

nextlevel

by Voith Paper — N° 04

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Transforming tissue
with a global focus

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What are the
future paths of paper?

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One-stop solution for
all paper grades

The future is paper

Editorial



Non-biodegradable trash is pushing our planet to the brink. Fixing the waste crisis requires a coordinated and radical shift towards more sustainable models of manufacturing and recycling. Voith is proud to be spearheading such a movement in the paper industry. As the full-line supplier in the industry, we have the unique expertise and experience to drive such a change.

Our thought-provoking cover story, "The great debate," demonstrates just how well we understand what is at issue. It is the reason why paper manufacturers repeatedly put their trust in us. We design reliable and future-oriented products for sustainable and cost-efficient production. Through sophisticated stock preparation processes, smart designs, tailored rebuilds and customer-oriented support hubs with dedicated teams. Behind which is a digital vision shaped by artificial intelligence and digital twins.

Applied smartly, tailored paper solutions can provide answers to our environmental challenges. Read on to discover how.

Andreas Endters

Andreas Endters
President & CEO, Voith Paper

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For compelling reasons:
the future is
100% paper



Another milestone: Martin Jauch discusses tissue trends

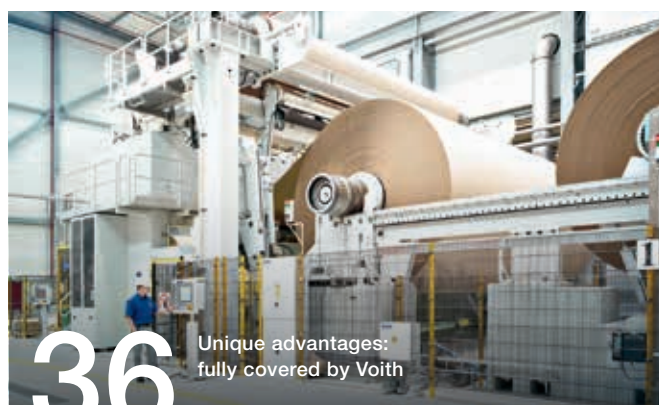
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27 Why it is time to take more responsibility



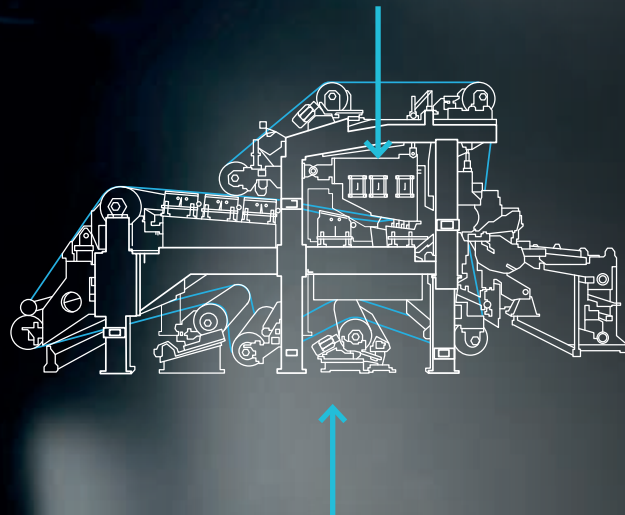
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Dewatering: low impulse, high performance

The newly developed DuoFormer CBh provides a smart combination and perfect alignment of proven components from the Voith DuoFormer family. This tried-and-tested design sees conventional forming rolls replaced with shoe-blade technology. As a result, the DuoFormer CBh is particularly cost-efficient as an investment, during operation and in maintenance. This modular approach to innovation has clear benefits for customers, as Sjon Vrieze, Manager Technical Operations, Smurfit Kappa Roermond PM 1, confirms: "The know-how of Voith with gapforming concepts, the pilot plant research they did in the Voith Technology Center in Heidenheim and the results we achieved together on past projects with Voith were the basis for our decision to order the DuoFormer CBh." The PM 1 start-up was an outstanding success. Completed on schedule in February 2019, it produced saleable paper from day one.



Efficiency in compact form

The compact design of the DuoFormer CBh is suited both for rebuilds and new machines. High dewatering capacity is ensured through the advanced shoe technology and the top wire suction box.

Instead of an investment- and maintenance-heavy suction roll, the HiVac, a high vacuum box, at the end of the DuoFormer CBh ensures the highest dry content.

1,600 m/min: Maximum operating speed.

News

A quick round-up

Dry and clean when hot and humid

Welcome Zircon and Zircon^{High}, two new members of the CleanWeave product family, the unique dryer fabric portfolio from Voith. Zircon has a dense weave structure with lower air permeability, while Zircon^{High} features an open weave structure for higher air flows. Resistant to hydrolysis and abrasion, both target an extended service life. They are particularly suitable for medium hot environments and challenging dryer sections, such as board and packaging paper machines. Thanks to the continuous flexing around rolls and cylinders, contamination is also worked out of the fabric. This means Zircon and Zircon^{High} maintain their cleanliness and drying efficiency over their entire lifetime. As with all members of the CleanWeave family, Zircon and Zircon^{High} have minimal intersection points and a low internal void area, preventing the accumulation of contamination in the dryer fabrics, ensuring they are easy to clean.

Top award for agility

Out of a total of 159 companies from around the world, Voith Paper has been ranked as one of the top five companies in agile innovation by the Fraunhofer Institute for Production Technology (IPT). Together with the Laboratory for Machine Tools and Production Engineering (WZL) of the RWTH Aachen University and a consortium of high-ranking industry representatives, the Fraunhofer IPT undertook an in-depth benchmarking project to determine "Successful Practices" in the early stages of the innovation process. Voith Paper was honored for its strong customer-centric and market-oriented focus for agile software development and machine design.

Locally based, strategically focused

Unionpel, one of Argentina's leading packaging paper manufacturers, chose Voith to supply its new MasterJet Pro headbox fitted with EdgeMaster format limiters for its paper machine, PM 1, that operates at its San Justo mill, in Buenos Aires. The new Voith MasterJet Pro headbox has achieved substantial improvements in paper web formation, as well as a significant decrease of CD basis weight variations. All services were completed on schedule, and the machine's commercial production was resumed immediately after start-up. For Unionpel, Voith's subsidiary in Argentina was an important factor for the strategic partnership. Such a local presence ensures that Voith offers products, services and solutions more quickly and accurately.

112
metric tons daily
production capacity

Record production boost

With the installation of the Voith MG cylinder at Irani's Vargem Bonita mill in the Brazilian state of Santa Catarina, the company has set a new production record for its specialty paper line. Irani's daily production average has increased from 90 to 112 metric tons per day. This average is expected to increase even further over the year, in line with the progress of the machine's learning curve. Made of carbon steel plates, the MG cylinder operates under higher steam pressures, thereby ensuring increased thermal efficiency. The higher gloss and smoothness properties achieved with the new cylinder translate into higher quality and added-value products. "Replacing the entire cylinder instead of grinding our existing one was the right choice," says João Santos, Maintenance Manager of Irani. "It has allowed us to increase our paper quality and production capacity consistently. Voith's solution proves how important it is to have a partner with an overall perspective of the business."



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innovate

A closer look at innovative technology,
people and solutions

The digital shake-up

Voith is about to re-invent one of its top-notch products, the DuoShake. With more than 250 installations worldwide, the DuoShake has been a key component in the papermaking process for a quarter of a century. Our digital generation of the shaking unit – DuoShake DG – is a forward-looking digital upgrade for the Papermaking 4.0 world. Its

Voith BlueBox allows mobile, on-the-spot parameter changes and a real-time visualization of data-driven insights. An intuitive cockpit provides key performance indicators. The DuoShake DG will enable new features, such as data analysis or condition-based maintenance.

Servolution: what's new?



Step inside
virtual reality:
stay safe
in the real
world.

Virtual training takes off

Although the virtual reality (VR) technology is a new addition to the Voith PaperSchool program, it is already making waves in the industry. VR provides a safe, immersive environment – even for trainings that are not possible in real life. Within seconds of putting on the headset, the trainee dives into the virtual paper machine world and is guided safely through a set of tasks. The confinement of VR increases the efficiency for the trainee. In contrast to a real plant, it is possible to give even untrained staff potentially hazardous training assignments. What's more, it is possible to embed safety issues within a routine task that appears quite safe on the surface. This increases general awareness of safety issues.

“Our VR training environment closes the gap to gamified training tools such as professional flight simulators,” highlights Michael Neumann, Manager PaperSchool, Voith Paper. “You can learn, make mistakes and come out confident that you can complete the tasks safely.” How does VR fit into the Servolution concept? More effective training helps not only to improve safety in mills, but also to increase machine availability and paper mill productivity.



“Our virtual reality training uniquely captures our attention and learning potential. The pedagogical effect is unrivaled.”

Michael Neumann

Manager PaperSchool, Voith Paper

Safe

Experience hazardous situations without the danger.

Immersive

Enjoy experiential learning that is more memorable.

Effective

Achieve 70%–80% retention rate.

Flexible

Carry out training at your convenience – independent of location and time.

Popular

Perfect for seasoned employees and the next generation of technicians.





innovate 09

Voith ISP85
InfiltraScrewPress
for highly efficient
dewatering.



Voith
MultiFoil rotor
for maximum
screening
efficiency.

Voith IPR Rotor
for energy-
efficient pulping.



Global refurbishment: locally based

With the opening of two new Refurbishment Service Locations, Voith now also provides a locally based, highly qualified refurbishment service in Whitfield (Boksburg), Gauteng, South Africa, and in Kommunar, not far from St. Petersburg, Russia. The new hubs will benefit from the Voith expertise of the 20 existing service hubs strategically located around the world.

“Bringing the right infrastructure and our high-caliber expertise even closer to the customer is crucial to ensure our customers’ paper mills maintain overall efficiency in the long term,” explains Geert Tichler, Product Manager, Voith Paper. In the past, customers often had to endure long delays and costs for essential repair work while parts were shipped abroad. Or, they were obliged to work with local firms that lacked the necessary expertise. “Both scenarios led to production losses and unscheduled shutdowns,” adds Tichler. “And often costly rotor replacements.”

In contrast, all Voith Paper Refurbishment Services Locations offer a wide range of customized services. The local teams have the expertise

to repair and refurbish the precisely tuned surfaces from rotors and screws back to design performance – independent of supplier and type. As this kind of maintenance is so specialized, Voith experts have been specifically trained in optimum repair techniques and methods. “In addition to adapting to market requirements, we are constantly innovating and optimizing repair techniques and materials,” adds Tichler, “improving performance and reducing costs.”



Servolution for refurbishments

The poor quality of today’s recycled wastepaper causes significant wear in rotating parts. Voith engineers have perfected the restoration of process equipment, with resounding success for customers.

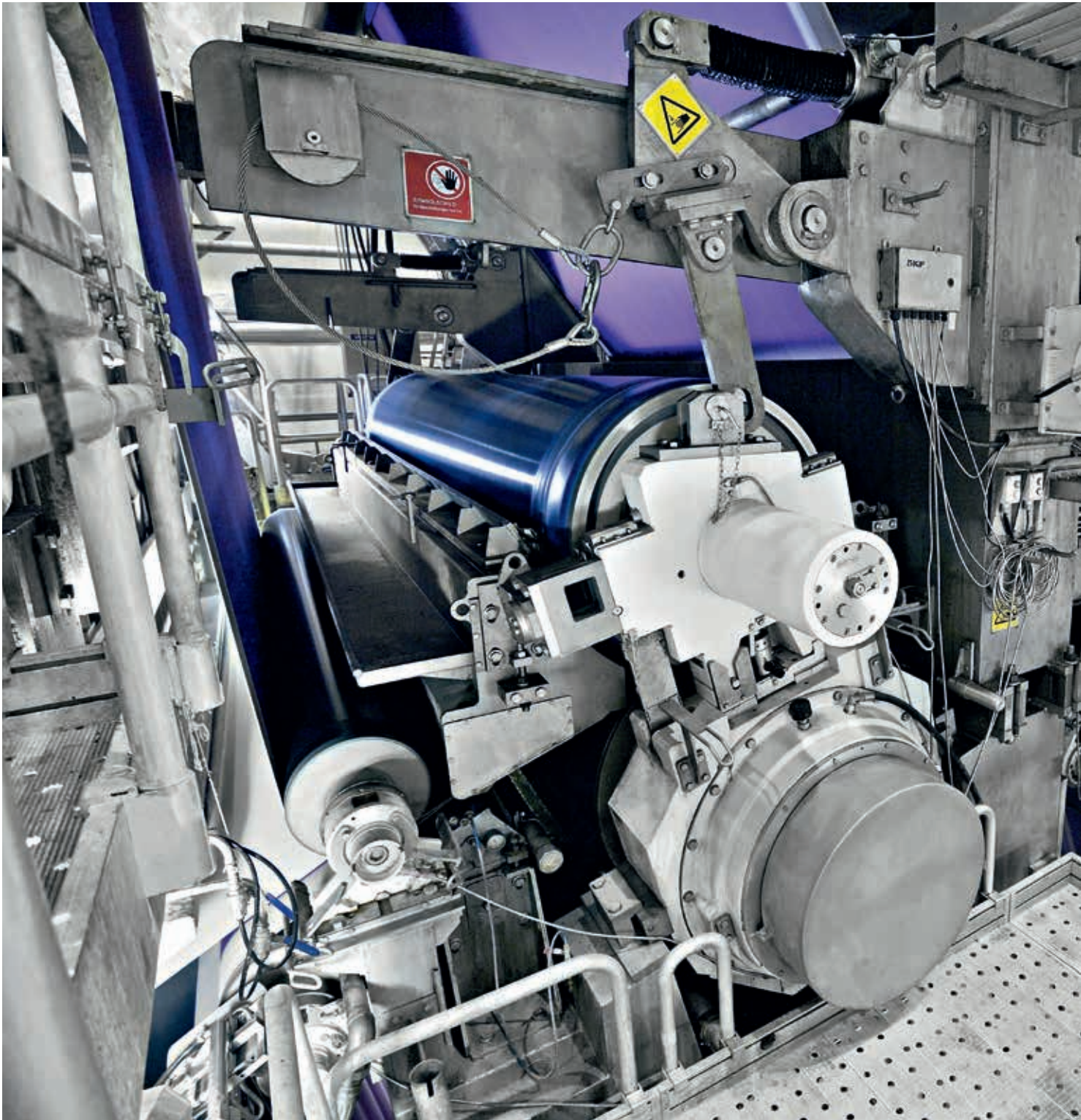
Ensuring reliable and efficient mill operations.

Achieving substantial savings in energy.

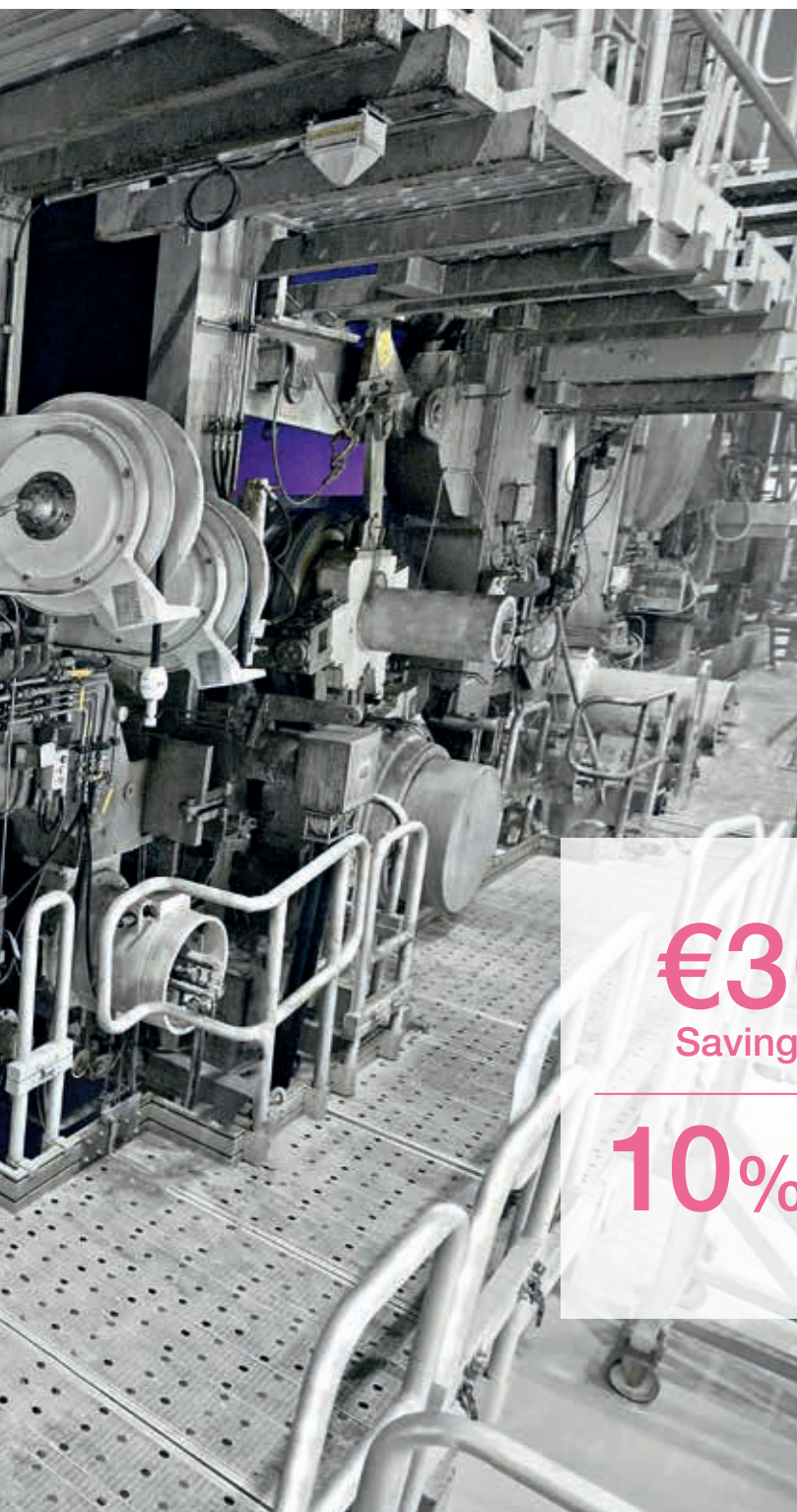
Cutting down on maintenance costs.

Avoiding costly purchase of rotor replacements.





A record for press rebuilds



↓
€30 million
 Savings per year.

10% Increase in productivity.
 ↑

With 20 successful start-ups under its belt in China, Voith Paper is the clear forerunner in the paper industry for rapid and cost-efficient press rebuilds.

Speed, efficiency and the environment: three key factors that are driving the current trend for rebuilds in China. Increasingly competitive conditions, stringent regulations and changes in the availability, quality and cost of raw materials in the country have created a dilemma for paper manufacturers: optimize operations rapidly or risk losing market share and profitability.

Voith is playing a key role in supporting Chinese paper mills to upgrade their plants with cost-efficient and effective rebuilds. The fast return on investment convinced many manufacturers – including Lee & Man, Jinzhou Paper, Jianhui Paper and Wanlida Paper – to choose Voith. In total, 20 rebuilds have already been completed over the last two years.

Customers often cite Voith's record in delivering advanced technological solutions as the deciding factor for their choice. For Jinzhou Paper, for instance, the change has been phenomenal.

The Jinzhou Paper PM 3 NipcoFlex press and headbox rebuild project achieved an immediate increase in machine productivity by over 10%. The machine speed went up from 800 m/min to 950 m/min. Dryness after press is higher than before, web strength is stronger, sheet breaks fewer – while steam consumption is much less. Thanks to close cooperation between Voith and Jinzhou Paper, the project was completed within

30 days, and paper on reel was achieved within six hours. "The customer benefits of the Voith NipcoFlex press technology are obvious. Short shutdown times, fast installation and start-up, followed by smooth operation – reliable!" explains Dr. Gregor Wiche, President Products & Services, Voith Paper Asia. "This, combined with more than €30 million annual savings for the 20 presses together, makes our shoe press the best product in the market by far."

Jun Pang, the Deputy General Manager at Jinzhou Paper, confirms the company is satisfied with the timely execution and results of the rebuild: "Voith's NipcoFlex shoe press is the best one I have ever used. And Voith is our paper mill's best partner."

Digital vision

How is the digital shift in the paper industry shaping up? Dr. Jürgen Abraham, Digital Business Officer, Voith Paper, outlines his vision of a seamless process boosted by artificial intelligence, smarter products and digital twins.

What is the digital vision of Voith?

In a nutshell, we see ourselves as the value-add partner throughout the entire life cycle of the paper machine and equipment. For our customers, buying a paper machine is not a once-in-a-lifetime event, but the beginning of a journey. From the outset, our customers want a machine that produces paper in the most profitable way. Not just today, but for the machine's entire lifetime. We help them remain at the forefront of technology throughout. Digitalization, in the form of Papermaking 4.0, ensures that the equipment always performs at its best, allowing our customers to stay competitive.

Artificial intelligence promises to upend our lifestyles. What can it bring to papermaking?

In one word: insights. Data transparency is at the core of digitalization and will provide new insights to better understand and control the papermaking process. Today, equipment signals already provide a wealth of data. But it's very hard for a customer to generate value out of this. Digitalization makes the performance of the machine more visual, and artificial intelligence helps to translate the data into actionable insights. It gives us new levels of control, automation and transparency – across locations.



Artificial intelligence leads to actionable insights and new levels of transparency.

_____ **And in the mills?** Such levels of transparency and automation will allow our customers to bridge the upcoming personnel gap due to demographic developments, for instance. A lot of seasoned papermakers are leaving the industry. Their replacements won't have the luxury of learning their trade over decades. Digitalization is key to enhanced training programs that will speed up the onboarding of new employees. Our virtual reality training allows staff to gain experience of operating their machine in a safe, virtual environment. But that's not all. As real-time information is fed into the cloud, Voith technicians have access to the real-time data off-site. As a result, we are able to support our customers more closely to continuously improve their processes. In our upcoming remote service, for example, we use this access to bring the expertise of skilled Voith technicians to the customer via video.


_____ **Will that require a more open mind-set?** Most definitely. In this respect, we can build on our long-term relationships with our customers. Our history shows that customers can trust us, in particular when it comes to data security.

_____ **The Industrial Internet of Things is a key driver. What's your favorite smart product?** That would be DuoShake DG. It is one of the first of our Papermaking 4.0-ready standalone products. Through the remote connectivity of DuoShake DG to Voith, we help our customers to continuously optimize the performance of the equipment. Such innovations take us a step closer to the digital twin. →

“Data transparency is at the core of digitalization.”

Dr. Jürgen Abraham
Digital Business Officer, Voith Paper





“Digitalization, in the form of Papermaking 4.0, ensures that the equipment always performs at its best.”

Dr. Jürgen Abraham
Digital Business Officer, Voith Paper

What is the deal with digital twins?

There are two aspects to our digital twin concept: the hardware and the process twin. The process twin stores real-time data generated during the running of the machine. It leads to efficiency gains in processes. DuoShake DG belongs to the process twin, as does our modular OnEfficiency portfolio. The OnEfficiency product family helps customers to control properties such as strength, fiber efficiency or sheet breaks. These tools dig into a variety of different machine data and parameters to give our customers a consolidated picture of the desired performance. Which is currently very hard to do otherwise. The second step will be to feed this data into a control loop so the paper machine controls itself and runs smoothly.

And on the hardware twin? Here, the goal is to improve machine availability and maintenance by increasing the transparency of maintenance needs and tasks of the installed equipment. I'm a huge advocate of our Voith Paper Webshop, which simplifies not only the purchasing of spare parts but also assists with the identification of spare parts by digging into this data pool. Virtual reality, VR, is also on this twin. As I mentioned before, VR allows training of specific

maintenance tasks in the safe environment of the virtual world. Ensuring a safe and standardized execution on the machine. However, its role already starts in the design phase by giving our customers a tool to become familiar with the equipment before the construction. It is a great tool, and we are constantly finding new ways to utilize it. Its story is far from over.

Where will these innovations lead?

This year, our field trials across the globe, including with VR and various OnEfficiency modules, will provide proof that we are achieving the benefits customers demand. We are increasing our focus in the evaluation and development of new value-add modules. Next comes the biggest challenge: scalability. Our solutions will always be tailored to the customer and paper grade, but the individual modules, equipment and tools will become more standardized. Higher standardization allows us to streamline operations and make solutions more widely accessible and cost-effective. Digitalization will give us a lever to continuously raise the bar in machine efficiency and availability. What makes us stand out in the industry is that we are moving toward a complete seamless approach to digitalization. This is the future.

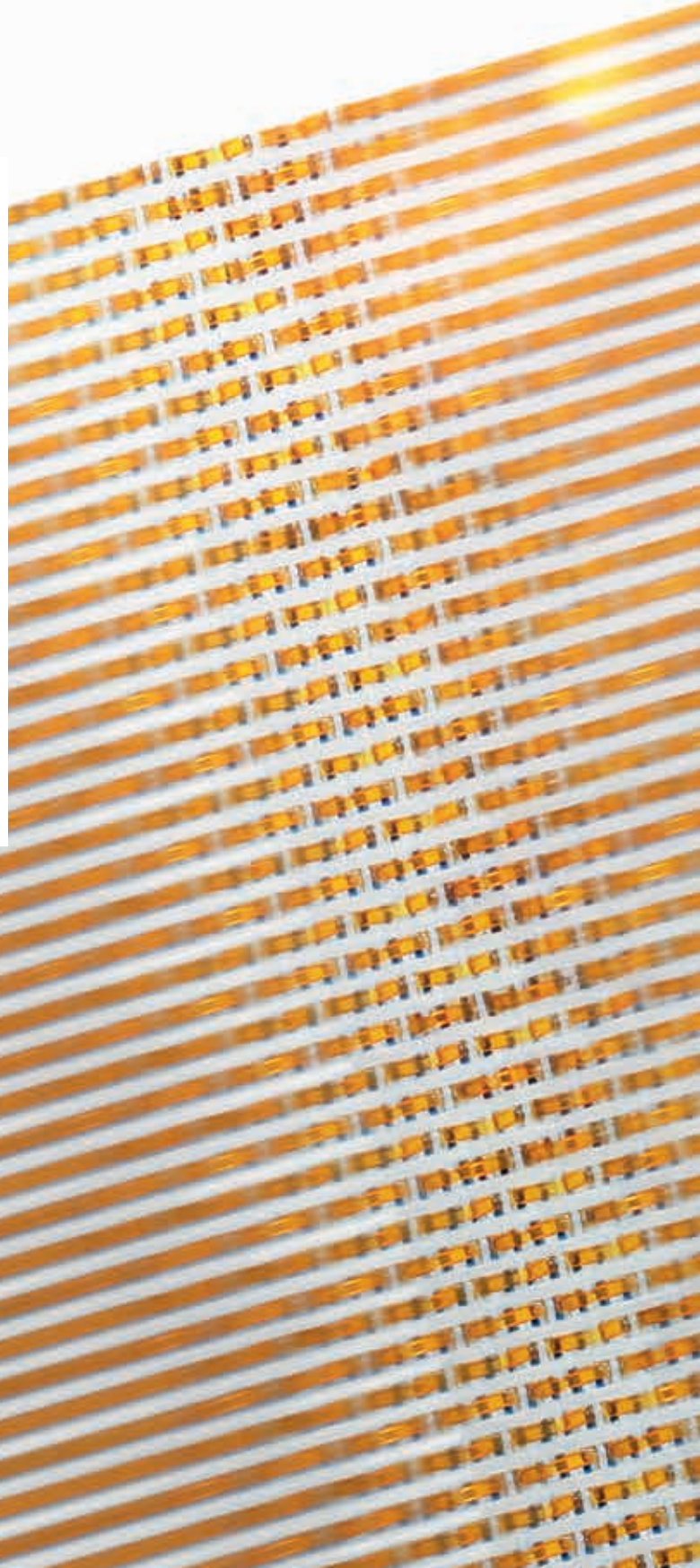
The Voith digital twin works on two levels to improve machine performance.

transform

An overview of key developments in
the paper industry

High-speed insight

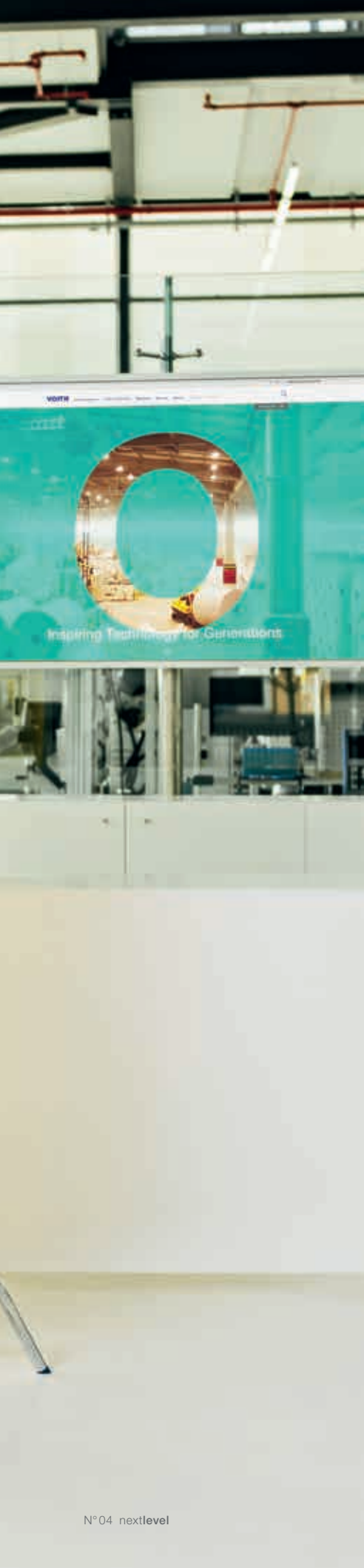
Condition monitoring of forming fabrics just got more efficient and accurate. The custom-built high-speed Voith Q-Fit camera captures high-resolution photos of yarns measuring a mere 0.3 mm in diameter, traveling at a speed of 1,500 m/min – under harsh, humid and the darkest of conditions. Voith service engineers analyze the images on site to provide real-time condition monitoring of forming fabrics. No wonder customers are impressed. Such insight is normally available only during shutdowns. “Ultimately, we avoid surprises,” confirms Jochen Wondrak, Production Manager at UPM Plattling PM 1. “The upfront knowledge from this unique service tool optimizes our shutdown planning and prevents unnecessary preparatory work for fabric changes. We’re convinced that the Voith Q-Fit camera ensures that our forming fabric performs to its full lifetime potential.”



A man in a dark suit and light blue shirt stands smiling in front of a large yellow backdrop. The backdrop is held up by metal stands. In the background, a factory environment is visible with glass partitions and industrial equipment.

**“We have
at our
disposal
unrivalled
expertise.”**

Martin Jauch
Senior Vice President Tissue,
Voith Paper



Tissue: in full swing

Martin Jauch, Senior Vice President Tissue, Voith Paper, heads up the new Voith tissue organization. Discover what this means for the industry in our in-depth interview. How does Voith's position as a full-line supplier ensure customers gain a competitive edge?

_____ Martin Jauch, let's start with your role and vision for the new tissue organization.

My goal is to concentrate on our tissue activities worldwide. This means putting a global focus in our development and simultaneously taking local customer needs and market trends into account – and adding even more customer benefits. We will use our existing strengths and experience to further expand

and increase our footprint in the tissue industry. Our digitalization drive alone secures a real value-add for our customers.

_____ How will tissue customers benefit?

We are respected in our field as the reliable partner with a strong technology focus. Our new tissue organization will build on these strengths. The focus will be 100% on tissue, backed by the full potential →

of Voith's expertise as the full-line supplier in the industry. We offer innovative solutions, products, service concepts and digital portfolio. By bundling our experience across the whole papermaking process for tissue, we are in a position to develop the market further together with our customers.

Voith is renowned as a full-line supplier not only for all paper, but also for all tissue applications. How has Voith built up such expertise and trust?

Voith built and sold the first-ever tissue machine worldwide! We have at our disposal unrivaled expertise at the Voith Tissue Innovation Center in Brazil. Our Fiber Technology Center in Germany covers all grades, as does our automation competence. Our domain knowledge doesn't end there – it extends over fabrics, clothing and covers, too.

As the full-line supplier, we provide complete process competence from one single source. This is a huge benefit for our customers. Of all the tissue machines on the market, our XcelLine offers the fastest start-up, highest availability and shortest erection time. Since 2015, customers from around the world have purchased over 25 XcelLine tissue machines. These were chosen by customers after their own due diligence evaluation of Voith machine efficiency, paper quality and low energy consumption. We also supplied the world's fastest tissue machine with a steam-heated dryer hood. This TM 16 for Cheng Loong in Taiwan produces up to 2,001 meters of tissue every

CHINA: The Taison Group trusts XcelLine for major expansion into tissue.

“The successive start-ups of four Voith XcelLine tissue machines for the Taison Group confirms the company is stepping up its expansion route and is determined to take a leading role in the Chinese tissue market,” says Paul Zhao, Project Manager, Voith Paper China. All four run at the greenfield plant in Jiujiang city, Jiangxi province.

“The Taison Group placed demanding criteria on the scope of delivery and partnership,” explains Zhao. “They wanted the highest speed with most capacity, efficiency and running stability. As well as the least energy consumption.” Compelling local and global customer references convinced the Taison Group to place their trust in Voith.

As the full-line supplier in the industry, Voith provided the XcelLine tissue machines, BlueLine stock preparation and Tissue 4.0 innovations. Key features include the perfect combination of a NipcoFlex T shoe press to

1 – Breaking new records: fastest start-up, low energy usage.

2 – An impressive line-up: high-quality tissue rolls.





2

offer remarkable energy savings, a 5.5-meter steel EvoDry Y yankee cylinder to enhance drying efficiency by optimized heat transfer, and the high-performance EcoHood T steam-heated hood to provide the required tissue quality with lower energy consumption. The Tissue 4.0 automation package with Distributed Control System and Machine Control System is an integral part of the order.

The record-breaking 9 minutes from the “stock on wire” to “paper on reel” for the TM 10 start-up confirms the sophistication of XcelLine. In a customer survey, Taison Group rated Voith extremely highly for the quality of the delivered solution, machine performance, excellent site service and timely delivery, highlights Zhao. “As a strong partner to Taison Group, Voith will continue to provide reliable technical support and drive sustainable development through relentless innovation and optimization of the tissuemaking processes.”

↓
480,000
metric tons
Annual production
capacity.

4
Four tissue
production lines
(TM 7, TM 8, TM 9
and TM 10) at one
location.

speed
+
capacity
+
stability
+
energy-
efficiency



minute. It set new technical standards when it went into operation.

Tell us more about the success of the innovations for tissue. We have succeeded in transferring tested and proven Voith technologies to tissue. Take for instance the NipcoFlex T. This development of our shoe press technology specifically for tissue saves on natural resources and reduces energy costs significantly. Other innovations also include the EcoChange T, and, of course, the MasterJet Pro T headbox. This works without recirculation, which reduces energy consumption. Together, and combined with our LowMist Former layout and automated dust-eliminating steam hood, these innovations ensure the highest solid contents and high efficiency, and really make a difference when it comes to serviceability, energy consumption and overall performance.

Tissue manufacturing comes with a unique set of hazards. How does Voith reduce the risks?

Safety is a crucial component in the design of all our products. Our technology fulfills all international standards, such as pressure codes for Yankees. Voith engineers developed the high-efficiency dust removal system to reduce the risk of fire. Our design improves the overall operator environment, which is secured by our equipment accessibility and maintenance.

What's happening in the area of pulp? Fiber makes up 60% of production costs. Our BlueLine stock preparation solutions ensure highly efficient fiber handling. In addition, →

our IntensaPulper IP-V for virgin fibers contributes to reducing energy consumption, improving maintenance expenditure and lowering fiber loss.

_____ And on the digital side?

Papermaking 4.0 applies equally to tissue operations as it does to other paper grades. Including in the use of artificial intelligence. Conventional means to measure paper properties and derive machine settings take time and disrupt the process. Papermaking 4.0 reduces this delay – which immediately translates into higher efficiency. Virtual sensors bring reliable and fact-based data about the process. Such insights reduce uncertainties and lead to stable and predictable operations.

Our one-stop Industrial Internet of Things cloud platform, OnCumulus, provides tissue manufacturers with a customizable central hub for data analysis and applications. For instance, the OnEfficiency.Strength module uses sensors to determine sheet strength. And, as with all of the XcelLine machines, our OnCare.Asset Management portfolio is an essential component for predictive maintenance and performance monitoring in tissue production.

Tissue will also enjoy the same benefits of virtual reality as all other paper grades. Voith is the first company to use virtual reality on a large scale for paper manufacturing. Starting with the 3-D model, customers can experience their machine before purchasing. And I mean really experience what it is like to walk through and use the

PORTUGAL: The Navigator Company chooses XcelLine to expand its sustainable tissue business.

_____ The environment has always been a primary concern for The Navigator Company. The Portugal-based pulp and paper group is Europe's top producer of bleached Eucalyptus globulus kraft pulp and has a forestry management system certified by the most widely respected international organizations. With the support of Voith, it is currently undertaking a major expansion in the tissue sector. By 2025, tissue is planned to account for 15%-20% of its sales. Essential to this strategy is the full scope of supply of Voith technology for the firm's existing Cacia site in Portugal, one of the biggest short-fiber pulp production plants in Europe.

"The XcelLine tissue machine is designed to maximize the utilization of eucalyptus pulp. This enables us to make superior tissue papers, in particular paper with high softness and bulk," says Paulo Santos, Mill Manager of Navigator Tissue Cacia, S.A. It is a

1 – At the core of the Cacia project: the XcelLine tissue machine.

2 – A modern site: operator-friendly and efficient.





“Tissue manufacturers will benefit from our digital twin.”

Martin Jauch

Senior Vice President Tissue,
Voith Paper

challenge to produce tissue paper with 100% eucalyptus pulp. Voith has extensive experience and unrivaled references of production processes using exactly this kind of raw material, highlights Leunis Teixeira Rocha, Project Manager, Voith Paper: “Our expertise is crucial for this partnership.”

Santos agrees, and reels off many reasons for partnering with Voith, including the good references, training of staff and the excellent support of the Voith Tissue Innovation Center in São Paulo, Brazil. Ultimately, teamwork is essential for the project, as Santos confirms: “Navigator and Voith are working together as a team to make the Cacia project a success and to make the site a reference in Europe.”

At the site, Voith innovations will minimize energy consumption and achieve maximum efficiency in short fiber usage. With the NipcoFlex T shoe press, the need for thermal energy can be substantially reduced. Operator-friendly, energy-efficient elements include the Pluralis refining technology, the MasterJet Pro headbox, EvoDry Y steel yankee and the EcoHood T. Moreover, Papermaking 4.0 features include the innovative ComCore automation platform. “The XcelLine machine is very efficient regarding the consumption of electricity, thermal energy and water,” adds Santos. “This is a big contribution to sustainability and the environment.”



“The XcelLine tissue machine is very efficient regarding the consumption of electricity, thermal energy and water.”

Paulo Santos

Mill Manager of Navigator
Tissue Cacia, S.A.

70,000 metric tons

Annual production capacity of high-quality toilet and towel paper on the new XcelLine tissue machine.

2,000 m/min
Maximum operating speed.

5,600 mm
Paper width.



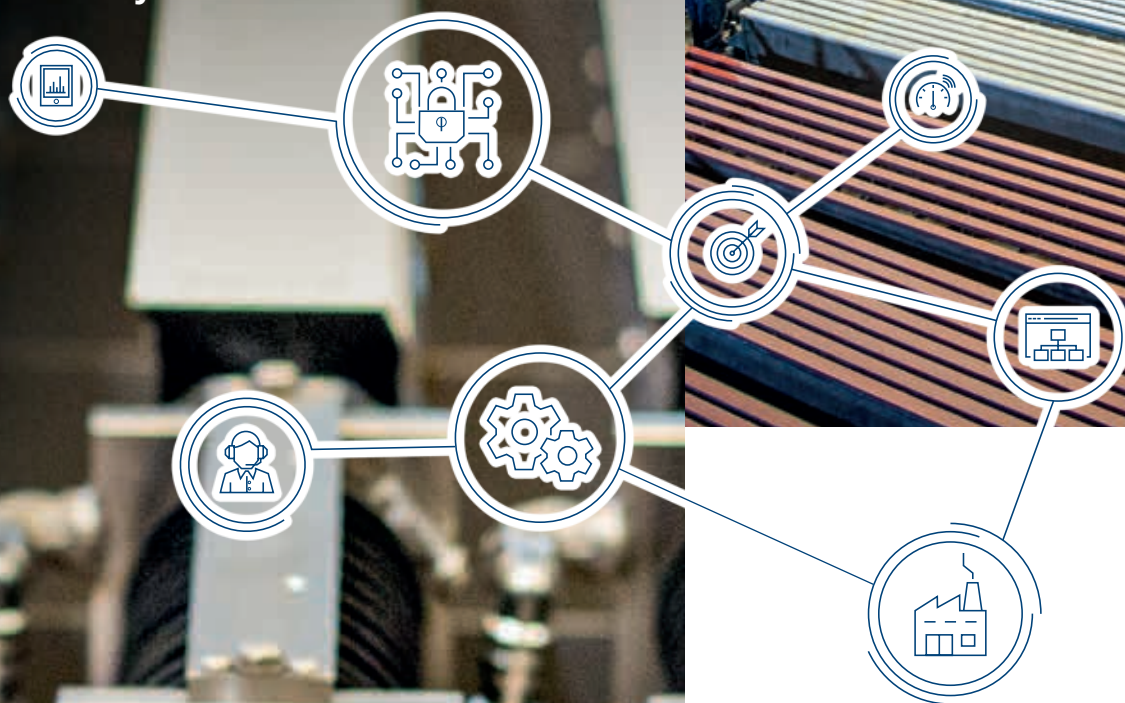
machine. Virtual training will not only speed up the learning curve, it will also help improve performance. Ultimately, as with all our customers, tissue manufacturers will benefit from our digital twin. This is an exciting development that will change how the industry will work in the future.

Finally, a word about your dedicated services for tissue?

One word covers it all: Servolution. This is about customer-centric solutions. In practice, we offer so much more than just spare parts. By providing overall solutions, our customers improve their productivity and reduce costs. In the field of tissue, we offer specialized OnSite Yankee Services, as well as a mechanical roll service contract. In addition to conventional services – such as supervision, start-up, optimization or alignments – Voith offers machine audits. Our Availability Service and Productivity Concept will bring existing tissue equipment to the next efficiency level.

Tailored upgrade

How a timely and rapid retrofit raised the bar and improved efficiency: with Voith's automated VForm hydrofoils.



For over thirty years, Mauricio Silva, Mill Manager at Forestal y Papelera Concepción (FPC), Chile, has known Voith as a reliable partner. "I've always been satisfied with the services that they supply," he explains. "For us, Voith is a full-line supplier that helps us to improve our machine and production."

FPC recently turned to Voith for support when one paper machine was not performing to its full potential, which had resulted in poor formation and low drainage in the wire section. FPC produces a wide portfolio of board and packaging grades, including testliner, fluting and gypsum board paper, in the range of 100 to 250 gsm. Annual production is around 100,000 metric tons. Flexibility in production was therefore an important benchmark to strengthen the performance and also the company's competitiveness.



The upgrade with the automated VForm hydrofoils is performed on the back layer of the two-layer Fourdrinier PM.

The solution was a tailored retrofit of the forming section with Voith's automated VForm hydrofoils initially in the bottom wire of the two-layer Fourdrinier PM. Just recently FPC also ordered the retrofit with VForm for the top wire. The upgrade ensured a unique blend of flexibility and consistency in production that FPC had not been able to achieve before. What's more, the upgrade was carried out within 10 hours on site during a scheduled shutdown. "After two days, we were already operating back at full speed," adds an impressed Silva.

Digital expertise

On top of the mechanical upgrade with the automated VForm hydrofoils, the retrofit was complemented with the connectivity to Voith's ComCore platform. It was this combination that led to the impressive results, as Silva is happy to confirm: "The benefits have been great in terms of the formation we have achieved, which are significant improvements, and we have also achieved better drainage as well as important improvements in paper strength values." For the main paper grades, the quality parameters – for instance, the tensile



10 hours
downtime required
for the upgrade.



**"Voith is a full-line
supplier that
helps us to improve
our machine
and production."**

Mauricio Silva
Mill Manager at FPC, Chile



www.voith.com/nextlevel4-VForm



strength properties – were improved by up to 12%, and formation by up to 14%. Dryness before press increased by up to 1.5%.

The secret?

"The beauty of this solution lies in its unique flexibility. It's unrivaled in the industry," says Dr. Thomas Jaschinski, Global Product Manager, Voith Paper. Jaschinski was directly involved in designing the customized solution for FPC. "Our VForm innovation allows enabling automatic changeover if different paper grades are produced due to the optimal adjustment of the VForm foils. When connected to ComCore – and where appropriate to OnCumulus, the Voith digitization cloud platform – our customers have access to monitoring that supports improved efficiency on another level completely." At FPC, this means that the production becomes more automated and therefore much smoother and more consistent. For all paper grades.

With expertise and a sense of humor, the upgrade was performed in excellent time. The result: a benchmark for the industry.
From left to right: Gabriel San Martin, Instrumentation Supervisor at FPC; Pedro Aguilera, Paper Machine's Head at FPC; Mauricio Silva, Mill Manager at FPC; Guilherme Custódio de Araújo, Designer, Voith Paper; Thomas Jaschinski, Global Product Manager, Voith Paper; Sebastião Moraes, Automation Engineer, Voith Paper; Juan Carlos Muñoz, Electrical Department Head at FPC; Juan Carcamo, Engineering and Project Head at FPC.



THE BLUELINE EFFECT

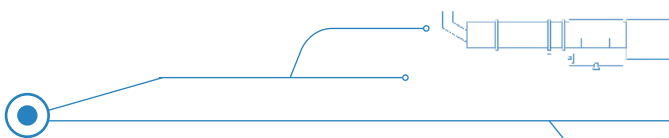


Fully covered!

The complete OCC process from Voith.

Thanks to elevated process consistency and energy-conserving techniques, including for instance the EcoJet, BlueLine provides up to 20% savings in pumping energy. The elevated consistency approach also directly translates into lower investment cost.

The process begins.



1. Pulping
Highest trash removal without
critical spinning: IntensaDrum.



2. Cleaning
The BlueLine two-stage process for
low loss of fiber, minimum wear and
efficient dirt removal: InduraHiClean.

Stricter regulations create a challenge for Chinese paper manufacturers. With the BlueLine stock preparation portfolio, they are reducing their environmental impact and positioning themselves for strong sustainable growth.

_____ With well over 50% of the market share, the Voith BlueLine stock preparation line is the clear market leader in China. The reasons why Chinese paper manufacturers consistently rank Voith as the number one supplier in internal rankings are also clear: “We ensure the lowest fiber loss, the lowest energy consumption and the lowest water consumption – for the highest quality of pulp,” says Kurt Yu, Regional President, Voith Paper Asia. “We provide the benchmark for a sustainable competitive edge for plant operations.”

Challenging conditions

Given the current market conditions for OCC (old corrugated containers) stock preparation lines in China, such benefits are particularly compelling. The combination of stricter import restrictions on recovered fibers, stringent environmental regulations and rising labor costs has proven a challenge for the domestic paper industry.

Since China’s stricter regulations on contaminants in recycled fibers came into effect in 2018, local manufacturers have turned to domestic suppliers of recovered material to make up for the dramatic loss in supplies. “The quality, however, is significantly inferior,” highlights Anton Han, General Manager, Voith Paper Asia. “We now have to handle more



furnish variability, more rejects and an increase in coarse contaminants.”

Challenge accepted

For manufacturers of high-performance recycled containerboard a more technologically advanced approach to stock preparation is required to cope with these developments. Voith ensures a much higher quality and robustness at each and every stage of the OCC process. “To begin with, the technology and engineering within each individual machine and component is superior, which allows for much more sophisticated plant concepts,” Han explains. “The stages are perfectly aligned so the whole OCC process with our BlueLine portfolio is perfectly balanced.” What’s more, Voith uses its feed forward concept to ensure elevated consistency levels in →

Sophisticated and perfectly aligned: the Voith BlueLine OCC process ensures the highest quality of pulp with the lowest fiber loss and energy consumption.



3. Screening
Leading technology in effective stickies removal at lowest fiber loss: IntegraScreen.

“We provide the benchmark for a sustainable competitive edge for plant operations.”

Kurt Yu

Regional President, Voith Paper Asia

Long-term trust in Voith technology and performance.

the stock preparation process. Voith is the only full-line supplier that offers fiber technology in combination with solutions to achieve the lowest levels of water consumption. Combining this advanced engineering with Papermaking 4.0 solutions will enhance stock preparation in the future.

Delivering performance

These are the principal reasons why the largest manufacturer of recycled containerboard in the region has placed multiple orders for BlueLine stock preparation for several plants across the whole of China. The first one was destined for the biggest BlueLine OCC stock preparation plant in China, and its successful start-up took place in January 2019. The remaining plants will start up at few-month intervals over the following two years. The scope of delivery covered the full stock preparation and the wet end process. These orders are also indicative of the trust that is placed in Voith across the region.

The complete solution will create a sustainable and eco-friendly competitive edge, by increasing efficiency, boosting productivity and ensuring high-quality end products. Han sums up the decision: "Customers are seeking the optimum result across three areas: quality, yield and efficiency. With the Voith BlueLine OCC process, we ensure that they are able to deal with variations in raw material and process in the most effective way." Ultimately, when customers experience the Voith level of advanced engineering, professional support and individualized services once the plant is operative, they choose to remain loyal and become repeat customers.

>50%

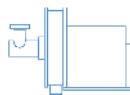
Voith Paper market share in China.

20

Number of major OCC plants equipped with BlueLine in China over the last two years.

70,000

Stock preparation machines delivered worldwide.



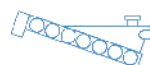
5. Dispersion
Energy-efficient and maintenance-friendly system for optimum properties of the final paper: Compact Dispersion System.



www.voith.com/nextlevel4-BlueLine-OCC



4. Thickening
The market-leading technology in terms of reliable operation, robustness and filtrate quality: InfiltraDiscfilter.



6. Material handling
State-of-the-art solutions deliver the industry-best integrated solution for WSR (water, sludge, reject).

How long until it's gone?

PAPER

PLASTIC

6 weeks

Paper
biodegrades
rapidly.

20 years

1,000 years?

Plastics do not biodegrade.
They become microplastics.

low density
polyethylene

p. 27 —————> p. 41

reflect

A round-up of views from thought leaders
on key trends and developments

Under the microscope

A plastic bag floating in our ocean is a powerful symbol of our throwaway society. But it's not just bags that are polluting our seas. According to the Ocean Plastics Lab, every year around 850 20-foot shipping containers of plastic bags, bottles, containers and more end up in our oceans. How long it takes for them to decompose remains anyone's guess. The estimates range from a few decades to centuries. Some studies suggest plastic has a 1,000-year lifespan. Microscopic granules may never entirely disappear. Its durability has been beneficial for businesses and consumers alike, but detrimental to our planet. It's time to reflect on our dependency.



Taking responsibility

For far too long, our fast, busy, throwaway lifestyles have prioritized convenience and disposability over sustainability. Our planet is on the brink. A new approach to combat the tide of waste and our rising carbon footprints is required, from consumers and companies alike. The paper industry has a responsibility to debate the environmental issues at stake, and also to take up the challenge to find long-lasting, sustainable and convincing solutions. Voith is proud to address this responsibility for humankind together with other partners.

Single-use

In 2018, the Collins Dictionary chose “single-use” as its word of the year. But it is not a term for the future. As of July 2018, 127 countries had passed legislation to restrict the use of single-use plastic.

300 million

Estimated annual world production of plastic materials in metric tons. About half is for single-use plastics alone.

Source: <https://plasticoceans.org/the-facts/>

The great debate

Given the dire situation of our natural environment, the business-as-usual approach to waste generation and recycling is no longer viable. Voith Paper is pioneering innovative and sustainable solutions.



51 trillion The amount of microplastics estimated to be floating around in our oceans already, not to mention the plentiful plastic material leached into our earth's soil.

Source: A global inventory of small floating plastic debris, Environmental Research Letters 08 December 2015

2050

The year when plastic rubbish could weigh more than fish in our oceans.

Source: The New Plastics Economy: Rethinking the future of plastics

8 million

The amount of plastic in metric tons that becomes maritime garbage each year.

Source: <https://oceanconservancy.org/trash-free-seas/plastics-in-the-ocean/>

Disturbing results

There is an abundance of research into the debris and waste in our oceans. The numbers may differ, but the results are always disturbing. Numerous studies led by Professor Richard Thompson, Head of the International Marine Litter Research Unit at the University of Plymouth, have raised the profile of marine plastic pollution. In 2004, the respected scientist coined the term microplastics for the minute plastic nanoparticles in our oceans. Today, the surfaces of the world's oceans contain an estimated 51 trillion microplastics. They are clogging our oceans, entering the marine food chain and ending up on our plates. The Ellen MacArthur Foundation, a charity that promotes a more circular economic model, estimates that if we continue along this path, our oceans will contain more plastic than fish by 2050. The Foundation advocates replacing non-recyclable materials with biodegradable alternatives.

Which is why paper has the edge for the future.



8.5 bn

Estimated number of plastic straws used each year in the UK alone.

Source: UK Department for Environment, Food and Rural Affairs

14%

The global recycling rate of plastic packaging.

Source: The New Plastics Economy: Catalysing Action

“It is imperative that we progress to more sustainable packaging. Voith is working together with our partners to create recyclable, compostable and quickly biodegradable end-of-life solutions.”

Frank Opletal
CTO, Voith Paper

72.5% Today's recycling rate of paper and board in Europe.

Source: European Paper Recycling Council

Efficiency and effectiveness needed

The circular economy provides a forward-looking blueprint for the environment: eliminate waste, innovate sustainably and circulate materials. Through Voith innovations in the BlueLine stock preparation portfolio and merQbiz, its online marketplace for recovered fibers, for instance, Voith Paper has already fully embraced the circular economy. Recovery and recycling technologies are integral to using resources more efficiently and effectively. Progress requires long-term partnerships within and outside of the paper industry for sustainable and innovative solutions.

Seize the opportunity

What measures are underway to support the transformation of the current linear economy into a circular economy? Across the globe, the importance of an integrated approach to recycling has been underpinned by legislation. In the EU, strict regulation of packaging and packaging waste has been a key driver in improving waste management practices. For instance, under the Directive 94/62/EC, packaging manufacturers have a legal obligation to reach even higher recycling targets, determined by the type of material to be recycled. While in Germany, legislation has stimulated innovation, too. By charging manufacturers a license fee for the “dual system” according to the recyclability of the material used, such regulation has led to the design of eco-friendlier packaging.

“In the future, our tools will enable the development of sustainable paper and board-based packaging already in the design phase.”

Dr. Tiemo Arndt

Business Unit Manager of Fibers and Composites at PTS, Germany

The focus, however, needs to be not only on recycling, but also on refuse collection and sorting. Do end-users dispose of products in the correct container? Is it technically possible to actually break down these products into the defined reusable fractions at the recycling plants? Essentially, this success rate depends on the product design. For decades, the paper industry has used the same recognized method to determine whether paper-based packaging is recyclable: the PTS-RH 021/97. This method was designed by PTS, the independent research institute based in Heidenau, Germany.

As plastic packaging is replaced more and more by paper-based solutions with similar characteristics to plastics, paper recycling is lifting off toward new horizons. The PTS is currently developing new tools to determine the recyclability of paper and board-based packaging in advance – based on the composition of the individual materials used in their manufacture. The motto will be “Test today, predict tomorrow.” →

Innovative barriers

Pooling technological expertise and pioneering clout is crucial in the development of sustainable packaging made from renewable raw materials in an eco-friendly setup. The Papierfabrik August Koehler SE is renowned as a pioneer in the industry, and respected for its innovations in machine-glazed specialty papers. At the company's facilities in Kehl, Germany, a new production line, Line 8, will go into operation in the summer of 2019.

Designed with the full-line competencies of Voith Paper, it consists of a BlueLine stock preparation unit, wet end process, XcellLine paper machine, offline coating machine and VariPlus winder, making it one of the most efficient specialty paper machines in the world. With a total capacity of up to 120,000 metric tons per year, Line 8 will produce a wide range of thermal papers and flexible packaging papers.

"Our goal is to significantly reduce the use of unsustainable materials in food packaging that are harmful to the environment. The close partnership with Voith Paper and their pilot tests support us in this endeavor in this high-growth market."

Kai Furler

CEO, Papierfabrik August Koehler, GER

100%
Recyclable food
packaging is the goal

The partnership between Koehler and Voith goes above and beyond the typical cooperation, however. Both companies are committed to playing a pioneering role in the global shift toward sustainable packaging. To ensure food safety, for instance, certain barrier characteristics have to be met. The Voith R&D team performs tests for Koehler at the Voith Technology Center in Heidenheim, Germany, the company's comprehensive pilot plant facilities, including on the coating pilot machines. The optimum processes will then be implemented on Line 8 in Kehl.

The exceptional built-in flexibility of the Voith complete solution will enable Koehler to offer a variety of new kinds of materials and functional surfaces based on their customers' requirements, including for hot beverages and food. It's a leading partnership for sustainable papermaking.

Safer decarbonization

Batteries powered by insights from Voith

While battery storage can support the road to decarbonization, the technology also has its downsides. Mainly safety issues and its heavy weight. Dr. Brian Morin is tackling them head on.

Morin is the CEO of Soteria Battery Innovation Group (Soteria BIG), a collaborative group of the most advanced materials companies, battery makers, electronics and car manufacturers who are working toward the same goal under license from Soteria.

The target is a lithium-ion battery architecture and technology that will set safety standards for the whole industry. And reduce the hazard of battery fires. Voith Paper is proud to be part of the consortium.

“Our high standards in awarding the Soteria mark will set the benchmark in safety for battery storage systems in the future.”

Dr. Brian Morin

CEO, Soteria Battery Innovation Group, US

The batteries produced using Soteria technology are already much safer, as NASA can confirm. When NASA hammered a nail through a battery produced using Soteria technology, it not only survived, it was the only battery in thirty years of testing that has ever continued to function after such severe abuse.

At the heart of the system is a novel non-woven separator, which replaces the legacy plastic separator. As a member of the Consortium, Voith has been performing production trials for the innovative separator on the Voith HydroFormer at the Voith Non-woven Technology Center in Düren, Germany. For over 40 years, the HydroFormer has ensured homogenous sheet formation with long fibers in the production of multiple end products. The future for this technology, however, has taken a surprising detour into electric vehicles and e-mobility.



READY TO ROLL

_____ A wide assortment of paper machine rolls stretch out as far as the eye can see. All dimensions, types and brands are lined up across the floor at the Voith Paper plant in Laakirchen, Austria. Dotted around the pristine site are highly skilled service engineers engrossed in their work. Focused and goal-oriented, they perform precision work and are masters of their profession. Combined with the state-of-the-art facilities, they offer a unique service.

"We successfully deal with absolutely everything. That's the reputation we have," says Manfred Jaspersen, Operations Manager, Voith Paper. "When it comes to paper machine rolls,

The Voith Paper plant in Laakirchen, Austria, has earned a reputation as the leading paper machine roll manufacturer. Its comprehensive, high-tech and eco-friendly operation also ensures customers benefit from a top-notch, tailored roll service.



Eco-proofing production

The electricity at the Laakirchen plant comes from 100% renewable energy sources, including carbon-neutral hydroelectric power. Recently, the plant has reduced overall energy consumption by 46%.



Expertly manufactured and serviced: top-of-the-range paper machine rolls meet stringent standards.

there's no limit to our expertise and capabilities." That's not just an opinion but also a well-established fact.

Laakirchen is recognized in the industry as a dual center of quality. This is where top-of-the-range paper machine rolls are manufactured and where existing rolls receive a tailored service to the most stringent of standards and requirements. The evidence for this is on display across the production floor. Voith's own rolls and third-party rolls lie side by side. "It's no secret that this is where quality service is ensured, regardless of the manufacturer of the roll," adds Jaspersen. "When a roll is perfectly maintained, the whole paper

production process benefits. It increases the machine performance significantly.”

Accelerated and optimized

What's interesting is another fact. The rolls on display are not only from paper machines: if an industrial roll of any kind needs grinding, balancing, coating – or manufacturing – the skilled engineers and high-tech equipment at Laakirchen can provide the optimal solution. Decades of experience in roll manufacturing and servicing have earned the plant an enviable reputation in the paper industry. This global recognition led to a recent expansion of the production facilities by 3,150 m² to 32,000 m². For two reasons. Number one: to cope more efficiently with the strong demand for its services. (A total of 1,500 rolls are serviced each year.) Number two: to accelerate the entire process and optimize the production site. Thanks to the clear focus on customer needs, precision engineering and a central location, customers from across Europe and beyond call on its services.

The Laakirchen teams travel far and wide to work day and night on complex rolls, cylinders and components in order to transport them to Laakirchen for maintenance and back. Recent contracts include the servicing of rolls from as far afield as Saudi Arabia and Russia. Every customer is unique – as is every tailored solution.

Heavyweights: a paper machine roll can weigh up to 120 metric tons. A tailored service is ensured at Laakirchen for each one.



1,500

Rolls serviced each year on site.

32,000 m²

Area covered by the production facilities.

100%

Renewable energy provides the electricity.



“It’s no secret that this is where quality service is ensured.”

Manfred Jaspersen
Operations Manager,
Voith Paper

Whatever the customer's requirements, Jaspersen and his team offer an individualized, customer-centric service. But it doesn't end there. The site is also renowned for its leading-edge R&D in thermal coating and collaborative work on technology transfer. Such work supports other Voith production facilities and service centers in Asia and in the US, too. As Jaspersen is keen and proud to highlight, there is no time for anyone to be bored: “This is definitely where the action is.”





Why choose a full-line supplier?

Bryan Hollenbach, Executive Vice President at Green Bay Packaging Inc., describes his first-hand experience of the partnership with Voith for a groundbreaking project in Wisconsin, US.

Green Bay Packaging Inc. is investing over \$500 million in a new paper mill in Wisconsin in the US. This is a huge commitment to the local area and the industry. Supporting the local community is clearly important to you. Can you tell us more about the reasons behind this decision?

Green Bay Packaging is a family-owned business that has been part of the Green Bay area for over 85 years. We believe in the long-term future of the corrugate industry. Corrugate is an environmentally friendly product that ships, protects and promotes the products of our customers. The corrugate industry is here to stay. Our plan is to continue to grow in this industry, and we are committed to the Green Bay area for both our headquarters and as a



“We are confident that we will achieve world-class availability and quality performance with the process we are building with Voith.”



Bryan Hollenbach

Executive Vice President at Green Bay Packaging Inc.



A pioneering partnership

Voith Paper will provide Green Bay Packaging Inc. with a complete packaging production line. The new PM 4 will be installed at the company's location in Green Bay, Wisconsin. The order includes an effluent treatment plant, BlueLine stock preparation, wet end process, XcelLine paper machine with a design speed of 1,200 m/min, and a VariFlex Performance winder. The package also includes paper machine clothing, a seven-year Total Roll Management contract for several machines and Papermaking 4.0 products.



sustainability with its 100% closed-loop water system. The new mill will take this concept one step further by partnering with our local, municipal wastewater treatment facility in a program that will allow for complete elimination of our dependency on our local river while assisting the region in reducing phosphorous emissions into that same river.

The new mill operation will generate steam by utilizing biogas from the effluent treatment plant reactor. The remaining supplemental fuel will be natural gas, therefore eliminating solid fuel from the operation. This will result in significantly reduced emissions from the operation, minimizing the impact of the site carbon footprint. These initiatives, combined, will make our new operation one of the most environmentally sustainable operations in the world.

Is there one game-changing technology in particular that will support you in your mission?

Can you share it with us?

The waste water pre-treatment technology that Voith is supplying us is a critical component in our design for our water reclaim system. Having the ability to effectively reduce the amount of organic load in our water stream is a key to the design of our cutting-edge water management approach. →

key manufacturing hub. We owe our success to the hard-working employees of Green Bay and the wonderful customers we have partnered with over the years. The community – state, city and county – are very supportive of the project. When you combine all of this – our employees, customers, strong community and our plan to grow in the industry – those are the key reasons behind the decision.

One of the stated missions of your company is to become a sustainable producer. How important to you is the environmental impact of the new plant?

Closely behind the safety of our employees, environmental stewardship is one of Green Bay Packaging's core values. Our existing mill operation has been leading the way in environmental



Double the capacity with Voith technology and expertise.

Voith's proven track record of partnership and execution played a key role in our decision-making. Voith's technology offering was very strong and was aligned with the deliverables we expect out of our new operation. That, coupled with Voith's strong service organization in North America, made them a solid team to partner with for this exciting project.

What are the main benefits of the Voith approach for Green Bay Packaging? Is there anything that surprised you, for instance?

Having Voith provide a full scope of supply, from pulper to the winder, allows us to have one point of contact to ensure that our required deliverables are met. Voith's approach to this supply as well as their automation capabilities and support are important to our success. While we have not yet chosen

Having the ability to remain a closed-loop system without the negative impacts to product quality and productivity is very exciting.

Voith is your trusted partner of choice for this groundbreaking project. It is the first time in paper history in the US that a project with

the breadth of supply and scope was delivered by a single source company. Why Voith? What does the company bring to the table?

Over the years, our relationship with Voith has grown, with execution of capital upgrades at both our Green Bay, WI, and Morrilton, AR, locations.

Fully convinced: fully trusted

1. Grupo Gondi, Mexico

From early 2020, the new state-of-the-art XcelLine paper machine PM 7 will operate at Grupo Gondi's new Papel y Empaques Monterrey plant in Northern Mexico. The machine will have a working width of 6,660 mm at the reel and a design speed of 1,200 m/min to produce testliner and corrugated medium with basis weights in the range of 90 to 250 g/m². Voith will supply the complete BlueLine stock preparation and XcelLine paper machine from wet end process to winder, as well as an extended scope, including detailed engineering for process, automation and electrical engineering.

Paper grade: Testliner and corrugated medium

400,000

metric tons
Annual production capacity.

“Voith's ability to deliver an advanced, full-line, state-of-the-art system was very important to us.”

Eduardo Posada
CEO at Grupo Gondi

a computerized maintenance management system supplier, we were somewhat surprised to learn that Voith has a solid offering in this area.

_____ **How important is the personal relationship in your work with Voith?**

Having a relationship based on partnership means a great deal to Green Bay Packaging. Over the years, Voith has proven to be a solid partner with Green Bay Packaging and we are looking forward to growing this relationship as we execute and optimize our project.

_____ **Can you tell us more about the impact Voith engineering and expertise will have on your production capacity and level of efficiency?**

Voith's technology offering will allow Green Bay Packaging to more than double the capacity it produces at its Green Bay Wisconsin mill location. We are confident that we will achieve world-class availability and quality performance with the process we are building with Voith.

_____ **Finally, a look further down the line into the future. How do you see the industry developing?**

The corrugate industry is a solid industry that has had ups and downs over the years. In the 1990s and into the 2000s, when manufacturing was leaving the US, the industry shrank but survived. Over the last five years the industry has grown at a steady rate and most recently had a bigger bump with the advent of e-commerce. The indus-

try survives and ultimately grows because the product is an environmentally friendly product that plays a critical role in the supply chain. The industry will continue to develop in ways that will include more light-weighting of products, ultimate development and expansion of digital printing, and the continued focus on developing environmentally and customer-friendly packaging. Our new mill is the perfect investment for the future and where the industry is heading. _____

“Voith’s proven track record of partnership and execution played a key role in our decision-making.”

Bryan Hollenbach

Executive Vice President at Green Bay Packaging Inc.

2. Papierfabrik August Koehler SE, Germany

The new production line, Line 8, for Papierfabrik August Koehler SE consists of a BlueLine stock preparation unit, wet end process, XcelLine paper machine, offline coating machine and VariPlus winder. Line 8 will produce a wide range of thermal papers and flexible packaging papers and will be one of the most efficient specialty paper machines in the world when it goes into operation from the summer of 2019. Thanks to its perfectly aligned and balanced components, XcelLine ensures both high machine and energy efficiency.

Paper grade: **Machine-glazed specialty papers**

120,000

metric tons

Annual production capacity.

3. Progroup AG, Germany

Progroup AG has chosen Voith's XcelLine machine concept for its flagship greenfield plant in Sandersdorf-Brehna, Germany. Propapier PM 3, to open in 2020, is a 10,000 mm wire width machine with an operating speed of 1,600 m/min. Voith was selected because of the outstanding performance of its XcelLine machine concept, as well as the BlueLine stock preparation, VariFlex Performance winder, clothing and roll covers, and mechanical roll service. In total, the company's annual production capacity will be about 1.85 million tons.

Paper grade: **Testliner and corrugated medium**

750,000

metric tons

Annual production capacity.

A new philosophy

Out of the Box

The circular economy is currently on trend. The basic concept of circularity, however, has been around for some time. Professor Dr. Michael Braungart, the founder and scientific director of EPEA, an environmental research and consulting institute in Hamburg, Germany, co-founded the out-of-the-box Cradle-to-Cradle® philosophy back in the 1990s. Today, he works with businesses and governments to find Cradle-to-Cradle solutions. Here, he outlines the forward-thinking concept.

What's behind the Cradle-to-Cradle concept?

Cradle-to-Cradle is inspired by nature. In nature, everything has a starting point, and is designed to be a nutrient for something else. We call it Cradle-to-Cradle because no valuable raw materials are ever lost. It stands for innovation, quality and good design, and describes the safe and potentially infinite cyclical use of materials. It is about designing products more intelligently, using materials more effectively, so that both business and nature can thrive and grow.

What does this mean in practice?

Products need to be designed so that they can be carefully disassembled to become nutrients for new products through biodegradation or recycling. Anything that wears out or degrades during use needs to go back to the biosphere. Basically, waste equals food. Everything that does not wear out or degrade belongs in the technosphere and can be used again. Our approach is not about minimizing our ecological footprint, but to maximize its effectiveness.

Why do you focus on effectiveness, rather than efficiency?

Nature is not efficient. It is effective. We need to emulate nature in its beauty, functionality and effectiveness. You first have to ask what is the right thing, rather than optimizing the wrong thing. People trying to use plastic out of recycled plastic materials is such an example. Making things less bad is simply not good enough. It needs to be beneficial. When you make wrong things perfect, you just make them perfectly wrong.

What is the right thing?

We have developed materials for train seats that end up as compost in market gardens – instead of being burned as hazardous waste. And Cradle-to-Cradle carpets that are not

“Making things less bad is simply not good enough. It needs to be beneficial.”

Professor Dr. Michael Braungart

only free of contaminants, but which can also remove fine dust from the air.

What could the paper industry improve?

Paper per se is a beautiful material. But still here we have the chance to optimize it. For example, my book “Remaking the Way We Make Things,” that I wrote with the US architect William McDonough in 2002, was printed on paper that is perfectly compostable. We can do it. You can only have safe and economical paper recycling with healthy printing.

A final word of inspiration?

Cradle-to-Cradle combines European problem-thinking with the American attitude to getting things done. We need both. We also need to understand the Asian way of seeing humans as a part of nature. Instead of just trying to understand what a circular economy or Cradle-to-Cradle approach can do, you should see innovation opportunity. Don't make it an ethical thing. It's only an innovation thing. Make it a quality thing. That's it.

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no
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spaceship
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We are all
crew.

Marshall McLuhan

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