

Responsible energy
from garbage bags 14

Reliability at the heart of
a long-term agreement 38

Remote service tools
from the future 56

Forward

VALMET'S CUSTOMER MAGAZINE | 3/2016

A shared journey forward with

Whakatane

board mill in New
Zealand



Editorial

Full speed ahead with our shared journey

In the previous issue of Forward magazine, we introduced our new approach to services – Shared Journey Forward. To make it easier for you as our customer to find just the right services and automation solutions for your needs, we have divided our offering into three categories: reliability, performance and new technology. We have also defined our key commitments to you: “safety comes first,” “people you can trust,” “close to you,” and “solutions to your needs” are the key experiences that we want to deliver to you every day.

In this issue, we deep dive into showing you real-life customer cases where Valmet and our customers have achieved impressive results by working closely together. However, at the same time we continue our internal development to enable our Valmet team to meet the commitments we are engaged to.

I am especially excited about the Expert’s Voice and Innovator’s Voice sections in this issue. Martin Wilcox, one of the keynote speakers at Valmet Customer Days this year, talks about the Industrial Internet – how companies need to look at their business five years from today, and start optimizing that business. In Innovator’s Voice, we introduce the next step in our road to strengthening Valmet’s leadership in design – using light, colors and infographics on the machines to improve usability, safety and user experience.

I hope these stories will inspire you in taking your next step forward!



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SENIOR VICE PRESIDENT
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In this issue 3/2016



New runnability systems improve board machine performance 44

Boosting performance at CMPC mills 26



Martin Willcox: The IoT is all about data 62

- 4 **In Brief**
- 6 **Shared Journey Forward**
Valmet’s services approach in a nutshell
- 8 **Cooperation moves Whakatane forward in improving performance**
Optimized processes through Performance Agreement
- 14 **Responsible energy from garbage bags**
Tammervoima turns garbage into energy
- 18 **Valmet IQ helping corrugators fly straight and level**
Improved quality and reduced waste at Santorromán
- 22 **In the spotlight: Yahya Kılıç of Hayat Kimya**
Building on entrepreneurship, endurance and courage
- 24 **Side by side on a shared journey**
E.ON Lockerbie carried out a major boiler upgrade
- 26 **Boosting performance at CMPC mills**
Multifield cooperation brings good results at Maule and Cordillera
- 31 **Benefits at K+S Kali through automation system upgrades**
Six gas turbines upgraded with new control systems
- 33 **A 10-year journey as an industry benchmark**
Metal belt calendaring at Metsä Board Simpele since 2006
- 35 **Output doubled at Mosaico Tolmezzo**
More production and reliability with new trim removal system
- 38 **Reliability at the heart of a long-term agreement**
Segezha Paper’s shared journey forward with Valmet
- 40 **Board machine rebuilt for improved performance and quality**
Yinzhou Paper installed two OptiFlo headboxes with control systems
- 44 **New runnability systems improve board machine performance**
Cartiere Villa Lagarina improves operation through new technology
- 48 **More efficiency, better performance**
Press section rebuild carried out at Mondi Štětí
- 52 **OptiConcept M gets visual**
Next step forward in design
- 56 **Remote service tools from the future are already here**
New ways of servicing through digitalization, big data and Industrial Internet
- 58 **Grinding with diamonds**
Energy savings with Galileo grinding technology
- 60 **Speeding up smooth bottom roll dryers**
Only short shutdowns required with UnoRun S web stabilizers
- 62 **The IoT is all about data**
Read Martin Willcox’ ideas about Industrial Internet
- 66 **Around the world**
- 68 **About Valmet**



Key technology and automation for Kotkamills started up

The start-up of Kotkamills' rebuilt board machine 2 in Finland took place on July 22, 2016. Valmet supplied key technology and automation package for the extensive paper machine grade conversion project. The printing paper production line was converted to produce a range of folding boxboards and food service boards.

"Our BM 2 is the first machine in the world to have the capability to produce dispersion barrier coatings directly on the machine, producing barrier boards that can be recycled with normal paper waste due to having zero plastic content. The interest in our new sustainable products has been massive. The new machine offers a wide range of interesting possibilities for converters, brand owners and designers alike," says **Markku Hämäläinen**, Chief Executive Officer of Kotkamills.

Earlier in June Kotkamills started up the conversion of their thermomechanical pulp (TMP) line into chemithermomechanical pulp (CTMP) line.

New Advantage DCT tissue line for Papel San Francisco in Mexico

Valmet will supply an Advantage DCT 100TS tissue production machine to Papel San Francisco in Mexico.

The new tissue line will fulfill Papel San Francisco's need of new capacity for standard tissue products. Valmet has previously delivered three tissue machines to the company. Two Advantage DCT machines started up in 2006 and 2009. One Advantage NTT started up in 2013, fulfilling the company's demand of textured tissue.

The new tissue machine will have a width of 2.8 m and a design speed of 2,200 m/min and will add 30,000 tonnes tissue paper per year to Papel San Francisco's current production of toilet tissue, kitchen towels and napkins.

Key technologies for Cheng Loong's new board machine in Vietnam

Valmet will supply Cheng Loong Binh Duong Paper Company with key process technology for its new BM 1 containerboard machine to be located in the company's Ben Cat mill in Binh Duong Province in Vietnam. Valmet's delivery includes a headbox, forming and press sections, a winder and quality measurement system.

Cheng Loong decided to invest in this new recycled containerboard mill and box plant aiming to tap into Vietnam's growing packaging demands. The start-up of the greenfield machine is scheduled for the beginning of 2018.

"The containerboard market is growing globally driven by increasing e-commerce and new packaging applications. Valmet has developed a number of excellent solutions to meet the market needs. Energy efficiency, high board quality and very good productivity are among the most important highlights of Cheng Loong's board machine," says **Jari Vähäpesola**, President of Paper business line, Valmet.

The Arne Asplund Mechanical Pulping Award 2016 granted for Galileo technology

The Arne Asplund Mechanical Pulping Award promotes the development of new technology for manufacturing high-yield pulp. In 2016, the award has been granted to Tomas Björkqvist, Mikael Lucander and Olli Tuovinen for their systematic research project and proving that their hypothesis about a novel grinding surface is valid. The award-winning Galileo technology covers a metal segment stone surface with a custom defined diamond segment.

Grinding wood with a diamond covered surface saves up to 500 kWh per tonne in annual energy consumption, depending on pulp grade and other operational factors. The novel technology has been successfully commercialized and is now scalable worldwide. *Read more on page 54.*



Demonstration scale plant for next generation dissolving pulp cooking

Valmet will supply a dissolving pulp cooking demonstration plant to Sappi in South Africa to explore and optimize the extraction of biorenewable chemicals. The plant will be close to industrial size and is located at Sappi's Ngodwana mill. The demonstration plant will make it possible to study the next generation dissolving cooking process and test new ideas in mill scale.

In this project Sappi and Valmet will together take the next step in dissolving pulping and explore new revenue possibilities in the dissolving pulp production. These new revenues include possibilities to extract bio-based materials from the cooking plant pre-hydrolysate stream such as sugars and lignin to beneficiate to higher value bio-chemicals.

"This investment in new technology continues to support Sappi's strategic direction of seeking new bio-based opportunities and at the same time will generate a platform with associated benefits for further increased volumes and quality of dissolving wood pulp," noted **Andrea Rossi**, Sappi's Group Head Technology.

Valmet maintains its position among the world's sustainability leaders

Valmet has been included in the Dow Jones Sustainability Index (DJSI) for the third consecutive year. The company was listed both in the Dow Jones Sustainability World and Europe indices.

The company inclusion is based on a best-in-class approach, which means that the indices only include the top ranked companies within each industry. The evaluation comprehensively reviews the company's performance with regard to social, environmental and financial factors.

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In Collaboration with RobecoSAM

Biomass-fired power boiler, biofuel storage and conveyor systems to HOFOR

Valmet and HOFOR Energiproduktion A/S have signed a contract regarding delivery of a biomass-fired boiler plant and related biofuel storage and conveyor systems to HOFOR's Amagerværket heat and power plant in Copenhagen. The new power plant will supply electricity and heat for the needs of the city of Copenhagen.

The investment will support the climate plan of Copenhagen, according to which the city aims to become the first CO₂-neutral capital in the world by the year 2025. The heat and power production will start in 2019.

The boiler plant will help to reduce CO₂-emissions from the plant by a total of 1.2 million tonnes annually. "The investment supports HOFOR's strategy to reduce CO₂ emissions through environmentally friendly and cost-efficient district heat production," says **Carsten Schneider**, Project Director at HOFOR.

The HOFOR biomass plant will be by value Valmet's largest boiler plant delivery so far.

Valmet and Saica Paper UK signed a Performance Agreement

Saica PM 11 in Partington, UK is a Valmet supplied OptiConcept board machine which started up in early 2012. In order to boost the performance of the machine, Saica and Valmet have signed a Performance Agreement.

The target of the agreement is to achieve mutually set productivity targets of the PM 11 production line including the OCC plant and winder. The productivity targets include, for example, reduction of paper loss and b-grade paper, and augmentation of the winder's average speed. The agreement includes also both expert visits on-site as well as expert support through remote connections. In addition, Valmet will keep Saica updated about board machine technical development, benchmarking information, latest technology innovations, new components, machine upgrades and services.

Segezha orders a biomass-fired boiler plant

Valmet will deliver a biomass-fired boiler plant and related automation and environmental systems to Segezha Pulp and Paper Mill (Segezha PPM) in the Republic of Karelia, Russia. The boiler will produce steam for the mill's production processes and enables the mill to use wood residues and sludge as fuel and thus reduce the use of heavy fuel oil and lower its emissions and environmental impact.

"The decisive criteria that determined our decision were the technological factors and successful boiler references in numbers of industry enterprises. We see that a modern multi-fuel boiler can efficiently burn waste from wood processing with high and variable humidity, as well as sludge from our effluent treatment," comments **Sergei Pondar**, Vice President of Production for Segezha Group.

SHARED JOURNEY FORWARD

Valmet's new services approach in a nutshell

Our core commitments to you

Safety comes first:

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

Close to you:

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



Solutions to your needs:

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

People you can trust:

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



Services designed for your needs

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

Reliability services

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

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

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

Performance services

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

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

New technology for process competitiveness

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

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

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

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

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Cooperation moves Whakatane forward in improving performance

The Whakatane board mill in New Zealand was able to optimize their existing processes to gain their maximum potential through a Performance Agreement with Valmet. The shared journey forward was named "Kaha", which means "strong" in the Māori language. "If we have been the captain of the project, Valmet has been an excellent co-pilot", says Mark Hammond, Head of Production at the Whakatane mill.

TEXT Eero Eduardo Halmari PHOTOS Simone Wagner Photography

The Whakatane Mill, located in New Zealand and owned by the SIG Corporation since 2010, has one board machine and an integrated stoneground wood pulp mill. The mill produces 135,000 tonnes of liquid packaging board and folding boxboard annually and works closely with SIG Global Technology in developing board structures for the future. After SIG took over, an internal development program was conducted in order to improve operations. The mill realized that to continue development merely with in-house resources was going to be a hard task.

Mark Hammond explains: "Although we have experienced resources on-site and a motivated and engaged

workforce, we needed more world-class resources and best practice experience and technology. We are fortunate to operate a mill with vast development potential. However, it is not all about capital: getting the most out of our existing assets is very high on the agenda. This situation lead us to start cooperation with Valmet, a company we consider to be a global service provider with the resources and know-how we were looking for."

Performance improvement in target

When the two-year Performance Agreement was signed in September 2014, Valmet conducted full-site, high-level audits, followed by detailed discussions and a comprehensive report highlighting key development opportu-

"The benefit of the Performance Agreement is that you have direct access to all the experts you really need."



Graham Millar is satisfied with the results and the professional execution: "When we compare our initial targets to the results, they align really well. It was an easy decision to renew the Performance Agreement for three more years."



nities. The mill team took the feedback and aligned key opportunities with their business strategy and their customers' requirements.

Nine concrete targets were defined for the Performance Agreement: increase machine speed, improve yield, develop the ply bond, optimize formation, widen the deckle at the winder, eliminate ear cracking, improve PPS without compromising stiffness, maximize the roll diameter off the winder, and optimize the roll tension of customer reels. Each target had specific, measurable numerical values.

Together, the project team developed both short- and long-term plans to achieve these targets. The short-term plan focused on quick wins, meaning high returns for relatively low efforts, while the long-term plan focused on improving the viability of the plant. Once the targets and plans were defined, it was essential to assign the right people to each task and to establish a working methodology. Finally, the two project managers – **Peter McLaverty** from Whakatane and **Juha Kovanen** from Valmet – put together a schedule for Valmet's specialist visits in order to ensure long-term development, best practice benchmarking, and the quick wins.

← Whakatane and Valmet are tied together in a committed partnership. "Valmet gave us the right advice, coaching and mentoring," says Mark Hammond, Head of Production at Whakatane (left) with Eero Halmari from Valmet (middle) and Garry Rusden, Finishing Area Manager at Whakatane (right).

A joint project team working towards the targets

Mark Hammond reflects on working together with Valmet: "The benefit of the Performance Agreement with Valmet is that you have direct and contractual access to all the experts you really need. They are part of the joint project team, and they work with us to achieve the agreed targets."

Peter McLaverty continues: "The experience, energy and enthusiasm Juha and his team of Valmet specialists brought to the project enabled us to challenge our existing practices and capabilities. All aspects of the operation were audited and dimensioned with the focused objective of delivering solutions to the nine concrete targets. The quick win recommendations have been implemented, with positive operational and quality improvement results." Peter McLaverty says that close cooperation and teamwork between the two parties has definitely helped Whakatane in defining their long-term improvement and growth roadmaps.

Benefiting from Valmet's pilot facilities

From Valmet's point of view, the audits and mill visits were well organized and efficient. "Everybody was speaking the same language," says Juha Kovanen. "With every visit, we had an exit meeting where we discussed the findings together with a big audience." Some audits were even performed at Valmet's pilot facilities in Finland to demonstrate what could be achieved with new technology in terms of smoothness, strength and bulk.

The value of the yearly savings was more than double the one-time cost of the Performance Agreement.

Payback time of the agreement under six months

Soon after the start of the cooperation, the first results were delivered. Energy savings of 8% were achieved through vacuum pump optimizations, and significant quality improvement and raw material savings were recorded through tension profile (TSO/TSI) improvement. In addition, the temperature set point for hood heating was reduced by 18% and for roof heating by 27%. Clear hood air balance and humidity control improvements were also observed.

With these quick wins, real savings were realized. **Graham Millar**, Mill Manager at Whakatane, confirms: "Our operational costs have decreased in line with Valmet's predictions. The value of the yearly savings was more than double the one-time cost of the Performance Agreement, effectively meaning that the payback time of the contract was under six months. The project was definitely worth the investment."

↓ "The only way to get results is to truly work systematically as one team and through a fully committed partnership," emphasizes Mark Hammond, Head of Production at Whakatane.

Captain and co-pilot

According to Mark Hammond: "For us to succeed, it was crucial that the Whakatane Mill took full ownership of the project. It would have been a big mistake to expect Valmet to come and deliver the results alone. If we have been the captain of the project, Valmet has been an excellent co-pilot."

Kovanen speaks on behalf of all at Valmet when he says that he really enjoyed working with the project. "Whakatane has been very open and direct with us. We have received all the information that we needed. The mill has been very committed and worked hard, with a passion."

A renewed agreement for continued success

Whakatane now has a long-term plan that will be followed confidently and with commitment. It involves an investment program and a payback plan for a new board grade, quality improvements, and higher production levels. To achieve this, it was only logical that Whakatane extended the Performance Agreement with a new three-year period. During this time, the focus will be on pre-engineering of possible new capital investments, process and quality opti-

↓ Peter McLaverty (left) and Juha Kovanen from Valmet put together a schedule for Valmet's specialist visits to ensure long-term development, best practice benchmarking, and the quick wins.



mization, as well as maintenance development.

"The current market trend in coated board is lightweighting," says Mark Hammond. "To stay competitive, we need to lead that trend. Lightweight products are increasingly being demanded by our customers for sustainability reasons."

According to Graham Millar, Valmet sees the world in a realistic way. Today, opportunities to build large capital projects are quite rare compared to opportunities to provide services for existing papermakers. "Valmet offers many services to help papermakers better understand their equipment and its development potential. This approach seems to be a very good one, because Valmet has the experts to support this strategy. I think it is a win-win situation." ■

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What is a Performance Agreement?

It is Valmet's business solution that targets agreed KPIs by combining process, operational and maintenance services through a long-term agreement. Performance Agreements are all about teamwork. Committed Valmet experts work alongside the customer's own experts systematically and continuously, with the common goal of pushing for that next level and creating new best practices.



Responsible energy

from garbage bags

'What a waste of waste' is no longer valid in Tampere, Finland. In January 2016, Tammervoima Oy's new power plant went into commercial operation and now turns garbage bags into energy. Valmet's flue gas cleaning, condensing and automation technologies contribute to its efficient operation.

TEXT Marjaana Lehtinen
PHOTOS Jussi Rinta-Opas and Soili Städter

The sound of a truck backing up and dumping its contents into a waste bunker can be heard approximately 80 times per day at Tammervoima's new plant. About 160,000 tonnes of municipal waste annually is combusted in a 60 MW grate incinerator and turned into 310 GWh of heat and 90 GWh of electricity. The company is jointly owned by Pirkanmaan Jätehuolto Oy, a local waste management company, and Tampereen Sähkölaitos, a local energy company.

"We managed to build the plant in just two years and stay within the 111 million euro budget. Thanks to a speedy timetable, the plant was finished by the beginning of 2016 when the landfilling of organic waste was banned in Finland," says Mika Pekkinen, Development Director, Tammervoima Oy and Tampereen Sähkölaitos Oy.

Waste incineration decreases the need for fossil fuels and lowers the climate load of energy production.

Efficient flue gas cleaning and heat recovery

Due to uneven fuel quality, emission limit values in waste-to-energy plants are tighter than in ones that run on other solid fuels. Efficient air emissions control is a must. "Our flue gas cleaning equipment has been designed for waste incineration. It is based on a semi-dry method and complemented by a condenser that recovers the remaining heat from flue gases," Pekkinen explains.

Valmet delivered to Tammervoima GASCON flue gas cleaning technology, such as an electrostatic precipitator for effective particulate capture and a condensing wet flue gas scrubber. The latter removes any remaining impurities and recovers energy in the flue gases that otherwise would escape into the atmosphere.



Congrats on the triplets!

Close and fruitful cooperation between Tampereen Sähkölaitos and Valmet resulted in three deliveries of flue gas scrubbers in 2015. The triplets received nationwide recognition by winning the public vote category and being among the best three in the "Climate Action of the Year Award" competition in Finland. The competition was organized by the Sustainability Forum of the Finnish Energy Industries. The aim was to acknowledge an energy-industry actor that has carried out investments or development projects to mitigate climate change or has otherwise contributed to combating climate change.

The new scrubbers recover energy in the flue gases that otherwise would escape into the atmosphere. They enable the company to produce more energy with the same amount of fuel, which increases efficiency. "We now save 260 gigawatt hours of fuel energy annually, which equals the amount needed to heat 15,000 single-family homes," Antti-Jussi Halminen, Vice President, Energy; Tampereen Sähkölaitos, points out. "This reduces our CO2 emissions permanently by up to 100,000 tonnes per year (10%) and has a major impact on air quality locally. We are committed to curbing climate change and saving our living environment."

↑ About 160,000 tonnes of municipal waste annually is turned into 310 GWh of heat and 90 GWh of electricity.

→ Janne Ahonen, one of the process operators, appreciates the analyses provided by the Valmet DNA automation system.



According to Mika Pekkinen, Development Director, Tammervoima Oy and Tampereen Sähkölaitos Oy (second to the right), waste incineration decreases the need for fossil fuels and lowers the climate load of energy production. Pictured also Ari Pinjamaa, Vice President, EMEA North and East Europe, Automation, and Arto Mäkinen, Project Manager, Automation, both from Valmet.

NOx is reduced with the selective non-catalytic reduction (SNCR) method. Valmet delivered Tammervoima its GASCON flue gas cleaning technology, including a Valmet electrostatic precipitator for effective particulate capture. The plant's semi-dry flue gas cleaning system is followed by a Valmet condensing wet flue gas scrubber that removes any remaining impurities and recovers energy in the flue gases that otherwise would escape into the atmosphere. This 'free' heat adds to district heat capacity. As the condensate from the scrubber is used as process water, there is zero wastewater.

The nominal capacity of the condensing scrubber is 8 MW. According to Pekkinen, it is run based on the plant's need for process water, usually at 4–5 MW.

"The flue gas cleaning equipment functions very well: almost all our emissions, excluding NOx, are less than 10% of our emission limit values. In choosing the equipment, we had the tightening emission requirements

in mind. The next time when we update our environmental permit, we don't have to do anything with the flue gas cleaning process," Pekkinen says.

Process data collected and analyzed across the power plants of Tampereen Sähkölaitos

The plant is operated with a Valmet DNA automation system. Valmet's delivery included a boiler safety system as well as reporting, monitoring and emission control applications. These applications are used for capturing and sharing data across the power plants of Tampereen Sähkölaitos.

"From an economical point of view, Valmet had the most advantageous alternative in the public tendering process. Additionally, the Valmet DNA system is already widely used in other Tampereen Sähkölaitos plants, and the new system at Tammervoima supports our **energy management system**," Pekkinen notes.

Delivered by Valmet in 2014 and integrated with the Valmet DNA automation and information system, the energy management system optimizes the utilization of the plants by taking into account the district heat need, electricity purchases and sales, fuel prices and availability of the plants. With the data collection, analyses, consumption forecasts and reports provided by the system, Tampereen Sähkölaitos is able to improve the efficiency of its production planning and make operations more economical in its power plants.

Automation system well liked by the operators

Commissioning the automation system was smooth since all the operators had earlier worked at the Tampereen Sähkölaitos Naistenlahti power plant and were familiar with Valmet DNA. Their tools to operate the plant include Valmet DNA applications for monitoring the performance of the boiler, steam turbine, heat exchangers, pumps and fans as well as for monitoring production, consumption, boiler fouling and operation point deviations in the boiler and steam turbine.

"We can do anything with this system. It's the best!" says Janne Ahonen, one of the process operators. "I especially like the analyses; you can see what is changing

and what is the average. And you can compare various process stages with each other."

His colleague Jan Aarnimetsä likes Valmet DNA, too. "It is simple to use and you can easily find the information you need. If something is wrong, you don't have to look for it in many places. This makes troubleshooting easier."

Valmet DNA emission monitoring system - an operative tool with effective reporting

According to Mika Pekkinen, automation is an integral part of the plant. It is the tool to comprehensively manage, operate and optimize a complicated process. He continues: "In a waste incineration plant, the environmental permit requires that flue gases are measured and controlled online. In this plant, the measurements go directly into our automation system."

The advanced Valmet DNA WI emission monitoring application enables effective authority reporting, but also serves the plant as an in-house operative tool. ■

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"Almost all our emissions are less than 10% of our emission limit values."

Valmet IQ helps corrugators fly straight and level

Demand for corrugated packaging is on the rise, fueled in part by the growth of online shopping. To meet the need for higher-quality packaging as well as improving production efficiency, new methods of quality control now play an important role in manufacturing corrugated board. Valmet IQ quality control solutions help corrugators to improve quality and reduce waste.

TEXT Nigel Farrand

The goal for any corrugated board manufacturer is to produce flat board with ideal bonding at full speed. Increases in corrugator speed – coupled with the trend for lighter weights and shorter grade runs – make manual control challenging. Traditionally, temperature measurements alone have been used to control corrugators, but in fact major issues such as warp, good bonding, cracking and post-warp in converting processes are all related to moisture control in the corrugators.

Valmet has now introduced a corrugator quality control concept with proven moisture measurement and control technology. The results are significantly enhanced production performance with minimized warp, improved glue penetration, and better ply bonding. Users report that die cutting and printing machines run remarkably faster with less downtime, that transport systems for the die cut sheets no longer jam with warped board, and – most importantly – that they have increasingly satisfied customers.

Valmet IQ and Cartonajes Santorromán's innovative packaging

Cartonajes Santorromán is a family-run company in Spain with over 100 years' experience in producing paperboard boxes and packaging. They work closely with the food and beverages as well as hazardous goods

packaging sectors, where corrugated cartonboard plays an important role in the protection and handling of the products. Santorromán has a philosophy of constantly investing in infrastructure and technology for manufacturing corrugated cartonboard, as well as any product that can be made using it. This has led to many innovative packaging products and a well-deserved reputation for quality. Innovative products bring new challenges: when they faced a warping problem, Santorromán turned to Valmet for a solution.

Warp problem solved!

The corrugator is the backbone of corrugated cartonboard production at Santorromán. In the corrugated board manufacturing process, liners are glued to a corrugated medium, forming a corrugated board sheet. Differences in the moisture content of the top and bottom facings can cause the sheet to warp, which interferes with the subsequent converting processes. "The warping problem manifested itself when we were making a double-walled, five-ply board on the corrugator, which involves gluing a second microchannel flute and facer to C-channel fluted board," says Jesús Pérez Osma, Technical Manager.

The results are enhanced performance with minimized warp, improved glue penetration, and better ply bonding.



← One of the two moisturizers.
 ✦ Santorromán's combination microchannel and C-channel fluted board is internationally approved for the transportation of explosives.
 ↓ Jesús Pérez Osma, Technical Manager (center) explains the finer points of a six-bottle wine box to Javier Navas of Valmet (left) with Corrugator Machine Manager, Victor Ruiz, (right).
 → Warping in the final combined sheet is a serious defect that can occur in the corrugator.



↑ "With the moisturizer, we can control the warp and gain better runnability in converting," states Ramón Martínez.

This type of product – a Santorromán specialty – is used to make boxes to transport explosives, for instance, an application for which the factory has special certification. Microchannel fluted products are also used extensively for packaging for fruit and vegetables. Warping in the final combined sheet is one of the most serious defects that can occur on the corrugator.

Santorromán installed two Valmet IQ Moisturizers for warp control of their corrugated board in March 2015. The Valmet IQ Moisturizer, used extensively in paper production to control curl and CD moisture profile,

has found a ready market to correct warp in corrugated board. The IQ Moisturizer corrects the warp of combined board by spraying a fine mist on the liner in a controlled way, providing a very high degree of control and very fast response to conditions that cause quality to deteriorate. According to **Ramón Martínez**, Maintenance Manager, "We see differences between reels, and we have grades with different facings that can be difficult to handle. We used to try and control warp in several ways – a little more preheating and sometimes more glue before the double backer – but both add costs, and more heat can

cause cracking at the die cutters. Now with the moisturizer, we can control the warp and gain better runnability in converting. This is very important for the case maker machines making flap boxes with fully automatic three-tone printing, slotting, die-cutting, gluing, folding, tying and palletizing. The sheets need to be as flat as possible to ensure trouble-free operation."

Valmet IQ is easy to operate

The operators now know how much moisture to add, and they need only to enter the number of grams per square meter according to the grade. For **Victor Ruiz**, Corrugator Machine Manager, the moisturizer is easy to use: "I see the first sheets from the machine, and with experience I can quickly make adjustments if needed. For lighter boards, we can also adjust the cross-direction profile to correct the edges." The control system delivered with the moisturizer takes care of changes in production rate automatically, so even during reel changes when the speed of the machine is changing, the moisturizer adapts immedi-

ately. A new reel might have a different moisture content, but the controls make it very easy for the operator to quickly change the moisture applied to the liner.

Impressive results

Jesús Pérez Osma is impressed with the results: "The corrugators can now run at maximum speed, and the quality is better. Previously, we had few complaints, because if we were not satisfied, we did not ship the product. But in the last year we have had no complaints at all, and the best recommendation is in-house from the converting machines, where you can even hear that the printing machine is running better." ■

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"You can even hear that the printing machine is running better."

In the Spotlight:

Yahya Kığılı

Chairman of Hayat Kimya

Building on entrepreneurship, endurance and courage. **TEXT** Katarina Åhsberg

Hayat Holding established as a textile business in Turkey 1937. Thirty years later, **Yahya Kığılı** joined the business and introduced panelboard products to the market, a business that still counts for 50% of the Hayat group's income. In 1987, detergents and diapers were added to the company's portfolio, and ten years ago they entered the tissue business.

Today Hayat Holding is a global enterprise with nearly 14,000 people, supplying products to around 100 countries on five continents. The company reached a turnover of USD 2.5 billion in 2015. Yahya Kığılı has been leading the company into new markets and challenges for nearly 50 years, and still does.

Tissue strategy for stable growth

So what is the reason behind the success?

"Our strategy has been to focus on immature markets with high potential. But immature markets often carry risky conditions along with their potential. It takes a lot of courage, determination, patience and endurance to enter and succeed in politically (and economically) volatile markets. Today we operate in Turkey, Iran, Russia and Egypt, all countries with their own specific challenges. Even though the market offers high potential, it takes time and vision to understand and adapt to local demands and standards. Our strength is our vision, patience and endurance. The vision to understand, analyse and internationalize the local needs and dynamics rapidly. The patience to make the right strategy, the right positioning and endurance to continue to work progressively over time to be successful."

"In the beginning, we aimed to manufacture consumer goods under our own brands, mainly to the Turkish

market. We decided to invest in the tissue business in 2004 and started up the production in Izmit, Yeniköy in January 2006. In only three months, we had the full range of tissue products on the shelves in Turkey."

The products were well received and the company reached second position in the market during their first year in the business. Two years later the production hit the upper limit and they took the decision to invest in a high speed machine from Valmet to be installed in the Izmit plant. Hayat also holds the speed record in tissue production since 2012.

Five Valmet tissue machines

Soon Hayat will be operating five Valmet tissue machines and it has, of course, been very important to know that the technology as well as the supplier would meet the company needs.

"Technical issues is one side of the coin. The other is runnability, company experience and number of projects. But it is also important to set up common targets, to believe in them, trust each other and work as a team in an honest and open atmosphere. We found that in Valmet."

"Continuous work and repeat projects also build technical reciprocal learnings, increased competence and cost benefit advantages."

"The land, climate and other conditions may differ, but there have been cases where we reapplied similar projects. As a result of accumulated learnings on installations, we managed to achieve very efficient start-ups. And there is also a cost benefit, of course."

"We feel very comfortable with Valmet by our side and are convinced that we can be successful together. We also feel that Valmet have trust in our technical people and our company. That is a good base for future cooperation"

The journey continues

Hayat continues its investments, in line with its globalization vision. Hayat's greenfield plants are all designed spacious enough to realize this growth.

But at the moment they are turning their eyes to new markets. "We are already in Turkey, Iran, Egypt and Algeria with various tissue, detergent and diaper investments. Just 1.5 years ago, we invested in Russia and

Nigeria. In Russia, we succeeded in becoming the second player on the market already. And we are observing the potential in Nigeria. Besides strengthening on existing markets and expanding in North and Central Africa and Middle East, we also consider expansion into the mature western markets. We will ignite our strengths, explore the opportunities, and when it is the right time, we will grasp it," Yahya Kığılı concludes. ■



About Hayat Kimya:

In 2006, Hayat Kimya started their first tissue machine. Ten years later, the fast-growing company will operate six tissue machines, in four countries, with an annual capacity of 420,000 tonnes of tissue paper and a capacity to convert 290,000 tonnes of consumer products. This makes them number one in terms of production capacity – and also market share – in Turkey. A remarkable performance built on the cornerstones of entrepreneurship, endurance and courage.



E.ON Lockerbie and Valmet:
Side by side
 on a shared journey

Design stage was key in ensuring future performance

“The design stage was crucial in ensuring that, even with such sweeping changes to the plant, the boiler would still perform to the current KPIs, but with much better availability,” Nigel Earp points out.

With the design of the new parts agreed, Valmet’s installation team was given the task of finding the most efficient and cost-effective way to proceed. Valmet’s local office was nearby, which made it easy to frequently visit the site.

Valmet replaced the existing furnace walls from the refractory line up to 14 meters, boiler nose, screen, and three stages of the primary superheater. Two original finned tube economizers were replaced with new plain tube economizers, including modifications to the ducts, soot blowers and platform level.

Safe execution on-time

“The work was completed safely and as planned in 22 days, with over 35,000 man-hours worked without any injuries – a great credit to the Valmet team.

Valmet’s team worked closely with the E.ON project team in the planning stages and the execution of the work,” says **Phil Shaw**, Engineering Manager, Asset Management, E.ON. ■

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Scotland’s largest biomass plant, E.ON’s Steven’s Croft biomass power station in Lockerbie, relied on Valmet and its local service during a recent major boiler upgrade – the same way as many times earlier.

TEXT Nigel Earp and Marjaana Lehtinen

The 44 MW Steven’s Croft power plant had come to a point where its bubbling fluidized bed (BFB) power boiler, originally supplied by Valmet, needed an upgrade. E.ON requested tenders to find the best solution for the upgrade, but also to find a partner who could support the plant in its day-to-day challenges over the long term.

“We looked into a number of possible solutions, and in the end we suggested changing the shape of the boiler. The engineering and process calculations were extensive but necessary to ensure that process parameters could

be met and that the structure could also house a huge change in the boiler,” recalls **Nigel Earp**, Service Manager, Energy Solutions and Services, Valmet.

Shared journey forward continues

Valmet’s solution and the good previous cooperation convinced E.ON. As the original boiler supplier, Valmet had all the detailed drawings and calculations available, along with the entire maintenance history. Valmet has also been in charge of all the outage works and has developed its services since start-up. Having lived through the plant’s problems enabled Valmet to find the best solution.



Strong partnerships are built on people. "We work as one team and have built many personal relationships over the years," says Jorge Aldana, Director of Project and Industrial Development at CMPC Papeles (left), talking with Eero Halmari, Marketing Manager from Valmet.

This is a story about people working together towards a common goal. CMPC Chile describes it as a strategic partnership with Valmet. Let's take a look at how the long-term, multi-field cooperation at CMPC's Maule and Cordillera mills has brought results that benefit everyone involved.

TEXT Eero Eduardo Halmari

CMPC and Valmet in partnership

True shared journey

CMPC's Maule mill produces world-class top-quality folding boxboard for global markets. Maule's BM 19 was originally started up in 1998, and Valmet (part of Metso at that time) carried out an extensive rebuild in 2005. Since then, CMPC and Valmet have been cooperating closely in many areas, with the aim of systematically developing the machine and CMPC's production operations. "Since the extensive 2005 rebuild, we've had ambitious development plans. It was evident that we needed a strong partnership," explains **Jorge Aldana**, Director of Project and Industrial Development at CMPC Papeles. Today, the annual production of BM 19 is 360,000 tonnes. The plan is to increase it to 450,000 tonnes, while simultaneously improving board quality, with Valmet playing an important role in achieving that goal.

Long-term agreements for performance and reliability

CMPC Maule currently has several service agreements with Valmet. A Performance Agreement started in 2012, resulting in production records, quality improvements and energy savings. Overall investment needs were also

evaluated through test runs during the contract period. "We see Valmet as a technology expert with strong process knowledge. It provides machinery, automation, and many kinds of services. We have taken advantage of that, and we can see the results," Aldana notes.

A Paper Machine Clothing Agreement also began in 2012, equipping the machine with forming fabrics and shoe press belts. The contract was renewed in 2016 to include press felts. Aldana continues: "Valmet's fabrics have long lifetimes with uniform performance during the entire lifetime. The agreement doesn't just give us the fabrics, we get service as well. There is constant, proactive monitoring, and replacements are quick. If we have problems, local rapid-response support is available. As a result, there are no more unexpected shutdowns related to fabrics."

Furthermore, a Consumables Agreement was signed in 2013, covering all board machine consumables like doctor blades, sizer and coater rods, winder belts and blades, again with related services. **Nestor Navarro**, Mill Manager at CMPC Maule, emphasizes the importance of creating long-term relationships with the mill's suppliers as well as its clients. "We are satisfied to have Valmet as

our technology and service partner – our contract renewals demonstrate that.”

Adding new technology brings many benefits

As part of the improvement program and to emphasize CMPC's desire for state-of-the-art technology, CMPC Maule decided to install a new OptiCalender Metal Belt in their BM 19. The metal belt calender is Valmet's patented innovation for producing lightweight coated board with superb surface and strength properties and high bulk levels.

“To achieve our targets for increased production and improved board, installing this new metal belt calender was key. It's a fantastic innovation,” Aldana states. The start-up of the new calender took place in June, 2016. The results have been encouraging: production is running well, the board quality has improved. With this new machinery, we can improve bulk with better surface quality.

That will strengthen our position in the global folding boxboard markets,” says Aldana.

The new equipment has also contributed to the mill's sustainability and safety targets. “Safety is super-relevant – our goal is zero accidents,” says Aldana. “Sustainability is CMPC's priority. Our energy consumption levels are among the best in the industry, and up to 73% of all the energy CMPC consumes is bio-based, renewable energy. We have made lots of investments to achieve this.”

Boosting performance at Cordillera mill

Based on the good experiences in Maule, CMPC also started cooperation with Valmet at their Cordillera mill, which produces liner, fluting, white-top and gypsum boards. The mill's BM 20 has an annual capacity of 270,000 tonnes and a wide grammage range. **Daniel Rodriguez**, Mill Manager of CMPC Cordillera, explains: “Our target for the cooperation with Valmet was to improve the performance of our BM 20. In 2014, we signed

“To achieve our targets for increased production and improved board, installing this new metal belt calender was key.”

a Performance Agreement with Valmet, with the goal of improving board quality parameters, such as profiles, surface and printability, and focusing especially on white-top liner. Valmet experts performed many audits. Based on the audit findings, the mill drew up an investment plan.”

The first step of the plan was to install a new OptiSup-

ply enzymatic starch converting unit and improve the sizer supply system. This took place in October 2015, enabling better screening and higher solid content, and resulting in better quality and runnability as well as increased capacity. Step two will be a machinery upgrade package from Valmet, to be installed during spring 2017.

Printing house sets the bar high for CMPC

Recently, Valmet had a unique opportunity to visit one of CMPC's biggest clients, MM Packaging Marinetti Ltda., part of the Mayr-Melnhof Group. Located in Santiago, Chile, Marinetti uses products from both Maule and Cordillera, especially for food packaging. As a state-of-the-art printing house, they have very high criteria for board in terms of runnability and uniformity. Any failures in these elements cause problems in production and increase customer complaints.

Marcelo Valdivia, Director of Operations at Marinetti, says: “CMPC's high-quality board products have given us trouble-free operation. Uniform board quality is probably the most important parameter for us.” Marinetti has worked with CMPC for a long time, and they are aware of the latest production improvements at the Maule mill. “We are looking forward to

the improved, more lightweight board”, says Valdivia. “For example, wine producers want to reduce their carbon footprint, so the lighter and stronger the wine box, the better. The newly improved, more sustainable boards can meet these requirements.”



↑ In 2015, Valmet's OptiScreen pressure screening units were installed on Cordillera's BM 20 as part of the sizer supply system improvement, resulting in better sizing quality, runnability and capacity.

→ According to Nestor Navarro, Mill Manager at Maule CMPC, communication and cooperation with Valmet has been very smooth. “We truly work as one team. Valmet provides us the solutions we need.”

→ CMPC and Valmet have cooperated closely in various areas during many years, with the aim of systematically developing the machine and CMPC's production operations.





Ilpo Turunen, Senior Manager for Agreements at Valmet, sees continuous development as the underlying theme for Cordillera's BM 20. "We've now set the agenda for production line developments, and we are eagerly awaiting the results of the first investment stage during spring 2017," Turunen says.

It's a true shared journey

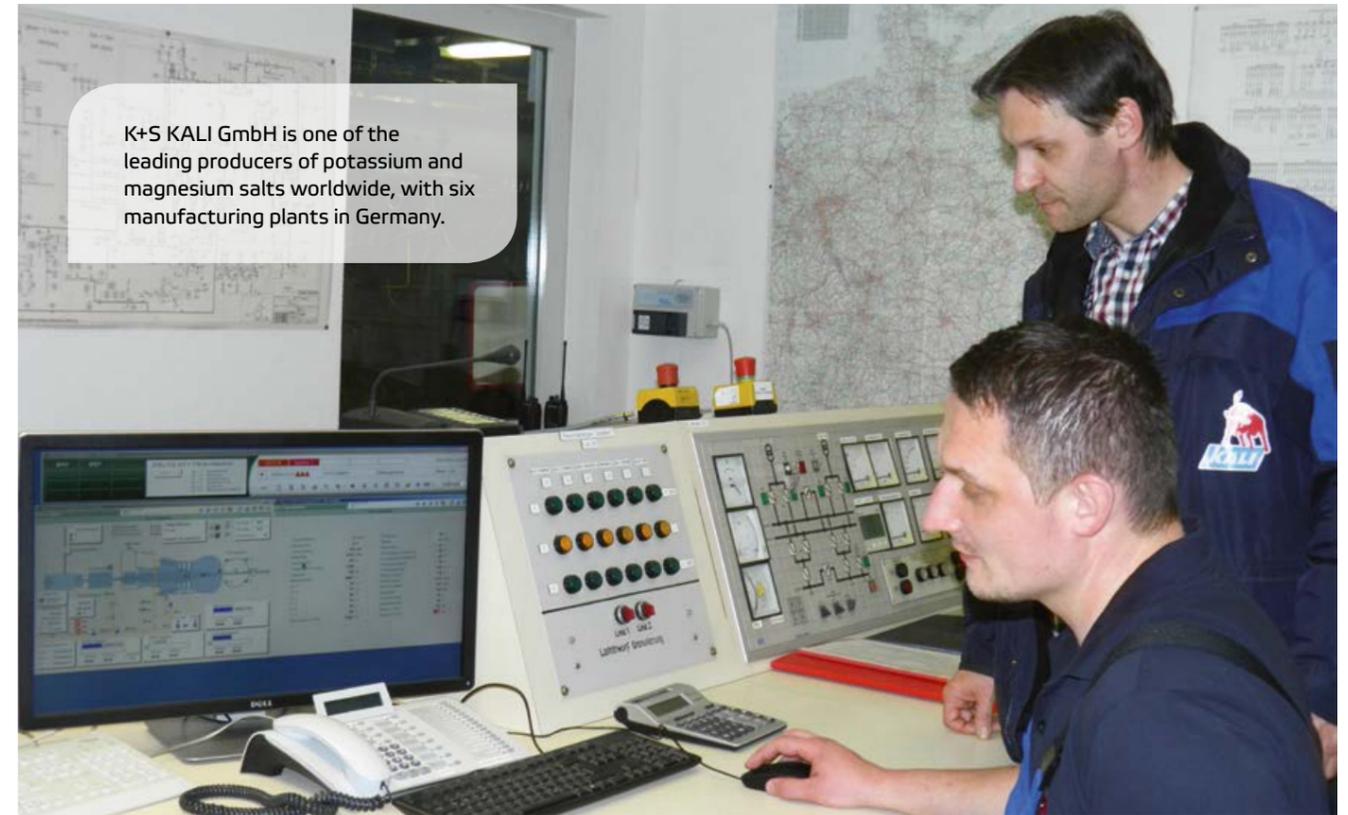
The long cooperation has transformed into strategic partnership between CMPC and Valmet. In Maule and Cordillera, Valmet has helped CMPC to keep its equipment running smoothly and reliably, as well as to optimize the performance of their production processes in order for the mills to make the most of their potential. Finally, Valmet has introduced new technologies to provide solutions according to CMPC's needs. These three pillars – Reliability, Performance and New Technology – are part of Valmet's newly revised services approach: Shared Journey Forward. CMPC started that journey a decade ago, and it plans to stay on board for the future. ■

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"With Valmet's help, we have received valuable input in how to achieve our targets," says Daniel Rodriguez, Mill Manager at CMPC Cordillera.



Established in 1920 in Chile, CMPC is one of South-America's biggest pulp and paper companies. CMPC's Maule mill produces top-quality folding boxboard for global markets.



K+S KALI GmbH is one of the leading producers of potassium and magnesium salts worldwide, with six manufacturing plants in Germany.

Operator Arthur Luda (on the left) and Ingo Nieke, Head of the power plant in Zielitz.

K+S KALI upgrades six gas turbines with Valmet automation system

In 2015, K+S KALI decided to upgrade the controls of their 20-year-old gas turbines. Six gas turbines were to be upgraded with the Valmet DNA control system at three locations in Germany. The first three upgrades took place in 2015, and the next three will follow in 2016. **TEXT** Soili Städter

The original turbine automation system was shipped with the gas turbines upon commissioning in 1995. It was designed as a classic black box and was no longer capable of meeting K+S growing need for a modern, transparent turbine control system. The new automation solution from Valmet includes automatic gas turbine control with Valmet DNA, vibration and overspeed protection, as well as a trend and alarm management system with modern and open analysis tools on a common automation platform. The automatic control and regulation tasks are accomplished with a highly available and redundant ACN MR process controller. The automation solution handles tasks such as

controlling the speed, load, combustion, and emissions, as well as start-up, shutdown and cooldown of the gas turbine.

The automation of the turbines has clearly improved with Valmet DNA. Most notably, much more information from the turbine is now available. Ingo Nieke, head of the Zielitz power plant: "We now get a much better idea of how start and stop operations take place. That is, we know the state of the turbine during the start sequence, why a sequence was canceled, where the errors are, and so on. Now we are able to actively focus on the errors, and the new automation system has made the job much more convenient."

Minimizing emission values

In Germany, the maximum emission limit value for NO_x is 75 mg/m³. Ingo Nieke explains that the emission levels are now much lower than the limit: "We are at 16 mg/m³. This is a very good value. One of the reasons for investing was to make sure we comply with the emissions limits."

Since the values are stipulated by law, they are regularly checked by TÜV Nord. With Valmet's new advanced control technology and the modern control algorithm, emissions are so low that they reach only a fraction of the permissible limits.

"In Germany, the maximum emission limit value for NOX is 75 mg/m³. We are at 16 mg/m³."

Clear interface with much more information with the new system

Valmet DNA is connected to the existing main control system via Modbus TCP interface, with a separate gas turbine operator terminal in the control room. This terminal features the same control options as the operator panel in the turbine cabinet in the cabinet room.

Plant Operator Arthur Luda is very pleased with the possibilities of the new system. "Compared to the old black box system, Valmet's user interface is much clearer and configurable. Data appears on the screen much more quickly – and much more information is available."

More power through improved process behavior

Since the automation upgrade, the gas turbine's process behavior has improved, making a capacity increase possible. Ingo Nieke: "We have approximately 200 kilowatts more capacity than before. That is indeed noticeable, because we now draw less electricity from the grid. This is the positive side effect of this project."

Project with professionals

The project was implemented in collaboration between Valmet and NGT Gasturbinentechnik. The factory acceptance test was conducted at Valmet's facilities in Tampere, Finland in cooperation with K+S KALI and NGT. The factory acceptance test allows the implementation of customer-specific requirements with respect to the control logic. Commissioning of the gas turbine in Zielitz was accomplished in one week. ■

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The operator interface of Valmet DNA is designed with usability in mind.

A 10-year journey as an industry benchmark

April 6, 2006, turned out to be a great day for Metsä Board Simpele. A new era of boardmaking was just beginning; a line was started-up after a major rebuild. The heart of the rebuild was a ValZone metal belt calender (today OptiCalender Metal Belt). **TEXT AND PHOTOS** Pauliina Purola

The past decade has shown that the risk of being a pioneer in a new calendering technology has been well worthwhile. The metal belt calender has opened up doors to success; learning by doing has converted the mill into a benchmark in the folding boxboard industry.

Before that day in 2006, Simpele had been a folding boxboard producer using the only production concept known those days to produce high-quality board. The conventional Yankee cylinder technique was restraining production. Valmet was developing a solution suited to this purpose; metal belt calendering offered a remedy to



Veli-Pekka Kyllönen, VP and Mill Manager of Metsä Board Joutseno and Simpele Mills, received a metal belt calendering placard as a memento of the ten-year anniversary. Valmet's Mika Viljanmaa gave a festive speech.



The OptiCalender Metal Belt operating at Metsä Board Simpele Mill has been a pioneer of metal belt calendaring technology since 2006.

the production bottleneck and extremely good board surface quality. This opportunity justified Simpele to make a major investment in the future.

A great leap into an industry benchmark

The metal belt calender truly started a new era, as it made a number of other upgrades possible by removing production line bottlenecks. The production capacity of the rebuilt and upgraded board machine has been almost doubled since 2006.

The doubling of production is very impressive but there are also other reasons for Simpele to be identified as the industry benchmark. The most important success factor is the board itself. The quality (stiffness and uniform quality e.g.) of the board was on a benchmark level even before the investments, but there was still potential for improvement. Since 2006, Simpele has been able to produce board with significantly increased bulk - thus substantially more lightweight - without any compro-

mises in surface quality or stiffness. The leap into a true benchmark and top producer has been great.

Good cooperation setting the base for improvement

The ten years represent a great success story, but the success is a result of hard work. The beginning was a bit rocky. The new technology extended the operating window and needed time for optimization and finding correct ways to operate. Minor modifications were also made in the equipment. Simpele and Valmet personnel met challenges and found solutions together thanks to the good cooperation and open atmosphere. One of the results is that the lifetime of the metal belt has been maximized - the record being now two full years.

“Good housekeeping, good housekeeping and good housekeeping”, summarizes **Timo Rantatalo**, Production Manager of Metsä Board Simpele, the three most important guidelines in the daily operations at the Simpele mill. Finding optimal operating and maintenance procedures has been the key factor in achieving the good current state of the mill.

Learning new things

The past ten years with the metal belt calender have thought both the Simpele and the Valmet personnel a lot. Good cooperation is and has been essential for both parties. “In each metal belt calender project, we’ve managed to get good results faster than in the preceding ones. To make our customers’ learning curves as steep as possible, we have managed to gather a list of do’s and don’ts to share with our customers”, says Valmet’s Development Manager **Mika Viljanmaa** about the successful learning curve.

Metsä Board Simpele has been the forerunner with the new technology. By continuously pursuing better results, the mill has maintained its position and has been enjoying the industry benchmark status already for 10 years. ■

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Simpele has been able to produce board with significantly increased bulk without any compromises in surface quality or stiffness.

Output doubled

Mosaico Tolmezzo doubled production and gained more reliable operation with high-speed TrimRecovery trim collecting system. **TEXT** Minea Hara and Kaisamajja Marttila

In 2014, the Mosaico Tolmezzo paper mill in northern Italy realized that the old trim removal system in the forming section of their paper machine PM 1 was no longer effective. They installed Valmet’s TrimRecovery trim collecting system in March 2015, since when the Tolmezzo mill has experienced fewer breaks and increased machine

runnability. The new TrimRecovery system has overcome the bottlenecks that had been preventing the mill from doubling its production. PM 1 at the Tolmezzo mill produces machine-glazed (MG) paper with a grade range of 17–40 g/m². The mill was strongly committed to finding the optimal solution to their trimming problem. “With a speed of 450 m/min and 20 centimeters of trim, we had water jets removing the stock from the fabric. After increasing the speed followed by a rebuild of PM 1, our system revealed its limits, with a lot of breaks and build-up of pulp and fibers,” says Furio Azzopardo, Mill Manager at Tolmezzo.

For the mill, a traditional trim removal system that sets down the trim on the fabric was not an alternative. “We needed a system that removes the stock from the fabric before the nip of the pick-up,” says Azzopardo. “We discussed it with colleagues and competitors, but they had nothing for the geometry of our machine. Since we had already talked about the technical solutions with Valmet and knew that they had done similar installations



“Our biggest interest from the very beginning was to avoid breaks and have a good trim. We have achieved all these targets more quickly than expected,” says Furio Azzopardo, Mill Manager (right), with Maurizio Sala from Valmet (left).

“The start-up curve was very impressive and the payback time for TrimRecovery was less than six months.”

elsewhere, it did not take us long to decide to order the TrimRecovery system.”

TrimRecovery allows doubled speed and production

Valmet's TrimRecovery solution cleans the trim area effectively and allows controlled recovery of high-quality trim for reuse as fiber raw material. The solution is installed so that the trim can be blown off the surface of the fabric.

“TrimRecovery is designed specifically to work at high speeds, so after Tolmezzo rebuilt PM 1, we just needed to find the optimal setup,” explains **Maurizio Sala**, Mill Sales Manager at Valmet.

The TrimRecovery start-up took place smoothly in March 2015, and the mill was immediately able to run the machine at speeds of up to 700 m/min. After some additional fine-tuning in May to increase the speed further, the TrimRecovery system showed its true capabilities. Running steadily at 900 m/min, there was still some margin left for increasing the speed. With the help of TrimRecovery, the mill has now achieved its target of doubling both speed and production. All the saved broke goes to PM 3 for reuse.

“Actually, the faster the speed, the better the system works,” Azzopardo laughs. The mill has also noticed that the new solution is not only effective, but easy to use and adjust. “For us, it's important that we can change the speed without having to touch the system.”

Estimated payback in just a few months

In terms of better runnability and increased machine speed, the mill has achieved all its targets more quickly than expected. “We were aiming to reach our targets within the first year, but we reached maximum speed in

only two months,” Azzopardo says. “The start-up curve was very impressive and the payback time for TrimRecovery was less than six months.”

The amount of web breaks has also decreased substantially. “Before, we had two or three breaks a day due to the previous trim removal system running at 500 to 550 m/min. Now, three or four days can pass without any breaks. Sure, we still have breaks and there are areas for improvement, but our detectors show that the time efficiency of PM 1 is now 97%. This includes overall breaks, shutdowns and felt changes.”

Cleaner trim area and happy operators

There are also other benefits, like a decreased need for maintenance and improved cleanliness around the trim area. By fall of 2015, PM 1 had not required any maintenance, just one planned shutdown.

“Of course, you can still see fibers on the machine, but now they don't cause breaks, which is important for us. The best thing is that our operators are now happy, because they don't even have to touch the system in order to clean it! Before, they had to clean the trim area four or five times every shift. Now the system runs smoothly and we only do the cleaning every two or three days. Life is so much easier for them now.” ■

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Installing TrimRecovery allowed the Tolmezzo mill to reduce breaks, increase machine runnability and overcome bottlenecks that were preventing the mill from doubling their production.

About the mill

Originally founded in 1928, the Mosaico Tolmezzo paper mill in northern Italy has two paper machines, PM 1 and PM 3. Now part of the Burgo Group, the mill produces chemical pulp for its own use, as well as up to 165,000 tonnes of base paper and machine-glazed paper every year under several different brands.



Reliability

at the heart of a long-term agreement

Segezha Pulp and Paper Mill and Valmet's shared journey forward continues with a long-term co-operation agreement for maintenance and remote control of Segezha's FormMaster breast roll shaker equipment.

TEXT Alexey Bondarenko and Heli Kankare

Segezha Pulp and Paper Mill, located in Karelia region, is Russia's largest producer of high-quality sack paper. The company has a Valmet co-operation service agreement for maintenance and remote control of the FormMaster breast roll shakers on both of its paper machines. The service agreement has increased the reliability of the mill, as their FormMaster equipment now has an availability figure of 98%, ensuring that the paper they produce remains of high quality. At the same time, they have been able to significantly reduce the number of unplanned shutdowns.

"FormMaster is an outstanding piece of equipment that allows us to produce competitive, high-quality sack paper. The equipment is continuously in operation on

98% availability

The availability of the FormMasters at the Segezha mill has increased to 98% since the service agreement was signed.

PM 10 and PM 9. If the FormMaster is out of operation, we can't produce top-quality paper. With FormMaster, the paper formation level is 15% higher and better quality parameters can be achieved," says **Vladimir Bolshakov**, Technical Director from Segezha Group, pointing to the importance of optimal FormMaster operation to

the mill. The high quality of Segezha's sack paper allows the mill to compete successfully in international markets, as 80% of its production is exported all over the world.

Vladimir Bolshakov shares why they are taking advantage of the FormMaster service agreement: "We were experiencing some failures with FormMaster preventing smooth operation of our paper machines and production of the top-quality paper that our customers require. Our trials to improve the availability by our own efforts were not successful due to the complexity of the equipment, and our local specialists were not qualified enough to implement high-quality maintenance and service. It was also difficult for us to estimate the required spare parts. Now we have trusted Valmet specialists visiting us reg-

Technical Director Vladimir Bolshakov is very satisfied with the high availability of the two FormMasters and the high quality of the paper produced.



ularly, providing support and solving problems with the equipment in operation."

Remote control diagnostics can identify negative trends

For the Segezha Group, the service agreement with Valmet consists of two scheduled service visits per year plus audit activities and online support, as well as diagnostics via remote control. This approach keeps the FormMaster stations in optimal mechanical condition and ensures production. "I can say that the reliability of our FormMasters has undoubtedly improved since December 2013 as a result of control from Valmet and close co-operation between our trained mill personnel and Valmet's specialists," says Vladimir Bolshakov.

Valmet experts always at hand

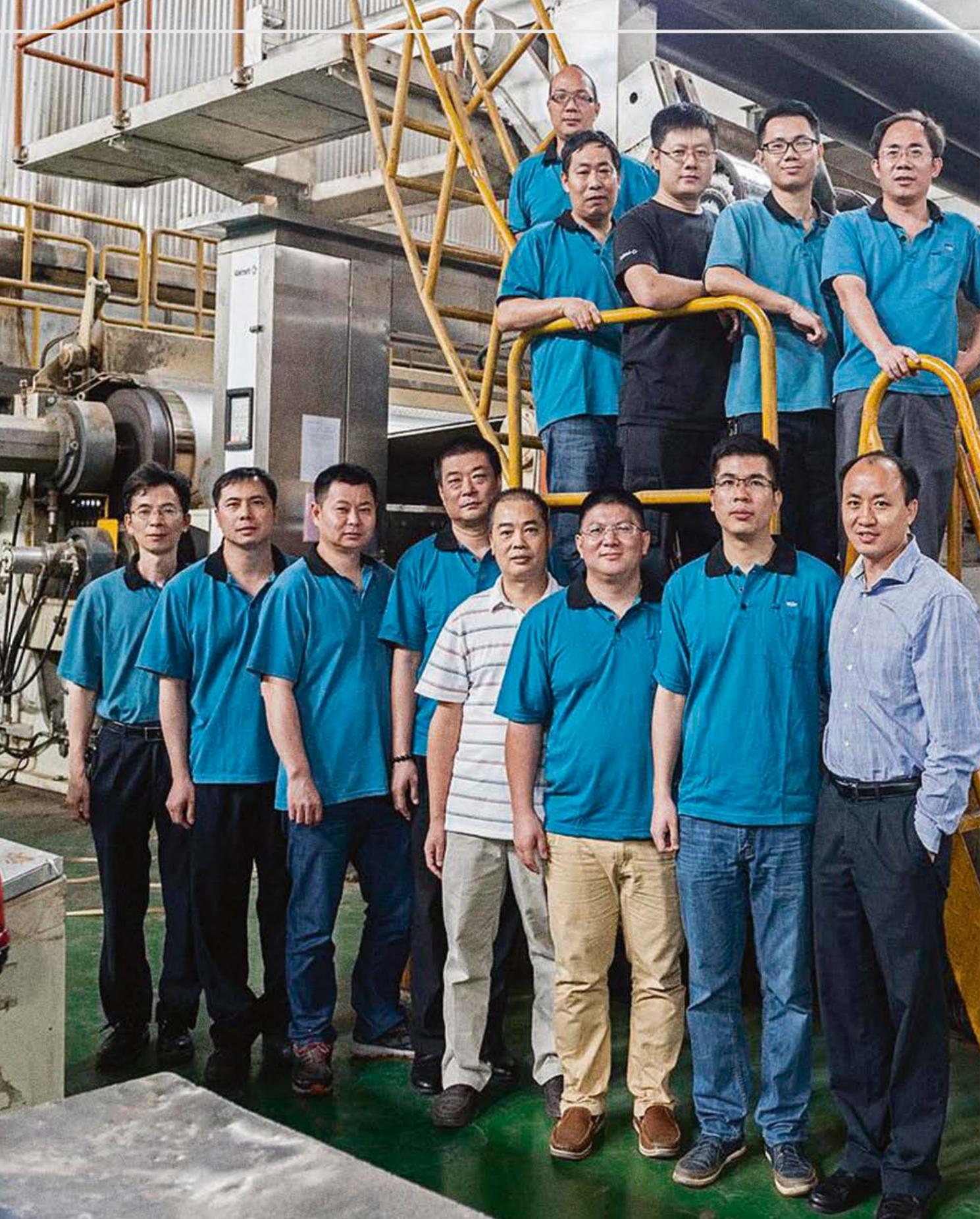
Chief Development Manager **Alexander Sivkov** identifies several key issues of the agreement: "This service agreement with Valmet is vitally important for our FormMaster maintenance needs, especially taking into consideration the tough situation with availability of skilled maintenance personnel at the mill. Valmet is able to deliver spare parts on-site in time and has a team of skilled experts. They have always quickly responded and supported us. Based on our long-term co-operation with Valmet specialists, who have visited the mill site for PM 9 and PM 10 FormMaster start-ups and service, we trust that they are capable of providing support in solving all problems with the equipment in operation, and we know that we will be satisfied with their work and good results."

To sum up, the long term co-operation agreement demonstrates excellent results in equipment reliability and sustainable operation. It also provides great educational opportunities to the mill personnel, as both parties are actively involved in maintenance. "The service agreement should definitely be extended, as the quality of our finished products and the situation with deliveries to our customers have obviously improved since we signed it," says Alexander Sivkov. ■



Chief Development Manager **Alexander Sivkov**: "This service agreement with Valmet is vitally important for our FormMaster maintenance needs".

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Yinzhou production group and Valmet representatives standing in the front of the Valmet IQ scanner.

An investment in competitiveness with a board machine rebuild

Dongguan Huangchong Yinzhou Paper improved its production and product quality with two new OptiFlo headboxes and two sets of Valmet IQ quality control system. Higher production efficiency means lower costs, and improved paper quality increased their sales and prices.

TEXT Sara Li and Kaisamaja Marttila

Yinzhou Paper was established in 1988, and previously had 24 sets of small machines. They have experienced more intense competition as larger Chinese players have entered the market. “We have really benefited a lot from the headbox rebuild,” says “Thanks to our continued rebuilds and upgrades in these years, Yinzhou has become the competitive company it today is,” says **Li Weier**, Chairman of Yinzhou Paper, who is satisfied with the good results.

Having a mindset for continuous improvement, the management team decided that the linerboard quality of PM 1 and PM 2 needed a boost. “We had frequent customer complaints regarding the evenness and CD profiles of our test liner, so we decided to replace the headboxes,” says **Wang Zhentao**, GM of Yinzhou Paper. The existing headboxes were made locally with a design speed of 500 m/min. The mill increased the machine speed to 750 m/min through day-to-day optimization, but the headboxes couldn't keep up with the higher speed, leading to quality problems.

Better quality test liner

The solution for improved end product quality was two OptiFlo dilution headboxes and two sets of advanced

quality control systems. They were installed for the bottom ply of the three-ply linerboard machines in February 2016. "Before the rebuild, the CD profiles on both machines were very poor. Our target for the CD profile variation was about 6 g/m², which we have basically achieved now," says Production Manager **Peng Guojun** about the results of the rebuild.

"The two-sigma value of CD profiles was about 2.5 before. Now it is between 0.5 and 0.8, which means we have achieved the goals of the rebuild," explains GM Assistant **Xiong Pengju**.

"Our customers are now satisfied with the end product quality. We see that investing in technological upgrades is necessary, and it benefits us through improved product quality and production cost savings," Li concludes happily.

Unexpected savings

"We also got unexpected results that are very satisfying," says Wang Zhentao with excitement. "After installing the new headboxes, we've had fewer paper breaks. Last month, we had only eight breaks, whereas we used to

have around 50. We also consume less steam, monthly values have gone down from 1.65 tonnes per tonne paper to 1.55 tonnes. Our raw material costs have also fallen, as the new headboxes can produce the same quality from lower-quality fibers, but with a much higher yield."

"Another obvious difference was that the rebuild enabled us to convert PM 2 to produce paper with a lighter basis weight of 110–130 g/m², and the running speed increased by 30 m/min," Xiong adds.

Short 86-hour shutdown

The shutdown of both machines to install the new headboxes was planned carefully to minimize the needed downtime, it took only four days from shutdown to start-up. "Thanks to our combined efforts, the project started up ten hours ahead of time," says Peng and acknowledges the good service attitude of Valmet personnel.

"Technical stability was one of the most important things we considered when choosing suppliers. Valmet met our strict requirements", says Xiong. "The headboxes are good in many aspects, such as low pressure loss, good



"As our partner, Valmet provided advanced equipment to make us more competitive", confirms Li Weier, Chairman of Yinzhou Paper.



"We also got unexpected results that are very satisfying," says Wang Zhentao, GM of Yinzhou Paper excitedly.

formation, and easy operation. The profile adjustment control system is top class as well."

Better runnability, web uniformity and quality with automation

Yinzhou Paper's PMs were equipped with Valmet DCS and QCS controls, which helped a lot in getting the results they wanted. They also selected Valmet IQ scanners and profilers to replace their old installations, and performance has improved with better runnability, web uniformity and quality.

"Personally, I think Valmet IQ Scanner is perfect," says **Chen Yongfa**, Automation Manager. "First of all, it has stable runnability, the system interface is easy for the operator. Secondly, its design is very good. The special floating bridge bearing design allows thermal expansion without beam distortion. The filtered air purge system also ensures temperature stability and maintains internal cleanliness. Thirdly, it can provide high precision and fast response. Fourth, dilution control uses dynamic automation mapping tools and corrects the actuator and web response area mapping quickly and accurately," he continues.

"By using Valmet IQ scanner and profiler, the basis weight, moisture, and caliper are also better and automatically controlled. It also provides precise CD control, helps in achieving the paper quality requirements. The two-sigma value of BW has improved by 64%," Chen Yongfa explains.

Value and return on investment

Investing in paper production is always a big decision. The question is, whether to choose the solution that has the cheapest price tag or the one with most value and return on investment? Yinzhou Paper has their own phi-

losophy: "Good things always cost more, but you seldom regret your choice," Li says.

Wang shares Li's opinion, adding, "Great equipment produces good products, but it is meaningless if we seek only the lowest investment price. If the headbox runs with bad formation, it might cause paper breaks, or bad paper quality, which leads to energy losses and wasted work and so on, we're all good at that math," Wang smiles. "So if all the core components are as good as possible, then energy consumption and all other costs savings are totally different."

"The results of the project show that our decision to choose Valmet as our partner was very wise.

After this rebuild, the quality of our products has improved significantly, which makes it possible to raise our prices. Improving competitiveness is very important to us. As our partner, Valmet provided advanced equipment to make us more competitive," Li confirms. ■



Peng Guojun, Production Manager of Yinzhou Paper (right) and Jiang Yuanlong, Valmet's start-up engineer.

New runnability systems

improve board machine performance
at Cartiere Villa Lagarina

In December 2015, Valmet successfully started up five HiRun P and one PressRun runnability systems on board machine BM 2 at the Cartiere Villa Lagarina mill in Italy.

TEXT Antonio Cinque and Heli Kankare



The new Valmet runnability systems at the Cartiere Villa Lagarina mill have significantly reduced web breaks and the subsequent production losses, increasing the reliability of the board machine. The average production speed has increased by more than 150 m/min, and maintenance shutdown intervals have also increased. BM 2 has a wire width of 5.78 m and it produces fluting paper with basis weights of 90–140 g/m².

Containerboard and corrugated packaging with social responsibility

Cartiere Villa Lagarina is part of the Pro-Gest Group, Italy's leading integrated producer of containerboard and corrugated packaging. The group started its operations in

1973, with the first factory in Ospedaletto d'Istrana, close to Venice. Today, the group has 22 vertically integrated mills spread across Italy, in close proximity to the market they serve.

The Managing Director of Villa Lagarina, **Francesco Zago**, says: "By using the best available technologies on the market, the Group aims to capture the maximum potential from the fiber recovered and deliver high-performance packaging with top-class strength properties. With a consolidated turnover of EUR 450 million in 2015 and an EBITDA margin of 19.6%, the Group is demonstrating its good business foundation, paving the way for further growth in the near future."

Francesco Zago continues: "Pro-Gest has invested heavily in developing an environmentally friendly company. All its facilities are equipped with effective water treatment and efficient power generation, minimizing consumption of fossil fuels. We are committed to the regions in which we operate. We interact with local communities and take our social responsibilities very seriously."

New runnability systems to bring reliability and performance

"The main target of the rebuild was to increase the average speed of BM 2 at Villa Lagarina. For that, we needed to stabilize the web and make the stabilization equipment more reliable, especially in the first drying groups. With the previous vacuum devices we were able to achieve high speeds, but only for short periods of time. After start-up, their performance deteriorated quite quickly, the web started to flutter, and tail threading became very challenging," explains Zago.

Most convincing solution from Valmet

Comparing possible solutions, Valmet's HiRun runnability system was the most convincing option for Villa Lagarina, as it eliminated most of the physical vacuum dividers, replacing them with air blades. The good reference base in the high-speed machine market was also a strong factor.

After six months of stable, satisfactory running, Francesco Zago is very pleased with the decision. The effects were clear right from the first week after start-up. The stable paper web and more effective tail threading have resulted in less time being wasted and, ultimately, in increased speed and productivity. He says: "The equipment has very clear, simple cleaning procedures, and Valmet's technicians have been guiding our team step by step during the optimization." ■

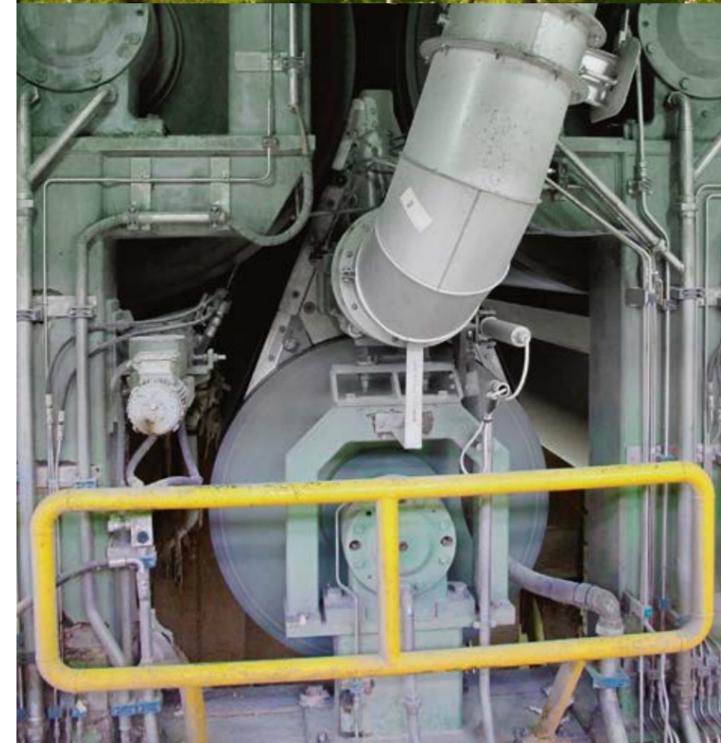
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Managing Director Francesco Zago from Villa Lagarina (on the right) with Antonio Cinque from Valmet.



Cartiere Villa Lagarina paper mill is situated in a vineyard valley, close to Lake Garda in northern Italy.

Pro-Gest has recently confirmed their trust in Valmet by purchasing a brand-new OptiConcept M board machine for lightweight packaging grades with a capacity of 1,500 tonnes a day.



The stable paper web and more effective tail threading have resulted in increased speed and productivity.

HiRun P runnability components on Villa Lagarina BM 3.

Modular design made the rebuild of the entire press section of paper machine PM 5 at Mondi's Štětí mill in the Czech Republic very easy. The schedule for the commissioning and start-up was only one week, and after the start-up, the mill had sellable sack kraft paper in just three days. TEXT Kaisamajja Marttila

More efficiency and runnability with new Optipress

With increased dryness resulting in better web runnability and less steam consumption, it is no wonder that the mill is happy with the rebuild concept and co-operation with Valmet.

"Our old press section was no longer state-of-the-art", tells **Helmut Riesenberger**, Senior Project Director at Mondi Štětí. "The aim of the modernization was to reduce energy consumption and improve paper web runnability." After considering all aspects, the mill took the bold step of having a total rebuild of the press section without reusing any existing press parts. The start-up was in October 2015.

Minimized shutdown time

Minimizing the time needed for shutdown makes rebuilds more effective and affects the overall profitability of the project. Mondi and Valmet worked together in order to make the rebuild – and especially the commissioning phase – as efficient as possible. "The press section was preassembled in Finland for a very fast assembly phase here on site. The modular design with no cantilever beams meant that we had to put much less efforts on civil

works. This meant lower costs as well, and we were on schedule from the very first day to the start-up," Riesenberger recalls.

Besides the technology, Valmet also integrated the machine control system for the new press section into the existing automation system. Riesenberger sees the benefits of having one responsible supplier for both automation and technology. "It is an advantage. Of course, we could solve this differently, but I think this is the fastest solution. Especially in rebuilds, where time is limited, this is a reasonable solution as the machine supplier knows best how to operate the system."

The new system makes diagnostics and troubleshooting very easy. "Valmet's machine control system (MCS) for the press section is fully integrated into existing distributed control system (DCS), so we can maintain this system and get all the data and values whenever we need in the future as well," Riesenberger adds.

Improved dryness and runnability

When asked about the performance of the new OptiPress press section, Riesenberger's answers promptly: "The key is the dry content, of course. The higher the dry content, the higher the runnability. The dryness values are now higher than before the rebuild. "It gives us a huge benefit in steam, as we have been able to reduce steam consumption enormously," he says. Vacuum usage is at the same level as before, even with the increased production. Also the number of sheet breaks could be reduced significantly. "All the efficiency figures, like time, material and speed, have improved compared to the values we had before the rebuild," Riesenberger concludes.



"The configuration and the basic design of the press section gives us better profiles, even at higher speeds, which we really did not expect. We've had very good numbers from the first day," Helmut Riesenberger explains.

"All the efficiency figures have improved compared to the values we had before the rebuild."

Quality improvement with better profiles

Brown sack kraft paper produced at PM 5 must meet the needs of demanding end customers. The best possible strength and stiffness are needed, as the sacks need to withstand rough handling and tough weather. Excellent runnability is needed for efficient converting and quick filling, and excellent printability to satisfy the demands from their customers.

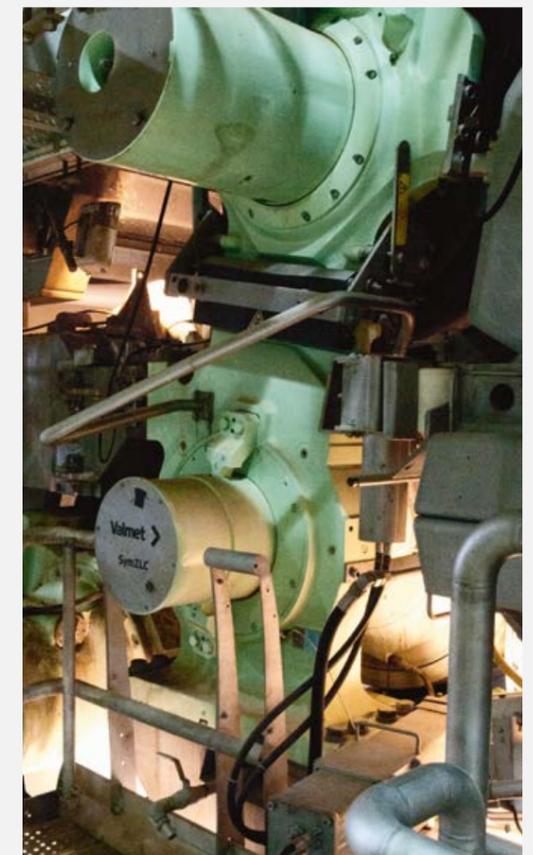
"The configuration and the basic design of the press section gives us better profiles, even at higher speeds, which we really did not expect. We've had very good numbers from the first day," Riesenberger explains. He continues: "The biggest benefit of the new concept is the absence of free draw between the nips. This fact has a positive effect on paper properties like tensile strength and stretch. Thanks to the higher outlet dryness, we were able to improve the 'smile' effect on the stretch CD, a means to lower the difference between the center reel and edge reels. Also, though we have a much higher dry content (higher press loads), we still can keep our porosity values, which are important for sack paper. We actually expected somewhat lower values, but they remained unchanged – we still have the same values."

Perfect co-operation

Complex projects like this never succeed without good co-operation. "I really felt supported by Valmet, right from the very first day. They reacted, they listened to us, and we had open discussions on all topics. We also had differences of opinion, but in the end we always reached a common view and a vision of how to proceed," Riesenberger says. "This project was very systematic. This approach, to have certain standards, is also something that I like very much about Valmet.

The power of co-operation can be seen in the smooth start-up. "We met all our parameters for sellable paper at full speed in just three days," Riesenberger sums up. ■

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OptiPress Center press section

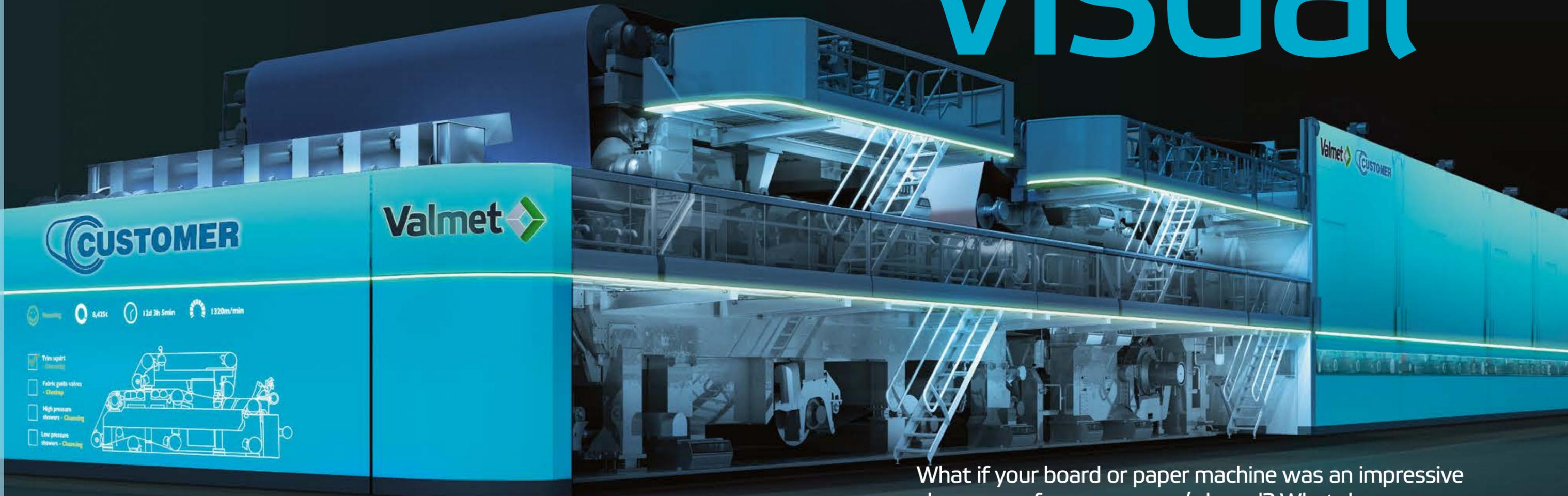
The existing press section at Mondi Štětí's PM 5 was replaced with an OptiPress Center press section. With this tri-nip solution, the new 1st press, the 2nd press and the 3rd press shoe nip maximize the dry content entering the dryer section and increase the wet strength of the paper. The resulting boost in dryness thus fully benefits web runnability in the open draw and at the beginning of the dryer section. Felt conditioning is done effectively with uhl boxes equipped with perforated covers. This results in improved dewatering and lower energy consumption.

The simplified frame construction of the modular press section design means a low load on the foundation, space savings, shorter shutdown and faster installation. Fabric changes are possible with the help of a fabric insertion unit, as there is no cantilevering. User-friendly design features like the new walkways emphasize safety and easy maintenance.

INNOVATOR'S VOICE

Get inspired

The next step in design – OptiConcept M gets **visual**



What if your board or paper machine was an impressive showcase of your company's brand? What does a paper machine look like when using light as a visual element to improve user experience? Would you like to see the speed and production figures displayed on the front panel of the machine? All of this is now reality with Valmet's OptiConcept M paper or board machine.

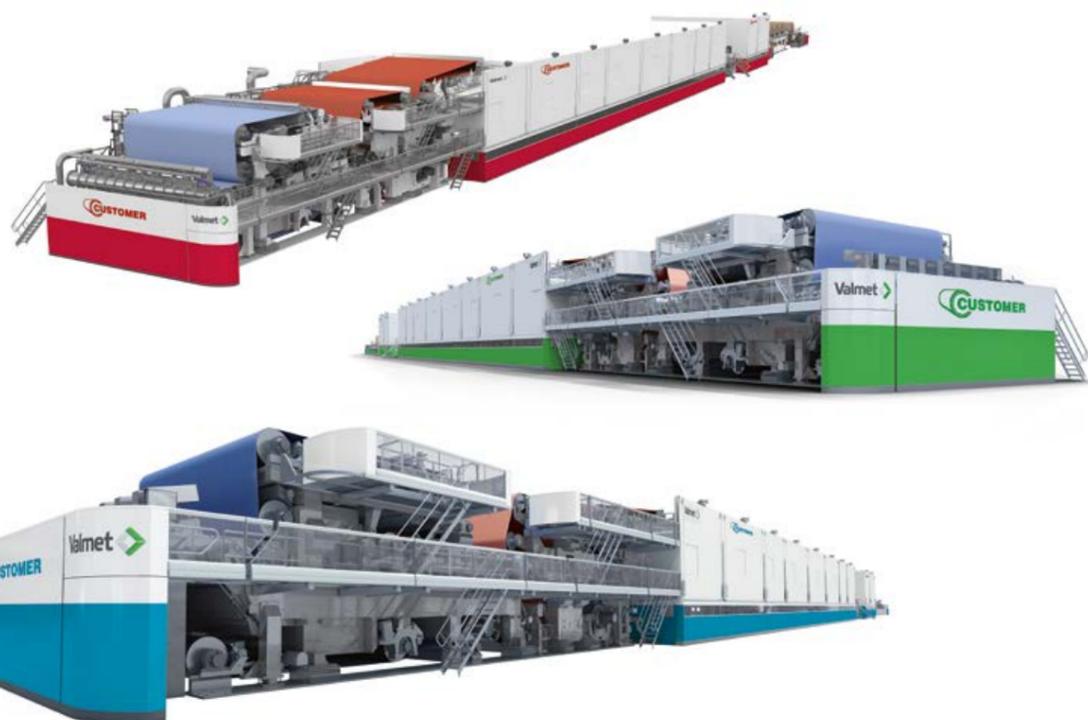
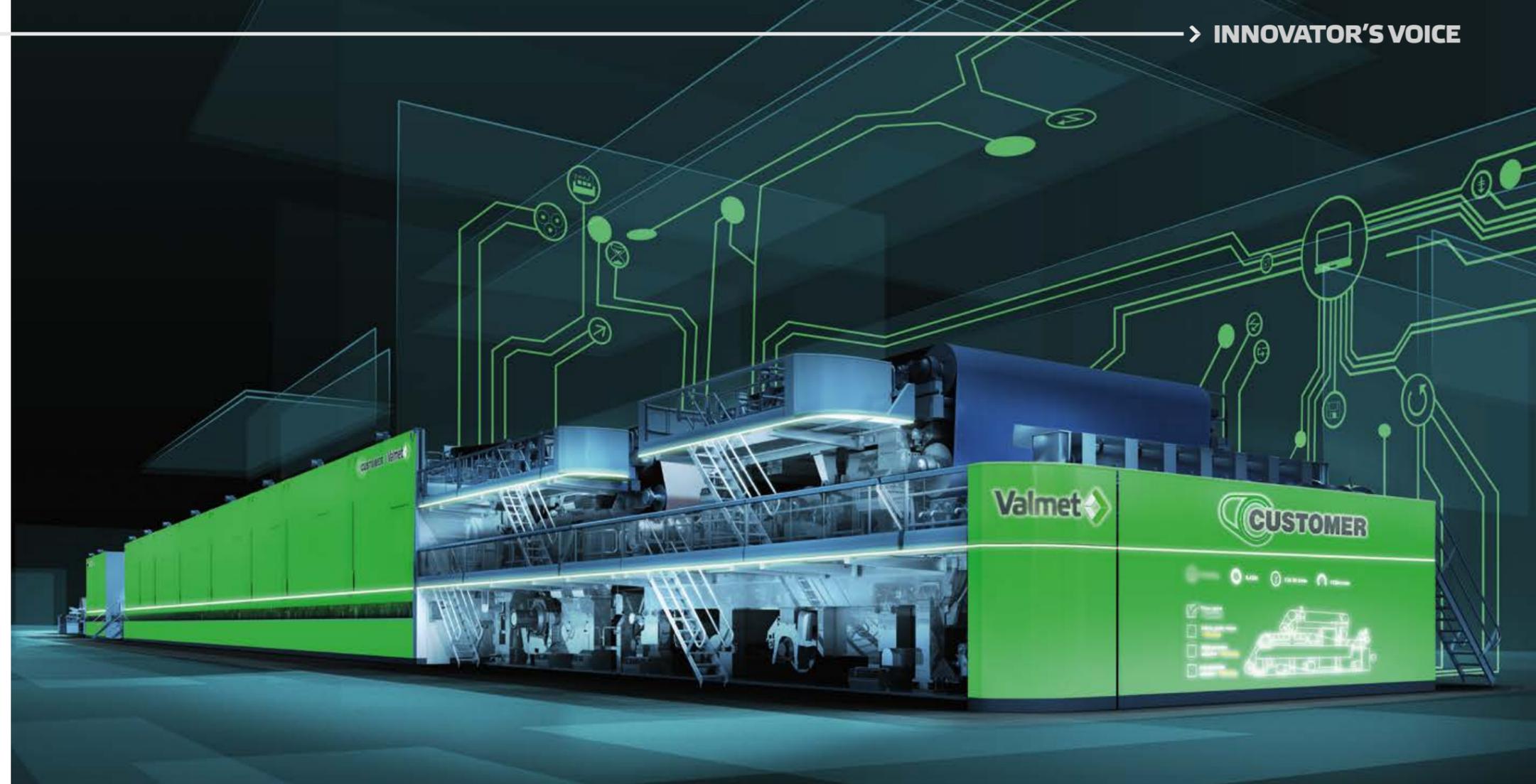
Valmet has been systematically focusing on industrial design for several years. One key result of this work has been the launch of OptiConcept M in 2011. The drivers behind its design have been safety and usability. Building on this work, the design of OptiConcept M is now taking the next step forward towards an even better user experience by exploiting visual elements, like customer branding and lighting.

Boosting the customer's brand

"OptiConcept M gives our customers the possibility to support their own brand visuals – to make their machine truly reflect the company's image. The customer brand can be visible in the line design, for instance in the form of the customer's company name, logo and brand colors. Add lighting, and the machine can even undergo a total 'color washing,' which can be most impressive on special occasions," says **Jussi Salojärvi**, Senior Design Manager at Valmet.

Lighting as natural part of machine environment

"In addition to being crucial for usability and safety, lighting is also a powerful way to influence the atmosphere of the machine hall," says Jussi Salojärvi. "By optimizing the lighting concept, we can balance the amount of light on the machine with natural light, movement and presence sensors. Lighting can be an integral part of the whole machine environment – we can light up the machine parts



➔ The customer's brand can be visible in the OptiConcept M line, for example with the customer's company name, logo and brand colors.

and sections that are critical at any particular moment, and fade out the lights in areas where they aren't needed. Today's lighting technology offers many ways to easily use light as a visual element to improve usability and safety," Salojärvi says.

Industrial Internet visualized

The use of Industrial Internet also offers new ways to make the whole papermaking process more visual. The front panel, hood and safety fences of the machine can be customized to show infographics with data from the machine to facilitate operative tasks and enable people to easily visualize process information. "This information can be real-time data on machine speed, grade, and energy or water consumption. Operating or maintenance data can also be highlighted to support maintenance work and to guide the operator, for instance when changing fabrics," Salojärvi explains. The info displayed on the machine isn't limited to just machine data. Photos, drawings, words of welcome – anything that suits the occasion can be used.

A wide range of options for rebuilds and new lines

"Our customers can choose from a wide range of new visual solutions as options for rebuilds as well as brand-new OptiConcept M lines. At Valmet, we keep abreast of developments in new digital technologies and want to make them part of the paper and board mill environment."

More to come in the future

"We have now started introducing these new solutions to our customers, and many board- and papermakers have shown positive interest in them. And of course, to keep moving forward, there is more to come in the future. Augmented reality, for example, will open up a variety of new options, e.g. for more efficient and safe operation and maintenance of a paper or board machine," Salojärvi concludes. ■

↑ The machine front panel, hood and safety fences can be customized to show infographics with actual process data to facilitate operative tasks and enable people to easily visualize process information.

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Remote service tools from the future are already here

Smart eyewear, augmented reality and predictive maintenance will revolutionize the way Valmet serves its customers. "The technology is already there, we just need to apply it to our vision," says Mika Karaila, Research Program Manager from Automation R&D. TEXT Minea Hara

As a trailblazer in developing novel ideas and innovative techniques, Valmet's ambition is to fix machine-related problems quickly and reliably. By using the many benefits offered by digitalization, big data and the Industrial Internet, mill maintenance can soon be carried out remotely using smart phones, tablets and smart glasses. From easier and more accurate measuring to predictive maintenance, Valmet is working on several pilot projects developing high-tech remote support tools.

Augmented reality means instant troubleshooting

At the moment, smart tablet applications are being tested for remote problem solving. One of these technology pilots is implemented with Pointr – a mobile app that utilizes augmented reality, a technology that instantly integrates digital information with a user's physical environment. In addition, Pointr provides users with live video streaming, voice chat and real time remote pointing for comments.

"It's easy to see the benefits of this kind of technology," says **Marko Heino**, Director of Field Services in Valmet. "Augmented reality will have a huge impact on how we

communicate with our customers. We can respond to service needs faster and ensure the quality of our service is consistent. What's great is that no extra hardware is needed, just a smartphone, tablet or laptop."

Problematic situations at the mill can be shown on the tablet to a remote support person who can then share drawings and other material back to the mill. First, the customer shares a picture or a video of the machine on-site using the tablet. The remote support person can instantly pinpoint and draw relevant items and corrective actions to the screen and talk through the needed maintenance suggestions. "We are currently piloting Pointr technology with a maintenance agreement customer and the feedback has been encouraging," Marko Heino goes on to say. Next, the pilot will be expanded to other select agreement customers.

Johan Pensar, Director of Industrial Internet at Valmet, sees great possibilities in utilizing Industrial Internet technology. "Access to process information enables remote troubleshooting and problem identification. When we combine this with augmented reality, Valmet will be able to provide expert support to anyone who needs it, regardless of their geographical location."

Safety glasses transformed into smart glasses

Pointr has also been successfully tested on smart glasses. The revolutionary optical technology merges remote support into safety glasses and brings instant visual information into the user's vision field – creating an augmented reality with hands-on diagnostics.

"The HUD (Head Up Display) is similar to those used on some of the world's finest fighter planes and cars," **Mika Karaila** explains. Displays on the market now are already able to offer a virtual image equal to a 60-inch TV screen.

The new high-tech eyewear shows diagnoses right in front of a person's eyes, right next to the process equipment being serviced. Smart glasses will not only transform remote maintenance to on-demand support with less information outage, but also allows mill personnel to use both their hands while working in difficult conditions as well as improving their skills together with Valmet experts.

From fixing to predicting

Videos and mobile control tools are already remotely solving our customers' technical problems. At the moment, mobile tools are perfect for simple projects but in the future, they will be used for all kinds of field service and maintenance applications.

"By analyzing process information with advanced technologies like Big Data, predicting future behavior of the machinery will become easier than before. This opens up opportunities for new and more efficient predictive maintenance models, where maintenance is optimized to minimize maintenance costs while allowing high asset availability," says Pensar.

Exciting times lie ahead

Big data and augmented reality will be utilized in accordance to Valmet's vision – to become number one in serving our customers. Global customer training will be needed in order to utilize the new gadgets and tools in an optimal manner.

When the remote field service tools are in full operation, they will have a huge impact on improving customers' mill reliability and production uptime. In the near future, Valmet will not only fix, but also predict problems – before trouble even starts. ■

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Grinding with diamonds

– an award-winning innovation

The search for an energy-efficient grinding method brought about grinding with diamonds. TEXT Minea Hara

In the late 1960's, Dr. Arne Asplund from Sweden developed the thermomechanical pulping process, the most modern development in the field of mechanical pulping since the invention of grinding wood with stones back in the 1800s. It was almost 50 years before the next breakthrough – grinding with diamonds - took place. This year, the innovation received the distinguished Arne Asplund Mechanical Pulping Award.

The search for energy-efficient grinding surfaces begins

In 1999, the first official trials of a novel mechanical grinding methods began in Finland. A joint effort of the owners of KCL* and Valmet, the thorough tests led by Mikael Lucander were run using electroplated surfaces with industrial diamonds. "With this method, the diamonds were scattered on the surface in no particular order. The results were merely indicative, but vital in initiating our project, which would significantly lower the alarmingly high energy costs every pulp mill faced," says Olli Tuovinen, Development Manager for Grinding segments at Valmet.

Soon, things started happening. At Tampere University of Technology in Finland, Tomas Björkqvist was working on his doctoral thesis, examining the effects of waves on an electroplated diamond surface. He reasoned that waves would result in lower load frequencies, which would effectively prepare the wood for grinding. Valmet also started working with Åbo Akademi University, Tekes**, UPM, Stora Enso and Myllykoski to study the impact of the shape and size distribution of the grinding particles. These studies were conducted on single-layer surfaces where the grinding grains were attached by brazing technology – a technology that placed the grains precisely in desired layouts.

"By this time, we had two projects going on," Tuovinen recalls. "One studying the electroplated diamond surfaces with a wave base shape, and another one focused on brazed surfaces, morphology and the size distribution of grinding grains including industrial diamonds on steel segments."

Grinding with brazed diamond segments

The results of the basic research project were so promising that the project funders (Valmet, Tekes, Metsä, Myllykoski, Stora Enso, and UPM) joined forces to move ahead with commercialization in a joint product development project. The first step was to compare the pros and cons of different surface manufacturing technologies and their impact on pulp quality and energy consumption. In these trials, multiple pilot studies were done at Valmet's Inkeroinen technology center.

In terms of energy-saving potential and pulp quality, both manufacturing technologies proved to be equally good, so the choice of the mill-scale technology needed to be based on other crucial factors. These drivers ended up being surface durability and precise control of surface

characteristics, as well as how the technology could be adapted to existing GW (groundwood) and PGW (presurized groundwood) machines. Due to these factors, the surface production technology based on brazing was chosen. Since the production technology was not ready for large grinding surfaces, Valmet took the initiative to develop the manufacturing technology, brazing materials and machinery for mill-scale tests.

Galileo technology sees daylight

In 2010, the first customer tested the grinding technology, with promising results. That same year, the innovation was commercialized and ready to for the world to see it. Launched under the name of Galileo and inspired by the brave Italian scientist Galileo Galilei, who also broke boundaries in his time, Galileo grinding technology immediately started disrupting standards in a very traditional industry.

"During my 30 years in the field, the requirements of brazed diamond surfaces have been the toughest I've ever come across," Tuovinen says. "The required precision is in the tens of micrometers on large surface areas. The surfaces must also be able to withstand 24/7 corrosion for a long period of time, and the diamonds need to grind half a million kilometers of wood under heavy loads, ideally with consistent quality and energy consumption. Maintaining this level of precision in such a demanding environment has been the biggest challenge of the entire project."

Tuovinen adds: "I'm delighted that we've achieved extraordinary long running times while maintaining uniform end-product quality and low shive levels. So far, the best results have been measured with six-month running periods, but Galileo surfaces can last up to a year since, unfortunately, not even diamonds last forever."

Significant impact on reduced energy consumption

With Galileo grinding technology, reductions in energy consumption can reach up to 300–500 kWh per tonne, equivalent to annual cost savings of over EUR 500,000. In the unique business model applied in Galileo, payments are based on realized production and actual savings, so Valmet also utilized a remote access system to easily monitor the grinding processes and Galileo's performance. This way, the customer is sure to never pay for more than they have saved and can only win.

After spending years on the project, Tuovinen has reason to be proud of the concrete results. "The best thing about the entire project has been the fact that we've been very customer-oriented from the very beginning. All our partners have been equally committed to proving that this innovative grinding technology is, and will be, worth investing in." ■

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* KCL is a pilot testing and production company owned by the Finnish pulp, paper and board industries

** TEKES is the Finnish funding agency for innovation

Speed up!

UnoRun S web stabilizers speed up smooth bottom roll dryers in paper machines. TEXT Paavo Sairanen

Increasing speed in smooth bottom roll dryer groups in a paper machine usually means long shutdown times and relatively extensive modifications, such as drilling and grooving the bottom rolls. Valmet's new runnability solution UnoRun S has completely changed the game.

In addition to improving dryer section runnability and production line efficiency, UnoRun S is ready for ropeless tail threading. Product Specialist **Paavo Sairanen** from Valmet explains: "UnoRun S is especially designed for dryer groups with smooth bottom rolls or cylinders. It is an excellent choice for rebuilds where a double-tier dryer group is converted to a single-tier dryer group."

Reliability and trusted performance

UnoRun S combines the best features of the well-known Valmet UnoRun and HiRun stabilizers. "HiRun technology is known as the runnability standard for high-speed paper machines, while UnoRun was the first runnability component introduced to the market 35 years ago," Sairanen explains. Following these two successful products, UnoRun S offers a unique solution for improving runnability in paper and board machines.

Installation in a short shutdown

Since the required air system outside the hood can be installed while the machine is running, the installation of UnoRun S stabilizers requires only a short shutdown. "The installation time needed always depends on the scope of the delivery, but installing the stabilizers and

internal hood ductwork for one or two drying groups can be done even in a two-day shutdown," says Sairanen.

Innovative operating principle

In HiRun technology, high-vacuum zones are separated from the low-vacuum pocket zone. First, the vacuum created in the release zone ensures that the paper web stays attached to the drying fabric instead of following the cylinder. Then, the vacuum created in the capture zone makes sure that the web is not separated from the drying fabric, but stays attached while running under the bottom cylinder.

"It is important to keep a lower vacuum in the pocket zone to avoid bending the fabric," Sairanen explains. "Fabric bending is often compensated for by increasing the fabric tension, which can require new stretchers and rolls. With UnoRun S, this extra investment can be avoided."

In addition to adjusting seals and air flows in the nozzles, Valmet's unique ropeless tail threading system for smooth bottom rolls, VenturiForce, can also be plugged into UnoRun S. This combination makes a single-tier section rebuild very competitive. Combined with innovative process engineering, UnoRun S is the perfect tool for improving runnability based on each mill's individual needs. ■

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Installing the stabilizers and internal hood ductwork for one or two drying groups can be done even in a two-day shutdown.



"By most estimates, today 99% of process sensor data is not fully leveraged, but rather is only used for limited anomaly detection and alerting," says Martin Willcox, Director of Teradata's Big Data Centre of Excellence.

The IoT is all about the

data

- not about technology for technology's sake

The most important issue for the emerging "Industrial Internet" is data integration - and the biggest potential prize is sophisticated optimization of end-to-end value chains. TEXT Lotta Forssell

According to **Martin Willcox**, Director of Teradata's Big Data Centre of Excellence, we should ask not what the Industrial Internet and the Internet of Things (IoT) mean to the manufacturing and process industries, but what it *could* mean.

Recent research by McKinsey Global Institute shows that the value of the IoT in industrial settings is largely dependent on systems and data integration - but research by Gartner Group suggests that up to 80% of IoT projects are currently being pursued as standalone, stovepipe initiatives. According to Willcox "those two pieces of research demonstrate that today, four out of five companies are getting the IoT wrong." It seems that there is still a lot of work to be done to truly tap the benefits of the Industrial Internet.

"If we get it right - and if the tactical implementations are refocused so that integration becomes a priority - the potential up-side for the global economy is estimated by McKinsey to be in the 3-11 trillion dollar range globally by 2025 across all industries and sectors," Willcox adds.

Preventative maintenance with data integration

There is a lot of data available and integrating that data is necessary, but ultimately it is sophisticated analytics that unlocks the value of the data. So the most important questions become: what data do you have; how is it managed and integrated; and what are you doing with it?

"By most estimates, today 99% of process sensor data is not fully leveraged, but rather is only used for limited anomaly detection and alerting," says Willcox. "The opportunity is to start utilizing that data, firstly to predict what will happen next - and ultimately to control outcomes."

According to Willcox, "the poster child for these 'next-generation' sensor data-enabled applications today is preventative maintenance, because increasing system up-time and availability is a high-value business problem in many industries - and because there are often large economic benefits to be tapped with even small improvements."

Full benefits with optimization

In the longer term, Willcox believes that the true game-changer will come from optimization - for example through optimizing yield in manufacturing processes by making near real-time adjustments in the process to minimize scrap and rework. "Optimization is about making the right things at the right time - and ensuring that you are making them right. A lot of optimization initiatives today are fairly narrowly targeted in the 'making it right' space - but the value chains in manufacturing and process industries tend to be long and complex and to involve

multiple players. Connecting the dots by integrating supply, manufacture, production and market demand data is the real opportunity."

Whilst the right technology is critical to enabling data integration and analytics at scale, Willcox cautions companies not to overlook the human and organizational factors. "Most companies today don't have enough skilled and experienced Analysts - so organizing the ones that you do have to maximize their productivity and impact is critical."

Not for the sake of technology

Willcox likes to say that "failing to plan for the integration of IoT data amounts to planning to fail", but he goes on to note that even companies that go into the Industrial Internet with eyes wide open often struggle with the scale of the challenge. "For a lot of B2C companies and use-cases, the big challenge today is instrumenting products and processes to capture data. In Industrial settings, high-value and safety-critical equipment have already been instrumented for some time - but SCADA systems were not typically designed to support integration and analytics of data at scale."

Additionally, companies need be selective about which data to integrate, as not all data are equally relevant to all companies. "For geeks like me, data integration and analytics are an end to themselves. But there always needs to be a business driver, because data integration costs money. Companies that run their Industrial Internet projects as technology-projects-for-the-sake-of-the-technology will fail. This is about changing business models."

Sharing the data for mutual benefit

Willcox notes that the idea of "as a Service" (aaS) business models is not new, but that the increased transparency and visibility that data sharing and integration enable, makes these business models more feasible and creates value for both supplier and customer. "We have a mining customer who captured sensor data from their excavation vehicle fleet and so came to understand that the manufacturer-recommended service strategy was resulting in unnecessary failures. They got money back from the Supplier - and the Supplier got an understanding of real-world usage patterns of their equipment that enabled them to build better and more profitable products. Both companies ultimately won."

To take full advantage of the Industrial Internet opportunities, Willcox advises manufacturing companies in particular to think first about what business they will be in 5 years from now - and to identify the processes and KPI's that will be critical to optimising *that* business. "For example, will your principal business be the manufacture of food processing equipment - or in processing food on behalf of your customers? Wherever possible, you should invest in data that will support the processes that are likely to be important to your business tomorrow, not only in the data that is important to your business today."



"The big challenge today is instrumenting products and processes to capture data."

Start by mapping value and data availability

A lot of companies have already started on their Industrial Internet journey, but Willcox says that it's not late for the foot-draggers to catch-up. "Erik Brynjolfsson at MIT likes to point out that his research demonstrates conclusively that 'digitisation is not a great equalizer that drives all companies toward similar processes and outcomes, but rather that it is driving the leaders and laggards further apart. We know what many of the early-adopters are facing a period of scrap and re-work of their stovepipe systems if they want to realize the really big benefits that are associated with integration and optimization across functional boundaries. So the race may have started, but it ain't over yet."

Willcox advises companies to start by profiling potential use-cases by their value and by the availability of the data required to support them, so that they can understand which of the high-value use-cases will be easiest to implement. "When you have identified the quick wins, go after them aggressively - but do so by building-out a scalable, sharable data platform that simplifies and accelerates

the deployment of the next set of use-cases - and the next, and the next - and so on and so on." In this way, companies create a virtuous circle by establishing a shared data asset that makes use-cases that are harder to implement today easier to deploy tomorrow, because much of the data that are required to support them have already been captured and integrated. ■



Martin Willcox has worked with IT and industrial internet applications for 19 years. He currently leads Teradata's Big Data Centre of Excellence. He has worked at Teradata since 2004 in pre- and post-sales consultancy roles with organization's undertaking major business intelligence projects in retail, manufacturing, telecommunications and financial services. He is passionate about using data and analytics to improve business performance. He is also one of the Keynote speakers at Valmet Customer Days 2016.

Around the world

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

Automation technology for Dunbar energy recovery facility in Scotland

Valmet has signed an agreement with Babcock & Wilcox Vølund A/S to supply automation technology for the new Dunbar energy recovery facility (EFR) in East Lothian, Scotland, UK. Advanced automation solutions will make it possible to efficiently control the renewable energy recovery process and to manage plant operations.

Moisturizing technology to SAICA's corrugated board converting plants

Valmet will supply two Valmet IQ Moisturizer systems to SAICA's corrugated board converting plants in El Prat, Spain, and Beaulac, France. By installing Valmet's moisturizing technology, SAICA's plants will be able to reduce corrugated board warping and consequently reduce waste and improve productivity in their converting processes.

Papeterie du Bourray replaces its control system with Valmet DNA

Arjowiggins' Papeteries du Bourray graphic papers mill in France has ordered a Valmet DNA distributed control system (DCS) for PM 1 to replace an earlier control system that is reaching end-of-life. The delivery includes engineering, installation supervision, training and commissioning.



Valmet invests in production of seamed press felts

Valmet develops its paper machine clothing production plant in Tampere, Finland by investing in press felt production. The investment is done in order to improve the product technology and production capacity of seamed press felts for the paper, board, tissue and pulp drying machines. Seamed felts improve safety and efficiency and are faster and easier to install compared to endless felts.

Valmet Customer Days in Stockholm

Valmet's Customer Days will be held in Stockholm, Sweden, on October 19-21. The event will include presentations of the latest pulp, paper and energy technologies.

Hengan started up their tissue machine ahead of schedule

Hengan's 19th tissue machine, an Advantage DCT 200HS tissue line successfully started up in August in Wuhu, Anhui province in China. The installation and commissioning were performed in record time and the start-up went very smoothly. The new tissue machine adds another 60,000 annual tonnes of tissue products to Hengan's current production of more than one million tonnes per year.

Meet Valmet at Energia 2016

Come to meet Valmet at Energia 2016 at Tampere, Finland, on Oct. 25-27.

Meet Valmet at Waste to Energy Asia Summit

Come to meet Valmet at Waste to Energy Asia Summit in Bangkok, Thailand, on Dec. 1-3.

Meet Valmet at ABTCP

Come to meet Valmet at ABTCP exhibition in Sao Paulo, Brazil, on Oct. 25-27.

Valmet inaugurates new logistics center in Brazil (kuva)

Valmet inaugurated its logistics center in the city of Araucária, in Paraná state in Brazil. The center is Valmet's fifth logistics center globally and serves the pulp, paper, fiber board and other industries across South America with spare parts and components produced by Valmet and its local suppliers. The new logistics center will help to secure the reliability and efficiency of customers' processes in South America.



Valmet IQ for new extrusion coating line of Metsä Board Husum

Metsä Board has ordered Valmet IQ quality control systems (QCS) for the new extrusion coating line to start in the first half of 2017 at its Husum mill. This order follows the recent start-up of Valmet IQ QCS on Husum's new BM 1 board machine and off-line coater.

Rebuilt paper machine started up at VPK Paper

After a comprehensive rebuild, the paper machine PM 6 at VPK Paper's Oudegem mill in Belgium has been successfully started. The rebuild in the forming, drying and reeling sections will lift up PM 6's production capacity from approximately 185,000 t/a to some 200,000 t/a of high quality packaging grades.



ITC Bhadrachalam to carry out an extensive board machine rebuild

Valmet will supply an extensive board machine rebuild and automation solution for machine and quality control to the ITC Bhadrachalam mill in India. The delivery includes all the key technologies from headbox to reel and automation for machine and quality control. The machine features number of leading technologies delivered exclusively by Valmet.

Automation technology to Sabah in Malaysia

Valmet will deliver automation technology to Sabah Electricity Sdn. Bhd.'s (SESB) Patau-Patau power plant on the island of Labuan, Malaysia. The plant's existing automation system will be replaced with modern technology that integrates boiler, feedwater and turbine control into one Valmet DNA automation platform. Modernization improves process controllability and availability.

Heze Baishida Wood orders a defibrator system

Valmet will deliver a defibrator system to Heze Baishida Wood Co., Ltd in China. This is a rebuild of an existing fiberboard line at the mill in Sunlaojia town. After the rebuild the mill will produce 18 tonnes per hour bd (bone dry) fiberboard. The start-up is scheduled for January 2017.

Moisturizer system to Zhejiang Dongda

Valmet will supply a moisturizer system to Zhejiang Dongda Paper Co. Ltd. in Hangzhou, Zhejiang Province, China. The new solution, Valmet IQ Moisturizer, will enable the mill to improve board quality on its paper machine PM 2.

About Valmet

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



A group of Valmetees from the Indonesian country management and Service business line as well as legal and sustainability functions made an assessment of Valmet's new service center site in Cikarang, Indonesia.

Ensuring responsible business operations wherever we operate

Valmet's new services center investment in Indonesia was assessed to ensure it is carried out in a responsible manner along with comprehensive stakeholder dialogue.

In mid-May, a group of Valmetees from the Indonesian country management and Service business line as well as legal and sustainability functions made an assessment of Valmet's

new service center site in Cikarang, Indonesia. The target was to ensure that we meet the principles set out in our Code of Conduct and the related policies such as Valmet's Health, Safety and Environment (HSE), Anti-Bribery, and Sustainable Supply Chain policies. The assessment covers ethical business practices, human and labor rights, health and safety, and environmental management topics.

"This kind of assessment is particularly important in cases such as the new service center investment, where our market presence significantly expands and might have wider environmental and social impacts on the surrounding community than before," says **Laura Puustjärvi**, Head of Sustainability at Valmet.

Active engagement with local stakeholders was key to the evaluation. The project team met with local Valmet employees,

municipal leaders, an NGO and representatives of the business park. The discussions helped to learn about current practices and the stakeholders' expectations of Valmet.

"In the project preparation phase, we already cover a number of topics. Including sustainability-related aspects in the process helps us to more comprehensively evaluate the situation and define areas that might need more attention," says **Pekka Kivioja**, Project Director for the Indonesian services center.

"For example, people from surrounding villages might have expectations of us regarding potential employment modes or how we plan to manage the environment in terms of noise, water and waste emissions," Puustjärvi explains. "The assessment helps us to recognize our economic, social and environmental impacts and act upon it."

Code of Conduct

Valmet's Code of Conduct sets the standards of responsible behavior for Valmet's employees and its partners, and creates a uniform foundation for all our ethical business transactions and work assignments.

All Valmet employees completed an updated Code of Conduct training in 2015.

Valmet maintains its position among the world's sustainability leaders

On September 8, 2016, Valmet was included in the Dow Jones Sustainability Index (DJSI) for the third consecutive year. The company is listed in both the Dow Jones Sustainability World and Europe indices.

"Maintaining our position in the Dow Jones Sustainability Index is an excellent achievement for Valmet. It proves that we have been able to improve our sustainability performance year by year, which is a key criteria for inclusion. We have systematically proceeded with our sustainability agenda, and by doing so we have achieved many concrete results. We will now continue this work by implementing our updated sustainability action plans for the next three years," says **Pasi Laine**, President and CEO of Valmet Corporation.

The company's inclusion is based on a best-in-class approach, which means that the indices only include the top ranked companies in each industry. The evaluation comprehensively reviews the company's performance with regard to social, environmental and financial factors. In total 316 companies were included in DJSI World for 2016-2017.

Read more: <http://www.sustainability-indices.com/>

MEMBER OF
Dow Jones Sustainability Indices
In Collaboration with RobecoSAM

New services center in brief

- Located in the island of Java
- Will be fully operational at the beginning of 2017
- Strengthens local presence and services offering
- Will serve Valmet's pulp, paper and energy customers throughout the Asia-Pacific area

Forward

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Valmet's customer magazine

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We invite you on a Shared Journey Forward



We are on a journey towards providing the best services experience for you. To keep your processes running smoothly and to optimize your production, explore our reliability and performance services. Our new technologies and industrial internet solutions upgrade your processes to the next level. On our Shared Journey Forward, we are committed to putting safety first, working close to you, earning your trust and providing the right solutions to your needs. Step on board at valmet.com/sharedjourney

