

nextlevel

by Voith Paper — N° 01.2017

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Customer-driven
innovation

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The global demand for
packaging paper

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To the next level of
papermaking



Eco-friendly trophies:
inspiring works of art for the paper industry

The art of sustainability

Editorial



This year, as we celebrate 150 years of lasting milestones, we also look forward to a future of innovation. Over the years, we have developed, honed and applied our expertise to design the optimal solutions for raising profitability and efficiency of our customers to the next level – from products and components through plant engineering and digitization to perfectly tailored service packages. As the technology leader, we are already developing tomorrow's solutions today, and are working with our customers to make paper production smarter and more sustainable.

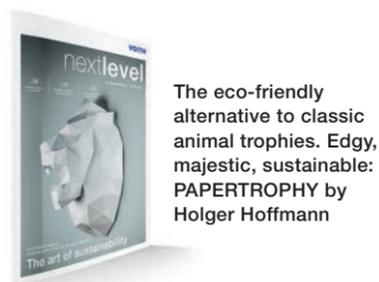
Customer orientation and excellence are the foundations of everything we do at Voith. These two dimensions will bring added value to our customers and help shape a competitive and sustainable industry, as we hope we showcase in this first issue of nextlevel, our new Voith Paper Customer Magazine. Enjoy the journey and the read!

Yours sincerely,

Bertram Staudenmaier
CEO, Voith Paper

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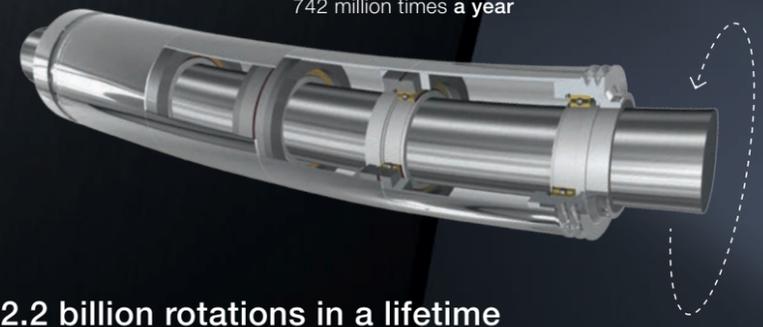
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Healing powers

Steel ball bearings are essential components in spreader rolls, but over time they become damaged and also cause considerable damage to the raceways. Unlike ceramic balls. As ceramic is harder than steel, the material can withstand the millions of rolling movements during production far better. What's more, ceramic balls have the capacity to polish, smooth and "heal" any imperfections on the raceway surfaces caused by the tiny particles that often break off during operational life. "Combined with a very special design for spreader roll bearings, it takes just one ceramic ball to provide self-healing power for a longer life," highlights Thomas Weissappl, Director Spreader Roll Global, Voith Paper.

Steel Ball

1,500 times a minute
—
91,000 times an hour
—
2.2 million times a day
—
742 million times a year



2.2 billion rotations in a lifetime
With ceramic, the EvoStretch spreader roll is more resilient.

Ceramic Ball



News

A quick round-up

The optimal start for efficiency

In stock preparation, a uniform flow is essential for stock quality and fiber efficiency, which is why Voith's disperser filling, TheWall, is now the benchmark for the industry. Hartmut Langner, Specialist in Paper Manufacturing at Varel, the paper and board manufacturer in Germany, confirms: "Quality fluctuations in the raw material can be more readily compensated for with TheWall, meaning that the product quality is kept at a consistently high level." In use at Varel since May 2016, TheWall's longer durability has other benefits, as Langner adds: "The continuous structure of TheWall lowers the risk of material fractures, making it possible for us to reduce unplanned downtimes and save on costs."

Perfectly aligned for retention

90%

Average fabric permeability retention levels of 90% in the dryer sector require an optimal alignment of equipment and fabrics. This is ensured with DryMax, part of Voith's innovative portfolio of AdvancedPRODUCTS. The optimal combination of CleanWeave dryer fabrics with the DuoCleaner Express cleaning system results in a perfect alignment and performance of fabrics and equipment, lowering operating costs and ensuring fewer breaks. FormMax and PressMax are also available as part of the portfolio of AdvancedPRODUCTS.



In-depth customer insight has defined a new Voith Paper service portfolio:

Equipment Services
Executing equipment-related parts and services

Process Services
Supporting optimization of customer processes

Productivity Services
Offering value agreements for productivity increase

Integrated Partnership
Taking over responsibility for service processes



“Voith provides the required know-how for complex situations and can solve any issue – with upgrades, adjustments or optimization.”

Erik Forsberg,
Manager Service Development, Voith Paper

Total trust for a close partnership

Papel Aralar S.A., the producer of 90,000 tons of uncoated and coated special papers annually, runs a complex operation in northern Spain that requires a sophisticated maintenance service. Since 2013, Voith has provided 24/7 support for the company's four paper machines in the area. The success of this long-term, ongoing commitment lies in Voith's strengths, experience and ability to provide tailored support. With long-term sustainable development always front of mind at Voith, customers benefit from reliable execution by highly skilled personnel. Their defined methods ensure the equipment is always operating well. Whatever the challenges, however tricky, complex or risky the tasks are, they are dealt with professionally, as the partners in Spain confirm. Jesús Usabiaga, Technical Manager at Papel Aralar, and Luis Sarobe, Maintenance Manager at Voith, sum up the partnership in just a few words: "We get it together."



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innovate

A closer look at innovative technology, people and solutions

A three-in-one solution

Performance improvement of Fourdrinier forming sections is the challenge – the solution is VForm. Allowing a continuous and optimal adjustment of the foil angle by up to 7°, and of the height by 5 mm, VForm's significant flexibility can achieve up to a 10% increase in formation and tensile strength, as well a 100% increase in dewatering, depending on the furnish and activity level. Connectivity to ComCore, the Voith digitization platform, allows for monitoring and improving efficiency. "With VForm, we have a unique, three-in-one solution that improves productivity, enables a broader product range and is also Papermaking 4.0-ready," highlights Dr. Thomas Jaschinski, Global Product Manager. For new builds or retrofits of most hydrofoil boxes.

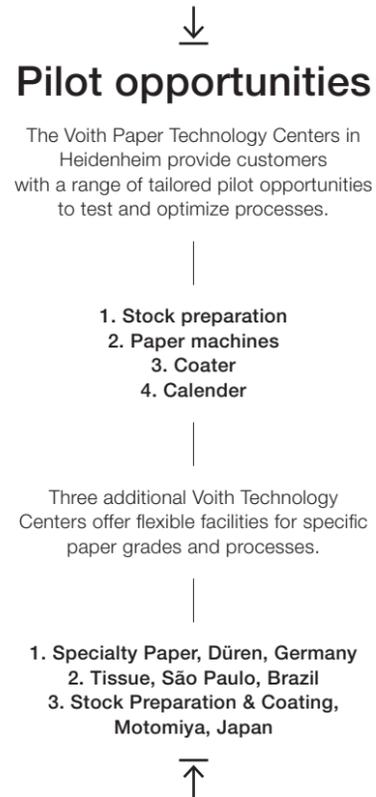
Customized innovation

Close collaboration at the Voith Paper Innovation Center sparks customer-oriented, cutting-edge product development. Real-world and virtual testing is at the core.

“There’s a constant bouncing back and forth of ideas,” explains Uwe Fröhlich, Senior Manager Pilot Operations at the Voith Paper Innovation Center in Heidenheim. **“We build on each other’s strengths, ideas and expertise, which gives us the spark to innovate further, for our customers and for us.”**

Innovative solutions are not created in isolation, but within a collaborative team, working in real-life conditions, in the laboratory and also in the virtual world – with a focus on the customer and the market. In Heidenheim, this kind of push-pull, pick-and-mix support is driving innovation in the paper industry.

Acutely aware of enormous complexity in papermaking, Voith Paper has created a smart ecosystem in its Innovation Center. This is where a competent team with experience



across the whole papermaking process provides the know-how customers seek to grow their businesses. It is a high-tech sandbox for innovation.

Carefully tailored trials

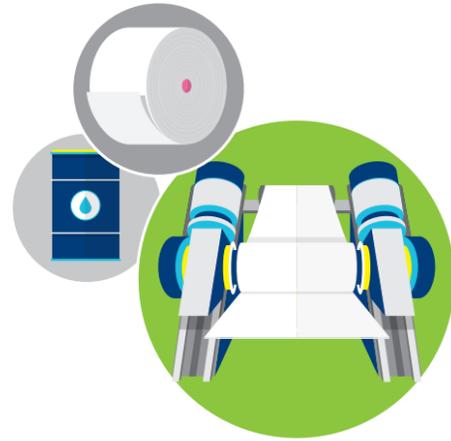
At the core are the individual Technology Centers. They provide the processes and systems customized for specific applications. The brand-new Fiber Technology Center, for instance, offers customers the opportunity to carry out trials of all main elements of stock preparation. At all the Centers, customers can bring materials for tailored trials in all aspects of papermaking in real-world conditions, in order to optimize their own production lines.

“Our customers understandably demand convincing results before they will adopt any new technologies,” says Fröhlich. “Our established innovation processes guarantee results.”



“We build on each other’s strengths, ideas and expertise.”

Uwe Fröhlich
Senior Manager Pilot Operations



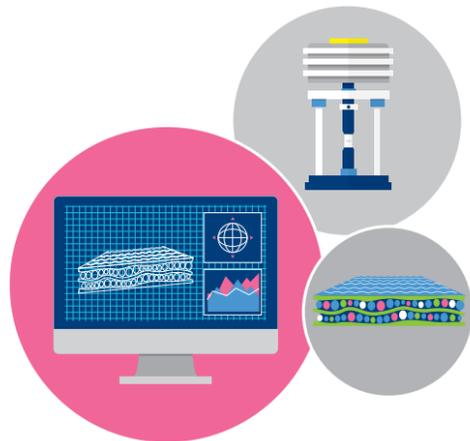
Pilot Machines

Providing real-world tests prior to rebuilds, investments or adaptations.



Laboratory

Using analytical technology for fiber, paper and coating color.



Simulation

Designing solutions with cutting-edge tools and techniques.

Dr. Tina Mutschler agrees. **“It is a robust process that has been tried, tested and proven to meet customers’ needs and the ongoing changes in the papermaking industry,”** she explains. As the Senior Manager Central Laboratory, Mutschler and her team provide precise test data as a further basis for assessing the pilot plant results, using, for instance, high-accuracy tomographic imaging of paper machine clothing. “Innovation depends very much on trial and error, supported by close monitoring and sharing of results. Collaboration with customers is really essential,” she says.

“It is a multiscale approach on so many levels,” adds Dr. Michael Weiss, Senior Manager Simulation. **“My team’s focus is on breakthrough and disruptive technologies, with an emphasis on speeding up product development. We make use of a broad portfolio of methods and techniques, ranging from basic simulation of physics and processes to data analytics and modeling.”** At the Simulation Center, new clothing designs are carried out using virtual prototyping and analysis tools. Computational fluid dynamics (CFD) and process simulation are vital techniques in optimization of design and performance of products and machinery equipment.

New product development

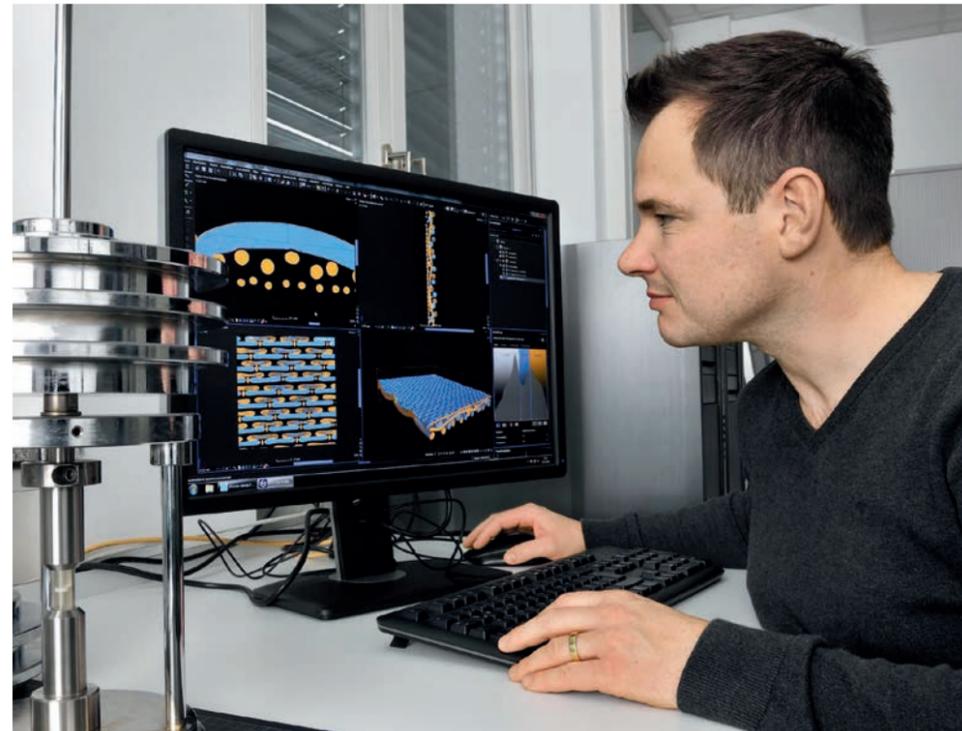
The advantages of this flexible three-leveled approach using pilot machines, laboratory and simulation is evident in Voith’s own R&D. Key developments

“It is a multiscale approach on so many levels. My team’s focus is on breakthrough and disruptive technology.”

Dr. Michael Weiss
Senior Manager Simulation



Pilot runs in the calendering ensure a close match to reality.



Creating virtual prototypes helps predict and assess product performance.

in curtain coating were the result of in-depth trials on the pilot coaters in Heidenheim and Motomiya, Japan, supported by the laboratory and advanced CFD and process simulations to evaluate alternative environmental conditions. **“Together, we developed our DF Coat to ensure the highest reliability and runability, reduced power consumption, as well as increased flexibility,”** says Fröhlich. Similar collaborative work led to the development of the EclipseR screening rotor and its exceptional novel foil design based on winglet technology, which ensures an energy reduction of up to 35% compared with old generation rotors – a clear advantage for customers.

Key pillars for innovation

Crucial to any innovation is the big picture. At Voith, this is obtained with Foresight Management. Often the first step in the innovation process, it combines five key pillars – Trend Analysis, Technology Foresight, Customer Foresight, Consumer Foresight and Radical Technologies. As it involves a development cycle of constant analysis and refinement, Foresight Management targets ways to fill R&D project pipelines and anticipate customer needs.

Value creation for customers

This customer-oriented approach provides a hybrid technology push and market pull to deliver a sustainable offering. At the Voith Paper Innovation Center, the objective is giving customers value creation and the technological and competitive edge in a cost-effective way, as Fröhlich emphasizes: **“We support our customers with a wide range of expertise to create customized solutions and to help prepare the industry for the next industrial age.”**

1
Accustomed to an early start: Tim Nevius in the driver's seat.

2
All on board: checking the cutting-edge equipment and crucial parts.

3
Tools at the ready: specialized state-of-the-art equipment belongs on every journey.



1

| 7:30 a.m. |



| 8:15 a.m. |



Efficient

Voith OnCall Mobile provides customer-friendly field service.



Premium

Guaranteeing less downtime – and substantial cost savings.

Driving support

Local, fast, competent and personal. How the Voith OnCall Mobile service reduces downtime and ensures a smoother production in Jacksonville, Florida, US.

Tim Nevius is headed out to Jacksonville, Florida, US, this morning for Voith's OnCall Mobile service. As a Field Service Engineer, he performs inspections, maintenance and repairs on machines at mills within a 250-mile radius. Two main factors are crucial for his work: his experience and a high-tech van stocked with specialized state-of-the-art equipment and critical items.

On arrival, Nevius inspects the DuoCleaner that uses highly pressurized water to clean the fabric mesh that carries the paper as it forms. Much of Voith's machinery is calibrated to precise specs. The nozzles, for example, contain sapphire inserts with diameter openings of 0.1–1.7 mm. Nevius has developed a feel for those minute tolerances. "Because of my years of experience, I've got a good eye for this," he says.



3



"Because of my years of experience,

I've got a good eye for this."

Tim Nevius, Field Service Engineer

| 11:00 a.m. |



2

4
All part of the service: expert explanations and insight tailored for the customer.

5
Under the hood: detailed inspections prevent downtime and shutdowns.

Moving underneath the hood of a stopped machine, Nevius stands on a steel catwalk inspecting the DuoCleaner heads. He then turns to repairing a leaking pump that regulates the pressure. Hydraulic pressure can reach several thousand pounds per square inch, so leaks present a safety hazard, to both equipment and personnel. "A leak in a pump cabinet producing up to 5,000 psi can produce a hole the size of a thread and act like a water knife," Nevius explains. Mill contractors had used hoses during their maintenance made of a material that caused corrosion, which in turn caused the leaks. Nevius has the fix.

Avoiding downtime

At paper mills like this one, machines run all day, every day, with the exception of a scheduled annual maintenance period. The superintendent at the mill is confident this service from Voith will save on stoppages. Partly because



Mobile

The state-of-the art mobile service van is stocked with specialized equipment and essential parts.



Expertise

Regular maintenance performed by the experts improves efficiency and ROI.

acquiring a working knowledge of the machines would require downtime, but also because the Voith technicians work much faster. "We need to have the guys with the right knowledge and expertise on that particular equipment to come in and service it for us," he says. As Nevius moves through the mill, he explains how to check and set up the equipment, so the employees learn from him, too.

Typically, machines accumulate problems during the year between annual maintenance shutdowns. "You've got a whole year. Things start breaking down, we start working on it, we don't get it quite right, we use the wrong parts, and it was just a downhill spiral until we started using this service," the superintendent admits. "Now we're getting everything back up to par and keeping it there."

A seamless service

In the afternoon, as the 30-foot-wide (9 m) sheet of paper spools through machines at 2,200 feet (670 m) per minute, Nevius paces the length of one of the paper machines, peering under the hood with a light. "I'm looking for opportunities," he shouts. Part of his job is to identify any gaps in manufacturing technology



6
Taking a walk around the mill floor to inspect the entire process.

7
Expertise, equipment and experience for a winning service.

| 4:00 p.m. |

6

"It was just a downhill spiral until we started using this service."

Now we're getting everything back up to par and keeping it there."

Mill superintendent, Jacksonville, Florida, US



7

that can be upgraded. By using the 3-D scanner stored in the van to capture large-scale and hyper-detailed imaging of machines and equipment, Nevius will also be able to reverse-engineer solutions to problems with other manufacturers' equipment.

Nevius speaks with deep admiration about the mill machinery, engineering and the process of papermaking. His job spans several areas of expertise – engineering, sales, personal relationships, instruction and maintenance – all of which are seamlessly integrated into what he does each day. And it is client-focused, as Nevius stresses: "We provide the premium service customers consistently seek."



4

| 2:00 p.m. |



5

Spotlight on smart service

Dr. Dieter Wenninger is President, Products & Services, at Voith Paper and is responsible for growing the global service business. He firmly believes that smart technologies and smart service go hand-in-hand.



A clear focus

"We elevate services for our customers to a new level."

_____ Dr. Wenninger, you introduced your new service concept last summer at the customer event in Hamburg. How important is service at Voith Paper now? Paper manufacturers are faced with many challenges, and ensuring competitiveness is a key factor for business success. It is essential that the paper machines run at a consistently high level throughout their entire life cycle. Therefore, advising and serving our customers does not stop for us after the start-up of a production line.

_____ To what extent do Papermaking 4.0 and service go hand-in-hand? Large volumes of data are generated and processed during paper production. This data – combined with our process expertise – lays the foundation for serving our customers all over the world with networked smart solutions. OnCare is one example of our digital solutions. It monitors important areas of the paper machine online and diagnoses initial damage before it becomes a problem. With remote support we can quickly restore system availability in an emergency and support our customers 24/7.

_____ What are your requirements for first-class service? A service is first-class when the customer clearly sees the value that our work adds. Generally, this added value can be represented in monetary terms: cost savings and increased production are just a couple of the metrics. Where we differentiate ourselves from other providers: we look at

the big picture. We elevate services for our customers to a new level, with 150 years of experience in the industry and our expertise in the area of digitization.

_____ How are you going about achieving that new level? We are a local partner to our customers. Through our regional business units, we provide a global network of experts. To be closer to our customers and respond even faster to their needs, we are focusing on rapidly expanding our service locations worldwide. The goal of our Voith Paper service organization is to ensure total customer care. _____

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transform

An overview of key developments in the papermaking industry

A quantum leap for flow and filter

In 2012, the InfiltraDiscfilter with BaglessPlus set the benchmark for filtration in stock preparation. The result: no bag replacements, less maintenance and fewer shutdowns.

With the new InfiltraDiscfilter with HiCon technology, the bar has now been raised higher. Firstly, special guiding blocks running between sturdy rails in the filter vat ensure the discs stay on track. Also, each disc is fed individually, which changes the flow pattern and guarantees an even consistency throughout the tank. HiCon can operate up to 2% inlet consistency, thus achieving a potential increase in capacity of 20%, as well as up to 50% in pumping energy savings. The upgrade option of HiCon is available for many existing filters.

Boost —

The huge growth in online commerce has boosted the demand for packaging materials of all types. XcellLine, the new generation of paper machines by Voith, is the key to building an optimized, sustainable supply chain. On a global scale.

The only way forward for board and packaging: efficient production, sustainable products

- ↓ **① Broad market:** Packaging material accounts for about half of all worldwide paper consumption. XcellLine is suitable for all qualities.
- ↓ **② Flexible usage:** The growing demand for eco-friendly packaging of small, individual items is met by lightweight packaging material.
- ↓ **③ Sustainable production:** The end product on the VariFlex winder is testliner, firm recyclable paper produced from recovered paper.



— Supply

It requires excellence to produce **800,000 metric tons** each year.

- ↓ **④ Guoling Fu, Mill Director of Zoucheng PM 31/PM 32 (left), together with Stanley Wang, Voith Project Manager.** The decision to commission XcellLine paper machines was a logical one, based on Voith's long-standing technological know-how and seven-year successful partnership with the firm.



Given the global dimensions of on-line commerce and the trend toward urbanization, the increase in worldwide demand for board and packaging paper has been phenomenal, but not totally unexpected. It is most noticeable in Asia, where the numbers are staggering, as Stanley Wang, Voith Project Manager in Kunshan, China, explains: "Online shopping has taken off on an incredible scale. Companies are having to wait in line for packaging material."

This demand is the reason why the Sun Paper Group made the strategic decision to expand its portfolio to include board and packaging material, a market the company had not served in the past. With an annual pulp and paper manufacturing capacity of 4.5 million metric tons, Sun Paper is one of the leading paper manufacturers in China. Now, an additional 800,000 metric tons of kraftliner and testliner have been added to its yearly capacity, manufactured on two Voith XcellLine paper machines, PM 31 and PM 32, installed in the same workshop in Zoucheng. The mill director, Guoling Fu, is clear that Voith was commissioned to build, install and service the two machines in recognition of the benefits of working with a full-line supplier of coordinated solutions from a single source. "Voith technology is leading in the paper industry," he says.

Sun Paper was rewarded with paper on reel months ahead of schedule. Such breakthroughs are setting standards not only in China, but also on a global scale.

Global solutions

The increased demand for sustainable packaging solutions has also caught the attention of leading European papermakers. In particular, papermakers are responding to the global trend for lightweight, flexible materials that allow cost-efficient, eco-friendly packaging of small, individual items. Having a portfolio of high-quality containerboard grades suitable for various packaging solutions for end users is paramount for the future.

With the start-up of the XcelLine PM 6 in December 2016, at the paper mill in Düren, Germany, Schoellershammer increased its annual capacity for corrugating medium and testliner, in a basis weight range of 80 to 120 g/m², by 250,000 metric tons. From

“Voith tailored the plant concept to our specific goal of building a reference facility with low energy consumption.”

Armin Vetter
Managing Director, Schoellershammer

contract to paper on reel, a mere 17 months had passed.

As the company focus is on high-quality products that are 100% recyclable, made with recycled paper, the decision to partner with Voith was an easy one, explains Armin Vetter, Managing Director at Schoellershammer. “Voith tailored the plant concept to our specific goal of building a reference facility with low energy consumption for manufacturing corrugated containerboard.” In addition, working with a single supplier was crucial. “We wanted a full-line supplier, someone who provides the complete system, from plate conveyor to winder, including measurement, automation and ventilation technology. That is why we chose Voith,” he adds.

For Andreas Koehler, Voith Project Manager at Schoellershammer, the partnership was characterized by trust from the beginning, and deepened throughout the cooperation. “The working relationship has been fantastic throughout,” he says. It is also clearly reflected by the fact that Schoellershammer has contracted Voith with the additional delivery of field instruments and hall ventilation, as well as other services, including total roll management, services for doctor blades and the preventive maintenance of various machine components.

Equally positive was also the experience back in China. Sun Paper is so convinced by the milestones set with PM 31 and 32, and the excellent working relationship, that the company has just signed a contract for two more XcelLine paper machines, PM 36 and 37, of the exact same type, increasing the company’s capacity to almost 6 million metric tons a year. This is a clear indication of the trust the XcelLine and Voith expertise inspires.



800,000

The number of metric tons produced each year on the two XcelLine machines at Sun Paper. The SpeedSizer AT applies the film flawlessly and uniformly during sizing and coating on the fast-running machines.

110 to 250 g/m²

Basis paper weight range produced on the PM 31. The CombiDuoRun dries the paper web on both sides for a more efficient process and quality result.

Dryer section

6,660 mm

Paper width at reel. Efficient and gentle paper dewatering is achieved in the press section with the Tandem NipcoFlex press, ensuring maximum production capacity at the highest quality level and a high dry content.

Press section

1,110 m/min

Production speeds. In the forming section, the multilayer technology of the Fourdrinier optimum sheet formation is guaranteed even at higher production speeds.

Forming section

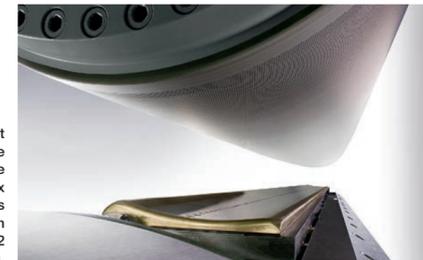
100%

Recycled paper is the basis for the recyclable end product at Sun Paper. The precisely tuned headbox MasterJet Pro G with ModuleJet ensures maximum energy efficiency at optimum jet quality in applying the stock on wire.

Headbox

Compelling benefits

Under perfect pressure: the cutting-edge Tandem NipcoFlex shoe press is installed in both PM 31 and PM 32 in Zoucheng.



1. Fast start-up

Voith task forces ensure that XcelLine paper machines are up and running fast. With Sun Paper, it took only 12 hours from stock on wire to paper on reel, and only one day to produce saleable paper.

2. Best value for money

For Sun Paper, profitability was achieved in the first six months. Innovative strength based on long-standing expertise makes Voith the first choice for longevity of products and the complete paper machines.

3. Advanced technology

Forward-thinking solutions, networked field instruments and smart preventive maintenance ensure paper production is more profitable.

4. Integrated solutions

Voith excels as a trusted partner by providing solutions from project initiation to commissioning, tailoring the service to customer needs and delivering the optimal solution for every step in papermaking, whatever the application.

5. Full-line supply

From BlueLine stock preparation to XcelLine paper machines, from superior services to Papermaking 4.0, Voith designs systems for the entire life cycle of paper machines, ensuring all components interact perfectly, cutting interfaces, inefficiencies and costs.

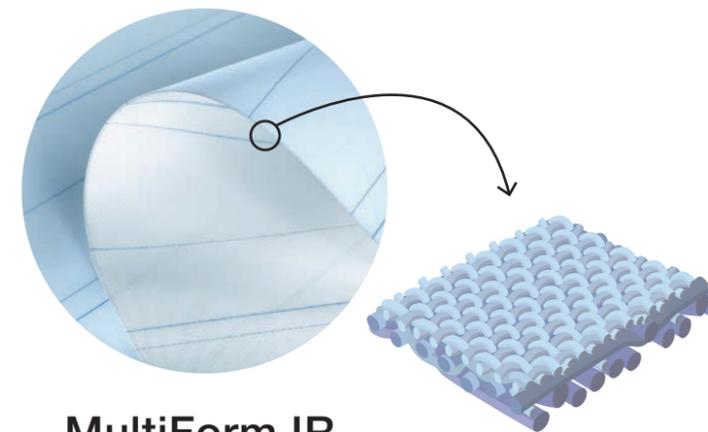


Components of high performance

The perfect combination of high-tech fabrics and equipment is essential to increase productivity, efficiency and runability.

Forming: an engineered solution

An optimal fabric design in the forming section can achieve a substantial reduction in energy consumption and a longer fabric lifetime. The recently introduced MultiForm IR is a medium-fine forming fabric that combines the benefits of a fine paper side on top of a strong and robust wear side – like no other fabric design before. Part of the established Voith I-Series, it is used worldwide in a wide range of applications, from fine paper to demanding packaging papers. The high-fiber support ensures good mechanical retention properties and a clean run, while the robust wear side guarantees stable profiles and an excellent wear resistance. “Our close cooperation with a Scandinavian customer led to an optimal design choice that helped to reduce the drive load by almost 10%, as well as a significantly improved paper quality,” says Tom Meijer, Global Product Manager Forming Section. “The engineered weave structure of MultiForm IR achieves an optimal lubrication between the stationary dewatering elements and the fabric wear side, resulting in both the energy saving and a record running time.”



MultiForm IR

The unique fabric design ensures excellent drainage is achieved over a longer life.



PeakElement

Elastomer component greatly improves press felt performance and machine efficiency, and start-up times are significantly reduced.

15%
higher rate of
compression than
standard felts

Press: for peak performance

Improved dewatering is achieved in the press section with Voith’s PeakElement integrated with press fabrics, a revolutionary new elastomeric component that enhances saturation and water flow through the fabric. In the past, new press fabrics required a period of lower dewatering. With PeakElement, however, start-up time can be significantly reduced. In the case of one paper mill, start-up was achieved within a mere six hours, instead of the normal one and a half days. “By providing a faster start-up, as well as constantly higher dewatering throughout its entire life, PeakElement differs from every other kind of press fabric on the market,” says Anders Nord, Application Manager Press Fabrics. Moreover, in mills using PeakElement, steam consumption has consistently been reduced by 12%.

Targeting costs

Digitization has always been a fundamental component of machine and plant engineering to optimize processes and reduce costs. Voith is leading by example.

Instant insight

Setting the optimal method to produce quality pulp and paper requires instant data processing that is not feasible in the hands of a technician, but possible with the modular Voith OnEfficiency portfolio. With OnEfficiency DIP the deinking process can be fully optimized. By taking all the actuators for final pulp brightness and ash content, this module provides cost awareness points in the flotation and bleaching steps and coordinates them to reach the brightness target at minimum cost. On average, this data-driven, real-time process control has a significant impact on running costs and quality. One European mill with an output of 350,000 metric tons a year achieved annual savings of over €3.3m, and cut the cost of fibers alone by €1.5m.

“There’s a clear demand for Augmented Reality as a knowledge-capturing tool.”

Tomas Jutbo,
Management Consultant,
Voith Digital Solutions

Visualizing information with AR

Augmented Reality (AR) is the latest consumer trend, and the latest addition to the Voith Paper OnCare family. Combining physical and digital, the OnCare AR module uses AR to help technicians with preventive maintenance on site. OnCare AR scans the connected target, triggering an instant, tailored feed of know-how. The app pulls up the corresponding, current information, such as detailed drawings, instructions, and crucial spare-parts and material data, from the mills or the Voith database. The relevant granular content is immediately contextualized. Live streaming from control and monitoring systems offers added value and an even better opportunity to analyze performance directly at the plants, as Thorsten Jankowski, Product Owner, Lifecycle Management/e-documentation, Voith Digital Solutions, explains: “Our customers want the right data at the right time with the right person. OnCare AR is a mobile solution that delivers exactly that. There’s a significant value-add in visualizing task-related data in real time.”

“How do we thrive in this digital age?”



Frank Opletal, Voith

Fernando Carroquino, SAICA Paper

“We need to be a step ahead!”

What is the new way of working? Fernando Carroquino, Industrial Director at SAICA Paper, outlines his views and vision in discussion with Frank Opletal, Chief Technology Officer, Voith Paper.

_____ **Frank Opletal: Industry 4.0, Internet of Things, Big Data – they are all hyped as part of digital transformation. What does digitization mean to you?**

Fernando Carroquino: We hear these buzzwords a lot. For me, digitization is not about complicating things, but about simplifying them and supporting lean management. It will help us disregard irrelevant data, so we can focus on what really matters.

_____ **So digital tools will help us make better decisions based on human intellect?** Exactly. We need computers to deal with small, everyday problems. But we need people to work

on improvements. Digitization is not a means to replace people. It is a tool to empower them.

_____ **Viewed this way, digitization is a great benefit, for people and companies. Where do you see the challenges?** In predictive analysis. Now, quality control is at the end of the production line. This is too late, and it is not the way forward. Before you take a sample from the parent roll, you should already know the paper quality. We need to be always a step ahead.

Imagine a cockpit with the relevant maximum and minimum parameters for a smoother production. This cockpit will also flag up an imminent paper break – and will also tell you what to correct immediately to prevent it. This is totally different from swimming in thousands of parameters of data.

_____ **I totally agree. A just-in-time predictive model is essential in helping to improve runability. Turning to services and maintenance: what do you expect in this area?** At the moment, preventive maintenance is based only on historical knowledge. Better data and systems will tell us that there are variables that will result in cost savings. In the future, I see us implementing remote preventive maintenance, with access and communication between all sites from one location. Of course, we share information now, but it is not immediate, or simple. Managers need to be able to copy and implement efficiency measures instantly. Standardization of processes is an important part of digitization.

_____ **Won't this require a new way of working?** Absolutely. The concept of “my knowledge is my treasure” belongs in the past. Now, we are talking about putting our knowledge into a cloud and sharing all the information internally between our production lines. For this, you need to have a very open mind. If we put all our knowledge into



Zaragoza

SAICA was founded in 1943 in Zaragoza, Spain. Its Paper Division operates four mills in Spain, France and UK, with seven paper machines.

2.4m tons

Today, the company is a leader in manufacturing corrugated paper products, with an annual production capacity of 2.4 million tons.

the cloud, however, security will be a key issue.

At Voith, we fully recognize that data access has to be safeguarded to the highest level. That is the technology side. But how do you inspire people to be open to this?

Actually, my team inspires me. They are always looking at ways to make improvements. It is our company philosophy to value our people, to trust the people to do the work they are qualified to do. At home, these same people are using technology every day. They are a step ahead. Give them the tools to try things out. At SAICA, we don't micro-manage. We have always understood the importance of handing over responsibility, and that failure is essential for progress. Error is part of progress – we do not punish it.

That is a great culture, and one that resonates with our approach, too. Finally, what would you see as a game-changing technological breakthrough? This is maybe a dream, but I would like an exact virtual replica of SAICA machines for trial purposes. Imagine if Voith could supply us with the data for a particular felt, we could input this into our virtual machine, and monitor what happens.

Reducing risks, saving costs, increasing speed. It is a dream.

That is a creative solution, and we are actually already working toward making your dream come true. We have grown our simulation department in R&D specifically to do more of these kinds of trials. Thank you for talking to us today, Fernando. It has been an insightful and inspiring conversation.

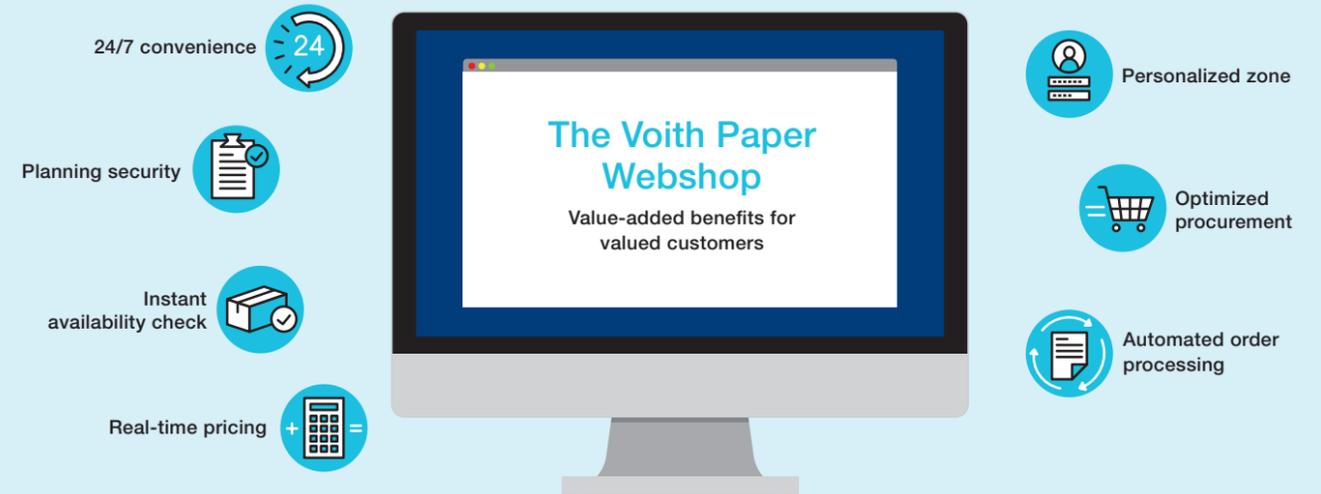


“How do you inspire people to open their minds to new ways?”

“My team inspires me. They are always looking at ways to make improvements.”

Beyond e-commerce

Online shopping has long been an established habit for today's consumer, and it is also a valuable tool in business-to-business transactions. With the Voith Paper Webshop, the sourcing process is considerably optimized.



90% Of all orders from Perlen Papier are placed via the Voith Paper Webshop.

“We are a lean workforce, so it helps that the Webshop is accessible at all times – it saves time with regard to contacting staff at Voith,” says Michelle White, Senior Buyer with Palm Paper in the UK. For White, the benefits of the Voith Paper Webshop go clearly above and beyond the normal functions of an online marketplace. The platform has become a key source of information. “It is very helpful with regard to information on specifications, sizes and where the parts are actually located on the paper machine,” she states.

“The system especially simplifies inquiries for us, as we are able to see the availability and delivery dates at a glance,” says Christian Stocker, Team Leader of Technical Purchasing with Perlen Papier AG in Switzerland. “We use the Voith Paper Webshop already for 90% of our orders, as reaction times are much faster,” adds Thomas Kreienbühl,

one of Stocker's colleagues in Technical Purchasing. The shorter processing time is a key benefit that allows for much greater flexibility. “With regards to ordering, it is a good tool and a definite step forward,” confirms Stocker.

On the Webshop, customers can find and order spares for their installations, via user-friendly search and navigation functions. Registered clients speedily find the right products in their own order histories, as well as original deliveries, through a variety of customer-oriented options, such as drawing numbers, customer material numbers and installation location. Further developments to the platform will provide SAP integration, which will allow customers to call up the Webshop directly from their SAP or own procurement system. Future features include enhanced order tracking, for instance, as well as product and service configurations.

A strategic focus

In his new role as Strategic Technology Manager for Board and Packaging, Johann Moser will combine his expertise in customer service and state-of-the-art paper technology. His goal is to ensure that Voith Paper provides a seamless, cutting-edge solution.

“It is similar to a successful professional sports team.” Given his interest in sports, it is not surprising perhaps that Johann Moser uses such an analogy to describe the complex papermaking processes. “We really need to work together with passion, perfection and precision for success. It is how we create satisfaction for our customers.”

To enhance this customer-oriented focus, Voith has established the role of Strategic Technology Manager, who is responsible for providing an even more direct line of specialized individual support at the upper-suite management level, with the distinct focus on strategic technological solutions across the complete papermaking process.

Tailored on many levels

Crucially, this involves the coordinated optimization and perfect alignment of all papermaking components, as well as the identification of any gaps in the portfolio, or the potential for new products and services.

Since January 2017, Johann Moser has been responsible for board and packaging technology, while Philipp Buchhold has recently been appointed the Technology Manager for Specialty and Graphic. In the future, in recognition of the importance of the three main paper grades, there will also be one manager responsible for tissue.



Johann Moser
Appointed to the role of Strategic Technology Manager for Board and Packaging in January 2017.
johann.moser@voith.com

“We really need to work together with passion, perfection and precision for success.”

Technology and experience is key

A graduate in chemical and process engineering of the Graz University of Technology in Austria, Moser has worked in the paper industry since 1988. Based in Heidenheim since 2004, his technological expertise stretches across all papermaking processes, products and services. In his new position, his goal is to ensure that Voith provides an all-around seamless solution. Given that the digitization wave is driving enhanced growth in board and packaging, this sector is now the most important paper grade – and is therefore viewed as a crucial investment area for the industry. “It is a highly standardized commodity, but it needs the best technology,” he says.

Reliable, efficient, more competitive

“It is my responsibility to provide expert insight on how to optimize production using less energy, fibers, chemicals and fresh water, which means adding value for board and packaging makers.” Cutting operating and investment costs, combined with increased efficiency, is always a priority for the mill managers. Moreover, a faster return on investment and increased competitiveness are also high on their agendas. “Papermaking needs a perfect composition,” he adds. “Strategic technology will make it real.”



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reflect

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

The concept of hyper-connectivity

Over 50 billion devices are expected to be connected to the Internet in the future. Not just individual smartphones, but whole machines, transport systems and cities. The next generation of networked vehicles, including the Mercedes-Benz Vision Van, promises to combine avant-garde design with the sleek integration of user-friendly, state-of-the-art connectivity. Digital is driving these trends, but it takes true leadership to implement such technology strategically. Thought leaders will shape the digital transformation of the workplace.

TO THE NEXT LEVEL

The digital world is spinning fast, disrupting every single sector. **SMART, MOBILE and SECURE solutions will win out across the board.**



_____ We are moving from a digital age that has widely and seamlessly connected individuals, businesses and services to an era where artificial intelligence, robotics and the Internet of Things promise to shape the future. Fully digitized players have pioneered this digital shift, driving innovation and automation, transforming customer experiences and expectations, as well as changing conventional thinking on business models. The hype is deafening, but the disruption is real. So, too, are the opportunities and benefits.

agriculture

Efficient yield and output. Real-time data analysis via drone-enabled technologies that are connected to cloud-based platforms promises to radically optimize the use of natural resources. Crop performance will be analyzed in flight.



mobility

Cost-effective convenience. Ubiquitous car-sharing services have already transformed taxi services and car journeys. The trend toward driverless transport systems and autonomous cars signal a bumpy ride for car manufacturers.



healthcare

Improved analysis and performance. Wearables, robotics and the Internet of Things are becoming more intelligent, connected and accepted by consumers. Predictive analysis and artificial intelligence could lead to better preventive healthcare.

Whatever the sector, to succeed, digital transformation has to exploit the ubiquity of the Internet and new technologies, but also provide protection against cyberattacks. Smart, mobile and secure solutions are essential for the future of businesses across the board, including **the next level of papermaking.**

A sharper vision for papermaking

“Papermaking. Next Level” will rely on the precise networking of know-how, processes and communication between machines. Bertram Staudenmaier, CEO of Voith Paper, explains why.

_____ Mr. Staudenmaier, what does “Papermaking. Next Level” mean to you? Essentially, it is about being smarter, more networked, more sustainable, as well as more profitable in this increasingly digitized age. Our cutting-edge know-how, broad experience and technological leadership are shaping the future of papermaking, taking it to the next level. To secure our position and further development, we are continuously refining our processes to achieve a level that is flawless. We have a clearly defined approach for the near future and beyond.

Most importantly, our strong position is supported by our regional experts. We are close to our customers and support them with a comprehensive approach, offering intelligently coordinated solutions from one source,

“Our cutting-edge know-how, broad experience and technological leadership are shaping the future of papermaking, taking it to the next level.”

for all paper grades and over the complete life cycle. This true customer orientation is the real focus of everything that we do. With Voith as a partner, paper manufacturers can already prepare for the future today, and we will guide and support them to attain the next level of paper manufacturing.

_____ How important is the client relationship? Our vision for customer relations is to be focused on long-term partnerships based on mutual trust and respect. By favoring the long view and remaining loyal to our customers, we are able to meet new challenges together. As a full-line supplier, we are in a position to provide professional advice across the complete production process, and to use our capabilities to develop solutions that create added value for all paper manufacturers.



In the long run, this is the way to guarantee success for us both, for our customers and for us.

_____ **And in the area of services?**

This is where we excel. Our portfolio of services is what connects the new machines, consumables and after-market business. Today, services already account for 60% of our business, while a third of our turnover is still generated by projects and new installations. This business will remain at our core, as the installed base provides the basis of our services for customers.



_____ **How do you meet customer expectations?**

The technological knowledge acquired over the past 150 years at Voith is fully exploited to support our customers. They need trustworthy suppliers that act as consultants and enablers, and that deliver reliable, fully developed technologies to produce all qualities of paper as flexibly as possible in the most cost-effective way. With our new XcellLine paper machines, for example, we guarantee our customers a fast and easy start-up, pioneering technologies and fewer downtimes through an optimized interplay of all components over the entire life cycle of the whole machine.



1. From a single source

As a full-line supplier Voith covers all areas of paper manufacturing – generating added value for customers.

2. Intelligent service

Tailor-made and smart solutions for higher availability and better process reliability.

3. Listening for innovation

Voith has the technologies for intelligent and sustainable paper production. In developing new product and service solutions geared to the challenges and needs of the market, Voith works closely together with customers.

4. Ready for the future

With Papermaking 4.0 – networked equipment and virtual systems – Voith already offers product solutions that enable intelligent paper production.

**Next
Level**



“By focusing on connected, smart solutions and processes, we are providing a clear added value for our customers.”

_____ **What role does digital play?**

A decisive one. The fourth industrial revolution is fully underway. Innovative technologies are connecting people, physical equipment and automation systems with the digital world.

We are continuously working on new Papermaking 4.0 solutions to improve efficiency, productivity and quality of the entire paper production process supply chain. By focusing on connected, smart solutions and processes, we are providing a clear added value for our customers.

For instance, our new OnCare AR features an assistance augmented reality module with video monitoring. Using augmented reality in this way significantly simplifies preventive maintenance and overhauls, for example, and also contributes to the streamlining of daily routine operations in paper mills. In 2017, our goal is to expand our range of digital applications. For this purpose, we created the new Voith Digital Solutions Group Division which brings together all our research, products and pioneering developments in the fields of IT, automation, software and sensor technology.

_____ **Could you give us some examples of forward-looking projects?**

A major challenge for our customers is the quality of recovered paper. To support them we are continuously improving established solutions and working on Papermaking 4.0, as well as new technologies. For instance, in March



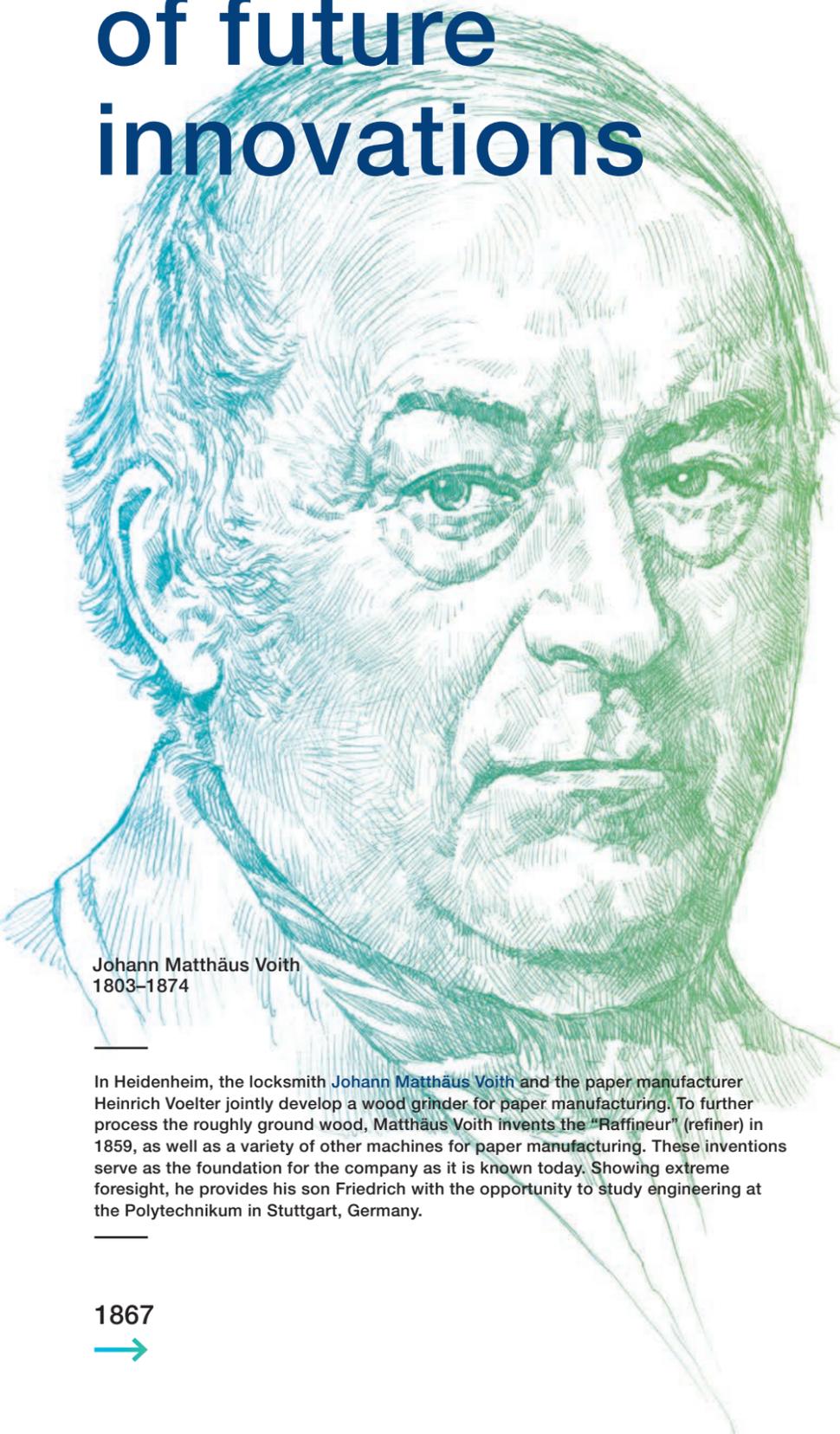
2017, we launched merQbiz, the first digital marketplace for recovered paper. Voith Paper is also helping to develop a radically new, sustainable and feasible pulping technology as a member of the EU research project Provides.

In terms of resource consumption, the reduction of energy demand is a crucial topic. What if, for example, we could reduce energy costs by 25%? It is possible with step-by-step improvements, and also by launching major new approaches.

_____ **What's next?** After 13 years at Voith, I will be stepping down from my role as CEO at the end of 2017. It has been a demanding but rewarding and fulfilling period in my career. During my time at the company, the paper industry has experienced challenging and volatile times, but thanks to the skill, dedication and foresight of the whole management team, together we have built a company that is now in a strong position to meet the challenges of the future. I am proud of this legacy.

It remains for me to wish the company, my colleagues and our customers the very best for the future. I have every confidence that my successor, Andreas Endters, has the experience, passion, authority and expertise to drive the paper industry forward. Voith will continue to strive to find new ways for our customers to thrive, and not just to survive. The focus will remain on the next level. _____

The roots of future innovations



Johann Matthäus Voith
1803–1874

In Heidenheim, the locksmith **Johann Matthäus Voith** and the paper manufacturer Heinrich Voelter jointly develop a wood grinder for paper manufacturing. To further process the roughly ground wood, Matthäus Voith invents the "Raffineur" (refiner) in 1859, as well as a variety of other machines for paper manufacturing. These inventions serve as the foundation for the company as it is known today. Showing extreme foresight, he provides his son Friedrich with the opportunity to study engineering at the Polytechnikum in Stuttgart, Germany.

1867



- **1867**
Friedrich Voith takes over his father's locksmith workshop with 30 employees. From the modest beginnings of a craftsman's space, he creates a state-of-the-art industrial enterprise with 3,000 employees.
- **1869**
Voith obtains the company's first patent, for a wood grinder.
- **1870**
Voith builds the first turbine in the company's history.
- **1881**
Voith builds its first complete paper machine, for paper manufacturer Raithelhuber, Bezner und Cie. in Gemmingen am Neckar, Germany.
- **1899**
The company delivers the first paper machine to Russia.
- **1903**
Voith receives an order for the delivery of Francis twin turbines to the Ontario Power Company at Niagara Falls, on the United States–Canada border. With 12,000 HP, they are the largest turbines of their time.
- **1903**
Voith opens its first foreign subsidiary, in St. Pölten, Austria.
- **1920**
Voith delivers a high-pressure headbox, a suction roll and the first paper machine with electronic multi-engine drive.
- **1927**
Voith builds the Voith Schneider Propeller, a ship propulsion system.
- **1932**
Voith develops its first turbo transmission, for a railcar in Vienna, Austria.
- **1953**
Voith commissions the most powerful paper machine at Feldmühle AG in Reisholz, Germany. The facts: wire width 5 meters, 600 m/min production speed, 200 metric tons newsprint paper per day.
- **1960**
In cooperation with the paper factories Haindl and Palm, Voith develops the flotation deinking process. This lays the foundation for today's environmentally friendly paper recycling.
- **1964**
Voith establishes a branch in São Paulo, Brazil.
- **1983**
Voith acquires the American company Appleton Mills and thereby enters the new business field of paper machine clothing.
- **1994**
Voith and the Swiss Sulzer Group start a joint venture, called Voith Sulzer Papiertechnik.
- **1999**
Voith acquires the British Scapa Group plc and becomes a leading supplier of paper machine clothing.

- **2010**
Voith celebrates the opening of Voith Paper City in Kunshan, China.
- **2016**
With "Papermaking. Next Level," Voith brings paper production to a new level. This is accomplished by applying innovative technologies, developing intelligent products and new services, and utilizing the opportunities available through digitization. The company and its employees work toward this goal with passion to make their customers in paper manufacturing successful – every day, today and in the future.
- **2017**
Voith celebrates its 150th anniversary – and looks ahead to the next milestone, with the motto "Welcome to the Next 150 Years."

Friedrich Voith
1840–1913

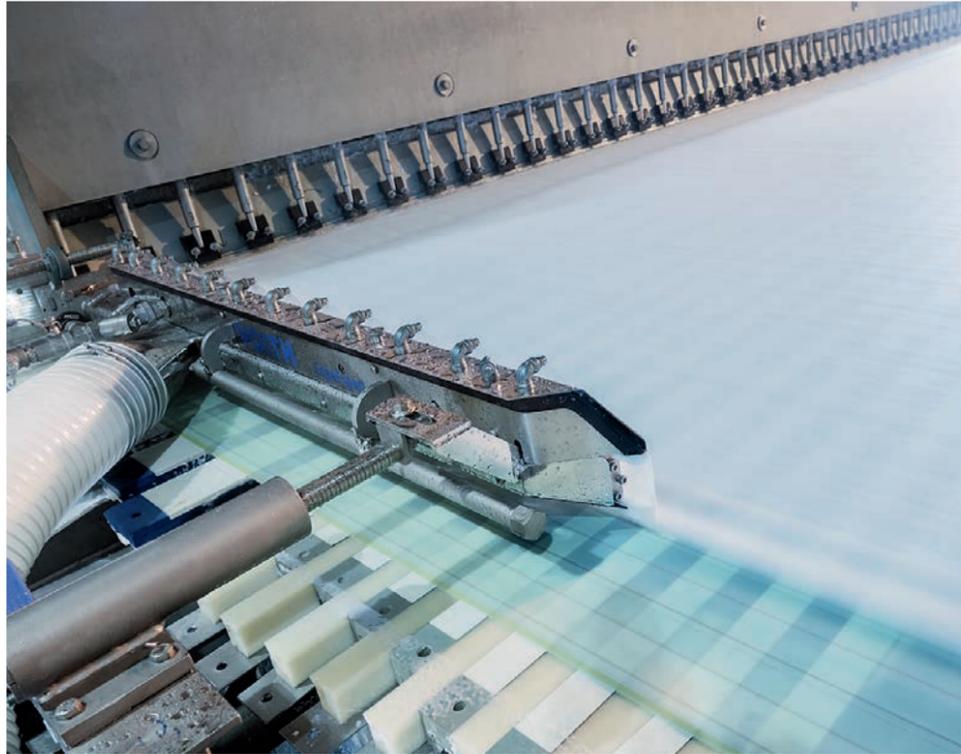
For 150 years, the Voithians' hearts have been beating for paper, its production and development. Generations of Voithians have continued to face new challenges, by people and markets, and have played a decisive role in the development of the paper industry.

2017



At the leading edge

How to cut and achieve optimal stabilization of the web edge? With the newly launched EdgeExpert by Voith. It is the cutting-edge standard for sustainability and efficiency.



Clean design, easy installation and efficient operation: the unique EdgeExpert concept saves fibers and adds stability.

_____ With an ingenious design that saves fibers, increases efficiency and cuts down on water consumption, Voith's EdgeExpert sets the benchmark in papermaking. Its unique edge trim concept is one key feature, as it defines the web edge directly in the stock jet as it exits the headbox. The technology is unmatched. For multilayer paper machines, this innovation means that high-quality stock suspension can be returned back into the stock circuit of a layer. The resulting savings in fiber ensure that the ROI is achieved within just a few months. The unique EdgeExpert functionality ensures an exceptionally

clean wire edge, while specially designed nozzles keep the EdgeExpert clean during operation – which is achieved with the addition of very little fresh water. As well as conserving resources, the EdgeExpert guarantees a stability of the edge that contributes to improved runability and productivity. Its one-of-a-kind adjustable mechanism allows the stock jet width to be set at between 0 to 120 mm directly on both sides. What's more, adjustments can be made during operation and tailored

to the specific paper grade. During routine downtime, EdgeExpert can be retrofitted within just a few hours onto any type of headbox, irrespective of the original manufacturer. Maintenance is simplified, as the integrated self-swiveling device makes light work of replacing the forming fabric. The combination of sophisticated design, advanced technology and ingenious implementation is once again proof that Voith has the edge in papermaking. _____

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Q&a

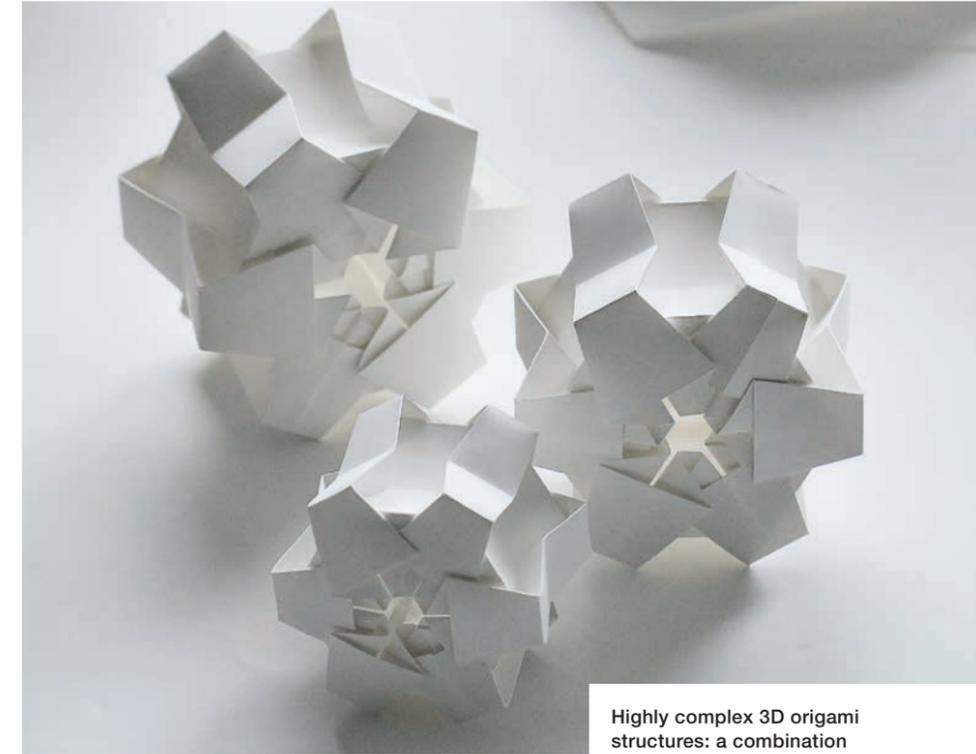
questions and answers

Using the ancient Japanese art of origami, Kristina Wißling is inspiring engineers to fold, shape, bend and design smart structures.

_____ **How useful is origami for industrial design and manufacturing?** Designers are often confronted with the challenge of turning 2D material into 3D structures that have volume and strength. The art – and science – of origami can hold the key to a solution. Crucially, origami can help cut down on costs substantially, by reducing volume for transport and storage, for example, or by optimizing production and eliminating waste. It is incredibly versatile.

_____ **Will digitization change what you do?** It offers enormous potential, and I already make use of special software and digital tools every day. With 3D printing, for instance, we'll be able to create geometrical structures more rapidly and cheaply, structures that are impossible with conventional machines and technology. In the future, selective laser sintering will enhance rapid prototyping and permit extremely creative structures and forms.

_____ **How do companies react when you offer origami workshops?** At first, there was skepticism. But since



Highly complex 3D origami structures: a combination of digital tools, traditional art and entrepreneurial talent.

2012, when I worked on a full-size tank out of paper for the military museum in Dresden, businesses have taken my origami skills more seriously. And they stopped seeing it as something their mothers did in their free time!

_____ **Are there any sectors that call on your expertise more often?** Origami-inspired products are found in every industry. On Earth and in outer space! Automotive and aerospace engineers often need to fit large objects into smaller spaces – think of satellites and airbags. How do they squeeze them in? One of my next projects will look at how to optimize the folding action of the roof of a convertible car. But whatever the focus, my clients generally need to find ways to do one of four things to achieve a desired functionality: increase stability, reduce size, improve shock absorption and resilience, and/or create a component out of a single piece of material. I work regularly with R&D departments to help solve tricky problems. Origami offers so much more than pretty figurines. _____



Complex origami tessellations formed from a single sheet. Such one-piece geometric patterns help solve tricky engineering challenges.



Kristina Wißling

The award-winning communication designer uses paper-folding ideas in technologically advanced projects.



Welcome
to the Next
150 Years

VOITH

Inspiring Technology
for Generations