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Forward

VALMET'S CUSTOMER MAGAZINE | 1/2017



A service agreement is a
joint commitment

Editorial

Together at the core of the circular economy

Last year, we sharpened our view of key megatrends and identified three large changes taking place. We named the first of these megatrends “Resource efficient and clean world,” which means that climate change and the scarcity of global resources are driving a global need to use resources more efficiently and to reduce emissions.

Circular economy thinking is directly linked to this megatrend. It aims to keep products, components and materials in a continuous cycle instead of disposing of them. The cases in this magazine provide you with good examples of how we together promote the circular economy in practice every day. We improve energy and raw material efficiency in the production processes, enable the use of a wide range of renewable fuels in multifuel energy boilers, and focus on chemical and energy recovery in the pulp-making processes.

The design of our production machinery enables flexible re-use and conversions, and the lifetime of equipment can be significantly prolonged with well-planned maintenance and partial replacements of production assets. Furthermore, Valmet's 16 technology centers give you the opportunity to develop and pilot your new products. This shared use of assets is also an example of the circular economy in practice.

We are at the core of the circular economy in many ways. Let's continue moving forward together in contributing to a resource-efficient and clean world.

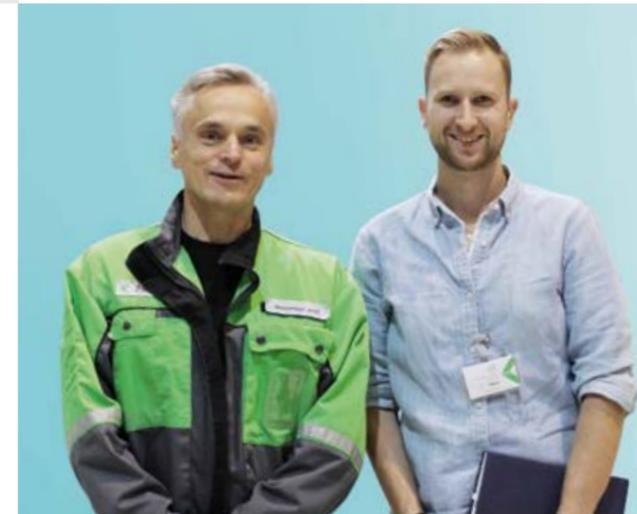


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In brief



Four tissue lines started up within three months at Lee & Man Paper

Four Valmet supplied tissue lines have been successfully started up at Lee & Man Paper Manufacturing's Chongqing mill in China within three months. The new lines, which are designed for production of high quality tissue products with low energy consumption, were all producing saleable paper from the very start.

Previously Valmet has installed an Advantage DCT 200 tissue line at the same mill in 2015. All five machines are equipped with advanced tissue technology to reach high quality with lowest possible energy consumption.

"The new lines bring a welcome contribution of 240.000 tonnes of new capacity to our production of consumer products. They will fulfill our requirements for new capacity," says **Raymond Lee**, Chairman, Lee & Man Paper.

Valmet to adopt 3D printing technology

Valmet is one of the first technology suppliers to the global pulp and paper industry to adopt 3D printing technology in its manufacturing processes to shorten lead times.

"3D printing is an excellent example of an emerging technology that has huge potential to be exploited widely in Valmet. We have taken a big step towards offering next-generation products without being limited by yesterday's production processes," says **Ari Saario**, R&D Director at Valmet.

At its new 3D Competence Center in Sundsvall, Sweden, Valmet has successfully used this technology to manufacture molding patterns and selected spare parts.

Three board machines to be rebuilt in North America

Valmet will supply three board machine rebuilds in North America. The customers remain confidential. The start-ups are scheduled for 2017 and 2018.

"Due to large installed base of paper and board machines in North America and their ageing trend of lightweighting in board production. Additionally our customers want to increase the use of recycled and non-bleached fibers," comments Sales Director **Jari Siitonen** from Valmet.

Valmet's automation to the new Ferrybridge 2 waste-to-energy facility in UK



Inova AG (HZI), the engineering, procurement and construction contractor for the facility. This is the tenth time that HZI has chosen Valmet's automation technology for its waste-to-energy plant projects.

"HZI is pleased to continue its cooperation with Valmet, building on our long-standing relationship and the earlier success of both Ferrybridge 1 and previous projects," says **Douglas Else-Jack**, Head of Supply Management at HZI.

Valmet enhanced its Valmet IQ solutions

Valmet has introduced a completely renewed version of its Valmet IQ Web Monitoring System, which is an integral element of the Valmet IQ Process and Quality Vision System. The web monitoring system is now more compact in size. Its enhanced features provide pulp and papermakers with higher-quality images than before for analysis purposes, enabling them to take virtually instantaneous corrective measures. These features maximize production line efficiency and product quality.

"We have made major changes to our web monitoring system when it comes to its camera, LED light and system structure. These improvements enable papermakers to focus faster on specific web problems and avoid profitability losses," says **Aki Torvinen**, Business Manager of Valmet.



Evaporation plant to Arkhangelsk in Russia

Valmet will supply a new evaporation plant, a combustion plant for gases generated in the production process and related automation systems for Arkhangelsk Pulp and Paper mill in Novodvinsk, Russia. The delivery will be part of execution of the second stage of the mill's priority investment project.

The delivery will include two new evaporation trains for liquors from kraft pulp cooking and semi-chemical pulp cooking processes, systems for collection, handling and combustion of gases and a new automation system to control the processes. The start-up is scheduled for 2019.

"The new evaporation plant construction, as well as other projects within the scope of the priority investment project, will be performed in order to optimize existing technologies and implement best available technologies (BAT) to reduce the formation of pollutants in the process cycle," says **Dmitry Zylev**, General Director, Arkhangelsk Pulp and Paper Mill.

Key technology for Sun Paper's new dissolving pulp mill in Laos

Valmet will deliver key technology for a new greenfield dissolving pulp mill to Sun Paper's new investment in Muang Phin, Laos. The target is to start pulp production during the second quarter of 2018.

"This is our first international investment where we are expanding beyond China. Laos has shown to be a good location for this mill from where we will supply high profit dissolving to China," says **Liu Yanbo**, Mill Manager at Sun Paper.

The delivery comprises key technology including batch cooking with engineering package, brown stock and bleaching presses for the fiber line, wood powder firing, belt dryer and lime kiln. Valmet also establishes site services for all goods delivered.

The future energy system calls for flexibility

Valmet played a major role in the FLEXe (Flexible Energy Systems) program that aimed at creating new technological and business concepts that enhance the transition from current energy systems towards sustainable ones.

The research carried out by Valmet, Tampere University of Technology and Technical Research Centre of Finland Ltd proved that it will be possible to increase flexibility and predictability in traditional energy production plants with Valmet's automation, control and process solutions and thus meet the requirements of the future energy system.

There is a lot of flexibility potential especially at CHP plants that link electricity and heat networks. If needed, district heat networks and their heat reserves can be utilized in optimizing electricity production.

Renova started up an Advantage NTT tissue machine

The Portuguese tissue manufacturer Renova produced its first Advantage NTT jumbo roll on January 20, 2017. The Portuguese family-owned company was the first European tissue producer to invest in Valmet's Advantage NTT technology. They will use the hybrid technology to produce both plain and textured tissue.

Renova is known for its tissue products in bold colors like black, red, pink and green. The paper is exported to countries such as USA, Canada, Japan, France and Spain. The Renova PM 7 start-up is Valmet's fifth Advantage NTT start-up so far.



A multifuel power boiler and flue gas cleaning system to Japan

Valmet will supply a multifuel power boiler and flue gas cleaning system to the Japanese company JFE Engineering (JFEE). This is Valmet's first multifuel boiler delivery to the Japanese market.

In 2015, Valmet and JFE Engineering signed a long term cooperation agreement to enable joint growth in Japanese energy market. The agreement combines Valmet's high efficiency technology solutions with JFEE's strong market presence and capability to supply EPC power plants.

This is JFEE's first EPC (engineering, procurement and construction) project based on the cooperation agreement. The boiler will be installed for MPM Oji Eco Energy Corporation (MOE) at the Mitsubishi Paper Mills Limited plant in Hachinohe city, Aomori prefecture in Japan.

CUSTOMER'S VOICE

Moving forward together

A Service Agreement is a joint commitment for a

shared journey

Valmet's experts have decades of experience from working with customers around the world. A Service Agreement is one way to benefit from this experience and get Valmet's professionals as part of your team. Whatever your need, they are committed to serving you - from spare parts to optimizing the whole process.

TEXT Marianne Valta

A Service Agreement is always negotiated individually between Valmet and the customer – they are tailored to meet every customer's needs. Agreements may cover only small parts of a customer's business, or they might be aimed at improving processes or overall performance and reliability. The solutions are based on Valmet's wide offering of process technology, services and automation. The scope of the agreement might be big or small, but the goal is always continuous improvement.

People building trust

A Service Agreement is based on an aligned way of working together for shared goals.

“Success always comes from people. Our target is to keep up a constant dialogue and build durable relationships with our agreement partners. We are committed to our customers' goals, and we always put in the extra effort in order to succeed,” says **Petri Lakka**, Vice President, Concept Development, Services business line at Valmet.

Signing an agreement with Valmet means that the customer benefits in many ways. Valmet's experts work as part of the customer's team or are available through over 120 service centers and remotely. Online services guarantee assistance 24/7, if needed.

“We have been working for decades to solve our customers' challenges, and our experts have built up vast knowledge over the years. We aim for effective execution and fast decision-making, which means savings in time and money. When our experienced professionals join forces with customers' experts, it often leads to innovations, too,” Lakka continues.

A Performance Agreement guarantees peace of mind

One of Valmet's agreement types is called the Performance Agreement. It is a step-by-step improvement program designed to improve and maintain the customer's competitiveness and profitability throughout the operations.

“Typically, a Performance Agreement aims at, for example, availability and productivity improvements, energy savings and financial development. Agreements are always tailor-made and tied to that customer's key performance indicators. An agreement with us gives our customers peace of mind, because it is in our interests to move our customers' performance forward,” explains **Toni Mäcklin**, Global Sales Manager, Service Agreements at Valmet.

A Service Agreement with Valmet is like a journey with a reliable companion: it makes the travelling easy, predictable and safe. And, as with good friends travelling together, there is always room for good ideas along the way. ■

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A beautiful avenue leads to the Ahlstrom Saint-Séverin mill.

Shared journey towards maintenance efficiency

Maintenance is not an island that you can execute, plan and develop separately from production. When analyzing the effectiveness and cost competitiveness of mill maintenance, the availability targets must be taken into account. Ahlstrom Corporation and Valmet have worked together to develop Ahlstrom's maintenance methods and improve maintenance efficiency. TEXT AND PHOTOS Heli Kankare

Two years ago, Ahlstrom started a three-year project to synchronize maintenance procedures and lower overall maintenance-related losses. The goal is to systematically improve and develop maintenance efficiency and to find a corporate-level way to work.

Ismo Uronen, Engineering and Technology Manager at Ahlstrom, is responsible for the maintenance improvement project covering the whole Ahlstrom Corporation. He explains why Ahlstrom chose Valmet to help them: "For us, Valmet's concept was the best. It was very hands-on - less theory, more real actions. Valmet had the right team right from the beginning. They had a solid understanding of what needs to be done and what kinds of results we can expect with those actions."

Cooperation agreement to develop mill maintenance

Ahlstrom produces innovative, fiber-based materials with functions in everyday life, in applications such as filters, medical fabrics, life science and diagnostics, wallcoverings, tapes, and food and beverage packaging. Ahlstrom has 28 mills around the world.

"For us, Valmet's concept was the best. It was very hands-on - less theory, more real actions."

In spring 2015, Ahlstrom and Valmet signed a cooperation agreement to develop maintenance at Ahlstrom's mills by providing selected auditing and expert assessment services.

Toni Mäcklin, Global Sales Manager for Service Agreements, has been involved throughout the project and worked with Ismo Uronen in every mill. Toni Mäcklin talks about the uniqueness of Ahlstrom's processes: "For me, this has been an exciting journey. I have been a papermaker all my life, and with this project I have seen special technologies like electrostatic coating and nano-coating. This has been challenging, educational and interesting, all at the same time. Ahlstrom is an innovative



↑ Examples of the end products from the Ahlstrom Saint-Séverin mill.



↑ Ahlstrom uses special production processes for its special product range.



company with a very active R&D department, and they also constantly develop new technologies for production."

Best practices at every mill

Ismo Uronen explains that the way of working with Valmet in this project develops all the time. Both parties are learning during the project, which is providing new possibilities: "In the couple of first mills we went through, there were several Valmet people on board, but since then we have learned more about our systems, and Toni's and my know-how have improved, and this year just the two of us have been conducting these mill studies."

He continues about the targets: "Project targets are defined yearly. We have found out that there are some mills that already have very high efficiency, and from those we can learn what they do well and deliver the know-how to other mills. For example, our Saint-Séverin mill is very efficient. The mill produces special, high-quality grease-

proof paper for several kinds of applications. Overall maintenance-related losses are among the lowest in the company.

Part of the success is that the mill is like a small family business in the French countryside, and they run it like that. People are committed to its success, so they go the extra mile."

Toni Mäcklin continues with an example: "In the mills we have visited this year, we have had group meetings for maintenance and operation personnel. They noted down the improvement needs and possibilities they had observed, and we created improvement lists. There were several small things that will bring value to the mills."

It's about the people

Toni Mäcklin has a clear vision of the key to great maintenance results: "We have to remember that the performance of the maintenance organization largely depends

↑ The overall maintenance-related losses at Saint-Séverin mill are among the lowest at Ahlstrom, which Toni Mäcklin (left) and Ismo Uronen are happy about.

on the capabilities and commitment of the maintenance people. Maintenance costs are like an insurance policy: the more you spend, the better availability you are expected to get. The important thing is to find the right balance for every mill. When high availability is needed, then more input is also needed for preventative maintenance.”

The cooperation agreement is also about the people. Ismo Uronen is very satisfied with the cooperation with Valmet, and especially with Toni Mäcklin: “Toni has organized everything from the Valmet side. His solid experience has made my work easier. I can honestly say that there have always been the right Valmet people in the right place at the right time. I think Valmet has really succeeded in this project.”

Mill output is the best indicator of maintenance efficiency

Ismo Uronen explains what he has learnt about mill maintenance: “The key lesson from the project so far has been that the mill has to be developed as one team, not maintenance and operations separately. In the end, the best indicator of maintenance efficiency is the production output. It is also the only indicator that can be clearly

demonstrated. Our goal is comprehensive mill development.”

“We now have better capabilities to find common practices for mills with similar equipment and to achieve, for example, savings on spare parts. During this project, we have been able to move our maintenance structure in the right direction: towards more planned maintenance and fewer unplanned shutdowns. Savings on maintenance can't be just cutting down the money. Improving maintenance efficiency is actually an investment that generates savings,” ends Ismo Uronen. ■

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➔ “Toni has organized everything from the Valmet side. His solid experience has made my work easier,” says Ismo Uronen (left).



Kuopion Energia walks the talk

At the final stage of a massive investment program spanning several years, Kuopion Energia Oy looks confidently towards the future. Its Haapaniemi CHP power plant is a true showcase of Valmet’s boiler, air emission control and automation technologies. **TEXT** Marjaana Lehtinen

The year of 2016 marked the 110th anniversary of Kuopion Energia, a producer of electricity and district heat in Kuopio, Eastern Finland. The company is a modern energy services provider who takes responsibility for the environment – and walks the talk, too.

“The need to invest in our Haapaniemi power plant and modernize it emerged when our pulverized peat-fired Haapaniemi 1 unit, dating from 1972, began to reach the end of its life cycle. As Valmet’s price and technology fulfilled our criteria best, we chose it as our new multi-fuel fired power boiler,” says **Peter Seppälä**, Director, Haapaniemi Power Plant, Kuopion Energia.



Featuring a 149 MW_{th} power boiler based on circulating fluidized bed (CFB) technology, the Haapaniemi 3 unit was started up in late 2011. It is designed for a flexible fuel mix. “In addition to peat, we are now able to use biofuels, mainly forest residues. Our initial target was to increase the use of biofuels slowly, but we ended up maximizing their use already during the first year due to the poor availability of peat,” Seppälä continues. “Our experience with the boiler has been positive, and it runs quite reliably. Our fuel mix varies: in the summer, we use more biofuels and in the winter, more peat.”

Boiler conversion to lower emissions

A few years later, the focus changed to the pulverized peat-fired Haapaniemi 2 unit, dating from 1982. Something had to be done since the Industrial Emissions Directive (IED) tightened its emission requirements radically with effect from January 2016. “We decided to carry out this investment in two phases, first dealing

with the NOx emissions and then with SO₂ and dust emissions. Until the very final stage, we had two options: either to convert the boiler to fluidized bed technology or equip it with low-NOx burners,” Seppälä explains. “One major factor that favored conversion was that it would lower total costs, since it would enable the use of forest residues. Although its investment cost was higher than that of low-NOx burners, profitability would be better in the long run.”

So in 2013, Valmet converted Haapaniemi 2 to fluidized bed technology. The scope covered modifications in pressure vessels, new air, ash and fuel systems inside the boiler house as well as new superheaters and a new economizer. After the conversion, the boiler’s NOx emissions have been lowered to the required level.

‘Free’ heat from flue gases

To deal with SO₂ and dust emissions at Haapaniemi 2, Kuopion Energia ordered a flue gas scrubber from

Peter Seppälä, Director, Haapaniemi Power Plant, Kuopion Energia: “We have strong faith in our investments. In the long run, they will be profitable and take us far into the coming decades.”

“Our experience with the boiler has been positive, and it runs quite reliably.”

Valmet. The delivery scope in 2015 included a modernization of the stack and the flue gas fans as well as an extension of the service life of the existing electrostatic precipitator. This investment resulted in lower SO₂ and dust emissions that now meet the tighter IED limit values.

An additional bonus brought by the flue gas scrubber is its heat recovery that significantly increases the plant’s energy efficiency and district heat production capacity. According to Seppälä, heat recovery from flue gases at full capacity is up to 60 MW, corresponding to around 200,000 megawatt hours in terms of annual energy. This ‘free’ heat production capacity lowers the total fuel need in Haapaniemi and partly replaces the need for oil-fueled heating plants at peak loads.

All operations under one automation system

All plant operations at Haapaniemi are controlled with Valmet’s automation technology. Kuopion Energia has been a forerunner in power plant automation and one of the first in the world to have installed a digital automation system – Damatic Classic – with a high-tech operator interface for Haapaniemi 2 in the early 80s. In 2005, the system was upgraded to Valmet DNA.

“When we chose the automation for Haapaniemi 3, it was both sensible and cost efficient to control the unit with the same system as Haapaniemi 2, as they are operated from one control room,” Seppälä points out. Harmonized power plant automation also benefits maintenance since fewer spare parts are needed.



Kuopion Energia produces electricity and district heat with its Haapaniemi 2 and 3 units. All plant operations at Haapaniemi are controlled with Valmet’s automation technology.

In addition to a Valmet DNA automation system, Valmet delivered a safety system for the Balance of Plant, a turbine controller for Skoda’s steam turbine and an electrostatic precipitator control to Haapaniemi 3. To run the combustion process in the most optimal way, the automation system has been complemented with Valmet’s advanced control solution, FBB Combustion Optimizer. The same application is also used for boiler capacity optimization. For superheater corrosion control, Haapaniemi 3 uses Valmet’s FuelDiet KCI Corrosion solution.

To get the full benefit from integrated automation, Kuopion Energia has modernized the automation of its district heating plants. Valmet has replaced outdated automation and remote control systems with Valmet DNA technology at the company’s six district heating plants, three district heating containers and 11 pumping stations. Most of the new separate subsystem has been connected already to the Haapaniemi power plant’s automation system.

All set for the future

According to Seppälä, Kuopion Energia looks confidently towards the future: “We have strong faith in our investments. In the long run, they will be profitable and take us far into the coming decades.” To ensure high plant performance, the company has signed a development agreement with Valmet for the flue gas scrubber, boilers and automation. ■

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Kuopion Energia looks confidently towards the future. “We have strong faith in our investments, they will take us far into the coming decades,” says Peter Seppälä (on the right). Together with him are Kimmo Pitkänen and Pasi Voutilainen from Valmet.

Lightness is the primary feature when Stora Enso Ingerois develops its Tambrite products.

Stora Enso Ingerois mill:

Making it lighter

Lighter board with better strength properties and lower cost with higher quality: this is the reality for board makers. The market is demanding somewhat contradictory properties from the produced boards. **TEXT** Pauliina Purola

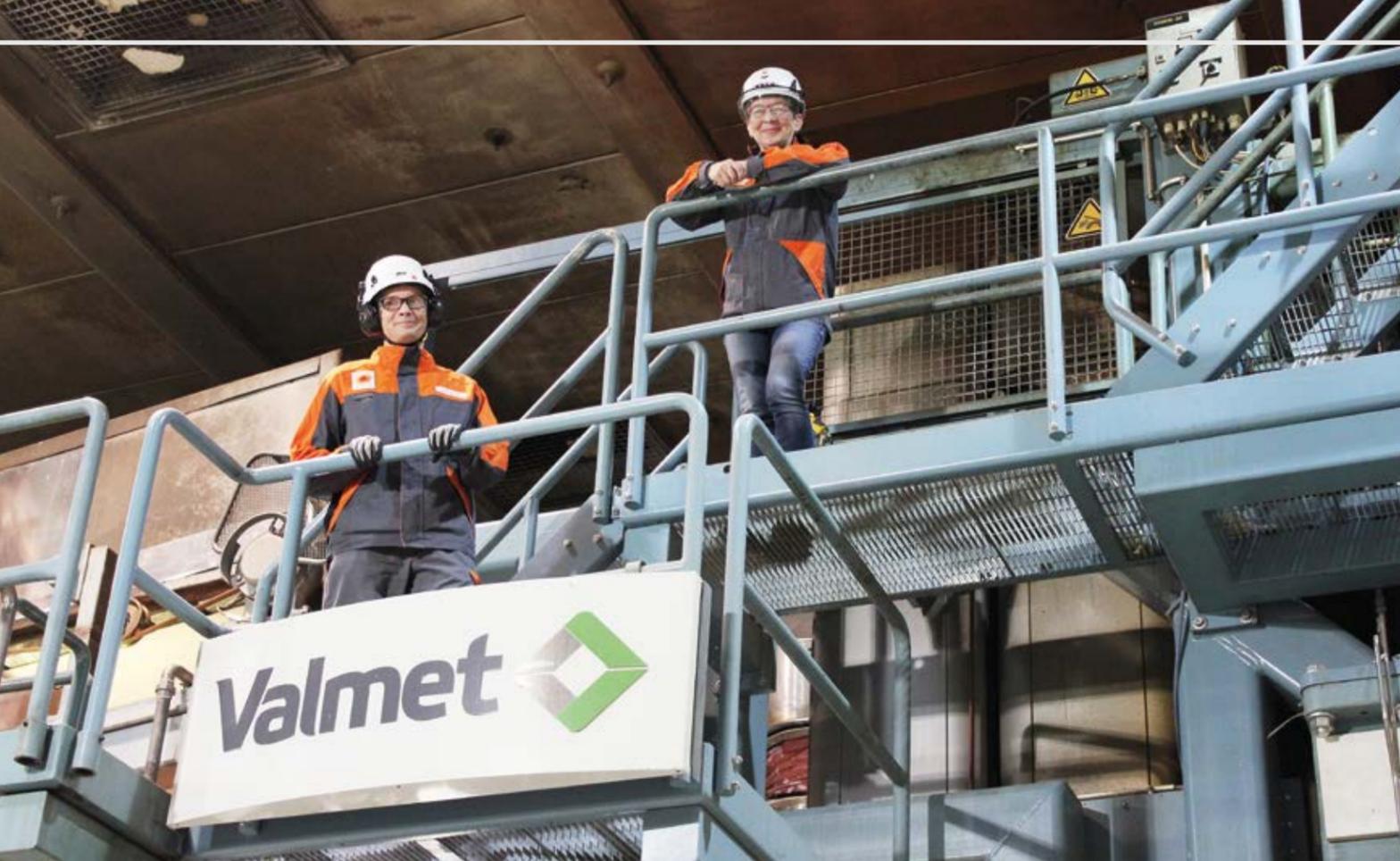
Stora Enso's Ingerois mill in Finland has been improving lightness and bulk for decades. The folding boxboard product brand Tambrite by Stora Enso has always met the needs of the market. Tambrite's long history means it has also been the one creating the requirements, since it was among the first to focus on lightweighting. Valmet's new aqua cooling calendering is another step towards making Tambrite even lighter.

Tambrite's story is fascinating. The main goal set 30 years ago remains the same. First it was about being profitable and a pioneer; later it was about sustainability and meeting the needs of the market. Lightness was – and remains – the primary feature when Stora Enso Ingerois develops its Tambrite folding boxboard products.

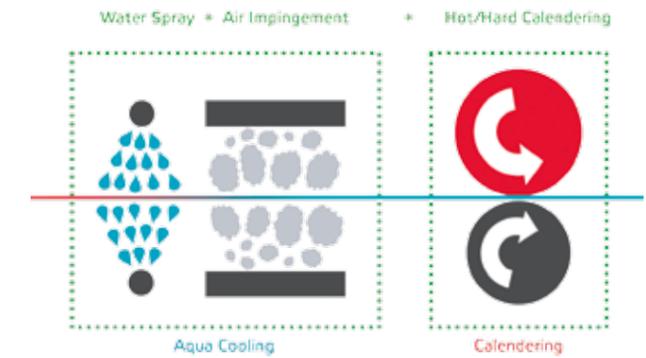
Answer plays hard to catch

Never settling for just maintaining the status quo, Ingerois is continuously looking for ways to improve Tambrite. This time, the focus was on the board-making process. The mill wanted to substitute the Yankee process and Yankee cylinder with a process less restrictive on productivity and speed. The decision was made to find a new bulk-saving calendering process and bypass the Yankee cylinder.

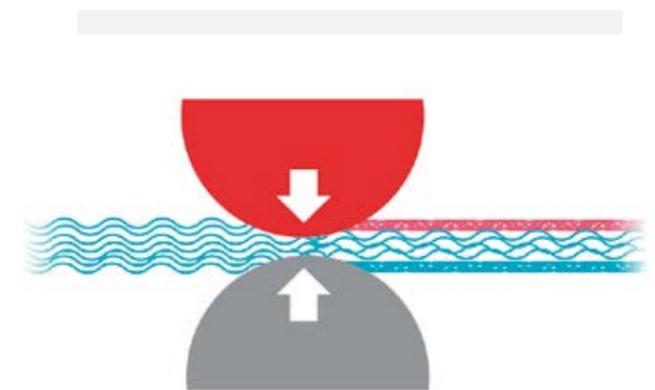
Sometimes the answer lies right in front of you, but finding the means to get there is the tricky part. "We have pilot facilities at Järvenpää to test calendering. We knew that pilot calendering always delivered better bulk than normal, mill-scale production: the cooler the web, the better the bulk," says Development Manager **Mika Viljanmaa** from Valmet. It took a while before the idea really struck: cooling the web with water and cool air.



Aqua cooling calendering: New way to save bulk in board-making



THE PRINCIPLE OF AQUA COOLING CALENDERING: First, apply water, secondly, evaporate the water and cool down the web with cool, dry air, and thirdly, calender the web.



CALENDERING EFFECT: The web surface undergoes thermoplastic deformation. The inner parts of the web maintain their elasticity and bulk by sustaining the lower temperature.



Aqua cooling calendering has aroused a lot of interest. In October, members of the Association of Chemical Pulp and Paper Chemists and Engineers (the Zellcheming Association) visited the Ingerois Mill to hear about the new bulk-saving technology. The members commented that lightweighting is definitely a trend throughout the paper- and board-making industry.

Valmet's recently developed Aqua cooling calendering is an interesting approach to saving on bulk. The method is based on the fact that pilot calendering trials usually give a better bulk to surface smoothness ratio than results from an operational mill. The reason for this is that the paper or board web is colder in the pilot machine and hotter under actual mill conditions.

Aqua cooling calendering recreates the ideal pilot conditions at the paper mill by cooling the web before calendering. This effective cooling is done by applying a small amount of water to the hot paper web and immediately evaporating the water by blowing cool, dry air over it.

Raw material savings of 2–4%

When water is applied to a paper surface, the wetting delay time tells you how long it takes before the water starts to penetrate the paper. With Aqua cooling calendering, the cooling takes place within the wetting delay time, so there is no roughening of the paper surface and no fiber-to-fiber bonds are broken.

As the pilot trials confirmed, the entire thickness of the web is cooled, not just the surface. Since the calendering nip only heats the surface, the calendering effect is permanent only in the very top layers of the web. The inner layers are elastically recovered, and the bulk is saved. By preserving bulk, it is possible to achieve savings of 2–4% on raw materials.

Equipment is easy to use

The equipment for Aqua cooling calendering is suitable for both new paper and board machines and rebuilds. The OptiDry Chill aqua cooler unit used for blowing cool, dry air is a lot smaller in size than traditional air drying units, making Aqua cooling calendering ideal for rebuilds.

The equipment is very easy to use and maintain. "Apart from normal cleaning, we have not had to do any maintenance on the equipment in the year that it's been in operation. There has been some normal work with the fans and motors, though," concludes Stora Enso's Production Manager Antti Veitola.

some minor challenges related to the newly developed equipment. "In research and development projects, there are always some issues that cannot be predicted. However, all the problems were fixed," explains Viljanmaa. "Big companies like Stora Enso and Valmet may face extra challenges because R&D projects are integrated into the model of a normal project, and sometimes this is not the ideal way to operate. But with people working together, things work very well," Veitola says.

"We talk about bulk-saving potential instead of precise numbers. We are happy with the clear results. The results basically depend on how much cooler the web can be in these kinds of process conditions," Veitola explains.

With the improved lightness and stiffness properties of Tambrite folding boxboard, it is good to go forward. ■

Stora Enso's Production Manager Antti Veitola (left) and Product Development Engineer Erja Nevanperä are happy with aqua cooling calendering. It is difficult to see the rebuilt machine part with the very compact OptiDry Chill air cooling unit.

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Finding the solution together

After process modeling by Senior Development Engineer Jari Ilomäki and a few pilot runs, Viljanmaa decided to share the idea with Antti Veitola, Production Manager at Ingerois, and Product Development Engineer Erja Nevanperä. The board machine maker needed cooperation of a board producer.

After some more calculations and pilot runs, it took only a little time to convince the Stora Enso personnel that the new process was working. "The results of the pilot trials were convincing. There was a clear correlation between the web temperature and bulk," explains Veitola. "As a final check, we ran a number of different pilot trials to compare the effects," he continues. After being assured, it was just a matter of making things as fast as possible.

Making it lighter together

The first ever aqua cooling calendering system was installed at the Ingerois mill in the fall of 2015. There were

"The results of the pilot trials were convincing. There was a clear correlation between the web temperature and bulk."

Innovative tissue machine breast roll shell boosts

reliability and performance

Metsä Tissue's Mänttä mill targets to reduce unplanned roll changes on its TM 1 tissue machine and to extend roll running times with Valmet's grooved, countersunk breast suction roll shell. **TEXT** Marjaana Lehtinen, Kari Röyskö

In April 2016, Metsä Tissue's Mänttä mill installed a Valmet grooved breast suction roll shell on the twin-wire gap former of TM 1. It marked Valmet's fourth delivery of this innovative solution for a tissue machine.

The breast roll on TM 1 had previously been operated with a plastic shrink sleeve. "There were a lot of runnability and contamination issues on the breast roll. A few times a year, we had to clean the roll, remove dirt that had accumulated under the sleeve and repair damage to the sleeve. The sleeve became wrinkled, and yarns broke due to wear," says **Jyrki Pekkala**, Maintenance Manager at the mill.

In most cases, it was not even possible to repair the

sleeve. The roll had to be removed from the machine and the sleeve replaced. The typical running interval for a breast roll was less than a year.

"In the fall of 2015, the old breast roll shell reached the end of its life, and we had to acquire a new one. At the same time, we wanted to get rid of the unreliable sleeve. We chose Valmet's grooved shell solution based on its good experiences and performance with previous deliveries," Pekkala explains.

Good runnability, no hole shadow marking, no contamination

The grooved breast suction roll shell has been operating continuously on TM 1 since its installation. "Start-up went without problems. Runnability has been good, and the shell does its job well," says **Jyrki Leppäaho**, Development and Energy Engineer at the mill.

Before the start-up of the new shell, Metsä Tissue was worried that the suction roll without the sleeve would increase hole shadow marking on the paper. "We have now produced most of our tissue products on this machine, and we have not noticed any hole shadow marking that would lower paper quality," Pekkala remarks.

➔ The innovative groove pattern on Valmet's suction roll shell increases the shell's open area, and smooths the flow of water from the web to the shell grooves and countersunk holes. This makes it possible to use a sleeveless shell without reducing the quality of the paper.

Additionally, roll cleanliness is better than before since no dirt can accumulate between the shell and the sleeve. "We can also use high-pressure washing showers more freely, since we do not have to watch out for the sleeve," Leppäaho points out. According to the mill, running with a sleeveless breast roll has not increased wear on forming section fabrics either.

Aiming to expand running intervals up to 2½ years

So far, this new breast roll solution has not needed any maintenance.

"We expect to extend breast roll running and maintenance intervals from less than a year to up to two-and-a-half years. Since there will be no unplanned roll change shutdowns due to sleeve damage, we will get dozens of hours more running time every year," Pekkala continues. "We will consider this same solution for our spare breast suction roll, too, when its shell needs to be replaced. I can warmly recommend this solution to other tissue-makers who are having issues with shrink sleeves." ■

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Maintenance Manager Jyrki Pekkala (on the right) and Development and Energy Engineer Jyrki Leppäaho from Metsä Tissue's Mänttä mill are very happy with the performance of the new shell.

Grooved (countersunk) suction roll shell benefits:

- Higher reliability
- Longer maintenance intervals and savings on maintenance costs
- Easier roll cleaning
- Longer running intervals (fewer roll condition checks and change shutdowns)

Grooved suction roll shells have been used in forming roll positions on paper and board machines for quite some time. Valmet has delivered over 70 such shells around the world and is the first manufacturer to develop an application for a breast roll position on a tissue machine, too.

The new solution provides significant benefits for tissue-makers. Thanks to the innovative groove pattern, it is no longer necessary to use a damage-prone metal wire or plastic shrink sleeve on the breast roll. This results in better roll reliability and less need for maintenance.



Rethinking steam and combustion

Parengo, based in Renkum, Netherlands, has invested regularly in its paper production. One of the latest investments was to enhance its steam distribution with Valmet's solutions. TEXT Soili Städter

In 2015, Parengo made major investments to improve the steam production efficiency of its PM 1, which produces 270,000 tonnes of SC-B paper annually for magazines and brochures, and its PM 2, a packaging paper line with a 385,000-tonne capacity.

The steam is mainly produced by Valmet's HYBEX bubbling fluidized bed (BFB) boiler with a production capacity of 50 megawatt (MW) using biomass as fuel.

Hans Hietbrink, Assistant Line Manager, Pulp & Energy, Parengo, describes the project: "Our goal was to stabilize the steam network and pressure, and minimize the steam upload by using the steam accumulator more proactively."

Valmet's automation solutions enhance steam production

To reach the target, Parengo selected Valmet's automation solution that consisted of a Valmet DNA

"Our goal was to stabilize the steam network and pressure, and minimize the steam upload by using the steam accumulator more proactively."

Steam Network Manager, an Advanced Process Control (APC) application to stabilize the steam network. By using multivariable model predictive control, it controls several steam network variables simultaneously.

The delivery included Valmet's DNA FBB Combustion Manager, an APC application that uses fuzzy logic control to regulate several variables for optimized boiler combustion.

High biomass boiler output in key role

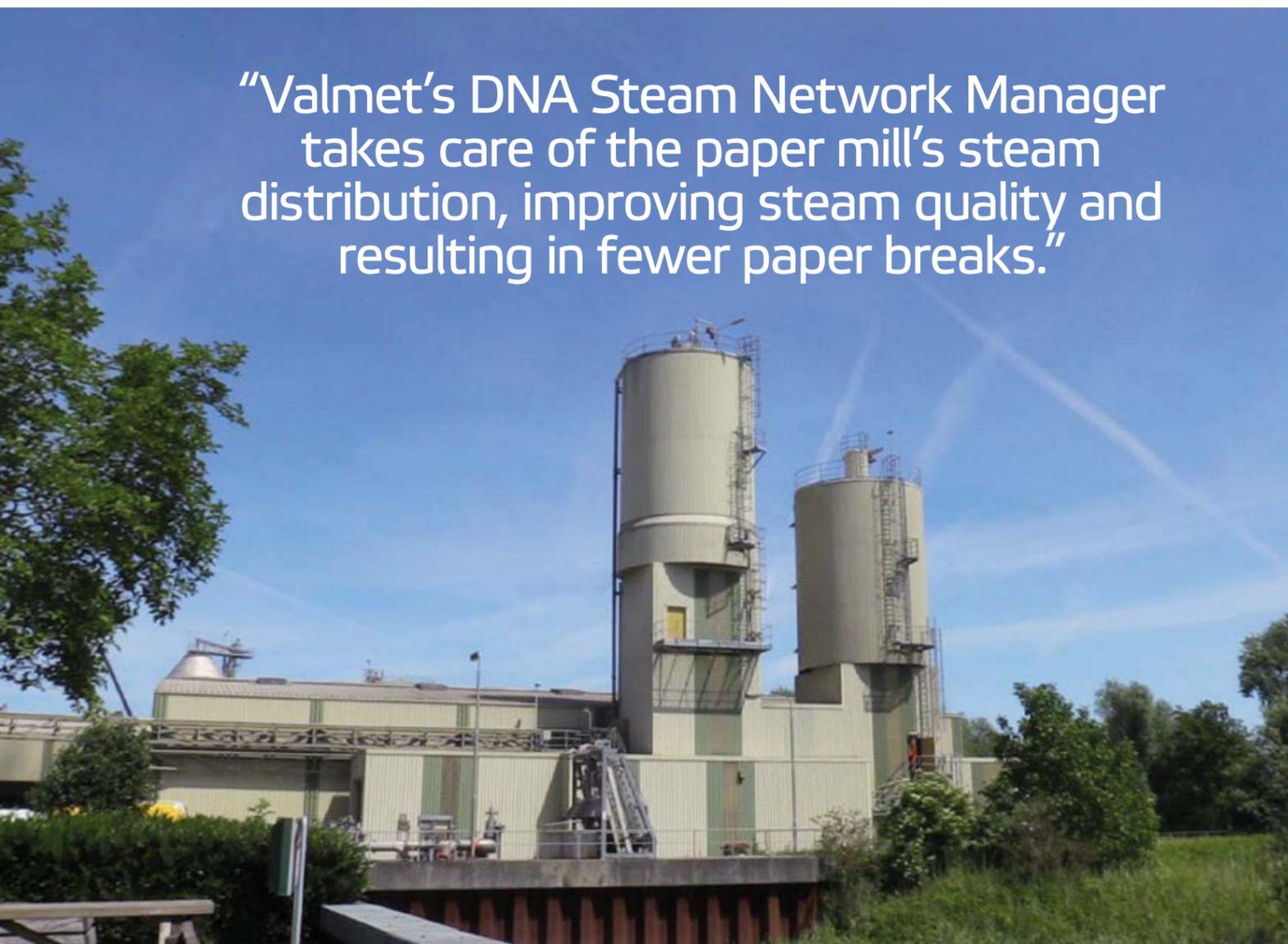
High biomass boiler output was especially important as Parenco aims to use its biomass boiler over its gas boiler.

The boiler load set points contribute to steam consumption. Now, the biomass boiler can supply the required load, and the steam accumulator compensates for the short-term steam balance. As a result, unnecessary gas boiler usage has dropped by over 70%.

"Valmet's DNA Steam Network Manager takes care of the paper mill's steam distribution, improving steam quality considerably and resulting in fewer paper breaks. That's why steam network stability is so crucial for us," Hietbrink explains.

The mill can manipulate the steam load set point in the biomass boiler and fuel feed set point in the gas boiler,

"Valmet's DNA Steam Network Manager takes care of the paper mill's steam distribution, improving steam quality and resulting in fewer paper breaks."



Operator Jeroen Liebrand (left) has received hands-on training for the new equipment. With him in the control room are Assistant Line Manager Hans Hietbrink (on the right) and Valmet's Sales Manager Stephan Wenzel.

while the HD steam pressure, MP2 steam pressure and steam accumulator pressure are controlled variables. With today's results, optimization of the whole steam production process is clear.

Combustion Manager stabilizes the process

Valmet's Combustion Manager application protects the process against variations in production, fuel amount and combustion. "Boiler efficiency has clearly increased with help of the DNA FBB Combustion Manager. NOx and CO₂ emissions have also been minimized," states Hietbrink.

Parenco must carefully follow emission limits and report the figures to authorities. "The application constantly checks hundreds of parameters that we have to track. Manually, this would be impossible. We have even reduced flue gas as one of those critical parameters," Hietbrink says.

Hands-on training for operators

By improved gathering and analyzing data, the mill can improve its efficiency and profitability. The APCs help the operators use the best operating conditions.

Stephan Wenzel, Valmet Sales Manager, explains: "It's very important the operators trust the APCs. They are not able to look at every variable all the time. That's why APCs are needed along with the DCS."

Valmet gave hands-on training to every operator. Jeroen Liebrand, a Parenco operator, confirms: "With Valmet's solutions, we can easily achieve maximum boiler performance. Hundreds of bits and bytes need attention. It's impossible to change the values every second. That's what the APC does, so we can be more efficient."

Enjoying the results

Parenco now enjoys the results. The desired ratio between the use of the biomass and gas boilers, minimized LD steam blow-out and many other advantages achieved with Valmet's solutions are helping the mill produce high-quality products at lower costs.

Hans Hietbrink is satisfied. "We have reached our main targets for the project. Valmet's experts have always been available for us, and I look forward to the next project with Valmet." ■

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PressPolar roll cover at Green Forest Paper

Eliminating bottlenecks

Reduced maintenance costs

The grinding intervals of the LNP rolls have been significantly extended at Green Forest Paper. Whereas previously the intervals for the rubber-covered rolls were eight months, it is now 15 months with PressPolar covers, thanks to their excellent wear resistance. This decreases grinding costs, too, as less grinding is needed, and it extends the cover lifetime, as there is less cover material loss. Other benefits include fewer machine shutdowns and improved machine efficiency.

Additionally, as there is no need for internal cooling water, maintenance costs and the risk of unexpected machine shutdowns due to failure of the cooling system are lower.

"We made the right decision"

"By replacing rubber covers with PressPolar covers on our LNP rolls, we have been able to increase the production speeds of our machines. We are very satisfied with the performance of PressPolar. It has proved that we made the right decision when we chose to cooperate with Valmet," concludes Wu.

Impressed by the excellent performance of the PressPolar cover, Green Forest Paper has replaced all the rubber covers on the LNP rolls of PM 1 and PM 2. To date, Valmet has supplied 11 PressPolar covers for them. ■

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By choosing an optimal roll cover for its highly loaded press rolls, the Green Forest Paper mill has managed to increase production, save energy and reduce maintenance costs.

TEXT Caifu Huang ja Marjaana Lehtinen

Green Forest Paper, located in the city of Qingyuan, in Guangdong Province, China, faced challenges with its paper machines PM 1 and PM 2. PM 1 mainly produces 100 g/m² high-strength corrugated paper, and PM 2 mainly 120–130 g/m² kraftliner.

"At the beginning of 2014, we wanted to increase production on PM 1 and PM 2, but it was difficult due to insufficient dewatering in their press sections and the

high drive load of the long nip press (LNP) rolls," recalls **Wu Guixing**, Production Director, Green Forest Paper.

Searching for a solution to these production bottlenecks, the mill contacted Valmet, who recommended replacing the existing rubber roll covers with PressPolar, its new polyurethane roll cover with low rolling resistance that offers savings on drive power. PressPolar meets the requirements for demanding LNP rolls and is designed to run without internal water cooling. There is no harmful water diffusion or absorption inside the cover either. The cover topography can be tailored for maximal dewatering and optimal runnability.

"We chose this solution, and we saw that PressPolar improved dewatering and reduced the energy consumption of the drive, resulting in PM 1 and PM 2 operating at higher speeds, which of course means higher production," says Wu.

Improved machine speed

The original cover material for the LNP rolls on the two machines was rubber. Due to their limited material strength, the rubber covers were only blind-drilled,

offering a small open area (20%) and void volume for water handling. As this all limited press section dewatering, it also limited the running speed of the paper machines.

The PressPolar polyurethane cover, tailored for LNP rolls, has excellent strength properties. Both blind drilling and grooving allows an open area of up to 40% and improves dewatering efficiency in the press section.

With the new PressPolar covers, PM 1 went from 500 meters per minute to 550 due to the higher dewatering efficiency and lower drive load. For PM 2, the speed increased from 690 to 750 meters per minute.

Major energy savings

Low hysteresis, minimal heat generation in the nips, and less roll weight due to no need for internal cooling water – all these features decrease the drive load.

At Green Forest Paper, the driving load of the LNP rolls fell from 50–55% to 35–40%. The savings on electric power for PM 1 and PM 2 amount to around RMB 2 million a year. At the same time, steam consumption per tonne has decreased due to the higher speed and improved dewatering.

Wu Guixing, Production Director at Green Forest Paper: "By replacing the rubber covers on our LNP rolls with PressPolar covers, we have been able to increase the production speed of PM 1 and PM 2. We are very satisfied with the performance of PressPolar."



Irving leaps forward

with Valmet CompactCooking



The on-time and 10% under budget project gives higher pulp yield, more production, better quality, lower maintenance and chemical savings.

TEXT Mark Williamson

When Irving Pulp and Paper of Saint John, New Brunswick, on the Atlantic coast of Canada, started up its new continuous pulping operation in March, 2016, it was a milestone in the Canadian pulp and paper industry. The two-phase modernization project for the bleached kraft pulp mill represented the largest investment in the Canadian industry since 1993. In addition to new chip screening and handling, the new continuous digester pulp line is based on Valmet's CompactCooking technology which replaced 14 batch digesters. In a second

phase following the fiber line start-up, a new pulp dryer will replace three existing dryers.

For this major investment, Irving was expecting significant returns based on increased mill capacity now and in the future, higher yield, flexibility of operation for hardwood and softwood pulps, reduced maintenance and operating costs, and improved pulp quality. As outlined in a presentation by Irving's Senior Project Advisor **Jim Brewster**, now retired, at Valmet's recent Customer Days in Sweden, that is exactly what they got, and some extra benefits as it turned out. The project was right on schedule and 10% below budget, according to Brewster. The start-up

was excellent, reaching target production on the third day and running for 75 days continuously after which a recovery boiler washdown was scheduled. Most importantly, the 600,000 man-hour project was completed with only one lost time accident. Irving Pulp and Paper was the general contractor for the project with Valmet providing valuable pre and post installation assistance as team members.

Good team design, operator training

The challenge in the design phase of the digester was to accommodate hardwood and softwood pulp swings, as the hardwood species (birch and maple) are much denser than softwood species (spruce, balsam fir and pine). Therefore, the residence times for hardwood pulp in the digester are considerably longer at the lower cooking temperature characteristic of CompactCooking. Brewster comments: "It was a very good team effort between Valmet and Irving to design the digester for maximum production of softwood yet sized also for the considerably lower hardwood production." The digester is sized for 1,866 adt/d of softwood pulp.

Operator training was another challenge since the 15 process operators had experience with batch cooking only, but none with continuous cooking. Process simulation and interactive multi-media training provided by Valmet were invaluable ingredients needed to bring the operators up to a high level of proficiency before start-up.

Nice and steady operation

Brewster noted that one of the key features of Valmet's two-vessel digester is the excellent liquor impregnation provided by ImpBin chip impregnation system. It combines the basic features of the traditional chip pre-steaming bin, impregnation vessel and flash system. Impregnation of chips at low temperature for a longer time has proven to be very effective generating pulps with very low reject content. Brewster notes: "We had significant problems with high rejects with batch digesters, now we have very few."

Hemicellulose protection and high pulp yields are achieved as well at the lower temperatures. He also notes that that cross-column uniformity is excellent, with no digester circulation required. Cooking temperatures are dramatically lower than the previous batch digesters, at 140 degrees C for hardwood and 148 degrees C for softwood. He concludes: "The machinery is very robust and reliable. Everything runs nice and steady."

Expected results, plus more

Although some further optimization continues, Irving Pulp and Paper has achieved the expected results plus more, and some unexpected side benefits. The mill is able to run at a 50 t/d higher production rate with constant recovery boiler solids loading. A good part of that is higher yield from the digester. Oxygen delignification effectiveness is up 5 to 10

← The two-phase modernization project for the bleached kraft pulp mill represented the largest investment in the Canadian industry since 1993. The mill team is happy with the results.

percent at lower reactor temperatures and there has been a 15 to 20 percent decrease in chlorine dioxide and caustic soda consumption at the same pulp Kappa number to the bleach plant. Those savings are attributed to an integral pulp washing zone in the digester which reduces black liquor carryover. That lower carryover decreases chemical consumption in downstream delignification and bleaching operations. Even the mill effluent quality is better with BOD down 20 percent and COD down 12 percent.

Energy consumption is down as well. The mill electrical load has been reduced by 1.5 MWe. Process steam is down 40 tonnes/hr, which is then diverted to the condensing turbine, saving 80,000 tonnes per year of biomass. "It has revolutionized the energy system in the mill," says Brewster.

Softwood pulp strength has improved although there is some further optimization required. Surprisingly, improved runnability on the pulp dryers is an unexpected benefit, with web breaks down 60 percent. The pulp dryers are no longer a mill limitation.

The expected lower maintenance costs are being realized according to preliminary numbers. The millwide

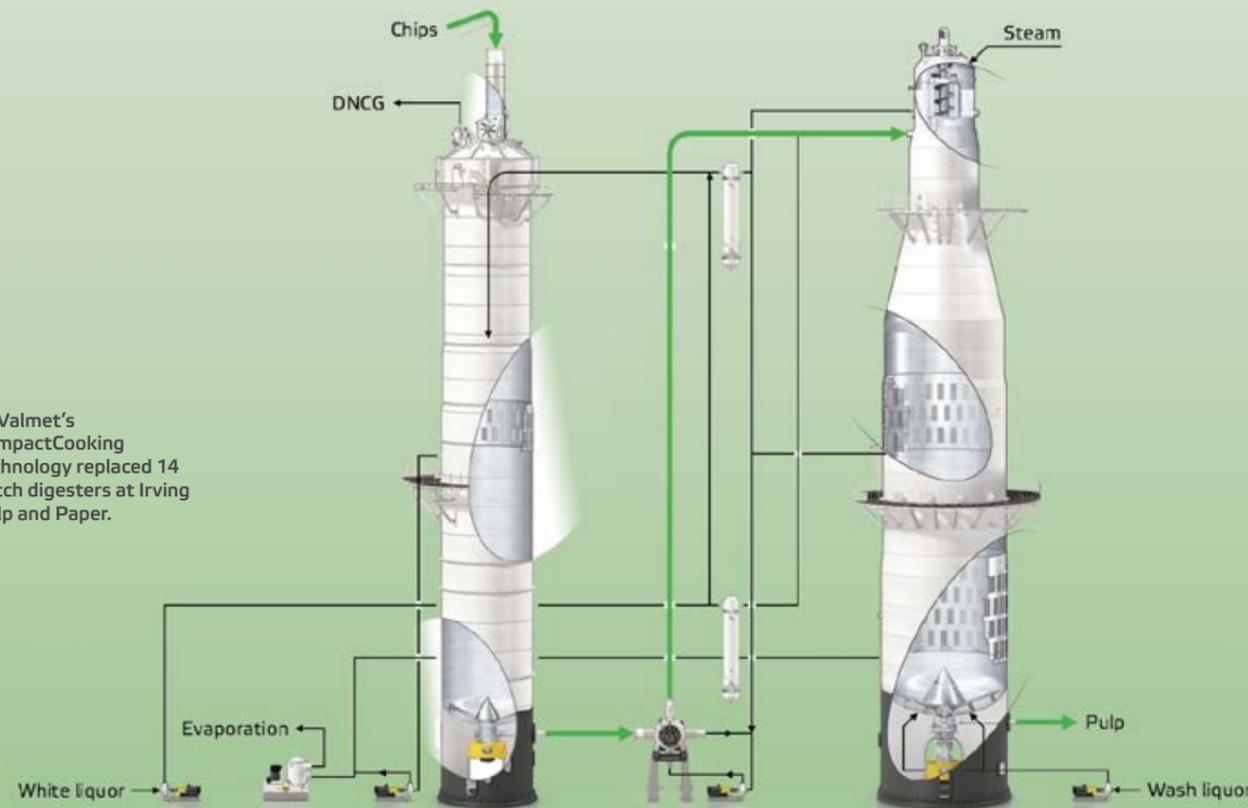
costs are down about 10 percent, although the digester reductions are higher.

In summary, Irving Pulp and Paper is "delighted with the results," according to Brewster. "We are looking forward to further optimization." ■

Project results

<p>Improved yield</p> <p>Pulp production is up by approx. 50 tonnes per day at constant recovery boiler loading.</p>	<p>Improved pulp quality</p> <p>Higher freeness has significantly improved pulp dryer runnability.</p>	<p>Improved pulp quality</p> <p>Higher softwood strength, but more work to be done.</p>	<p>Lower bleaching costs</p> <p>15–20% reduction of ClO₂ and NaOH.</p>
<p>Lower energy consumption</p> <p>Mill electrical load down approx. 1.5 MWe and biomass consumption down 80,000 tonnes per year.</p>	<p>Lower maintenance costs</p> <p>To be determined (preliminary approx. 10%).</p>	<p>Improved O₂ delignification</p> <p>Softwood delignification up 5–10% at lower reactor temperatures.</p>	<p>Improved effluent quality</p> <p>Final BOD and COD discharges down 20% and 12% respectively.</p>

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→ Valmet's CompactCooking technology replaced 14 batch digesters at Irving Pulp and Paper.

Only five years ago, Aktül Kagit's mill in Pamukova, Turkey, was a greenfield site. Today it is a flourishing plant that started up its second Valmet Advantage DCT 200 tissue machine on February 29, 2016. TEXT Katarina Åhsberg

From greenfield to
**world-record
 production**
 in five years

Aktül Kagit's tissue mill in Turkey has achieved a lot in a short time. In addition to two tissue machines, a new converting plant has been built next to the main building. On top of this, the mill's PM 1 reached a world record production for conventional tissue machines: 74,047 tonnes in one year. And this was accomplished with a tissue machine producing all grades from facial to dispenser towels with different grammages - averaging more than three grade changes per day.

The production record did not happen by chance. Since PM 1 started up in September 2011, the focus has been on machine efficiency. The first year's production figure of 59,000 tonnes has been continuously increasing, and in 2014, they reached 70,000 tonnes of sellable paper. In 2015, the new record greatly exceeded their production target. It is likely that PM 2 will be even more efficient than the current record-holder. With two Advantage DCT tissue machines in operation, there is the opportunity to optimize the production even further. The number of grade changes has previously lowered the

efficiency of PM 1, but by dividing the grades between two machines, it can make a change.

Erkan Tirnavali, General Manager, points out three key factors essential for successful operations.

"First is the machine itself, second the raw material, and third our staff. All these three factors have to work together for maximum success. If you look at the team, we have only five years of know-how and experience - but Valmet have given us good support."

He continues: "Other reasons for the success were the precise planning of the start-up and the cross-functional project team. The start-up date for PM 2 was set two years ago. We started on the agreed day, February 29, just as we had done with PM 1. This was a very big success for the organization and our way of working as one team together with Valmet."

A different way to work

The philosophy behind the cross-functional project team was that all the people involved also had other duties alongside the new machine project. "We were installing

"Other reasons for the success were the precise planning of the start-up and the cross-functional project team."

a new machine and needed to cover all the competence areas, but at the same time we could not jeopardize the operations on PM 1. The project manager was also the production director at the time, and the maintenance manager was assisting him. Shift operators, technicians and others had all double responsibilities."

Aktül was the first tissue producer in Turkey to install an Advantage ViscoNip press. Today, both PM 1 and PM 2 are equipped with the flexible pressing technology, which is one of the secrets behind the capacity record.

Reliable and flexible operations pushing efficiency and capacity

Today, the two Advantage DCT 200 tissue machines have a total production capacity of 150,000 tonnes. Within a year, when the new converting line is up and running, the converting capacity will be 125,000 tonnes per year.

90% of the production is converted in-house, and the remainder is sold as jumbo rolls. Turkish consumers mainly demand economical multi-ply products or very high-quality, three-ply kitchen towel and bathroom tissue. Aktül sells more than 70% of its finished products to



↑ "The Advantage ViscoNip press has made my life much easier," reveals Aktül's Converting Manager Yüksel Özbek (right) to Production Director Ziya Karadeniz (left).

← Erkan Tirnavali, General Manager of Aktül Kagit.

→ Both the PM 1 and PM 2 projects are characterized by good team work, open communication and joint development.



private labels, but at the same time, it is growing its own Komili brand which is growing quickly.

The converting line is now accompanied by a second line, and together they will offer a converting capacity of 125,000 tonnes a year.

Determine product features

Also The Advantage ViscoNip press has contributed to Aktül's successful operations. The flexible pressing technology makes it possible to experiment with softness, bulk, tensile strength, and fiber and energy consumption. The nip load is adjusted with respect to the specifications of the grade being produced.

"We use the maximum load for napkin and kitchen towels to get more tensile strength, as we deep-emboss these products in converting. We get more bulk and save a lot of drying energy. For bulky products like premium-quality tissue, some facial tissue and paper handkerchiefs, we don't apply embossing. Here, we use a minimum load to get more softness, bulk and water absorption."

The ViscoNip has also improved runnability. As paper breaks are very rare, the machine speed can be increased, improving the efficiency of both the paper machine and the converting machines.

Good team work paved the way for repeated success

Aktül's strategy was to look five years ahead from the very start. The greenfield site was designed and dimensioned

with enough space and utilities to supply two machines. That, of course, made the second machine project more cost-effective to realize. But a repeat project with the same supplier has other benefits, too: "Our mill team were familiar with the technology and had experience from the installation of PM 1. We had good relations with the Valmet team and had found an effective way of cooperating. I would say we worked truly as one team in this project, and that is a very important factor for our common success. We started up on the exact date as planned, the technology is highly efficient, and we are continuously doing joint developments with Valmet. This is a big success for Valmet – and for us."

Both the PM 1 and PM 2 projects are characterized by good team work, open communication and joint development.

"Today we are growing in this location. A capacity of 150,000 tonnes of tissue paper and 125,000 tonnes of converted products is no longer a dream – it is coming true right here, right now." ■

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Aktül's second Advantage DCT 200 machine started up on February 29, a date which had been fixed ever since the project started.



DoubleDoc doctor solution significantly reduces sheet breaks

Iggesund Paperboard installed a Valmet double doctor solution, with the result that the board machine is running more stably and with less downtime. **TEXT** Sofia Forslund **PHOTOS** Iggesund Paperboard

Iggesund Paperboard's board machine BM 2 had been experiencing problems with doctoring in recent years, which had been the main reason for sheet breaks in the machine. Single doctoring was not able to keep the third press top roll clean, which led to build-ups, causing holes in the sheet that led to breaks in the calender. BM 2 had eight sheet breaks a month, and it took on average an hour to come back to prime quality production each time.

Based on this situation, the company appointed a project group, and different suppliers were invited to present solutions to the problem.



“We are very happy how the project turned out, from the first contact with Valmet to the start-up.”

No more breaks due to pulp build-up

“The reason why we chose Valmet as our supplier is that their solution impressed us and Valmet gave a very professional impression of themselves,” says **Stefan Johansson**, Production Engineer of BM 2. Valmet carried out a pre-study during one day to be able to offer a tailor-made solution.

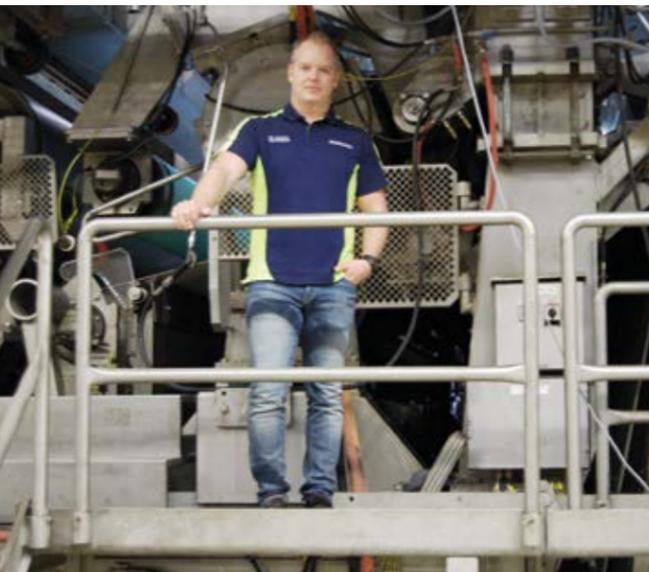
The contract for the new doctoring solution was signed in June 2015, and the installation took place during a pre-planned, five-day stop in November. Valmet's own assemblers were responsible for the installation of the double doctor. It went smoothly and only took three days. After the installation, one assembler stayed onsite to participate in the start-up of the machine. The DoubleDoc started with ValCar and ValTech doctor blades, which were included in the delivery.

With Valmet's DoubleDoc, there are no more breaks due to pulp build-up from the third press. These days, the second blade collects any build-up that might pass the first blade. The changing interval for the doctor blades is six weeks. As the new doctoring unit is larger than the previous one, there was a slight worry that it would affect the tail threading in a negative way, but it has worked without any problems.

Iggesund Paperboard is situated in Hudiksvall, in the north of Sweden. It is an integrated pulp and board mill with its own chemical pulp. The mill produces solid bleached board (SSB) for graphic design packaging for the food, tobacco and cosmetic industries. Board machine BM 2 produces 195,000 tonnes of paper a year with a basis weight range of 180–380 gm² at a speed of 550 m/min. The third press section was originally equipped with a single doctor blade.

“We are very happy how the project turned out, from the first contact with Valmet to the start-up. Apart from a few adjustments at start-up, we haven't had any downtime due to the doctoring,” says Johansson. ■

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Stefan Johansson, Production Engineer of BM 2.



Iggesund Paperboard is an integrated pulp and board mill using its own chemical pulp.

All goals achieved

Coater section rebuild in Mayr-Melnhof Kolicevo



With good planning, suitable equipment and professional personnel, good results are achieved as planned – even in challenging board machine rebuild projects.

TEXT Pauliina Purola PHOTOS Pauliina Purola and Topi Saari

“All the targets for the project were achieved. Runnability is better than before, and the efficiency is better, too,” says **Rok Sustar**, Technologist and Assistant to the Production Manager at Mayr-Melnhof Kolicevo mill in Slovenia. After more than a year, this positive atmosphere has not changed: the mill personnel are content with and confident about the improved coating section.

Before the rebuild, board machine BM 3 of Mayr-Melnhof Kolicevo Karton was facing challenges with runnability and efficiency. The coating section required improvements since the speed of the board machine was

Mayr-Melnhof Karton Količevo BM 3

Width at reel	4,500 mm
Production speed	510 m/min
Capacity	210,000–220,000 t/a
Grades	FBB, liner, recycled cartonboard grades
Grammages	200–500 g/m ²
Application	Food, cosmetics, pharmaceutical packaging, and other high-quality applications

going to be increased and the existing coating technology was not suitable any longer. This resulted in the decision to rebuild the coating section.

Pilot trials before the decision

Before the rebuild decision was made, the coating concept, coating color chemistry, and performance were tested at the Paper Technology Center in Järvenpää, Finland. Rok Sustar is convinced that finding the correct solution is easier with the chance to run a pilot. The decision does not have to be based on assumptions and conjecture when there is concrete proof before your eyes. “You can see the benefits and witness the good runnability,” Rok Sustar says.

Professional project

With clear targets in mind, a multilayer curtain coater and a blade coater started up after a very short shutdown period in the summer of 2015. A supply system for the two layers of the curtain coater was also installed. Sustar explains that the Valmet personnel were really professional. He continues: “The installation went according to plan. It was a short installation time, and there was a lot to do – like building it and testing it with water – but everything went well. The compact size of the curtain coater was also a real advantage in the rebuild.”

“In ten minutes, it was working”

When everything is well planned, you are likely to get good results quickly. All the movements and hydraulics were tested at the workshop before the equipment was sent to the customer site. “In ten minutes, the board was saleable,” Sustar states.

The coating section has been easy to operate and more reliable since the rebuild. Curtain coating has a contactless coating application, which is good for runnability and reduces web breaks. “There is less second-rate board and fewer breaks at the coating section. Also, the day-to-day handling is a lot easier than before,” says Sustar.

High coating color quality with supply system

To achieve high coating color quality, curtain coating requires a completely airless coating. This sets high standards for the OptiSupply machine circulation and its degasser. “The degasser in the supply system is working very well. We always reach the pressure we want to,” says Sustar. The maintenance requirements are relatively moderate: “We clean the degassers every two months in the longer shut-downs. They’re quite easy to clean. It takes less than two hours to open them, clean them with high pressure water, and close them – this includes everything.” A short, automatic cleaning sequence is used during the brief shut-downs.

Asking for better and better

The Količevo mill has noticed that their customers are ever more demanding for higher quality and lower prices. Continuous improvement must be a constant state of mind for each producer.

A cost-effective rebuild with fast results is the only alternative. Any shutdown is a direct loss of income for the board producer. For good results, you need the correct concept choice, good planning, and proper raw materials to achieve the desired targets. A rebuild is always a challenge, but the risks are minimized with a good and reliable partner. “Valmet personnel are really professional,” summarizes Sustar. ■

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Rok Sustar from MM Količevo (left) and Timo Nurmiainen from Valmet know the importance of pilot trials; they give the opportunity to test the papermaking process and coating chemistry.



“The installation went according to plan. It was a short installation time, and there was a lot to do but everything went well.”



Sensus' dietary fiber production

controlled by Valmet DNA

The Sensus company, located in Roosendaal in the Netherlands, is part of the Royal Cosun group, an international developer, manufacturer and supplier of natural food ingredients. The Roosendaal factory produces inulin from chicory roots, and the process runs with an automation solution from Valmet.

TEXT AND PHOTOS Soili Städter

Jaco Geuze (on the right) and Valmet's Henk ten Kate are pleased with the high process reliability offered by Valmet DNA control system.

Inulin is a natural, soluble dietary fiber that comes from the roots of the chicory plant. This food ingredient is also labeled as "oligofructose" or "chicory root fiber," and it has significant, scientifically proven health benefits. Besides fiber enrichment, it can be used to replace sugar and fat while improving taste. The inulin factory was first established in 1991.

Chicory season determines the operational rhythm

"In Holland, the weather conditions are very good for growing chicory. We have contracts with farmers in a zone around the factory to deliver chicory," explains

Jaco Geuze, Automation and Software Engineer at Sensus.

During the harvest months, from August to December, chicory roots are brought to the factory. Inulin is extracted from the roots with hot water. During this period, when the production line runs 24/7, having a reliable automation system is vital. In the summer season, the operation lines are shut down for cleaning, maintenance and implementing new projects. Some parts of the factory continue to operate, such as the wastewater treatment and product handling/loading.

Long-term cooperation with Valmet

Sensus is a long-term customer for Valmet. The first

"A reliable automation system means high process availability."

automation system – Damatic XD – was delivered to the factory in the 1990s. Since then, the automation system has been upgraded continuously to include the latest Valmet technology.

Inulin production is a complicated process. About 98% of all this is controlled with a Valmet DNA system that has about 5,800 I/Os. Over the years, Valmet's automation system architecture has proven to offer lifetime expandability and upgradeability. Typically, 80% of the Sensus production is a continuous process, while 20% consists of batch processes. Switching between the two happens automatically, and for this, Valmet DNA provides solid production support.

Process reliability for business continuity

Valmet DNA is a modern system with an integrated information management system. This combination offers high process reliability and controllability, with seamless communication between various functions. At Sensus, the reliability of the process helps to secure business continuity.

"A reliable automation system means high process availability. It contributes to our competitive position in the market. We are processing a natural product that has to be handled with the highest hygiene and quality," states Jaco Geuze.

Valmet DNA has a trend and event archive, Valmet DNA Operate TEA that shows trends with alerts. Geuze explains: "It gives us enough information to dig into the events and learn from them. We can find out the reasons

The inulin production is a complicated process featuring e.g. a pulp press section.

for failures and see whether it was a software problem or human error so that we can avoid it in the future. We often take advantage of this feature. Valmet DNA gives us a better view of the process."

A good five-year plan for automation upgrades

In recent years, many improvements have been made to the process operations. The most common reason for investment has been to replace obsolete parts. Now, the automation upgrades have been executed more systematically. "The maintenance manager is involved in the planning process. We make a five-year plan together with Valmet. For instance, now 90% of the work is executed from our earlier plan. Additionally, a preliminary plan for the next six to ten years can be made," says Geuze.

Planning all actions in advance and keeping on time and on budget reduces operating and maintenance costs.

Innovative challenging

Sensus has signed a service agreement with Valmet. Most of all, the company appreciates the 24/7 access to on-call services. Remote control is implemented for enhanced contact with Valmet experts. For Geuze, good customer service is crucial. One of the things he is most satisfied with is Valmet's quick responses.

"A system audit and preventive maintenance is done once a year. When targeting the high season, everything needs to be well planned. We cannot afford any failures when the capacity is in full use," Geuze explains.

Sensus has always been innovative when it comes to challenging Valmet. Valmet, in turn, has been pleased to respond to those challenges.

Thanks to the strong cooperation, the company's dietary fiber Frutafit inulin is produced efficiently in Roosendaal and then sent off to be enjoyed in markets globally. ■

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↑ In the production facilities of Roosendaal, dietary fiber Frutafit inulin is made for global markets.

→ Jaco Geuze checking the ACN units in the cabinets.

↓ Jaco Geuze (left) and Jos Jongenelen from Sensus and Henk ten Kate from Valmet in the control room.



HiRun P web stabilizer Success story continues

Improved sheet runnability and paper quality at Holmen Paper Braviken Mill. **TEXT** Jarkko Nurmi

Paper machine PM 53 at Holmen Paper's Braviken mill produces grades ranging from newsprint to sophisticated SC papers. The single-tier dryer section of PM 53 includes eight drying groups, all originally equipped with vacuum stabilizers. In a rebuild last fall, two old stabilizers were replaced with new HiRun P web stabilizers in the first and second drying groups. While introducing new HiRun technology, the existing vacuum rolls and suction air system were utilized.

Proven improvement in sheet stability from day one

The rebuilt HiRun P system was successfully started up in September 2016, and its performance has met all the requirements for a stable sheet run and lower draw. The rebuild enabled a decrease in the press-to-dryer draw of at least 8%, which in turn lead to a 4.4% increase in stretch at break and a boost in tensile strength of 4.7%.

Superintendent **Fredrik Rothman** is pleased with the results: "This was an interesting rebuild with new technology, resulting in proven enhancements in sheet stability from day one! The long-term results with reduced draw and higher tensile strength have definitely exceeded our expectations."

The HiRun P web stabilizer is an application for perforated roll concepts with proven HiRun technology. The main benefit of this technology is its high vacuum level, which gives excellent sheet runnability and enables draw reduction. ■

Braviken PM 53 was commissioned in 1996, and until 2015, it produced newsprint and uncoated magazine paper. After an upgrade in 2015, PM 53 now produces paper in a basis weight range of 34–50 g/m², with grades ranging from newsprint to sophisticated SC papers, including the recently developed Holmen UNIQ SC paper. PM 53 has a wire width of 9.65 m, a designed speed of 1,700 m/min, and an annual production capacity of 310,000 tonnes.

Holmen Paper is a specialty paper producer that uses the properties of virgin fiber to provide cost-effective alternatives to traditional paper choices. At its Braviken mill in Sweden, Holmen Paper operates two paper machines – PM 52 and PM 53 – producing magazine, book and SC paper, as well as newsprint. The mill's own TMP lines produce the pulp needed for production.



"We have seen a well-executed project from contract to start-up, including good cooperation with everyone involved, from project management to installation staff", say Mats Andersson (left) and Fredrik Rothman.

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A rolling stone gathers no moss

Freedom of speech and people's desire for information were the basis for founding Schoellershammer paper plant in 1784. Much has changed over the years, but it is the constant movement that lies behind success.

TEXT Marianne Valta

Schoellershammer GmbH & Co. KG, located in the city of Düren in Western Germany, has been producing paper for over 230 years. During its existence the company has secured success by being able to adapt to the changes in the industry.

The birth of the Internet meant a dramatical decrease in the demand of printing paper – information was suddenly available on-line. However, it was the same Internet that

made the world one marketplace: everything was at reach.

“We have been going through a lot of changes during the past years, but I think it is the ability to change that makes us strong. It was a difficult decision to close the fine-paper segment in 2015, but at the same time we made the decision to build a brand new machine to reply to the growing demand for packaging paper,” says **Konrad Franken**, Line Manager of PM 5 and PM 6 at Schoellershammer.

The investment was finalized in the end of 2016 and it will double the production capacity of the plant.

Quality with excellent customer service

Schoellershammer has summarized its vision as follows: We stand for maximum customer satisfaction with high product quality and optimal service, coupled with a high sense of responsibility for nature, people and the region. The same attributes are expected from the partners, and

that is why Schoellershammer has chosen Valmet as one of their PM 5 paper machine clothing suppliers.

“We have been buying PM 5 press felts from Valmet for many years, and I am impressed by their very good quality. The standards are very high; the press felts are of high-quality. The stability of the press felt during its life-cycle is very good and they have reliable lead times. I expect very much, but have always been satisfied with the runnability, dewatering and lifetime of Valmet's products,” says Franken.



Konrad Franken

“We have been buying PM 5 press felts from Valmet for many years, and I am impressed by their quality.”



Valmet speeds up the production of seamed press felts

The Valmet's fabrics production site at Tampere has been re-modelled by updating some existing weaving looms and building a new fiber blending line in 2016. The investment was finalized with a new wide weaving loom during first quarter of 2017. This will widen Valmet's paper machine clothing offering by adding thicker seamed felts into the product range.

"We are in the midst of a transition in paper industry, where many paper machines are re-modelled to produce packaging paper instead of printing paper. As a result there is a demand for thicker seamed felts and I'm delighted that with our newly organized production lines we will now be able to reply to that demand. The investment will also allow us to take the quality level of our seamed felts even higher," says **Simo Metsäranta**, Product Group Manager, Press Felts, at Valmet.

Quality felts for press section performance

New, thicker felt types will add to Valmet's product range and hence make the offering even wider.

"We have a large felt portfolio both in seamed and endless felts to respond to our customers' needs. And, we have been able to develop very advanced technologies for chemical treatments of felts. Especially these treatments, which are continuously developed further, differentiate us from other felt suppliers. The treatments increase the durability and nip-dewatering properties of the felt," explains Metsäranta.

In addition to broadening the product range of Valmet's press felts, the investment will increase the total production capacity.

Working together

In addition to offering high-quality paper machine clothing, Valmet's target is to walk along the customer all through their production process. This has been noticed at Schoellershammer PM 5 as well.

"Valmet has professional understanding in machines, develops our processes and has a customer-oriented way of working. They visit PM 5 regularly and are always available for discussion if problems arise. Improvements are done fast without excess delay," summarizes Franken.

Safety comes first

Due to the fact that there is no cantilever at PM 5, it was no longer possible to use endless felts and Valmet's ability to provide seamed felts for packaging paper machines is very important.

Seamed press felts were originally developed to ensure occupational safety at paper machines. A seamed felt is remarkably safer to install compared to an endless felt. Today also time and money count – for seamed felts less manpower is needed for the installation and stoppages are therefore relatively short.

"At Schoellershammer PM 5, we do appreciate the safety that seamed felts bring along. Not to disregard the importance of saving time and money during seam-felt installation. All in all, with Valmet's press felts we have been able to stabilize the run of our paper machine PM 5 and that is crucial for our process," says Franken. ■

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Vice President of Production, Yong Lu is happy with the board quality after the rebuild.

Solving problems with a dedicated service attitude

“Valmet has always met our expectations with their quick response times, and exclusive and specific solutions for our needs. Valmet is clearly committed to serving us,” says Young Lu, Vice President of Production of Ji’an Group.

TEXT Tina Gao and Heli Kankare

The coated white-top liner machine PM 3 at Ji'an Group, China, was started up in 2011. The Valmet-supplied machine is equipped with curtain coating technology.

Recently, an uneven cross-direction roughness profile in the base board caused some problems. Experts from Ji'an and Valmet joined forces to find a solution. The decision was made to install a Valmet FormMaster breast roll shaker to improve the formation and board quality.

Improved performance in formation and strength

In PM 3, the roughness at the edges was higher than in the middle of the web, requiring either frequent changes of coating blades to achieve the desired high quality or acceptance of downgrading the end product. Since the market for coated white-top liner is highly competitive in

“Valmet’s service attitude was superb, and the end result is excellent.”

China and the price difference between grades A and B is EUR 14 per tonne, a solution was needed. How could Ji'an maximize profit by improving paper quality while

simultaneously decreasing their operating costs?

A field study and analysis found that improving the formation was the best way to improve the roughness profile. First, there were trials to adjust the edge flow with the existing equipment, but since the results were not as good as expected, they opted for a Valmet FormMaster breast roll shaker to improve the formation.

The installation took only three days, and the start-up was successful. The new breast roll shaker has now been running for over eight months, and it has met Ji'an's expectations. Paper quality, smoothness and printability have improved as was expected – and guaranteed.

Valmet is a long-term partner of Ji'an Group. **Yong Lu**, Vice President of Production, is happy with the long cooperation: “We have been working with Valmet for six years, and during that time, Valmet has demonstrated an excellent ability to support and help us with solving actual production issues, like cost savings and board quality

improvement. Valmet has always met our expectations with their quick response times, and exclusive and specific solutions for our needs. Valmet is clearly committed to serving us, and we are convinced we should continue our cooperation. This project was no exception: everything was on time, Valmet's service attitude was superb, and the end result is excellent.” ■

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Valmet FormMaster breast roll shaker

- Improved paper formation and strength
- Better printability and smoothness
- Better formation and stock furnish construction
- Electricity savings, less beating energy consumption, less steam consumption
- Savings on raw material, reduced production costs
- More convenient operation and maintenance

Ji'an PM 3 produces premium-quality coated white-top liner for the Chinese market, with a production capacity of 600,000 tonnes a year. The web width at the reel is 7,250 mm, and the machine operates at 1,200 m/min. Ji'an Group produces first-class packaging boards from recycled fiber. The production capacity is over 1.3 million tonnes per year, and the company has retained its market share in the most recent financial year.

From left to right: James Hui (Valmet), Chao Genbing (Ji'an PM 1 production manager), Wang Hongwei (VP of Ji'an group), Yu Shuan (Valmet), Shujun Wang (Ji'an maintenance manager).





From centimeters to millimeters

Coater bottom waste reduced at Burgo Villorba

The off-machine coater at Burgo Villorba's paper machine PM 8 in Italy is making good use of Valmet's WaterJet turn-up system and Valmet's knowhow. With over 99% roll change performance efficiency, they have reduced the amount of bottom waste significantly and increased the average speed of the coating machine by 100 m/min, and they are now operating more safely. TEXT AND PHOTOS Kaisamajja Marttila

Massimo Sponchiado, Mill Manager of Burgo Villorba (on the left), is happy with Valmet's WaterJet turn-up system. On the right, Mill Sales Manager Maurizio Sala of Valmet.

“Although it was effective, our old system was causing the sheet to wind onto the spool unevenly and creating a lot of reject in the unwinder and calenders,” says Mill Manager **Massimo Sponchiado**, about the situation before the investment. “On top of that, we were not happy with the speed of the coating machine. To turn up and splice successfully, we always had to reduce the speed of the machine, which didn’t do our efficiency figures any favors,” he continues. Given their previous experience with Valmet’s knowhow and the success of the WaterJet turn-up device installed at their Duino mill, they entrusted Valmet with the task of resolving these challenges.

The off-machine coater at Burgo Villorba’s PM 8 is making good use of Valmet’s WaterJet turn-up system and Valmet’s knowhow.



“It was not just about setting us up with new equipment – Valmet checked the whole process and optimized the reel operations together with us.”

“We liked Valmet’s holistic view, and their willingness to help and solve problems. It was not just about setting us up with new equipment – they checked the whole process and optimized the reel operations together with us,” says Sponchiado.

Earning trust

The WaterJet turn-up system was installed in 2015. “The tuning of the system was not immediate, but we’ve always had very good co-operation with Valmet. It is not something we take for granted,” Sponchiado points out, explaining that Valmet has proved itself worthy of their trust. As well as having an expert on-site during process studies and start-up, the Villorba mill has found having remote services useful. “We’ve got expert services by phone and email, with very good availability. I remember very late one Friday evening we were having some

challenges. **Petri Mustonen**, Valmet’s expert, was at a birthday party with his family, and despite this, he was on the phone and he was helping us. We heard the music in the background, but he was there, solving the problem with us,” says Sponchiado, laughing.

Change of parent roll quickly and cleanly

The targets of the project have been reached. “The amount of bottom waste has reduced from several centimeters to less than 5 mm. We’ve also achieved our final target of a flat speed profile for the coating machine, and the average speed of the coating machine has increased by 100 meters a minute,” Sponchiado says. The system is also reliable, with efficiency values of 99%. “We never have breaks during turn-up operations, some during splicing,” he confirms.

Completely automatic operation increases safety

“Operator safety has improved a lot. With the previous system, the operator had to intervene manually during the splicing with an air gun to keep the paper sheet in the right position. Now, the operator waits for the turn-up in the control room,” says Sponchiado. The mill has been focusing on safety issues and creating an even better safety culture. “Safety is not a question of money, but of attitude,” he says, adding: “In 2012, we achieved a lower incident frequency alongside a daily production record. We’ve seen that working on safety increases productivity, too, as you increase the efficiency of the people.” ■

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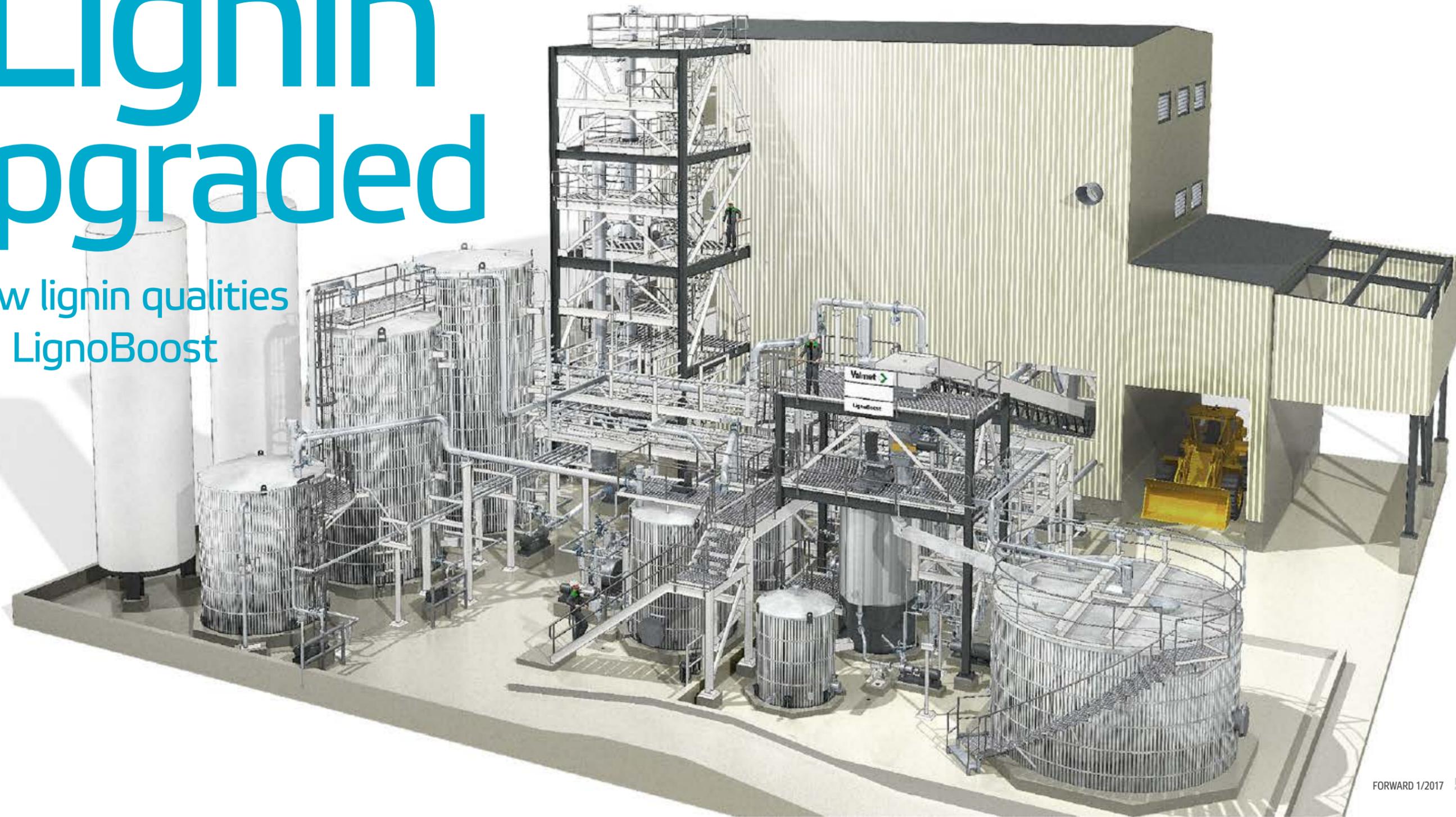
How does the turn-up system work?

The WaterJet turn-up system is needed in reel spool changes in the paper machine. With the WaterJet turn-up system, two water jet nozzles traverse to the middle of the machine to initially cut a fine strip in the middle of the sheet. The strip is glued to the empty spool, after which the nozzles quickly traverse to the sides and widen the strip. As a result, the device ensures consistent, fast and clean parent roll changes.

Lignin upgraded

– new lignin qualities
with LignoBoost

Valmet's LignoBoost process has been developed further and extended. Today there are new process concepts that tailor the extracted lignin into different qualities. This gives several new options for kraft pulp mills to extend their product range and go into new businesses. TEXT Andreas Liedberg



Lignin has been extensively studied, and the number of patent applications involving lignin is increasing rapidly. Valmet and its partners have developed several add-on processes to LignoBoost. Today kraft lignin can be tailored to suit many different and interesting uses.

Water soluble, sulfonated lignin

Sulfonated lignin is a well-established product with a wide range of uses. The current world production is more than one million tonnes a year. Lignosulfonates are almost exclusively produced in sulfite-based chemical pulp mills, as lignosulfonates form in the sulfite process. Sulfonating kraft lignin has traditionally been done with formaldehyde, which poses risks to both workers and the environment.

Using a new process available from Valmet, lignin can be sulfonated without the use of formaldehyde. Moreover, as lignin extracted with the LignoBoost process is very pure, the resulting sulfonated lignin contains a lot less impurities and has a high amount of active content. This provides cost effective use in all types of dispersant applications.

Carbon green

“Carbon black” is the name for a black powder used as a reinforcement filler in rubber products. As world pro-

duction was more than 12 million tonnes in 2015, and as the raw material is heavy fractions of oil, replacing carbon black with a CO₂ neutral alternative represents a true opportunity for the pulp and paper industry.

Valmet and its partner SunCoal have been able to develop a high-temperature carbonization process that converts lignin extracted with the LignoBoost process into “carbon green,” a new alternative that meets the specifications for several grades of carbon black. Carbon black can also be used as a precursor for activated carbon, another market of several million tonnes a year.

LignoBoost lignin for biochemicals

Valmet is working with partners to enable the use of lignin as a base for biochemicals. One partner is BioChemtex, an Italian company which is part of the Mossi Ghisolfi group and a leader in technologies for production of second-generation biofuels and biochemicals. Using BioChemtex’s proprietary technology MOGHI, lignin can be used as a sustainable feedstock for production of a bio based version of PET, a thermoplastic polymer. This polymer is used in the manufacturing of a wide range of products like synthetic fibers and containers for food and beverage. The world production of PET is according to some reports currently above 20 million tonnes per year, and rising.

Odorless lignin

Valmet and RISE Bioeconomy have recently developed a process that makes it possible to remove 97% of the odorous compounds in lignin. This opens up possibilities for using lignin extracted with the LignoBoost process in applications close to the consumer, like boards for indoor use, plastic cutlery or other plastic products.

Going forward

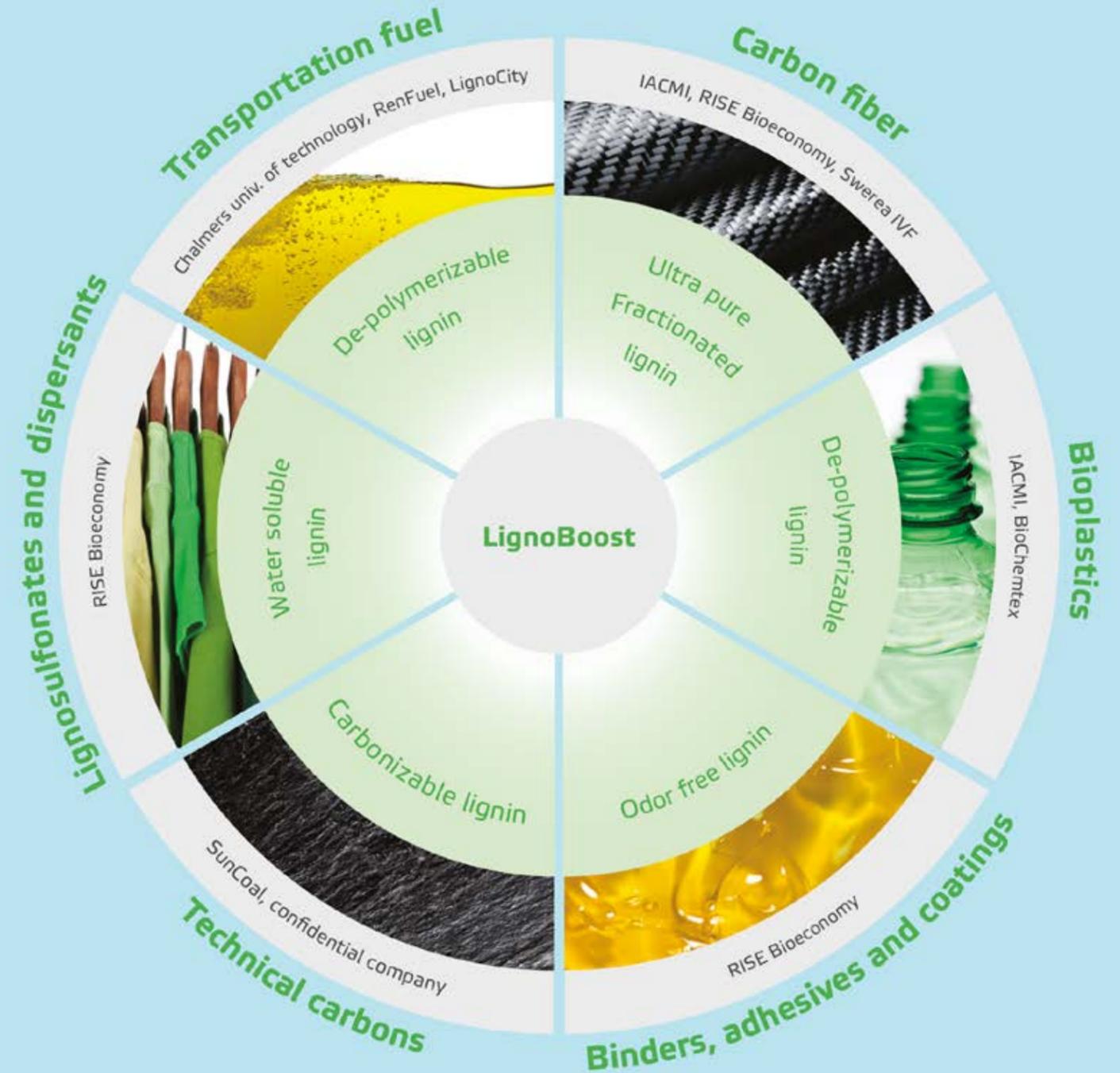
Lignin is renewable and abundant. According to estimates, more than 78 million tonnes of lignin circulate in the worldwide kraft black liquor flow every year, and some of this is already sold profitably from pulp mills. Going forward, new process concepts enable further upgrading of lignin for even more profitable end products. And when it comes to CO₂ emissions, the environment will be a winner, too. ■

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It looks like the very near future will bring even more valuable uses of lignin.



Valmet has now process concepts for tailoring lignin into several different qualities. Many of them have world markets in the range of several million tonnes a year.

EXPERT'S VOICE

Food for thought



"The main driver of the circular economy is the exhaustion of easy-to-access resources, which is creating high pressure in terms of availability, and high price volatility," says Fredrik Rosén.

Roadmap towards a

cellulose-based society

Fredrik Rosén from the RISE Bioeconomy (previously Inventionia) shares his vision of how we can reduce fossil dependency by promoting renewable, bio-based products. TEXT Vesa Puoskari

"There are several forest industry companies coming up with new innovations and emerging products made of forest fibres. For example, many new bio-products such as biofuels, biochemicals and biocomposites are currently made from forest industry side streams," states Fredrik Rosén, Director of Market Strategy at RISE. Cellulose is the most common building block in nature for a circular, bio-based economy. The forest industry and agriculture are thus slated to play a key role in the future evolution of the bioeconomy. In the future, forests resources could be used to create a virtually boundless array of products from textiles and vehicle parts to cosmetics and prosthetics.

“It’s not only forest companies that are interested in what can be done with forest fibre.”

According to Rosén, a significant segment of the population sees products that are made from renewable resources as something positive. However, the divided opinion of consumers poses an obstacle to this positive trend.

“In a recent survey we found out consumers have very mixed attitudes to the sustainability of forest-based materials. Some 50% think that buying and using bio-based products is a good thing, while the other half sees it as unsustainable.”

The Innventia International Consumer Survey was conducted in the United States, Brazil, China, Sweden and Germany during January 2016, with 500 respondents interviewed in each country. The focus of the study was society’s readiness to shift from a fossil-based society to a bio-based, circular society.

Rosén emphasizes that it will be increasingly important for the forest industry to demonstrate new innovations, and not just talk about them. The industry should also offer clear proof of its sustainability.

“Sustainably managed forests grow faster than they are harvested. However, our study shows that a high percentage of people do not understand how sustainable forest management works,” he notes.

“For this reason, the forest industry has to work even harder to get their message through and prove that they are doing the right thing.”

Entering uncharted territory

Thanks to efforts in various industries to reduce dependency on fossil-based products, there is a growing demand for products manufactured from bio-based materials.

Besides engaging in conventional pulp making, the traditional pulp sector is also focusing on innovating new products from the side streams of the pulp making process.

“Lignin is an opportunity for pulp products. There are several ongoing projects that concentrate on extracting and valorizing lignin, which is a non-cellulose part of the wood. Lignin can be used in many kinds of products designed for various end-uses,” says Rosén.

Carbon fibres made from lignin can, for example, be used as substitutes for traditional plastic products in the future.

Bio-based products are likely to co-exist with fossil-based products long into the future – we are unlikely to see a sudden fossil phase-out. It takes time for new products to become established in the value chain.

“Basically, there are two options. Either you have to fabricate new drop-in alternatives that are completely interchangeable with old ones or then you have to aim higher in the value chain by creating something new,” explains Rosén.

One of the latest and hottest trends in the fibre industry is 3D formable material made of renewable resources. As yet, this is unknown territory, and therefore a business risk for all involved.

“Very cool new things can be made from this material, but customers higher up in the value chain are not willing to take a risk and build a new process for a totally new material, so the manufacturer has to also provide converting and packaging applications themselves. To do so cost-effectively, they have to work together with other partners.”

What is more, the competition for raw materials is getting tougher. “It’s not only forest companies that are interested in what can be done with forest fibre. We are getting increasing interest from other actors, too. Also chemical companies and smaller players are looking into forest fibres,” he adds.

Focus on the circular economy

Rosén points out that the focus of EU discussion is switching from renewable materials to the circular economy and recyclability.

The main driver of the circular economy is the exhaustion of easy-to-access resources, which is creating high pressure in terms of availability, and high price volatility. Renewable raw materials and recyclable products pose a positive challenge to our dependence on fossil-based products.

“There is momentum both at the EU level and consumer level to find products that are easy to recycle. Also the forest industry has to get much better at promoting and talking about the circularity of forest fibres – but also better at recycling, too, by ensuring that there are efficient systems in place for recycling the fibres.”

The role of the EU is also to help companies to finance and scale up new products and ideas. More research and technology development is needed to harness this biomass potential in a sustainable manner.

“We have to have proper infrastructure and pilot equipment for scaling up products and production in Europe. For example, in the US they are investing much more money into demonstrating and building up new pilot plants.”

Rosén regrets that the EU has not yet managed to find a solid long-term approach in the promotion of sustainable options such as biofuels.

“It is impossible to invest in products and infrastructure if you do not have a long-term vision of what is going to happen at the political level.” ■

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.

An extensive paper machine rebuild for Sappi North America

Valmet will supply an extensive rebuild for Sappi North America at its Somerset paper manufacturing facility in Skowhegan, Maine, USA. As a result of the rebuild, the paper machine (PM 1) will be able to produce both coated paper and a variety of consumer packaging products.

Meet Valmet at PaperCon

Come to meet Valmet at PaperCon in Minneapolis, MN, USA, on April 23-26.

Meet Valmet in ICCI Turkey

Come to meet Valmet at the ICCI exhibition in Istanbul, Turkey on May 3-5.

Meet Valmet at Zellcheming

Come to meet Valmet at Zellcheming in Frankfurt, Germany, on July 4-6.



Increased capacity for Matias Gomá Tomás' board mill

Valmet has received an order for a board machine capacity increase upgrade and a three year paper machine clothing agreement from Matias Gomá Tomás S.A.'s board mill in Spain. The target of the rebuild is to increase production capacity and production speed by improving runnability, reducing breaks and increasing drying capacity.

Valmet to modernize flue gas desulphurization at Rokita's CHP plant in Poland

Valmet will modernize a flue gas desulphurization (FGD) of PCC Rokita SA's combined heat and power (CHP) plant in Poland. The delivery is part of a project in which Rokita will modernize the flue gas system of three coal fired boilers to meet future emission limit values. The modernization project will include replacing key equipment and modifying the absorber design.

Valmet Clothing Days seminar

Valmet Clothing Days seminar takes place in Tampere, Finland on May 10-11, 2017. The event includes case studies, presentations of new service and fabric developments, as well as Industrial Internet solutions. For more information, please contact pmc.fabrics@valmet.com.

Valmet's automation for Kemira's new sodium chlorate line

Valmet will supply an automation system for Kemira's new sodium chlorate production line under construction in Joutseno, Finland. The automation system will control the production process and ensure its reliable operation.

Valmet and Kotkamills sign an automation service agreement

Valmet and Kotkamills Oy have signed an extensive automation service agreement. In addition to supporting production processes, the agreement will secure high availability of automation at the entire Kotkamills mill and especially on the new consumer packaging board machine BM 2. This is one of Valmet's most extensive service agreements for automation in Finland to date.

Defibrator system to Quansen Wood in China

Valmet will deliver a defibrator system to Quansen Wood Co., Ltd's new fiberboard line located in China. The investment targets at extension of the product range. The mill will mainly produce thin board at a production of about 180,000 cubic meters per year, which requires approximately 18 tonnes per hour of bone dry (bd) fiber.

Roll service center extended

Valmet has at the end of 2016 expanded its roll maintenance operations with the latest technology equipment for rubber and composite roll covers in Karlstad, Sweden. This investment strengthens Valmet's service capabilities in Scandinavia, while also supporting Valmet's roll service offering to customers throughout Europe.

Luso Finsa in Portugal orders a defibrator system

Valmet will deliver a defibrator system to Luso Finsa in Portugal for their fiberboard production plant. The very first developed EVO-56 defibrator system was also ordered by the Finsa Group back in 2006 to its Padron mill in Spain and now they have rewarded Valmet with a repeat order.



Meet Valmet at Ligna 2017

Come to meet Valmet at Ligna exhibition in Hannover, Germany, on May 22-26.

Meet Valmet at PowerGen Europe

Come to meet Valmet at PowerGen Europe in Cologne, Germany, on June 27-29.

Strategic partnership with Consulta Enterprises

Valmet has entered into a strategic value-added reseller (VAR) agreement for power and process industry automation with Consulta Enterprises in India. The agreement covers India, the United Arab Emirates, Nigeria, Saudi Arabia, Sri Lanka, Bangladesh and Nepal.

Automation technology to Nepa Limited in India

Valmet will deliver automation technology to Nepa Limited in India for its two refurbished paper machines and new deinking plant. The solutions enable the paper mill to increase productivity and improve product quality.

Headbox upgrade for Green Forest in China

Valmet will supply a headbox upgrade and two headbox reconditioning service packages to Green Forest (QingXin) Paper Industrial Limited paper mill in China. "This upgrade turns our slice controlled headbox into a dilution-controlled headbox and we expect this to improve our board quality," says **Wu Guixing**, Production Director, Green Forest.

White liquor pressure disc filter to Daio Paper, Japan

Daio Paper has ordered a white liquor pressure disc filter to their Mishima pulp mill in Japan. The new filter will start up in September, 2017. "Daio Paper planned for a new white liquor filter to be installed in parallel with the existing two lines of white liquor filters. This investment is done to increase the white liquor production, which was limited in the existing lines. Daio selected the Valmet OptiDisc WL filter as the preferred technology for this de-bottlenecking project," says **Jiro Nakamura** of Valmet.

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.



Valmet's year 2016

Valmet took solid steps forward in its business performance and achieved a strong position as one of the world's sustainability leaders. We focused on strengthening our innovativeness and ability to bring future solutions to our customers. We took a major leap during the year by launching a new, improved approach in services.

Since the beginning, Valmet's Way Forward – the essence of the company's strategy – has been based on the mission of converting renewable resources into sustainable results. This means that with our unique combination of process technologies, services and automation solutions, we enable our customers to produce sustainable products from renewable raw materials, such as wood, waste or agricultural residues. We wanted to further define our role in the circular economy. We are developing future solutions to replace fossil fuels and plastics; to minimize the use of water, energy and other raw materials; and to enhance the lifetime and recyclability of our customers' production assets.

Solid and consistent business progress

In 2016, Valmet made consistent business progress. Our profitability continued its steady improvement and for the second year in a row we reached our target range with a comparable EBITA margin of 6.7%.

The orders received by the Services business line increased by 6% and Automation business line contributed EUR 299 million to orders received. The services business developed well in all geographical areas, with Asia-Pacific and South America leading the growth. In automation, we continued to win market share via competitor replacements.

Our strong work in sustainability received recognition

To Valmet and our customers, sustainability is at the core of the operations. Our Sustainability360° agenda covers all aspects of business and integrates our sustainability work with our strategic targets. During the year, Valmet received two important third-party recognitions for our sustainability work and reporting: Valmet was included in the Dow Jones Sustainability World Index for the third consecutive year with a record high result, and on the CDP Climate A-list for its actions and strategy to mitigate climate change.

Important steps in customer excellence

In customer excellence, we finalized the first phase of a longer project to take our way to serve our customers into the next level. We introduced four core commitments to our customers and crystallized our services offering under three categories: performance services, reliability services and new technology. This sounds simple, but it was a major effort, and it means a large internal transformation and training process around the world.

We want to create the future

Last year, we continued to crystallize our R&D focus to ensure a future-oriented R&D portfolio and a solid roadmap going forward. Our R&D has three goals: to ensure advanced and competitive technologies and services, to enhance the efficient use of raw material and energy, and to promote renewable raw materials.

Our Industrial Internet solution has four building blocks: our strong fleet of installed process technologies, our automation platform, a vast number of applications and services to utilize the gathered data for customers' benefit, and the partner ecosystem that is being built to tie the best Industrial Internet knowledge together.

Focus on process improvements has brought results

We continued to focus on health, safety and the environment (HSE), quality, procurement, and project management processes. Our lost time incident frequency rate (LTIF) among our own employees was a record low 2.3 in 2016. Our systematic work to develop our safety culture and to embed HSE management practices into all aspects of our business has led to this good development. In the coming years, we will put special emphasis on improving contractor safety management practices.

We value our forward-oriented culture

In 2016, we also discussed in more depth what is best about working at Valmet in order to attract forward-looking talent in the future, too. It turned out to be the feeling when we together as a team create sustainable and forward-moving results – that feeling when everything works together. We can continue share this feeling of accomplishment with our customers and partners, and within the Valmet team in the coming year.

Valmet figures in 2016

Net sales by area in 2016, %



- North America 22%
- South America 7%
- EMEA 47%
- China 12%
- Asia-Pacific 12%

Personnel by area in 2016, %



- North America 11%
- South America 5%
- EMEA 65%
- China 14%
- Asia-Pacific 6%

Forward

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FORWARD

Valmet's customer magazine

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