS SJÖQUIST

Using the same operator displays and control programs in the simulator as in the "real" DCS, together with the process simulation, made the training realistic. The operators were well prepared for the start-up. From left: Per Nilsson (Operator), Håkan Zampieri (Valmet trainer), Ola Hägglund (Operator) and Alexander Höglund (Operator).

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One-stop shop for turbine control

Valmet's offering for power plant turbine retrofits is a one-stop-shop approach to a plant-wide control system. The customers benefit from an open solution that ensures high system availability and cost effectiveness. TEXT Soili Städter

In 2015, Valmet received an order for a gas turbine control system for Sabah Electricity's power plant in Melawa, Malaysia. Experiencing lack of technical support and having no spares available, the company decided to completely refurbish its General Electric LM2500 gas turbine control system from 1994, with an aim to extend the lifetime of the plant for another 10 years.

Opting for expertise

To implement the project, Valmet teamed up with Pestech Technology, the company's Malaysian value-added reseller (VAR). Valmet's contribution included its complete gas turbine control solution together with related engineering and commissioning support. In turn, Pestech provided the work for the hardware design, cabinet assembly, installation and testing.

Valmet's extensive experience in retrofitting gas turbines throughout the world gave Sabah confidence that Valmet would be able to deliver the project successfully. Plus, the proposal was further strengthened by Pestech's ability to implement the work locally.

Best gas turbine performance

The complete concept from Valmet for the gas turbine controllers includes automation, machine monitoring, information management and the possibility to integrate them into a plant-wide distributed control system. It ensures the control of all aspects of turbine functionality, combining the simplicity of stand-alone gas turbine control with the thoroughness of a fully integrated system.

Valmet's gas turbine controller and its redundancy concept are designed to achieve the highest possible system reliability and availability, enhanced by easy and cost-effective maintenance. The system has no black boxes, as everything uses an open platform. Customers are free to change the displays. In all, the solution is more open, comprehensive and expandable than any others on the market today. This leads to the best possible gas turbine performance.

For Sabah, it was also important that the system is based on distributed control system technology so they can make modifications easily, if needed.

Although the Sabah case is a first reference for Valmet with an LM-type gas turbine, the company has been delivering similar solutions for many years to district heat plants, power plants and backup units.

Partnering opens doors

"One of our strengths is the ability to provide an integrated hardware and software package along with technical support," explains **Tom Bäckman**, Product Manager for Turbine Controls at Valmet. "Our local VAR, like Pestech in Malaysia, can then execute the project to make it more cost effective for the customer."

"We want to be known for our one-stop-shop approach as an automation supplier. Customers can get everything from turbine control, to machine and vibration monitoring, generator control and hydraulic upgrades," he describes.

Special market for gas turbines

"To provide a successful gas turbine control package, you need to know the regulations," states **Johan Musch**, Valmet's Product Manager for Gas Turbine & Compressor Automation. "Moreover, gas turbines can experience overfiring, combustion instability and mechanical overload. Therefore, the control system needs to be configured so it can react quickly and accurately," Johan continues.

> "We want to be known for our one-stop-shop approach as an automation supplier."

Valmet's gas turbine control provides deeper insight into the LM-type turbine and guarantees redundancy at all levels. It includes control and protection in one system.

Record start-up in six months

The knowledge sharing between all parties contributed to quicker problem solving and enabled the project to be completed one week before the official outage end date, lasting altogether for only six months. Typically, projects of such scale can take up to 10 months to deliver.

For Sabah, the decision to upgrade its turbine control system with the latest-technology solution will give the plant new tools with better functionality and a more operator-friendly interface. Moreover, the management can be assured of having a smoothly operating control system for the next decade of the plant's lifetime. ■

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Maintenance for the GASCON bag house filter is easily carried out from the penthouse.

Super effective flue gas cleaning at Kirkniemi

Sappi Ltd's Kirkniemi Mill has been able to clearly reach lower dust particle emission limits thanks to Valmet's GASCON bag house filter.

TEXT Marjaana Lehtinen and Valmet

In connection with delivering a multi-fuel boiler to Sappi Ltd's Kirkniemi Mill in Lohja, Finland, Valmet also supplied the GASCON bag house filter for dry flue gas cleaning.

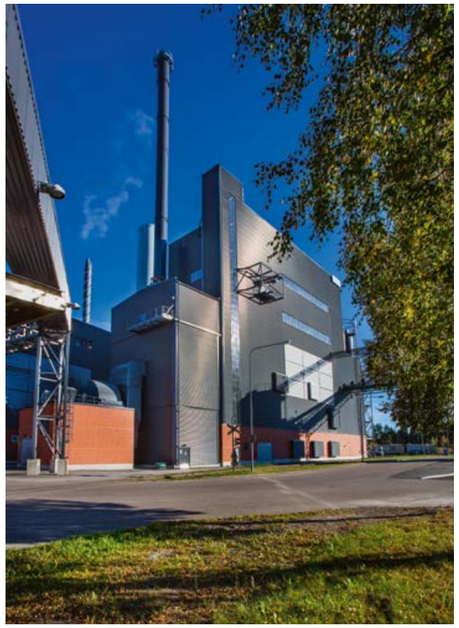
The mill with an annual capacity of 760,000 tonnes of high-quality coated publication papers has always had a keen focus on environmental matters in its daily operations. Consequently, it was natural to go for effective flue gas cleaning that minimizes all environmental impacts.

"The GASCON bag house filter was the best solution for us since our dust particle emission limit values are so low. We wanted to get the best available technology to meet the environmental requirements. With a bag house filter, it is possible to reach a lower dust particle emission level than with an electrostatic precipitator," says **Kalevi Merinen,** Power Plant Manager in Kirkniemi.

Gentle but efficient cleaning

The solution is based on Valmet's long experience, wide know-how and innovations in flue gas cleaning technology. In addition to effectively removing dust particles from flue gases, the GASCON bag house filter is also able to capture acid gas components (SO_x, HCl and HF) with a hydrated lime or sodium bicarbonate injection, as well as dioxin and heavy metals equipped with an activated carbon injection. It provides efficient pollutant control for a wide variety of fuels. To ensure the best possible operation with additive injections, the design is based on computational fluid dynamics (CFD) modeling.

The filter is equipped with Valmet's Ecostar filter bags that feature high in-house material and manufacturing quality. The gentle pulse-jet type filter bag cleaning is carried out online and can handle a large amount of incoming dust. The pulse frequency is based on the pressure difference across the filter and a timer.



Multi-fuel boiler decreases energy costs

In 2014–15, Valmet delivered a circulating fluidized bed (CFB) CYMIC boiler to the Sappi Kirkniemi mill. The boiler plant has a steam capacity of 88 MW. The boiler combines high-efficiency combustion of various solid fuels with low emissions, even when burning fuels with completely different calorific values at the same time. These include bark, other wood-based fuels and coal.

The new power plant significantly reduces the mill's cost base by decreasing energy costs and securing energy supply. The technique facilitates a major increase of biomass fuel in the mill's energy production.

Long-term cooperation

Valmet has been a long-term partner to Kirkniemi mill, supplying paper and stock preparation machinery as well as automation. All three paper making lines at Kirkniemi are delivered by Valmet. At the beginning of 2012, the mill's relationship with Valmet entered a new phase with the start of a frame agreement covering various services and spare parts for the three papermaking lines. The cooperation continues. In February 2016, it was announced that Valmet will rebuild Kirkniemi's paper machine PM 3 wet end.

Full integration with process control system

The bag house filter operation is controlled and monitored with a programmable logic controller designed by Valmet and fully integrated with the mill's process control system. According to Merinen, this makes filter control much easier for the operators as all information is available on the distributed control system displays and all functions can be controlled through the main system. "The operators do not necessarily even know that there is a separate black box between the systems," he points out.

Cleaning pulse properties can easily be changed during operation. In addition to controlling the bag cleaning, the system also detects possible pulse valve failures and damaged bags.

"There have been no problems whatsoever with dry flue gas cleaning, and the equipment works very well."

Emissions under 2 mg/Nm^3

The Kirkniemi mill has now been running the bag house filter since August 2015 with excellent results. "It has worked extremely well, and we are very happy with it," Merinen remarks.

Valmet guaranteed that it would be possible to reach dust particles emissions of 7 mg/Nm^3. Still, the mill has been able to go under 2 mg/Nm^3. Although the solution has four compartments, full capacity has been reached with just three of them, which is a typical starting point for process design.

"As we had some doubts about this very first GASCON bag house filter that features Valmet's in-house technology during the purchase stage, we have followed its performance very closely. There have been no problems whatsoever with dry flue gas cleaning, and the equipment works very well," Merinen concludes. ■

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Successful conversion from paper to board

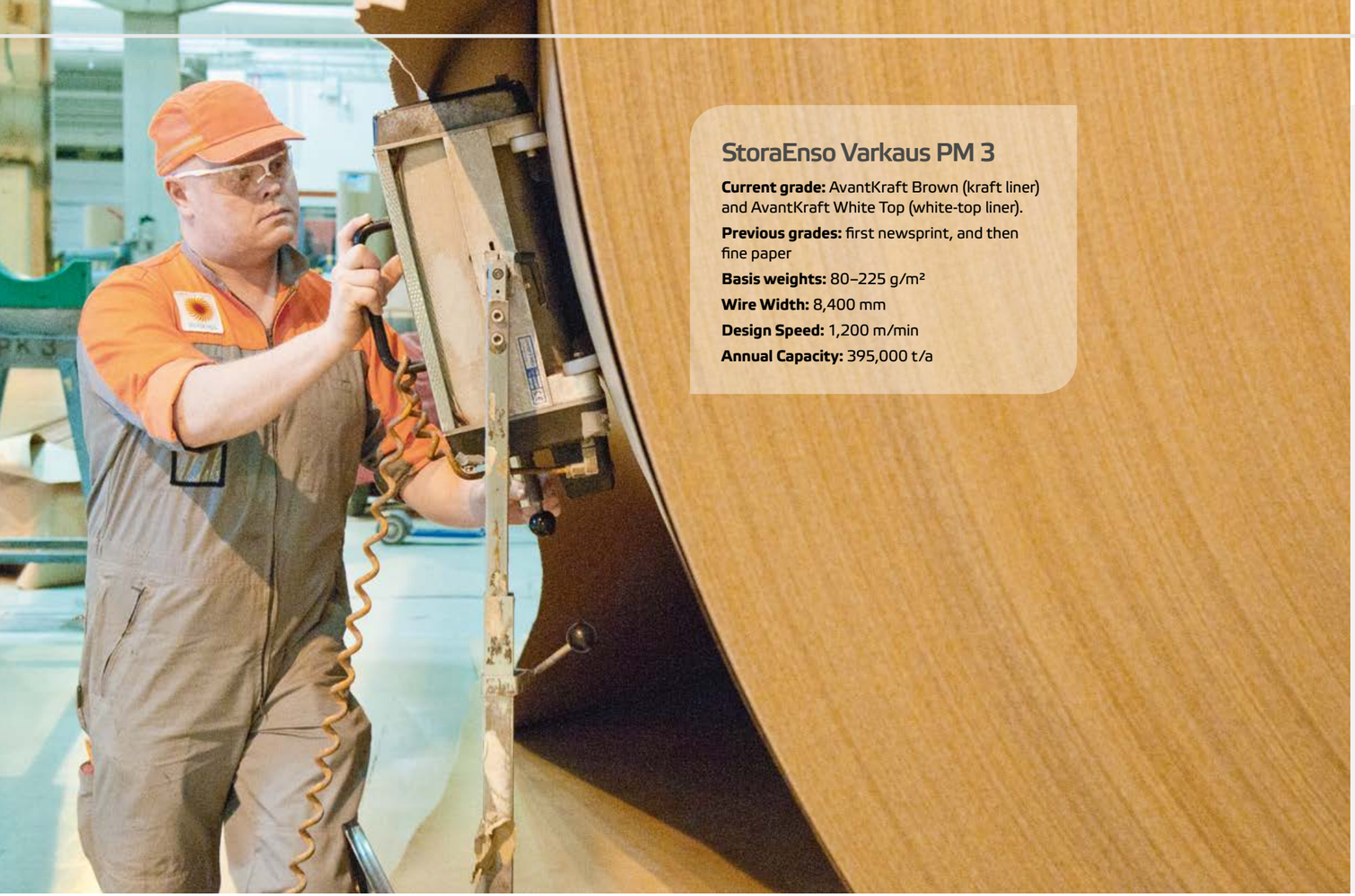
A marvelous journey

"PM 3 is almost like a new machine now; a combination of brand-new technology and good, well-maintained trusted technology", says Jukka Lyyra, Area Manager of Paper Machine & RCF Plant, Stora Enso.

TEXT Kaisamaija Marttila and Pauliina Purola

Growth in traditional retail and e-commerce is increasing global demand for sustainably produced packaging materials. In 2015, Stora Enso's Varkaus mill in Finland converted their existing paper machine into a board machine to produce linerboard to better meet the market need for renewable packaging. They chose Valmet as their partner for this challenging rebuild.

"Every paper engineer has a dream about building a new machine" says **Jukka Lyyra**, Area Manager of Paper Machine & RCF Plant, about the conversion project, with a boyish grin. "I've been fortunate, as this is my second



StoraEnso Varkaus PM 3

Current grade: AvantKraft Brown (kraft liner) and AvantKraft White Top (white-top liner).

Previous grades: first newsprint, and then fine paper

Basis weights: 80–225 g/m²

Wire Width: 8,400 mm

Design Speed: 1,200 m/min

Annual Capacity: 395,000 t/a

Jukka Lyyra (on the left) and Ari Saarnio can now offer their customers sustainable, high-quality products of lower grammage.

The OptiFormer multi-Fourdrinier forming section has two headboxes and the possibility to tune the pulps and furnishes for improved end product quality with cost savings.

The improved fiber flow of an OptiFiner Pro refiner allows a smaller rotor, resulting in low no-load power, up to 50% lower than a traditional similar capacity refiner.

Safety is top priority at Stora Enso and one of the most important things to consider when choosing suppliers. Valmet met the strict requirements.

project in this role. It has been a marvelous journey," he continues. "PM 3 is almost like a new machine now; a combination of brand-new technology and good, well-maintained trusted technology. The opportunity to produce high-quality products with reasonable costs is there."

From paper to packaging

The old fine paper machine was an excellent choice for a rebuild: the Varkaus mill has good facilities, reliable wood and energy supplies, and skilled, motivated personnel. Furthermore, the conversion was not the first of its kind: PM 3 had gone through a previous transformation from news to fine paper in 1985.

In order to make the latest paper-to-packaging conversion a reality, the machine was fortified with new refiners, a new headbox, a forming section rebuild including a Fourdrinier extension with a new top forming unit, a press section rebuild with a new SymBelt press nip, as well as rebuilds of the dryer section, calender, reel and winder and the related air systems. To ensure consistent end product quality, a new Valmet Kappa Analyzer was installed for the pulp mill and a Valmet IQ quality control system (QCS) for the rebuilt board machine. Valmet's retention measurement (RM3) analyzers provide real time information about wet end consistency and retention. Valmet also took care of the installation and testing, and provided start-up support and training along with fabrics for the machine start-up.

> "The opportunity to produce high-quality products with reasonable costs is there."

Right-weighting for resource savings

"The whole wet end and multi-Fourdrinier forming section is now very suitable for lightweight liner production: it has two headboxes and the possibility to tune the pulps and furnish for improved end product quality with cost savings. It is proven, widely used technology, but there are still new elements and technological advantages," says Lyyra about their reasons for updating the technology. "The headboxes [one new OptiFlo and one relocated and rebuilt with dilution control] seem already to be very suitable for producing high-quality liner with stable profiles. And the brand new OptiFiner Pro refiners are saving us energy and money," he continues.

For the Varkaus mill, cost competitiveness is a priority. "We try to use as few resources as possible. Raw material, energy and chemical consumption are all tied up with the machinery used and how optimized the processes are. Of course, we are serving our customers as well as possible in their quality needs, but in a way that means they can choose our lower-grammage products – what's known as 'right-weighting' or 'right-grading'".

Target: To be the number one for customers

The Varkaus mill is determined to meet the needs of its customers who demand consistent performance in terms of containerboard strength. Cleanliness is also important because of the end uses involving food. Stora Enso is already receiving good feedback from the market. "For us, the Valmet IQ QCS is very important, as it unites our technology, quality control and processes. Reliable pro-

"Safety is our top priority at Stora Enso, and actually one of the most important things we consider when choosing suppliers."

cess measurements and making adjustments accordingly is one of the key points when producing high-quality products. The technology permits modifying the pulp and raw material into the different plies", Lyyra explains.

The mill is satisfied with the new quality control system. "The QCS is the heart of the production line. It reliably monitors how well we succeed in producing high-quality board and also fine-tunes the quality and profiles according to customer expectations – and can even exceed them," Lyyra says. The Valmet RM3 analyzers ensure the stability of the wet end. Project Engineer **Timo Vänttinen** explains that the measurements have made start-ups and grade changes faster. "It is vital to have right process information to make right decisions at right time", he explains.

Co-operation for good results

"Of course, we considered all supplier options carefully. Valmet knew the mill well from previous projects, the technical solution was well suited to our needs, and Valmet's location was close. It all matched well," **Ari Saarnio**, Project Director, says. Stora Enso is also satisfied with the co-operation. "The teamwork during the project phase was very good, despite the tight schedules. Looking at the big picture, the project has been a successful one."

"Professionally, it has been a pleasure to work with Valmet. The Valmet team has been very open, reliable and very easy to work with. There are always challenges when you're dealing with a demanding project like this one. But that's what project work is: finding solutions to the challenges quickly and efficiently. We have done that work quite well with Valmet," adds Jukka Lyyra, too.

Safety comes first

"Safety is our top priority at Stora Enso, and actually one of the most important things we consider when choosing suppliers. Valmet met our strict requirements. We can see that Valmet's technology is safe, as it should be," notes Saarnio. "The safety factors for installation and start-up were carefully considered, but it went beyond that, as all the new equipment installed is safe to use and maintain."

Saarnio also mentions that there is always some overlap when combining old and new technology. "The standards of the new technology can set an example for the old technology, too. For example, we ended up introducing additional lighting on older machine parts for improved safety."

Targeted start-up curve reached easily

Starting up the machine after a rebuild may be one of the most rewarding and anxious moments in a papermaker's job. Start-up represents the culmination of months of hard work. A successful start-up means achieving the desired paper quality and new product sales as planned, and it also has a significant effect on how economical the project ends up being.

"The start-up went smoothly, considering that the rebuild was large and we moved from paper to packaging," Timo Vänttinen explains. "We were able to get production going without many runnability issues, and we started the tune-up phase right away." Lyyra adds that "the targeted start-up curve was reached easily – we went even further than targeted. But then we faced some challenges, which is normal. Now we are well on track again. We still hope to achieve improvements in quality and production, though."

In this case, Valmet was also responsible for the installation. "When a supplier is taking care of the installation, it makes our lives easier. And the supplier knows their machinery best," Lyyra says.

It's the combination that takes performance forward

Valmet supplied the technology, the automation and the fabrics for the start-up of the rebuilt machine. Having a single point of responsibility is beneficial for all parties. "With one supplier, there are fewer players and thus fewer overlaps in the start-ups. In my opinion, it lessens the 'responsibility dodging' and makes also the tune-up phase and further development easier," says Saarnio.

Lyyra holds the same opinion. "It makes our lives easier. Having one supplier means they concentrate more on the whole production instead of a small part of it. Besides making start-up smoother, this set-up makes sure that everything is connected together well and works together in an optimized way, including in the tune-up phase. Together with just one supplier, we can improve productivity and quality in a very efficient way." ■

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For the Varkaus mill, the new quality control system is the heart of the production line, monitoring reliably how well they succeed in producing high-quality board.

The OptiFlo headbox is well suited for lightweight liner production, as it provides stable profiles.

Project Engineer Timo Vänttinen of Stora Enso (on the left) and Technology Manager Juha S. Kinnunen of Valmet discussing production targets.

Start-up with Valmet paper machine clothing

Project Engineer **Timo Vänttinen** shares his thoughts about the start-up:

"All in all, the start-up regarding clothing went very well. With forming fabrics, we haven't made any changes to the original designs – they are perfect. In the press section, as the third press is very challenging, some changes were made towards heavier and more open felts.

The cooperation between the papermaker and clothing specialist is very important. During the start-up phase it was very intense, as we looked for the best solutions. It is the clothing you can still affect and make changes to – you cannot affect the machine structure any more.

Valmet clothing responds very well to the expectations we have of clothing. With forming fabrics, we have already reached the level of dry content we want. With press felts, some fine-tuning still needs to be done in order to get the dry content to the level we really want. As said, the third press position is very challenging. All the dryer fabrics are performing well. There's nothing to be added to that."

"Regarding clothing development, that work has been exemplary from the Valmet side. You guys take it seriously and you really focus on making improvements."

"And, last but not least, the technical service you provide is very important, also for the future. We have different needs, and you need to be up to date all the time."

START-UP CLOTHING:

- GapMaster forming fabrics
- EcoMax press felts
- BlackBelt shoe press belt
- TamStar dryer fabrics

Tampere Water saves energy and chemicals with Valmet's wastewater solutions

Tampere Water recently installed several Valmet total solids measurement devices and a sludge dewatering control package at its Viinikanlahti wastewater treatment plant in Tampere, Finland.

TEXT Heli Karaila and Nigel Farrand

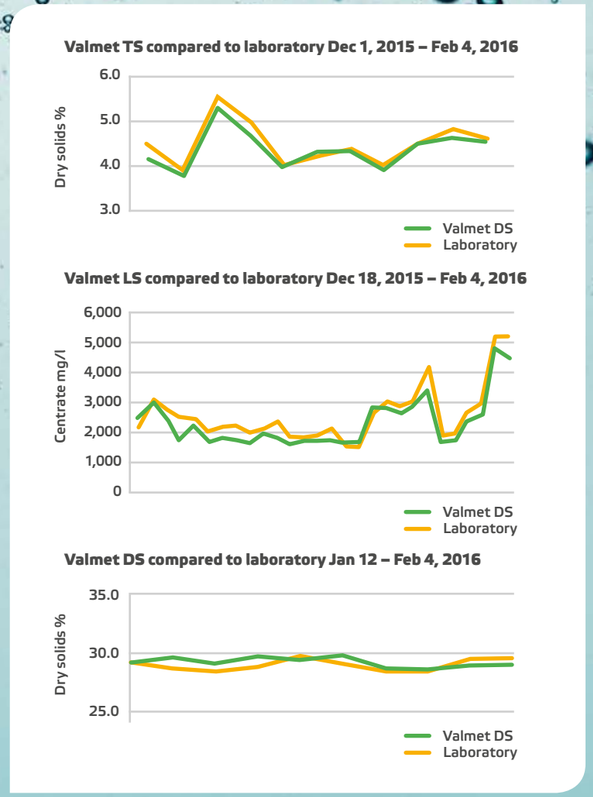
After the start-up at Tampere Water's Viinikanlahti wastewater treatment plant, immediate results were visible, from savings in pumping energy to improved anaerobic digestion and subsequent sludge dewatering. In addition to improved solids control, the measurements now also provide a valuable insight to plant operation, with real-time solids information replacing infrequent laboratory analysis. Maintenance Engineer **Ari Oksanen** comments: "We can now see process parameters in kilos rather than cubic meters, which is a great help in optimizing the different stages of treatment."

The biological and chemical wastewater treatment in Viinikanlahti is based on an activated sludge process coupled with phosphorus precipitation by ferric sulfate. The process consists of screening, grit removal, primary sedimentation, aeration and secondary sedimentation. Wastewater sludge is digested in anaerobic digesters after which the sludge is dewatered by centrifuge. Biogas from the digester is used to generate electrical energy and heating for the plant.

Although Tampere Water's highly efficient treatment methods meet the requirements of Finnish and European Union legislation, they still decided in 2015 to enlist Valmet's help to improve its chemical and energy efficiency. **Heikki Syrjälä**, Technical Manager at Tampere Water, valued Valmet's input to the project, "As we are planning a new treatment plant, this was a good opportunity to discover what the latest technology has to offer. The quality and workmanship displayed by Valmet has been excellent," he says.

Total solids measurement

Three Valmet Total Solids Transmitters (Valmet TS) are in use to measure total solids after the primary clarifiers, before the digester and before the dewatering centrifuge. The four circular primary clarifiers in Viinikanlahti allow solids in the wastewater to settle to the bottom of the clarifier before being pumped to the sludge thickening tank. Prior to the Valmet TS installation, pumping from the four clarifiers was controlled in a timed sequence, which meant that from time to time a clarifier would be emptied of solids and only water would be pumped to the thickening tank. With Valmet TS measuring the total solids content, the pumping sequence from the four clarifiers is now controlled to a minimum solids content, avoiding excess water being pumped to sludge thickening. According to **Sami Ilomäki**, Operating Engineer, the reduction in pumping has been quite dramatic: "We used to pump 76 m^3 an hour to thickening. Now, with accurate total solids control, that's fallen to only 50 m^3 an



Good correlations to laboratory results were obtained immediately in the first two months after start-up. Top to bottom: dry solids to digester, centrifuge centrate and dry cake solids.

hour, saving pumping energy and reducing excess water to thickening."

With a second Valmet TS transmitter after thickening, the measured solids content to the digester has now increased from 3.5% to 5%. "The higher solids content in the digester reduces the heating demand and has also resulted in less foam," says Ilomäki. As well as needing less heat, the optimized solids content also increases digester residence time, producing more biogas.

Centrifuge control

After anaerobic digestion, the sludge is dewatered before being transported by truck for use in agriculture, landscaping and other soil improvement uses. Sludge dewatering is carried out in the centrifuge, where water is forced from the sludge. The dried sludge (dry cake) is then taken by conveyor to be trucked away from the plant. The liquid centrate from the centrifuge is recycled back into the process. As Syrjälä explains, "Sludge dewatering is a complicated process using both energy and chemicals. To avoid wasting either of them and save on transportation costs, optimization is necessary. Running the process manually in the optimal way is difficult."

Optimization of sludge dewatering

The Valmet solution is dewatering optimization with the Valmet SDO (Sludge Dewatering Optimizer) control package. Valmet SDO is a small-scale Valmet DNA control system employing multi-variable model predictive control (MPC) to control the centrifuge operation. A Valmet TS transmitter is used to stabilize the mass flow to the centrifuge, now measured in kilos of sludge per hour. In the first phase of optimization, performed in December 2015, this allowed dewatering polymer to be controlled as a ratio to the mass flow rather than the cubic meter-based flow rate previously used. With the mass flow under control, the second phase of optimization in January 2016 was to optimize solids in the centrate and moisture in the dry cake with a combination of torque control and polymer.

A Valmet Low Solids Measurement (Valmet LS), is installed in the centrate outflow and another specialized measurement, Valmet DS, measures the solid content of the dry cake as it falls to the conveyor. This is where the multivariable model predictive control, unique to Valmet SDO, comes into play. As the centrifuge torque is increased, more water is extracted from the sludge and the solid content increases in the dried sludge, but at the same time centrate solids increase to be wastefully re-circulated through the plant. Increasing polymer dosage increases the solid content of the dried sludge and also reduces centrate solids, so the control combines the optimum torque and correct polymer dosage to save both energy and chemicals while achieving the optimum amount of reject solids and a higher dryness in the dry cake from the centrifuge.

> "We have now been able to reduce reject solids by 50%."

More good results

The new measurements and centrifuge dewatering control have been very successful, Sami Ilomäki reports: "Previously, our centrifuge operating parameters had to be very much on the safe side to limit the recirculation of reject (centrate) solids. We have now been able to reduce reject solids by 50%." Ilomäki sees room for even further improvement as people become more familiar with the controls: "The controls are easy to operate and the system is very user friendly, allowing us to easily adjust parameters and even measure the effectiveness of different polymers. We now have a much better picture of what is going on in the treatment process." ■

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Viinikanlahti engineers Sami Ilomäki (on the left) and Ari Oksanen are very happy with the operation of the Valmet TS.

The resulting dry cake, which is taken from the plant by truck.

With accurate total solids control Tampere Water is saving pumping energy and reducing excess water to thickening.

According to Sami Ilomäki (in the middle), "The Valmet LS measurements have helped us to reduce the amount of recirculating material by 50%."

In the Spotlight:

Varun Jain
CEO of Khanna Paper

Khanna Paper Mills decided to invest in a new, high-tech solution for its upcoming paper machine wet end rebuild in India. Khanna Paper's CEO Varun Jain shares his thoughts about this investment as well as the paper and board business overall in India. **TEXT** Marika Mattila **PHOTO:** Joonas Nieminen, Movya Oy

How do you see the paper and board industry in India?

"The outlook for the paper and board business in India is quite positive. It is growing at a rate of almost 10% annually. Recently, this has been visible in new projects and new capacity in the market. The new capacity is coming more and more from the packaging side.

The common trend that we can see in the market is the demand from our customers for higher quality. We need to respond to that demand and supply the right quality at the right time to our customers."

You decided to invest in a new, high-tech solution for the coming challenging rebuild of PM 5. What were the main reasons for choosing Valmet as the supplier?

"In the end, it was a good fit. We know that sooner or later, demand for newsprint as well as for printing and writing grades will start to decline in India – maybe in five to seven years. We selected Valmet as the supplier for the rebuild due to their ability to provide solutions that are flexible for future needs, too. After the rebuild, we will have the flexibility to make also packaging grades according to future market demand."

Forming with innovative shoe and blade technology represents the latest development of the paper-making forming process. What are the main benefits of this technology for your business?

"Firstly, this new technology will make us a quality leader in the newsprint market. Secondly, it will give us the flexibility to enter the writing and printing segment as well. Thirdly, in the future we will be more flexible to produce packaging grades with this machine."

What are the main factors for a papermaker to stay competitive?

"The main factor behind our competitiveness is our ability to listen to our customers and to focus on the right actions to deliver the best quality to our customers. I see the future of Khanna Paper as very bright, because we are moving in the right direction as the technology and quality leader in the market. We have strong passion for developing this business." ■

"After the rebuild, we will have the flexibility to make also packaging grades according to future market demand."

About Khanna Paper's wet end rebuild:

Valmet will supply a paper machine wet end rebuild to Khanna Paper Mills located in Amritsar, India. The main targets of the rebuild are to improve end product quality, increase production and add paper grades by extending the basis weight range. The start-up of the rebuilt newsprint paper machine PM 5 is scheduled for the first quarter of 2017.

"In order to succeed in the papermaking market, knowledge is vital."

Cartiere Del Garda is located in the picturesque town of Riva Del Garda in northern Italy. Two paper machines produce 350,000 tonnes of WFC paper a year, with a wide variety range of 90–400 g/m2. The philosophy of Cartiere del Garda is to be flexible and achieve the highest possible performance in terms of reliability, efficiency and quality.

Buying knowhow

boosts competitiveness of Cartiere del Garda

Valmet's press nip analysis service increased production and saved money, but also helped to gain fundamental knowhow.

TEXT Minea Hara, Kaisamaija Marttila

Lecta Group's Cartiere del Garda mill in Riva del Garda, Italy, decided to utilize Valmet's iRoll Portable press nip analysis service to resolve a problem with moisture profiles and reduced press felt lifetime. In addition to increasing production and saving money, the mill gained fundamental knowhow to further strengthen their position in the market.

"In order to succeed in the papermaking market, knowledge is vital," says **Antonio di Blas**, Production Manager at Cartiere del Garda. "If you lose the knowhow, you lose your margin and you're out".

Finding an accurate measurement solution

The mill had noticed an increase in the wearing of the fabrics on its PM 3 and suspected that the problem was caused by a press nip overloading effect. "Despite conducting infrared and temperature measurements, the fabric lifetime kept decreasing, and we were not able to measure anything useful or find partners to help us. So we started looking for other options, including new technologies, and we learned about Valmet's iRoll technology," explains di Blas.

The iRoll Portable press nip analysis service combines dynamic nip profile measurement with the capability of doing testing in real process conditions. "We soon understood the possibilities of iRoll measurement technology in the press section. For example, we could measure

dynamically over a long time period, which sounded fantastic for us."

iRoll improved runnability in the press section

The iRoll Portable analysis took place in April 2015. The measurements showed that the nip loading was actually low in the area where the felt was wearing quickly.

"As a result, we added extra cooling to the Nipco oil distribution system, and the Nipco itself was loaded based on parameters drawn up with Valmet's specialists according to the measurement results," says di Blas. The mill started adjusting the nip in manual mode with the new loading profiles suggested by Valmet.

For Cartiere del Garda, utilizing iRoll technology was justified not only from a problem-solving perspective, but also from a knowhow point of view.

Longer lifetimes and better profiles

Within just a couple of months, the changes made based on the iRoll Portable Analysis results were showing positive results. The felt lifetime was increased from 30 days to 50 thanks to less wearing, which means a reduction from using 12 felts every year to eight. In addition, moisture profiles and reeling performance have improved, and the cover lifetime of the press roll has grown longer, resulting in reduced maintenance and regrinding costs.

Above all, the better profiles mean that production has increased due to improved runnability and higher speeds. "As the wrinkles have disappeared, we have been able to increase the speed of the machine by 30 meters a minute. For us, that's really a lot," says di Blas.

"We are really satisfied with Valmet's service and the results," di Blas reflects. "We got a solution to our problem. Actually, it was a double success: we got an accurate technical explanation plus a 'free-of-charge' solution for further savings." ■

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"Surviving in the market has to do with finding solutions for improving a certain part of your process instead of making huge investments," says Antonio di Blas, Production Manager at Cartiere del Garda (left), pictured with Mr. Stevanato Loris, operator on the PM 3 and Maurizio Sala from Valmet.

Benefits achieved at Cartiere del Garda:

Press felt lifetime increased from 30 days to 50

Machine speed increased by 30 m/min

Increased cover lifetime of the press roll

iRoll Portable measures and optimizes nip profiles

The iRoll Portable service provides cost-effective process analysis and advanced nip profile measurements for improving sheet quality and optimizing nip profiles.

- Designed for press nips, sizers, reels, winders and coaters
- Analyzes paper and fabric tension profiles
- Traditional nip film and electrical blanket measurements are replaced with sensitive film sensors mounted on the surface of the roll
- Measured nip profiles are visualized in true dynamic running conditions.

↑ "In our case, we were able to improve the press section's runnability by introducing iRoll technology", says Antonio di Blas, Production Manager at Cartiere del Garda.

Better quality with lower energy costs

Hankuk Paper removes product quality limitations and saves EUR 50,000 in annual energy costs.

TEXT Minea Hara

With the global contraction of the printing paper market, Hankuk Paper Onsan mill in South Korea decided to put extra focus on its specialty release paper by improving its internal bonding strength and dimensional stability. However, their machinery had some product quality limitations, and any future modernizations would need to support the mill's social and environmental goals of reducing energy costs.

Hankuk Paper carefully studied and compared equipment, references and cost competitiveness of different suppliers, and landed on Valmet. "We saw that Valmet's process knowledge is both broad and reliable. Valmet also gave us a quality guarantee for the equipment," says **Cheounghawn Rha**, Mill Manager, from Hankuk Paper.

FormMaster solves quality issues

The mill opted for a FormMaster breast roll shaker to improve the quality and printability of their specialty paper. "When we installed the FormMaster in May 2015, its reliability had already been proved with references from inside and outside the country," says **Byeong-Gyu Hwang**, Vice Mill Manager. "We set the dimensional stability target at 1.8, which is around 2.0% of the wet expansion rate, and we were able to achieve these drying shrinkage levels. We have been satisfied ever since."

FormMaster has an axial shaking force of 60 kN, which allows longer strokes and optimized formation. The self-balancing breast roll shaker improves the visual appearance of the final product and achieves the same strength properties with a lower basis weight – and less raw material. FormMaster has allowed Hankuk Paper

Hankuk Paper has reached their goals for the investment in less than a year. "We are satisfied, not only due to the great product quality that we expected, but also thanks to the electricity cost savings", says Cheounghawn Rha, Mill Manager at Hankuk Paper.

to keep optimal conditions for the dimensional stability-sensitive grades at a 25 mm stroke and a frequency of 420 rpm. It has improved the formation of not just specialty paper, but even their base paper and wood-free paper. The maintenance of FormMaster has also proved trouble-free.

OptiFiner Pro reduces annual energy costs by EUR 50,000

When producing specialty paper, a controlled refining process is essential. "Our product was in need of internal bonding strength, and we also wanted to see an increase in refining capacity. Valmet's OptiFiner Pro refiner had the potential to solve both of our problems."

The OptiFiner concept aims to produce the desired fiber properties through accurate control of the refiner gap. This high-efficiency refiner optimizes the refining process by using less energy while producing better-refined fiber. At Hankuk Paper, OptiFiner Pro replaced two conical refiners in the PM 1 refining line. Now, with the newly equipped OptiFiner Pro, the line is run with two refiners instead of four. Ever since the installation, the mill has been producing 124 bone dry tonnes a day on all grades except the specialty paper while still saving on electricity costs.

On release paper, the internal bonding strength could be improved from 140 to 170~200 ft-lbf/in². Without making any changes to the flow amount, consistency or refining degree of the paper machine, the mill has achieved an annual energy reduction of 114 kWh, equivalent to savings of EUR 50,000 per year.

In addition to energy savings, the mill has also been able reduce raw material costs by switching from 100% bleached kraft pulp to a mix of bleached kraft pulp and CTMP.

> "We have been able to extend the lifetime of the segments from six to eight months."

An easy-to-operate refining process

Operating the new refiner has turned out to make Hankuk Paper's life easier. "The display functions on the local panel, like worn out bar status and refiner utility condition, are very useful to us and have made maintenance easier," **Seung-Back Lee**, Part Leader of Production Team 1, notes. "We've been able to extend the lifetime of the segments from six months to eight months." ■

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About Hankuk Paper Onsan mill PM 1

Average operating speed in 2015: 772 m/min
Design speed: 950 m/min
Wire width: 3,850 mm
Weight range grade: 37–143 g/m²

→ OptiFiner Pro refiner has reduced annual electricity costs at Hankuk Paper by up to EUR 50,000. From left to right: Seung-Back Lee, Part Leader of Production Team 1, Cheounghawn Rha, Mill Manager, Byeong-Gyu Hwang, Vice Mill Manager.

← On top, microscopic image of the fiber before OptiFiner Pro. After installing OptiFiner Pro, the refining degree has been improved by one microbar.

Saving energy

CMPC Talagante chose Valmet Advantage DCT, the most energy-efficient tissue machine in the world.

TEXT Katarina Åhsberg

The Talagante Mill of the CMPC company in Chile is a well-organized mill comprising three tissue production lines and a number of converting lines for roll products, napkins, facial tissue and handkerchiefs. They employ around 1,000 people on daily basis. Talagante has its own cogeneration system and has also invested in a state-of-the-art water treatment plant.

Of the mill's total production capacity of 105,000 tonnes, 55,000 or more are produced by TM 3, which is an Advantage DCT 200 machine installed by Valmet in 2013. It is currently the tissue machine with the highest production capacity in Chile, holding the production record of 5,600 tonnes in a month.

Energy efficiency as an absolute must

"When we decided to go for machine number three, we were of course looking for high production capacity but we also said that we wanted to have the most energy-efficient machine in the world at the time," says **Felipe Harding De La Fuente**, Mill Manager.

Carlos Hirigoyen, Corporate Director of Industrial Development at CMPC Tissue explains more: "Today, Chile probably has the highest energy prices in Latin America. So for us it is a must to be as energy-efficient as possible."

The decision to select Valmet's Advantage tissue technology was based on a comparison of the Valmet's efficiency guarantees and the total cost of the investment.

"It wasn't necessarily the least expensive choice, but when we compared it to the overall operating cost of solutions from other suppliers, the numbers favored Valmet. And the machine has performed as expected, so we did not make any mistake about that."

In addition to having the most efficient and energy-saving tissue machine, the overall design of the machine hall has been considered.

"We have tried to minimize the movement of stock preparation and decided to locate everything on one floor. The design of the machine inspired us to focus on energy savings in every aspect of the project," says Harding.

Impressive energy figures

Felipe Harding continues: "TM 3 consumes about 20–25% less energy than our other machines producing the same kinds of grades."

"When we compared the overall operating costs, the numbers favored Valmet."

The Talagante mill produces approximately 2.5 million paper rolls every day.

Despite running at a high linear load, the paper quality has been great.

The low energy figures also support CMPC's environmental strategy. From a business perspective, it is very important to be environmentally sustainable over the long term. The company has been a pioneer in Chile in complying with legislation.

Amazing profiles and runnability

One of the reasons behind the energy efficiency is the Advantage ViscoNip press, with its uniform cross-machine direction loading, operating over a wide range of linear loads. The flexibility in loading towards the Yankee also opens up extensive potential for product development.

Despite running at a high linear load, the paper quality has been great, and the runnability in converting has improved, too. Recently, some tests to run the ViscoNip with a low nip load have been performed, with good results.

"We have been producing some light grades with improved softness, and we have recorded very good product quality, better than our other machines," says Harding.

In addition to energy savings and high-quality products, the runnability and product quality are also impressive. Harding continues: "Absolutely, the profiles are more uniform, which improves the runnability. Comparing the profile analyses for all three machines, TM 3 outranks the other machines".

"The profile issue is vital to obtaining a certain quality in a stable way. The consistency to get the right quality at every moment is what is most important for a tissue producer," Carlos Hirigoyen emphasizes.

The experience of running the ViscoNip press has convinced CMPC that it would also be an efficient tool for reducing energy consumption at other mills, too. Recently, they decided to upgrade their PM 11 in Caieiras, Brazil with an Advantage ViscoNip press for energy reasons.

CMPC's strategic decision to select the most energy-efficient machine in the world at Talagante turned out to be a wise choice, as well as giving them the highest production capability in Chile. As an extra bonus, they are reducing their environmental impact, well in line with their strategic targets.

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The Talagante mill is located in an open landscape close to vineyards and the Maipo River.

The Talagante mill recently installed a cogeneration system where Valmet provided the conceptual design and the project to connect the exhaust system to TM 3.

Talagante TM 3

Machine Type: Advantage DCT 200
Width: 5.5 m
Design speed: 1,800 m/min
Forming: OptiFlo II TIS headbox
Pressing: Advantage ViscoNip press
Drying: Cast alloy Yankee cylinder, Advantage AirCap hood
Reeling: Advantage SoftReel
Valmet Automation DNA and QCS
Valmet engineering

About CMPC

CMPC is a leading company in Latin America. It operates in the fields of forestry products, wood pulp, paper and tissue. CMPC has 22 tissue machines in seven countries with a total production capacity of 600,000 tonnes of tissue a year for the Latin American Consumer and Away-From-Home markets. The Talagante mill in Chile specializes in producing high-quality tissue products such as printed napkins, as well as other niche quality products for the whole market.

CMPC market their products under seven brand names. The most well-known and popular are Elite and Confort, which has more or less become the generic term for tissue in Chile.

Carlos Hirigoyen and Felipe Harding are satisfied with the Advantage ViscoNip press' energy-saving capabilities.

"The new air nozzles both improved drying capacity and decreased energy consumption."

PHOTO Peace Boat/Shoichi Suzuki

About the mill

With six paper machines, two off-machine coaters and an annual production of 860,000 tonnes, Ishinomaki Mill is Nippon Paper Industries' flagship mill in Japan. A pulverized coal boiler provides the main source of energy alongside two black liquor recovery boilers and a biomass boiler. Its PM N6 started to produce lightweight coated paper and A3 coated paper in 2007.

Close to 20% cut in air dryer energy

PowerFloat Plus air dryer nozzles cut air dryer energy consumption by close to 20% at Ishinomaki. TEXT Minea Hara

With 1,005 tonnes of lightweight coated paper produced every day, Nippon Paper Industries' Ishinomaki Mill's PM N6 is one of the largest capacity paper machines in Japan. In 2011, the mill was devastated by the tsunami that followed the Great East Japan earthquake. The mill has now recovered from the disaster. One of the mill's most recent updates was the rebuild of the PM N6 air-dryer blow nozzles in order to enhance the drying capacity.

More drying capacity with less energy

The N6 machine has three air dryers after the coaters and conventional float-type air blow nozzles. There had been problems with the air dryer reaching its drying capacity limits at normal operating speeds. The sheet edges were unstable, and as the wet coating color contacted the air dryer, lumps of dried coating color caused sheet breaks and defects.

Valmet suggested installing a new type of energy saving nozzle on the dryers. The target was to increase drying capacity, improve energy efficiency and also enhance the smooth running of web edges inside the air dryer.

New PowerFloat Plus blow nozzles were installed in September 2014. Expectations were exceeded, as the mill was able to double their original target of reducing the energy comsumption by 10%. **Hideyo Yamaguchi**, Assistant Manager of the Paper Production Department at Ishinomaki Mill, explains: "The new air nozzles both improved drying capacity and decreased energy consumption."

Advanced air nozzle dryer technology

As one of the most advanced nozzles on the market, Valmet's patented PowerFloat Plus permits up to a 50% increase in drying capacity compared to conventional foil nozzles, and a 25–30% increase in evaporation capacity with float-type nozzles. The innovative air nozzle dryer technology results in less energy being lost to the exhaust air and additional energy transferred to the sheet.

Energy savings through improved drying efficiency

Mr. Yamaguchi is happy with the results. "After the installation, we achieved an energy saving of close to 20% with the air dryer through improved drying efficiency. Sheet runnability was also improved, and the distance between top and bottom nozzles could be made 20–55% narrower than with the old type of nozzles," he confirms.

"We are planning to continue to improve production capacity by utilizing the drying capacity improvements. We are pleased with the cooperation with Valmet on the installation." ■

Text based on presentation by Hideyo Yamaguchi, Ishinomaki Mill, Nippon Paper Industries Co., Ltd. / Japan Tappi

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← Hideyo Yamaguchi, Assistant Manager of the Paper Production Department at Ishinomaki mill.

"We have had excellent support from Valmet every step of the way."

Marie Morin and Peter Grabner confirm that the installation of the Valmet IQ QCS system has been very successful.

When IQ takes the control

Valmet IQ replaces 1995-vintage legacy quality control system and reduces grade change times by 25% at Stora Enso Skoghall.

TEXT Sören Back

Stora Enso Skoghall is one of the world's largest producers of liquid packaging board. KM 8 is the biggest liquid packaging board machine in the world, with a production capacity of 465,000 tonnes of five-ply board coated three times on the top side with a starch application on the wire side. Replacing their old quality control system (QCS) on board machine KM 8 with a modern Valmet IQ system with three scanners, has cut the time of grade changes by 25%.

"In 2011, we had reached the end of the lifetime of the existing quality control system, which had been operating since KM 8 started in 1995," says **Leif Karlsson**, Project Manager at Stora Enso Skoghall. "We had a Measurex system, and it was becoming increasingly difficult to get hold of spare parts. Therefore, we started a project to replace the existing QCS, at the same time as we wanted to keep the existing special solutions and develop them further."

In addition to the project group, a reference group that included process operators was created to make sure that all the important matters were taken into account. Requirements were listed, and in order to give potential suppliers a good basis for their calculations, around a hundred machine runs were conducted to e.g. determine how long run-ins and quality changes took. We needed to shorten them using a new quality control system."

Project split into three parts

The suppliers got all the relevant machine data to calculate the times for run-ins and quality changes as well as for machine optimization. A quality control system with the right choice of sensors to measure the relevant properties, good profile control across the machine, advanced control of property variations in the machine direction, and online retention measurements for the different board plies should make run-ins and quality changes at least 25% faster. After a comprehensive evaluation of the offers and technical solutions from suppliers, Stora Enso opted for Valmet's IQ quality control system.

"As it is a big deal to change from one quality and control system to another, we wanted to make it as risk-free as possible," Leif Karlsson continues. "In order to reduce the risks, we therefore split the project into three parts."

The first part was done during the autumn maintenance break in 2012 and comprised the base paper scanner with measurements for grammage, moisture, caliper, fiber orientation, formation and color, as well as a new moisturizer for moisture profile control. A Valmet Retention Measurement device (Valmet RM3) was installed for one of the board plies to test its capability. The outcome was very positive, so Skoghall bought RM3s for all plies as they saw great potential for optimizing the chemicals used. During the first year, the operators were able to switch between the old moisturizer and existing fiber orientation control and the new equipment from Valmet.

The second part of the project, completed in autumn 2013, was in the coating section, in which the manual profile controls of all three coating stations were replaced with a Valmet IQ Coat Weight Profiler for automatic control of the coating. Two of the scanners were installed after the first and third coating units. After the second pope reel, the grammage, moisture, caliper, coat weight and color are measured, as well as the surface moisture on both sides. In the future, measurements of surface moisture on both sides of the web can be used to control the curl.

During the autumn maintenance break in 2014, the last parts of the old quality control system were replaced. Valmet renovated or exchanged all the actuators for grammage control in the headboxes. Today, the fiber orientation of the board's top and back plies is controlled with Valmet IQ Slice Profilers, while the basis weight control for the three middle plies is done with a Valmet IQ Dilution Profiler.

After the second pope reel, the grammage, moisture, caliper, coat weight and color are measured, as well as surface moisture on both sides.

Facts about the KM 8 QCS system

- 2 Valmet IQ Slice Profilers
- 3 Valmet IQ Dilution Profilers
- 3 Valmet IQ Coat Weight Profilers
- CD controls from popes 1 and 2, and for coating station from single-sided scanners.
- MD controls: headbox × 5, drying, coating, retention and chemistry
- 5 Valmet RM3 analyzers in retention measurement
- Valmet Pulp Analyzer for freeness control

Marie Morin and Peter Grabner at a coating unit where the coat weight profile is now automatically controlled.

Stora Enso Skoghall produces 780,000 tonnes of liquid packaging board and CKB board as well as 375,000 tonnes of sulfate pulp and 260,000 tonnes of CTMP.

All three start-ups have been very successful and we managed to achieve approved quality after just ninety minutes," says Leif Karlsson, Project Manager.

Run-in periods and quality change times reduced by 25%

"All three start-ups have been very successful and managed to achieve approved quality after just ninety minutes," says Leif Karlsson. "We have now been running KM 8 for more than eighteen months with the complete Valmet QCS system. Almost all our goals have been achieved, including shortening run-in periods and quality change times by 25%."

Reduced maintenance

"A QCS is a narrow competence area, so it is important to have our own people with knowledge about the system," says **Peter Grabner,** who is in charge of the QCS system maintenance for KM 8. "So we have a dedicated QCS group to keep control of the system and be able to give support to the operators. One of the four teams is in turn available around the clock, but luckily most of the support needed can be given from home."

"All in all, the maintenance needed for the new QCS system has been considerably reduced compared to the previous situation, and of course we can easily get hold of spare parts."

"Excellent support every step of the way"

"The total investment was roughly five million euros, which was below our budget even though we split the project into three parts over three years," says Leif Karlsson. "We wanted to minimize the risks. We believed – and we still do – that it was the right decision. Some money could have easily been lost if we had had problems with the new system or our lack of experience with it if everything had been done in one go."

"We have had excellent support from Valmet every step of the way. During the start-up, experts from Valmet worked with each shift team, and we also had a support link from Finland so that any issue or problem could be resolved swiftly," Leif Karlsson finishes. ■

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Sharing the journey with tissue makers

Valmet's unique range of tissue services contributes to improved tissue making performance by focusing on energy efficiency and product quality.

TEXT Minea Hara

For a tissue making line to operate to its maximum potential, there needs to be perfect interaction between many processes and parameters. At a grand scale, even small actions can have a huge impact on improving tissue paper properties and reducing energy consumption.

Unique offering of process technology, automation and services

With a strong experience base and a global network of specialists in tissue making, Valmet has the competence, technology and resources to solve maintenance and optimization challenges. Our service solutions combine process knowhow, automation and services in an advantageous combination. We set out to meet each customer's individual targets.

Unlocking the potential for better tissue making

Typical challenges in tissue making include process performance, avoiding unplanned shutdowns, reducing energy consumption and maintaining consistently high tissue quality. Today's tissue makers are striving for more sustainable operations and improved cost efficiency.

Reducing environmental impact is a natural part of Valmet's development of tissue solutions. The potential for higher quality and reduced energy consumption is another driving force for innovation. Above all, we aim to make tissue makers' lives easier with safe, easy-to-operate equipment and solutions that pay for themselves quickly.

Solutions for energy savings and easier operation

In many tissue machines, there is an energy saving potential that can be tapped.

Today's tissue machines use about 70% of their total energy in the drying process. With proper dryness parameters and balanced settings of the hood and air system, Valmet's smart Advantage BalanceControl system lifts production to a new level while keeping the drying energy consumption as low as possible. The profiling accuracy of Valmet's IQ Steam Profiler combined with its advanced steam injection technology maximizes steam absorption efficiency and temperature increase, providing very high dryness.

Valmet DNA is a single automation system for all functions needed for tissue automation, and is scalable to all operating conditions, no matter the size. Monitoring the tissue machine's energy and raw material consumption in real time improves maintenance efficiency and makes operators' work easier.

"The potential for higher quality and reduced energy consumption is a driving force for innovation."

Scalable automation solutions, such as Valmet IQ online quality management, offer all the devices and controls needed to optimize end product quality and process stability. In response to tissue makers' specific needs, Valmet IQ has several features dedicated to tissue, such as the industry-first online IQ Softness sensor.

Solutions to ensure uniform tissue paper quality

Targets for improved end product quality often revolve around better tissue bulkiness and higher softness. A stable and reliable press operation minimizes variations in quality and improves runnability.

Valmet's Advantage ViscoNip press provides flexibility in press nip load variation, for example, to reduce the energy consumption or to increase bulk and softness. To ensure safe, reliable pressing operations, the new Advantage ViscoNip service supports optimum performance to maintain high product quality and sustainable production.

Well-functioning processes in optimal dewatering and sheet formation are necessary not only for good paper roll quality, but even to avoid economic losses due to web breaks, poor roll structure and unplanned shutdowns. Valmet's roll covers, tissue forming fabrics, press felts and shoe press belts are designed to provide the best possible dewatering technology through improved drying capabilities and resilient performance in even the toughest conditions.

Benefits that speak for themselves

Unlocking the potential for higher-quality tissue production is all about finding optimal solutions, taking advantage of advanced technology and utilizing smart combinations of automation and equipment. Tissue makers all over the world are benefiting of Valmet's service solutions through higher-quality tissue rolls, easier operation and major energy savings. ■

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Tissue-makers are looking for energy savings and good machine performance – in other words, high efficiency and good runnability. Paper machine clothing is an important part in achieving these targets. TEXT Marjaana Lehtinen

Successful tissue making performance with

optimized fabrics

"Getting paper machine clothing and machine technology from one supplier is a benefit to our customers," says **Mikko Blom**, General Sales Manager, Paper Machine Clothing at Valmet.

Valmet offers tissue mills a full scope of forming fabrics, press felts and shoe press belts - all optimized for ideal performance.

Felts for best dryness

Valmet's StarMaster FT family includes press felts for all kinds of tissue machines, from traditional ones where maximal dryness is typically achieved with one nip, to

Screening the BlackBelt surface after casting.

machines with an Advantage ViscoNip press or shoe presses. The ideal kind of press felt depends on, for example, whether the machine produces premium or heavy grades, whether it is a fast or superfast machine, or if a short breaking-in time is needed.

"The base structure of the felt must be dense to create hydraulic pressure. On the other hand, it must be open to allow the water to flow onto the surface of the suction roll and to utilize the suction roll vacuum effect on the back side. Optimization presents a challenge," Blom says. "One of our 'secret weapons' in R&D is a water flow simulator that measures water flow resistance through the felt in both the cross and machine directions. Our tissue felts are also tested on our pilot machine in Karlstad, Sweden."

Introducing: A new coated seamed press felt for safe installation

Seamed felts greatly improve safety at mills. It is much safer to install a seamed felt than an endless one. Thanks to the seam, felt installation is much faster and it takes much less manpower to change the felt. In addition, tissue felts are typically very long, averaging some 40 meters. Installing a long felt can be challenging and time-consuming. That's why Valmet has developed the coated SeamMaster FT felt.

"Coating, in turn, allows us to make a seam flap that not only protects the seam, but also eliminates potential problems caused by the seam on light tissue paper," Blom explains. The treatment makes the felt structure dense, non-compacting and perfect for a fast start-up and immediate nip dewatering. It also gives the felt a much smoother surface.

Good dewatering and long lifetime with BlackBelt

Today, all ViscoNip presses are equipped with the BlackBelt FT shoe press belt. It features accurate dimensions and easy installation, as well as a unique matt treatment on the inside surface to ensure low friction between the ViscoNip beam and belt. A large open area and void volume ensure good dewatering with no risk of marking.

> "Combining a Valmet felt and BlackBelt has resulted in an energy savings world record in tissue production."

"High-density grooves have proven to be a good solution, especially for tissue machines. The narrow lands ensure fast dewatering without leaving any water flow marks on the sheet," Blom adds.

So far, the record running time of a BlackBelt in a tissue machine has been over 200 million nip cycles. Another belt lasted for over 17 months in a shoe press.

Record-high energy savings

The combination of a Valmet felt and BlackBelt has resulted in an energy savings world record in tissue production. A modern tissue machine in Chile became the first in the world to lower its specific energy consumption to under 1,800 kWh per tonne produced. In July 2015, the same machine achieved record-high efficiency of 89.7%.

"The machine has run many Valmet felts, and the results have been very consistent. This proves that the repeatability of our products is high," Blom points out.

Excellent runnability in the forming section

For high-speed tissue machines with the highest fabric stability requirements, Valmet's solution is GapMaster Ultra FT. The benefits of this modern SSB fabric include a high dry content, high retention and cleanliness, as well as excellent trimming.

"Results from tissue machines have proven that GapMaster Ultra FT's fiber and water carry is lower as compared with other corresponding products. Also trimming has worked very well. These benefits have resulted in improved runnability", Mikko Blom concludes. ■

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The final touch before packing the felt into the box.

Juha Kronqvist is a service design expert who is on a mission to create and improve services with an emphasis on human-centric thinking. He believes businesses can grow by offering great customer experiences.

Why services need great design

The latest hot trend in the business world is "service design" – a new form of development approach that focuses on humanizing interaction in service processes. TEXT Vesa Puoskari

"Service design focuses on the people that are served by technologies and systems, putting them back at center stage," says **Juha Kronqvist**, Design Director at service design consultancy Hellon, who also teaches service design at Aalto University in Helsinki, Finland.

Kronqvist is on a mission to create and improve services, with an emphasis on human-centered thinking. As a result of rapid digitalization and a focus on efficiency, many organizations have lost sight of the realities of peoples' daily lives. As a result, they provide confusing technology and overly complex IT services that have little to do with mundane reality.

"In the digital world, dissatisfied customers can easily replace a poorly performing service provider with another, because services no longer build strong connections between people and providers. Customers also share their good and bad experiences on social media, which is beyond the control of service providers," says Kronqvist.

"The battle is tough, so organizations have to truly concentrate on their customers' needs in order to gain a competitive advantage," he points out.

Kronqvist knows this field better than most, as he is preparing his PhD thesis on the topic at Aalto University in Helsinki. At the same time, he is deeply involved in his work as a leading service designer at Hellon, a rapidly growing consultancy based in Helsinki and London.

"Businesses can grow by offering great customer experiences. Price and cost efficiency are still essential, but there is also a need for empathy and a human touch in this field. Satisfied customers buy more and are likely to use a service again – which is why you must never stop investing in developing the customer experience," says Kronqvist.

Starting with people

According to Kronqvist, the core of service design is to find out how service providers connect with customers in their everyday lives, covering the whole value chain from the first contact through to the final invoicing of the product or service.

The process involves planning and organizing the infrastructure, communication and material components of a service to improve the quality of interaction between the service provider and customer.

"In the first phase, we comprehensively analyze the current state of the service and the kind of customer experience it provides. Then we develop new ideas for improving the interaction between service providers and their customers."

"During the testing phase, we prototype ideas in simulated situations. For example, we have constructed a service environment at our premises and tested how our ideas would work in practice," says Kronqvist about the creative process.

Mapping the process requires human-centered expertise, including designers, ethnographers, graphic designers and spatial design professionals, as well as engineers and business experts.

"When we have verified that the new service works perfectly from the beginning through to the end, it is time to take the next step and invest in organizational changes," explains Kronqvist.

Service design needs a new approach

Demand for service design is continuing to grow globally, as evidenced by the increasing number of companies that now have their own service design teams and budgets.

Investors also reward companies for these efforts. The DMI Design Value Index shows that design-led companies have maintained a significant stock market advantage over the last ten years, outperforming the S&P 500 by an extraordinary 228%.

Kronqvist believes that even the long production chains typical in manufacturing are ultimately all about people, not just organizations. He notes that traditional manufacturing companies are constantly adding new services to their product portfolio, their aim being to build an ecosystem around their products and services.

"Existing structures and processes have to be reshaped to provide better customer service. This transformation requires a totally new approach and engagement from the whole organization."

Kronqvist predicts that the increasing use of artificial intelligence and robots will eventually replace a large proportion of service sector jobs, making service design all the more relevant.

"We are going to need more people with creative problem-solving capacity and empathy who can solve complex challenges in the future." ■

"The battle is tough, so organizations have to truly concentrate on their customers' needs in order to gain a competitive advantage."

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.

Meet Valmet at Tappi PaperCon

Come to meet Valmet at Tappi PaperCon conference in Cincinnati, Ohio, USA, on May 15-18.

Advantage NTT tissue line produces 100% textured tissue in Chile

An Advantage NTT tissue line has started up at the Forestal y Papelera Concepcion (FPC) mill in Chile. The new line fulfills FPC's target of producing 100% textured tissue, differentiating the company's product offering, with low energy consumption. This is so far the widest installed Advantage NTT machine with a width of 5.5 meters. The delivery also included an automation package.

Multivariable process controller to Boliden's zinc plant

Valmet has received an order for a Valmet DNA multivariable predictive controller from Boliden's zinc plant in Kokkola, Finland. As an advanced process control, the multivariable controller is one example of Valmet's Industrial Internet solutions.

New screening and washing plant to Smurfit Kappa Cellulose Du Pin

Valmet will supply Smurfit Kappa Cellulose Du Pin Biganos pulp and paper mill in France with a new screening and brown stock washing plant for kraft liner pulp production. The order includes a screening plant with a reject refiner and a washing stage consisting of a filter stage followed by two TwinRoll presses. The plant will have a capacity of 1250 adt/d.

Wood pellet heating plant to Helen power plant

Helen Oy has ordered a wood pellet heating plant to its Salmisaari power plant in Helsinki, Finland. The wood pellet plant will enable Helen to increase the use of bio fuels in district heat production. The new plant helps the city of Helsinki to meet its aim of increasing its production of renewable energy.

Sofidel orders a Valmet Advantage NTT tissue line

Sofidel has ordered a complete automated tissue line to their Delitissue mill in Ciechanóv, Poland. The delivery includes an Advantage NTT 200 tissue line, stock preparation equipment and automation system. Valmet has previously delivered eleven tissue lines to Sofidel mills in Europe.

Cooperation started in lignin derived biochemicals

Valmet and Biochemtex will start to cooperate in the field of conversion of lignin into biochemicals. The development project will combine and adapt LignoBoost and Moghi technologies. LignoBoost is Valmet's proprietary technology for the extraction of purified lignin from black liquor produced by pulp mills. Moghi in turn is Biochemtex's proprietary technology for the conversion of lignin into biofuels and biochemicals.

New partnerships to expand Valmet's automation business

Valmet has signed new value-added reseller (VAR) agreements for power and process industry automation in Hungary, Spain and India. Valmet will supply Valmet DNA automation and information platform for process control, whereas the partner is responsible for project execution and resources.

New white liquor filter to Rottneros pulp mill

Valmet will deliver a white liquor filter to Rottneros' Vallvik pulp mill in Sweden. This investment is part of Rottneros AB's larger rebuild project, which aims to increase availability and the total production volume at both of Rottneros AB's pulp mills, Rottneros Mill and Vallvik Mill, and with a target to reach a capacity of 500,000 tonnes per year.

Board machine key technology to China

Valmet will supply board machine key technology to two new containerboard machines in China. The customer remains confidential. The delivery will include five new OptiFlo Fourdrinier headboxes and two OptiPress Linear double-nip press sections. All the delivered machinery will be equipped with machine control systems.

About Valmet

Valmet is a leading global developer and supplier of services, automation 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.

LOCAL AUDITOR POOLS
Valmet's procurement organizations in each area have a pool of local sustainability auditors.

Explore sustainability at Valmet

Valmet systematically works on its sustainability agenda, which focuses on five core areas: a sustainable supply chain; health, safety and environment (HSE); people and performance; sustainable solutions and corporate citizenship. Each focus area has a specific action plan with targets and key performance indicators. The year 2015 was a milestone for many significant achievements in our sustainability work.

Global supplier management process in place

By the end of 2015, Valmet had established all the key processes for evaluating and managing the sustainability of its suppliers' operations in a globally aligned manner. By the end of the year, all active suppliers had been informed about the company's Sustainable Supply Chain Policy, to which all suppliers are required to commit. All suppliers had also been assessed using a five-level sustainability risk assessment, and relevant tools and processes established for supplier self-assessments and audits.

Based on the risk assessments and self-assessments, Valmet conducted in total 41 supplier sustainability audits with a third party in 2015, and 380 procurement professionals globally attended training in sustainability.

Valmet's safest year ever

During 2015, Valmet met its mid-term target for lost time incident frequency (LTIF) for Valmet employees. Our LTIF rate at the end of 2015 was 3.3 (12 months rolling; 5.5 at the end of December 2014). Once again, there were no fatalities in Valmet's operations among our employees and our contractors.

We have systematically developed our management approach to ensure continuous improvement in safety culture, processes, competencies and performance. In 2015, we focused on improving preventative safety measures, reinforcing safety awareness and leadership, and harmonizing HSE practices globally in customer project deliveries.

Personnel engagement on the rise

In 2015, Valmet conducted its second employee engagement survey, which had a global response rate of 81 percent (68 percent). The survey results improved in nearly all questions, and overall global employee engagement rose by 9 percentage points to 65 percent.
During the year, Valmet launched a renewed global training portfolio with five new global training programs. We also continued to develop the role of managers and embed the company values in our daily work.

Socially responsible and globally aligned operations

Valmet's values and Code of Conduct, along with selected globally acknowledged principles, establish the foundation for sustainable performance at Valmet.

To promote standards of behavior along with the set principles, Valmet enforced its updated Code of Conduct in 2015. By the end of 2015, 90 percent of Valmet's employees had completed the related e-learning or had participated in classroom sessions to familiarize themselves with the updated Code.

Valmet recognized as one of the world's sustainability leaders in 2015

As a token of our strong overall sustainability work, Valmet was included in the Dow Jones World Sustainability Index as one of the 317 most sustainable companies in the world, for the second year in a row. Valmet also ranked highly in CDP's climate change program, with a score of 97/100.

New sustainability action plans for 2016–2018

In early 2016, Valmet conducted an extensive review of its strategy in order to establish new action plans for 2016–2018. These roadmaps define specific actions and targets for each focus area. There is a continuing special focus on ensuring a globally sustainable supply chain and continuously improving our HSE culture.

More information on the agenda and action plans is available at **www.valmet.com/sustainabilityagenda**

Read more in Valmet's Annual Report or watch the "Explore sustainability at Valmet" video (QR code) to learn more.

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Valmet's customer magazine

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Move your performance forward with Industrial Internet

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Valmet FORWARD