

The power of a  
shared journey 24

Optimizing  
combustion 58

The rewinder as  
an enabler 68

# Forward

VALMET'S CUSTOMER MAGAZINE | 1/2020

Refiner rebuild for Mitsubishi  
Paper's Hachinohe Mill

Quality  
all the  
way

# Editorial

## Making high quality happen

Valmet is committed to high quality in both its operations and the products and services we provide to our customers. To fulfill our commitment, we take a systematic approach to developing our quality performance. We work closely with our customers to understand their quality-related needs and meet their expectations. Customer feedback is a valuable source of information that helps us to become better in quality and in serving our customers.

To boost our quality culture and performance, we focus on several different areas of quality. Our common theme at Valmet is: *“Quality does not just happen – we make it happen”*. We aim for a good quality performance before, during and after the delivery of our technologies and services, and cooperate with our customers in enhancing the quality of their end products.

As well as providing our customers with high-quality products and services, we also want to create a

strong customer experience at all touchpoints and enable smooth cooperation. We attend to the smaller things as well as the bigger things – for example, efficient and purposeful meetings and easy access to all relevant documentation are basic parts of our quality performance as a partner.

High quality requires determined work and commitment at every step of the value chain. By continuously strengthening our quality culture and investing in the training of our personnel, we ensure that the values and competencies of our people match those required to produce high-quality solutions. We also set clear quality-related requirements for our suppliers and partners, and support them in fulfilling the set targets.

Making high quality happen is truly a common effort! In this magazine, we explore and highlight examples of the many ways in which we are working with quality – most often in close cooperation with our customers. I hope you enjoy reading about them!



**ANU SALONSAARI-POSTI**  
SENIOR VICE PRESIDENT  
MARKETING AND COMMUNICATIONS

 > [Twitter.com/valmetglobal](https://twitter.com/valmetglobal)

 > [Youtube.com/valmetglobal](https://youtube.com/valmetglobal)

 > [LinkedIn.com/company/valmet](https://linkedin.com/company/valmet)

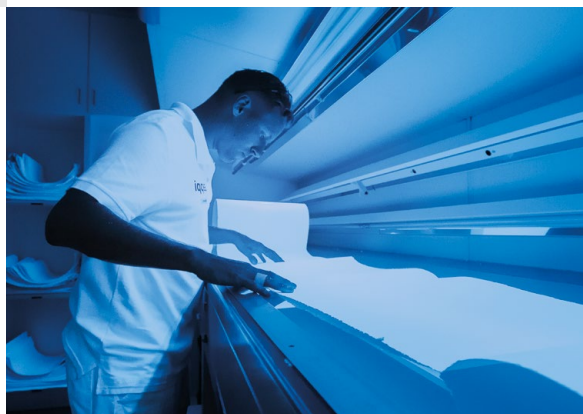
 > [Facebook.com/valmetcorporation](https://facebook.com/valmetcorporation)



> [www.valmet.com](http://www.valmet.com)



# In this issue 1/2020



**White and bulky board with three-layer headbox and metal belt calender**  
**20**

**True teamwork fuels the success of maintenance operations outsourcing**  
**41**



**Advanced technology secures efficient processes for years to come**  
**44**

- 4 In brief**
- 8 Moving forward with a full range of new VII solutions**  
Valmet introduces a full range of new, data-driven Industrial Internet solutions.
- 12 Quality all the way**  
A comprehensive approach to quality resulted in the optimization of both operation and quality in Mitsubishi Paper Mills' refiner rebuild.
- 18 Making quality happen**  
At Valmet, everything starts with understanding what quality means to customers.
- 20 Bright and shiny board**  
Valmet's unique three-layer headbox and metal belt calender have helped Sappi Maastricht to produce outstandingly white and bulky board.
- 24 The power of a shared journey**  
A shared focus on continuous improvement has enabled Beihai Mill to become a benchmark for high-end white cardboard in China.
- 30 The next step forward with intelligent iRolls**  
Valmet's Intelligent Roll Solutions for press efficiency has reduced web breaks, increased speed and boosted post-press dry content at the N R Agarwal paper mill.
- 32 Smooth flow from reel to winder**  
A fast parent roll change solution with a butt-joint splicer and automatic parent roll transfer have helped Mondi Štětí free the PM7 finishing area of bottlenecks.
- 35 To the finest fiber detail**  
Better knowledge of raw material fiber properties have helped the BillerudKorsnäs board mill improve stock preparation.
- 38 A breakthrough in surface cleaning cylinders**  
Improved doctoring on the dryer section has helped meet production quality requirements at Corex's board mill.
- 41 All for one**  
Outsourcing of maintenance operations to Valmet has proven a powerful combination for Asia Symbol (Shandong) Pulp & Paper Co.
- 44 Building for the future**  
ARAUCO's major ongoing expansion project in Chile – MAPA – focuses on the production of high-quality pulp and renewable energy.
- 48 The giants of the sea**  
A unique combination of tailor-made scrubbers and automation has helped DSME's new container vessels drive sustainability at sea.
- 50 The heart of the biogas plant**  
The world's northernmost biogas plant runs with Valmet's DNA automation system at the Lappia Vocational College.
- 52 Shared values – shared targets – shared partnership**  
The annual maintenance shutdown at Klabin's Monte Alegre paper mill has continued the success of outsourced shutdowns.
- 56 Excelling with data**  
Mondi and Valmet have joined forces to take the performance of Mondi's Syktyvkar pulp and paper mill to the next level.
- 58 Beating NOx emissions missions with optimized combustion**  
Pohjolan Voima has succeeded in reducing NOx emissions and improving energy efficiency through combustion optimization and data analyses.
- 62 Steel or casted Yankee**  
Steel and casted Yankee dryers both have their benefits in different areas, depending on your type of production.
- 66 Unleashing the green value of methanol**  
Better use of the pulp mill byproduct methanol may help a pulp mill reduce fuel costs and the carbon footprint, and increase production.
- 68 The rewinder as an enabler**  
Converting tissue paper into finished products is not always as straightforward as it might look. That's where the rewinder comes into play.
- 72 Digging more deeply into fibers and particles**  
Valmet's Fiber Image Analyzer's new ultra-high definition imaging and classifying capabilities enable a more detailed understanding of fiber reactivity.
- 74 Expert's voice**
- 78 Around the world**
- 80 About Valmet**

# In brief

## New long-term social responsibility program kicks off

Valmet is initiating a new long-term social responsibility program for the company. The program's key themes are: "Equal opportunities for wellbeing"; "Toward the future with science"; and "Protecting the planet for the next generations".

As a first step in program implementation, Valmet has signed a three-year agreement with Save the Children Finland to support their Child Sensitive Social Protection project in Dungarpur, India. Valmet donates EUR 50,000 annually to Save the Children's project, which increases children's school attend-

ance and retention, and improves care for orphans and other vulnerable children. The project reaches a total of 24,000 children and adults.

"Our project in Dungarpur supports the most vulnerable children and their families. Our target is to increase their access to existing social protection programs and improve parents' awareness of children's education and wellbeing, which is one of the most efficient ways to prevent child labor and reduce malnutrition," says **Anne Haaranen**, Director for International Programs at Save the Children Finland.



## CLIMATE

## Recognition for climate action

For the second consecutive year, Valmet has been recognized for its actions and strategy to mitigate climate change with the best A rating in CDP's climate program ranking. CDP is an international non-profit that encourages companies and governments to reduce their greenhouse gas emissions, safeguard water resources and protect forests.

"Our customers in the pulp, paper and energy industries are moving toward lower CO<sub>2</sub> emissions, and Valmet's technology and innovations are playing a key role in their progress. Our solutions enable customers to reduce their energy use and cut CO<sub>2</sub> emissions," says **Laura Puustjärvi**, Head of Sustainability, Valmet.

Valmet is actively developing new ways to improve energy, water and material efficiency, reduce its solutions' emissions during the customer use phase and bring new innovations to the market. Valmet also has a systematic program to reduce CO<sub>2</sub> emissions in its own operations, with a focus on more sustainable transportation, energy efficiency improvements and process optimization.

## The world's fastest coated board making line is on the horizon

Valmet will supply a coated board making line (PM 2) with extensive packages of automation and Industrial Internet solutions for APP's Guangxi Jingui Pulp and Paper's (GJPP) Qinzhou mill in China. The start-up is scheduled for 2021.

When started up, the PM 2 will be the world's fastest and very modern coated boardmaking machine with the highest capacity. The startup and further optimization of the new board machine will be supported remotely from the Valmet Performance Center,

utilizing the latest Industrial Internet solutions.

"The most important target for GJPP was that the PM 2 would be a high-capacity board machine line with state-of-the-art technology. The customer also emphasized the importance of a low operating cost. Valmet's coated board line's very low energy and water consumption values were proven to be the lowest ones when comparing to competitors," says **Timo Saarevu**, Senior Sales Manager, Valmet.

## Orora's Botany Mill continues mill maintenance outsourcing

Valmet and Orora Limited have signed a multi-year Mill Maintenance Outsourcing (MMO) agreement to continue taking care of the site maintenance of Orora's Botany B9 board making line in New South Wales, Australia. In addition to the MMO agreement, Valmet and Orora have signed a Performance Agreement targeting clear and systematic production and maintenance improvements.

"Valmet is one of our key performance development partners, supporting B9's operation and improvement since the start up in 2012. We have worked collaboratively since then with progressive improvements and achievements in

key areas such as productivity and cost reduction. Our objective is to ensure the B9 facility becomes an industry benchmark in all areas of efficiency and cost," says **Craig Nicol**, General Manager Operations, Botany Mill.

Both agreements include Valmet Industrial Internet (VII) solutions to provide a live link between customer and Valmet experts for process optimization. Although Valmet's remote services have been utilized since the machine's start-up, the Valmet Performance Center will now offer the customer a new channel to reach Valmet's specialists for remote support and case studies.

Valmet has

# 85

**Industrial Internet (VII) applications for pulp, board, paper, tissue and energy producers**



## Continued investment in R&D and pilot facilities

Valmet's Paper Technology Center in Järvenpää, Finland, provides the world's most comprehensive pilot testing for the dry end of board and paper machines. To provide even better piloting services and correspond more accurately to the mill environment, the sizing section was updated with new spray beams, nip rolls and a web preheating system.

The new spray beams correspond closely to the spray beams of a mill-scale sizer – their details and functions are exactly the same. Valmet has also invested in new rolls and covers for hard nip sizing. Because the rebuild improves the efficiency of the pilot activities with reduced machine downtime, sizing concept changes are considerably shorter. This is a real advantage when a customer wishes to compare different surface sizing methods. By adding the web preheating, the pilot trial results correspond much better to the paper mill environment. You are most welcome to test all the available surface sizing technologies – film, spray, and pond application with soft and hard rolls – in the most realistic and mill-like environment.



→ [www.valmet.com/campaign/finishing-pilot-trials](http://www.valmet.com/campaign/finishing-pilot-trials)

# In brief

## Industrial Internet ecosystem partnership with Fabio Perini

Valmet and Fabio Perini, the leading company of the Körber Group's Business Area Tissue, has established an Industrial Internet ecosystem partnership to strengthen collaboration in the tissue industry. The partnership combines Valmet's comprehensive tissue-making technology and process optimization know-how with Fabio Perini's solid expertise in complete solutions for converting and packaging machines, as well as in the converting process and technology.

The collaboration aims to provide an unbroken chain of production data from the tissue machine to the converting line, and utilize artificial intelligence-driven applications in the tissue production process to make the converting operations downstream more efficient.

"By combining the strengths of our companies, we can facilitate broad innovation and fast adaptation, enable new business and service models, and help improve the profitability of companies in the tissue business," says **Oswaldo Cruz Junior**, CEO of Körber's Business Area Tissue.



## New microwave consistency measurement for pulp and paper makers

Valmet has launched a completely redesigned Valmet Microwave Consistency Measurement – Valmet MCA (patent pending) – for pulp and paper makers. Valmet MCA is now provided with digital electronics and the new Direct Sweep Detection measurement to offer higher performance measurement sensitivity and accuracy than competing analog designs.

Valmet MCA measures the total consistency of the pulp process stream, independent of fiber length, freeness, wood species or blend. Valmet MCA's new Twin Blade and the newly redesigned Flow Through sensors complement the offering by allowing paper and pulp makers to install it in larger pipe diameters. With its wider applicability, the new Twin Blade sensor can also be used to measure unscreened pulp.

The new and easy-to-use operating unit, Valmet Bridge, with comprehensive diagnostics, Wi-Fi and Industrial Internet-ready capabilities, provides a user-friendly experience and intuitive access to transmitter operations and Valmet's remote services.

## Key pulp mill technology and automation for Lenzing's and Duratex's joint pulp mill project

Valmet will deliver key process islands for Lenzing's and Duratex's joint venture named LD Celulose S.A. The new 500,000 tonne per year dissolving pulp mill is located in the cities of Indianópolis and Araguari in Minas Gerais state, Brazil. Valmet's delivery includes a fiberline, pulp drying and baling line, evaporation plant, white liquor plant and a mill-wide automation system. The start-up of the new mill is planned for the first half of 2022.

Dissolving pulp is a key raw material for manufacturing Lenzing's wood-based textile and specialty fibers. "Wood-based cellulosic fibers offer an important contribution to enhance sustainability in the textile industry. In planning the new production facility, particular importance was given to sustainability aspects. The plant will be among the most productive and energy-efficient mills in the world," states **Stefan Doboczky**, CEO of the Lenzing Group.

Valmet's experts share their thoughts on topical issues



by Johanna Kuronen  
Process Engineer

## Valmet Marine Services ready to serve

As of 1 January 2020, the SOx (sulphur oxides) emissions allowance has been decreased to close to zero in all ships. This regulatory change has increased the global demand for exhaust gas cleaning systems, or scrubbers. To respond to the simultaneous need for more scrubber maintenance, Valmet has launched Marine Scrubber Services.



“We are offering our marine customers an efficient service for spare parts, maintenance services and agreement-based business. Currently, our service consists of reliability services such as technical advice and spare part supply, but we are already expanding into performance services and other extended services such as follow-up & analytics and remote monitoring & support,” says **Teemu Toivonen**, Global Product Manager for Marine Scrubber Services.

Valmet Scrubber Services is a supplement to Valmet Marine's current offering, thus providing a unique combination of flue gas cleaning technologies, services and automation.

## Key technology for Bracell's new pulp mill

Valmet will deliver key technology for Bracell's project to build a new pulp production line at its mill located in Lençóis Paulista, São Paulo state, Brazil. Valmet's delivery will include an evaporation plant and a white liquor plant the lime kilns of which are fueled with gasified biomass.

In May 2019, Bracell announced its plan for a substantial expansion of the São Paulo pulp mill in Lençóis Paulista (formerly Lwarcel) to increase its current production capacity of 250,000 tonnes per year (tpy) by an additional 1,250,000 tpy to achieve 1.5 million tpy. The project is expected to be completed by the end of 2021.

## Continuous improvement is about making minor enhancements every day

Continuous improvement is a term most of us have probably heard at some point in our careers and lives, but, based on my experience, not many of us have taken a moment to consider the meaning behind the expression. Continuous improvement, or CI as it is often abbreviated, is at its simplest a way of acting in which things are done a little better the next time.

Most often, the secret of quality lies not in major activities but in minor changes made in daily operations. For example, I suggest everybody takes a moment every day to evaluate if something can be done more efficiently. By identifying areas with improvement potential and conducting the required changes, we may find ourselves on the way to improved quality – and thus to success. Aspects such as agreed common ways of operating or the reorganization of tasks to minimize the amount of excess work are small steps that can have a great effect on overall efficiency and quality.

Valmet has its sights set on continuing to improve its operations, products and services daily. We are pursuing this target by learning from our mistakes

and listening carefully to customer feedback. I have quite recently switched position within Valmet and taken the leap from the world of group-level quality to that of fiber technology research and development. It has been great to see that quality thinking is an integrated part of daily operations. At my workplace, considerable attention has

**“Most often, the secret of quality lies not in major activities but in minor changes made in daily operations.”**

been paid to the seamless cooperation and communication between process and laboratory personnel, because successful customer trials are impossible without everyone's contribution.

The daily improvements, no matter how small and insignificant they may seem at the time, are a vital part of being competitive in a tough operating environment. The ability to harness the improvement opportunities in our operations and behavioral patterns enables us to move our performance forward, benefiting both us and our customers.

# Moving forward with a full range of new VII solutions

Valmet introduces a full range of new, data-driven Industrial Internet solutions to pulp, board, paper, tissue and energy producers.

**TEXT** Leena Marttinen

**V**almet's Industrial Internet (VII) solutions combine advanced monitoring and prediction applications, Advanced Process Controls (APC), dynamic process simulators and remote services from Valmet Performance Centers in comprehensive solutions that provide tangible benefits to customers.

## **VII solutions for the needs of each customer industry**

The new VII solutions have been created for the specific needs of pulp, board, paper, tissue and energy producers. The aim is to efficiently utilize data and Valmet's expertise to reduce energy consumption, improve chemical and environmental efficiency, optimize pulp and paper quality, increase process reliability, maximize production, and enable the efficient management of the customer's equipment fleet.



“The aim is to empower our customers to move toward autonomous plants or mills.”

### Pulp

- VII for Production Capacity
- VII for Energy Efficiency
- VII for Environment
- VII for Pulp Quality
- VII for Chemical Efficiency
- VII for Reliability

### Board and Paper

- VII for Production Capacity
- VII for Paper Quality
- VII for Energy Efficiency
- VII for Reliability

### Tissue

- VII for Production Capacity
- VII for Tissue Quality
- VII for Energy Efficiency
- VII for Reliability

### Energy

- VII for Production Capacity
- VII for Energy Efficiency
- VII for Environment
- VII for Reliability
- VII for Fleet Management

“Our customers’ needs have been the starting point for developing these data-driven Industrial Internet solutions. We’ve integrated our process, automation and services expertise and extensive Industrial Internet application portfolio in a value-added solution offering. The aim is ultimately to empower our customers to move toward autonomous plants or mills, which will result in significantly more efficient production processes and operations. We want to engage our customers in a dialogue with data to move their performance forward,” says **Jari Almi**, Vice President, Industrial Internet at Valmet.

### How to get started with turning data into value

Applying a VII solution for a customer typically starts with a VII Data Discovery process. The first step is for Valmet’s experts to work with the customer to really understand the challenges and define the scope of data discovery. A batch of data is then taken from the systems

of the mill or plant, after which Valmet’s analytics team and process specialists make a big data analysis to identify the potential for improvement. The proposed solutions are then reviewed with the customer. This process lasts from six to eight weeks.

The result of the data discovery process is that the improvement potential is recognized, and the customer and Valmet have a shared understanding of the opportunities and next steps to be taken to convert data into value.

The implementation phase of the VII solution begins by establishing the VII applications, connectivity to Valmet’s Cloud and the remote services from the Valmet Performance Center. As part of the continuous VII solution, the customer receives remote support and data analytics from Valmet’s experts. Through the Valmet Customer Portal, the customer can see the VII applications and follow the selected KPIs.



"We want to engage our customers in a dialogue with data to move their performance forward."

### 85 applications to choose from

Valmet's portfolio of 85 Industrial Internet applications can be used to instantly optimize processes but also to predict what's around the corner. Thanks to the more predictive nature of the available information, it is possible to gain better control of the daily work in a mill or plant by pre-planning activities and running the process with fewer resources.

"In addition to production planning and control, data-driven applications incorporating Artificial Intelligence (AI) can process a large amount of data to provide a more holistic view of the entire production chain – something we humans could never do by ourselves," says Jari Almi.

### Valmet Performance Centers

Remote services from Valmet's eight Performance Centers are a key element of the VII solutions. Through remote connections and tools, Valmet's expert network is easily available for process, automation and maintenance support. And when required, on-site visits by Valmet's field service experts complement the remote services.

Valmet has a network of eight Performance Centers, serving customers around the world. Five of the centers are industry-focused: the Performance Centers for energy, pulp, board and paper, tissue and automation customers.

There are also three area-specific Performance Centers, operating in China, North America and South America. This ensures that the service can be offered in several languages and in every zone. The Performance Centers bring Valmet's data analyst and process expert network close to customers with a secure data connection to their mills or plants.

### Customer Portal

Customers can easily collaborate with Performance Center experts, access their VII applications and follow

up their Key Performance Indicators (KPIs) in Valmet's Customer Portal.

The portal combines all Valmet's online services in a simple easy-to-use platform in which all users have a personalized interaction with Valmet. The content and functionalities have been designed with customers and Valmet's experts.

For example, if a reliability-related VII application indicates that there is a need for spare parts, the order for the required parts can easily be placed in the e-Store module of the Customer Portal.

### Toward autonomous mills and plants

In the near future, successful companies will increasingly base their decision making on insights from data analytics and predictive applications, allowing them to take the optimization of their production and business to a new level.

Based on predictive applications the user can for example understand potential risk for equipment failure and prepare for the next planned shutdown better. This allows a shift from scheduled maintenance to outcome-based equipment maintenance.

"In future, Artificial Intelligence will probably take wider responsibility for mill or plant operations by autonomously entering the best set points into the automation system and changing its own settings to adapt to a predicted problem. The steps towards such autonomous mills of the future are already on the horizon," says Almi.

#### For further information, please contact:

Jari Almi, Vice President, Industrial Internet, Valmet, tel. +358 40 764 7512

The comprehensive catalogue of the new VII solutions can be found in [valmet.com/valmet.com/VII-application-catalogue](http://valmet.com/valmet.com/VII-application-catalogue).



## Implementation of a VII solution for existing production process

Phase	Improvement potential	VII Data Discovery	Implementation of continuous VII solution
	<ul style="list-style-type: none"> <li>Customer and Valmet's experts define data discovery scope and prioritize customer's issues</li> </ul>	<ul style="list-style-type: none"> <li>Valmet's analytics and process experts perform data discovery</li> <li>Improvement potential is identified based on data analysis</li> <li>Solution scope is reviewed with customer</li> </ul>	<ul style="list-style-type: none"> <li>VII applications and remote services are established based on data discovery findings</li> <li>On-site visits by Valmet experts</li> <li>Continuous data analytics and remote support by Valmet's experts</li> <li>VII applications and KPI follow-up are accessible for customer through Valmet Customer Portal</li> </ul>
Data		Batch of customer data when data discovery process starts	<ul style="list-style-type: none"> <li>Establish connectivity to Cloud</li> <li>Data analytics in Cloud and on-premise server</li> </ul>
Value	<ul style="list-style-type: none"> <li>Common understanding of issues for data discovery</li> </ul>	<ul style="list-style-type: none"> <li>Potential improvement actions are recognized</li> </ul>	<ul style="list-style-type: none"> <li>Keeping up optimum performance based on online data</li> <li>Latest features of applications always available for the customer</li> </ul>
		6-8 weeks	Continuous



# CUSTOMER'S VOICE

Moving forward together





# Quality all the way

Quality never stands alone – it's more like the sum of factors resulting in better products and processes.

And this was the case with Mitsubishi Paper's Hachinohe Mill, which resulted in the optimization of both operation and quality. **TEXT** Marika Mattila, Daisy Yang

To secure its competitiveness, Mitsubishi Paper Mills Limited, a manufacturer of high-grade printing and communication papers, conducted a refining rebuild at their Hachinohe mill in Japan in 2019. The company selected Valmet's high-capacity conical refiner as a solution to both increase end-product quality and decrease the energy consumption of the PM2's refining process.

↓ For operations daily tasks related to refining process has been reduced. The maintenance work is also easier than before the rebuild.

### A high-quality solution from idea to operation

Refining plays a decisive role in developing both stock fiber properties and final paper properties such as strength. It also greatly affects a paper machine's runnability and is a major energy consumer in a mill. Mitsubishi Paper trusted Valmet's refining expertise and high-quality technology because of the excellent results described in several references from around the world.

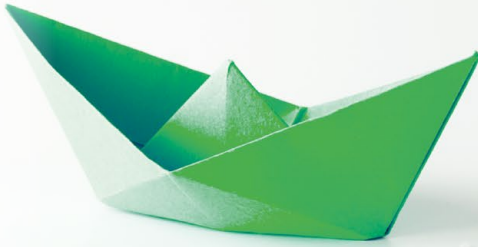
"We're very satisfied with the energy-saving effect of 30 percent, the reduction of maintenance costs and the refiner's easy operation method for our operators. We can now produce almost all our product grades with a single Valmet high-capacity refiner instead of the two old refiners," says Mr. **Hajime Endo**, Manager of No.1 Paper Production, Operation Department at Mitsubishi Paper's Hachinohe mill.

The right solution was justified by conducting pilot trials at Valmet's Fiber Technology Center, where they were comprehensively compared with the PM2's actual production conditions.

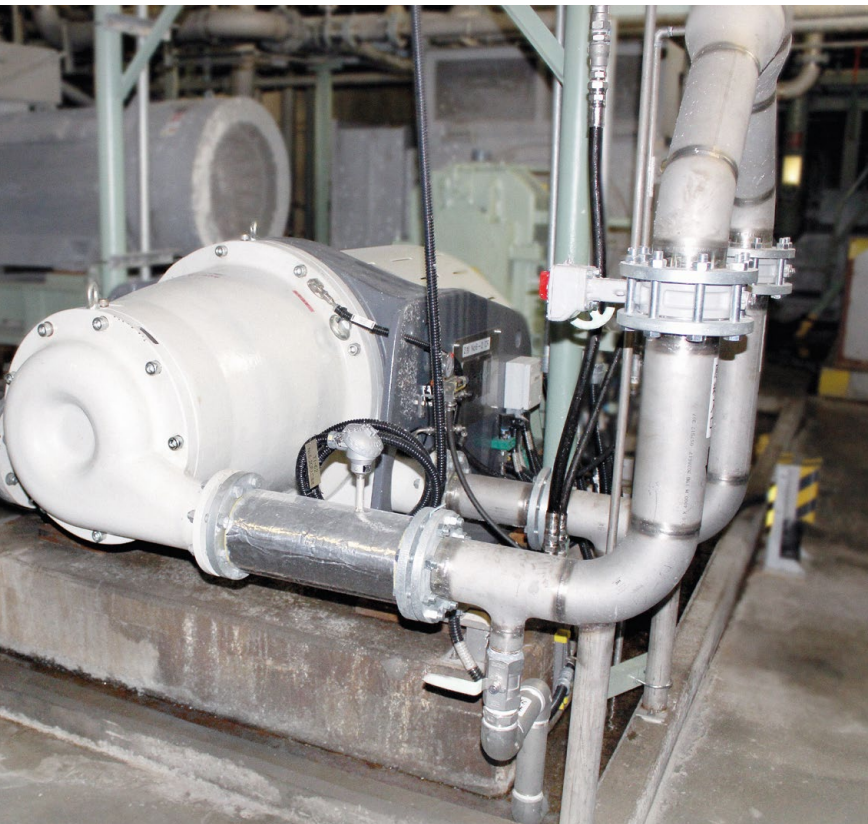
### High fine paper quality secures competitiveness

Now, after the rebuild, the fibers are refined in a low energy uniform refining process that improves paper formation and internal bond strength, while providing





“We’re very satisfied with the vast technical support from Valmet in the optimization of both operations and quality.”



## Full-scale pilot testing facilities

Valmet’s pilot facilities for stock preparation processes provide the complete testing environment for mechanical pulping, recycled fiber, stock preparation and pulp drying. This enables the individual testing of the customer’s own processes. It also provides a comprehensive basis for product development.

The comprehensive facilities allow customers to run tests on a set-up that mirrors their current process configuration or the one they’re looking to set up.

← In the Valmet high-capacity refiner, the stock is fed at both ends of the refiner, which enables even fiber distribution to the refining zone. The fibers are distributed inside the refiner using a flow-through principle, which results in a much smaller refiner size compared to a conventional refiner with a similar capacity. As a result, it is possible to reduce the number of refiners required, which significantly reduces power consumption.



“Daily refining process tasks like refiner switching have been reduced in operations.”

wide production flexibility. “We believe we can produce high-quality fine papers by improving the paper strength. Another advantage of the improved refining process is our ability to produce many product varieties with a wide basis weight range, which means increased flexibility,” states Mr. Endo.

### Improved performance and fluent operation

The new refining process also brings advantages to the operators’ daily work, because even pulp quality has stabilized both operations and quality.

“Daily refining process tasks like refiner switching have been reduced in operations. Maintenance work is easier too, because it is possible to estimate the replacement time of the refiner segments and do not need to maintain multiple refiners. And problems like pulp leakages from the seal part we had before the rebuild have been eliminated,” says Mr. **Yamato Hamada** (Technical staff), of No.1 Paper Production, Operation Department at Mitsubishi’s Hachinohe mill.

### Vast knowledge and expertise

According to Mitsubishi Paper, the main factor in remaining competitive is to reduce operating costs through energy and raw material savings. This requires experienced partners with excellent technical capabilities and problem-solving skills.

“We’re very satisfied with the vast technical support from Valmet in the optimization of both operations and quality. We’re especially grateful for the proactive proposal of Valmet conical refining technology as an energy-saving solution. We received a lot of accurate advice and proposals during the project and solved all the challenges together,” Mr. Endo summarizes. ■

**CONTACT PERSON**  
**Kenji Matsumoto**  
Sales Manager  
kenji.matsumoto@valmetpartners.com  
Phone: +819016064048



## Three reasons to choose Valmet's high-capacity conical refiner

The high-capacity refiner is unrivalled in its ability to produce the desired pulp quality for three main reasons.

**First**, it is a single gap machine. The refining gap is equal throughout the refiner, unlike in double disc refiners, for example, and this single gap delivers homogeneous fiber properties.

**Second**, it features an accurate gap control. It is well known that the refining gap is one of the main parameters influencing the produced pulp quality. In the high-capacity refiner, gap control is very precise and quick, because servo motors are used, allowing fast and accurate control of the rotor position, and thereby the refining gap.

**Third**, all the fibers are treated equally because, unlike conventional refiners, the high-capacity refiner feeds the stock evenly across the bars in the refining zone and thus enables excellent transfer of mechanical energy to the fibers.

These three features of the refiner enable excellent refining process controllability, and thus positively impact the end-product properties.



"We are very satisfied with the energy saving effect of 30%, the reduction of maintenance cost and the refiner's easy operation method for our operators", says Mr. Endo.

# Making quality happen



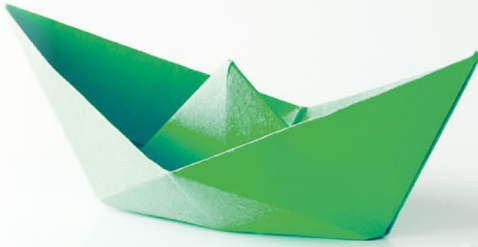
“We make it happen,” says Krisztina Kuusisto, VP, Operational Excellence at Valmet’s Paper business line. She explains how quality is defined at Valmet, and how we ensure it’s integrated in each phase of our value chain.

“It’s important for Valmet to manage quality across its value chain. However, everything starts with understanding what quality means to our customers,” says **Krisztina Kuusisto**, VP, Operational

Excellence at Valmet’s Paper business line.

Valmet is close to its customers and maintains a continuous dialogue with them to gain a deep understanding of their needs and expectations. And Valmet has the processes in place to respond proactively.

For example, the quality-related demands of a pulp or paper producer or an energy company on its technology



# “Everything starts with understanding what quality means to our customers.”

provider may be related to the quality of its product, environmental impact, cost-effectiveness or the reliability of the processes using Valmet's solutions.

“However, our approach to the quality we deliver covers more than just our technology, automation and service solutions: from our perspective, the whole project is our ‘product’ – starting with product development and ending when the production warranties have been fulfilled and approved,” says Kuusisto.

The customer experience we offer is an important aspect of how our customers perceive us as a technology partner.

“We gather customer feedback and maintain an open dialogue with our customers concerning our cooperation. That's how we know that our customers value things like our ability to manage meetings efficiently with the right people in place, that we give prompt and comprehensive answers to their inquiries, and that we can offer them easy access to all relevant documents at the right time. We're constantly striving for a combination of high-quality products, services and customer experience.”

## Continuous improvement of our own operations

Valmet is also continuously developing the quality of its own processes. Lean thinking – doing things right the first time – is adopted and executed broadly across Valmet. Lean is a way to operate in delivering accelerated performance and reaching the company's strategic targets.

“We're regularly training our people in Lean. One of Valmet's global training programs is Leading through

Lean, which is designed to give participants understanding and tools for day-to-day Lean deployment,” says Kuusisto.

Another important quality-related method that is actively applied at Valmet is Continuous Improvement (CI); this means that Valmet is constantly driving smaller and larger process improvements forward step-by-step. As part of Valmet's positive quality culture, all employees are encouraged to play their part in developing and delivering high quality, and to look for and report areas in need of development. The CI feedback process is used a lot at Valmet and produces thousands of improvement initiatives every year.

## Managing quality every step of the way

To manage the quality delivered by its supply chain and external resources, Valmet has set and communicated clear requirements concerning quality, and has the related approval processes in place. Not only does Valmet meet with its suppliers regularly to discuss quality, it also provides support and training for its key suppliers in quality issues such as Lean training.

“We're very keen to ensure that high quality is delivered at every step of our value chain, from planning and production to customer delivery and beyond. The way we see it, quality doesn't just happen – we make it happen,” Kuusisto says. ■

Blue UV light shows  
the even quality of  
the coating layer.

# Bright and shiny board

A nicely blue-printed, luxury folding box has initiated a change at Sappi Maastricht. Valmet's unique three-layer headbox and metal belt calender have helped Sappi to produce outstandingly white and bulky board, with excellent printability and surface properties.

TEXT Pauliina Purola PHOTOS Joonas Nieminen

The board for the blue folding box was produced using Valmet's metal belt calender. Product Research Manager **Jos Daniels** of Sappi says: "Valmet's **Mika Viljanmaa** showed us boxes made using a board machine in China. The boxes looked fantastic. We wanted to achieve a similar high-end look, but in a Sappi way."

### Improved products – but how?

A few years back, Sappi Maastricht realized that their customers wanted folding box board (FBB) with the same excellent surface quality, printability and whiteness as their current graphical papers. In response, Sappi launched a new board called Atelier, but the production was cut short due to customer complaints. "We knew what we had to improve," says **Tjerk Boersma**, Process Technology Manager at Sappi. But there were limitations: the existing machine had only one headbox – and then there was the budget.

### The idea of a three-layer headbox on paper

The project started with a metal belt calender, but it was soon realized more was needed. As the existing machine was one-layered, the mill asked Valmet for a headbox with three layers.

The engineers from Sappi and Valmet worked together to achieve their shared goal. "Cooperation during the development phase and the rebuild has been really good. We had a very good relationship with the engineers. Compliments to the team!" **Rob de Koning**, Manager Process & Quality at Sappi, describes the project. When the design started to look good on paper, they needed to get a better understanding of the concept.

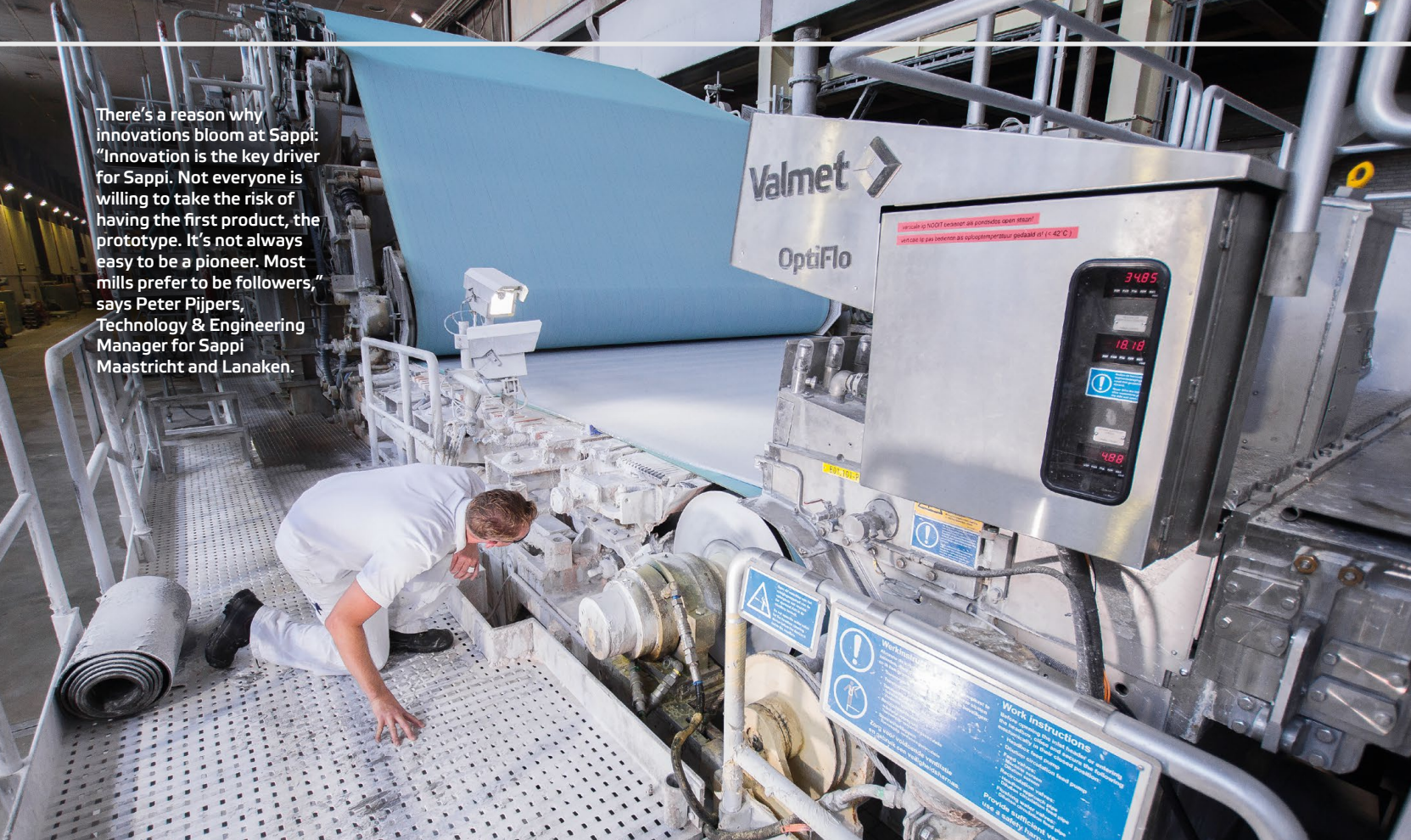
### Proof for the concept with pilot trials

With investments calculated in millions, you need to get proof before the actual decision. "It definitely adds value," says **Ferdinand Koster**, Mill Director of Sappi Maastricht, of the piloting facilities at Valmet. "It's very important to have such piloting abilities. You can put the lessons you've learned into the machine you're building," says Boersma. de Koning emphasizes: "We were able to get the proof we were looking for. And we could increase the filler content by more than five percent without losing bulk, stiffness or surface properties."

The top management needed reassurance too: "We needed proof that we could run three layers to convince our people at our headquarters in Brussels," **Jean Peerlings**, Improvement Technologist at Sappi, continues.

After the careful prework, it was clear that the solution

There's a reason why innovations bloom at Sappi: "Innovation is the key driver for Sappi. Not everyone is willing to take the risk of having the first product, the prototype. It's not always easy to be a pioneer. Most mills prefer to be followers," says Peter Pijpers, Technology & Engineering Manager for Sappi Maastricht and Lanaken.



for Sappi Maastricht was the combination of a new three-layer headbox and a metal belt calender. "We needed both the technologies, one for the layering, and one for the surface and to save bulk," **Wim Devens**, Director Central Technology & Engineering at Sappi, concludes.

### The 1<sup>st</sup> three-layer headbox: significant savings in operational costs

During the rebuild, Sappi Maastricht exchanged the old headbox for a new one, supplying three simultaneous layers of stock. Not all the grades produced in Maastricht (graphical, solid bleached sulphate boards, SBS, FBB) are traditionally layered, but the mill has found it valuable to layer all their grades. They optimize the quality and cost of each layer for each grade.

"Having three separate headboxes would have been a far bigger investment – ten times what we needed," says de Koning. With the three-layer headbox, there are great operating cost savings, too, as Boersma explains: "It's an enormous cost saving. With three headboxes, you have three wires, with all the water and a lot of chemicals. Cleaning and changing the wires takes a lot of time. So, it's not only about the investment – you also have to consider the energy, chemical and consumable costs.

We're achieving the same quality as with three headboxes. Actually, we're getting even better board than with three headboxes."

### Extremely smooth surfaces and high bulk

One innovation is even better when accompanied by another. Even after ten years, the metal belt calender is still a unique technology, with its long, metal-belt-supported calendering zone giving extremely good surfaces and preserving bulk. "Because we're a graphical mill, we needed two-sided surface improvement, and the only machine capable of that was the metal belt calender," says de Kon-

"The customers like our board very much, because it's very white and bulky. The printability and runnability are excellent, too."

ing. “The metal belt is producing and running well. It’s doing its job. There are no problems,” adds Boersma.

### “Better to have a bumpy road than no road”

“I’ve done only one project where the start-up was better. We should all be proud of what we’ve achieved in a short time,” says **Peter Pijpers**, Technology & Engineering Manager for Sappi Maastricht and Lanaken. Each time you develop and build something new, it’s a learning process. Sappi Maastricht has learned how to run with Atelier. “We’re now continuing the optimization. It’s been a long road. But better to have a bumpy road than no road at all! In this market situation, no road would’ve happened if there hadn’t been a rebuild,” Pijpers says.

### The silky touch and feel of Atelier

Today, Sappi Maastricht is producing a very high-end product range, with outstanding quality and folding properties. Their Atelier products combine the best qualities of different grades: the printability and surface properties of graphical paper; SBS whiteness; and the bulk, stiffness and creasability of FBB.

The market has received the first samples enthusiastically, and there has been positive feedback. “We qualified quickly after the rebuild – especially for the graphical grades. We’ve only had positive feedback. The surface is smoother and flatter. The printability and convertibility have further improved,” says de Koning. “The customers like our board very much, because it’s very white and bulky, and the printability and runnability are excellent too. That was the aim of the project. They compare us to SBS boards, because our high whiteness beats even SBS,” de Koning continues.



Tjerk Boersma



Ferdinand Koster



Rob de Koning



Jean Peerlings



Peter Pijpers



Jos Daniels

↓ Extremely smooth surfaces and high bulk with the OptiCalender Metal Belt.

“Maastricht is unique, because we combine graphical qualities with the FBB quality of Atelier. I’m not sure if anyone else can achieve this – I’ve never seen it as good anywhere else. There’s no cracking – nothing. The metal belt calender makes the surface superb. We can see the bulk increase, with a good surface. We can produce such a nice, smooth product,” Daniels emphasizes.



### Flexibility for the future

It took some time to get where Sappi Maastricht is today, but the future looks good. “Looking back on the cooperation with Valmet, it went very well,” Koster says in summarizing the project. “The combination of the headbox and metal belt calender allows us to be very flexible and produce a lot of different grades,” Pijpers says.

And the flexibility goes beyond just the machine. “You have the flexibility to make a high-end product, but you also have the flexibility to make low-cost products that meet lower requirements. We can select cheaper raw materials, and adjust the grade and quality. And I hope we’ll soon be able to say to the market, ‘If you want this, you can have it at a certain price.’”

And that’s what the customers get: bright and shiny board from Sappi Maastricht. ■

#### CONTACT PERSON

**Kari Sorsa**  
Sales Manager  
+358 405803011  
kari.sorsa@valmet.com



# The power of a shared journal

The partnership between Stora Enso's Beihai Mill and Valmet has continued since the pulp and board line installations in 2016. Their shared focus on continuous improvement has enabled Beihai Mill to become a benchmark for high-end white cardboard in China. **TEXT** Sara Li **PHOTOS** Lu Jun



Kevin Jiang,  
Director, Valmet  
Mill Improvement  
business in China.



ev

**B**eihai Mill in the Guangxi Zhuang Autonomous Region in China is Stora Enso's largest overseas single investment project. It has been running for nearly four years, since May 2016. Initiated as a greenfield project, it has sprung up from nothing over recent years and developed into a well-known manufacturer of high-end white cardboard in China.

**Zhu Weiyan**, General Manager of Stora Enso's Beihai Mill, describes the mill as a forest-pulp-paper integration project with a very clear product strategy: to create a comprehensive product line of food packaging materials based on liquid packaging paper, including white cardboard, coated kraft paper and packaging paper.

Mr. Zhu is glad to have chosen such a compatible partner as Valmet, with whom they have been focusing on sustainable development and the reliability and stability of the equipment. In 2016, Valmet delivered a chemi-mechanical pulp (BCTMP) line, an OptiConcept liquid packaging boardmaking line and integrated automation solutions to the mill. Later, in 2019, Valmet delivered two Valmet Breast Roll Shakers for the forming section, a blow box between press nips, and felt tension for the press section.

### A shared focus on sustainability

"Consumers are placing increasingly high requirements on product safety and environmental protection. Offering the possibility of recycled products and meeting customers' demand for customization have therefore become a key trend," says Mr. Zhu.

**"The Valmet service team has earned our respect with their professional service spirit, cooperative attitude and effective problem-solving ability."**



Stora Enso has invested in research into how to replace plastic with sustainable fiber-based products and has always sought to develop lightweight, safe and recyclable products. Mr. Zhu states that Beihai Mill can currently produce the most lightweight cardboard of its kind on the market, which means that cardboard featuring a larger area, greater thickness and better stiffness can be produced with the same raw materials, while reducing raw material consumption and improving resource utilization.

On top of this, Mr. Zhu points out that this cardboard is mainly used for food packaging and is 100 percent free of fluorescent brighteners, which demonstrates a commitment to product safety even for the parts invisible to their customers.





← Yang Shangjiang, StoraEnso Beihai customer service engineer (left) and Pang Chenglin, StoraEnso Beihai Rewinder team leader (right).

↓ Mr. Zhu highly values the customized service offered by Valmet: "Demands are responded to positively and in a timely manner, and are well supported by Valmet's global network. In the picture: Qin Haichao, Valmet mill site service engineer, and Lucas Fu, Valmet Account Manager.

### Continuous improvement

According to Mr. Zhu, the high-end product customers they serve are demanding: "We've been striving to satisfy customers quickly and meet their demands for high quality and low costs." He acknowledges a dedicated and energetic team, and the support received from Stora Enso's global experts, as well as the technical support from suppliers such as Valmet, in making it possible to respond to these requirements.

The operating efficiency of the board machine has reached the designed annual production capacity of 450,000 tonnes after operating for one and a half years.

"The mill's team is currently making further efforts to increase annual production capacity to 500,000 tonnes, based on the premise that this will ensure quality," Mr.



Zhu says. In addition, the mill is constantly developing new products and trying new technologies with the goal of further improving product quality, enhancing operating efficiency and reducing various emissions derived from production.

In 2019, the team studied the potential offered by Valmet's Breast Roll Shaker and blow box technology. They significantly improved the flatness and uniformity of the paper layers and increased the lateral stiffness of the cardboard, with a subsequent improvement in quality.

### A partnership of mutual trust

Mr. Zhu is satisfied with the cooperation with Valmet, which has always been based on mutual trust and smooth communication. "We've shared the goal of solving problems and formulating solutions, implementing them efficiently, and constantly building trust in the process," Mr. Zhu concludes.

"For more challenging issues we can share world-class expertise with the help of remote diagnosis from the Valmet Performance Center."

→ "The Valmet service team has earned our respect with their professional service spirit, cooperative attitude and effective problem-solving ability," says Zhu Weiyuan, General Manager of Stora Enso's Beihai Mill.



For example, Mr. Zhu acknowledges that during the shaker cooperation project in 2019, Valmet provided a shaker solution based on Beihai Mill's higher requirements for smoothness and the uniformity of the paper layer. Moreover, Valmet was able to deliver the machinery within a shorter deadline, and a new transportation plan for imported equipment was implemented to replace sea shipping with China-EU special trains to shorten the transportation time.

Jiang Chunyuan, Valmet's Mill Improvement Business Director, agrees with Mr. Zhu. He underlines that the shaker and blower project marks another example of mutual trust and cooperation: "We proposed solutions, demonstrated technical principles and explored previous success cases. The Beihai Mill team quickly decided to give it a try, and once again Valmet has proved it is trustworthy."





### Global expertise available through Performance Centers

According to Mr. Zhu, the pulp and paper industry is a stable traditional industry, and mill operation is also a long-term and continuous improvement process. The service life of modern paper machinery can be 60 years or more, so the after-sales service of equipment suppliers has a long way to go.

Mr. Zhu highly values the customized service offered by Valmet: “Demands are responded to positively and in a timely manner, and are well supported by Valmet’s global network. Domestic engineers respond quickly to problems that can be solved locally. For more challenging issues, we discuss solutions together to allocate global resources and share world-class expertise with the help of remote diagnosis support from the Valmet Performance Center.”

Mr. Zhu also values the continued excellent support provided by Valmet’s service department, who maintained the highly valued tradition of regular executive meetings experienced during the board machine and BCTMP line delivery project in 2016.

“So far, the Valmet service team’s professional service spirit, cooperative attitude and effective problem-solving ability have earned our respect,” says Mr. Zhu. He says they hope to work closely in future to obtain continuously improved solutions and make use of new technology and innovative products. ■

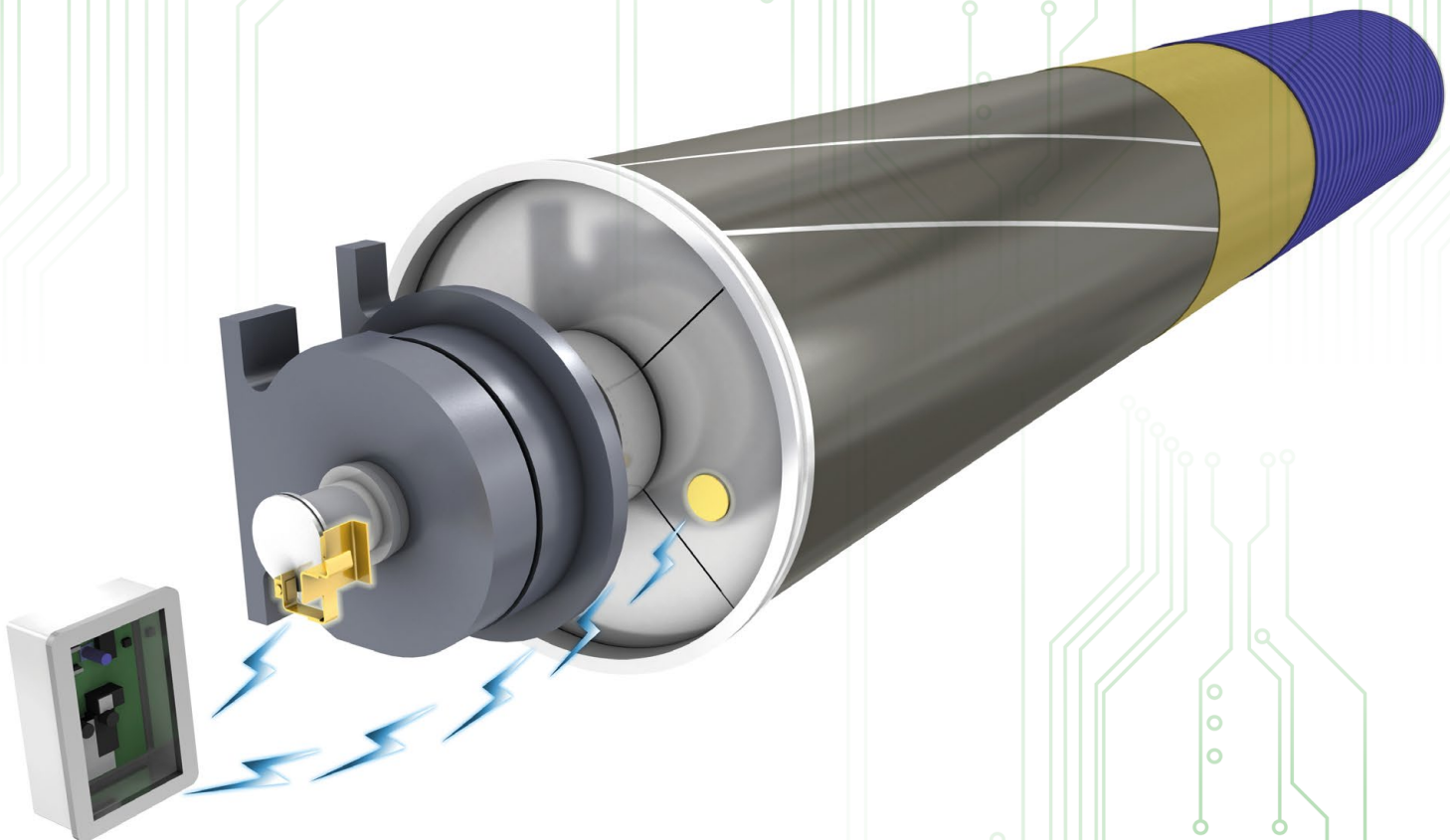
#### CONTACT PERSON

**Kevin Jiang**  
 Director, Mill Improvement  
 Business in China  
 +8613500037809  
 kevin.jiang@valmet.com

# The next step forward with intelligent iRolls

N R Agarwal has been able to reduce web breaks, increase speed and boost post-press dry content on its PM5 with Valmet's Intelligent Roll Solutions for press efficiency.

**TEXT** Ankit Arya, Marjaana Lehtinen and Tatu Pitkänen



**B**etween 2017 and 2019, N R Agarwal's PM5 in Sarigam, Gujarat, India, ordered six roll covers (rubber and PU) from Valmet for its bi-nip press section process rolls. They were giving excellent performance, and it was time to move forward and further optimize the wet pressing performance.

### Unclear dewatering capacity challenges target achievement

**Mr. Deepak Bharadwaj**, Senior VP of N R Agarwal Industries, set several targets for the PM5 press section. These included improving moisture profiles and reducing web breaks. The mill also wanted to increase the machine speed but was unsure whether the press section would be able to handle dewatering at higher speeds. The press's dewatering capacity was unknown, because the actual loading in the press section was unclear. This made the optimization and speeding up of the machine even more challenging. The trial-and-error method is always available for a speed increase, but in today's competitive market, it is a slow and uncertain way to proceed.

### Quick and cost-effective measurement, suitable for all paper machine sizes and concepts

To complement its previous roll cover delivery and enable the mill to achieve its targets, Valmet recommended its Intelligent Roll Solution, including nip measurements and Valmet iRoll Portable Press Analysis services for the bi-nip press.

Valmet's iRoll Portable Press Analysis services allow paper and board makers to optimize profiles online quickly and cost-effectively without expensive investment in equipment. This unique service can measure nip profiles under real dynamic conditions during maintenance shutdowns. Benefits can be obtained with all kinds of paper machine concepts and grades, regardless of the size of the machine.

The mill decided to go ahead with a complete service concept, consisting of Valmet iRoll portable, nip load measurements, press simulation and optimization services.

N R Agarwal PM5 is a conventional machine, featuring a bi-nip press and 3rd press. The machine has undergone several rebuilds to improve its efficiency and performance. With a wire width of 4,550 mm, PM5 produces writing, printing and copy paper at a rate of between 730 and 920 meters per minute.

### Significant improvements in wet pressing efficiency

The nip measurements revealed a difference between the calculated and actual load in the press section. Based on the actual load and nip profile, it was possible to optimize the press load and roll cover crowning, which improved runnability. Other results included improvements of one percent in web dryness after the press and 1.5 percent after the bi-nip, as well as a 10-12 percent draw reduction after the bi-nip section.

With a correct picture of the nip profile, the mill could now optimize it in line with Valmet's recommendations. It has been possible to increase the machine speed to 950 meters per minute, in accordance with the initial goal. Web breaks in the press section have been reduced by 20-30 percent, and roll build-up has improved. ■

#### CONTACT PERSONS

**Ankit Arya**  
Mill Sales Manager,  
AP India Service Operations  
+91 9643401140  
ankit.a@valmet.com

**Tatu Pitkänen**  
Global Technology Manager,  
Roll covers and maintenance  
+358 40 8697601  
tatu.pitkanen@valmet.com



"After the optimization of the wet pressing with the Valmet iRoll Portable Press Analysis and nip simulations, we can achieve the best performance from the press section. I highly recommend it to other paper mills too," says Rajendra Agarwal, Managing Director and Chairman, N R Agarwal Industries Ltd.



Smooth  
**flow**  
from reel to winder





When Mondi Štětí was looking to free the finishing area of PM7 from bottlenecks, the solution was found in a fast parent roll change solution with a butt-joint splicer and automatic parent roll transfer. While increasing winder capacity, the rebuild also improved safety.

**TEXT** Angela Paganini, Pauliina Purola **PHOTOS** Topi Saari

**T**he bottleneck between reel and winder was evident. It was also the starting point for the rebuild project of Mondi Štětí's PM7, which produces calendered specialty kraft papers. To further increase the production reliability of its paper machine, Mondi decided to take action. The challenges were posed mainly by the winder's lack of capacity to cope with increased production targets and the non-optimal interaction between it and the reel. Valmet's task was to find a safe and efficient solution to free the finishing area from bottlenecks.

### Finding a solution to increase winder capacity

Mondi's Senior Project Director **Helmut Riesenberger's** team planned to increase the diameter of the parent roll, targeting the minimizing of manual work like sample taking and parent roll transfer. This would have required a major rebuild, with modifications to the dry end foundations, overhead lifting crane and drives, without affording the targeted efficiency increase.

# The results of the rebuild were extremely good: The winding capacity increased by 62 percent.

Valmet came up with a cost-effective technical solution that fulfilled all the requirements for capacity and increased safety. There was no need for expensive foundation work, or drive or overhead lifting crane rebuilds. Valmet's solution was tailored to seamlessly fit into an environment that had no existing Valmet technology. During the purchasing process, the Mondi Štětí team had intensive discussions with the Mondi Świecie mill in Poland, where a similar project had been executed a few years earlier. Feedback and experiences from Świecie were positive and encouraging.

Valmet offered a unique and proven solution called Dual Unwind, which changes parent rolls very fast and offers automatic butt-joint splicing. The parent roll change and splicing take place during the winder set change. The solution provided the required capacity for the existing winder. Full parent roll transport was also fully automated with automatic transfer rails, and now connects the reel and winder more safely and efficiently.

## Professional project handling

The upgrade was successful, with short shutdown times. Riesenberger underlines the good cooperation with

Valmet: "Everything was well organized. There were no delays, and the delivery was on time." In addition, communication was always open and good. "Problems were solved immediately", Riesenberger continues. He was also happy with the cooperation with Valmet's project team: "The cooperation was excellent."

## Parent roll change time massively reduced

The results of the rebuild were extremely good: The winding capacity increased by 62 percent. This was due to Dual Unwind, because the winder parent roll change time was decreased as planned, and the winder downtime during the parent roll change was close to nothing. Riesenberger emphasizes the importance of Dual Unwind: "The fast parent roll change was the key in this project. The parent roll change time has been massively reduced."

## Minimized bottom waste at the reel

Very good results were also achieved with the reel's Water Jet Turn-up Device and an optimized nip loading solution. Reel bottom waste was minimized, and highly efficient turn-ups were achieved. And on top of everything, the parent reel diameter increased.

## Safer for operators

For Mondi, safety has always been the highest priority. Valmet provided a solution that meets all the latest EU safety regulations. Operator safety was improved significantly by installing a fully automatic parent roll transferring system, with transfer rails from reel to winder. All the delivered equipment was designed for safe operation and to meet safety regulations. New safety mats, fences and gates were also added.

"Our concern to build a system compatible with the existing one has been dealt with to our complete satisfaction. Reliability and efficiency are optimal", says Riesenberger. ■

## About Mondi Štětí

Mondi Štětí mill in the Czech Republic is one of the leading European suppliers of high-quality sack kraft and specialty kraft papers. The PM7 produces calendered specialty kraft papers with high strength and outstanding printability, which serve as shopping and food bags, cement bags, pet food bags and packaging for products in the chemical industry.

### CONTACT PERSON

Ville Piipponen  
Senior Product Sales Manager  
+358 50 476 8644  
ville.piipponen@valmet.com

# To the finest fiber detail

Better knowledge of raw material fiber properties with the Valmet Fiber Furnish Analyzer has helped the BillerudKorsnäs board mill to improve their stock preparation. Additional expert support is provided remotely from the Valmet Performance Center.

TEXT AND PHOTOS Nigel Farrand

**T**he BillerudKorsnäs production facility in Pietarsaari, Finland, produces world-leading kraft and sack paper intended for users with very high demands for strength, durability, flexibility, food grade purity and printability. The Pietarsaari mill also produces advanced and high-performance paper grades for a variety of technical applications, such as abrasive papers, and reel and ream wrapping. With a total of more than 150 production grades, extensive knowledge of raw material fiber properties is essential to meet the high quality that customers have come to expect and rely on for subsequent converting operations.

“Our device was one of the first installations with an ultra-high definition camera for online fiber analysis,”

# “We can immediately see the effect of process changes on the fiber, without waiting for laboratory tests or samples from the reel.”

says **Matti Myllylä**, Production Superintendent in Pietarsaari. “It was the start of a very good cooperation project that continues today, almost a year since the analyzer start-up. The support from Valmet, both on-site and using the analyzer’s remote connection capability, has been really good, making it a relatively smooth experience.”

## Improved stock preparation

The new Valmet Fiber Furnish Analyzer (Valmet MAP Q) analyzer incorporates new fiber imaging technology, which provides micro-scale details, from fiber dimensional properties to shives and their size categories. Monitoring incoming pulp quality and subsequent fiber development provides the opportunity for better control of stock preparation.

Further improvement can be achieved with a built-in modeling tool that can continuously predict pulp proper-

ties from a combination of the analyzer’s measurements. As well as measuring a wide range of fiber and shive properties, the device characterizes irregular particles, including vessel segments, flocs and other particles. An additional measuring module for standardized freeness, both Canadian Standard Freeness (CSF) and Shopper-Riegler (SR), plus a chemistry module to monitor pH, conductivity and consistency, completed the delivery to the Pietarsaari paper mill.

“The Valmet MAP Q includes a really good software client and user interface which provides me with essential information at my desk – especially valuable when running trials or troubleshooting. We can immediately see the effect of process changes on the fiber, without waiting for laboratory tests or samples from the reel,” says Myllylä (right), pictured here with Jyrki Härkönen, Production Development Engineer.



### Early evidence of fiber spins

“For certain grades, fiber spins (where fibers mechanically entangle themselves very tightly) can be a particular problem, as they project from the surface of the paper and cause holes in a barrier coating or lamination applied later. Valmet MAP Q has shown that some of the fiber spins are present in the incoming pulp, and some are created in our stock preparation. Within 50 minutes of pulp coming into the mill to the reel, Valmet MAP Q provides much earlier evidence of fiber spins, and we can adjust process conditions to minimize them,” explains **Jyrki Härkönen**, Production Development Engineer. “The analyzer has shown us the effect of refining conditions and issues like plate wear on fiber spins and other pulp properties to enable future follow-up for further improvement.”

### Remote support from the Valmet Performance Center

Following installation, the first calibrations were made during the start-up at the end of November 2018. After a second on-site visit by Valmet for the SR freeness calibration and the introduction of the chemistry module, the remote connection capability then came into use.

“Our laboratory technician took samples from the analyzer, and the Valmet engineer was able to remotely make the necessary calibration adjustments. With the remote connection, Valmet assistance is always close at hand for help with process troubleshooting and equipment support,” says Härkönen. “Additional SR freeness calibration has been undertaken remotely to further increase accuracy, and today we are closely following the SR values, fiber length and fibrillation degree, which will enable us to develop control models to optimize refining and save energy. We are still in the learning phase, but a thesis project in 2020 will take us much further,” adds Myllylä.

### Process engineer's tool

“Today, we operate the analyzer as a process engineer's tool, but ongoing work to integrate the measurements in the process control system will see us take the next step toward automatic refining control,” says Myllylä.

“We can have up to 15 grade changes per day and presently adjust conditions according to grade specifications. With the analyzer, we now have the capability of enhancing control according to incoming pulp properties, as well as matching grade specifications with the incoming pulp. We can now produce certain grades according to incoming pulp properties and optimize refining, which translates to energy savings and reduced broke while producing the same high quality,” declares Myllylä. ■

#### CONTACT PERSON

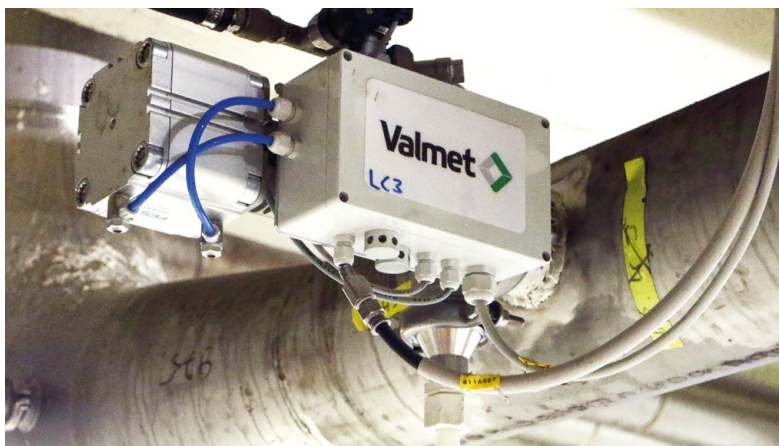
**Ismo Joensuu**  
 Manager, Paper Analyzers  
 +358 407006483  
 ismo.joensuu@valmet.com



Valmet MAP Q parameters can be accessed remotely and locally to provide immediate support as required.



The Valmet MAP Q installation in Pietarsaari.



Eight sampling points had been decided on – first, to monitor incoming bleached and unbleached pulp, and then to follow fiber development after the high consistency (HC) and low consistency (LC) refining stages. Final pulp quality is monitored with a sampler after the machine chest and another in the headbox recirculation. The eight sampling points are automatically measured in sequence, with each measurement taking approximately five minutes.

"Encouraged by the project, we will next investigate how to improve doctoring on the calender," says Sami Kari, Project and Development Manager at Corex. Pictured with Antti P. Pitkänen from Valmet.

A man with a mustache and glasses, wearing a white hard hat with "SAMI KARI" written on it, a high-visibility yellow and blue jacket, and a checkered shirt. He is smiling and standing in an industrial environment with large machinery and pipes in the background.

# A breakthrough in cylinder surface cleaning



Corex's (earlier Corenso) board mill in Pori, Finland is developing its production and equipment continuously. In 2019, one of the development projects was improving doctoring on the dryer section to meet the quality requirements of production.

**TEXT** Antti P. Pitkänen and Marianne Valta

**PHOTOS** Hannes Frigård/Kuvabitti and Antti P. Pitkänen

Following the introduction of a new product group at Corex's board mill in Pori, special attention was paid to the cleaning of cylinder surfaces in the dryer section: "For a few years now, we have been supplying our customers with board to be laminated. For an end product with a glossy surface, the quality of the base board needs to be flawless. For instance, dirty cylinders can cause depressions in the board," says **Minna Kurittu**, Production Manager of the mill.

### The goal: clean cylinder surfaces

Based on a doctoring audit covering the whole board machine, the development of doctoring at the beginning of the dryer section was identified as the most important item. The problem was fines and impurities sticking to the surface of the dryer cylinders. Dirty cylinder surfaces weaken the drying effect, increase energy consumption and often cause the above-mentioned quality defects in the end product.

"We chose Valmet as our partner for our development project because we were convinced of the expertise of Valmet's specialists in this area. The price was also competitive, as the proposed solution was eventually rather simple and did not require any large-scale rebuilds in the production line," says **Sami Kari**, Project and Development Manager.

### Finding a solution together

Development of the doctor concept was discussed in a kick-off meeting following the audit with both parties' specialists. The shared view was that doctor beams which were in good condition would be used, bearing assemblies would be serviced and blade holders would

be upgraded from gravity-loaded to hose-loaded Valmet Doctor Holder Compact holders. In addition, opening mechanisms would be removed from the doctors and their position would be locked with turnbuckles.

“Self-profiling holders improve the blade’s conforming on the roll surface and enable a precise and, if necessary, higher blade load than the old, gravity-loaded doctors. The doctors are operated from a separate pneumatic control unit. The decision was made to implement the modification on the three dirtiest cylinders at the beginning of the dryer section,” says **Antti P. Pitkänen**, Product Specialist, Valmet.

### Breakthrough with thermally coated doctor blades

After start-up, cleaning the surfaces proved to be more difficult than anticipated. A breakthrough was reached on the third attempt by using thermally coated Valmet Doctor Blade Bronze nCT blades, which demonstrated their effectiveness right after start-up. After a couple of days in operation, the Bronze nCT blades made the surfaces shiny clean.

“The difference was remarkable! The Bronze nCT blades immediately started to carve the surfaces clean so that slivers were flying at the dryer group. After a couple of days, the change was hard to believe,” says **Jonas Nordquist**, Production Development Engineer.

### Reliable expertise

The development project reached its goal: significant improvement was achieved in the cleaning of the cylinder

surfaces. Blade replacement is also easier and safer now, and the Valmet Blade Trolley acquired during the project has improved the storage of blades.

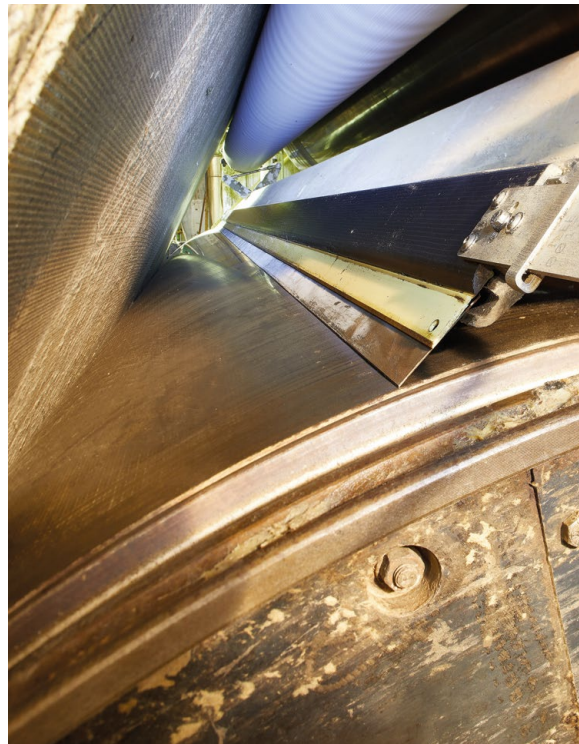
“Our cooperation with Valmet has been very smooth. The product specialist actively searched for solutions during the project. We were confident that Valmet would have the necessary expertise and the decisions made would also meet the prerequisites of the equipment manufacturer and our production process. This allowed us to focus on other shutdown work ourselves. Encouraged by the project, we will next investigate how to improve doctoring on the calender,” Kari says. ■

#### CONTACT PERSON

**Antti P. Pitkänen**  
Product Specialist  
+358 503170551  
antti.p.pitkanen@valmet.com

### Corex Pori

- Manufactures heavy 200–545 g/m<sup>2</sup> board grades from recycled fibres for the raw material of winding cores.
- A 4,700 mm wide machine with a design speed of 350 m/min, producing 120,000 tonnes of board a year.
- The Pori coreboard mill has a long history; the roots of the mill go back to the 1920. Since May 2019, the mill is part of Corex, the core, coreboard and consumer packaging division of VPK Packaging Group. With its 30 manufacturing locations in 16 countries, Corex is the market leader in Europe and China.



“After a couple of days, the change was hard to believe,” says **Jonas Nordquist**, Production Development Engineer. See pictures: before (left) and after (right).



In the middle, Ding Guolin, Chief Commander of the Overhaul Power Boiler: "The joint effort of the two teams was rewarded in the successful annual shutdown."



# All for one

Outsourcing of maintenance operations to Valmet has proven a powerful combination for Asia Symbol (Shandong) Pulp & Paper Co: both parties can focus on what they know best. This cooperation is fueled by the fact that they truly work as one team. **TEXT** Sara Li, Heli Kankare

In May 2018, Asia Symbol (Shandong) Pulp & Paper Co., Ltd. and Valmet signed a maintenance outsourcing agreement for pulp mills and paper machines. According to the agreement, Valmet takes care of the maintenance and maintenance development at Asia Symbol's plant in Shandong Province in China, covering pulp mills, paper machines, power plants, chemical plants and water treatment facilities.

"Valmet has many good mill maintenance outsourcing references in Europe, and we saw there how their advanced management concept and global vision work, and how their global resources can offer support. Now we're the first in China to believe in the model and believe in Valmet – and ourselves. This is a perfect win-win situation, because as a machinery supplier, Valmet knows our equipment well, and we know more about production. We're very confident about our production efficiency, which is world-class, and we've invited Valmet to manage our maintenance work, which allows us to focus on further improving our production," says **Chang Yonggui**, Head of Asia Symbol's Board Operation Department.

### A powerful combination

Asia Symbol's Shandong mill is the first in China to adopt Valmet's service outsourcing model, leading a new trend servicing Chinese pulp and paper mills, and attracting widespread attention in the industry. After a year's experience of the maintenance outsourcing model, the future looks promising.

"Asia Symbol's Shandong mill was the first pulp and paper company to choose the mill maintenance outsourcing model in China. It was a bold and innovative initiative. Our target has been to combine the strengths of our own maintenance management with Valmet's global resources and professionals to achieve a win-win situation, complement each other and make progress together," says Mr. Chang.

"Valmet knows the equipment and technology, and they're very professional in equipment maintenance management. Our strength lies in the management of production operations, improving the mill's product quality and production efficiency, and reducing energy consumption. This is our core competitive advantage. We're also very confident in what we've achieved so far, but if we can increase the focus on production management, I believe we can do even better. That's why we decided to go for maintenance management cooperation with Valmet," he continues.

### A good beginning is half the battle

**Li Ling**, Senior Manager of Pulp Line Maintenance at Asia Symbol, describes the difficulties and confusion at the beginning of the cooperation: "In my opinion, the key to the success of mill maintenance outsourcing is teamwork. The degree of integration between the Valmet and Asia Symbol teams basically determines the success or failure of the cooperation. But this wasn't easy in practice. We have

"We've really merged into one team all working for a common goal – from top to bottom!"

different company cultures, different management models, and even the communication languages are different."

"But we now understand each other's strengths. We're familiar with each other's working methods, and most importantly, we've benefited from cooperation. You might say we've really merged into one team all working for a common goal – from top to bottom!" Mr. Li comments on current progress.

### Annual maintenance shutdown successfully completed

Valmet also took care of the power boiler area's annual shutdown in 2019. Power boilers and steam turbines are special equipment, and they must be strictly and carefully managed if maintenance is to ensure safety, quality, schedules and cost-effectiveness. **Ding Guolin**, Valmet's power area maintenance manager at the mill, was in charge of the shutdown: "The PB4 shutdown and overhaul went smoothly, and was completed ahead of schedule with a high safety level and zero accidents. The joint effort of the two teams was rewarded – this success truly reflects our teamwork!"

"Our preparatory work started long before the shutdown. We planned the shutdown carefully and undertook spare parts preparation. During the shutdown, we implemented the work as planned, responded quickly to unexpected problems, and solved them effectively and in a timely manner," Mr. Ding concludes.

### Future value from remote expert services

**Zhang Liyong**, Pulp Maintenance Manager, and **Teng Yikun**, Manager of the Reliability Maintenance Department of Asia Symbol's Shandong mill, are looking forward to having more remote field service support from Valmet's experts: "After all, the local field service team can't solve all the problems, and Valmet has the most experienced global resources. It would be valuable to utilize more global support from Valmet for equipment reliability management, and the condition monitoring of new equipment and technologies. I think the local field service team can become a window for remote experts to join us in solving our problems together." ■

#### CONTACT PERSON

**Marko Kesti**  
Director, Mill Maintenance  
Global Operations  
+358 40 837 2454  
marko.kesti@valmet.com



↑ On the first anniversary of the cooperation, Valmet awarded an anniversary certificate to Asia Symbol (Shandong). Chen Xiaorong, Managing Director of Asia Symbol (Shandong) Pulp & Paper Co., Ltd. (on the left of the certificate) and Zhu Xiangdong, President of Valmet China (on the right).



↑ Liu Peng, Valmet Reliability manager, Asia Symbol MMO Site Operation.



↑ "We now understand each other's strengths. We're familiar with each other's working methods, and most importantly, we've benefited from cooperation," says Li Ling, Senior Manager of Pulp Line Maintenance at Asia Symbol.



↑ Head of Board Operation Department, Chang Yonggui: "This is a perfect win-win situation, because as a machinery supplier, Valmet knows our equipment well, and we know more about production."

The recovery and biomass boilers will supply clean energy to the mill, and an energy surplus will be delivered to the Chilean National Electrical Grid.



# Building for the future



ARAUCO's major expansion project in Chile - MAPA – is being constructed with a good pace. Once completed, the mill will focus on producing high-quality pulp and renewable energy. Advanced technology will secure efficient processes for years to come.

**TEXT** Kerstin Eriksson, Lotta Forssell, Francisca Maass

**T**he Arauco Mill is located just off the shores of the Pacific Ocean at the foot of the Andes in Horcones, Chile. In 2018, ARAUCO decided to initiate a major investment project to expand the mill's pulp production with a new 1.56 million tonne eucalyptus pulp production line and the modernization of the existing 0.55 million tonne radiata pine pulp production line. The project is called MAPA, an acronym for Modernización y Ampliación de Planta Arauco – Modernization and Extension of Arauco Mill in Spanish.

“MAPA is the largest industrial project in the Biobío region, and one of the most important in Chile. It's also the largest and one of the most important investments in ARAUCO's history – with an investment of 2.35 billion dollars, 30 months of construction and an expected employment impact of more than 8,000 jobs,” explains **Charles Kimber**, Senior Vice President of Corporate and Commercial Affairs at ARAUCO.

“This investment establishes us as one of the most important producers of eucalyptus pulp worldwide. In addition to high-quality pulp, the expansion project will allow us to increase the generation of clean and renewable energy from forest biomass,” adds **Franco Bozzalla**, Vice President of Pulp and Energy Business at ARAUCO.

### Securing the most efficient processes

Valmet was chosen to deliver pulp drying and baling lines, a recovery boiler and a biomass boiler for the project. The delivery project was kicked off in late 2018, and it is planned that the new mill will commence operations in second quarter of 2021.

“We know that Valmet has the best technology in the world for our field, and we wanted the best of the best for our new line. We've worked together with excellent results and service for many years. We want to secure the most efficient processes, improve environmental efficiency, waste less water, use fewer chemicals and all in all get the most out of wood – and for that, we always knew that Valmet was an excellent choice. Works are proceeding and by the end of January 2020 the project had a completion rate of 35.5 percent,” Bozzalla summarizes.

“Our customer started the site works in early 2019, and they've done the engineering and most of the production and procurement for the key technologies. Our site team is in place, and several shipments have arrived at the site. This year will be very busy, with finalizing the final procurement and shipments to the site, and supervision of the installation of our equipment,” says **Paulo Aguiar**, Vice President, Wood and Pulp Handling business unit at Valmet.

### Predictive pulp drying production

The pulp drying line consists of two complete drying machines, including four high-capacity baling lines. The pulp drying line will allow continuous high-quality production. It will also include low-energy and heat-consumption technologies, contributing to a lower operational cost and minimal environmental impact.

“We’ve delivered three drying lines to ARAUCO previously, so the MAPA delivery is a repeat order, and these will be the fourth and fifth drying machines we’ve delivered to them,” says Aguiar.

The drying machine will be equipped with the most advanced process controls to automatically adjust the production parameters and achieve high availability, with minimal need for human operations.

“It will be predictive production by advance bale weight control. We’re installing sensors that will support the customer remotely. A web monitoring system, scanners and profiling will all contribute to the good runnability of the machine.”

In addition to the high automation of the drying machine, expert support will also be available if required to support Arauco’s operators via a remote Internet connection from Valmet Performance Center and process analysis through Industrial Internet applications.

# “We wanted the best of the best for our new line.”

### Renewable energy from the forest

“The expansion project will allow our mill to increase the generation of clean and renewable energy from forest biomass. The recovery and biomass boilers will supply clean energy to the mill, and an energy surplus of 166 MW will be delivered to the Chilean National Electrical Grid,” Bozzalla says.

The recovery boiler includes Valmet’s advanced high-power features, enabling maximum energy efficiency and high electricity production, and a smelt spout cleaning robot for improved safety and operator-friendliness.

The power boiler is tailored to burn local biomass, such as eucalyptus bark, chipped wood, wood residue and effluent sludge. Both boilers are equipped with



“MAPA is one of the most important industrial projects in Chile. It’s also the largest and one of the most important investments in ARAUCO’s history,” explains Charles Kimber, Senior Vice President Commercial and Corporate Affairs at ARAUCO.



“We want to secure the most efficient processes, improve environmental efficiency, waste less water, use fewer chemicals and all in all get the most out of wood – and for that, we always knew that Valmet was an excellent choice,” summarizes Franco Bozzalla, Vice President of Pulp and Energy Business at ARAUCO.



“This year will be very busy, with finalizing the final procurement and shipments to the site, and supervision of the installation of our equipment,” says Paulo Aguiar, Vice President, Wood and Pulp Handling business unit at Valmet.



“Our boiler delivery is a truly multinational effort,” says Tapani Nummelin, the Project Manager for the Valmet boiler delivery.

↑ Valmet Cutter was preassembled in Ulvila Finland before shipment to Chile.

Valmet ESPs (electrostatic precipitators) for excellent dust particle removal from flue gases.

“Our boiler delivery is a truly multinational effort. The key design, engineering and production of key components come from our home base in Tampere, but Valmet teams in other locations in Finland, Sweden, India, China, Brazil and – naturally – Chile are contributing in their area of expertise,” says **Tapani Nummelin**, the Project Manager for the Valmet boiler delivery.

Valmet will also deliver the mill-wide NCG (non-condensable gases) collection and handling solution to secure safe incineration of the odorous gases formed in the pulp production process.

### Extra effort for local circumstances

Chile and its pulp production facilities are in a seismically active region. The strongest known earthquake of modern times, the 1960 Valdivia earthquake, was recorded in Chile. In March 2010, an earthquake severely affected Central Chile and the entire pulp and paper production of the country. As a result, new regulations and procedures were put in place for construction that also impacted the boiler design for this project.

“This was the first new pulp mill to be built in the region after the 2010 earthquake. Our calculation was affirmed by the leading Chilean seismic expert, Professor **Rodolfo Saragoni**. Naturally, this was something new for us, but it was great to see how the experts from both

sides worked together, and kindred spirits were found,” Nummelin explains.

The result is that the recovery boiler steel structure weighs about 50 percent more compared to a boiler build of similar size elsewhere in the world. ■

#### CONTACT PERSON

**Paulo Aguiar**  
VP Wood and Pulp Handling  
tel: +358 50 413-4171  
paulo.aguiar@valmet.com

## Scope of delivery

- Pulp drying line with a daily capacity of 5,000 Adt and the potential for future capacity increase through debottlenecking: 2 drying machines and 4 high-capacity baling lines
- Recovery boiler with a daily capacity of 6,300 tDS with a smelt spout cleaning robot
- Fluidized bed power boiler with a capacity of 160 MWth
- Mill-wide NCG collection and handling solution

# The giants of the sea

The largest ever container vessels will soon sail with Valmet's automation. Daewoo Shipbuilding & Marine Engineering has chosen the unique combination of tailormade scrubbers and automation to drive sustainability at sea.

TEXT Soili Städter

PHOTOS Shutterstock and Soili Städter





**T**he Korean shipbuilding history is embedded in Geoje, in the South Gyeongsang province. One of the most significant shipyards there is Daewoo Shipbuilding & Marine Engineering (DSME). It is the largest shipyard in the world, driving innovation to meet customers' needs in the demanding marine business.

### Largest container vessels ever

Thousands of vessels are built at DSME's shipyard. The world's largest container vessels are currently in production. Each of these seven vessels can carry 23,000 TEU (twenty-foot equivalent unit) containers.

**Seong-Hyun Park**, DSME's Assistant Manager, Ship Machinery, Procurement Department, is clearly proud of their container vessel expertise. Such large container vessels have never been built before. They therefore need to be tailor-made, with containers fitting perfectly in the correct place on the vessels. Valmet's strength lies in the flexibility of its scrubber design. The shipyard has selected the U-type scrubbers, which means that they have their own bypass line.

Valmet's scrubber system delivery includes hybrid scrubber systems for the main engine and generator engines, including auxiliary systems and automation. In the open-loop mode, the exhaust gas is washed with seawater. In the closed-loop mode, it is washed with recirculated water and alkali. All emissions are continuously monitored, and the complete exhaust gas scrubber system is controlled by Valmet's proven marine automation.

### A unique combination: scrubbers and automation

The integration of Valmet's automation with the scrubber makes the delivery unique. It is a cost-competitive solution to get both from the same supplier. For instance, fewer engineering hours are needed, and information sharing between the scrubber and automation experts is easy.

During the construction process, risks in time schedules can be reduced when products come from the same supplier. Later, the vessel owner will need only one source for spare parts and maintenance. The single point of services will enhance customer service.

### Local experts enhance the project

"In Korea, Valmet's dedicated project engineers undertake the work," says **Keon-Yeong Yoon**, Valmet's Vice President for Automation in the Asia Pacific.



Seong-Hyun Park is very satisfied with the services offered by the local Valmet personnel. "They are helpful and are very familiar with the project. Their Project Engineer, **Dong-Seon Kim**, is the perfect contact to support us on a daily basis. He's committed to improving the project's performance," he emphasizes.

**Anssi Mäkelä**, Valmet's Senior Manager, Sales & Technology, Marine Emission Control, adds: "The basis of our fruitful cooperation lies in the trust that has been created by working closely together. Our aim is to offer our expertise to customers. The key is knowledgeable resources, local people who speak the local language – and people who know the culture and are eager to learn new things."

### Tight time schedule for start-ups

As part of large projects, pre-inspection and factory acceptance tests (FAT) are also extremely important. They ensure that everything fits when installation is underway in the vessels.

The commissioning for the first vessel started in early 2020. The final delivery will soon follow. For seven vessels, the time schedule is well planned, and everyone needs to work together. ■

#### CONTACT PERSON

**Anssi Mäkelä**  
Senior Manager, Sales & Technology,  
Marine Emission Control  
+358 503174173  
anssi.makela@valmet.com

"Along with producing energy, we also test the efficiency of biogas production in Arctic conditions," says Jarmo Saariniemi, Office Manager at the Centre of Expertise for Rural Entrepreneurship at Vocational College Lappia.



# The heart of the biogas plant

The world's northernmost biogas plant has been running with Valmet's DNA automation system for five years at Vocational College Lappia in Loue, Finland. The plant provides excellent support for the educational institute's vision of becoming an energy self-sufficient farm.

TEXT AND PHOTOS Soili Städter

**J**armo Saariniemi, Office Manager at the Centre of Expertise for Rural Entrepreneurship at Vocational College Lappia, has worked as project manager for the biopower project. "The design work was already started in 2009, and the plant was built in 2010. Valmet's automation system was purchased at the end of 2013, and the biological process began the same year. Heat generation started in 2014. Along with producing energy, we also test the efficiency of biogas production in Arctic conditions," Jarmo Saariniemi says.

## The Valmet DNA display shows the status of the entire biogas process at a glance.

The main raw material is cow slurry, which is mixed with grass silage. With 115 cows, you get about 7–7.5 cubic meters of sludge per day.

The biogas obtained from the plant is used to heat the facilities at the vocational school. Even if heat production decreases during the summer, the biological process is still at work

### Optimal bioprocess

Nitrogen from the manure is used in the bioprocesses. In the biopower plant, the slurry is digested by microbes at 37 °C, which is the optimal value for the mesophilic process. The biogas consists primarily of methane (approx. 55–65 percent) and carbon dioxide (approx. 35–45 percent).

The biogas plant includes a very large pumping system, a 169 m<sup>3</sup> reactor basin and a 1,000 m<sup>3</sup> post-gasification pool, which also serves as gas storage. Unit 1 features

a storage tank, from which the sludge is pumped twice daily into the reactor.

A total of 62,000 m<sup>3</sup> of biogas is produced each year. Heat production is 360 MWh.

### The heart of the biogas plant pumps with automation

During the process's planning stage, each step was precisely defined to enable a smoothly operating automation system for the plant. Valmet's expert for the project was **Markku Keskimäula**. A designer from the Seinäjoki University of Applied Sciences was also involved.

"Commissioning proceeded well, because the design work had been carefully done. Markku's input for this was very important," Saariniemi remarks. Valmet trained the automation system users at its regional office in Kemi, Finland and on-site at the vocational school.

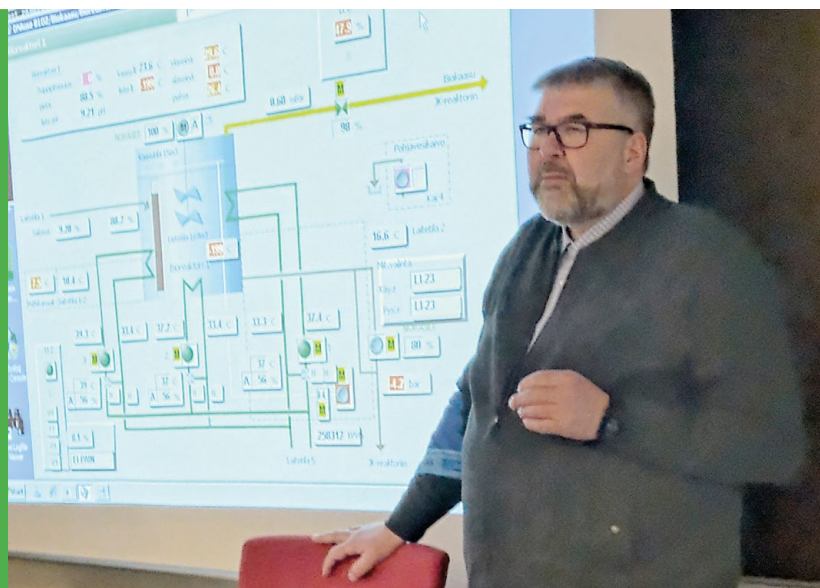
The Valmet DNA display shows the status of the entire biogas process at a glance. The operator can anticipate disturbances, and the plant as a whole has never experienced downtime due to a failure. The bioprocess conditions have stabilized.

"Automation is the heart of the biogas plant. It's essential for the plant's functionality and safety. Likewise, the automation makes it easier to operate the process and frees up personnel for other tasks. Valmet DNA has been a good choice for us. The specification, installation and process management have worked exceptionally well," says Saariniemi in summarizing the benefits of the system. ■

**CONTACT PERSON**  
**Markku Keskimäula**  
 System Specialist  
 +358 405574461  
 markku.keskimäula@valmet.com

## Remote connection from the classroom to the process

**Jarmo Saariniemi** presents Valmet DNA automation to his students. "Valmet DNA is a smart learning environment. It's user-friendly. With its help, it's possible to illustrate the process operations to students – for example, how to start the pumps, how to change valve positions and so on. For teaching purposes, it's also possible to create the different scenarios that need to be solved."



# Shared values – shared targets – shared partnership

The shared values of safety, sustainability, quality and respect for others have taken Klabin and Valmet a long way forward. Their nine-year partnership in shutdowns continued with their successful annual maintenance shutdown at Klabin's Monte Alegre paper mill in 2019.

TEXT Luciana Pompeu, Heli Kankare and Fernanda Maia PHOTOS Luciana Morassi

“The long history of Klabin and Valmet is one of partnership in problem solving and searching for innovation. It's a business process success story,” says **Marcelo Gasparim**, Fiberline Production Manager at Klabin's Monte Alegre paper mill.

The long partnership between the companies provided a strong starting point for the recent annual shutdown at Klabin's Monte Alegre mill – their crown jewel inaugurated in 1914.

## Major shutdown

The challenge was large and complex: the implementation of the annual maintenance shutdown at Klabin's Monte

Alegre paper mill in Telémaco Borba, Paraná. In May 2019, this meant the mill needed to halt its production for eleven days for equipment and facilities maintenance.

The maintenance shutdown involved more than 500 professionals from different companies, led by Valmet shutdown management team and approximately 65 Valmet employees, who focused on making this period a shared journey with the team at the Klabin Monte Alegre mill.

## Careful planning and teamwork

A work of such magnitude requires careful planning, timely execution, efficient project management and targeted development activities. Moreover, the Monte Alegre mill is one of the most complex integrated mills in the





"We're happy with the results of the shutdown," says Marcelo Gasparim, Klabin Monte Alegre Fiberline Production Manager, pictured with Fausto Pires, who was responsible for field service during the shutdown.



← Valmet Field Services professionals worked seamlessly together to meet the tight schedule.

↑ “We expect our partners to align with our principles and values, as is the case with Valmet,” says Luiz Francisco de Almeida, Maintenance Planning Manager at the Monte Alegre mill.

world, which introduces further variables to the project.

According to **Luiz Francisco de Almeida**, Maintenance Planning Manager of the Monte Alegre mill, the shutdown is a great opportunity to review all the equipment and facilities to ensure that future operations can be conducted safely, reliably and productively.

The 2019 maintenance shutdown at the Monte Alegre mill was a great example of teamwork and comprehensive planning: Valmet’s field service team worked alongside the mill managers and personnel throughout the process. A focus on safety, quality and meeting deadlines secured a successful result, and overall the project increased the reliability of the mill. After the shutdown, it was decided to continue the cooperation for another year, with the next shutdown in 2020.

“I think the secret of our success is merging our strengths and working together toward the same goals,” concludes **Fausto Pires**, Valmet’s technical Assistance Manager.

### Effective outsourcing

For Klabin, outsourcing the annual shutdown is highly effective, and synergy with companies that share the same goals is essential. The goal of such a partnership is to bring the best technology and innovation to the mill, while respecting each other’s expertise.

While Valmet secures the best possible condition of critical production equipment by planning and implementing major shutdowns professionally, the customer

can concentrate on running their core business. A professionally planned and executed shutdown also ensures there are no extra costs or schedule overruns, and minimizes downtime and risks, with a high focus on safety.

“Whenever our partners meet or exceed our agreed targets, it means greater operational security for the plant. In other words, it means compliance with our operation plan and the targeted quality within the set budget, and ensures the competitiveness of our mill,” he explains. ■

**CONTACT PERSON**  
**Fausto Pires**  
 Technical Assistance Manager  
 Mobile: +55 41 9 9207-6533  
 fausto.pires@valmet.com

## Benefits of an outsourced shutdown

- Transparency in planning and execution phase
- Safety planning for the whole shutdown
- Improved risk identification and mitigation
- Resource efficiency
- Cost and schedule management
- Faster start-up and revenue generation

“I think the secret of our success is merging our strengths and working together toward the same goals.”



From left: Luiz Alfredo, Jonatan Melo and Jorge Leite.



# Excelling with data

Mondi and Valmet have joined forces to take the performance of Mondi's Syktyvkar pulp and paper mill to the next level. Central to their current performance agreement is the increased utilization of Valmet's Industrial Internet - VII solutions, which enable better use of data and a more collaborative way of working. **TEXT Nigel Farrand**



1200 T/D	RATIO SP	16 %
23072 l/min	RATIO LF	24 %
1.0 %	RATIO BROK	5488
242 T	ACTIVE SP BROK	13671
702 T	ACTIVE SP SP	
140 T	ACTIVE SP LF	
	PRODUCTION BROK SP	
	PRODUCTION SP SP	
	PRODUCTION LF	

**M**ondi Syktyvkar, a fully integrated pulp and paper mill in Russia, has been using Valmet's Advanced Process Controls (APC) since 2012 to improve the operational efficiency of their fiberline. The cooperation now continues for a further five-year period, because Valmet's Industrial Internet - VII solution agreement enables further efficiencies and capabilities.

### Fiberline optimization continues with Industrial Internet applications

Mondi Syktyvkar operates three uncoated fine paper machines, one containerboard machine and a pulp dryer, as well as a wood yard, a pulp mill, a power plant and a wastewater treatment plant. Covering the entire supply chain in Syktyvkar from wood to paper requires special care if all the processes are to be designed and run sustainably and efficiently.

To support this approach, the scope of the VII solutions agreement covers the two fiberlines in the pulp mill, with cooking optimization for three digesters, as well as the optimization of washing, oxygen and bleaching stages for the hardwood and softwood fiberlines.

The continuing partnership seeks to gain further performance improvements by using Valmet's Industrial Internet applications and remote expert support from the Valmet Performance Center. The solutions selected for the agreement are VII for Pulp Quality and VII for Chemical Efficiency.

### Setting clear objectives with benchmarking

Using Valmet's vast global installed base, confidential benchmarking with other optimization projects around the world help ensure targeted actions have clearly set objectives for future operational savings or improvements. Once a year, the Valmet expert team performs an on-site process audit supported by a remote specialist team, depending on the mill's requirements. In addition to the annual audit of the process and equipment, the agreement includes several process area-specific on-site visits by the optimization specialist.

Identified innovations and opportunities with shared roadmaps for improvement can be easily followed in the Opportunities module of the Customer Portal.

### Working to shared performance targets

The process performance-based agreement represents the partners' trust and confidence in their ability to excel in their own core competences. For Mondi, this means reduced energy and raw material costs, reduced process variability, optimized quality and production, and enhanced environmental performance.

The results look promising: Management of the entire fiberline and cooking optimization has resulted in maximized cooking yield and fiberline capacity exceeding the economic impact of the initial APC project, which has resulted in chemical savings of EUR 5 million. ■

**CONTACT PERSON**  
**Samuli Lehtonen**  
 Director, Performance Optimization  
 +358 505836281  
 samuli.lehtonen@valmet.com

Mondi Syktyvkar is one of the leaders in the Russian pulp and paper industry and the largest domestic paper producer. The annual output of the mill exceeds 1.2 million tons of high-quality competitive products including office, offset and newsprint paper, containerboard, and market pulp.



### VII solutions scope

- VII for Pulp Quality
- VII for Chemical Efficiency
- Remote Services from Valmet Performance Center



# Beating NOx emissions with optimized combustion



Pohjolan Voima's values – skillfully, boldly and together – came to life when the company succeeded in reducing NOx emissions and improving energy efficiency through combustion optimization and data analyses at its two biopower plants.

**TEXT** Marjaana Lehtinen  
**PHOTOS** Hannu Vallas and Kai Tirkkonen

**P**ohjolan Voima, a major player in the Finnish energy sector, accounts for approximately 20 percent of the country's total electricity production. At its 22 power plants, it produces electricity and heat for its shareholders – export industry companies, energy companies and cities – with hydro-, thermal and nuclear power.

With emissions limits tightening at the end of the Industrial Emissions Directive (IED) national transition period, the company had to find a way to reduce NOx emissions at two of its biopower plants, Kymin Voima in Kouvola and Kaukaan Voima in Lappeenranta, Finland. Additionally, at both plants the company wanted to improve boiler efficiency, and at Kaukaan Voima reduce ammonia consumption.

### Focus on combustion management

Both plants produce process steam, district heat and electricity, and the main fuels are forest industry side streams and forest residues. Their fuel mixes vary according to the season. Kymin Voima's boiler utilizes bubbling fluidized bed (BFB) technology. Kaukaan Voima's boiler plant utilizes circulating fluidized bed (CFB) technology.

Thanks to combustion optimization, there is now no need for Kymin Voima to invest in an ammonia injection system at all. "We'll be able to keep emissions below the upcoming tighter limits with our present technology and more accurate controls, as well as by reducing the use of NOx-containing fuels such as peat," says Managing Director Antti Rainio at Kymin Voima.

The customer understood that the technical challenge with emissions management actually lay in combustion management. “The problem is often connected with fuel input. When the boiler furnace is wide, even as much as 10 or 20 meters, it’s challenging to feed the fuel evenly throughout the furnace. The bubbling sand in the furnace contributes to good combustion, but it isn’t enough. Changes in fuel quality and mixture add to the challenge,” says Managing Director **Juha Kouki** at Kaukaan Voima.

### Advanced process controls optimize combustion

The solution for improving combustion management and consequently reducing the formation of NOx in the boilers was developed in close cooperation with Valmet. After

a process improvement study in the fall of 2018, Valmet DNA Combustion Manager, an advanced process control application for optimized combustion, was installed in the plants’ existing Valmet DNA automation systems.

The advanced control application manages the combustion process against variations in production, fuel amount, fuel quality and combustion circumstances, based on fuzzy logic, measurements and measurement data. Advanced control technology ensures even fuel input at all times.

“The most significant improvement is more even fuel combustion throughout the boiler. The oxygen level after the furnace can be more accurately controlled and thus reduced too. In turn, this reduces the amount of flue gases and enables better carbon monoxide control. Com-



← Control room at Kymin Voima biopower plant in Kouvola. Advanced controls at both plants of Pohjolan Voima have made operators’ work easier and freed up their time for other tasks from manual control.

↓ At the Kaukaan Voima plant, NOx emissions were previously controlled mainly with an ammonia injection system. Thanks to more accurate control technology, it has been possible to reduce its use and consequently save costs through lower chemical consumption.



# Advanced control technology ensures even fuel input at all times.

bustion staging also improves, contributing to lower NOx emissions,” Managing Director **Antti Rainio** at Kymin Voima points out.

The long list of other benefits includes a reduced requirement for combustion air, which reduces the need for auxiliary electricity, improving power plant performance. The lower amount of flue gases improves boiler efficiency. Power plant energy efficiency improves, because more heat and energy can be produced with the same amount of fuel. Heat losses also decrease, because less heat goes to the stack from a smaller amount of combustion air.

## Lower chemical consumption

Thanks to combustion optimization, there is now no need for Kymin Voima to invest in an ammonia injection system at all. “We’ll be able to keep emissions below the upcoming tighter limits with our present technology and more accurate controls, as well as by reducing the use of NOx-containing fuels such as peat,” adds Rainio.

At the Kaukaan Voima plant, NOx emissions were previously controlled mainly with an ammonia injection system. Thanks to more accurate control technology, it has been possible to reduce its use and consequently save costs through lower chemical consumption.

An additional bonus is that advanced controls at both plants have made operators’ work easier and freed up their time for other tasks from manual control. ■

**CONTACT PERSON**  
**Tiina Stenvik**  
 Director, Performance Solutions  
 +358 408216886  
 tiina.stenvik@valmet.com

## Toward the next step in utilizing data

Valmet has complemented its performance and reliability optimization solutions with the Data Discovery service as part of Valmet’s Industrial Internet – VII offering. This provides a fast and cost-effective way of charting development potential or problems related to a power plant process by utilizing plant data from various sources, as well as advanced analytics and process expertise. The service is suitable for power plants in both the energy and pulp and paper industries.

In analyzing the data, Valmet uses advanced analytics methods, such as machine learning and artificial intelligence, to create predictive models. The customer gets a concrete development proposal and tentative applications to resolve the issue within three months of the project kick-off. The results provide the customer with a clear insight into how to improve and optimize plant performance.

“We’ve utilized analyzed plant data to optimize emissions and power boiler efficiency, improve proactive condition monitoring, maximize power plant capacity and predict boiler agglomeration, to name a few examples. Next, we plan to use data to increase the use of renewable fuels at power plants,” says **Tuomas Petänen**, Head of Energy Segment, Industrial Internet, Valmet. “Together with Pohjolan Voima we will next look into these further possibilities of utilizing data to improve reliability and performance,” Petänen concludes.



# INNOVATOR'S VOICE

Get inspired



Steel Yankee dryers need to be metalized before use. Recently Valmet launched Infinikote II, the first Chrome free metalizing in the market.



# Steel or Casted Yankee

Selecting the right Yankee merits careful consideration. After all we are dealing with the heart of your tissue machine here. Steel and casted Yankee dryers both have their benefits, in different areas, depending on your type of production.

**TEXT** Magnus Högman

**PHOTOS** Mikael Karlsson and Magnus Högman



The surface of a Yankee needs to be absolutely perfect to create the best paper sheet. Also the rest of the dryer is thoroughly tested due to the fact that it is a pressure vessel.

**W**ell over 100 years since it was invented, the Yankee dryer is still at the heart of tissue mills around the world. But while the essence of the Yankee remains the same, today's dryers differ greatly from those of a century ago. Technical developments have improved safety, performance and availability.

For a long time, Yankee dryers were supplied only by a few manufacturers with access to their own specialized foundries. With the development of more reliable, full face thermal spray coatings in the 1990s, steel Yankee dryers also became a viable alternative for the manufacturing of creped tissue papers.

Consequently, nowadays when selecting a Yankee dryer, one significant decision that most mills will face is the choice between steel and cast iron. Here it is important to consider factors such as capacity, efficiency, process compatibility, operational cost and risk minimization.

No single solution can offer the best fit for all mills, and the specific circumstances and needs of your production process, tissue products and market.

Working with a supplier that has ample experience with and a complete range of both varieties can therefore also play a critical role in making sure you get the best solution for your production.

### Strong arguments for steel

There is a wide range of characteristics to consider when choosing a Yankee dryer, from drying performance and efficiency to safety and durability. In certain areas, steel can offer advantages over cast iron.

Most notably, steel is a stronger material. This means that the dryer design can have a thinner, more thermally efficient shell with greater drying capacity. If your process so admits, you can utilize the added capacity, in turn, to shift drying from the hood, creating potential for reduced energy consumption. Steel is also a ductile material and generally better suited for pressure vessels.





Feature	Steel	Cast	
Drying capacity (theoretical)	+++	++	Stronger steel allows for thinner shell, but can be compensated by deeper grooves for cast. Practical, process-dependent drying limitations.
Energy efficiency (theoretical)	+++	++	Related to drying capacity. Drying more with Yankee reduces losses in AirCap. Yankee itself does not use less energy.
Safety	+++	++	Steel is generally a better material for pressure vessels. But design and quality are equally important. Valmet has an excellent safety record.
Surface properties (when metallized)	+++	+++	Both cast and steel shells are metallized with the same type of thermal coatings.
Surface properties w/o coating	N/A	+++	Cast iron provides a good papermaking surface as is. A steel shell is too soft and must be metallized for papermaking.
Long-term reliability and durability	+?	+++	Cast iron has been used and proven for over 150 years. Ribbed, steel dryers have been in operation for significantly shorter time.
Surface temperature uniformity	++	+++	High-quality cast iron is uniform with even properties. A high-quality welded shell has small variation between weld and plates.
Vibration damping properties	+	+++	Grey cast iron has excellent vibration damping properties, 10 to 20 times that of steel.
Corrosion and erosion resistance	+	+++	The free graphite of cast iron forms a barrier to corrosion. Steel has no free graphite and is more exposed to corrosion fatigue and erosion.
Maintenance and periodic inspections	++?	++	Well-established recommendations and methods for cast Yankee. Knowhow for steel Yankee under development.
Process compatibility (TAD, hybrid)	+?	+++	TAD and hybrid processes utilize higher doctor loads known to quickly deteriorate metallized shells. Steel largely unproven.
High press load capability	++	+++	Very little experience in the industry with steel Yankee and high press loads. Steel is stronger but cast iron has good fatigue resistance.
Others (top speed, stability)	++	+++	Very little experience in the industry with steel Yankee in top-speed tissue machines.

Side-by-side comparison. The table gives an overview of how steel and cast iron Yankees compare when it comes to different properties and characteristics.

### The case for cast

But this is only half the story. While steel can provide the best choice for some tissue producers, cast iron also presents a number of clear advantages.

Cast iron can be especially beneficial when it comes to characteristics that deal with durability. The material's free graphite ensures a high level of resistance to

corrosion and erosion and, although steel is a stronger material, cast iron benefits from good fatigue – press load – resistance.

Further, cast iron provides a good papermaking surface as is and does not need to be metallized as does the softer steel shell.

When thinking long-term, consider that cast iron has demonstrated reliability in Yankee dryers throughout their century-plus history. There is far less data available on the long-term performance of newer steel Yankee technology.

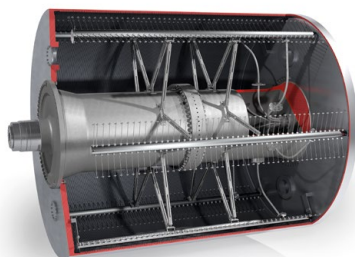
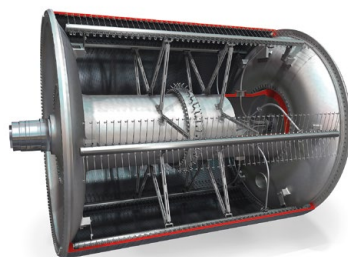
### Selecting the right Yankee

Selecting the right Yankee merits careful consideration. After all we are dealing with the heart of the tissue machine here.

And as far as giving our advice, our current conclusion is that steel Yankee dryers are suitable and proven for most conventional tissue making processes and in particular for maximizing Yankee drying rates where possible.

Cast iron Yankee dryers are suitable and well proven for all processes but in particular for high nip load Yankees for use with extended nip presses and in processes that utilizes higher than conventional doctor loads like hybrid and thru-air drying processes. ■

Valmet cast Iron Yankee dryers originates from 1891. They are typically suitable and proven for all processes but in particular for high nip loads up to 150 kN/m, TAD and hybrid tissue making processes.



The first steel Yankee dryers were launched in early 2000's. They are typically suitable and proven for most conventional tissue making processes with nip loads up to 120 kN/m.

**CONTACT PERSON**  
 Magnus Högman  
 Sales Manager  
 +46 705601372  
 magnus.hogman@valmet.com

# Unleashing the green value of methanol

Methanol is a pulp mill byproduct with great potential. Its better use may help a pulp mill lower the fuel costs, lower the carbon footprint and increase production. **TEXT** Andreas Liedberg

**C**ommercially available methanol is primarily made from natural gas and is therefore not carbon neutral. But pulp mill methanol is a green fuel that can be used instead of natural gas or oil. A mill produces some 10 to 15 kg of methanol per tonne of air-dry pulp (ADT), and this is enough to make many modern pulp mills operate without any fossil fuel at all. Instead, they use liquid methanol that is produced and stored in the mill.

## New purification technology

But today, using pulp mill methanol can be something of a challenge. It is concentrated in gaseous form in the evaporation plant, and after some heat recovery steps and the reduction of the moisture content, the gas is sent to either incineration, typically to the lime kiln or to the recovery boiler, or to a liquid methanol system. The methanol is heavily contaminated and has a very strong odor. Handling is therefore difficult, and combustion results in emissions of NO<sub>x</sub> and SO<sub>2</sub>. The methanol can also vary in water content and quality, and this has resulted in lime kiln capacity issues.

To take the pulp mills forward, Valmet and several industry partners have developed a new purification technology. Today, it's possible to upgrade existing methanol systems so pulp mills can produce purified methanol – bio-methanol.

## Higher profits and a lower carbon footprint

“The benefits of purifying methanol can come from using it as a fuel at the mill, selling the purified methanol or debottlenecking the recovery boiler. A pulp mill with a production of 400,000 tonnes of pulp per year produces approximately 15 tonnes of methanol per day, and for a mill like this, the combined benefits could reach several million dollars a year,” says **Anders Rothelius**, Manager, Evaporation Applications and Technology at Valmet.

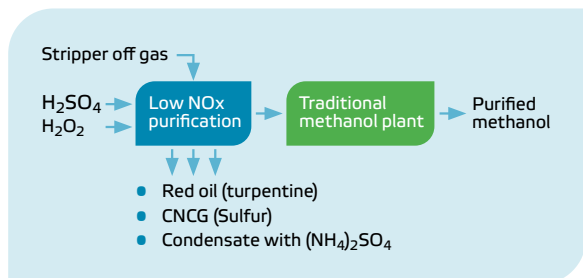
Using purified methanol instead of the normal quality brings benefits like better combustion, lower emissions and higher availability. And if 15 tonnes of methanol per day are used as fuel instead of oil, the mill saves USD 0.9 million/year or more, lowering its carbon footprint.

The benefits will be greater for mills with access to a market for bio-methanol. Fossil methanol sells at around USD 500/tonne, but since there is no established market for bio-methanol, it is difficult to predict its value. Selling 15 tonnes of purified methanol/day at the price of fossil

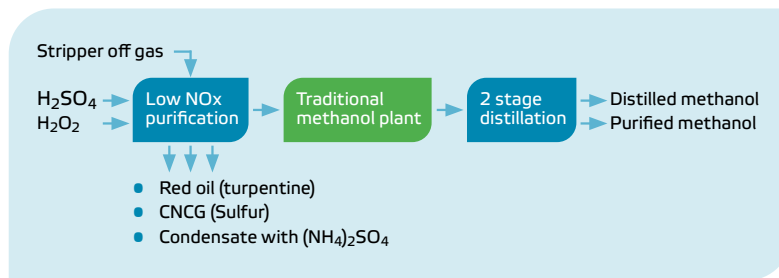


Anders Rothelius

Existing methanol plants in pulp mills can be upgraded with a purification step located upstream from the methanol plant. The resulting purified methanol is a high-quality fuel that can be used at the mill or sold.



Purified and distilled methanol is clean enough to be used in other chemical processes like chlorine dioxide production. This will displace fossil methanol use for this purpose at the mill.



methanol produces annual revenue of USD 2.6 million. And it's likely that the bio-methanol will command a premium.

Removing methanol from the recovery boiler fuel mix can also enable increased pulp production. If the recovery boiler is the limiting factor, the mill will be able to produce one extra tonne of pulp for every tonne of methanol that is removed. If extra pulp brings USD 250/tonne, including other costs, 15 additional tonnes of pulp per day will increase profits by approximately USD 1.3 million/year.

### A methanol upgrade

Liquid methanol systems can now be upgraded with a purification step. And if the resulting bio-methanol is dis-

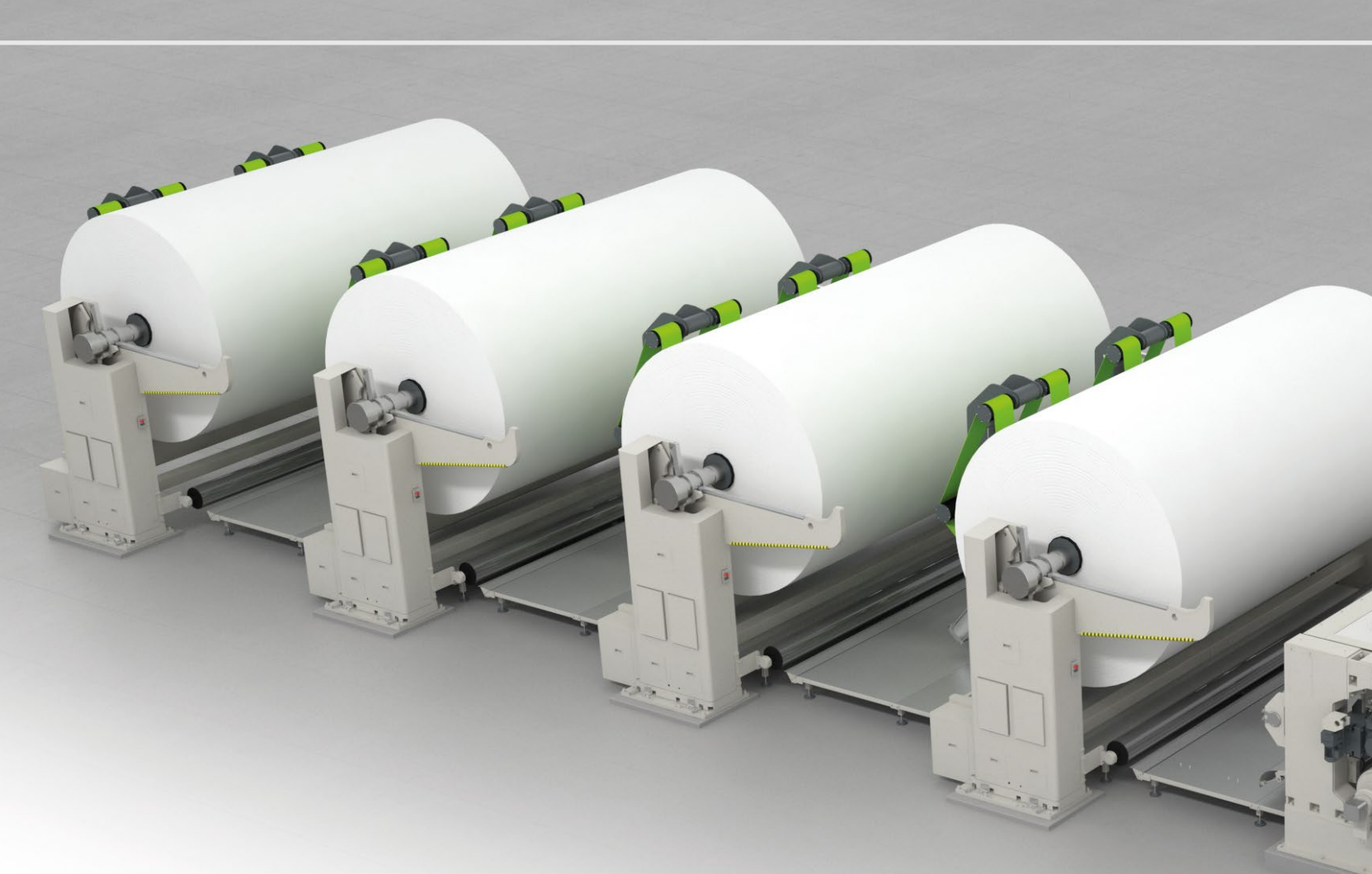
tilled, it becomes so pure that it can be used in chemical processes. This makes it possible for pulp mills to displace fossil-based methanol for the production of chlorine dioxide, an important bleaching chemical.

“The methanol purification plant that was built during the development project was operated at a pulp mill for almost 4,000 hours without problems. The design was later completed and is now proven for commercial applications. The development of the technology was made possible with the help of several industry partners, and we're now ready to help pulp mills use this technology to bring their performance forward,” Rothelius concludes. ■

#### CONTACT PERSON

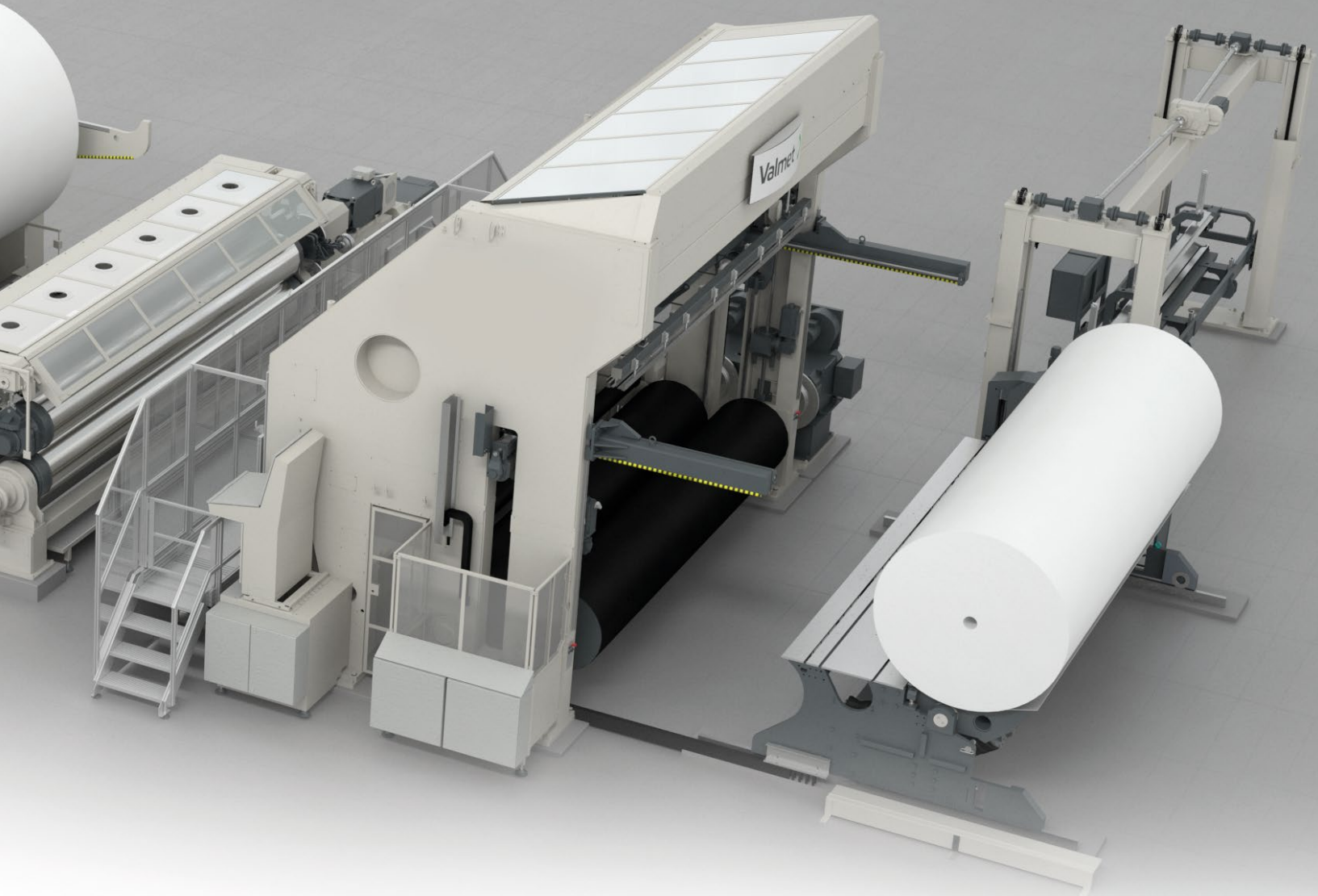
Anders Rothelius  
 Manager Evaporation  
 Application & Technology  
[anders.rothelius@valmet.com](mailto:anders.rothelius@valmet.com)





The  
**rewinder**  
as an  
**enabler**

The rewinder needs to have a versatile design, because different mill set-ups and desired end products highlight the different requirements of a rewinder.



Converting tissue paper into finished products is not always as straightforward as it might look, especially if the final product is to be folded. A step between the tissue machine and converting is often needed. That's where the rewinder comes into play.

TEXT Allan Grimm PHOTOS Katarina Åhsberg

**T**he mother reel arriving from the tissue machine is the first stage of a long converting journey before the tissue paper ends up on the consumer market as toilet roll, kitchen towel, napkins, handkerchief etc.

To convert tissue folded, and in many cases rolled, products, the mother reels need to be combined or slit, or slit and combined, depending on the characteristic of the finished converted product. To enable this, the mother reels are processed through a tissue combiner/slit rewinder machine.

#### Key requirements for rewinding

The challenge for the slitter rewinder is to produce a maximum number of combined and/or slit reels per day,

## The many roles of the rewinder

Paper mills with a converting plant integrated in their organization produce mother reels from the tissue machine. The rewinder combines and slits these for wholesale dealers and/or for their internal converting plant.

Paper mills without a converting plant produce mother reels from the tissue machine and then combine and slit jumbos for wholesale dealers or converting companies.

Companies that only convert tissue rolls and folded and interfolded products can buy rolls that are already combined and slit from a wholesale dealer or mother reels directly from the mills. If the strategy is to purchase mother reels, they can use a rewinder for combined and/or slit reels in accordance with their production requirements.

corresponding to a predefined specification for the number of plies and slits, and the desired roll diameter. The converting plant (integrated or not) will convert these combined and/or slit reels once more into a finished tissue product that satisfies market demand.

Any converting action influences the paper characteristic produced by the tissue machine. The embossing process increases web thickness, with a reduction in tensile properties, and inaccurate tension control may have a negative effect on the percentage of crepe. The rewinder, even if it is frequently located in line with the tissue machine, can be considered the first step of the converting process, and the rewinding challenge is to ensure that as much as possible of the original paper characteristics are preserved.

Another factor to consider is that converting machines' efficiency and machine availability differ from tissue machines. Production capacity according to converting or market demand characteristics needs to be calculated in advance to avoid any potential delay in the tissue machine's production.

### Future enabler

When selecting a rewinder, several key parameters need to be considered to calculate the correct production output in terms of tonnage, number of plies and slits, and



When selecting a rewinder, it's important to consider any future needs that may arise in your business.



↑ When correctly configured, the rewinder is the toolbox that enables the tissue machine output to satisfy every tissue consumer's need throughout the production chain.

the desired roll diameter. The web width, basis weight, density and size of the mother reel all have an impact on production output. Crepe ratio influences how many meters will be wound onto each roll, while the number of stands required depends on how many plies are needed. More plies will consume more mother rolls from the tissue machine. The number of slitters depends on the desired finished roll widths. The finished reel diameter range and core diameters are also important parameters for the rewinder's production output. If enhanced smoothness is required in the end product, a calender and other features can be added.

However, the most important thing is to select a rewinder that preserves the tissue quality generated in the tissue machine with equipment that can adapt to any future needs that may arise in your business. Instead of a possible future bottleneck, the rewinder may be your future enabler. ■

**CONTACT PERSON**

**Andrea Coluccini**  
Product Sales Manager  
Tissue Rewinders  
andrea.coluccini@valmet.com

"The new Valmet F55 opens several new horizons for our research into wood and fiber structure," says Antti Haapala, Associate Professor at the University of Eastern Finland (UEA).



# Digging more deeply into fibers and particles

The University of Eastern Finland is looking for a more detailed understanding of fiber reactivity and an analysis of the relationship of fibers to product properties with the Valmet Fiber Image Analyzer's new ultra-high definition imaging and classifying capabilities.

**TEXT AND PHOTOS** Samar Yacoub and Antti Haapala

**T**he classification and compositional analysis of pulp fines is relevant for monitoring industrial processes such as screening and grinding, and quantifying some product properties. The morphology of fines also describes the way they are generated from fibers, and the detection of fibrillar fines allows an analysis of the delamination of the fiber cell wall. The same approach has already proven effective in assessing the effects of chemical pre-treatments on fiber structure when various micro- and nanocellulose products are being prepared. An analysis of the degree of fiber deterioration is a good marker for pre-treatment efficiency and reaction kinetics, which indicates a sufficient processing time for further micronization processes.



### New optics module

Utilizing 37 years' experience in laboratory and online fiber measurements, Valmet has launched a completely redesigned optics module for the Valmet Fiber Image Analyzer (Valmet FS5). Since its launch in 2013, the Valmet FS5 analyzer has provided precise standardized fiber morphology measurements that are possible without special training, sample preparation or laboratory facilities. The new optics now feature a wider measurement cell to allow improved shive particle measurement, a larger image area to measure more and longer fibers, and an ultra-high definition camera, providing faster fiber analysis and increased sharpness for significantly better fibril and small particle detection.

2019 was a record year, with a total of 30 Valmet FS5 analyzers sold. Besides its everyday use in production facilities, the Valmet FS5 has been the analyzer chosen by many industrial research facilities and universities. Valmet has collaborated with the University of Eastern Finland (UEF) in studying new measurement applications in the development phase of the new optics module. The university is now continuing to seek a more detailed understanding of fiber reactivity and to analyze the relationship of fibers with product properties.

### Improved small particle detection with ultra-high definition

Fast and reliable fiber characteristics analysis has already been available for decades, but the identification of small particles and different types of fine has been limited because of the optics and camera systems' limitations.

"We're looking for small details in fibers and fines that are quite difficult to observe and require a high degree of sophistication in both optical detection and the classification of particles," says **Antti Haapala**, Associate Professor at the University of Eastern Finland (UEA). The technology in UEF's old analyzer lacked the capabilities of "seeing" and/or identifying small particles like fiber fibrils and parenchyma cells. "We can now visualize details far smaller than could be obtained with the device purchased in the early 2000s," Professor Haapala continues.

The leap from the Valmet FS5's original high definition to ultra-high definition optics enables smaller particles to be visible. The smallest dimension of a measured particle is nearly 1 µm. This accuracy enables good identification of different fines particles from wood-based pulps.

### Automated identification of non-fiber-like particles

However, optical measurement capability alone is not enough. Wood- and plant-based pulps also contain particles other than fibers.

The Valmet FS5 has a unique built-in neural network-based feature called the Teach Tool. With this intuitive and easy to use feature, it is possible to teach the analyzer to identify various non-fiber-like particles by the

**"We can visualize details far smaller than could be obtained with the device purchased in the early 2000s."**

user's input of the type of particles one wishes to measure.

Professor Haapala and his team use this feature to obtain more information from their samples. "The new Valmet FS5's features in the detection of classified particle types are being applied for the detection of different tree cell types – for example, tracheids, vessels and parenchyma. The latter two are often just considered fines," explains Professor Haapala. After training for the analyzer has been completed, the results from the classified particles are easily available.

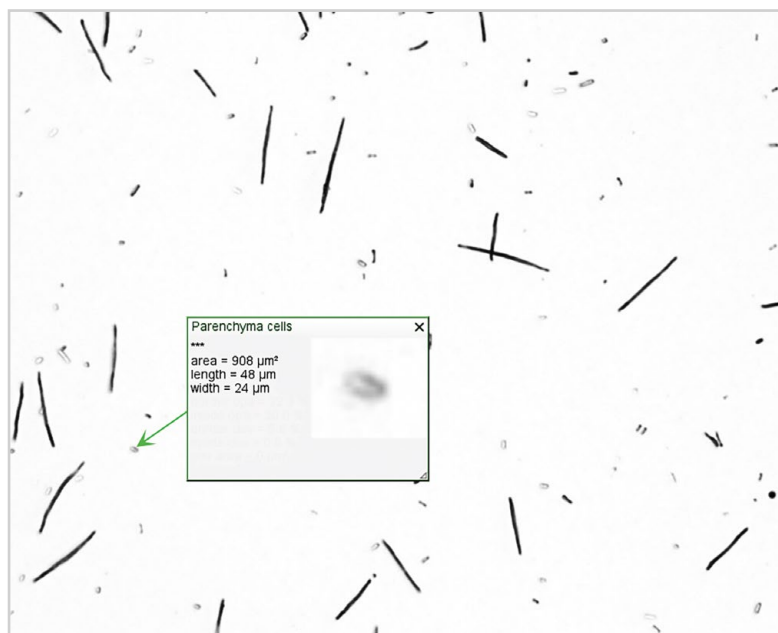
With a typical Valmet FS5 analysis, tens or hundreds of these particles are measured, taking an average of only five minutes to complete the analysis and obtain the results from the sample.

### Straightforward setup

"The Valmet FS5 setup was straightforward, and everything worked out fine. After verification fiber checks and a briefing on user-level issues, our lab technicians began to work on our samples the same day," says Professor Haapala. ■

#### CONTACT PERSON

**Tommi Niskanen**  
Product Manager, Valmet Fiber  
Image Analyzer  
tommi.niskanen@valmet.com  
+358 400 758 915



[www.valmet.com/fs5](http://www.valmet.com/fs5)



# EXPERT'S VOICE

Food for thought





# Quality brings competitive advantage

Quality is a holistic part of an organization's total competitive advantage, and the role of the customer has thus become increasingly central in quality work. Quality is also connected with a company's business strategy, management and leadership – and is seen as everyone's responsibility. **TEXT** Sanna Haanpää-Liukko **PHOTOS** Tomi Parkkonen

**D**efining quality can be an almost impossible task, because quality can mean such different things to different people, and in different situations and cultures.

“I see quality as one of the integral dimensions of a company's sustainable competitive advantage, SCA. SCA is a set of company assets, attributes, or abilities that are difficult to imitate and that allow a business to be more successful than its competitors over a long period,” says **Josu Takala**, Professor in Industrial Management and Materials Management at the University of Vaasa.

“Quality is holistic and is connected with a company's business strategy and management, and increasingly to leadership. The more quickly the operating environment and customer demand change, the more critical the latter becomes,” Takala continues.

### Quality thinking is evolving continuously

Takala says quality is not theory but praxis, a very practical thing – and it always has been. Quality thinking can be traced back to medieval Europe, where craftsmen started organizing in guilds with defined quality standards in the late thirteenth century. Hundreds of years later, the Indus-

# “Strong quality culture supports employees in making quality decisions.”

“The transformational leadership style encourages employees to innovate and create new solutions and ways of doing that are necessary for the future success. It builds a winning culture, not only within quality, but throughout the organization.”

trial Revolution created a need for new ways of managing quality, and Statistical Process Control and Total Quality Management, among other methods, have since seen daylight.

Today, businesses are increasingly based on advanced technologies, the latest know-how, digitalization and innovativeness, so quality thinking has also evolved. What companies now strive for is a holistic quality culture, characterized by the idea that everyone in an organization should be empowered to take responsibility and make quality decisions. The role of leadership is strongly emphasized.

## Quality should be customer-driven

Today, with quality seen as a holistic part of an organization's total competitive advantage, the customer's role has become increasingly central.

“It is the customer who defines what quality is. In an age of constant change, a company needs to be capable of moving quickly, often strategically, to meet customers' changing expectations. Indeed, a company should always be one step ahead of its customers when it comes to identifying future needs,” Takala points out.

While a company needs to comprehensively look at its quality, the customer is primarily interested in the fulfillment of their own quality-related needs and demands. Understanding what these are, and how they affect the company's way of operating, is therefore of crucial importance.

For example, a pulp or paper producer's quality-related demands on its technology provider may be related to the quality of its own end product; or it may be related to environmental quality or cost-effectiveness. In addition, the quality of know-how plays a more central role as more advanced technologies and Industrial Internet solutions are deployed.

## Turning data into quality

Digitalization and the IoT have created access to a vast amount of data concerning machine performance,

product quality or customer behavior, for example. This data can be utilized to enhance both product and process quality, and even to detect new, quality-related business opportunities.

“The big challenges here are connected with the quality of the data collected and the data analysis. Data itself is of no value; what is valuable is the ability to analyze it and create insights,” says Takala.

Machine learning and AI technologies are already being utilized today in monitoring and enhancing quality. Machine vision is used to detect variations, and different sensors collect data on single parts of a machine, or on a whole process and its end products. Not only does machine learning enhance the predictability of an infrastructure's maintenance requirements, it can also alert us to end-product quality-related problems that have yet to occur.

Digitalization and the Industrial Internet also promote the transformation of the relationship between a customer and a supplier into a deep partnership or ecosystem. The quality of know-how, such as data analytics competence, and a deep understanding of the customer's needs, will thus play an important role in companies' future quality approaches.

## In search of an optimal competitive strategy

Various decision-making tools can support a company in choosing its competitive strategy in a changing environment. As an example, Takala mentions the Sand Cone Model, originally introduced by Ferdows and De Meyer.

The Sand Cone Model suggests that although it is possible to trade off competitive capabilities – quality, dependability/flexibility, speed and cost-effectiveness – against each other in the short term, there is a dynamic time-dependent hierarchy between them. This means that building a sustainable competitive advantage requires the trade-off relationship approach to become a cumulative one, in which one capability is built on another.



## “It is the customer who defines what quality is.”

Originally, the model suggested that companies should develop all four sustainable competitive advantages by following a certain sequence of strategic priorities. The suggested sequence starts with enhancing quality – indeed, Ferdows and De Meyer believe a company’s quality performance is a precondition for all lasting improvements. The next step is to strengthen dependability/flexibility, followed by accelerating speed and finally, optimizing cost-effectiveness. A company can thus benefit from all four dimensions of sustainable competitive advantage without losing any of them, even in demanding market turbulence.

### Empowering employees to meet changing customer needs

The right leadership approach can support an individual’s and organization’s capability to change quickly to meet customer requirements.

“The transformational leadership approach is a tool for empowering individuals and organizations to change what they do, and how they do it,” says Takala, who has cooperated with the Finnish Defence Forces and supported them in adopting a transformational leadership style.

Transformational leaders encourage each team member’s motivation and positive development, act as a role model and foster an ethical work environment with clear values, priorities and standards. They also build a culture in which all team members are supported in making their own decisions and taking ownership of tasks.

“This leadership style encourages, inspires and motivates employees to innovate, and create new solutions and ways of doing things that are necessary for the organization’s future success. It builds a winning culture, not only within quality, but throughout the organization.” ■

# Around the world

## A new recovery boiler and an evaporation upgrade for Husum pulp mill

Valmet and Metsä Board have signed an agreement for the supply of key technology for the planned renewal of the Husum pulp mill in Sweden. The supply covers a new recovery boiler and an upgrade of the existing evaporator with a new super concentrator. The contract is conditional on Metsä Board making the final investment decision after receiving the environmental permit.

## A new lime kiln and a fiberline upgrade for SCA Obbola

Valmet will deliver key technology to upgrade the SCA Obbola mill's pulp production in Sweden. Valmet's delivery includes a new fossil-free lime kiln and an upgrade of the existing fiberline.

## Final stage of forming section rebuild for Stora Enso's Skoghall Mill

Valmet will supply the final stage of its four-stage forming section rebuild to Stora Enso's Skoghall Mill in Sweden.

## A waste-to-energy boiler for Lidköping Energi

Valmet will supply a waste-fired steam boiler to Lidköping Energi AB in Lidköping, Sweden.

## An Advantage ThruAir tissue production line for Irving Consumer Products

Valmet has received a repeat order for an Advantage ThruAir machine from Irving Consumer Products in the United States.

## Automation for Lounavoima Oy's waste-to-energy plant

Valmet was chosen by EPC Steinmüller Babcock Environment GmbH to deliver its DNA Automation System, complete with its special emission monitoring and reporting application, to Lounavoima Oy's greenfield waste-to-energy plant in Salo, Finland.

## A new Advantage DCT tissue production line for Alas Doradas

Valmet will supply an Advantage DCT100HS tissue production line, including a de-inking plant and an extensive automation package, to Alas Doradas in El Salvador. The order includes a Valmet Performance Center agreement.

## A board machine rebuild for Umka

Valmet will supply a board machine rebuild to Umka Cardboard Mill in Serbia.

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 customers to move their performance forward.

### Automation for Terrafame's new battery chemicals plant

Valmet has received an automation technology order from the multi-metal company Terrafame for a new battery chemicals plant in Sotkamo, Finland.

### An energy management solution for Kemira Chemicals' plants

Valmet will supply an energy management solution to optimize production and energy consumption at Kemira Chemicals' bleaching chemical plants in Äetsä and Joutseno in Finland.

### A defibrator system for Tianjin Shengsong Wood

Valmet will supply a Defibrator™ system to Tianjin Shengsong Wood Co. Ltd in Tianjin, China.

### A flue gas condensing plant for Helen's Vuosaari heating plant

Valmet will supply a flue gas condensing plant to Helen Ltd's Vuosaari C bioenergy heating plant in Helsinki, Finland.

### A new evaporation line for Century Pulp and Paper

Valmet will supply an evaporation line to Century Pulp and Paper's (CPP) pulp mill in Lalkuan, India.

### A hard nip sizer to Asia Paper Manufacturing

Valmet will supply a new sizing section with a hard nip sizer to Asia Paper Manufacturing at Sihwa Mill in the Republic of Korea.

### An automation system for Nanjing Jinling Shipyard Co., Ltd.

Valmet will supply a Valmet DNA automation system for TT-Line's new RoPax vessel contracted by Nanjing Jinling Shipyard Co., Ltd. in China. The innovative dual fuel vessel will be powered by liquefied natural gas (LNG) and is designed according to TT-Line's Green Ship concept.

### A defibrator system for Çamsan Entegre

Valmet will supply a Defibrator™ system to Çamsan Entegre Ağaç Sanayi ve Ticaret A.Ş in Turkey.

### A defibrator system for Qinzhou Lvyuan Wood

Valmet will supply Defibrator™ and Steam Separator PV systems to Qinzhou Lvyuan Wood Co., Ltd. in China.

### Key containerboard machine technologies to Sri Andal

Valmet will supply key board making technologies to Sri Andal Paper Mills for its new containerboard making line located in Tamil Nadu, India.

### Cooking and fiberline for Tamil Nadu Newsprint and Papers Ltd.

Valmet will deliver a cooking and fiberline to Tamil Nadu Newsprint and Papers Ltd. (TNPL) for their unit 2, located in Mondipatti in the Trichy District, India.



# About Valmet



## Valmet's year 2019

Valmet closed 2019 with record high profitability. During the year, we received major orders and strengthened our services and technology offering by acquisitions. We also continued our success in sustainability acknowledgements.

**V**almet's orders received, net sales and comparable EBITA were at a record high level at the end of 2019. Orders received increased by 7 percent to EUR 3,986 million, and the order backlog at the end of the year was EUR 3,333 million. Net sales increased by 7 percent and amounted to EUR 3,547 million. The comparable EBITA margin was 8.9 percent, well within the target range of 8-10 percent.

Valmet is starting the year 2020 as a strong, continuously developing company.

**All business lines developed well**  
All Valmet's four business lines – Pulp and

Energy, Paper, Automation, and Services – developed well in 2019. We received an order for a large pulp and paper technology delivery to Brazil consisting of a kraftliner production line, a new fiberline, a new continuous cooking and a pulp dryer rebuild. The kraftliner machine order was an important breakthrough into the Brazilian paper industry market. Furthermore, the continuous cooking order creates the first reference for our new cooking technology. We also received a second significant key pulp technology delivery for Brazil consisting of an evaporation plant and a white liquor plant.

In Germany, Valmet was chosen to deliver an outstanding combination of high-end

boardmaking technology, a comprehensive selection of services, automation and Industrial Internet to what will be the world's largest containerboard machine. Valmet was also chosen as a partner for an extensive paper machine conversion rebuild in Finland.

We took a major step forward with the continuous renewal of Valmet DNA automation system by introducing a new web-based user interface that extends the use of the automation system beyond the traditional control room.

**Acquisitions strengthened services and technology offering**

In Services, Valmet continued the expan-



Valmet is a leading global developer and supplier of services, automation and technologies for the pulp, paper and energy industries. Our more than 13,000 professionals around the world work close to our customers and are committed to moving our customers' performance forward – every day.

sion of its global footprint to be close to customers by opening a new service center in Chile.

To further strengthen services business and technology offering for the pulp and paper industry customers, we acquired two North American-based companies – GL&V and J&L Fiber Services – in 2019. The integration of the two acquired businesses has been effective, and the onboarding of the over 700 new professionals has been completed successfully. Thanks to the acquisitions Valmet's local presence and capabilities further strengthened especially in North America.

### Consistent progress in sustainable business practices

Sustainability is at the core of Valmet's strategy. Valmet has put a lot of effort over the years into strengthening sustainable business practices, enhancing the circular economy and the transparency of its operations through reporting.

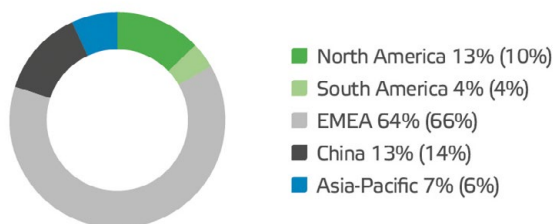
Thanks to the company's continuous progress in sustainability, in 2019, Valmet was included in two of the high prestige sustainability indices, the Dow Jones Sustainability World and Europe Indices, for the sixth consecutive year. The company also achieved the best A rating in the CDP Climate Rating and was again selected as a constituent for the Ethibel Sustainability Index.

### Continued innovations to enhance raw material and energy efficiency

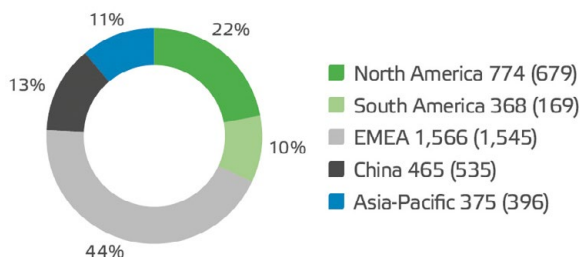
Valmet's strategy focuses on customer excellence, technology and innovations, process excellence and people. On top of these, Valmet concentrates on building leadership in field services, and taking the lead in the Industrial Internet and digitalization.

In 2020, Valmet will bring new and innovative products and services to the market, enhancing raw material and energy efficiency, develop its people through versatile training programs and implement many development actions to further improve the customer experience.

Personnel by area, %



Net sales by area, EUR million



## Forward

### VALMET'S CUSTOMER MAGAZINE

#### FORWARD

Valmet's customer magazine

#### PUBLISHED BY

Valmet Corporation  
PO Box 11  
FI-02151 Espoo, Finland  
Tel. +358 10 672 0000

#### ADDRESS CHANGES

valmet.info@valmet.com

#### EDITOR-IN-CHIEF

Anu Salonsaari-Posti

#### MANAGING EDITOR

Susanna Salmenpää

#### EDITORIAL BOARD

Anu Salonsaari-Posti  
Leena Marttinen  
Susanna Salmenpää

#### ASSOCIATE EDITORS

Marika Mattila, Kaisamajja Marttila, Pauliina Purola, Heli Kankare, Katarina Ahsberg, Anne Paloheimo-Seppänen, Riitta Pöntynen, Kerstin Eriksson, Andreas Liedberg, Satu Lamminen, Eric Tetreault, Juha M Virtanen, Helena Lamberg, Gaurav Ghosh, Jingwei Liu, Sara Li, Sofia Forslund, Livia Bianco, Jarmo

Ervast, Soili Städter, Åsa Arencrantz, Lotta Forssell, Pia Hahl-Granfeldt, Mira Aalto, Susanna Rikkonen, Petra Anders

#### ENGLISH LANGUAGE

EDITOR  
AAC Global

#### LAYOUT AND ART WORK

Neutron Design

PRINTING  
Grano

©Copyright  
Valmet Corporation  
All rights reserved

Printed on MultiArk Silk  
115/250 g/m<sup>2</sup>  
Supplement printed on  
Lumiforte 115 g/m<sup>2</sup>

Printed on April 22, 2020



Reproduction permitted  
quoting "Forward" as source.

All product names used  
herein are trademarks of their  
respective owners.

#### ADDRESSES

Valmet Corporation,  
customer data

#### ISSN

0356-2751 (Printed)  
1458-8013 (Electronic version)

# Valmet Industrial Internet – VII

## Dialogue with data to move your performance forward



Are you utilizing data efficiently to take your operations to the next level?

Valmet is now introducing a full range of Industrial Internet solutions to pulp, board, paper, tissue and energy producers. Our VII solutions combine Industrial Internet applications, Advanced Process Controls (APC) and remote services from Valmet Performance Centers.

Explore our extensive VII solutions at [valmet.com/VIIolutions](http://valmet.com/VIIolutions)

