

VOITH

PAPER TECHNOLOGY JOURNAL

TWOGETHER

#34 | 2013

COVER STORY

THE PAPER MARKET IN TRANSITION

SPOTLIGHT: PULP

THE VERTICAL REVOLUTION





Cover picture:
Global trade is increasing.
The transport of goods
increases the worldwide
demand for board and
packaging paper.

IMPRINT

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DEAR READERS,

Every change holds new opportunities and perspectives. That also applies to the current changes in the paper market. Thus, on the one hand, we see a declining demand for graphic paper that has a strong impact on our industry; on the other hand, the need for board, packaging paper and tissue is growing.

In our cover story, we shed light on these changes and the future opportunities they bring for paper as a truly sustainable resource.

Our spotlight on pulp has entirely to do with sustainable production. The highlight here is one of our latest developments: a vertical dryer section for pulp drying. This technical revolution requires far less steam and, as part of our pulp drying machines, facilitates an efficient process.

Today, resource-saving technologies are indispensable for economical and responsible operation. At Voith Paper, we have been committed to this topic for many years as leading technological partner of the paper industry. With developments such as BlueLine, our innovative product line for stock preparation, resource efficiency becomes a reality. But also our new press felt, the EcoHood dryer section hood, and our roll covers for tissue machines are all steps toward sustainable paper production that we present to you in this issue.

Renewable, recyclable, biodegradable: There is hardly a material better suited as a sustainable raw material and offering more versatility than paper.

I hope you enjoy the new issue.



On behalf of the Voith Paper Team

Dr. Hans-Peter Sollinger,
Member of the Voith GmbH
Management Board and
CEO of Voith Paper.





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THE PAPER MARKET IN TRANSITION



Change, upheaval, challenge – these terms frequently come up in discussions on the paper market today. The broad scope of the term ‘paper’ increases the complexity of any consideration. While graphic paper is under pressure, things look promising with other grades. Ultimately paper is one of the few truly sustainable resources that holds its own against other materials. ▶

▷ **What is the paper market in the first place?** There are many ways to categorize this market in all its variety. A very clear and simple classification is into the four classic segments: graphic paper, board and packaging paper, tissue and specialty paper. Practically all paper grades can be covered by these four groups. As different as the products are that are gathered in these segments, so, too, are the market conditions and challenges stakeholders face in their respective areas.

Digitalization presses graphic. Many companies that specialize in graphic paper are currently experiencing difficult times. Due to advancing digitalization, sales of books and newspapers are dropping. The effects are clearly noticeable: The need for graphic paper is continuously decreasing in many highly developed national economies. Even in high-growth countries such as China, this segment is registering only comparatively moderate growth. Seen globally, leading research companies such as RISI are thus expecting, at best,

stagnation in the coming years, if not a considerable shrinking of the graphic market. This means many companies in the industry are facing big challenges – primarily, of course, publishing houses and paper producers.

But the suppliers of the paper industry such as Voith are also being affected. Dr. Hans-Peter Sollinger, President and CEO of Voith Paper, explains: “The paper market in many countries shows a decline in the graphic paper segment of a few percentage points. However, this situation heavily affects us on the supplier side. As a consequence of weak demand for graphic paper, practically all investments by the paper industry in new graphic paper machines have been stopped. We are experiencing here a drastic cutback in project activity, and not just with us but rather in the entire market, by about 90%. So we are relieved that we expanded into new areas at Voith Paper more than 10 years ago and can serve all segments of the paper market today as a process supplier. Due to this



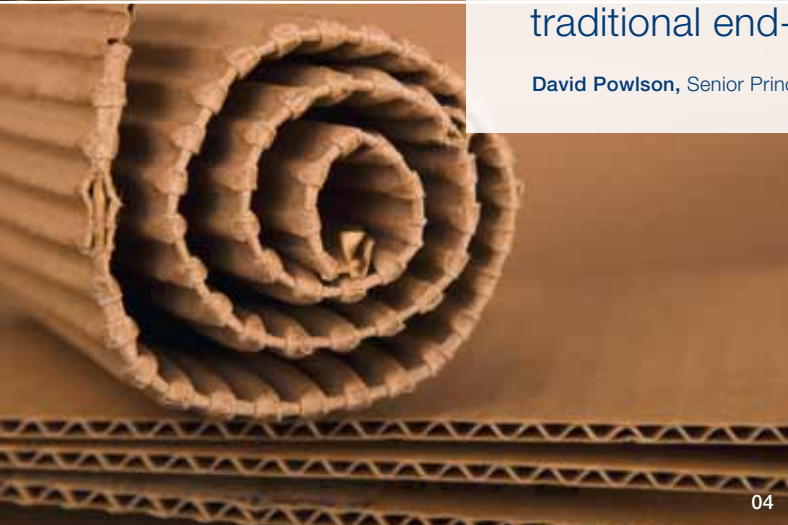
02



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“There will be new niches sitting alongside the significant traditional end-uses.”

David Powlson, Senior Principal at Pöyry



04



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broad line-up, we are in a position to be able to partially compensate for such a market change.”

Bright spot with other grades. Things look far more positive in the case of tissue paper. The market for tissue products is growing worldwide and is proving to be very stable during cyclical fluctuations. Esko Uutela, specialist for tissue papers at RISI, sees clear potential in this segment: “The tissue market increased even during the global financial crisis, and this trend will continue in the coming years. We expect an average global growth rate of about 4% annually; we even calculate with 6–7% annual growth in tissue demand in the emerging markets.”

To a similar degree, board and packaging papers are also growing, and make up the biggest segment of the paper market. However, the new machine types on which this growth relies no longer conform to the principle of “bigger, faster, wider.” Instead, in the recent past there has been more demand for efficient and compact machines of medium size in the paper industry (see p. 13). The market segment for board and packaging paper also has very good prospects for the future, since it profits from the increase in global trade. Moreover, paper as a packaging material has certainly not exhausted its possibilities and could replace other less sustainable materials. David Powlson, Senior Principal at Pöyry, explains: “Paper still has plenty of opportunities for serving even more packaging needs than in the past. Paper-plastic composites substituting non-paper products, for example in the area of food, are just one example we regard as highly promising. There will be new niches sitting alongside the significant traditional end uses.”

Sustainable paper. It is becoming all the more important for paper to show its unique characteristics in competition with other materials and technologies: renewable, recyclable, biodegradable. Along with renewability, using wood as a resource, the end product of paper is attractive due to its recyclability and biodegradability, which make it an ideal material with regard to sustainability. But in addition, the papermaking process also has to be considered and configured in a more environmentally friendly and resource-saving way. Accordingly, the paper industry is globally committed more than ever to the goal of sustainability.

02–04 The four classic segments of the paper market: graphic paper, tissue, board and packaging paper and specialty paper.

“Compared to other materials, paper has a marvelous starting point. It is renewable and recyclable.”

Marco Mensink, Deputy Director General at CEPI

Already at the end of 2011, the Confederation of European Paper Industries (CEPI) was the first of the energy-intensive industries to answer the challenge set by the European Commission to develop a roadmap showing to what extent industrial CO₂ emissions can be reduced. The challenge CEPI set for itself in its Roadmap 2050 is very ambitious: By 2050 the CO₂ emissions of the sector should be reduced by 80%. “Compared to other materials, paper has a marvelous starting point. It is renewable and recyclable. If we manage in a common effort to find breakthrough technologies to make the paper industry even more resource-saving and energy-efficient, this sector has so many opportunities,” illustrates Marco Mensink, Deputy Director General at CEPI.

On the agenda worldwide. It is not just the European paper industry that is concerned with cooperation in energy and resource efficiency. The North American association AF&PA published a sustainability report in the summer of 2012 that conveys a clear message. By 2020, the share of recycled fibers in paper production should increase to 70%, and energy consumption should be reduced by 10% and CO₂ emissions by 15%. Other goals include support for sustainable forestry and investment in innovative, water-saving processes.

Along with the more mature markets of Europe and North America, the Chinese boom market has also put sustainability of the paper industry on the main agenda. In the country's 12th Five-Year Plan, the paper industry is highlighted as a new source of economic growth. During the period this plan covers, China's paper industry is expected to make great progress in environmental matters so as to increase its global competitiveness. A representative of the biggest Chinese paper mill sums it up: “Companies that are effective in energy conservation, resource management and environmental protection are usually both profitable as well as socially responsible.” //

“WE HAVE TO ADAPT TO THE CHANGED DEMAND”

The paper industry is going through challenging times. Digitalization is especially having an effect on graphic paper in the mature markets; globalization is causing new economic areas to gain in significance and is increasing competitive pressure. Twogether spoke with Dr. Wolfgang Palm, CEO of the Palm Group, one of the leading paper manufacturers in Europe, about the current developments in the industry.



Dr. Palm, at King's Lynn in England, you operate the world's largest machine for newsprint. Do you see a future for this paper grade?

Dr. Wolfgang Palm: Since the beginning of 2012, we have been seeing a reduction in quantity in the market for newsprint. The way I see it, the development that has begun will continue for some years. The circulations of the daily newspapers will presumably further decrease by 2% annually. Thus I don't see any potential at all for a new graphic paper machine in Europe. But just because there is no need for a new machine doesn't mean that the paper grade itself will die out. I can't imagine that at all. The daily newspaper is part of our culture. The content and the feel can't be replaced by the electronic media. The need for newsprint will stabilize at a lower level. But paper manufacturers, publishers and print shops have to continue working intensively on the quality of the product so as to slow the downturn as much as possible.



What is required to stabilize the market in Europe?

The paper industry has to adapt its capacities to the shrinking demand. I don't see any other possibility, since there are no export markets that are significantly growing. Thus, for example, some paper manufacturers have already converted from newsprint to upgraded qualities. But of course this is only a limited solution, since the market for paper of higher qualities is also not growing and you thus come up against other capacities that are then in turn endangered.

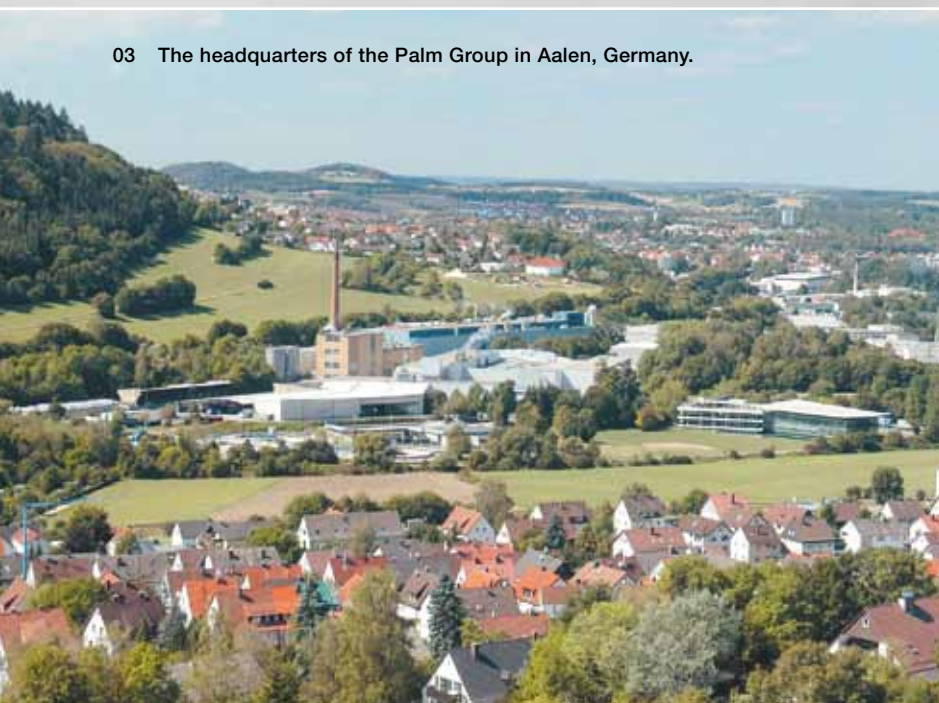
But also there are still quite a lot of very old graphic machines in Europe that are between 40 and 80 years old and are actually at the end of their technically and economically reasonable service lives. A glance at North America shows that in this case shutdown is a sensible strategy. The paper manufacturers there have been facing dropping >



01 The Palm Group is among the leading producers in the European paper industry.



02 The PM 7 at the King's Lynn location in England.



03 The headquarters of the Palm Group in Aalen, Germany.

The Palm Group

The family-owned company with headquarters in Aalen, Germany, was founded in 1872 and today is one of the leading producers in the European paper industry. The Palm Group is divided into two areas: Papierfabrik Palm with four paper mills and Palm Verpackungsgruppe. In 2009 the company put the world's largest paper machine for newsprint into operation in King's Lynn, England. All of the company's products are based on recovered paper.

Papierfabrik Palm

- 4 locations in Germany and England
- 4 paper machines for newsprint, 3 for corrugated base paper
- Altogether 1.9 million t/a

Palm Verpackungsgruppe

- 18 corrugated paper plants
- Altogether 400,000 metric tons of corrugated board and packaging

“I’m not worried about the future of the European paper industry. We have a strategic advantage in our industry: We produce from a renewable resource and our product is easy to recycle.”

Dr. Wolfgang Palm, CEO of the Palm Group

▷ consumption of graphic paper for 12 years, which instead of its former 30% now makes up only 17% of the world market. Shutting down the appropriate machines has counterbalanced shrinking demand so that the market can now stabilize.

Along with paper grades there are also other changes happening in the market. The requirements of paper manufacturers have changed in addition. What expectations do you have for a paper machine today?

The trend toward ever wider and faster machines is over. Today I no longer have to post a speed record and in my opinion it’s definitely the end of the story with the 2,000 m/min already achieved. We’ve also already achieved the maximum with width; actualizing more would be difficult just from a logistic perspective.

Worldwide there is a development away from extremely high performances and toward things such as resource conservation. This is a fundamental change of direction. Along with the best possible product quality, sensible and conservative handling of resources is an extremely important point. Lower energy consumption and use of secondary fibers are for me important issues that 15 years ago were not yet so fixed in the heads of the design engineers. In the meantime that has changed, and Voith has certainly been a leader in that regard. Nowadays you can no longer afford to not invest in resource-conserving solutions.

What innovations are you still waiting for?

There are physical limits, and the paper manufacturing process itself has already been optimized about as much as possible. A lot has been achieved in the last 20 years, so I don’t believe that there are still quantum leaps ahead of us. It’s rather the many small steps with which we’ll make headway. A further reduction of energy consumption and even more intelligent and resource-conserving stock preparation systems are certainly interesting and can also be implemented in the near future. And beyond that? My dream would be less

dilution of the paper stock in the headbox. That would really have decisive energy-saving effects on the entire process.

How can paper be produced economically in Europe during the next 10 years?

Sustainability will certainly be a decisive topic in the next few years. Energy, water, air and exhaust air will be the decisive issues for the future. Here we can and must implement further savings so as to increase our cost-effectiveness. In addition, we have to increase the recycling rate so we have enough recovered paper available. The collection rate in Europe is already very high, but globally there is still potential here.

In general, we will have to adjust to lower growth rates in Europe. But this is not bad per se. If the industry adapts to the changed demand situation, then I see a thoroughly positive development. Certainly it’s difficult for the individuals when every old paper machine and paper mill doesn’t survive. But this is a natural process that also takes place in other industries. In addition, this has the pleasing secondary effect that the percentage of new facilities is increasing. Thus ever more modern and resource-efficient machines will be in operation, which will mean a big leap in the reduction of energy consumption in the industry.

So I’m not worried about the future of the European paper industry. We have a strategic advantage in our industry: We produce from a renewable resource, and our product is easy to recycle. Therefore we still have further potential for development. The drop in graphic paper is indeed a challenge, but there is constant consumption of specialty paper in Europe, and there’s even growth in tissue and packaging paper. These developments will mutually compensate one another so that the European paper industry will continue to thrive at a high level in the future as well.

Thank you for this interview, Dr. Palm. //





MWV RIGESA STARTS UP NEW PM 4

KRAFT LINER FOR PACKAGING FOOD AND FRUIT

In 2012, MWV Rigesa started up kraft liner production on its new PM 4. The company, a subsidiary of MeadWestvaco Corporation MWV, produces 300,000 metric tons of kraft liner per year on this machine for use in the company's packaging converting operations throughout Brazil. The producer's supplier selection was based upon the Process Line Package in which Voith took the responsibility for nearly the complete project. >

NEW PLANTS

▷ With the PM 4, MWV Rigesa produces high quality kraft liner using the latest Voith technologies. The installed MasterJet Pro, for example, is a head-box that combines optimum paper quality with maximum energy efficiency. Its innovative dilution technology feeds the dilution water directly into the stilling chamber, which provides for a very even distribution. This dosing method results in a high accuracy of the control response in the web, which is improved by over 50% compared with conventional systems.

The dilution system is controlled by the OnQ ModuleJet CD actuators. This mechatronic module consists of metering element, valve, linear drive unit and control. It is perfectly tailored to the dilution principle so that MWV Rigesa benefits from an integrated system that features uniform profiles, better paper quality, lower energy consumption and reduced operating costs.

Other technical advantages of the PM 4 arise from the installed Tandem

NipcoFlex press, which is mainly used for fast and efficient machines. Two shoe presses in a row ensure a high dewatering capacity after press allowing high speed. The dryer section has a single tier configuration in the beginning to stabilize the sheet and to increase runability.

Benefits from a one-stop supplier.

The final and probably most important reason for the selection of Voith as preferred supplier is the company's Process Line Package. According to the PLP approach, Voith takes full responsibility for a new project. As a general contractor and expert on the entire paper manufacturing process, Voith ensures that the machine goes into operation safely at the guaranteed start-up time.

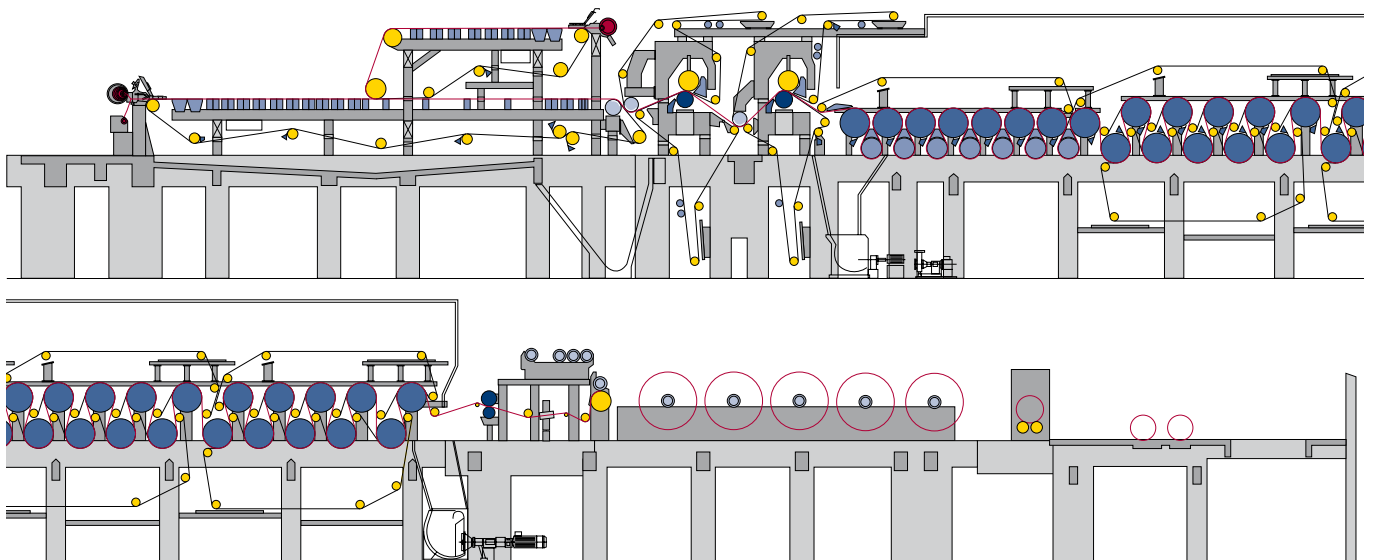
At MWV Rigesa, Voith took sole responsibility for the whole paper machine including every section of the entire process line, like piping, pumps, turbines, vacuum system, electrification, valves. Only vacuum

pumps, the electric package, the OCC plant and all civil works were the customer's responsibilities. Therefore, the paper producer had only one contact and one interface for the major part of the scope of supply. With the PLP, the entire project cost was established at the beginning of the cooperation, which provided full transparency to the customer.

High-quality food packaging.

The PM 4 produces kraft liner with 80% unbleached Southern Brazilian pine and 20% recycled fibers. The basis weight ranges from 90 g/m² to 375 g/m² and the kraft liner produced is used for packaging food such as fruits. MWV Rigesa chose Voith not only because of technological advantages, but also because of a long-term relationship: Voith had supplied an existing machine (PM 3) to the company in the 1970s. This long and successful cooperation was an important reason for the company to rely on Voith again.

02 Schematic layout of MWV Rigesa PM 4



For the MeadWestvaco Corporation the Voith PM 4 was an investment in increasing its corrugated packaging business in Brazil. Headquartered in the U.S., MWV is a world leader in the packaging industry and currently employs 2,500 people in Brazil.

With the expansion of its operations, MWV Rigesa wants to meet growing customer demand for high-quality packaging solutions. The kraft liner produced on the PM 4 is used as an outer ply for corrugated board, due to its high strength and moisture resistance.

Along with supplying the new PM 4, Voith has also rebuilt the MWV Rigesa PM 3, which has been in operation since the 1970s. It was upgraded to the state-of-the-art technology in order to increase its efficiency. The PM 3 produces 140,000 t/a of fluting paper, in a lighter basis weight range and with a 30% recovered paper share. //

Facts & Figures: MWV Rigesa PM 4

- Startup: July 2012
- Product: Kraft liner
- Design speed: 1,200 m/min
- Capacity: 300,000 t/a
- Basis weight: 90–375 g/m²
- Wire width: 7,300 mm
- Fiber mix: 80% virgin fiber,
20% recycled fiber

Technical Contact



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02-04 Voith took sole responsibility for the whole paper machine including every section of the entire process line.



FROM FIRST BRICK TO FINISHED QUALITY PAPER

JUST 17 MONTHS TO STARTUP

The startup of the PM 24 saw the first-ever paper machine with online coating technology going into operation at Sun Paper in Yanzhou, China. And this was after a project duration of only 17 months.

Before any paper was wound on the roller, the foundation first had to be laid. After all, there was nothing at the current machine location, not even a building. Sun Paper and Voith began laying the foundation rails in November 2010 and then started the main installation on schedule in January 2011. "This was a superb achievement on the part of all those involved," says Gerhard Buhmann, Senior Project Manager at Voith Paper. "Plan, erect the building, produce or

procure all the necessary products at the various sites worldwide, transport them to Qingdao and from there overland to Yanzhou – and all of that without any delay whatsoever in the overall project."

Coating without interruption. The PM 24 in Yanzhou is Sun Paper's first machine to use online coating technology, where the paper is coated twice on each side within the paper



01



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01-05 Voith Paper supplied all the technical components from paper machine to the two calenders and two winders, as well as the entire system of electronics and control elements.

Facts & Figures: Yanzhou PM 24

- Startup: July 2011
- Products: LWC and wood-free coated papers
- Maximum operating speed: 1,800 m/min
- Capacity: 420,000 t/a
- Wire width: 8,100 mm
- Length: 296 m (plus parallel offline calenders and winder 78 m)
- Raw material: Long and short fiber pulp, BCTMP

Sun Paper

Sun Paper is one of the largest private companies in China and the biggest producer of coated board and food-grade folding cartons. The company, which employs 10,000 people, produces 3.5 million metric tons of pulp and paper every year. Yanzhou is where the company has its headquarters and operates six board and seven graphic paper machines. Sun Paper has another 15 facilities in China and other regions of Southeast Asia as well as in the USA.

machine process directly after the drying section and then wound. In a separate step, two offline calenders smooth the paper to produce the finished product. Voith Paper supplied all technical components from paper machine to the two calenders and two winders, as well as the entire system of electronics and control elements. Given this large scope of supply, the project time of just 17 months was extremely short.

Directly after startup in summer 2011 the paper machine impressed with its very high efficiency, attributable not just to the machine but also to the professional work undertaken by Sun Paper's production management. Just

four days after its startup, the machine was producing paper of saleable quality, testimony to the success of the project. At a wire width of 8,100 mm and maximum operating speed of 1,800 m/min, the machine will produce up to 420,000 t/a wood-free coated paper in the basis weight range 52–105 g/m². This makes the PM 24 in Yanzhou the fastest and widest machine for graphic papers within the Sun Paper Group. At a capacity of up to 420,000 t/a, it is also the most productive.

As well as supplying the machine, Voith also signed an on-site service agreement with Sun Paper, which will significantly simplify optimization and maintenance. //

“This was a superb achievement on the part of all those involved.”

Gerhard Buhmann,
Senior Project Manager Voith Paper

Technical Contact



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REBUILDS

SAVING COSTS, INCREASING EFFICIENCY

REBUILDS ACROSS EUROPE

From Italy to Sweden: Four European paper manufacturers have planned and realized rebuilds on their paper machines in cooperation with Voith. The main goals were increased machine efficiency and runability as well as reductions in raw material consumption. To achieve them, Voith installed a DuoFormer Base and rebuilt a size press, while also integrating an EdgeSaver module and NipcoFlex presses. And thus the papermakers could meet their targets: Efficiencies were increased and costs reduced.



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Cartiere del Polesine PM 4, Loreo: speed increased. When Cartiere del Polesine, a long-established, family-owned company near the town of Adria, Italy, wanted to increase the capacity of its machine in 2006, the owners turned to Voith. Voith's technicians installed a DuoFormer base with a two-layer headbox in 2007. Finally the next step followed in September 2011: Due to installation of a DuoCentri Nipcoflex press section, including an extension of the predryer section, the solid content after the press section increased to the promised 51%, and the speed increased to 1,000 m/min.

Cartiere del Polesine was very satisfied with the results and at the end of 2011 also ordered a new quality control system, clothing and other equipment. Over the past 10 years, Voith has successfully carried out more than 20 rebuilds in Italy.

Weig TechnoKarton BM 6, Mayen: improving runability. This manufacturer of plasterboard in Mayen, Germany, has commissioned Voith with rebuilding its BM 6, to be implemented in two steps. At the end of 2012, ropeless threading in dryer group 9 was implemented. Presumably by the end of 2013 Voith will tackle the rebuild of the existing size press, with the aim of maintaining a clean periphery around the size press and improving runability.

Stora Enso BM 7, Skoghall: saving raw materials. Stora Enso Skoghall, Sweden, has given Voith the order for rebuilding its press section. The first press nip was rebuilt and a shoe press (NipcoFlex press) was installed. The aim of the rebuild was to use less raw materials for board production while keeping the bending stiffness unchanged. Due to the increased discharge dry content after the press, energy used for drying is reduced and there is a potential for increasing the production speed. Stora Enso produces liquid packaging board and folding boxboard in Skoghall.

Rondo Ganahl PM 2, Frastanz: saving fibers. At Rondo Ganahl in Frastanz, Austria, an EdgeSaver module was installed on both sides of the PM 2 on the headbox of the top wire in July of 2011. The product performs two functions at the same time: it takes over edge limiting of the web at the headbox and at the same time ensures single-grade recovery of edge trimmings. The fibers can thus be recycled. Annual savings of around 200,000 € in raw material costs can thus be estimated after nine months of operation.

Both EdgeSavers have been running very satisfyingly since startup. Connection to the existing machine components was trouble-free. Handling during operation also convinced the customer from the very beginning. //

- 01 The Italian family-owned company Cartiere del Polesine trusts in the DuoFormer Base by Voith.
- 02 Paper manufacturer Stora Enso in Skoghall, Sweden, relies on the NipcoFlex shoe press.
- 03 The PM 2 at Rondo Ganahl in Austria: Voith installed an EdgeSaver module on the headbox of the top ply wire.

Technical Contact



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STORA ENSO PLANS THE FUTURE WITH THE EILENBURG PM 1

FLEXIBLE PRODUCTION WITH THE JANUS CALENDER

With the rebuild of the Eilenburg PM 1, Stora Enso Sachsen has achieved two advantages and has safeguarded its production for the future, thanks to its new Voith calender, offering better smoothness and thus higher paper quality. In addition, the calender can be upgraded in the future and expanded to a Janus with 2x3 rolls. Paper of higher quality can thus be produced as needed in the future, with greater added value.



01 The Voith calender can be expanded to a Janus with 2x3 rolls by retrofitting two rolls.

The quality of the paper that Stora Enso produces with the Eilenburg PM 1 has become demonstrably better. That can be shown by the higher linear pressures and temperatures after the comprehensive rebuild. The result: smoother paper. Currently newsprint, heatset and telephone book paper are produced from 100% recovered paper in a basis weight range of 34–48.8 g/m². In order to increase the paper quality and the runability of the machine, the paper producer contracted out the rebuild in 2011. The main focus was a new calender that only Voith could provide in this form. The highlight is the fact that the calender can be expanded to a Janus with 2x3 rolls by retrofitting two rolls.

In addition, the maximum operating speed of the paper machine was increased from 1,750 to 2,000 m/min. In order to be able to dewater the paper web even more intensely even at this high speed, Voith installed a new NipcoFlex press

module. It works with the proven shoe press technology. Two new fabric stretcher and seven fabric guides were installed in the dryer section, and the machine air handling system was modified. Due to the rebuild of the first two dryer groups, all the rolls are now on the machine side of the dryer fabric. The result: up to 4% more dry content after the press and clearly improved cleanliness in the dryer section, which reduces the number of breaks.

In order to not only improve the quality for heatset paper (inserts, catalogs, etc.) but to raise it to a new level, Stora Enso decided in favor of the rebuild. Production was on hold for just 12 days. Moreover, a new exhaust system in the wet end and the Voith JetCleaner for cleaning the bottom wire were part of the rebuild. A new threading system and an edge trim were installed with the new calender. //

Technical Contact



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RECORD BROKEN IN JUST EIGHT DAYS

RAPID REBUILD AT APP

The paper manufacturer APP wanted its BM 6 board machine to process 1,100 m/min – more than a machine for high-quality art board has ever produced. To achieve this goal, suction forming boards and a suction roll were installed, the press section was supplemented by new water doctors, and splash pans and the entire dryer section was reconfigured. Everything was to take eight days and not an hour longer. It really couldn't be done – really. ▶





02 The reconfiguration of the dryer section was designed to make additional drying capacity available without changing the length of the section.

▷ It's hot and it's cramped, and it would be best if no one made a mistake. The 7.5-ton TurboDryer S hot air dryer slowly floats upward on massive chain hoists. The Voith assembly manager Andreas Schwab coordinates every movement of the team. The men are standing in the belly of paper manufacturer APP's gigantic BM 6 board machine. Dryer cylinder 5 – and later also dryer cylinder 7 next to it – has to be lifted so as to be able to place hot air dryers 3 and 4 under it.

Ultimately, the rebuild of the dryer group had the aim of making additional drying capacity available and in the process leaving the length of the dryer section unchanged. "This was the most elaborate part by far of the entire project," says project manager Robin Liang. "We had to drill cylinders, dismantle rolls that we no longer needed and finally remove doctors so as to have enough space." Space was needed to mount new DuoStabilizers on cylinders 5 and 7. The aim was to make a supported paper draw out of an unsupported one and thus to noticeably increase the speed through fewer web breaks.

A second measure on the dryer group also served this purpose: Voith attached a drilling rig successively on cylinders 5 and 7 that drilled several thousand holes to make a Supported web run possible in the future. In the process, the cylinder turns cyclically under the drilling rig, always one unit further. This process alone took two and a half days for both cylinders – two and a half out of eight.

Like clockwork. Not one hour can be wasted; the team has to work together like the geared wheels in a clock. Robin Liang: "In a rebuild such as this, 15 or more people are operating in the tightest space under time pressure, so the coordination has to be 100%. I imagine the building of the pyramids in ancient Egypt as being similar; there, too, a few coordinated, and many pulled on innumerable cords and hoists in order to move the gigantic stones."

“In a rebuild such as this, 15 or more people are operating in the tightest space under time pressure, so the coordination has to be 100%. I imagine the building of the pyramids in ancient Egypt as being similar; there, too, a few coordinated, and many pulled on innumerable cords and hoists in order to move the gigantic stones.”

Robin Liang, Project Manager Voith Paper

Nine Voith employees and roughly as many from the APP customer team and the assembly company managed the rebuild in Xiaogang. The discussions at the end of each workday were key to the project's success, according to Liang. “You sit down with the customer, balance the progress of the work with the schedule and plan the steps necessary for the next day.”

Every move hits home. The steps have to be carried out exactly in the specified order. For example, installation of the TurboDryers could only be done after the drilling and the other work one level up was completed. First they placed one TurboDryer after the other on the perforated rolls and then began to bring the big air duct parts into the right positions, piece by piece. While 1.5-meter air duct pieces were fixed and bolted down at a height of four to five meters, the customer changed the steam pipes of the steam system in this tight area. Drilling, bolting and welding in the tightest of spaces demands a lot from the team – every step had to be right, as time was short.

In summary, the dryer section had a supported web run in the upper part so as to lower the number of breaks and thus increase the speed. The rebuild of the lower part, however, provided for more drying capacity without having to lengthen the machine.

Unusual paths. In order to make the record-breaking production speed possible, Voith had to also modify other sections. And in the process take unusual paths: The suction forming boards used in the wet section were newly developed and had never before been installed anywhere. A fan suctions the water on the forming board and the web is immediately fixed, which facilitates the targeted high production speed. In addition, a suction roll was installed at a critical point to prevent lifting of the web. The rebuilds on the press section were more conventional but also effective, as Liang says: “Beforehand, the

customer didn't have any water doctors or easily adjustable splash pans, so remoistening occurred. Some of the water pressed out of the paper web was then thrown back onto it again. That doesn't happen any more.”

New insights gained. On February 29, 2012, after exactly eight days of downtime, APP's BM 6 in Xiaogang, China, started up again. Just one day later it was producing high-quality art board at a speed of 930 m/min. Finally, on April 18 APP succeeded in producing board for 24 hours with an output of 1,103 m/min. Never before had a comparable machine managed to do that. And even the production goal of 4,000 t/d was exceeded.

Along with the speed, it is also a bonus that APP can control energy consumption depending on the paper grade produced. The new TurboDryers that consume additional gas do not always run at full capacity, because this is not necessary with thin grades.

Voith has gained new insights in Xiaogang, not just in the area of technology but also with regard to organization. Robin Liang: “Some things in such projects are easier to manage if the contractor operates with its own assembly company.” Voith can now provide this service in China. Thanks to a joint venture, Voith now offers an expanded service portfolio and at the same time is deepening its roots in the fast-growing Chinese market. The new joint venture, Voith Integrated Mill Service Company, Ltd., offers complete assembly and installation work as well as professional maintenance for paper mills. //

Technical Contact



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WELL-POSITIONED WORLDWIDE

Voith Paper, as one of the leading partners of the paper industry, completed a reorganization of its business on October 1, 2012. In order to be able to meet the requirements of our customers in the best way possible, we are relying on a more regionally oriented organizational structure with four regional business units and three global business lines.

The four regional business units comprise the most important markets of Voith Paper: North America, South America, Asia and EMEA (Europe, the Middle East, Africa). The three global business lines ensure the high quality standards of our systems, products and services worldwide. They bring together technological expertise globally so as to be able to continue developing innovative and optimally coordinated solutions for our customers.

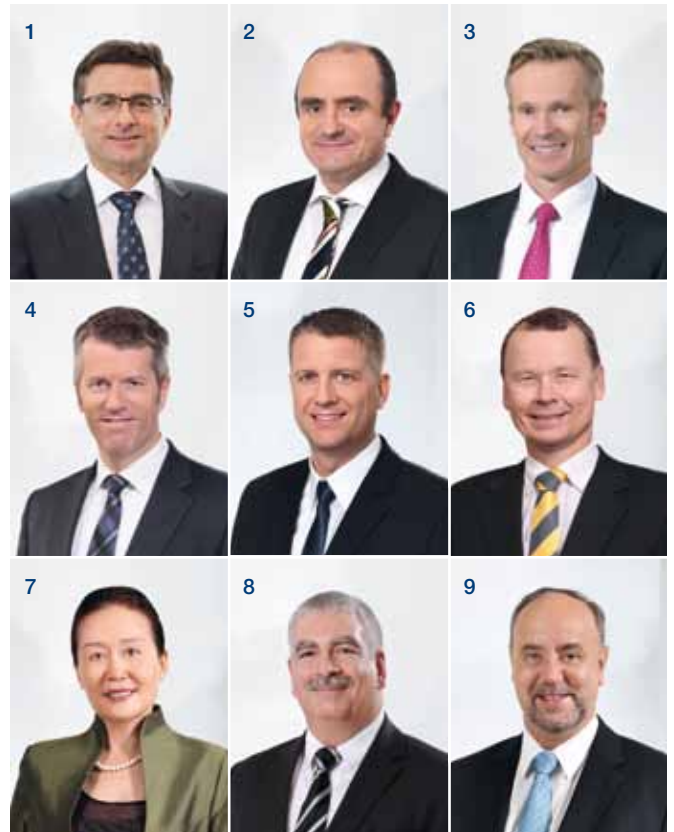
This new regional setup pursues the goal of orienting the portfolio even more towards the local conditions in the markets and working in partnership with them. Due to our proximity to our customers, it will be more possible than ever for us to understand the various markets in their diverse complexity and to create the best possible products for the paper industry.

For the customers of Voith Paper, this ensures that the product and service range will cover the entire papermaking process for all paper grades in the future. As process provider, we continue to offer everything from a single source: stock preparation, paper machines, automation, consumable materials, services and technologies for recycling and wastewater treatment. For our customers, Voith Paper remains a reliable partner whose solutions are even more tailored to local market conditions and customer requirements. //

Voith Paper Management

Voith Paper Management

- 1 Dr. Hans-Peter Sollinger, CEO
- 2 Martin Scherrer, CFO
- 3 Bertram Staudenmaier, Fabric & Roll Systems
- 4 Andreas Endters, Projects
- 5 Dr. Uwe Knotzer, Products & Services
- 6 Dr. Antti Kaunonen, EMEA
- 7 Ming Ming Liu, Asia
- 8 Bob Gallo, North America
- 9 Nestor de Castro, South America



“PM REFERENCES” APP

The first iPad app from Voith Paper is available for free in the Apple Store. In the “PM References” app are details of all Voith paper machines that have gone into operation since 2000. The app facilitates a search for paper machines on the basis of various filter criteria such as paper grade, wire width and annual production. For each paper machine the technical specifications, photos, a schematic drawing and articles from our customer magazine together are displayed. //



The “PM References” app can be loaded from the app store onto an iPad using the following link:
<http://itunes.com/apps/pmreferences>

Or scan the QR code:



MILESTONE INSTALLATION

The success story continues: start-up of the 100th OnQ ModuleSteam steam box.

The OnQ ModuleSteam steam box is used in the wet section for increasing production or improving the CD moisture profile. By heating the paper web, the viscosity of the water is reduced. With the simultaneous reduction of the surface tension in the paper web, improved dewatering comes about with the same dewatering elements. Higher production rates with improved qualities are the result.

The compact design ensures the best possible access to the components relevant for maintenance. Due to its small space requirements, OnQ ModuleSteam can be easily retrofitted in existing press sections. Production or energy savings of 5–10% are thus possible with very low investment costs. //

CLEAR FACTS

With a new process, Voith supports its customers in the selection of the ideal press felt for the respective paper machine.

What is behind the term press felt characterization (PFC)?

Dr. Tina Mutschler: Up to now, the choice of the press felt was particularly influenced by the experience of the sales employees. This has functioned well. But now we have found a way to back this up with concrete values and results. Press felt characterization is a mix of theory and practice so as to obtain the best result for the customer in the end. The basis for press felt characterization was laid by a careful development of method so as to reliably determine the magnitudes measured and to correlate them with parameters such as dewatering or compressibility. But laboratory values have to be well-founded. For that reason, we balance these values with the real-life values of the customer. Only in this way can we verify what the optimal value is and better coordinate the selection of the felts with the customer’s machine.



What are the advantages for the customer?

The greatest advantage is transparency in the selection of the press felt. On the basis of the values, the customer can see which felt achieves the best result in the customer’s machine. For us, that means that we can now serve our customers even better. At Voith, research is not just characterized by the idea of innovation, but is also very customer oriented. And finally, by means of the laboratory tests and analyses we also continue to develop our products, which in turn benefit the paper manufacturers.

Is press felt characterization suitable for all paper machines?

Yes, our method is suitable for all press felts – regardless of machine type. //

BRAZILIAN TISSUE MILL USES INNOVATIVE STEEL YANKEE CYLINDER

LESS STEAM IN THE BOILER

In July 2012, the new TM 4 of tissue manufacturer Sepac started to produce paper at the Brazilian town of Mallet. The machine consists of a new steel Yankee cylinder developed by Voith in São Paulo that consumes up to 6% less steam. Due to other new technologies, the machine also consumes less energy and saves heating costs.

Sepac, producing two-ply toilet paper in Mallet with its tissue machine TM 3, has seen its market grow by 8% in Brazil – about twice as much as the tissue market growth overall. As the capacity of the machine was no longer sufficient, Sepac chose the TM 4, designed for 1,800 m/min production speed and equipped with the first Voith steel Yankee cylinder to be installed worldwide. Due to improved ductility and reduced shell thickness, it compares well with a conventional cast iron cylinder, transferring the heat noticeably more efficiently to the paper and lowering steam consumption by up to 6%.

Wood firing. João Ferreira Dias, President of Sepac, also has a wood mill with a managed forest. Since the latter

“Voith Paper has shown itself to be very flexible and customer oriented in the development and construction of our new tissue machine. We were thus able to further extend our successful partnership that began in 2008.”

João Ferreira Dias, President Sepac

is larger than necessary for the mill, there is enough wood available to heat thermal oil for the tissue production. Voith has thus adapted the technology for the heating and drying hood to this already available resource, so the customer receives another big economic benefit.

Another new technology in the TM 4, which has been running since July 2012,

allows the energy consumption of the fan pump to be reduced by 5%. Due to a new design, the head box of the TM 4 is the first one that works without a recirculation line. The latter used to be necessary in order to obtain an optimal CD basis weight profile. Since this recirculation is no longer needed, the corresponding energy requirement is also reduced. //



01 The new steel Yankee cylinder lowers steam consumption by up to 6%.

Technical Contact



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LEE & MAN PAPER RELIES ON DUOCLEANER EXPRESS

500,000 € SAVINGS

Lee & Man Paper in China commissioned Voith to equip the PM 4 in Dongguan with DuoCleaner Express. Since the rebuild in the middle of 2011, there has been a significant improvement in cleaning effectiveness and performance of the dryer fabrics. This has resulted in higher productivity and reduced the operating costs by approximately 500,000 €. For this reason, the paper manufacturer decided to have 15 other machines equipped with the same cleaning system.

It only took two days for Voith to rebuild the pre-dryer section of the PM 4 as the first of 16 machines at Lee & Man Paper. The liner machine produces corrugated medium in the 90–200 g/m² basis weight range. Voith upgraded the original DuoCleaner on the top dryer fabrics of the 1st and 2nd dryer group and on the bottom dryer fabric of the 4th group with the improved DuoCleaner Express system.

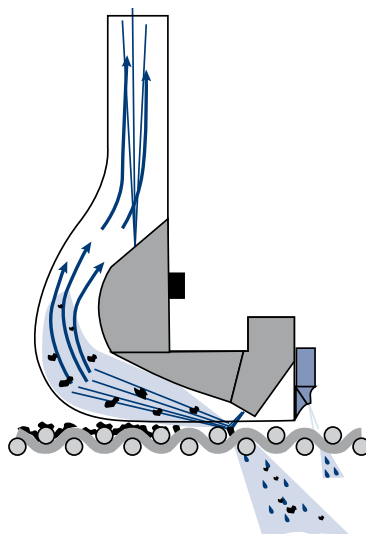
The DuoCleaner Express traverses with up to six concentrated high-pressure cleaning jets that spray onto the dryer fabric at a defined angle. A water jet injector in the cleaning head creates negative pressure and, together with the connected vacuum, reliably removes the deflected water and dirt particles. A small amount of water penetrates through the fabric into a tray and is discharged. An air knife blows out the remaining water from the fabric.

The improved design pays off. The new system substantially reduces the steam consumption of the paper machines – and with improved paper quality at the same time. Lee & Man Paper saves up to 500,000 € annually in water and energy

costs – just on PM 4 at the Dongguan location. After the successful rebuild, Lee & Man Paper awarded Voith the contract to equip 15 other machines at their sites in China with the DuoCleaner Express. Altogether this Chinese paper manufacturer is using over 50 DuoCleaner Express systems. //

02 Functional cleaning

Dirt particles are reliably removed



01 Successful application: dryer fabric cleaning with DuoCleaner Express.

Technical Contact



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NEW PRESS FABRIC FOR BOARD AND PACKAGING PAPER

REVOLUTION DEWATERS AT AN UNSURPASSED LEVEL

The new Revolution press fabric lives up to its name. The performance benefits have repeatedly delivered value to the customer. An engineered polymer layer embedded in the fabric structure provides for this. It maintains a uniform pore volume and increases the contact surface against the paper web. Revolution increases the dry content by up to 2%, improves the startup, enhances paper smoothness and maintains steady-state performance through its operational life.



01 The new Revolution press felt improves surface characteristics with board and packaging paper and achieves a 2% higher dry content.

Revolution, available as an endless or a seam fabric, was designed specifically for producing board and packaging paper. The newly developed press fabric technology allows polymers to be integrated into different levels of the fabric structure. Revolution can thus maintain a uniform pore volume even under a high load. The structural stability of the fabric is ensured at all times. When the fabric is compressed, the water drains far more easily through the fabric structure. The felt is saturated more quickly, and the hydraulic pressure aimed for in the nip is reached at an earlier stage. Revolution thus controls the dewatering before, during and after the nip. Revolution can increase the dry content as compared to a conventional fabric by up to 2%.

Thanks to its self-cleaning effect, the Revolution press fabric suffers less contamination. It provides for consistent performances over a longer period at a steady-state production level. In comparison to ordinary fabrics, Revolution press fabrics have better abrasion resistance and thus the fabric integrity is maintained over a longer period of time. In addition, the polymer layer minimizes rewetting, which improves after-press solids.

Revolution has already been successfully run in several paper machines – one being a European manufacturer of testliner and corrugated medium in the third bottom press. The machine with a DuoCentri press is 7.45 m wide and runs at 900 m/min. The new press fabric has increased the dry content out of the press by 0.5%.

Smooth paper. Revolution also noticeably improves the surface of board and packaging paper. “Since the felt can be compressed, the contact surface between the felt and the paper web in the nip is increased. The increased number of contact points increases micro-dewatering and reduces the surface roughness,” explains Peter Mödl, Senior Application Manager for Press Fabrics at Voith Paper. The press fabric provides for an extremely uniform dewatering, whereby an especially smooth paper web can also be achieved out of the press section. In the case of coated board, for example, the benefit is twofold as the value extends to the paper manu-

facturer's customer. Not only can coating color be saved but the paper produced offers a higher quality printing surface.

Quick start, long performance. The Revolution press fabric turns time into money in a double sense. From startup, the fabric rapidly achieves its optimal pore volume for maximum dewatering and machine speed. Since the fabric is quickly saturated, it provides immediate operational effectiveness. Consistent higher speeds bring an enormous economic advantage, and if this is possible with less vacuum then energy can be saved. This value was experienced at a German paper mill that produces fluting liner on 5.45 m at 1,100 m/min. In the pick-up position immediate dewatering was possible with the Revolution Seam felt. The customer achieved successive production records and a longer operational life, and now uses Revolution in this position exclusively. //

02 Revolution seam felt

Example for felt structure positioning of the Revolution layer



Technical Contact



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STOCK PREPARATION EFFICIENT AS NEVER BEFORE

BLUELINE: SUSTAINABLE SOLUTIONS FOR THE FUTURE

Modern stock preparation has to provide maximum performance with the highest system efficiency. Efficiency means not only using less energy, fiber and water, but also sustainability in terms of quality and reliability – consistent with Voith values. After three years of development work, Voith presents its new product portfolio for stock preparation that addresses these issues: BlueLine.

The new BlueLine product line is tailored to the needs of the modern, environmentally friendly paper industry. With BlueLine, customers profit from proven Voith quality and reliability and at the same time low energy, fiber, water and maintenance costs.

Reliable and maintenance-free. Among the first available BlueLine products for stock preparation are the IntensaPulper, the IntensaMaXX pulper detaching machine and the IntegraGuard headbox screen. But special attention should be paid to the InfiltraDiscfilter here. Voith has set a new standard in dewatering and filtering of pulp in stock preparation with this product. Thus the InfiltraDiscfilter ensures pulp suspensions are dewatered more reliably and free of maintenance than ever

before – and with the highest specific capacity industry-wide.

Higher filtrate quality. The core of the InfiltraDiscfilter is the improved version of the BaglessPlus filter disc in combination with a new design of the center shaft. The corrugated surface of the disc, which is made of rugged steel, increases the filter surface and thus the capacity of the disc filter. At the same time the knock-off of the fiber mat was improved. Another plus is the reduced maintenance costs. This is because the steel discs are nearly maintenance-free. Conventional disc filter sectors have bags made of synthetic fiber fabrics that show tears after a certain amount of time. Thus the bags of the conventional sectors often have to be replaced after one year so as to function flawlessly. This dismantling

and installation results in high costs that are avoidable with the Bagless-Plus sectors. The new technology thus improves fiber yield and service life of the disc filter.

From theory to practice. Laboratory conditions frequently deviate from those in the real world. The InfiltraDiscfilter thus had to prove itself in practice with customers. The touchstone was the parallel test run of three different units in two different plants. The practical test was first done on a deinking system at a paper mill in Annaberg, Germany, and then on an OCC system in Malaysia. As different as the areas of use may have been, the problem-free installation and startup of the new disc filters were impressive in both locations and systems.



The high quality of the filtrate at the dewatering facility in Malaysia was especially surprising. Both plants noted an increase in yield as a result of the improved process. “We were impressed by how quickly and flawlessly Voith implemented and started up the Infiltra-Discfilter,” says Holger Hampel, Manager of the Schönfelder Papierfabrik GmbH in Annaberg. “Voith has completely fulfilled all the promises it made.”

First choice in the WEP. The bottom line is, InfiltraDiscfilter is not just an outstanding dewatering machine, but also the first choice for fiber recovery in the wet end process. In save-all applications, it achieves convincing results in combination with the new space-saving 4-port valve from Voith in obtaining various filtrate qualities. As a result, the

quality of the filtrate is optimal, and the capacity is high thanks to the high and stable vacuum.

Looking ahead. Voith is already on the starting blocks with additional product development for the BlueLine product line. Soon three other product innovations from Voith are coming on the market with the IntegraScreen, the Intensa-Drum pulping drum and the Infiltra-Screwpress dewatering machine. //

Technical Contact



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BlueLine: benefits

01 IntensaMaxx detaching machine

- + Less maintenance time
- + The highest operational reliability
- + The lowest amount of wear
- + Less energy consumption than with the Fiberizer
- + More than 30 units already sold

02 IntensaPulper stock pulper

- + 20% less energy consumption than conventional pulpers with the same pulping quality
- + Optimized flow pattern due to excentric container design
- + High level of pulping efficiency due to improved rotor design
- + More than 50 units already sold

03 InfiltraDiscfilter

- + Lastingly stable and outstanding filtrate values
- + The highest specific capacity industry-wide
- + Easy and compact installation
- + Cost savings thanks to low maintenance outlay
- + Very good fiber recovery
- + Already around 20 units sold



01 The dryer section is the biggest energy consumer.

Benefits at a glance

- + Less steam consumption due to more efficient removal of water from drying with less exhaust air
- + Saving of thermal energy due to higher performance of the existing heat recovery system
- + Saving of electrical energy at the fans due to lower amounts of air
- + Option to increase production without adding on to the existing ventilation technology
- + Facilitates an effective heat recovery concept
- + Improvement of the hall climate and active building protection due to heavily reduced heat and moisture inputs into the hall
- + Reduction of the noise level in the hall
- + Possible use in many applications – in particular with machine optimization

NEW DRYER SECTION HOOD WITH HIGH DEW POINT

DRYING MORE EFFICIENTLY

The new Voith EcoHood 65 dryer section hood noticeably reduces energy and steam consumption. Its secret: a high dew point of 65°C.

The dryer section is the biggest energy consumer in the paper machine. Even small improvements on the hood and air system can have a big influence on the operating costs. With the new EcoHood 65, the amount of supply air and exhaust air in the dryer section can be substantially reduced as compared to previous hood designs. Steam consumption drops, and the fans require less power. In addition, the efficiency of the heat recovery system increases.

Technical fundamentals. When drying paper, the evaporated water is discharged via air. The amount of air required results from the possible water absorption capacity of the exhaust air. The latter depends on the dryer section

hood's design and degree of insulation, expressed as the dew point of the hood. The higher the dew point, the more water the exhaust air can absorb without condensation forming on the hood and the smaller the amount of air required.

The new EcoHood 65 is the next step in the development of the previous Voith hood with a dew point of 62°C and has a reworked design and improved components. Many details were optimized for this. For example, thermal bridges were eliminated and special seals were used. The hood facilitates good process control and operability of the dryer section. Access is via lifting gates, access doors and wire



“The rebuild of the hood proceeded smoothly and the new hood enables us to save a significant amount of energy in the pre-dryer section.”

Ralf Schwarzer, Project Manager at DS Smith Paper in Witzenhausen

change gates, or is also possible via the hoodroof.

Better recovery of energy. The higher dew point increases the energy content of the hood exhaust air, which allows better energy recovery. While usually only simple heat recovery systems are possible at a low dew point, extensive systems can be installed with the EcoHood 65. Thus, for example, the dryer section supply air, fresh water, white water and hot water for hall heating can all be heated in succession.

In addition, the amounts of air suitable for production can be regulated with an energy optimization system that is separately available. A high dew point is thus possible over the entire range of grades in the paper machine. The drying pro-

cess becomes noticeably more efficient and operation of the paper machine more cost effective due to these improvements.

The new hood in use. DS Smith Paper Deutschland GmbH has also realized the advantages of the dryer section hood and for the first time has installed the new Voith EcoHood 65 on the pre-dryer section of the PM 1 at the Witzenhausen location. DS Smith produces over 340,000 metric tons of corrugated cardboard base paper per year on the PM 1.

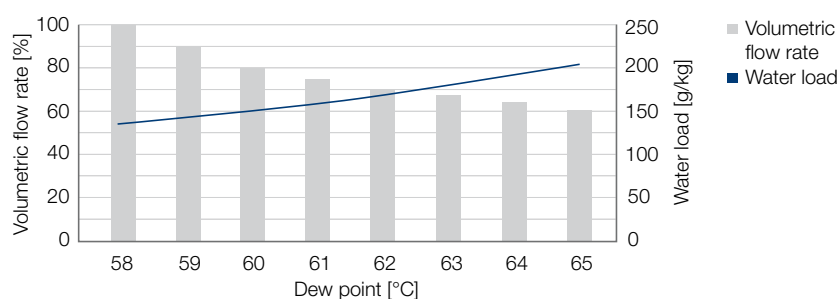
“We are very satisfied with the new dryer section hood,” reports Ralf Schwarzer, Project Manager at DS Smith Paper in Witzenhausen. “The hood is functional and of high quality. The rebuild proceeded smoothly and the new hood enables

us to save a significant amount of energy in the pre-dryer section.”

Less exhaust air. Before the rebuild, the pre-dryer section hood operated with a dew point of about 57°C. This required the input of 400,000 m³/h of exhaust air. With the new hood and a dew point of 65°C, the amount of exhaust air can now be reduced by 30% to just 270,000 m³/h. An investment in the Voith Eco Hood 65 thus quickly pays off.

The Voith EcoHood 65 is an ideal choice when optimizing existing machines, because often an efficient heat recovery concept can only be achieved with the help of a good hood. The EcoHood 65 can thus be an important component for high energy savings – and quickly pays off. //

02 Change of volumetric flow rate at increase of dew point



Technical Contact



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MAJORSOFT AND MEGASOFT ENSURE EFFICIENT AND RELIABLE TISSUE PRODUCTION

NEW ROLL COVERS WITH IMPROVED POLYMER MATRIX

They have already fully proven themselves in numerous field tests: The new MajorSoft and MegaSoft rubber roll covers are ideal for tissue machines. Thanks to their newly developed build-up, they are extremely durable and provide for reliable and efficient operation.

The new roll covers' formula for success is their innovative multi-layer structure. Here is where the new "secure bonding technology" shows its worth: Voith Paper technologically changed the manufacturing process for rubber roll covers and, in particular, improved the polymer matrix of the base layer and the intermediate layer.

Now there are more points of contact in and between the cover layers. The bonding force between these layers is

thus four times as strong as with conventional rubber roll covers. There is nothing like the reliability that results. A new rubber polymer matrix was also developed for the functional layer of the roll cover, where choosing the right application, the cover can deliver higher dewatering content, more energy savings, longer grinding intervals and improved dry content.

Tested under extreme conditions. Over the last two years, both roll covers



were tested in tissue machines worldwide. The high durability and stability of MajorSoft was on display here. Thanks to the adapted reworked functional layer, there is less after-hardening and despite extreme conditions a simultaneous improvement in production efficiency. MegaSoft also proved itself in several tests. Among the advantages of the “secure technology” with this cover is a newly developed functional layer that consists of an improved rubber polymer matrix. Grooves and open surfaces of up to 35% are thus possible. After-hardening – a familiar problem with rubber roll covers in tissue production – is clearly reduced. The high water storage volume is increased and there is less hole dishing and reduced material deformation.

The MegaSoft roll cover recently demonstrated what it can do in a tissue ma-

chine. The machine uses fresh fibers and recovered paper and produces on a width of 3.5 m at a speed of 1,600–1,850 m/min. The paper produced has a weight of 17–23 g/m². By using MegaSoft, the production speed was increased by 25 m/min and the dry content was improved by up to 1.2%. The energy saving is 63 kWh/t, and altogether production was increased by 1.3–1.5%. This manufacturer thus saves almost 180,000 € annually.

Longer operation with consistent quality. In comparison to previous rubber roll covers with the same load, wear on the MajorSoft cover is halved and the MegaSoft cover has only one-sixth the wear. The multi-layer cover structure absorbs the nip stress and reduces shear force down to the shell. Until now, an uneven nip carried the danger of local over-pressing, which can lead to damage of the cover and thus to unexpected production stoppages. Here, too, the advantages of “secure technology” make themselves felt: The improved adhesion strength and added points of contact in the cover guarantee a reliable and uniform application. In addition, the risk of the cover layers separating is drastically reduced, thanks to the high level of bonding strength between all the layers.

Which cover for which application?

Which cover is the right one depends above all on the condition of the nip and the profile of the Yankee cylinder. Experts from Voith Paper clarify in advance of an installation whether MajorSoft, MegaSoft or the SolarSoft polyurethane roll cover should be used. In each case, longer running times and characteristics, improved paper profiles and more efficient production will be the result. //

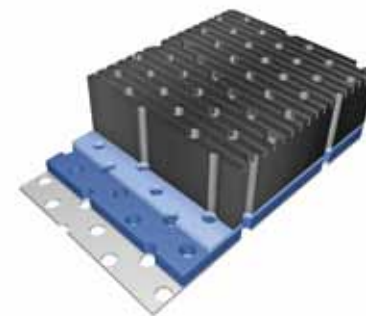
02 MajorSoft

Durable long-life rubber roll cover



03 MegaSoft

Higher dewatering capacity through grooves



Technical Contact



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PULP

ON THE PATH TO
GREEN PRODUCTION



THE VERTICAL REVOLUTION

01 The vertical dryer section of the pilot machine São Paulo.

Technological progress also calls for a rethinking of certain things that have been accepted as given for decades and considered virtually set in stone. One of these truths is that the pulp always runs horizontally through the dryer section. Yet early in 2012, Voith started up a pilot pulp drying machine with a dryer that ignores this principle. A technical revolution.

“Our pilot machine opens up new options for refining and testing our pulp technology,” says Marcelo Karabolad dos Santos, Head of Development for pulp drying machines. “We can run trials for customers, develop new products and simulate production parameters for new machines.”

The pilot machine is installed in Voith Paper’s Innovation Center in São Paulo. It is approximately 55 m long and 0.5 m wide and models the entire pulp manufacturing process from screening to cutting and baling. The complete line was designed with a focus on saving energy and increasing productivity.

Less energy. The vertical dryer section is not the only interesting part of the machine. The other sections consist of innovative yet already proven technologies where Voith has a lot of experience. The screening, for example, uses up to 30% less energy due to a new basket and rotor design. The MasterFormer is a wire former for pre-drainage followed by a double wire former with high tension. It removes a great amount of water and therefore allows a lower vacuum consumption and thus also saves energy.

The press section is largely based on the shoe press technology that has been

very successfully used for a long time in conventional paper machines. The MasterFlex press with two shoe presses is able to work at very high pressures. Using eucalyptus, this brings a high solids content of almost 60% after the press and results in a lower steam consumption or higher production. In addition, it improves the runability of the machine causing fewer breaks due to high dryness after the 1st and 2nd press.

From horizontal to vertical. However, the technical revolution as such takes place in the dryer section. Unlike all comparable machines developed and built to date, the pulp in São Paulo runs through this dryer vertically, not horizontally.

In the patented process, the web is guided vertically by pulp guide rolls. Blow boxes installed between the guide rolls dry the web from both sides. The web is guided and kept stable only by the guide rolls and not sustained by the air flow.

This means that unlike the horizontal process, the air flow is used in its entirety for drying, which substantially enhances the efficiency of the impingement drying.

Increased efficiency. The vertical Master-Dryer improves the runability of the machine because of shorter downtimes after a break. Karabolad dos Santos explains: “A vertical MasterDryer can be cleaned in minutes, whereas the conventional ▶

“A vertical Master-Dryer can be cleaned in minutes ...”

Marcelo Karabolad dos Santos,
Head of Development for pulp
drying machines.

SPOTLIGHT: PULP

▷ horizontal system might take several hours.” The reason for this is that in the horizontal dryer the broke pulp falls onto the blow boxes and is labor intensive to remove. In the vertical dryer, the pulp simply falls between the blow boxes onto the conveyor and then goes to the pulper. Finally, the MasterDryer allows zone control, which may optimize the drying process.

The pilot machine’s cutting technology, supplied by Pasaban in Spain, works with synchronized knives, a system that improves cutting quality and reduces both noise levels and vibration allowing higher speeds.

First customer. The pilot machine has been running since the beginning of 2012. There is already the first satisfied customer using the vertical drying technology. Since June 2012 a vertical dryer group has been operating very successfully at Lwarcel Celulose in Lencóis Paulista in São Paulo state.

And this system showcases a third advantage of this technology. The customer wanted to increase the drying capacity of the existing machine, but did not have enough space to install another horizontal dryer deck. This is where vertical dryers offer the benefit of just being tall but not long. Luís Künzel, General Director of Lwarcel Cellulose, is impressed: “During

“With the help of the vertical dryer, we are now in a position to increase drying capacity by 15%.”

Luís Künzel, General Director of Lwarcel Cellulose

the entire rebuild phase, which took about six months, the existing horizontal system could continue to run. With the help of the vertical dryer, we are now in a position to increase drying capacity by 15%.” //

Technical Contact



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02 Where revolutionary ideas are developed: The Voith Innovation Center in São Paulo.

RESOURCE: WOOD

THE PULP BEHIND THE PAPER

Wood fibers are a great resource: they are renewable, recyclable and biodegradable. Processed into chemical pulp, they are an ideal sustainable raw material for paper production. Therefore, it is becoming even more important for pulp producers to be transparent and ecologically responsible.

01 Immediate vicinity: eucalyptus plantation and native rainforest.

In the last twenty years the global demand for chemical pulp has risen noticeably. Worldwide, more than 160 million metric tons per year are produced from wood. North America produces more than a third of this. The base products here are primarily pine trees and spruces. The major part of the chemical pulp is produced in integrated mills, i.e., these companies directly use the raw material themselves for their own paper production. Thus pulp producers in the U.S. sell no more than about 15% of their production as market pulp to customers and use the remaining 85% for their own consumption.

Growth engine South America. Things look very different further to the south. The South American region is one of the most important growth markets for the chemical pulp industry and has nearly doubled its share of global production in the past 10 years. There are a multitude of pure pulp mills here that sell their product to the market. More than 90% of the South American chemical pulp is exported, primarily to Europe, China and also North America. One reason for the region's success is its geographic situation. Pulp production is heavily dependent on local conditions such as climate and soil composition. Both of these factors impact the choice of

the type of wood that is planted. South America, especially Brazil, profit from conditions that are very well suited to the cultivation of eucalyptus. Its enormous productivity has given the subcontinent high growth rates in pulp production during the past few years.

Action made transparent. Responsible use of the forest was for a long time a purely national concern. However, this changed at the beginning of the 1990s when the media and environmental organizations began to more precisely examine and critically challenge forest management worldwide. Areas such as the tropical rainforests and Russian and western Canadian forests were appearing in the headlines. At least since this time, environmental aspects have been very close to the top of the agenda in pulp production, and many producers insist on a maximum of transparency. They invest in cultivation of the forests as a renewable and sustainable resource and are very much concerned with maintaining the sensitive ecological balance.

One of the biggest producers of market pulp is the Brazilian company Fibria. With forest ownership of around 1 million hectares – an area almost as large as Hawaii – it ▷

SPOTLIGHT: PULP

▷ has specialized in the cultivation of eucalyptus. The importance of sustainable action becomes clear on all levels at Fibria: There are defined short-term and long-term sustainability goals, a sustainability committee that advises management and also an extensive sustainability report annually, which gives information about all activities in this area.

Mosaic instead of monoculture. Fibria deliberately does not cultivate more than two-thirds of its forest estate, but instead protects the local native forest and thus the diversity of species. Eucalyptus plantations are operated in the remaining area according to the latest findings and the most environmentally friendly methods. Native forest and plantations are mixed and form a kind of mosaic. This type of management provides a viable habitat for a variety of wildlife. In 2012, the company planted almost 70 million seedlings that will not only provide a benefit as a later supply of wood, but also stabilize the soil while they are growing and absorb carbon dioxide from the air. Fibria was thus able to draw an exceedingly positive balance in 2012: The company's own forests absorbed 3.8 million more tons of CO₂ than the company emitted as a whole.

In order to measure the effects of its own actions and to constantly improve its forest management, Fibria regularly carries out environmental studies. In addition, the local flora and fauna, the soil and the water resources are monitored. The behavior of birds and the number of bird species are taken as the main indicators for the environmental quality of the forests. Various analyses provide information about the composition of the soil and serve as a basis for deciding on the selection of areas to cultivate. Protection of the soil, well-balanced manuring and allowing leaves, twigs and tree bark to act as a protective layer are standard in the work of the plantations. In its own research center, Fibria is working on new types of eucalyptus that reduce the effects of plantation management on the soil and the environment and at the same time increase the yield per hectare.

Fibria's commitment to sustainable forest management is also confirmed by independent third parties. About 80% of forest stands have FSC or CERFLOR certification. The Forest Stewardship Council, which came into being in 1993, is one of the most important institutions of its kind. The standards it sets for the responsible management of forests are then monitored for adherence by independent examiners. CERFLOR is the Brazilian equivalent.



Environmental protection is attractive. Thanks to high environmental standards in the production of South American market pulp, this product is finding broad acceptance worldwide. The producers are among the leading developers of a wood resource that is planted and harvested in a responsible and sustainable manner. In addition, there is a second reason for the rising demand: Brazilian eucalyptus trees are used even more frequently for chemical pulp production since they have a big economic advantage. Due to the climate, they are already fully grown after about seven years. With a yield of 44 m³ per



- 02 The seedlings are grown in tree nurseries until they reach the required height for the plantations.
- 03 Hardwoods such as eucalyptus provide short fibers.
- 04 Softwood pulp has long fibers, giving paper greater strength.

fibers about 1 mm in length. It is primarily suitable for production of bright white graphic paper such as writing and copy paper, but also tissue to which it contributes a special degree of softness.

By contrast, due to the soil composition and the climate, softwoods such as pine and spruce are mainly used in northern Europe and Russia. Chemical pulp produced from softwood has long strong fibers and thus gives paper more strength.

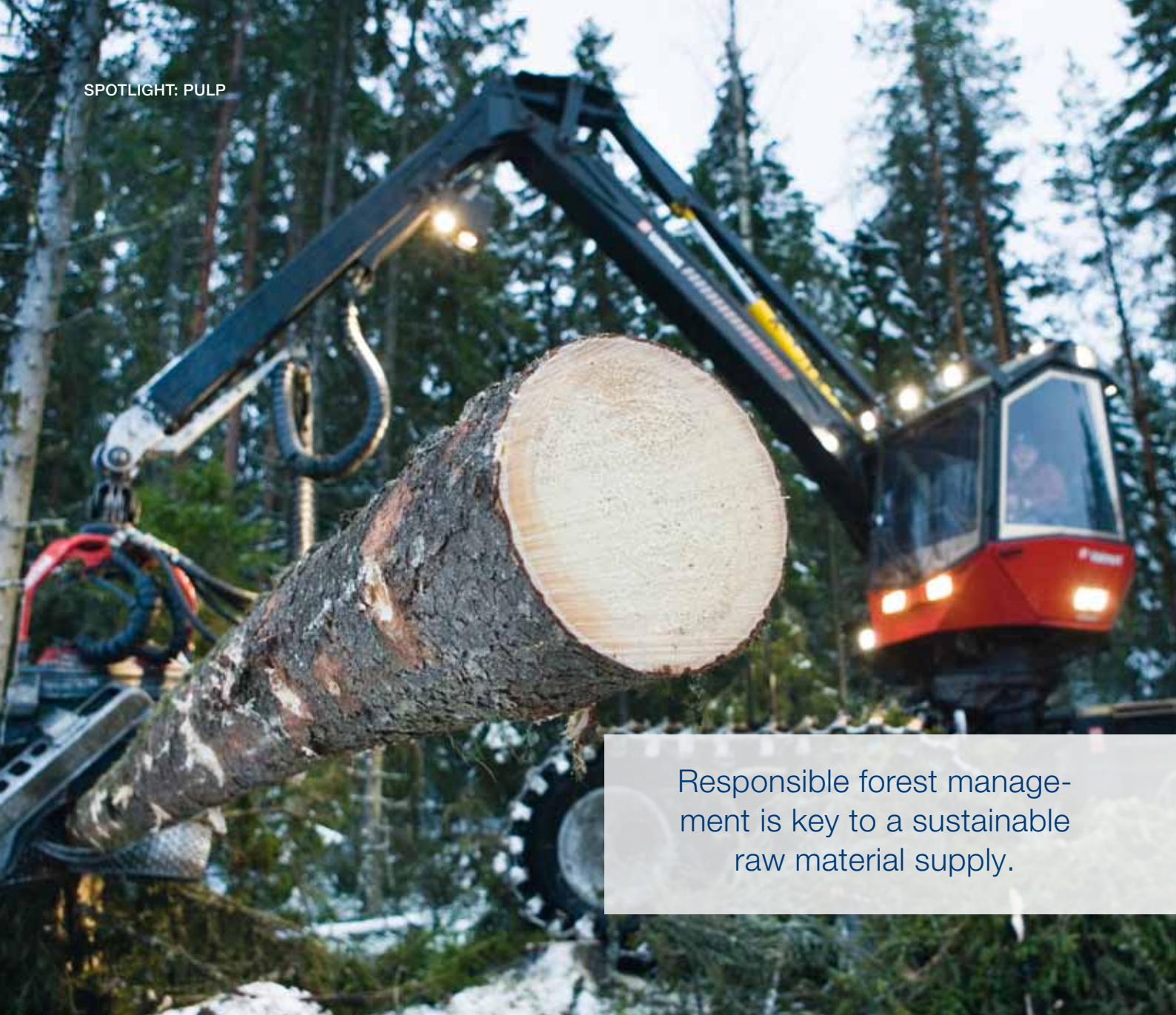
Scandinavian model. With 2.6 million hectares of Swedish forest, an area half as large as the Netherlands, the pulp and paper producer SCA is one of Europe's biggest owners of forestry land. Around 2 million hectares are managed for wood use; the remaining area is left undisturbed. SCA plants spruce, pine and birch which, compared to Brazilian eucalyptus, involve completely different periods of time: From the seedling to the mature tree takes 100 years. Accordingly, long-term sustainable forestry is all the more decisive. SCA annually cultivates 90 million seedlings in its tree nurseries and replaces each felled tree with three new ones. The growth of the forest thus exceeds the felling, which SCA is also planning for the next 20 to 30 years. Like Fibria, the Swedish company can also be satisfied with a positive CO₂ balance, since its forests absorb more carbon dioxide from the air than is emitted by its own forestry, industrial production and transport.



hectare per year, they are by far the most productive resource for chemical pulp. By contrast, eucalyptus trees in southern Europe need 13 years and North American pines need a full 25 years before they can be processed.

Different countries, different kinds of wood. But other kinds of wood are also interesting and important for chemical pulp production. Depending on the wood used, the chemical pulp exhibits different quality features. Chemical pulp obtained from hardwood such as eucalyptus consists of shorter

The forests of SCA are certified by the FSC and in part by the PEFC, the Programme for the Endorsement of Forest Certification, which was founded in 1999. The latter is an umbrella organization of national forest certification systems that as a whole includes the largest certified forest area worldwide. Already at an early stage, SCA declared preservation of biodiversity to be the most important environmental goal of its forestry. In 1987 the company adopted an environmental protection policy focused on preserving the biodiversity of flora and fauna in the management of the company's own forests. Since then SCA has constantly further developed environmental protection in forestry with this main goal in mind. Since the company covers only about 50% of its paper mill needs with the chemical pulp it produces, the other half is purchased. By following strict guidelines, SCA provides for ▶



Responsible forest management is key to a sustainable raw material supply.

▷ transparency regarding the origin of these fibers and has obtained the chain-of-custody certification from the FSC for this.

Forest exchange. So as to prevent unnecessary CO₂ emissions due to long transport routes, each pulp mill of SCA processes trees from the nearest forest. This even goes beyond the company's own stands; thanks to an agreement with other owners of forest land, exchanges are made among them if a forest belonging to another owner is closer to an SCA pulp mill.

Even with the trucks that are used for transport of the logs and the chemical pulp, SCA takes a close look. The drivers are

trained in how to drive in an especially economical fashion and consume little fuel. In addition, modern truck engines are used, and if possible freight trains are used instead as a means of transport. With these measures, by 2020 SCA wants to reduce its CO₂ emissions by 20%.

Due to its numerous efforts in the area of environmental protection and ethical action, in 2013 SCA was distinguished for the sixth time in a row as one of the world's most ethical companies by the U.S. think-tank Ethisphere Institute.

The world needs virgin fibers. Many people and many media outlets are skeptical when virgin fibers are produced from trees and used for paper production. But wood is one of

HOW DOES A LOG BECOME VIRGIN FIBERS?

To get to the fibers, there are different processes that can be grouped into two categories: the chemical processes with which chemical pulp is obtained, and the mechanical processes for the production of mechanical pulp.

1) Chemical processes

In order to obtain chemical pulp, the lignin has to be removed from the logs. This is done by chemical means. As a first step, the logs are decorticated, washed and milled into wood chips. The latter are then cooked over several hours in a chemical solution. Depending on the chemicals used in the cooking, a distinction is drawn between sulfite pulp and sulfate pulp (also called kraft pulp), with the latter being produced much more frequently.

By means of the cooking process, the lignin contained in the wood is largely removed, which otherwise leads to yellowing of the paper under UV radiation. After further process steps that are for screening and cleaning the chemical pulp, it goes into the bleach. The fibers

not only gain the desired whiteness there, but also lose their smell, taste and the remaining lignin.

As a high-quality raw material, the chemical pulp thus obtained is especially suitable for production of high-quality paper grades. It is characterized by a high degree of brightness and gives paper very good strength. The yield of chemical pulp is reduced due to the removal of the lignin, however, which is reflected in the production costs.

In integrated mills, which are a combination of pulp and paper mill, the chemical pulp is processed directly in the same paper mill. If production is for sale to third parties, however, it is referred to as market pulp. The latter is dried in pulp drying machines such as those from Voith, usually cut into bales and finally packed ready for shipment.

2) Mechanical processes

Mechanical pulp is produced by using mechanical processes. Originally, the logs were crushed with the aid of

grindstones (grinding process), but nowadays this is not very common. Meanwhile, use of a refiner in which the wood chips initially produced are defibrated at a temperature of up to 140°C is standard. Thermomechanical pulp (TMP) is thus obtained. If in addition the wood chips are chemically pretreated so as to obtain more strength and brightness and less lignin, the pulp is called CTMP.

In contrast to the chemical processes, the mechanical processes are less elaborate and the yield is nearly doubled, as almost all of the wood can be used. However, the higher portion of lignin in the mechanically produced material leads to a yellowing of the later paper, so-called wood-containing paper. For this reason, mechanical pulp is especially suitable for coated paper or products used in the short term such as newsprint paper. But its big advantage is its high volume, which facilitates good opacity and strength. Mechanical pulp is thus frequently used as a raw material for board production. //

the few really renewable resources. Through smart and responsible forestry, producers such as SCA are even increasing the woodland area and are thus providing for a positive effect on climate, soil and CO₂ values.

In addition, the use of virgin fibers makes sense in regions like Scandinavia. In Sweden, for example, the northern half of the country is densely forested, but sparsely populated. There are high rates of recovered paper collection, to be sure, but the amount of recovered paper that is gathered is simply not sufficient. Thus Swedish paper producers have traditionally increasingly relied on virgin fibers and therefore use the raw material directly in front of them that is produced from the nearby forests managed over the long term.

If you consider the entire paper recycling loop, it also becomes clear that pulp – independent of paper produced or region – is indispensable. That is, not every paper fiber finds its way back into the recycling process. Just think of all the books in libraries or homes, wall papers or paper towels that do not become recovered paper. For this reason alone, the need for paper cannot be met merely with recovered paper that is recycled again and again. In addition, global demand for paper is increasing and so also the required amount of the raw material.

Production and demand. In the last decades, the global demand for chemical pulp has grown significantly. What is remarkable here is that a substantial amount is exported, since regional conditions often do not allow on-site production. ▷



06 Considered globally, the development of chemical pulp production remains very promising.

Structural transformation becomes apparent.

While South America is certainly regarded as an emerging chemical pulp market due to its very good initial situation, and Asia – above all China – relies on imports due to the high need and low level of its own production, the market situation in North America and northern Europe is somewhat different. In both regions consumption of printing and writing paper is declining over the long term, which has an effect on the chemical pulp producers as raw material suppliers. In addition, they are feeling the rising competition from the emerging

▷ According to the information provider RISI, Latin America will take first place in the production of market pulp in 2025 and by then produce 14 million more metric tons than in 2011. The region will thus account for about half of the expected growth worldwide. The reasons for this are the excellent conditions on site that facilitate cultivation of eucalyptus and thus production of very high-quality chemical pulp at favorable production costs.

China is happy to purchase the product since the need for chemical pulp in the country is great. This primarily results from the increasing production there of printing and writing paper as well as tissue – grades for which virgin fibers are used as raw material in most instances. RISI estimates that by 2025 China will have the largest increase in the need for chemical pulp, namely by 14 million metric tons, which is more than half of the overall global increase in need. Since both the soil composition and the climate in China are less suitable for tree plantations, the country will not be able to meet its demand by itself, so Chinese chemical pulp imports are likely to increase in the next few years.

countries. The number of conversion projects is thus increasing in both regions and the producers going for other pulp grades. A large number of machines are being converted to produce fluff pulp and dissolving pulp. These two grades have a higher price level and therefore ensure the competitiveness of the producers.

Considered globally, the development of chemical pulp production remains very promising. Noticeable growth continues to be anticipated. First of all, the growing need for paper in the emerging markets is contributing to this, and secondly, there is the increasing demand for board that results from the global online trade. Especially in Asia, but also in many other regions of the world, a clear increase can be noted in this area. Global tissue consumption with an annual growth of about 4% is also leading to a situation in which chemical pulp will be a sought-after raw material in the coming years. //

REDUCING THE TCO BY TOTAL ROLL MANAGEMENT

A CLOSER LOOK AT ROLLS

Voith's Total Roll Management (TRM) is a tailor-made program for effective and reliable rolls service. It increases the availability of the rolls and reduces the number of shutdowns. At regular intervals, paper manufacturers receive detailed overviews of their machines, costs, service lives and roll performances. Support from Voith roll service centers worldwide is available any time it is required. >

01 Voith Roll Service: always close to the customer thanks to service center locations worldwide.



SERVICE

▷ The outsourcing of roll services allows a mill to focus on its core competency while accessing a large pool of knowledge and expertise at the same time. The Voith Total Roll Management program offers to the customer a full line of mechanical services, including rebuilds, reconditioning, preventive exchange of wear parts, installation of spare parts and engineering upgrades. The mechanical services are accompanied by detailed and transparent record keeping that provides customers with a more comprehensive understanding of their own operation.

Complete roll service. The Total Roll Management program is geared towards achieving four overriding goals: reducing the total cost of ownership, increasing roll reliability and improving paper quality and machine productivity. In an increasingly competitive environment the goal of every papermaker is to reduce operating costs as much as possible without sacrificing the integrity of their operation. The TRM program begins with collecting roll records to establish a baseline and history of all chronic or re-

peating roll problems. A record of mill downtime establishes the baseline of past performance to measure the effectiveness of future improvements. The rolls that are identified during the implementation phase as having problems are the initial primary focus of the Total Roll Management program.

Process optimization and standardization and thorough record keeping are pivotal in improving roll reliability. Unscheduled shutdowns can be eliminated through consistent repair and maintenance programs. Likewise, rolls occasionally need a technology update to ensure top performance.

Longtime scheduling. By incorporating Total Roll Management, it is possible to improve the performance of existing rolls. Using SØNAR, a special roll management software program, Voith can track and document the complete history of any roll in the machine. The data becomes more valuable over time allowing mills to accurately review history records, identify trends and schedule preventative maintenance accordingly.

Furthermore, the right combination of roll covers in every application also influences machine efficiency and paper quality. Voith is capable of restoring all types of rolls for any machine according to OEM specifications.

Service on each level. The Voith Total Roll Management program includes several out-of-mill services that go beyond the standard maintenance routine. They can be classified into three categories:

1. RollCare:

including all preventive services for all kind of rolls. It also includes grinding, balancing, testing, and every non-destructive inspection of covers and single parts of the roll.

2. RollRep:

including repair/replace journals and damaged parts, repair bearing fits, journal replacements and honing.

3. RollUpSolutions:

bringing older rolls up to date with the latest technology.



02 TRM includes roll services that are rendered directly on site or externally away from the paper mill.

PREVENTING UNPLANNED
SHUTDOWNS WITH VOITH PAPER

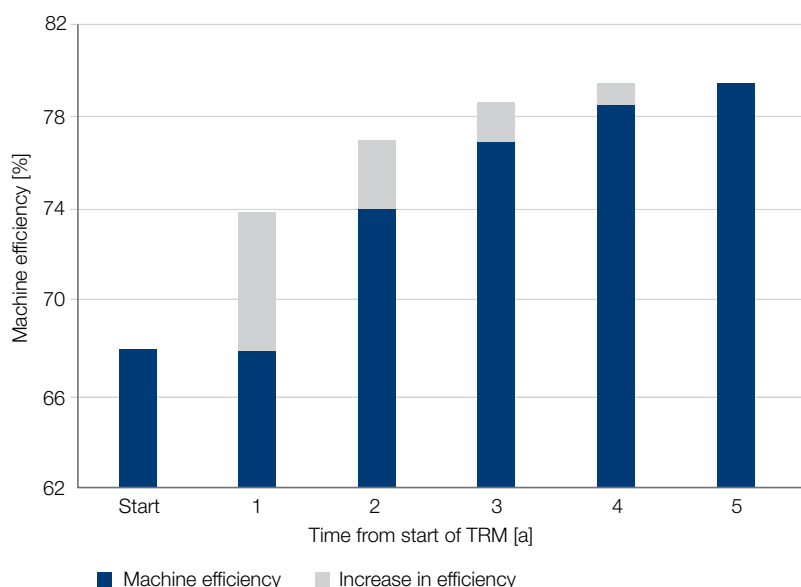
THE LARGEST ROLL TEST RIG WORLDWIDE

Voith Paper operates the world's largest roll test rig in Kunshan, China. Voith invested around 1 million € in the testing technology. Customers profit from it by being able to prevent unplanned shutdowns and ensure the reliability of their rolls.

Problem and cause analyses are possible at all production speeds with the test rig. Numerous rolls were already tested by customers in northeast and southeast Asia. In principle, every roll type with a maximum diameter of up to 2,500 mm and an overall length of up to 15,000 mm at test speeds of up to 2,500 m/min can be tested in the test rig. Among the preventive testing procedures are measurements of the oil flow for gear units and pressure zones and recording the temperature profile of individual roll components over time, along with dynamic vibration velocity measurements. Depending on the roll size, such a check lasts between three and 24 hours.

Customers that performed roll service by themselves usually do not have the ability to test the roll under production conditions. The test rig can be used to check if the roll operates as intended without having the risk of an unscheduled downtime after installation. With the aid of the test rig in one particular case, significant problems were identified and an unplanned shutdown and greater damage were thus prevented. //

03 Increase of machine efficiency through TRM



Voith technicians also participate in a number of in-mill services and substantiate roll cover, roll mechanical and process performance improvements through some of the following in-mill services:

- Measure and analyze roll covers when press rolls are removed from operation
- Verify nip profile using dynamic and/or static nip impressions
- Perform down day roll cover inspections to identify any issues
- Monitor the abrasiveness of wire and felt rolls to minimize clothing costs
- Analyze press section physical mass water balance to identify opportunities for sheet solids and/or profile improvements
- Calculate nip data to optimize nip conditions
- Provide engineering support for roll design and chronic roll issues

Customer support on site. The implementation of the Total Roll Management is a comprehensive effort that requires extensive communication between Voith and its customers. Voith operates worldwide rolls facilities in order to respond locally and quickly to customer needs.

To monitor and ensure the success of TRM, the Continuous Improvement Process provides customers with constant updates about their current roll situation. //

Technical Contact



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PAPER MACHINE “RE-COMMISSIONING” AT MWV COVINGTON

AGING IS NOT AN OPTION

In today’s competitive environment, machine efficiency and paper quality are of paramount importance. The operations team of MeadWestvaco (MWV), Virginia, USA, realized that going forward, increased downtime, as well as quality issues caused by aging machine components, was not an option, and a service program dubbed “Re-Commissioning of C1” had to be undertaken. After only two months, unscheduled downtime was significantly reduced.

Covington Paper Machine C1 is one of three paper machines in operation at this site. C1 was supplied by Voith in 1985 and, over its lifetime, has produced more than 8 million tons of paperboard.

As with all industrial equipment, the machine is subject to wear and tear from operating 24/7, 365 d/a. MWV’s production team needed to develop a service program to keep the maturing C1 machine operating at peak performance and turned to Voith for a solution.

In summer 2012 Voith entered a service contract agreement with MeadWestvaco for an introductory six month period. Initial meetings between MWV and Voith were held to discuss how to best address challenges and specific issues in bringing the 27-year-old machine back to at least the original design specification mechanically while adding further value by simultaneously

implementing product quality improvements where required.

Technical resource on the ground:

Voith Paper’s service program – termed C1 Re-Commissioning – was developed together with MWV to assist C1 personnel in the area of parts identification, spare parts inventory review, rebuild opportunities, and process optimization. The initial agreement included the services of a Voith specialist who spends 10-day blocks of time at the Covington mill.

All service was scheduled with flexibility to MWV Covington mill needs, but was planned for 10 days at the mill and two weeks out of the mill. Additionally, Voith worked with MWV to review the spare parts for C1 with the goal to ensure MWV has a complete list of recommended spare parts including levels of criticality.

The successful and very close cooperation between MVV and Voith produced results quickly: The C1 machine efficiency was increased and unscheduled downtime greatly reduced. //

Technical Contact



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01 **Greg Hansrote, MWV Covington, (right), and Helmut Tausel, Voith Paper, worked towards a common goal.**

“Our Voith service contract was a significant part of a highly successful C1 paper machine efficiency project. Unscheduled downtime was greatly reduced within two months of implementing the initiative.”

Greg Hansrote, Vice President MWV Covington, Virginia, USA



MeadWestvaco

MeadWestvaco (MWV) Corporation is a global company with five business segments: Food & Beverage Packaging; Home, Health and Beauty Packaging; Industrial Packaging; Specialty Chemicals. The Packaging segments produce bleached paperboard, Coated Natural Kraft paperboard, linerboard, and packaging for consumer products.

The MWV plant in Covington, Virginia, USA produces high quality, Solid Bleached Sulphate (SBS) coated board. SBS, the highest quality paperboard substrate, is produced from bleached virgin wood pulp.

SBS can be used as a moisture barrier in liquid and food packaging and in high-end packaging where the quality of a printed image is required.



VOITH HYDRO: TREND TOWARDS MODERNIZATION

MODERNIZATION OF HYDROELECTRIC POWER PLANTS IN BRAZIL

Retrofitted: After decades of operation, many hydroelectric power plants are now being modernized.

VOITH TURBO: CARDAN SHAFTS FOR HYDRO-ELECTRIC POWER PLANT IN CHINA

A LIFT FOR SHIPS

Voith delivered eight cardan shafts for the 663 km Three Gorges Dam in China.

In order to have an alternative to the lengthy three-and-a-half hour journey for ships through the five stages in the series of locks, the Chinese prestige project was equipped with a ship's lifting equipment. A kind of elevator conveys the boats in a trough up to 113 m upward and downward. The trough with a usable surface of 120 m x 18 m and 3.5 m of water depth weighs around 34,000 metric tons. Four 169 m reinforced concrete towers that are anchored in a gigantic concrete plate

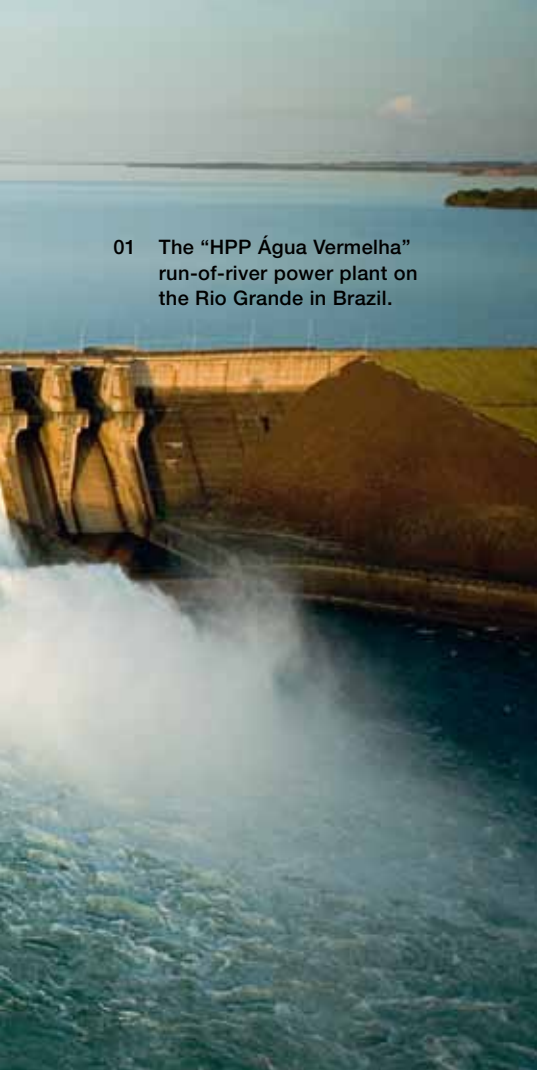
serve as the base. The trough hangs on 256 steel cables within the columns. Propulsion is achieved with electric motors. Eight cardan shafts from Voith transmit the output of the motors to pinions. The order shows how important

quality and reliability are to those who operate the system. They also relied on Voith technology for power generation; six of the turbine units offering 700 MW each were delivered for the power plant. //

02 Gigantic: a cardan shaft for the Three Gorges Dam.



01 The “HPP Água Vermelha” run-of-river power plant on the Rio Grande in Brazil.



Voith is one of the world's leading suppliers of equipment, technologies and services in the area of hydropower. The company not only completely equips new facilities but also has long-term expertise in modernizing existing facilities. The trend toward modernizing hydropower plants, which is already ongoing in markets such as North America and Europe, can now also be seen in South America, where it supplements the still strong focus on construction of new hydropower plants.

With its comprehensive expertise, Voith benefits from this trend and has, among other things, received the order for the “HPP Água Vermelha” run-of-river power plant on the Rio Grande in Brazil. It is one of the biggest orders for modernization of a Brazilian hydropower plant and the biggest carried out by a single company ever. The order is worth around 80 million €.

In order to bring state-of-the-art technology to Água Vermelha, Voith Hydro will do a general overhaul of the generators, turbines and the associated electromechanical systems and completely modernize numerous components. Água Vermelha has been in operation since 1978, has six units with a total output of 1,396 MW and is the biggest hydropower plant of the AES Tietê energy company. Hydropower is the biggest, oldest and most reliable form of renewable energy generation. Worldwide it makes an indispensable contribution to a stable power supply and thus to economic and social development – both in industrial countries and in emerging markets. In addition, hydropower contributes significantly to climate-friendly energy production. In Brazil, hydropower is particularly significant. It supplies more than three quarters of the required electrical energy for the biggest electricity market by far in South America. //

VOITH INDUSTRIAL SERVICES: ON-SITE MACHINING

THE MACHINE COMES TO THE WORKPIECE

Mobile and flexible: That's the motto of production support at Voith Industrial Services. On-Site Machining allows successful use on site and at any time.

So that plants work economically, downtimes have to be minimized and utilization has to be optimized. On-Site Models with solution-oriented maintenance service support a smooth process workflow. With assigned personnel, Voith Industrial Services is currently active at approximately 50 different European locations dealing with process industries oil & gas, chemical and petrochemical as well as the energy industry.

Since April 2012, the European portfolio has been supplemented by services in On-Site Machining. Voith offers a 24-hour service here, with which defective plant or system parts and equipment can be processed and repaired on site with a pool of mobile machine tools. Dismantling and transport of defective plant or system parts is not necessary. Time and costs are thus saved, and elaborate rebuilds are avoided. //



03 Flexible service on site.

QUICK INFO

THE EQUALIZING SCREW

The equalizing screw is part of the disperser system. Its main task is the transport of the dewatered crumbly stock from the screw press to the disperser. Here, large lumps discharged from the press are ground to hazelnut-sized crumbs. Through internal recirculation in the screw housing, the volumetric flow is also somewhat homogenized.

The mixing in of additives such as sodium hydroxide or sodium silicate is possible directly at the screw without any problems. //

DID YOU KNOW?



Voith Paper is now on YouTube and Twitter. Clips on products and solutions for the paper industry are clearly listed and easily accessible on the YouTube channel.

The Voith Paper Twitter presence offers all the latest news on commissioned startups, new products and services, as well as other interesting industry updates. //

PUZZLE CORNER

Unscramble the words to their correct sequence to find four papermaking technical terms.

gipnulp
dnrwie
nerfire
lupp

Solution:
pulping, winder,
refiner, pulp



A QUICK GOOGLE

“PAPER APP”

The “Paper by FiftyThree” app, awarded with the Apple Design Award 2012, brings paper and color into the digital world: on the iPad. The sketchbook is easy to operate. Besides offering nine colors, it features artist’s and charcoal pencil, marker, rollerball pen, watercolor brush and eraser functions. The app focuses on the essentials.



Confusing features? Not here. Strokes are slightly optimized so that small works of art can be achieved even with little artistic talent. //

Download: <http://itunes.apple.com>

QUICK INFO

PAPER BAG 2.0

Fashion designer Jil Sander adorned the male models showing her collection with “paper bags.” They are made of brown, wax-coated paper and include small vents, fine seams and discreet labeling of the brand name on the front.

The accessory quickly sold out and shows the versatile applications of paper. Sander designs a fashion item from the reusable paper bag and as such creates an object of value.

The “Vasari” bag by Jil Sander is available for 200 €. //

TWOGETHER TIP

A WHIFF OF PAPER

The smell of printer's ink and book paper is now also available as a perfume. The perfumer Geza Schön created it, while the design is from the well-known German designer Karl Lagerfeld. "Paper Passion Perfume" is what the scent is called and has the subtitle "For Booklovers."

The perfume is issued by Wallpaper* magazine and the Steidl publishing house and is thus part of the Wallpaper* Handmade 2012 exhibition in Milan, Italy. The bottle is presented inside a book that includes texts by different authors, e.g., Lagerfeld himself, an avowed enthusiast for the smell of freshly printed book paper, and Günther Grass who won the Nobel Prize in literature in 1999. The other non-printed pages were punched out in the shape of a bottle and thus form its packaging. "Paper Passion" aspires to connect the intellect with the luxurious character of a perfume. Likewise, it is supposed to allow a quiet, concentrated atmosphere to come about and remind people of the joy of reading. //



A QUICK WORD

INTERVIEW



Rose Gu in Kunshan, China

Location:
Kunshan, China
Area: fabrics

Rose Gu has worked at Voith for nine years and is Operations Manager.

What do you like most about Voith?

There are three things I like the most: fairness, possibilities for personal development and further education, and the collegial working environment.

What would you say is the greatest success in your professional life?

My greatest success was my career development at Voith. I've been working at the company for over nine years. Voith has always given me opportunities to further develop my career.

What tips do you have specifically for young female employees who are at the beginning of their career path?

My advice is to be self-confident and open-minded. Young female employees should bring a fresh and unbiased perspective and a corresponding attitude. That's also what business as a whole is generally looking for.

What differences do you see between a German and a Chinese company?

German companies are more results-oriented, have flatter hierarchies and an open corporate culture. Chinese companies are more process-oriented, have strict hierarchies and a comparatively closed corporate culture. //

TWOGETHER CULTURE TIP

THE GATE TO THE WORLD

A true description of the city of Shanghai with its 20 million residents. The metropolis is a significant cultural and educational center in China. Voith Paper City in Kunshan is only about an hour north of Shanghai.

There are many places of interest such as the Shanghai World Financial Center, which is the tallest building in China at 492 m. There are offices, hotels and shopping centers, among other things, inside the skyscraper. At the highest level it is possible to walk from one side to the other over a glass floor.

Among the cultural attractions is the first-class Shanghai Grand Theater with an international stage. A broad range of exhibits are on display in the Shanghai Museum and the Shanghai Science & Technology Museum. The former specializes in Chinese art, while visitors interested in the natural sciences can discover things in the latter with its 68,000 m².

The 400-year-old Yuyuan Garden, in which people can relax among plants, goldfish ponds and rocks, offers a contrast to the modern metropolitan districts. //



CLICKING THROUGH THE VOITH PAPER RANGE OF TOPICS

TWOGETHER ONLINE

Who hasn't experienced this: You're traveling, in a train or at the airport, and want to briefly catch up on news or look something up, so you pull out the smartphone. The same applies to the office or home, where the laptop and PC have displaced the good old reference book. In the last few years, digitalization has changed our habits in far-reaching ways and also offers a wealth of new possibilities for customer magazines.

Thus, with the next issue, twogether will transform itself into a full-fledged professional online magazine. Our readers thus have direct access worldwide to current information on paper manufacturing and the latest technologies and products from Voith Paper. They can take a look at our range of topics online at any time – whether on a smartphone or a PC.

You can already take a first peak into our new online magazine today. The current twogether issue is available online at www.voith.com/twogether. Have a look at the contents page where we present the articles, which can be individually called up, in a clearly arranged overview. Or make use of the search function, if you are interested in published articles on a specific subject matter. The twogether magazine issues already published are also offered as e-papers, of course. You will easily find them on the archive page.

The interactive online magazine offers you a forum as well, where you can find and submit ideas, suggestions for improvement and feedback. We are looking forward to the exchange. And so that you don't miss any new articles in our online magazine, register on our twogether website or follow our Twitter channel. //

QR CODES – HOW THEY WORK



1

On your preferred app platform (App Store, Play Store et al.) select a QR reader and download the app to your smartphone or tablet.

2

Open the app and hold the camera of your smartphone or tablet over the QR code for automatic scanning.

3

If the QR code is recognized, your smartphone or tablet will directly open the respective website.

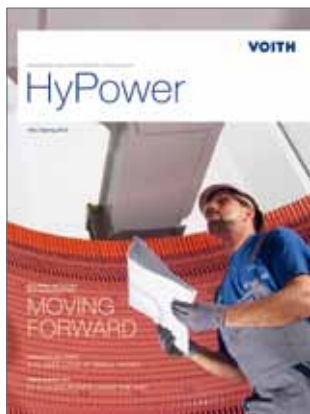


REFERENCES AT A GLANCE

All references presented in this issue are collected together and shown clearly here.

1. **Covington, USA:** Maintenance program increases machine efficiency of the C1 at MWV Covington.
2. **Lençóis Paulista, Brazil:** Vertical dryer section increases drying capacity up to 15% on the pulp drying machine at Lwarcel Celulose.
3. **Mallet, Brazil:** new TM 4 tissue machine with steel Yankee cylinder at Sepac.
4. **Rigesa, Brazil:** new PM 4 for kraftliner with 300,000 t/a at MWV Rigesa.
5. **Rebuilds in Europe:**
 - a. **Skoghall, Sweden:** rebuild of the press section including installation of a NipcoFlex press at Stora Enso.
6. **Mayen, Germany:** rebuild of the BM 6 as ropeless threading at Weig Techno-Karton.
7. **Witzenhausen, Germany:** First use of the new EcoHood 65 dryer section hood reduces the amount of exhaust by 30% on the PM 1 at DS Smith Paper.
8. **Annaberg, Germany:** InfiltraDiscfilter from the Voith BlueLine product line impresses during practical test at Schönfelder Papierfabrik.
9. **Yanzhou, China:** new PM 24 with on-line coating technology at Sun Paper.
10. **Dongguan, China:** DuoCleaner Express installed on the PM 4 saves up to 500,000 €/a at Lee & Man Paper.
11. **Xiaogang, China:** Rebuild makes BM 6 the fastest machine worldwide for high-quality art board at APP.
6. **Frastanz, Austria:** Installation of two EdgeSavers saves 200,000 €/a at Rondo Ganahl.
7. **Eilenburg, Germany:** rebuild of the dryer section and installation of new press and calender on the PM 1 at Stora Enso.
8. **Frastanz, Austria:** Installation of two EdgeSavers saves 200,000 €/a at Rondo Ganahl.
9. **Yanzhou, China:** new PM 24 with on-line coating technology at Sun Paper.
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The magazine for
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