

# twogether

Paper Technology Journal

**En route on the seas: recovered paper** | Interview with Carlos Aguiar, CEO Aracruz | **Successful start-up of PM 1 in Khon Kaen**





4 *En route on the seas: recovered paper.*

14 *Interview with Carlos Aguiar, CEO Aracruz Celulose, Brasilien.*

18 *The new PM 1 in Khon Kaen, Thailand, is setting quality standards.*

## Report

- 4 En route on the seas: recovered paper
- 11 Largest and most up-to-date deinking plant in the world in Lynn
- 12 “Lufthansa-Magazin” printed on LEIPA paper
- 14 Interview with Carlos Aguiar, CEO Aracruz Celulose

## New Plants

- 18 The new PM 1 in Khon Kaen is setting quality standards
- 22 Klabin celebrates PM 9 first anniversary

## Rebuilds

- 24 IP Pensacola – unique collaboration
- 28 New MasterJet headbox at Manistique Papers
- 30 Single NipcoFlex with PrintFlex SP3 Planar in use in Docelles
- 32 Increase in performance by upgrade of the forming section
- 35 UPM Schwedt success story
- 37 Interview with Steffen Deszpot, UPM Schwedt

## Products

- 40 Quality improvement with lower energy consumption – MultiFoil-Rotor and C-bar screen basket
- 42 NipcoFlex shoe presses and QualiFlex press sleeves for optimal dewatering
- 45 Reliable tail transfer with the TailBlade system
- 46 Gecko start and end gluing that inspires
- 49 New approach in doctor blade technology
- 51 Rolls – top-level precision
- 53 Forming fabric MultiForm HC, the new standard for demanding positions
- 55 OnC VeriCheck57 – convenient upgrade option

## Service

- 57 Energy audits reveal savings potential
- 60 The virtual winder – training simulator used successfully
- 62 NipSense and NipMaster for optimized dewatering

## Research & Development

- 64 DuoFormer Base II – a step towards the future
- 68 New polyurethane roll cover SolarSoft increases production and saves energy
- 70 Improving the drying process using PrintTech LFC with Linx technology
- 72 Energy-saving pulping concept for recovered paper fibers – IntensaPulper IP-R
- 73 New solutions in stock preparation at the Fiber Systems Technology Center

## News

- 75 Guess where the paper comes from for the latest children's bestseller
- 76 Carbon-neutral printing of twogether magazine
- 76 Blended Learning with Norske Skog
- 77 Voith Paper Environmental Solutions wins coveted environmental award
- 77 Mondi and Voith Paper – “adventure day twogether”
- 78 Voith Siemens Hydro – state-of-the-art hydro power laboratory
- 79 News from the Voith Group



*Dr. Hans-Peter Sollinger,  
Member of the  
Management Board  
Voith AG and President  
of Voith Paper.*



### **Dear customer, dear reader,**

*Just a few decades ago, the boldest futurologist would certainly not have dared to suggest that anyone would talk about recovered paper as a valuable commodity. In our cover story, we highlight the impressive details of the global trade in the raw material of recovered paper.*

*Voith Paper has been active in the world markets for many decades. The interview with Carlos Aguiar (pg. 14), CEO of Aracruz Celulose S.A. in Brazil, the world's largest manufacturer of bleached eucalyptus pulp, illustrates how deeply involved we are in the field. I would like to take this opportunity to thank Mr. Aguiar for agreeing to the interview and for his open and very honest answers to our – at times – critical questions. They demonstrate our customers' understanding for the necessary ecological measures and prove that the industry is also ready with an answer and to put words into action.*

*The answers from Voith Paper are clearer than ever. We research and develop new products and machinery, with the aim of conserving resources and systematically redu-*

*cing energy, water and fiber consumption without compromising quality. We received the coveted British environmental prize, the "Green Apple Award" in the House of Commons, for these achievements (pg. 77).*

*The engineers at Voith Paper never cease to constantly improve their own products. The energy savings with a Mini NipcoFlex shoe press amount to around 65,000 kilowatt hours per day (pg. 42). In the end, our energy audits offer all customers the opportunity to accurately identify and calculate the savings potential in their own paper mill. Read more about this on page 57.*

*On behalf of Voith Paper, I would like to thank you for the confidence you have shown in us in 2008. We wish you and your families a happy, festive season and a successful year in 2009.*

*H. P. Sollinger*

*On behalf of the Voith Paper team*





En route on the seas:

**recovered paper**



*Recovered paper – very special waste.*

**The Californians found it to be a successful export. Municipalities and private waste disposal companies argue about it in Germany. Swiss townships finance communal projects such as kindergartens with it. France, Spain, Italy and Great Britain have increased their collection rates enormously in the last few years in order to participate in the growth of this commodity. Recovered paper, formerly a waste material, has advanced to become a material with a high world market price. And like other high-value raw materials, this one also has to travel around the world.**

Once again, globalization sends its regards: Sparsely wooded countries like China, India and other Far East nations need more paper than ever in the course of their economic development, be it packaging, sanitary or printing paper. Since domestic raw materials are scarce goods and fresh pulp from abroad is expensive, they are securing recovered paper for themselves where it is separately collected: in Europe and North America.

Transport can be organized inexpensively. The compacted recovered paper bales travel to the Far East as inexpensive return cargo on freight ships that carry more and more computers, monitors and entertainment electronics from Asia to the Western industrial nations. In some ways, the material thus returns to its source: The Association of Chinese Package Manufacturers estimates that in 2005 around 20 million paper and cardboard packages were exported to the whole world, of that eight to nine million to Europe. And the forecast that this commodity flow will become

a long-term pattern requires no clairvoyant abilities.

### Continuous increase in demand for recovered paper

Today, China is already the second-largest paper producer in the world after the USA. In 2007, according to an estimate from market observers, the country imported more than 20 million tons of recovered paper – in 1996, it was only a good 3 million tons. Further growth of its paper production and thus also of its need for recycled paper is estimated to be at least 10 percent per year. A similar situation is expected in India. In the meantime, a world market for recovered paper has developed. Its volume is estimated to be 35 million tons (2007). For comparison: in Germany, in the past year around 15.5 million tons of recovered paper was collected; in Europe, it was around 56 million tons.

However, with consumption of 15.8 million tons, Germany is a net importer and is thus contributing to the

## Definition

### Return rate and not recycling rate



Recovered paper recycling was the forerunner of an organized recycling economy, but is distinguished from materials such as steel, aluminum or glass by the fact that not all used paper can be recycled. Sanitary paper, for example, is not recycled. Books are also not a typical “recycling product.”

For that reason, with paper one doesn't speak of the recycling rate, as with other materials, but instead of the utilization rate. It indicates the ratio of the amount of utilized recovered paper to the amount of new paper that the paper industry of a country produces. The fact that the utilization rate of Lithuania in 2006 was 119 is not a typographical error. The paper industry there produces primarily packaging paper that is almost exclusively made from recovered paper. Since significantly more recovered paper is required for production than ultimately leaves the plants as new products, the utilization rate exceeds the 100 percent mark. In Finland and Sweden, this value is 5 and 17 percent, respectively.

A second important indicator is the recovered paper return rate. Due to the aforesaid sanitary paper alone, it can never be one hundred percent. It depends on the consumer buying habits of a country and – quite fundamentally – on the collecting discipline of the populace and the effectiveness of the respective collection system. With a return rate of 75 percent, the Germans are world champions in the collection of recovered paper. With values of over 70 percent, the Austrians and the Dutch also doing well. Without a doubt, there is still room to improve in North America. The return rate here is currently “only” a bit over 50 percent. The recovered paper return rate in China is still comparatively low. It is indicated as being 34 percent and is thus significantly below the value of 73 percent stated for Japan.



## A brief cultural history

### Germany: highly organized



In Germany, recovered paper disposal is organized to a high degree. The return rate is correspondingly high: Three quarters of the paper consumption of roughly 21 million tons was put back into circulation in 2007. Private collection systems exist in parallel with the municipal and regional systems. In contrast to the situation in Sweden, for example, the paper industry has not developed any of its own activities.

The rising recovered paper price has awakened new interest. Since a lot of money is involved, collecting brings forth strange fruit – it is somewhere between popular sport and professional profit seeking. In some cities and regions, a regular battle is raging for the new asset, especially between private and municipal waste management providers, but also between competing private companies – in some cities, residents found up to four of the special blue recovered paper bins at their front door overnight. In other places, resourceful citizens disposed of public collection containers on their own initiative in order to supplement their household money with the sales proceeds (five cents per kilo).

Many of the municipal and regional operations consider themselves to be victims of this development. They see themselves as being deprived of an important income source that – according to their arguments – should contribute to lowering disposal fees.

By contrast, the disposal groups want to use the opportunities the market is offering them. With the blue bin at the front door, they want to mobilize the last reserves by accommodating consumers who previously had to bundle their newspapers or carry them to a public paper container.



*A precious item in every office: the waste paper basket.*

global shortage. This is not without consequences. In 2002, the municipalities sometimes had to pay the waste disposal companies more than 110 euros for each ton of recovered paper hauled away, regardless of the sales proceeds that could be realized. But two to three years later, the situation turned around: increased raw material and energy prices and the globally rising demand suddenly made commercial paper out of recovered paper. From that time on, prices have been rising and have almost doubled just since 2006. Presently, a ton of sorted recovered paper fetches 70 to 90 euro.

#### **Offices and households for improving waste paper collection**

It thus becomes attractive to worm out every last bit from households and offices. Because only at these

two places can recovered paper collection still be increased. In printing shops, cardboard packaging plants and other processing operations, systematic recycling has been the daily routine for quite some time. The same holds for the “unpackers,” particularly commercial enterprises in which colossal amounts of packaging material accumulate, and for the publishing houses and commercial press enterprises that have their returns recycled.

The recovered paper reserves in Germany are thus only around 5 percent of the paper consumed. Around 75 percent is already collected, while another 20 percent is not available for recycling. This includes, for example, technical paper, which is used in electronic components, transformers or in automotive engineering, or sanitary paper. The additional effort

via “urban mining” – the buzzword is already circulating – to mobilize the last 5 percent is worthwhile, if at all, only at the current price level.

### **Waste paper as a low-cost raw material**

The paper industry is watching the development with mixed feelings. For reasons of cost alone, it is keen on using as much recovered paper as possible. The recycling material is cheaper than fresh pulp, and not just as raw material. Using it also brings

noticeable savings in energy consumption. The production of paper from recovered paper uses only about a third the amount of energy that is required for production of new paper from wood (fresh fiber paper). Water consumption is only 15 percent, and water contamination only about 5 percent. But the rising prices put the energy-intensive industry under additional pressure.

It seems as if the game with recovered paper in this country is largely exhausted. The German paper

### **A brief cultural history**

#### **Sweden: the paper industry does the collecting**

Sweden is in the top group when it comes to recycling recovered paper. Of the 559,000 t of paper disposed of in 2007, 85 percent of it was collected and reprocessed. Despite the high return rate, Sweden still imports around 400,000 t of recovered paper annually. In Sweden, the paper industry itself has taken over the task of collection. For this purpose, the big companies of the industry, Holmen, Stora Enso and SCA, founded Pressretur AB. Later, M-real also joined the system. Pressretur has made agreements with the 290 municipalities in Sweden. According to the agreements, the municipalities obligated the homeowners to set up collection containers. In addition, there are 5,800 public recycling stations. Three transport companies are exclusively commissioned with the collection of recovered paper. Processing is done in 31 sorting stations. From there, it is delivered to seven paper mills in containers or in the form of bales weighing up to 1,000 kg. This system costs the owners of Pressretur annually 37 to 43 million euros. Pressretur makes no profit. The Swedish system is thus supervised primarily by the municipalities that in turn are monitored by the Office for Environmental Protection.

#### **Switzerland: tied bundles**

The Swiss are proud of their recovered paper collection system. In the Alpine republic, they are convinced that in no other country are newspapers, magazines and (brown) cardboard packages collected in such good quality as in Switzerland. That is due to collection logistics oriented to need. Thus, light-colored recovered paper is predominantly bundled separately. Only in regions where the recovered paper is used as raw material in a cardboard plant are light-colored and brown grades collected together (in a bin). A framework agreement with the paper industry guarantees the municipalities minimum prices for the recovered paper. The municipal collections can thus work in a cost-covering fashion. At the same time, it is left up to the municipalities to conclude contracts on the basis of market prices and to achieve surpluses that they can use for municipal projects. But then they have to take the risk of falling prices into account.



producers in the meantime finance a good two thirds (utilization rate: 68 percent) of their production with recovered paper. Most newspapers today are printed on paper that consists of 100 percent recycled fiber material. Most sanitary paper likewise has high portions of recovered paper. Even paper of higher value, e.g., for magazine printing, increasingly contains recycled fibers.

### Deinking – prerequisite for use of recovered paper

The technique dates back over 200 years ago when rags – the classic textile paper raw material – became scarce. In 1774, the Göttingen professor Justus Claproth published “An invention to make new paper from printed paper and wash out the printing ink completely.” As “deinking,” his process is to this day the basis for utilization of recovered paper.



*Collection of waste paper is already practiced in many countries.*

## A brief cultural history

### China: recovered paper urgently sought

China has no municipally organized collecting, sorting or recycling programs. Nonetheless, recycling of newspapers, magazines, cardboard and paperboard – and also iron, non-ferrous metals, glass and plastic – functions optimally. The raw material value in the “junk goods” alone ensures that largely everything used finds its way back into the resource circulation system. Recovered paper is a prime example here. Thus in front of supermarkets and electronics shops, cardboard transport containers are neatly folded and bundled in stacks, in order to then be transported on bicycle racks or the loading platforms of all sorts of vehicles to the privately organized acceptance points.

Even light-colored graphic paper is collected, but is sometimes more heavily contaminated, so that like brown packaging paper it is usually “only” suitable for production of cardboard and paperboard – and utilized primarily by smaller operations. Big paper manufacturers like Huatai in Shangdong Province import recovered paper (deinked paper) from North America and Europe. The quantities and qualities they require are not to be found in China itself.

### California: higher prices for cleaner paper

The return rate for paper in the USA is currently at 51.6 percent, in any case significantly more than the 31 percent in 1997. But large quantities of recovered paper still end up in the garbage dumps – in 2004, 8.4 million tons just in California. It is true that 95 percent of all California households have joined the state recycling system. But in many places the paper still ends up in the same bin with yogurt containers, plastic bottles and cans. In Los Angeles, there has been a recycling system with waste separation since 2002. Utilization takes place partly in municipal, partly in independent operations. There has been a change of attitude toward recovered paper – and in no small part because of economic considerations. “Recovered paper is number 1 among the export goods on the US west coast,” says Jared Blumenfeld, director of San Francisco’s environmental agency. For that reason, San Francisco is investing in new garbage trucks. The first 180 trucks in the fleet compress the contents of the recycling bins separately so that glass doesn’t break and the paper isn’t contaminated. The city hopes to recover the additional costs for these garbage trucks – it can demand very high prices for its clean paper.

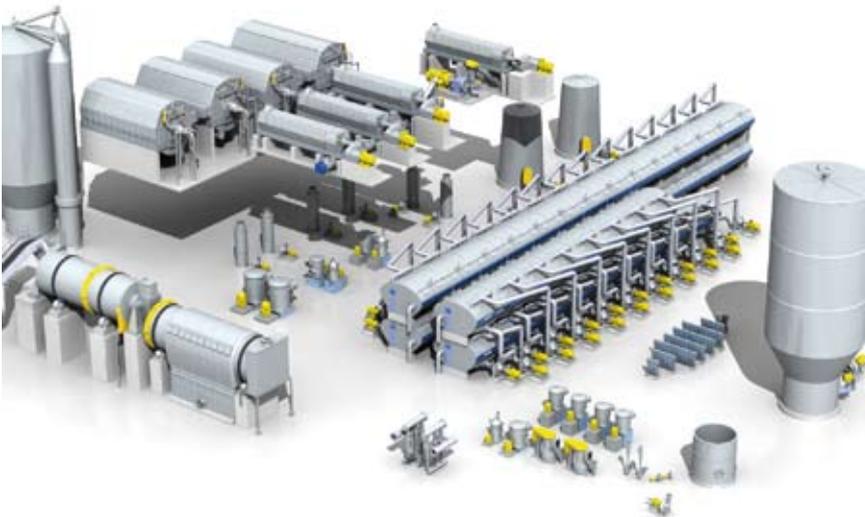
### India: recycling for survival

Glass bottles, plastic canisters, the remains of newspapers – in India, approximately 1.5 million people earn their livelihood by collecting and selling on potential recyclables. For many, it is the last hope before starvation. As a rule, the municipal councils are responsible for disposal of household waste. But as overflowing containers and unofficial garbage dumps indicate in large numbers, the municipal waste disposal systems are not very effective. Megacities like Delhi, Mumbai and Chennai have transferred parts of their waste disposal to private companies. The system of the garbage collectors works better. They recycle about 20 percent of domestic waste. They sell their “booty” pre-sorted to middlemen who further sort the garbage and pass it on via other dealers to recycling operations. Large-scale consumers such as hotels, plants and offices deliver their potential recyclables directly to middlemen or processors. Entire branches of industry, such as the steel industry or paper production, largely rely on recycled raw materials. According to information from the Board of Trade, India imported around 1.7 million tons of recovered paper in the 2005/06 fiscal years. Since the paper industry is achieving two-digit growth rates, its hunger for recovered paper will substantially increase in the future.

New paper mill in England featuring the world's largest drumpulper

## Largest and most up-to-date deinking plant in the world

**Voith Paper is currently building a new paper mill for the papermaker Palm. Starting Autumn 2009, newsprint paper will be produced at the mill in King's Lynn, England. With its pulping capacity of 2,000 bdt/d (bone dry tons per day), recovered paper will be the world's largest deinking line.**



*Schematic diagram of Lynn PM 7 deinking line.*

In Britain the recovered paper situation differs to that in Germany: there is a surplus of recovered paper that is exported in large quantities. At the same time there is a deficit of newsprint paper, which has to be imported from North America, Scandinavia and Central and Eastern Europe. For Palm the British market is very promising. The new paper machine Lynn PM 7, designed for a maximum annual tonnage of 400,000 t, will be the largest paper machine for newsprint paper in Europe.

Voith Paper's TwinDrum pulping technology will be used in stock preparation. In future it will be able to process 2,000 bdt/d recovered paper, giving it the highest pulping capacity

in the world. Following pulping, the recovered paper is screened in several steps to remove coarse and fine contaminants.

The screening is followed by the flotation, the key to every deinking system. At 70 m, Voith Paper's EcoCell flotation machine will be the longest flotation line in the world. In the flotation machine the air entrained into the stock with the EcoCell diffuser removes the printing inks that have separated during the pulping of the recovered paper.

At 5 to 500 micrometers, printing ink particles are so fine that mechanical screening is impossible. They accumulate on the air bubbles and are discharged as foam.

The flotation deinking process was developed in stock preparation at Voith Paper as far back as the late 1950s. Voith supplied the first flotation machine for the production of tissue-crêpe paper in July 1959. Since then Voith has delivered more than 1,000 flotation machines all over the world. The deinking process step has become part and parcel of recovered paper treatment for high-quality writing and printing papers.

The use of recovered paper places high demands on the recycling of residual material, as 500 t of waste are produced in Lynn from a furnish of 2,000 bdt/d recovered paper. After the flotation and circuit-water cleaning stages about 400 t of it occur in the form of sludge. Residual material represents a valuable energy and material source. While screened coarse rejects such as iron and metal parts can be re-used directly, combustible residues are transferred for energy recovery or the generation of power. This results in profitable utilization instead of expensive waste disposal.

### Contact



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LEIPA: High quality magazine paper from secondary fibers

## Recycled paper from Berlin used as raw material for “Lufthansa Magazin”

**The production of magazine paper from recycled fibers has failed until now mainly because of the poor quality of the end product. LEIPA Georg Leinfelder GmbH, with mills in Schrobenhausen and Schwedt, Germany, faced this huge technological challenge together with Voith. And succeeded. Since July 2004, the PM 4 in the Schwedt mill has produced first-class LWC paper from up to 100% secondary fiber pulp. Since January this year, Lufthansa AG is one of the well-known customers of the recycled product with its magazines “Lufthansa Exclusive” and “Lufthansa Magazin.”**

With a print run of 310,000 copies, the Lufthansa in-flight magazine is provided for guests of the airline in the airplanes and airport lounges. Since one copy is generally read by several passengers, the glossy magazine reaches around 1.4 million people in 16 countries each month. For a long time, the Lufthansa editorial team searched

in vain for an excellent-quality magazine paper with high recovered paper content. Only the recycled paper that is produced by LEIPA in Schwedt met the high requirements. The concept of producing high-quality LWC paper from up to 100% deinked recovered paper fiber, on a fast running online machine is a one of a kind worldwide.

### Forerunner role in ecological magazine production

The Lufthansa magazine has been printed on LWC paper by LEIPA since January 2008. Up to 1,000 km of paper run through the printing machine for one issue. The IKEA magazine in Turkey, Israel and Belgium, the Rus-



*The Lufthansa magazine is printed on high-quality LWC paper from LEIPA in Schwedt, Germany.*

*The recovered paper is made from up to 100% secondary fibers and meets the highest requirements.*

sian “Newsweek” and the “Victoria’s Secret” catalogue from the USA are also produced from LWC paper by LEIPA. After 27 months of close cooperation with Voith Paper in the project and implementation phase, LEIPA put the PM 4 into operation four years ago. Back then, the paper machine led the way in ecological magazine production and it continues to do so today. It was the first to successfully produce coated magazine paper grades with such high recovered paper content while retaining a quality level in all relevant properties that is equal to primary fiber products.

#### **Magazine paper made from up to 100% secondary fibers**

A total of 300,000 metric tons of LWC paper are produced on the PM 4 each

year. Both the customer and the papermaker can be satisfied with the end product. Three years ago, coated magazine papers by LEIPA, consisting of up to 100% secondary fibers, was certified as meeting the Forest Stewardship Council (FSC) guidelines. LEIPA thus received official confirmation that their production is especially environmentally friendly.

The recovered paper that is recycled in Schwedt comes mainly from household collections in the greater Berlin, Brandenburg and Mecklenburg-Western Pomerania area. Approximately 800,000 metric tons of recovered paper are processed in the mill each year. With a wire width of 8,900 mm, the PM 4 can produce a basis weight range between 39 and 60 g/m<sup>2</sup>. All processes from precalendering to

coating to supercalendering take place online at production speeds of up to 1,800 meters per minute.

To achieve better product quality, LEIPA assigned responsibility for the complete production process of the PM 4 to Voith Paper in 2003 in accordance with the Process Line Package concept. Voith supplied the entire process line, starting with bale dewatering to stock preparation and the paper machine through to the roll packaging machine. Even after the PM 4 was put into operation in July 2004, Voith remained involved in the project through classic and ongoing system partnerships. What is still a very successful reference paper machine today is the result of the continued, close cooperation between Voith and LEIPA.



*The plantations use degraded land only, which are areas that have already been destroyed, either by railway construction, sawmills or the farming of other agricultural crops.*

Interview with Carlos Aguiar, CEO Aracruz Celulose

## Transparency brings critics to silence

**The Brazilian company, Aracruz Celulose S.A., is the world's largest producer of bleached eucalyptus pulp. The Group cultivates around 286,000 hectares of its own eucalyptus plantations, interspersed with around 170,000 hectares of native forest reserves, in the states of Espírito Santo, Bahia, Rio Grande do Sul and Minas Gerais. The wood is processed in plants in the first three of the above locations. With a workforce of 12,000, made up of 2,500 of its own permanent staff plus 9,500 temporary workers, Aracruz posted a turnover equivalent to 1.88 (2006: 1.68) billion US dollars in 2007. "twogether" conducted an interview with the CEO Carlos Aguiar.**

**twogether:** The pulp industry worldwide is coming in for a lot of criticism, despite the fact that erstwhile sins such as elemental chlorine bleaching have long been a thing of the past for the majority of producers. What is your point of view?

**Aguiar:** We endeavor to continuously improve our processes in both environmental and economic terms. As soon as new opportunities for improvement are discovered, we are also prepared to invest in them, in order to benefit from the advances in our industry. Chlorine-free bleaching was one such development and the drastic reduction of our water consump-

tion was another. There has also been substantial progress in our efforts to reduce energy consumption and produce power in our own plants. One project at our plant in Rio Grande do Sul aims to supply almost twice as much power to the public grid than is used by the plant itself.

**twogether:** The international media is keen to level two charges at your company: one, the misappropriation of land tracts, which you were forced to return to the Tupinkim and Guarani Indians in 2007, and two, the accusation that you are cultivating plantations on land that was once considered one of the most species-rich

forest ecosystems in the world. How do you counter these charges?

**Aguiar:** First of all, let's deal with the second issue: this accusation is totally unfounded. Our plantations use – and will always use – degraded land only, which are areas that have already been destroyed, either by railway construction, sawmills or the farming of other agricultural crops. And our special "mosaic planting" method – our plantations in Espírito Santo are interspersed with remnants of the former Atlantic Forest – ensures a large variety of species. Studies prove that since 1989 more than 125,000 birds and 559 different species of

animals have been observed in our forests. Regarding the question of indigenous land: on the basis of documents going back to 1860 we can prove that not one of the lands acquired by Aracruz has ever belonged to the Indians. Anthropological studies also prove that in the past there were never any Tupinikim or Guaranis living in that region. The Tupinikim came from Bahia, the Guaranis from Paraguay or Rio Grande do Sul.

However, the problem has been resolved: in order to avoid further conflict we have concluded an agreement to hand over the 11,000 disputed hectares to the Indian tribes. We also have a court ruling to the effect that the surrounding area is not indigenous. This will allow us to prevent further manipulation by these Indian tribes.

**twogether:** As the market leader for eucalyptus pulp you supply the inter-

national paper industry with an important raw material. Yet Aracruz is often criticized for its high export quota and thus its contribution to globalization. Is the criticism that Aracruz is sacrificing native forests on behalf of foreign industry justified?

**Aguiar:** It is not for nothing that we have been listed on the Dow Jones Sustainability Index for four consecutive years. In addition, we belong to the sustainable business index of the Brazilian stock exchange Bovespa. This shows that we are using advanced practices. Because we are particularly visible as the global leader in eucalyptus production it is obvious that we come in for most of the criticism, perhaps also because our critics hope that changes made by the leading companies will have a knock-on effect for the rest of the industry. In addition, Aracruz, like most pulp producers, works in regions in which there continues to be a lot of social inequality. Although we have contributed a lot to the development of these regions, no one can expect one company to single-handedly solve all the social problems and dilemmas faced by the community. So even though it is unfair, it is understandable that the biggest company in a region will be criticized for these problems.

**twogether:** Do you see any ways of resolving this image problem?

**Aguiar:** Yes, I have to say that the situation has already improved. Aracruz is trying to be more and more transparent, and this helps to gradually dampen some of the criticism. Our strength is that we listen to our



*“We endeavor to continuously improve our processes in both environmental and economic terms.”*

Carlos Aguiar, CEO, Aracruz Celulose S.A.



*Studies prove that since 1989 more than 125,000 birds and 559 different species of animals have been observed in the Aracruz forests.*

personnel. By telling us what they think about what Aracruz is doing they help us to improve the company, make it more competitive and work for the benefit of the community.

**twogether:** Plantations can make a significant contribution to supplying the global economy with fiber without having to destroy indigenous forests. Why is it that the advantages of this kind of cultivation receive so little recognition?

**Aguiar:** Here too, there has been some improvement. In Brazil and other parts of the world there are a considerable number of NGOs (Non-Government Organizations, editor's note), which are starting to recognize that plantations are a strategic solution to meet the increasing demand for wood. There is an increasing awareness that the systematic planting of forests has numerous beneficial effects.

**twogether:** Are these predominantly economic benefits?

**Aguiar:** We can demonstrate economic, social and ecological benefits. One of the major environmental benefits is the opportunity to protect and even expand native forests. Brazilian legislation requires that for every two hectares of planted eucalyptus forests, one hectare of native forest has to be preserved or planted. Our forestry partners program, involving 3,900 farmers with a total of 96,000 hectares, also prevents the cutting down of native forests for private use, i.e. for firewood, charcoal or fuel. This is because the farmers receive for their own use a specific percentage of the plantation wood they produce. In fact, the sustainable planting of eucalyptus trees on depleted soil provides an alternative source of wood for various purposes, and gives us the opportunity to retain rural man-

power in these regions. Not to mention the CO<sub>2</sub> effect: planted forests absorb large amounts of greenhouse gas. For every ton of CO<sub>2</sub> emitted by our factories, three tons are absorbed by our forests. This is one of the reasons why huge eucalyptus plantations have been established in countries such as India and China.

**twogether:** Plantations are often described disparagingly as "green deserts." Is the accusation that they contribute to a reduction of biodiversity justified?

**Aguiar:** What is better – an area of pastureland that is not capable of sustaining even a minimum amount of flora and fauna, or a planted forest with at least 500 different species in it? When we intersperse native forest with the planted forest we create ecological corridors. "Green desert" is a derogatory term without any

scientific basis. The planted forest protects the soil from erosion, protects the watersheds and improves soil quality. Fourteen years of plantation work show us that eucalyptus trees help to recuperate degenerated soils, by increasing the amount of organic material and retaining humidity.

**twogether:** Land is very much in demand. Conservationists, the regional population, indigenous peoples and various sectors of industry are competing fiercely with one another for the land available. How do you see the position of the pulp and paper industry among these conflicting interests?

**Aguiar:** Brazil's pasturelands today account for an area of 220 million hectares. Without the least obligation to protect native forests this causes soil degradation and erosion. Since the time of the government of

Castello Branco (1964 –1967, editor's note) 71 million hectares of Brazilian soil have been earmarked for agricultural reform. Soy beans take up 21 million hectares, corn 3 million and sugar cane 6.6 million. The sum total of Brazil's planted forests is only 5.5 million hectares, of which only 2 million are for pulp and paper. The rest is destined for lumber, chipboard, fuel, charcoal and other uses. Thanks to 5.5 million hectares of plantation we enjoy almost 2 million hectares of preserved native forest.

**twogether:** There is worldwide disagreement as to whether the benefits or risks predominate in the development and cultivation of genetically modified plants. Are you already working with genetically modified eucalyptus plants?

**Aguiar:** Although we believe that this technology can be of great benefit to

the pulp and paper industry in both economic and ecological terms, we are still not using any genetically modified plants. This is in compliance with Brazilian legislation, with major debate on the subject still ongoing. Instead of discussing rigid positions, we can move forward constructively, analyze the risks and discuss the measures necessary to keep these risks to a minimum. The cultivation of genetically modified corn and soy has already been approved in Brazil. The issue of approval for planted forests has not yet been resolved. As soon as the Brazilian legislature follows the lead of the scientific debate and gives the go-ahead, we can initiate some trials in this area. Because, of course, in the long term, Aracruz has to keep in step with technological progress.

**twogether:** Señor Aguiar, thank you for talking to us!

*The sustainable planting of eucalyptus trees on depleted soil provides an alternative source of wood for various purposes.*

*“One of the major environmental benefits is the opportunity to protect and even expand native forests.”*

*Carlos Aguiar, CEO, Aracruz Celulose S.A.*





**Khon Kaen PM 1**

Paper grades:	Woodfree writing and printing papers, Copy papers
Production capacity (gross):	730 t/24h (based on 80 g/m <sup>2</sup> )
Wire width:	5,850 mm
Max. paper width on reel:	5,280 mm
Design speed:	1,500 m/min
Max. operating speed:	1,300 m/min
Raw material:	
Bleached short fiber pulp	80 - 100%
Bleached long fiber pulp	0 - 20%
Filler	10 - 20%

*The result of the joint efforts by PPPC and Voith: a paper machine with state-of-the-art technology.*

The new PM 1 in Khon Kaen is setting quality standards

## Top in every aspect

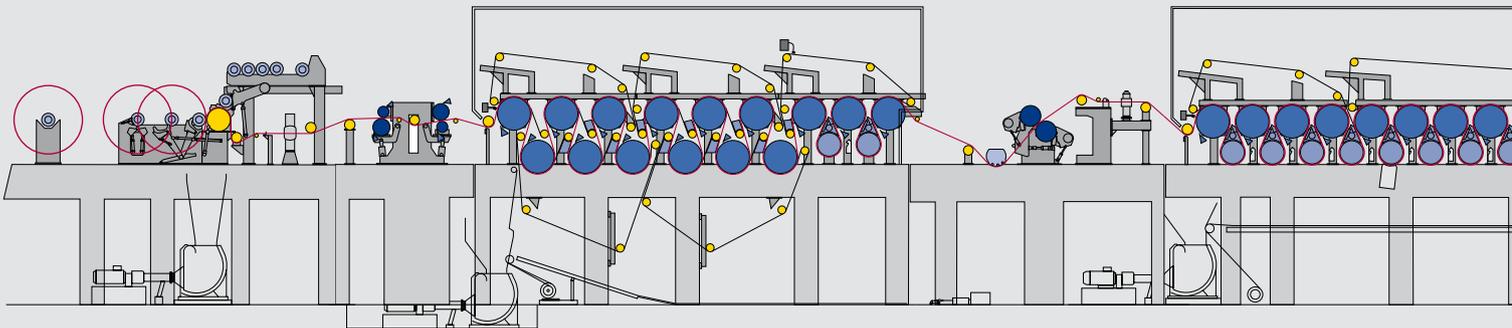


**The new paper machine of Thai papermaker Phoenix Pulp and Paper Co. Ltd. (PPPC) – a subsidiary of the Siam Cement Group (SCG) - went into operation just in time for the 2008 New Year Festival in Thailand. It became clear very early on that the quality of the paper produced is setting new standards. Furthermore, all guarantees could be successfully confirmed just five months after startup.**

Already during the inquiry process for this major project, PPPC asked for the best technology available to ensure the highest quality and efficiency, while keeping to optimum investment

costs. The location for the new paper machine was to be at Khon Kaen, approximately 500 km northeast from Bangkok in the heart of Thailand. PPPC has operated a factory to pro-

duce bleached eucalyptus pulp there for years. The objective of the investment was to process the pulp into high quality writing, printing and copy paper directly on site. With the new produc-



*Layout Khon Kaen PM 1.*



*A good partnership from left to right: Egdar Roman, Voith Assembly Manager; Amnuay Ponpued, Khon Kaen Mill Director; Terasak Chamikorn, Managing Director; Surat Khoonrugsa, Paper Production Manager Khon Kaen PM 1; Dr. Martin Zimmermann, Voith Chief Commissioning Engineer.*

tion line, the capacity of these papers should increase by 200,000 metric tons per year and SCG Paper will become the leading producer of graphic papers in Thailand.

The Voith Paper delivery includes the approach flow, the complete paper machine with auxiliary components, MCS, CD profile control systems and the winder. There was a tight time frame for the design and engineering work but this all went to schedule. The individual sections and components were preassembled in time at

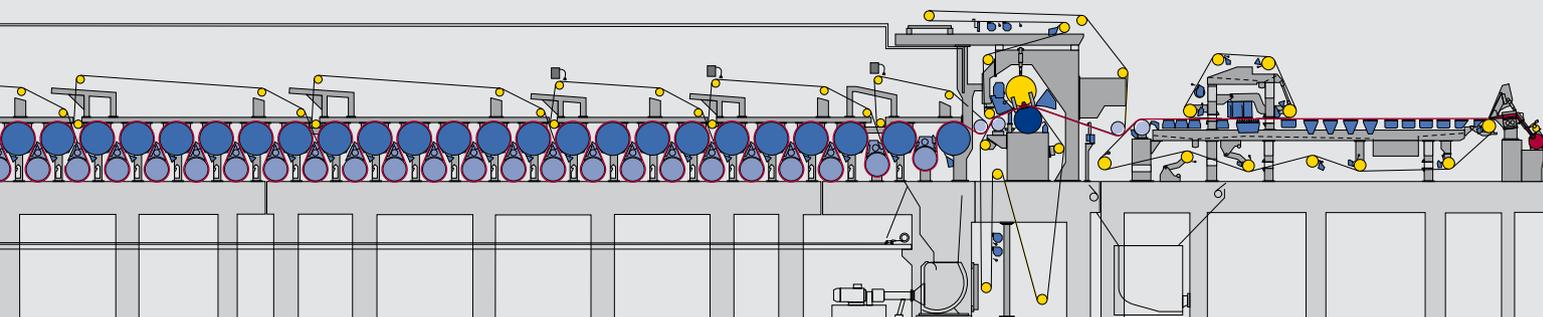
the various Voith Paper locations in Europe and China. Numerous drawings, foundation plans and piping diagrams were generated from the 3D mill model. Chests, structural components and pipes could be pre-fabricated to a great extent thanks to the extremely effective 3D planning.

#### **Monsoon rain hinders construction**

The construction and assembly teams had to battle unusually heavy monsoon rain in August 2007. "Roads

and storage areas were sodden, trucks got stuck and containers overturned. The difficult conditions led to delays with construction. However, thanks to the huge efforts of all the staff working on the building site, we managed to avoid missing the deadline," explains Voith Project Manager Hubert Eger.

The project teams from PPPC, Voith Paper and C.L. International worked extremely well together throughout the entire project. Surasak Amawat, project manager from PPPC, thanked Voith Paper for the good partnership.



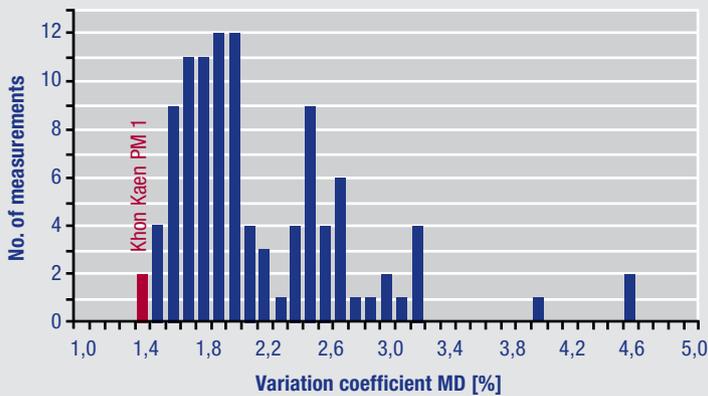


Fig. 1: Benchmark basis weight MD profile.

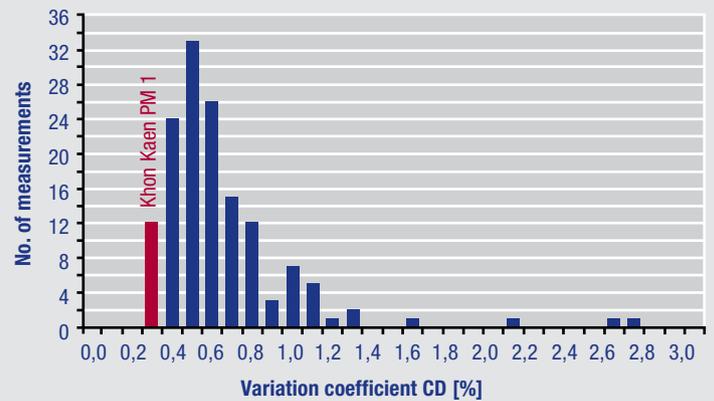


Fig. 2: Benchmark basis weight CD profile.

*“We chose Voith as the main supplier for this project because we are confident in the quality of machinery and services. ... We are very happy with our PM 1.”*

Terasak Chamikorn, Managing Director Khon Kaen

### Customer training as a factor for success

In order to ensure the success of the project in the long term, the customer's employees received intensive training. A comprehensive training program for the customer's future operating and maintenance staff was set up and run by Chief Commissioning Engineer Dr. Martin Zimmermann. In addition to theoretical instruction, practical training modules were also completed during the shop assembly at Voith in Heidenheim and visits were made to a suitable reference mill over several days. During the startup, a group of experts from various disciplines and experienced

papermakers supported the Khon Kaen team. Surasak Amawat is convinced that these comprehensive training measures contributed significantly to the success of the project, especially to the smooth startup and effective optimization.

### Paper on the reel just in time for the “Songkran” Festival

To the customer's great delight, the first paper was wound onto the MasterReel just a few hours before “Songkran,” the Thai New Year Festival on 12 April 2008. Sellable from the outset, as mill director, Amnuay Ponpued emphasizes. The starting speed of 1,000 m/min

increased to 1,200 m/min within a few short weeks. In the case of 120 g/m<sup>2</sup> offset paper, 816 metric t/d were produced three weeks after startup, 12% above the design specification.

### Outstanding paper quality in every respect

It was already clear soon after the startup of the paper machine that the ambitious quality targets had been met. The quality control system displayed an absolutely even cross profile for basis weight, caliper and moisture content. The Tapio analysis in the Voith Paper laboratory confirms this: the variation coefficients of basis

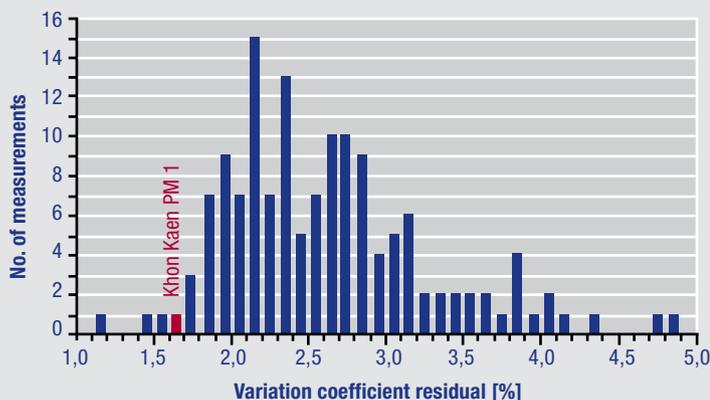


Fig. 3: Benchmark basis weight residual deviation.



The Khon Kaen team with the first full drum.

weight and caliper for CD, MD and residual deviation are among the best ever measured. This is illustrated impressively by the histograms in Fig. 1- 3. Thanks to ModulePro in the dryer section, excellent 2- $\sigma$ -values of less than 0.2% were achieved for the moisture cross profile on the reel too. It is not only the profiles that are convincing; the paper from the Khon Kaen PM 1 also leads the way in technological parameters. With 80 g/m<sup>2</sup> copy paper, an Ambertec formation index of 0.32  $\sqrt{\text{g/m}^2}$  and a bulk of 1.4 cm<sup>3</sup>/g was achieved. The rough two-sidedness is within  $\pm 10\%$  in the entire roughness range from 70 to 220 ml/min Bendtsen. These exceptionally good values confirm the technological total concept of the PM 1.

### Greatest level of customer satisfaction

The starting curve of the machine is also a top performer. For 60 and 70 g/m<sup>2</sup> offset papers, the speed

quickly increased to the maximum operating speed of 1,300 m/min – a top speed for machines with hybrid former for wood-free grades. Furthermore, five months after startup, the warranty test runs were successfully completed first off for all reference grades. “Top quality and productivity values - and at record speeds!” Voith Commissioning Engineer, Martin Zimmermann sums up proudly.

As a result of the smooth startup, the Final Acceptance Certificate (FAC) was already signed after a record-breaking six months after the machine was put into operation.

Amnuay Ponpued, the Khon Kaen Mill Director is happy with the huge success of the project: “We are setting new standards with the quality of our copy and offset papers and are very well placed in the competitive landscape.” Managing Director, Terasak Chamikorn is also extremely pleased: “I have known Voith for a long time.

We chose Voith as the main supplier for this project because we are confident in the quality of machinery and services. Many thanks to your team for your cooperation and support. We are very happy with our PM 1.”

Tongchai Soha, Process Engineering Manager at SCG Paper, sums it up briefly and succinctly: “This machine is top notch in every aspect.”

### Contact



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Klabin celebrates PM 9 first anniversary

## A masterpiece has been delivered



With a yearly production capacity of 350,000 tons, Klabin today has the largest virgin fiber board machine in Brazil. The PM 9 is specifically developed to produce Liquid Packaging Board (LPB), Folding Box Board (FBB) and Carrier Board. The machine was installed in the Monte Alegre mill in Telêmaco Borba (federal state of Paraná) and is already in full operation.

Almost 400 days have passed since Brazil's major producer and exporter of paper and cardboard completed one of the most important projects undertaken by the company in that country – the MA-1100 – and started up its core component, the PM 9. 'MA' stands for Monte Alegre and '1100' for the 1.1 million tons capacity of the paper mill. Project planning began around 2003. Voith Paper experts initially suggested a few alternatives to improve LPB production, such as rebuilding the PM 4 and PM 6, which, after several studies,

proved not to be the best solution. As Klabin has been a long-term supplier to Tetra Pak in a 25-year partnership, the realization of the MA-1100 project was seen as necessary in order to support the foreseen growing market demand, as only few companies around the world have the technology to supply LPB.

### A tight space and a tight schedule

One of the major challenges of the MA-1100 project was to find space in the Monte Alegre mill. The site is

*One of the several groups visiting the paper machine during the opening ceremony.*





*The red cable car hovers above Rio Tibagi. Employees have an incomparable view to the Monte Alegre.*



*Official opening. Council of Administration of Klabin, Mr. Roberto Requião (Governor of the state of Paraná) and Mr. Miguel Jorge (Minister of Development, Industry and Exterior Trade Department for Brazil).*

located between the Harmonia and Tibagi rivers, and the mill is built on a steep hill, which made it very difficult to find space for a 250-meter-long paper machine and its building. The solution was to move the sheeting plant and to build the new machine room on that site. About 60,000 truckloads of material had to be moved to the site.

This was not the only challenge: achieving the agreed deadline was crucial for Klabin and Voith. Acquisition of the PM 9 was approved by Klabin on April 21st, 2006, and Voith had the mission to build the machine and start it up within 17 months.

In order to speed up the process, Voith invested in pre-engineering and research before the project acceptance, defining all the items that were required for the success of the project before the official start. The Process Line Package acquired by Klabin from Voith was also of great help. Voith became responsible for all technical

parts of the project, from the civil construction supervision to the start-up itself, involving 40 direct suppliers and almost 400 indirect vendors. Voith Paper Brazil set up a project management “war room” in the company’s headquarters in São Paulo, where weekly meetings were held to monitor and control the situation in all areas involved.

On October 15th, 2007, Klabin and Voith started up the PM 9 exactly at 8 pm, producing its first paper parent reel, which was celebrated at the mill and also throughout the company in Brazil. The machine is now operating at full production. Klabin’s engineers believe that soon the PM 9 will surpass the level of production foreseen for it.

#### Contact



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#### Customer Comment



**Francisco C. Razzolini**  
Project, Industrial  
Technology & Purchasing  
Director

“We at Klabin felt really comfortable with the final design that we achieved for the PM 9 with the help of Voith’s professionals. With the trials we did and all the references we searched, we felt very confident of Voith’s qualifications to build this particular machine. They have a large presence in Brazil, with a large, qualified body of technicians. Voith delivered a masterpiece.”

#### Infobox

With the Process Line Package (PLP), Klabin acquired the complete stock preparation system, the approach flow system, board machine, winder, roll transport and wrapping systems, ancillary equipment, the electrical equipment as well as installation and start-up.

A unique collaboration leads to the industry's new benchmark

## IP Pensacola: That's the way to do it

**“We all win, or we all lose.” Is there a better way to put together the spirit of a common project of great magnitude? In this case, the challenge was raised by International Paper’s Pensacola mill. But how to get there – let the story begin...**

It's nearly impossible to find anyone who doesn't know International Paper based in Memphis, Tennessee, USA. IP is a major player: the largest forest company in the world. It has been the premier producer of paper and board since the acquisition of Weyerhaeuser containerboard, packaging and recycling business. Today, IP operates 23 pulp, paper and packaging mills in North America and one in Mexico. In 2007, the company delivered more than 12 million tons of paper to the market.

However, the North American paper industry has gone through hard times, and the changing market demands leave no one unaffected. Streamlining the business had become essential. For IP, this means concentrating on

two production areas: uncoated papers and industrial/consumer packaging.

### **Full involvement in every level**

A typical paper machine project involves meetings after meetings, quotations and updates, test runs, visits to reference sites, and the list goes on. The possible suppliers compete head-to-head, and in the end, one of them wins the deal.

The numerous discussions involving purchaser and supplier might sometimes run hot, since the opinions are not always the same. Naturally, everybody plays for his own team following their own targets; it takes time to come to an agreement satisfying all participants.

*PM 5 produces lightweight kraftliner with a quality exceeding all expectations.*

The IP Pensacola rebuild, however, was anything but typical. Just a few months after the first project meeting, IP chose Voith Paper to carry out the project for the PM 5. Voith Paper was chosen to be not only the supplier, but also a real partner in a mega-scale initiative.

First, IP and Voith Paper signed a pre-engineering contract, which was soon followed by an order for the PM 5 rebuild. In time, IP realized the benefits of a single source supplier and brought in other Voith Paper divisions – such as Fabrics, Fiber Systems and Rolls – to the project. Consequently, Voith Paper became IP's all-inclusive supplier. Right in the beginning, an in-depth alignment session was organized for the core project team to show the correct way. During the project ex-

### Machine description of PM 5

Wire width:	9,640 mm (380 inches)
Production:	500,000 short t/year
Product:	high-quality kraftliner from virgin fiber
Basis weight range:	112 - 176 g/m <sup>2</sup> (23 – 36 lbs/MSF)
Design speed:	1,128 m/min (3,700 feet/min)
Start-up:	September 22, 2007

#### Main scope

Supplied by all divisions of Voith Paper, Board and Packaging, as the leading partner

- Three pressure screens, HydroMix and upgrade of existing equipment
- TopFormer F, two MasterJet F headboxes, ModuleJet dilution water control
- DuoCentri NipcoFlex shoe press
- Dryer section upgrade
- New roll covers and coatings
- Complete upgrade of existing winder
- Several quality enhancement tools for lightweight grades, like DuoShake unit and EdgeModule for headbox
- Control and automation package with engineering services
- PM clothing including QualiFlex press sleeves

ecution, frequent meetings took place where everyone whose job function was affected by the PM 5 conversion was included. IP involved all different levels. The whole staff was fully engaged in order to be able to identify with the new product. Complete training across the machine was provided to everybody.

On top of that, every three months, a stakeholders' meeting was conducted, keeping the top management of IP and key suppliers involved and fully informed.

Even the distance over the Atlantic did not create problems during the project execution. Additionally to face-to-face meetings, conference calls and web meetings were used efficiently. Thanks to the utilization

of modern communication tools, the seven-hour time difference was working for the project!

#### FEL as project structure

IP chose Front-End Loading for the handling of project development. FEL is a systematic stage gate concept to develop major capital projects, where the customer, the engineering company and the supplier work all together as one team.

Front-End Loading includes rough planning and design already in the early stage of a project lifecycle. There is a solid rationale for this approach: In the beginning, the ability to influence changes in design is relatively high and the cost to make

those alterations is relatively low. Even though FEL requires more time and money in the beginning, these costs are minor compared to the expenses and efforts saved in not having to make changes at a later stage.

IP is experienced in the FEL field, and Voith Paper is no greenhorn, either. Together, the companies had already completed one project, using the FEL concept with success.

The Pensacola FEL project consisted of five phases. The first one was the execution of a complete business analysis. Four aspects were always top of mind in all stages – strategy, cost reduction, regulatory and maintenance – so that all possible consequences were taken into account.



*The moment of truth: After several weeks downtime PM 5 will soon run again.*

The second phase concentrated on technical aspects. A preliminary machine design was defined. The partnership between IP and Voith Paper gained momentum.

After business and technical issues, the focus was set on an execution analysis. Project plan, implementation strategies, balances – all that and much more – were completed in the third phase. The detailed concept for the rebuild was now developed together, based on IP's product specification and the capital investment proposal took form.

After the go-ahead, an implementation phase followed. This fourth phase included permit, procurement, construction, training and commissioning, for example.

Finally, in the fifth phase, PM 5 started up. IP executed the go-to-market plan and began the operation as well

as optimization. Moreover, the project did not finish with the start-up of the paper machine. An evaluation comparing actual performance to project objectives and a transfer of the lessons learned during the process were also carried out.

#### **Quality beyond all expectations**

Converting an existing copy paper machine to produce completely different grades involves many uncertainties. Starting from the pulp mill through stock preparation, all machine sections and functions must be carefully inspected and upgraded.

In the end, the only point that matters is whether the product quality meets the project specifications and market demands.

At Pensacola, the result is more than positive. The achieved strength

properties and basis weight profiles are at the high end of the market. In addition, the PM 5 is, without any exaggeration, one of the world's fastest kraftliner machines.

These results could not have been achieved without the hard work of all team members. The customer, the equipment supplier, the engineering company and the construction company did all their very best to achieve the project targets.

Voith Paper is convinced that International Paper is on the same successful path that SAICA charted several years ago. As is widely known, the Spanish SAICA was the first one to produce lightweight corrugating medium from 100% recycled fiber and is considered to be the industry's benchmark in the medium and test-liner market. With its Pensacola PM 5 producing lightweight kraftliner from 100% virgin fiber, nothing prevents

IP from achieving the same in its own area.

### Collaboration – How to walk the talk

If one word could describe the Pensacola project, it would be “collaboration.” The importance of this word may be diminished because of overuse, but at Pensacola, it has true meaning. A real cooperation developed between all team members, and this was evident at

every phase of the project. IP paid constant attention to the team spirit, especially in the hottest project phases. Even when the team encountered challenges with conflicting opinions, consensus was quickly reached because everyone was truly on the same team and working toward a shared goal.

The whole team can be proud of the result. The 12-month ramp-up curve was cut down to one third of the original project plan, and

Pensacola produced saleable paper from the start! The rebuild of PM 5 has a fairy tale ending – the paper-maker, the end customers, the supplier – everybody is happy. That’s the way it should be.

#### Contact



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## “Voith did a very good job in this very challenging role.”

*Todd Crutcher, Investment Manager, Intenational Paper's Pensacola mill, USA*

**twogether:** At the beginning of the project, you decided to choose Voith Paper to be your single source supplier. What were your exact expectations, and how were they fulfilled?

**Crutcher:** The close coordination of all the components (e.g. equipment, machine clothing, roll covers) needed in the machine rebuild was an important factor. The supplier had to work with the mill production, project engineering, maintenance teams and the construction company to ensure that the finished product was perfect – in every way. This expectation was crucial to the success of the Pensacola rebuild. Voith did a very good job in this very challenging role.

**twogether:** Collaboration and team spirit – how did you succeed to walk the talk?

**Crutcher:** It wasn't easy! I give a great deal of credit to the leadership of the key groups participating in the project: engineering, construction and our mill partner. The overriding principle was always to drive to the best solution through clear, honest communication of the issues. Success was only measured by the Team's results. It was never okay to have a win/lose situation. I am proud of this result!

**twogether:** How would you describe the quality of the end product and its current position in the global market?

**Crutcher:** Pensacola is clearly a global market leader in container-board production, and the machine has remarkable capabilities.

**twogether:** What are your expectations concerning the market development for (lightweight) kraftliner?

**Crutcher:** There is no limit to further development of lightweight kraftliner from Pensacola. Our customers like the product, and the mill teams are becoming more proficient at making the optimum use of the new technology installed.

New MasterJet headbox at Manistique Papers

## Rebuild results in new production record



*New headbox at Manistique Papers.*

**In 2007, Manistique Papers invested 6 million US dollars to upgrade their facility by replacing the existing headbox with a new MasterJet II F Dilution Control headbox. Since the start up in June of 2007, the new headbox is fully living up to the customer's expectations and has significantly improved sheet profiles and sheet formation.**

### Objective of the Rebuild

The existing headbox was a Voith W headbox from 1980, originally designed for 3000 fpm. The W headbox was rebuilt years ago to be able to handle a maximum operating speed of 4000 fpm, however, the current operating speeds have exceeded this level. The objective of this rebuild was to replace the W headbox with a new MasterJet II F Dilution Control headbox designed for the current production speeds, and capable of operating as a gap former headbox in a future rebuild of the wet end.

Voith had a significant design challenge to fit the new headbox into the limited space. To resolve the problem,

the new dilution plate technology was used. The dilution header and high consistency header were placed above the headbox in order to fit the new equipment into the restricted space, minimizing the total installed cost significantly.

### New MasterJet II F Dilution Control Headbox

In June of 2007 Manistique Papers replaced the old W headbox with a 4.2 m (163.62 inches) wide MasterJet II F Dilution headbox. The new state-of-the-art headbox is equipped with lamellas for best jet quality, Edge Module to achieve optimum fiber angle, and Edge Master to control sheet edges. A PD Tank to reduce approach flow pulsation

and a dilution system for excellent cross direction weight profiles were also included.

After a scheduled nine day shutdown, the new headbox was started up on



*Aerial photo of Manistique Papers.*

June 20th of 2007 and salable paper was produced the same day. The sheet went on the reel quickly thanks to all the good preparation work done by Manistique Papers and Voith. Soon after the start-up, the optimization process of the new equipment took place and the results were very impressive. The new headbox improved cross direction weight profiles by 50%.

The improved weight profile also resulted in a better moisture profile at the reel. The mill was able to increase the reel sheet moisture setpoint by 1.5%, resulting in lower dryer steam consumption and significant cost savings.

### Formation Improvements

Lamella technology and an intensive optimization of jet impingement, jet velocity (rush/drag) and table settings resulted in an improved formation. Sheet formation improved by 30 to 40% for all grades produced on this machine.

### Further Improvements

The machine draw was reduced by approximately 1%, mostly due to improved sheet edge quality. The sheet fiber alignment (TSO angle) after the rebuild was within  $\pm 3$  degrees and the overall machine efficiency increased.

#### Infobox

##### Manistique Papers Inc.

Manistique Papers, located in Manistique Michigan, USA, was founded in 1920; the mill was recently acquired by the Kramer family, based in Northbrook, Illinois, USA. Manistique's 100% recycled specialty paper products are used for commercial and book printing, as well as business and envelope papers. It has been manufacturing 100% recycled uncoated groundwood papers since 1984.

#### Contact



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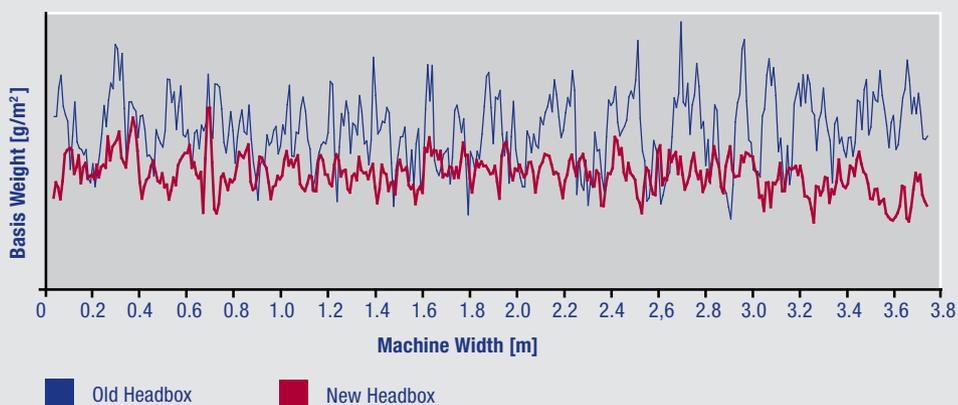
#### Customer Comment



**Jon Johnson**  
General Manager  
Manistique Papers, Inc.

“Manistique Papers, Inc. has been on a path of transformation from a newsprint mill to a 100% specialty mill for over a decade. In the past, our 100% recycled content created customer excitement, but variability in basis weight and moisture profiles created printing and converting deficiencies.

The new MasterJet II F Dilution headbox provides excellent sheet formation, vastly improved weight profiles and has enabled us to increase machine capacity with the ability to optimize sheet moistures. A production record of 500 t/d was set on August 22, 2007; this shattered the old record set in 1995 of 481 t. The new headbox is a key component for the future of the mill and the Voith team provided unparalleled support.”



Improved CD profiles with new headbox.



*Felt change in Docelles: the bottom felt is prepared for the installation in the press section.*

Single NipcoFlex with PrintFlex SP3 Planar in use in Docelles

## An unbeatable team

**In the summer of 2006, the PM 1 of the Finnish paper maker UPM Kymmene was rebuilt by Voith Paper in the French mill at Docelles. Especially for UPM Kymmene Docelles, Voith Paper developed a felt, which guarantees high dryness with a consistently good machine run. In October of 2008, a speed record was achieved on the PM 1 with the Print-Flex SP3 Planar fabrics.**

In October 2008, the PM 1 in Docelles operated at 1215 m/min during the production of the envelope paper “UPM Poste.” A few days earlier, felts of the PrintFlex SP3 Planar type were mounted at both press positions in the press section of the paper machine, combining the proven Planar concept with the Spectra elastomer technology. Planar technology is a unique modular non-woven concept. Individually twined threads are placed next to one another in a layer, without being connected by other threads.

Thanks to the lack of crossing points, they provide the greatest possible contact surface to the paper web and are thus clearly superior to woven structures. For example, a maximum production performance can be achieved thanks to fewer sheet marks, faster runs, and consistently high dewatering.

Spectra technology is a non-woven, non-textile elastomer, which can be highly compressed and provides a long-lasting reset force. The combination of Planar and Spectra operates optimally on sophisticated press positions where high dewatering performance and a compensation of the vibrations are required. Thanks to the Spectra elastomer, disturbances and irregularities in the press are compensated. Since February 2008, PrintFlex SP3 Planar has been used as top and bottom felt. PrintFlex SP3 Planar is a three-layered felt and consists of two Planar layers and one Spectra layer. It is the ideal fabric for the

Single NipcoFlex press from Voith installed in 2006.

### **Challenge: high dewatering right from the beginning**

The installation of the Single NipcoFlex press in 2006 was part of a rebuilding phase in the mill in Docelles. UPM Kymmene had decided to further improve the paper quality of its copy and envelope paper, and to increase the production. In order to meet this challenge, Voith Paper recommended the Single NipcoFlex concept in Docelles. The press became the core of the rebuild. It is one of the most space-saving press sections and suitable for wood-free, uncoated grades. In addition to the new press, hot air dryers and products such as the Voith Drive and ProRelease+ stabilizers were installed.

Voith Paper Automation was involved with the installation of an OnQ EnviroScan and an OnV Felt-View in the rebuild project. Both products were implemented for the measurement of moisture during the paper production process. While the Felt View measures felt moisture, permeability, and felt temperature in the press, the EnviroScan determines the moisture and temperature of the web.

The PM 1 in Docelles was only able to set its speed record after the Single NipcoFlex press had been covered with the PrintFlex SP3 Planar on all positions. The felts used are the key element of the Single NipcoFlex press section. For the Voith Paper’s research team, it was a challenge to

develop a product, which ensured high dewatering from the beginning while at the same time guaranteeing consistent properties throughout the operating time. After numerous tests and test runs on the VPM 6 in the Voith Paper Technology Center in Heidenheim, Germany, the combination of Planar and Spectra technologies finally developed. The innovative PrintFlex SP3 Planar felts and the Single NipcoFlex press operate outstandingly in Docelles, which is also underscored by the speed record.

#### **Infobox**

##### **Cooperation for over 30 years**

The cooperation between Voith and the UPM Kymmene Docelles mill began in the 1970s. As part of major rebuilds at the time, Voith provided the press section, which was followed in the 1980s by the rebuild of the dryer section.

Shortly before the turn of the century, a DuoFormer D was installed to improve quality. In 2005, Voith Paper received the contract from UPM Kymmene for the rebuild of the PM 1 in Docelles.

#### **Contact**



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The PM 4 at UPM Steyrermühl was rebuilt to the modern DuoFormer CVB design.

Increase in performance by upgrade of the forming section with loadable forming blades

## Small outlay – big effect

The PM 7 at UPM in Schongau (Germany) and the PM 4 at UPM in Steyrermühl (Austria) were equipped with counterblade technology through rebuild of existing DuoFormers CV to the modern DuoFormer CVB concept. The paper quality was thereby improved and the dewatering capacity increased. Both machines have the fastest blade formers by far and with average speeds of around 1750 m/min are among the ten fastest newsprint machines in the world.

	PM 7 UPM Schongau	PM 4 UPM Steyrermühl
<b>Startup</b>	1989	1990
<b>Wire width</b>	9,200 mm	9,650 mm
<b>Grade</b>	newsprint	newsprint
<b>Furnish</b>	DIP+TMP	DIP+TMP
<b>Basis weight</b>	40-49 g/m <sup>2</sup>	40-49 g/m <sup>2</sup>

Fig. 1: Basic data for the PM 7 UPM Schongau and the PM 4 UPM Steyrermühl.

The production of graphic paper grades with gap formers has its origin in the blade former. From 1988 to 1994, Voith built numerous successful DuoFormer CF and CV blade former models.

The early blade former concepts were impressive due to their good formation, but at the same time showed certain deficiencies in retention characteristics. In addition, there were other optimization issues typical of the model, such as the sensitivity of jet impingement and cross profiles and also the sheet symmetry.

At the beginning of the nineties, the blade former lost more and more importance. With the introduction of combined roll-blade gap formers and the flexible loadable counterblades, the trend developed unequivocally toward more modern concepts such as the DuoFormer CFD.

#### Key component: loadable forming blades

Since being launched by Voith, this technology has become established

as the industry standard. Meanwhile, gap formers for new graphic paper machines are designed exclusively with flexible counterblades. This key technology also finds broad application in rebuild concepts for existing formers. In particular, the numerous existing blade formers offer a big market potential. Apart from a few exceptions, these machines were originally not equipped with loadable counterblades.

#### Rebuild concepts for blade formers

In order to meet the most varied customer requirements, two rebuild concepts with counterblade technology for blade formers were developed: the DuoFormer CB and the DuoFormer CVB. Both concepts build on the long experience of Voith gap former technology. They are tailored both to Voith blade formers and to BelBaie formers.

The arrangement of the dewatering elements follows the proven concept of the DuoFormer TQv. No forming roll but rather a curved blade shoe

is used solely as the initial dewatering element. It is designed as a separate element for the DuoFormer CB or, alternatively, as the first section of the subsequent forming suction box for the DuoFormer CVB. The most suitable concept in each case is the result of the overall evaluation of qualitative requirements and the existing machine parts.

Both rebuild concepts were developed, tested and optimized by means of intensive test runs on the Voith pilot machines. The deficiencies of the early blade former concepts were thereby eliminated. Essential success factors were, among other things, optimized geometries for jet impingement and wire support, modern wire design and the defined sequence of dewatering pulses.

#### Rebuild of PM 7, UPM Schongau and PM 4, UPM Steyermühl

Both machines were started up barely twenty years ago and produce mainly standard newsprint. The PM 7 at UPM in Schongau was rebuilt in 2006. The PM 4 at UPM in Steyermühl

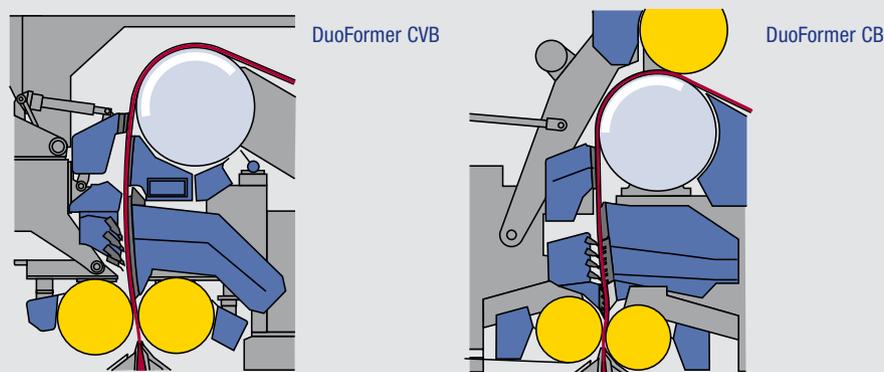


Fig. 2: Rebuild concepts for blade former with counter blade technology.

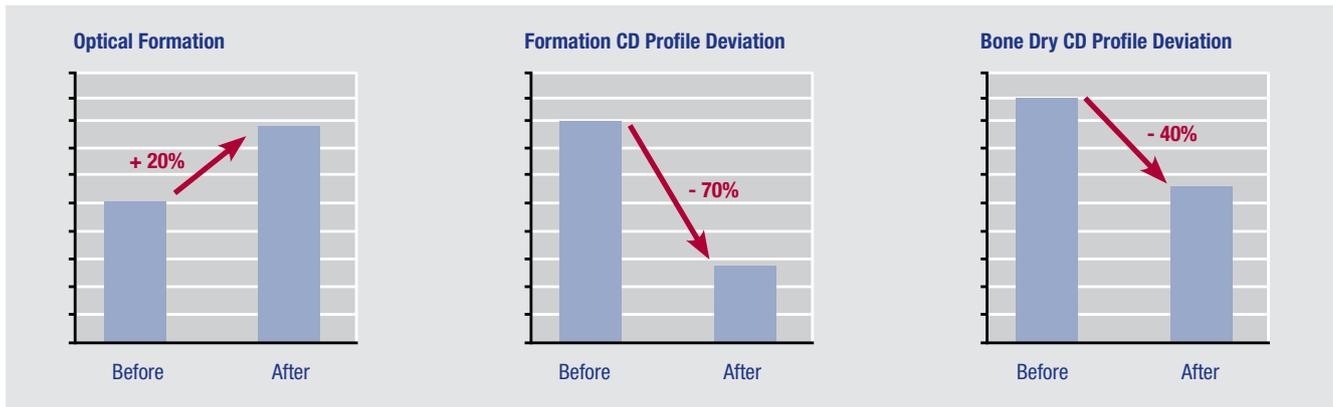


Fig. 3: The PM 4 at UPM in Steyerrmühl – improvement in quality through rebuild from DuoFormer CV to CVB.

mühl followed in 2007. Both formers in their original DuoFormer CV design were rebuilt to the DuoFormer CVB concept. Essentially, the blade geometry of the forming suction box was modified and at the opposite side a forming box with three loadable forming blades was installed.

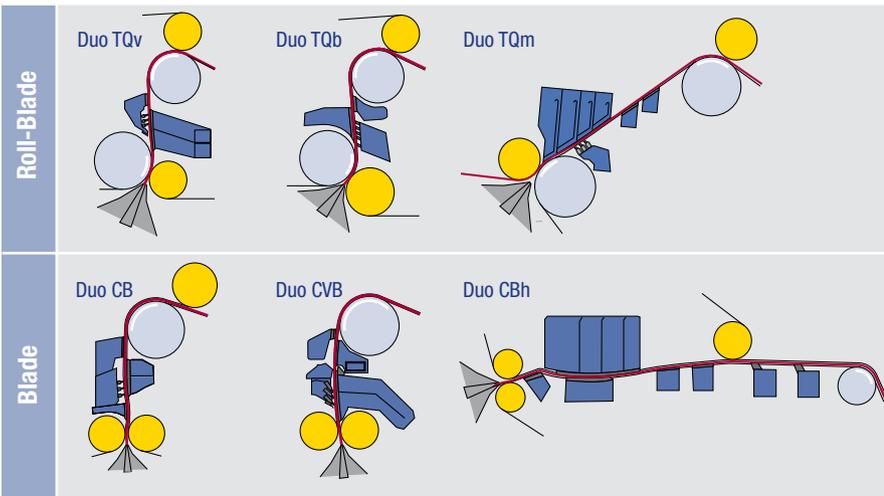
In combination with additional modifications on other machine sections, both machines increased their speed by ca. 100 m/min following the rebuild. Today, both machines are in the range of 1,750 m/min average pro-

duction speeds. They are thus the fastest blade formers in the world and are among the ten fastest newsprint formers generally. The diagrams above show some quality improvement results of the PM 4 at UPM Steyerrmuehl. Along with the clearly reduced cross profile deviations, the formation, in particular was improved by a good 20%. The good blade symmetry was achieved, dewatering capacity and thus process stability of the former was also increased at the same time by the installation of counterblades.

**Perfect Fit rebuild concepts**

The blade former rebuild concepts described supplement the already numerous solutions designed for other types of forming sections such as hybrid formers or roll-blade gap formers. These concepts also offer the most cost-efficient solution for meeting the customers’ targets. As a rule, loadable forming blade technology is used as the core element here, too, in order to be able to meet typical customer targets such as quality improvement and speed increase.

Fig. 4: Overview of rebuild concepts for graphic gap formers.



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*Between meadows and forests, up to 305,000 t/a of newsprint paper are produced on the PM 11 at the UPM mill in Schwedt, Germany. (Image source: UPM Schwedt).*

## UPM Schwedt success story

# A new lease on life: fit for the future in three days

**The times are changing and we are changing with them – those responsible at UPM Schwedt, Germany, took this old saying literally and decided to bring their 12-year-old quality control system (QCS) up to the latest state-of-the-art system.**

UPM Schwedt is not settling for half-way measures. The mill, which is in the immediate vicinity of the German-Polish national park, is setting standards in the areas of environment, safety and quality management. Nothing less than “best available technology” was set as the goal for the PM 11 paper machine, so modernization of the existing QCS was the obvious thing to do.

In doing so, it was important that the already installed automation products

could be integrated into the new system supplied by Voith Paper Automation. The existing isolated applications were integrated into the QCS software, so that UPM Schwedt is now profiting from a continuous, uniform platform.

In the process, an upgrade for the existing Profilmatic software, which was already used on the headbox at the OnQ ModuleJet dilution water control was also carried out. In the course of standardization, all other

cross profile controls were automated with the Profilmatic. In order to achieve the highest possible uniformity of paper quality, several machine direction controls were also installed that, among other things, also contain a program for automatic grade change.

Furthermore, UPM Schwedt opted for a soft-/hardware update of OnV TechnologyMonitoring. This system monitors all critical machine components and immediately sounds



Continuous quality control system from the headbox to the reel: OnQ ModuleJet, OnQ EnviroScan and OnQ Scanner.

*“Along with the new hardware landscape,  
now fit for the future, the now uniform  
platform was for us, above all, a great leap forward.”*

*Steffen Deszpot, Manager Mill Service & Energy, UPM Schwedt*

an alarm if there are vibrations of felts or rolls. Furthermore, it is in a position to detect short-wave fluctuations of quality parameters – such as basis weight or moisture – and assign them to the machine parts that are causing them.

In addition, the other QCS hardware was also reconditioned and replaced when necessary. Thus, the scanner in front of the reel was replaced by a Voith OnQ Scanner, which is equipped with sensors for basis weight, moisture and thickness. The previous ash point measurement was integrated into the scanner. The existing OnQ EnviroScan that measures the moisture and temperature of the paper web directly at the beginning of the

dryer section was checked and worn-out parts replaced. The project was topped off by delivery of an OnView information system with a high-power database. It is integrated into the new QCS. Via OnView, easy access to historical as well as current data is possible that can be clearly visualized with various tools and thus analyzed.

The extensive modernization was carried out within three days. The aim of increasing the uniformity of the paper produced was achieved. This illustrates the significant improvement of the 2sigma values of all important quality parameters. Furthermore, Voith Paper Automation guarantees a technical availability of 99.8%.

Those responsible at UPM Schwedt were also satisfied with that and Steffen Deszpot, responsible for the PM 11 technology, is convinced:

*“Along with the new hardware landscape, now fit for the future, the now uniform platform was for us, above all, a great leap forward.”*

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**“It’s clear:  
professionals were  
at work here ...”**

**During a visit to the UPM mill in Schwedt, Germany, Steffen Deszpot, Manager Mill Service & Energy, took time out for a conversation. The topic was the modernization of the quality control system (QCS) on the PM 11. The 35-year-old has worked at the mill for seven years and has had a storybook career. Since last year he has taken over the responsibilities of Technical Director and has jointly overseen the QCS project.**

**twogether:** Mr. Deszpot, what were the reasons behind the modernization of the PM 11?

**Deszpot:** The crucial factor was the incomplete hard- and software support for the previous QCS. We simply didn’t get any more spare parts, or only at high prices. In the current situation on the paper market, however, you just can’t afford that. A market leader, like we are, who wants to stay that way in the future can only do it with modern technology. For that reason, along with good, uniform paper quality, high technical availability was also an aim of the project. It was clear to us: if you want to be one step ahead, you have to invest.

**twogether:** Without a doubt, you solicited several proposals. What ultimately tipped the scales for Voith Paper Automation?

**Deszpot:** Voith’s proposal offered what was technically the best and most innovative solution. It satisfied our desire to integrate existing automation components into the new QCS. There were indeed less expensive proposals, but I can defend Voith’s somewhat higher price without misgivings, since I’ve gotten quality for it. Furthermore, we also wanted Voith’s automation for a Voith machine in order to have as few discussions about interfaces as possible. In addition, it was important to us

that Voith will upgrade the Schwedt service center and we thus profit from quick access times and an expanded spare parts storage.

**twogether:** UPM and Voith employees worked hand-in-hand on the project. How would you describe this joint teamwork?

**Deszpot:** The teamwork was very good! The project support was beyond dispute. Voith started up with a vigorous, experienced group here, and you have to praise the responsible project managers on both sides. They worked together closely and in a structured fashion and really delivered a super job.

*“A market leader, like we are, who wants to stay  
that way in the future can only do it  
with modern technology.”* Steffen Deszpot

Because of that, the final implementation of the project took only three days.

**twogether:** One of Voith's claims is to offer our customers custom-made solutions ...

**Deszpot:** ... and that was done, too. Since we have our own programmers and developers at the plant, over the years some of UPM Schwedt's own solutions emerged that we didn't want to lose. They were responsive to these special requests and even attended to details such as font sizes and so forth on the control panel displays.

**twogether:** The new system has been running now for almost a year.

What do you think are the most important advantages?

**Deszpot:** The PM 11 already had a rather high degree of automation beforehand, but the system had grown slowly and featured a motley hard- and software mix. Everything was operable, but there was no well-rounded concept. That has changed now! Existing isolated applications were integrated and all QCS products have now been brought together on a common platform. The daily work routine has thus become clearer, i.e., in very concrete terms, we have also been able to say goodbye to some monitors in the control room. Furthermore, the new Voith technology monitoring, offering many more moni-

toring possibilities than were available to us previously, was a clear leap forward. Nowadays, such a system is indispensable in order to keep an eye on the machine. Proactive maintenance thus becomes possible and malfunctions can be eliminated before they cause problems.

However, one of the most important advantages for us is also the reliable spare parts supply for the QCS that is now ensured. In this way, we save on procurement costs and the maintenance costs are also at a reasonable level.

**twogether:** How do things look with the paper quality? Have your expectations been met here?

*“Voith started up with a vigorous, experienced group here.”* Steffen Deszpot



*“Nowadays, such a system is indispensable in order to keep an eye on the machine.”* Steffen Deszpot

**Deszpot:** Our aim was to get a uniform, suitable, i.e., for us controllable paper quality both in machine direction and also in cross direction. Our customers, the printing houses, should have exactly the same basis weight at the beginning of the roll as at the end and of course also a clean profile over the entire width. The modernization certainly helped us in this. The 2sigma values of oven-dry tons, moisture, thickness and ash are clearly better. Furthermore, thanks to the new grade change program, we can change more quickly from one basis weight to the next, so that the difference in cutting of rolls declines. In addition, the more uniform paper quality contributes to the fact that we

have a higher smoothness of running and thus also an easing of the machine's web break characteristics. That's difficult to express in figures, but in my assessment the number of breaks has decreased. Due to the constant quality, the paper runs through the machine in a superior way not only with the printers, but also with us.

**twogether:** Have you also had feedback from your customers in this regard?

**Deszpot:** Yes, complaints regarding quality are declining and our paper has a very good reputation with the printing houses.

**twogether:** Mr. Deszpot, when you look back on the project today, what do you remember in particular?

**Deszpot:** Many companies can implement the technology today. However, a project is carried out by the people who work on it. And in this case all have really done a very good job! It was clear from the very beginning: professionals were at work there. I can thus say with a good conscience that I would do it again in exactly the same way.

**twogether:** Many thanks for the candid conversation!



The PM 11 of UPM in Schwedt.

A perfectly matched team: MultiFoil rotor and C-bar screen basket

## Quality improvement with lower energy consumption

**Save energy wherever possible: a goal high on the priority list of many paper makers. Utilizing the right combination of rotor and screen basket in the screening machine can save up to 30% on energy costs. The MultiFoil rotor and C-bar screen basket from Voith Paper have proven themselves to be an especially successful duo. Moreover, a newly developed narrow bar basket allows for further improvements in quality.**



*A perfectly matched team: MultiFoil rotor and C-bar screen basket.*

*20% larger open screen area through narrower bars with the new C-bar Q.*

As early as 2002, the MultiFoil rotor and C-bar screen basket were installed in several pressurized screens at the Thai Kraft Paper factory. Since then, the Thai paper maker is saving nearly 7 million kWh of electric power each year, emitting 9,143 fewer tons CO<sub>2</sub> and reducing the overall fiber loss in the approach flow system from 0.4 to 0.1% when compared to the old screening equipment. It was also possible to considerably reduce the residual sticky content following the screening system. The electricity saving corresponds to the yearly per

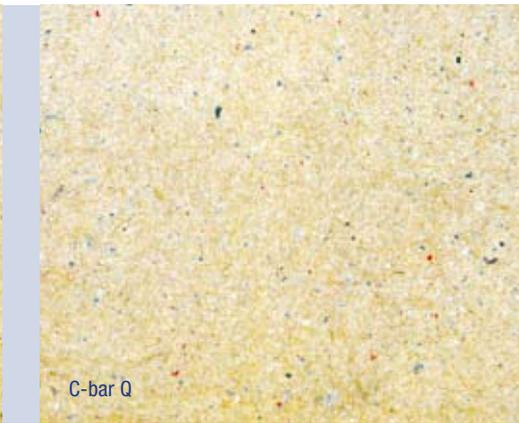
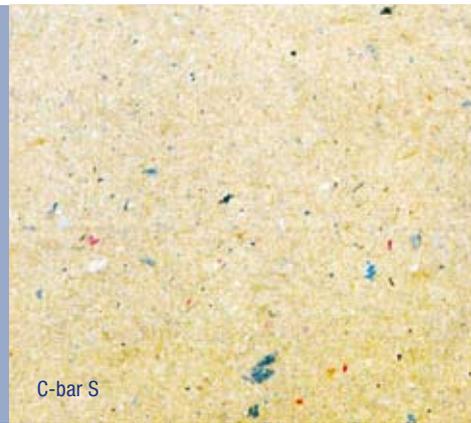
capita consumption of about 4.000 people in Thailand.

The secret to success is the optimized screening mechanism of the two components. The foils allow the MultiFoil rotor to generate adjusted pressure and suction pulses, which thus provide for constant flow properties. Pulsations like those that frequently occur with other types of rotors are kept to a minimum. This significantly reduces power consumption. Thanks to the precise apertures and the special profile design, the

C-bar screen baskets noticeably improve the screening efficiency and product quality. The reduction rate of sticky content increases and the overall fiber loss drops.

### Successful retrofitting of third-party equipment

Voith machines have been adapted for a long time to the high performance requirements of screening systems in paper mills. Since 2000, over 200 non-Voith screens have also been retrofitted with the C-bar tech-



*Converted TLA 450 with MultiFoil rotor and C-bar screen basket.*

*C-bar Q quality advantage: noticeably fewer impurities in the product (sample sheets taken from the second stage of OCC long fiber screening).*

nology and MultiFoil rotor from Voith Paper. These include, among others, the facilities of Chinese paper maker Nine Dragons and Smurfit Kappa based in the city of Zülpich in Germany. Prior to the conversion, Nine Dragons often had to deal with fiber spinning on the rotor and the screen basket. The problem was solved by equipping the pressurized screen with a C-bar screen basket and MultiFoil rotor. Throughput was also increased from 950 to 1.000 m<sup>3</sup> per hour while power consumption was reduced by 30%.

At the Smurfit Kappa mill in Zülpich, there were troubles with fiber spinning on the PM 6, which was remedied by retrofitting the approach flow screen. At the same time, throughput was increased by 10% without any change to the total power consumption. Installing a MultiFoil rotor and C-bar screen basket in the PM 4 in Zülpich also resulted in a production increase. The old screening equipment had run up against a throughput limit, meaning that it was

impossible to increase output. After converting to MultiFoil and C-bar technology, the screen worked outstandingly — even at 20% higher throughput.

**Even better screening results**

The various products of the C-bar series are distinguished from each other by the width of their vertically arranged bars. The more narrow the bar width, the more open screening area is available. In 2007 Voith Paper launched a new narrow bar screen basket design, the C-bar Q, offering 20% more open screening area than the standard bar screen basket.

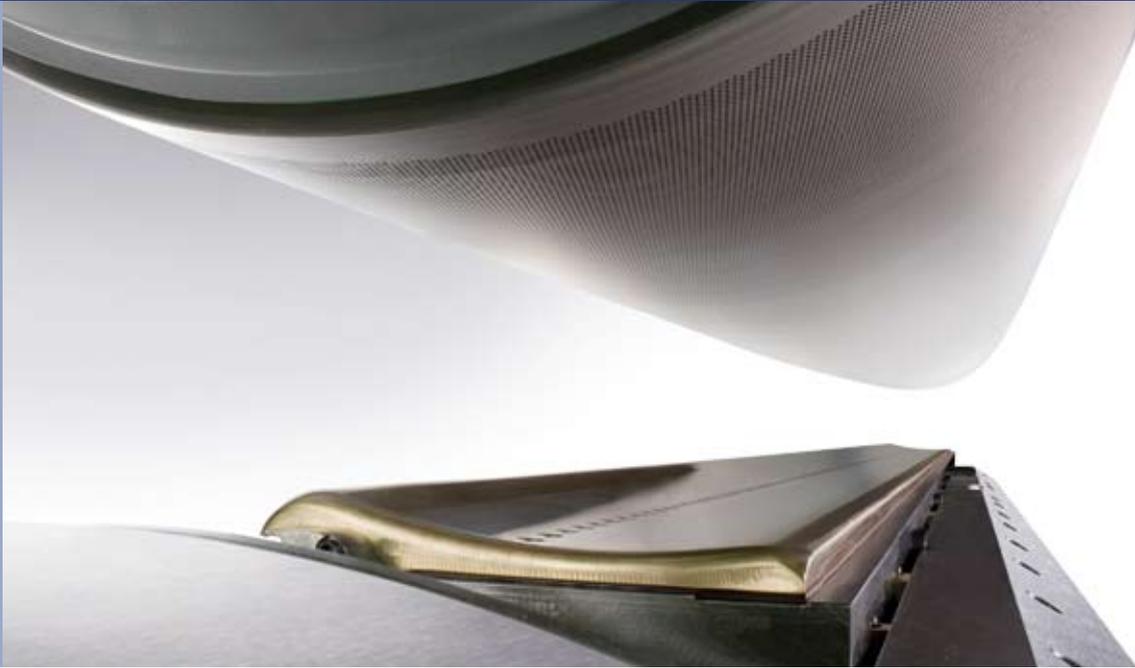
Comparisons made at the Spanish cardboard maker U.I.P.S.A. (Union Industrial Paperlera S.A.) using the new C-bar Q and the standard screen basket C-bar S showed that for the same aperture width it was possible to increase the removal rate of stickies with the C-bar Q by 12%. The reason is a reduction of the slot passing velocity because the same mass of

pulp is distributed across a larger available open screening area. The screening efficiency increases and contains noticeably less foreign substances in the screened stock. If the slot passing velocity is kept constant, the production quantity of the screen can be increased alternatively without compromising the screening quality. As a result, the use of the C-bar Q either improves the screening efficiency or increases production and without any compromise on quality. The Spanish customer of Voith Paper was so convinced by the C-bar Q results that he immediately ordered the same type screen baskets for additional screens.

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Pure high technology – NipcoFlex shoe press.

## NipcoFlex shoe presses and QualiFlex press sleeves for optimal dewatering

# Evolution instead of revolution

**The technology of the closed shoe press has been on the market for over 20 years. Nonetheless, milestones in the efficiency of paper machines are still being achieved with NipcoFlex shoe presses and QualiFlex press sleeves through consistent development.**

The technology of the closed shoe press was already launched in a first application in 1984. The advantages that can be obtained with shoe presses are not only the energy-efficient optimization of a production line. The rise in dry content here leads to a reduction of thermal drying energy, with the additional consumption of electrical drive energy being overcompensated by far. Additional advantages include, e.g., longer felt running times or improved runnability of the production line due to fewer breaks. With gradual introduction of shoe press technology, starting with packaging paper and going through all other paper grades all the way to the shoe calender, over 400 shoe presses

have been successfully brought onto the market so far.

### Undisputed market leadership

The 400th NipcoFlex shoe press was sold by Voith Paper to Tamil Nadu Newsprint and Paper in India. It is part of the new PM 3, which will produce high quality, wood-free writing and printing paper. The PM 3 has a wire width of 6,100 mm and a maximum speed of 1,200 m/min. It will be equipped with a Tandem NipcoFlex press section, in which the enormous dewatering capacity of two NipcoFlex shoe presses is combined with the volume-conserving pressing, completely without the

classic roll nip. The NipcoP counter rolls to the shoe roll are equipped with the new grooved stainless steel cover, G-Flex. In addition, QualiFlex press sleeves are also supplied for the NipcoFlex shoe presses. Voith Paper is the only manufacturer that has shoe press and press sleeve technologies concentrated under one roof; thus, they can be optimally coordinated with one another.

For Tamil Nadu, this is already the fourth shoe press after rebuilds of the PM 1 and PM 2 in 2002. This follow-up order shows the confidence Tamil Nadu has in this proven technology. With a market share of 60%, Voith is the clear market leader in this segment.

**Mini NipcoFlex shoe press**

Depending on the production line size and required output of the shoe press, the construction kit of available module sizes had already been consistently expanded in the past and oriented to market needs. Specifically in rebuild situations with restrictions regarding space requirements or crane capacity, Voith was always in a position to offer the most compact shoe press rolls with the highest power density.

This construction kit is now supplemented by the Mini NipcoFlex press. Here, it's a matter of a new shoe roll size with only 770 mm diameter. Despite this very small diameter, an

enormously high power density was achieved, so that with a sheet width of 4,500 mm a line load of up to 500 kN/m can be attained.

It is significant that all essential components of the NipcoFlex technology, already proven in many instances, such as pressure shoe, press system or hydraulic concept, were also taken over for this new roll size in order to offer maximum reliability.

As an example, the integration of a Mini NipcoFlex press into a multiple-roll press, as was done with the first order for a customer in Italy (Fig. 1), can be cited. The Mini NipcoFlex press is generally an ideal rebuild

solution for small and medium-size machines. As an application example, a press rebuild of a paper machine for production of wood-free paper grades that is 5,000 mm wide (Fig. 2) can be noted. Starting with a roll press with a 120 kN/m line load in the third nip, with which 45% dry content is achieved, the dry content can be increased by 3% to 48% by using a Mini NipcoFlex with a 450 kN/m line load.

In Fig. 3 the energy-related and financial effects for 80 g/m<sup>2</sup> paper at 1,200 m/min are shown. The higher dryness corresponds to a saving of 115 t of steam per day or approx. 72,200 kWh/d less energy. But at the same time only ca. 4,900 kWh/d

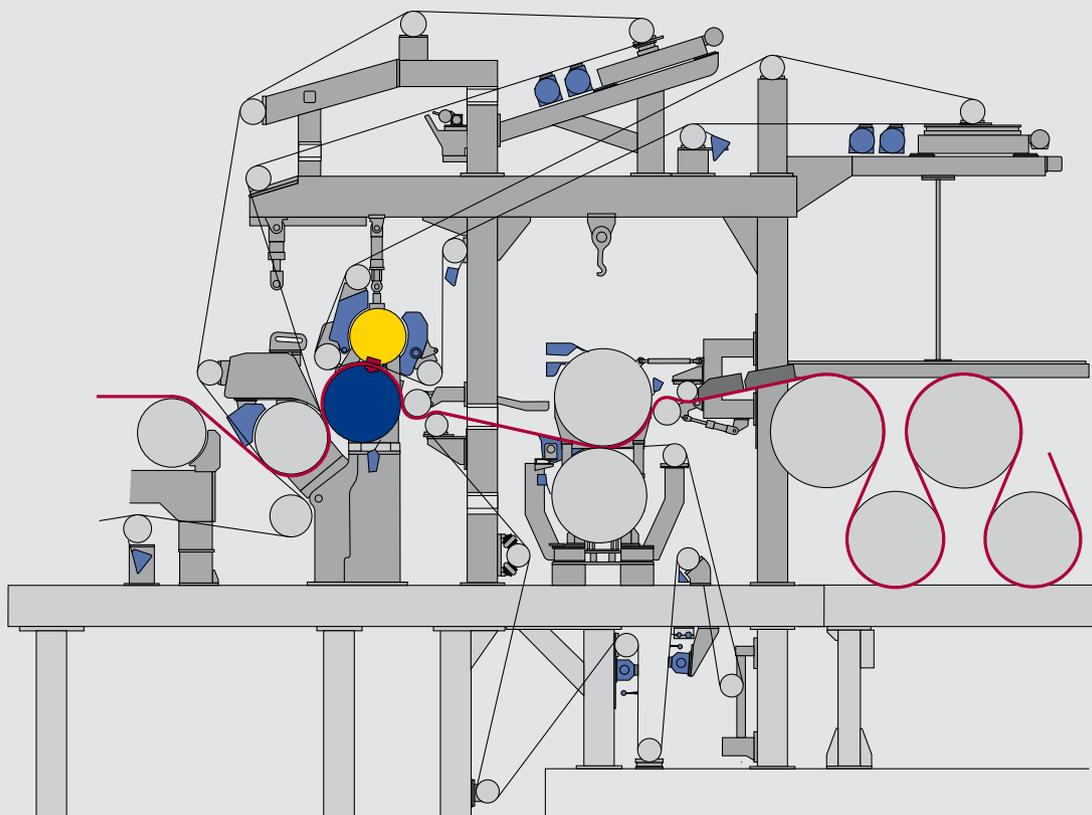


Fig. 1: First Mini NipcoFlex installation (blue and yellow) in Italy.

more electrical energy are required for the drives and hydraulic system. It thus becomes very clear that a shoe press is the ideal way to save large amounts of energy. Even taking into account the fact that a kWh of steam is more cost-effective than electric current, good values result for the ROI. Despite extra expenditure for drive energy or press sleeves the paper manufacturing costs in the selected example can be reduced by almost 900,000 euro per year to a large extent as a result of energy savings. And this does not yet take any account of possible additional production due to increased speed.

**QualiFlex press sleeves**

The performance of a shoe press is also significantly dependent on the performance of the press sleeve used. The essential factors for success here are the right surface selection, with grooved sleeves maximum stability of the land area and an especially wear-resistant

material. Only if all three criteria are met a press sleeve can contribute to lastingly ensure the maximum performance of a production line over the entire life time.

In the development of QualiFlex sleeves, work is continuously done on all three areas. With the introduction of an interrupted groove in the surface portfolio, customer needs can now be addressed in a more individual fashion. Precisely for systems in the transitional range between blind-drilled and grooved sleeves, this can be a way to optimize the dry content without getting problems with water spraying back. With over 100 different possibilities, QualiFlex sleeves thus offer the largest surface variety on the market and allow individual coordination with the requirements.

With optimized polyurethane grades, there has been success in combining the highest abrasion resistance with extremely high stability of the grooved

sleeves' land area under load and the required flexibility for use in shoe presses. The result is a void volume in the nip that is up to 20% higher. This is the basic precondition for efficient dewatering with the highest line loads. With the same nominal groove geometry in comparison to competitors, it can contribute to increased and at the same time long-lasting dewatering and improved dry content values.

This can be clarified on the basis of practical experiences clearly showing that the dewatering remains constant over the long running time. This is reflected toward the end of a sleeve period with demonstrably up to 1% more dry content.

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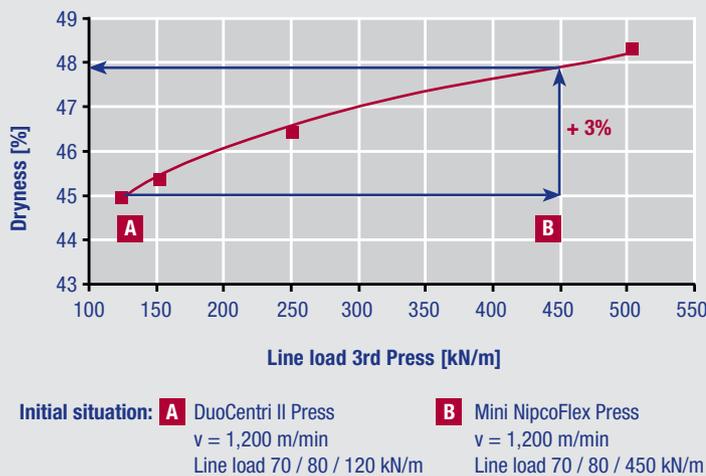
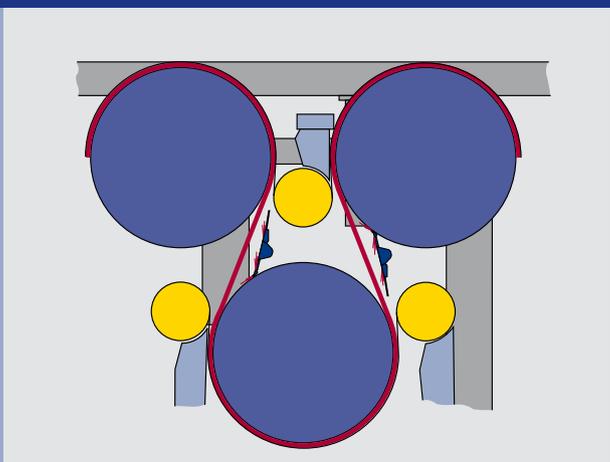
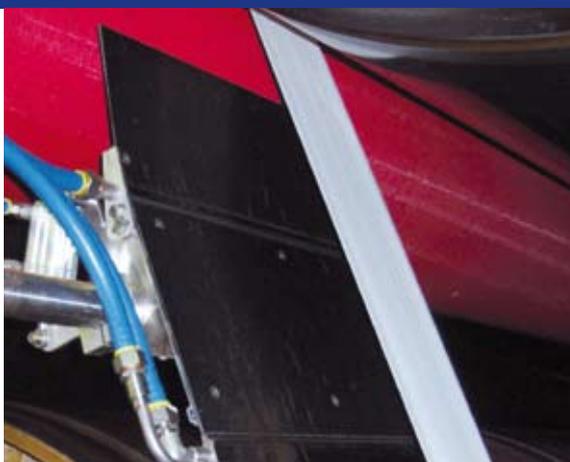


Fig. 2: Up to 3% increase in dry matter content possible.

Energy and financial effects for wood-free paper (80 g/m<sup>2</sup>) and a working width of 5,000 mm (nearly 200 in):

	Today	Mini NipcoFlex
<b>Speed</b>	1,200 m/min	1,200 m/min
<b>Line load</b>	70 / 80 / 120 kN/m	70 / 80 / 450 kN/m
<b>Dryness</b>	45%	48%
<b>Steam consumption</b>		- 115 t/day - 72,200 kWh/day
<b>Electrical drive</b>		+ 4,900 kWh/day
<b>Sum</b>		- 881,900 €/year

Fig. 3: Through use of the Mini NipcoFlex press, 881,900 euro can be saved annually.



*The TailBlade system shortens the threading time and increases threading reliability substantially.*

Market leadership with ropeless transfer systems strengthened further

## Reliable tail transfer with the TailBlade system

**A cooperation agreement was concluded at the beginning of the year with the Finnish company, Runtech Systems. It has to do with ropeless tail transfer for double-tier dryer sections. The TailBlade transfer system provides for reliable and fast threading.**

The Voith Paper system for ropeless tail transfer that has been successfully used for over 15 years was further developed with the company Runtech Systems and thus ensures market leadership in the coming years.

### Functioning of TailBlade system

Just like the previous threading system, the new system works with blowing nozzles in order to be able to transport the sheet tail safely from dryer cylinder to dryer cylinder. Mini-doctors made of carbon fibers are installed on the top and bottom cylinders. These TailBlade units are moveably mounted so that they can be attached to the dryer cylinder during the tail threading. The core of the TailBlade transfer system consists of a carbon blade of the doctor, which is designed as an air nozzle and separated into two air chambers. The first

nozzle blows in the direction of the dryer cylinder. There it lifts the sheet tail from the dryer and creates an air cushion.

The second nozzle blows in the direction the paper is running; it accelerates the paper tail and fixes it crosswise to the machine direction by means of the suction effect at the TailBlade. The upper air nozzles in the guide element likewise blow in the direction of the sheet run and thus support a stable paper run with minimal shreds.

Variable designs of the TailBlade provide for safe and fast transfer even with narrow space conditions, such as at group gaps or at already installed machine-wide doctors. The flexibility of the application is additionally shown by the possibility of upgrading the previous blow-air threading system.

### Advantages of TailBlade

Top priority during the development was given to low sensitivity to process fluctuations such as grade changes and speed changes. After a web break or restart of a paper machine, the TailBlade system shortens the threading time and increases threading reliability substantially. The paper web can be run wide earlier and the full production starts up again quickly. In addition, the maintenance costs are noticeably lowered and operational safety at the paper machine is increased.

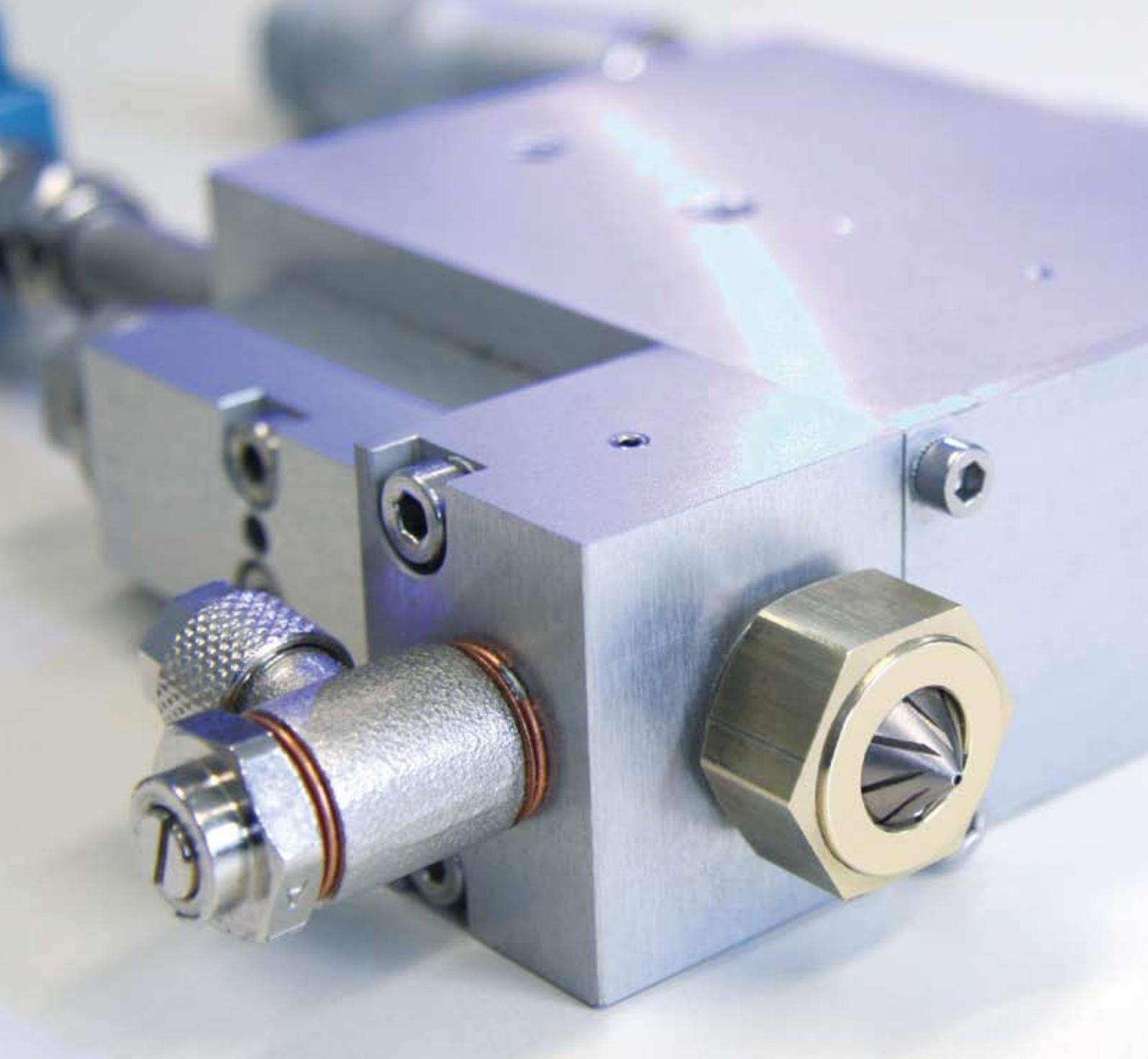
### Contact



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Cascades bet on hot melt for winder

## Gecko start and end gluing that inspires



*Fig. 1: The application unit – the heart of the Gecko.*



**The operators of winders know about the significance of start and end gluing. However, until now some wishes remained unsettled. The new Gecko system from Voith does away with the previous disadvantages. Quality and productivity increase noticeably and, in addition, the costs of consumables can be lowered. The Gecko is the perfect conversion solution for all existing winders.**

Start and end gluing is an important step within the winding process. If the gluing process does not proceed optimally, bothersome production interruptions and badly glued spots are the results. The former lowers the productivity of the winder and the latter causes problems in subsequent processing such as packing and transporting of the finished rolls.

**Basis**

Until now, you could fall back on two alternative methods for start and end gluing. Either cold glue is applied to the paper web or adhesive strips are attached. These hitherto known methods often do not satisfactorily perform the task of gluing.

With cold gluing, the elaborate cleaning of the applicator nozzles and tray, the dispensing of dripping water into the slitter section or into the maintenance area and incorrectly adhering cold glue hamper the smooth production flow. Once the gluing process is interrupted, it can no longer be properly completed. In that case, the process must be carried out by hand. Unplanned machine standstills and additional personnel expenses are the result. If adhesive strips are used, complications can result due to cutter and surface dust, along with the high costs for consumables and the time-intensive changeover process.

**Our solution**

The new “Gecko” start and end gluing is the first choice when it’s a matter of replacing existing gluing equipment. The new hot melt system not only does away with the difficulties during the production process described above but also guarantees a durable and resilient adhesion.

Voith’s Gecko has a strong and reliable hold – just like its little green namesake. But in contrast to the living version, the system works in contactless fashion. With several applicator nozzles, it sprays hot melt precisely onto the paper or board web from below.

In collaboration with eight adhesive manufacturers, 30 adhesives were examined on the way to the best possible gluing result. The Power Tack M700 adhesive, which is particularly distinguished by its adhesive strength and cure time, was developed especially for use with the Gecko.

**Field report: Cascades**

After development of the new start and end gluing, a customer was quickly found who wanted to test the Gecko under production conditions. Voith found a competent partner in

**Infobox**

**Advantages of the new hot melt system**

**Gecko:**

- High process reliability
- Suitable for all paper grades
- Strong and long lasting adhesion
- No limitations in gluing-, web-, and set change speeds
- Easy maintenance
- Low operating costs with low glue consumption
- Circulation principle avoids clotting or hardening of the glue
- Approved for indirect contact in food processing

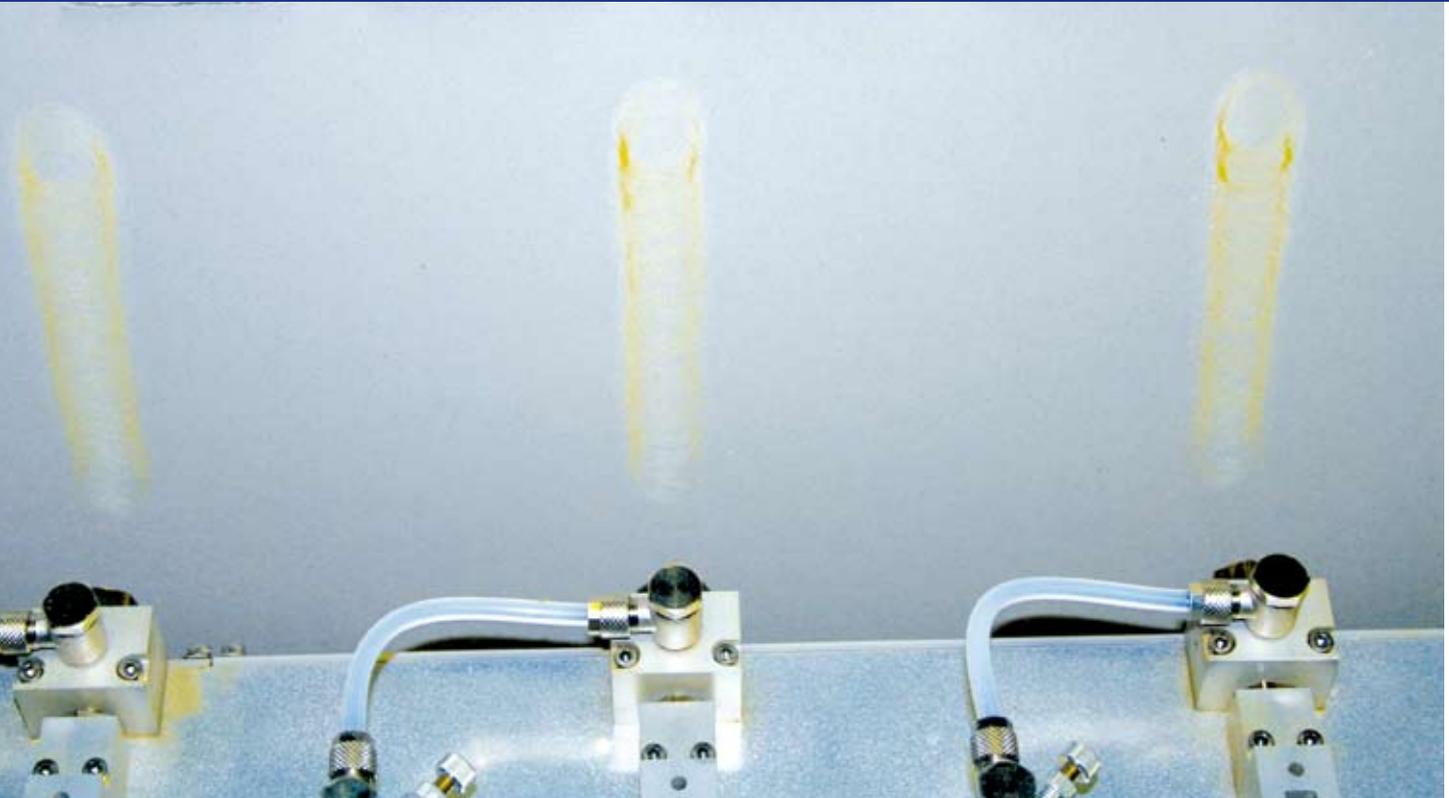


Fig. 2: Sizing using spin-spray process.

Cascades at Arnsberg, Germany, where coated folding box board between 180 and 450 g/m<sup>2</sup> is produced.

The challenge for every retrofitting and every subsequent installation in an existing system is to carry out the task in the shortest possible time. Best of all, during a planned standstill.

After two days of on-site preparatory work, commissioning took place in Arnsberg within only six hours in November 2006. This lightning-fast conversion is possible since the Gecko is set-up and completely tested before delivery. The Gecko has been working now for more than two years without malfunction or maintenance worth mentioning.

The goals of the conversion sought by Cascades

- reduction in the high running costs of consumables (adhesive strips)
- reliable start and end gluing of the rolls
- reduction of dead times for the winder (increase in productivity) were all achieved to the full satisfaction of the customer.

Since November 2006, the hot melt system was successfully put into operation on four other winders in Europe.

**Contact**



**Johann-Günter Grill**  
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**Customer Comment**



**Manfred Stemmer,**  
Managing Director,  
Cascades Arnsberg  
GmbH

“We were the first ones who retrofitted a winder onto the new roll start and end gluing system from Voith Paper. The collaboration was excellent. Despite a tight schedule, all deadlines were met by Voith “to the minute.” When we had questions, there was always a contact person available who promptly gave exhaustive information. After several months running time, one can say that it was a smooth project without start-up problems. To end with a play on words: “Voith’s start and end gluing – perfect from start to finish!”

New approach in doctor blade technology

# The perfect harmonization of doctor blade and roll cover

**Roll, cover and doctor blade must become an unbeatable trio. To achieve this, modern doctoring analysis methods, a unique doctor service and constant innovations in doctor blade technology are all necessary. Efficiency and runnability of a paper machine can only be increased considering these factors.**

Thorough analyses of the doctoring are necessary to identify existing weak points. In a complex doctor audit, each machine section is investigated and analyzed.

A doctor audit contains:

- Optical check and evaluation of function of cover and blade
- Check of lubrication in operation
- Measurements of blade angles on worn and new doctor blades
- Check of doctor efficiency and doctoring system
  - load
  - oscillation
  - check of drive and bearing
- Investigations and evaluations of doctor profile in the lab
- Measurements of run-in doctor angles with micro-section and microscope
- Profound report including summary and suggestions

The results gained in an audit are evaluated and analyzed with state-of-the-art methods of modern R&D

*Voith Paper Rolls service expert changing a blade.*



techniques. In addition to the investigation results, on-site inspection of the doctor blades are subject to profound analysis in the Voith Paper labs. Technical and application know-how is incorporated into the constant monitoring of the doctor situation, which is important for the successful performance of roll covers. Both components have to be synchronized to achieve maximum efficiency. Detailed knowledge about covers and doctor blades are of utmost importance and both are combined within Voith Paper. The harmonization has proven to be very successful. Permanent cooperation between production, application service and R&D are the motor for innovations, developments and effective applications of SkyLine doctor blades.

*SkyLine team in expert talk (from left to right) Christoph Scherz (Production), Rene Zottler (Application service), Alexander Etschmaier (R&D).*



**Success Stories**

**LWC machine in Austria:**

The doctoring situation was investigated and analyzed as described above. The operation conditions were optimized by the specialists from Voith Paper Rolls. With the perfect doctor blade quality, the cleaning and conditioning of the cover surface was significantly improved. The lifetime of the blades could be increased; deposits between take-off and cleaning position were reduced.

**Kraft paper machine in Bulgaria:**

Based on the results of a detailed analysis of the press section, the doctoring situation on the TopRock

cover was optimized. The fiber-composite blades (SkyComp 60) reached a lifetime of 45 days; former blades reached only 15 days.

These results can only be achieved when roll covers and doctor blades are constantly working together.

**Joint development of roll covers and doctor blades**

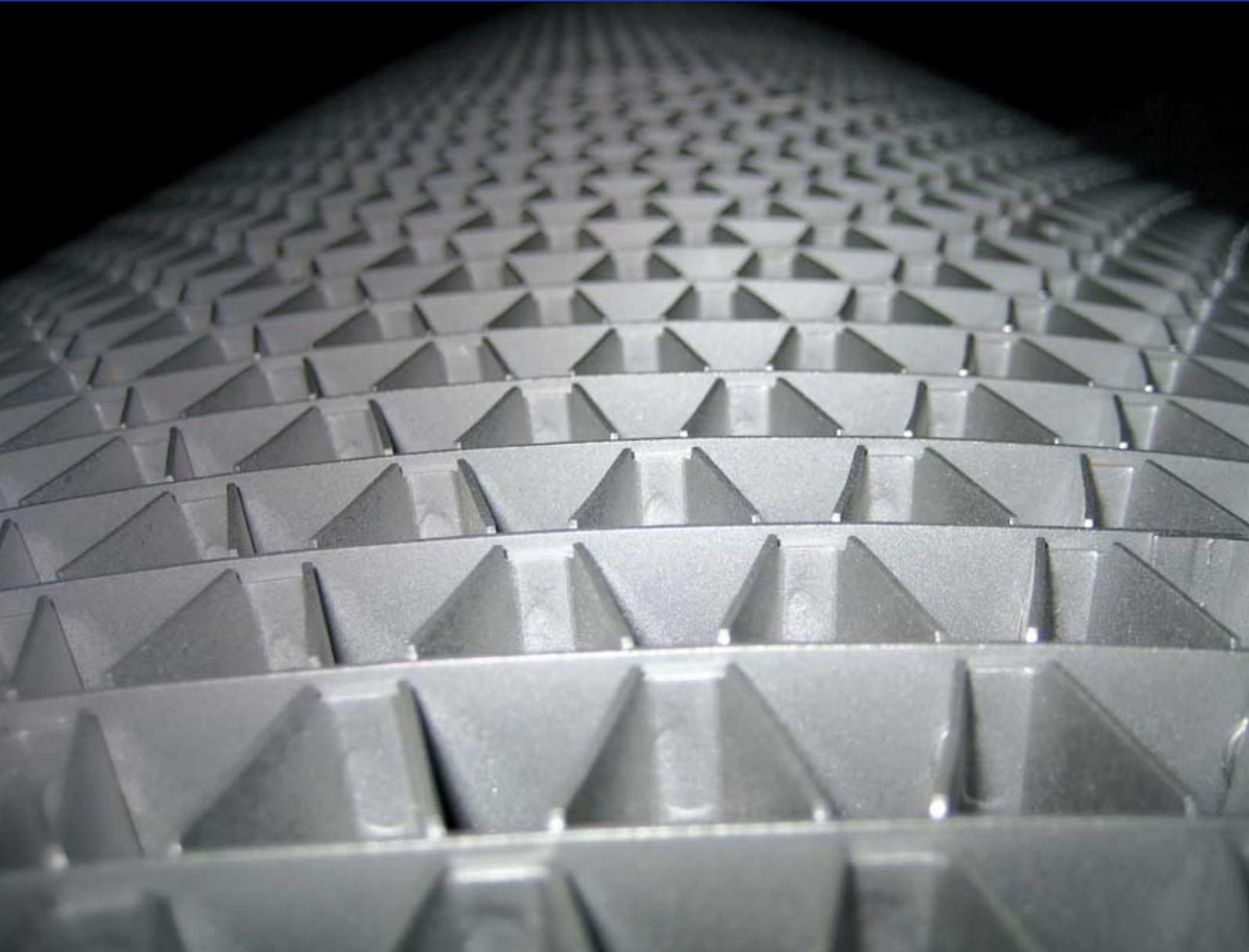
The latest innovation in thermal coatings, TerraSpeed, was the basis for the development of thermal coated doctor blades, which can be applied in both cleaning and take-off position. State-of-the-art manufacturing technologies were implemented for the production of thermal coated steel doctors and coater blades. Besides the high quality coating, the grinding procedure for coater blades is of high importance for the product. Very narrow tolerances must be observed. Tailored bevel geometries can be applied to the coater blades (SkyCoat), on special machines in only one production step.

First successes were achieved on a board machine. The intense cleaning of the TerraSpeed coating and the never achieved lifetime of the SkyTerra doctor blade proved the approach of harmonizing roll cover and doctor blade to be right.

**Contact**



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*View of a honeycomb structure.*

**Top-level precision**

## **Rolls – rolling round the clock**

**As paper machines are increasingly becoming larger, wider and faster, it is essential for the rolls to keep up with this development. Qualified staff, state-of-the-art technologies and advanced manufacturing processes are extremely important and a prerequisite to achieve this goal.**

Every day, over 110 people are busy manufacturing rolls and contributing their experience. Many of them have been working in manufacturing for decades and have deep knowledge

around paper machine rolls. The machinery in the manufacturing hall are up to 18 m long, yet these machines are aligned for straightness tolerance of less than 0.04 mm

deviation. As the material used for manufacturing rolls changes and moves during machining, it poses a great challenge to both man and machine. Almost every roll is unique

and specially tailored to the needs of the paper machine for which it is intended. Length, diameter, weight and load data are exactly calculated and defined before production begins.

**Tibo**

In 1999, the first gun-drilling machine (Tibo 1) was installed in St. Pölten, Austria, for producing suction rolls. Tibo 2, the bigger brother to this proven machine, was installed to handle the increasing number of suction rolls. Almost 200 spindles simultaneously drill the suction holes into the duplex stainless steel. The Tibo 1 and Tibo 2 are the most advanced suction roll drilling machines in the world. For example, a continuous vibration monitoring system is used to detect drill wear and vibration in order to minimize and avoid breakage of drill bits. Up until now, Tibo 1 and Tibo 2 have drilled more than

140,000,000 holes. Placing all holes one after the other in a straight line would result in a length of more than 7,000 km, which equals the distance from New York to Budapest!

**New welding robot**

This year, a welding robot was acquired to assist the personnel in plasma jet welding operations. The welding robot achieves an extremely high accuracy, which is essential for stainless build-up welding of suction roll heads. A very high, but very short energy input leads to minimum mixing while resulting in excellent bonding to the parent material.

**Honeycomb structure**

Apart from that, honeycomb structures for forming rolls and dandy rolls are also manufactured. Spot-welding with an amperage of up to 5,000 A

produces a very light, yet very sturdy structure. Since the electrical resistance changes as the honeycomb is built, a special CNC system is used to monitor and adjust the welding parameters to stay within precise tolerances.

Consistent high quality and precision are important. The Austrian roll factory is certified according to ISO 9001/2000. This is how Voith keeps pace with the constant advancing development of paper machines.

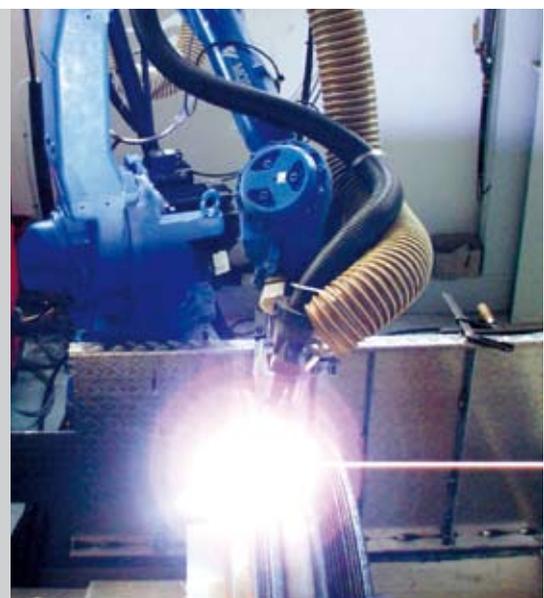
**Contact**



**Thomas Hackl**  
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*Made to measure: Suction holes are drilled into the duplex steel by spindles.*



*Welding robot for plasma welding.*



*MultiForm HC and DuoFormer Base perfectly fit together.*

Forming fabric MultiForm HC, the new standard for demanding positions

## Producing Board and Packaging on a new level

**The new H-Series product line would not have been complete without the HC design range. MultiForm HC is a coarse SSB weft bound design, featuring high dewatering capacity, low marking and predictable life, fitting today's application requirements for coarse forming fabric demanding board and packaging positions.**

The MultiForm HC is the coarsest member out of the recently developed H-Series. This design is especially created to fit Voith Paper's DuoFormer Base bottom positions. In addition, the MultiForm HC has a much wider field of application. It is suited for the production of middle or filler ply of multi-board and under ply of white top liner, test liner, kraft liner and grey board.

### Forming fabric requirements

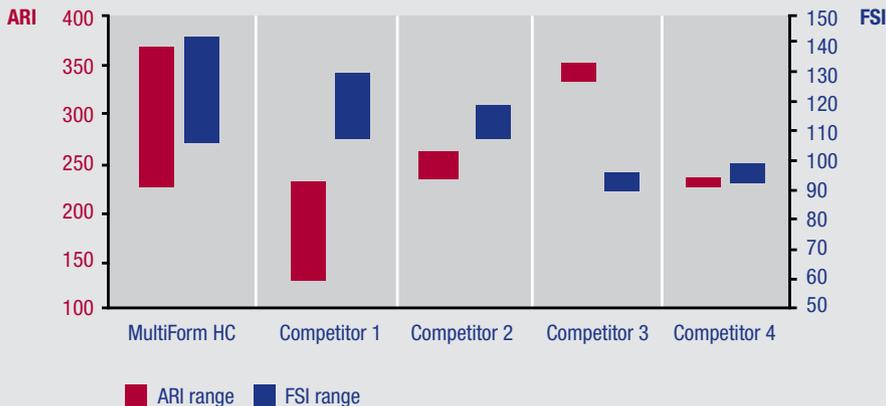
Typically, forming fabric requirements in relation to the above mentioned application fields are high dewatering capacity, good retention, homogenous

formation, low marking, high strength values, clean running and predictable life.

High forming fabric dewatering capacity is required as often raw material with high SR values are applied or in gap-former technology huge amounts of water need to be removed in a short time span. At the same time, high mechanical retention without the use of chemical additives is preferred, even when dewatering takes place under aggressive circumstances. The forming fabric needs to be stiff and stable, but at the same time be able to pass on counter blade

activity, to obtain a good profile and a homogeneously formed sheet. For example, in the case of multiply board, this might also enable a reduction of under-top and top layer grammages. Additionally, it is beneficial not only to get high amounts of fines on the surface to get high surface strength, but also high ply bonds between sheets.

From the point of view of machine productivity, clean running is a very important issue. Flat forming fabric edges, low water spraying and fiber bleeding or fiber carrying will keep the machine environment clean and



FSI (Fiber Support Index) and ARI (Abrasions Index) in comparison.

reduce the risk of breaks. Good and predictable running times enable long production runs, shorter and less machine stops.

### MultiForm HC Development

MultiForm HC has been developed to address all of the mentioned points. Additionally, taken into account have been the potential decrease in raw material quality and higher quality demand of the customers of board and packaging producers. A further objective is the desire to save costs by producing lighter grades with the same strength properties. The outcome is the SSB technology-based MultiForm HC (SSB = Sheet Support Binder), combining, for example, a high Fiber Support Index of 142 and an Abrasion Index of 330 within one product. In comparison, out in the market there are hardly any products within this segment even reaching one of these two numbers!

### Test runs at VPM 5 in Ravensburg

MultiForm HC has been thoroughly examined on VPM 5, Ravensburg, Ger-

many, our DuoFormer Base trial machine. This way, new forming concepts can be tested in a non-production environment and later be transferred, at low risk, to real production machines. Trial runs with MultiForm HC were made in comparison with MultiForm V – a warp bound SSB design, and MultiForm A – a high shed Extra Weft Added design. The new MultiForm HC showed higher initial dewatering, higher mechanical retention, lower marking and smoother surfaces. Furthermore, the MultiForm HC ran very clean.

### Field results

Runs on production machines confirm the test results. In general, improved formation is reported as well as lowered retention aid consumption. At Julius Schulte Söhne PM 3, Germany, the production of core board was clearly improved by upgrading from a triple weft fabric to MultiForm HC. The customer reported that he was able to increase machine speed and production output as well as improving the relevant paper parameters and the dewatering capacity. Fabric life was 110 days, about 15% more than previously

achieved. In Asia, MultiForm HC was on the gap-former at a record start-up, producing the first paper at a speed of 1210 m/min. According to the customer, the target dry content and sheet quality were achieved. Based on the apparent features, MultiForm HC is the new standard for coarse forming fabric demanding positions in board and packaging. Feedback from customers of different countries is very positive, showing a bright future for MultiForm HC.

### Infobox

**Julius Schulte Söhne PM 3, Germany**  
 Paper grade: Coreboard, Speciality paper /  
 Cardboard packaging  
 Basis weight: 140- 650 g/m<sup>2</sup>  
 Former: Fourdrinier with top dewatering unit

### Customer Comment



**Dirk Nidel**  
 Production Manager at  
 Julius Schulte Söhne

“We have established that MultiForm HC can be used for the whole range of our products. Increase in machine speed and production were two results we were able to achieve, moreover paper quality improved. MultiForm HC has become standard on PM 3 and now, more recently, also on our PM 2.”

### Contact



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Convenient upgrade option

# To a new S7 controller without production loss



**A new control system in five steps**

1. Removal of existing CPU
2. Installation of new "OnC VeriCheck57" module
3. Reading of S5 and S7 programs
4. Mixed operation with synchronization of both programs
5. Activation of S7 program

The hardware components can be subsequently replaced at any time.



**If a product is phased out, it's time to look around as quickly as possible for something new. It is good if the alternative also brings additional benefits: OnC VeriCheck57 allows graduated-cost modernization of existing S5 controllers without additional standstill.**

After production of the SIMATIC S5 program, which is common in the paper and pulp industry as a controller, is gradually phased out by the manufacturer, the product will no longer be available from 2015 at the latest. In order to make the conversion of existing S5 controllers to the S7 successor version as simple as possible, Voith Paper Automation has developed a solution with OnC VeriCheck57 that is adapted to the needs of customers.

**Quick, safe, gradual**

OnC VeriCheck57 offers a gradual migration of SIMATIC S5 to S7. In the process, the existing CPU (central processing unit) is first replaced with a new, more high-performance V57 assembly from Voith. In the next step, in addition to the existing S5 the S7 program is also read in, so that both run parallel in combined operation. Control of the connected hardware, such as valves, is still done at this time via S5, but all input and

output signals are also simultaneously processed by S7. This allows a detailed alignment of both programs that is automatically recorded and evaluated.

As soon as there are no longer any irregularities between S5 and S7 and both work in completely congruent fashion, one can switch over to S7 during a planned shutdown. This verification of the software offers the highest possible reliability during migration. In addition, a modernization of the S5 controller becomes possible without production loss.

**Keeping costs under control**

One of the most important advantages of modernization by means of OnC VeriCheck57 is the separation of hardware and software conversion. In contrast to other approaches, with this solution only the CPU is replaced and the rest of the hardware components such as I/O cards and PCs can continue to be used. Through this

gradual conversion, the costs are staggered and the investment remains straightforward. The extent of the modernization is individually arranged with the customer. In addition, due to the software verification a FAT (factory acceptance test) becomes unnecessary, saving both time and costs.

**Infobox SIMATIC S5/S7**

The SIMATIC S5 was launched on the market in 1979 and is among the programmable logic controllers (PLCs). It is for controlling process and machine functions. The program is stored on a processor, the so-called CPU (central processing unit).

After production of the S5 is stopped, an upgrade to the SIMATIC S7 successor version will be necessary to ensure the availability of replacement parts and support by service personnel.

**Contact**



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Energy audits reveal savings potential

## Papermaking under close “energy-scrutiny”

In recent years the costs for oil, gas and electrical power have increased at breakneck speed. One of the biggest challenges in papermaking is therefore to reduce energy consumption, so as to ensure cost-efficient production. An energy audit carried out by Voith Paper provides an analysis of the energy consumption in paper production. It then identifies where in the production process energy can be specifically saved and/or better utilized.

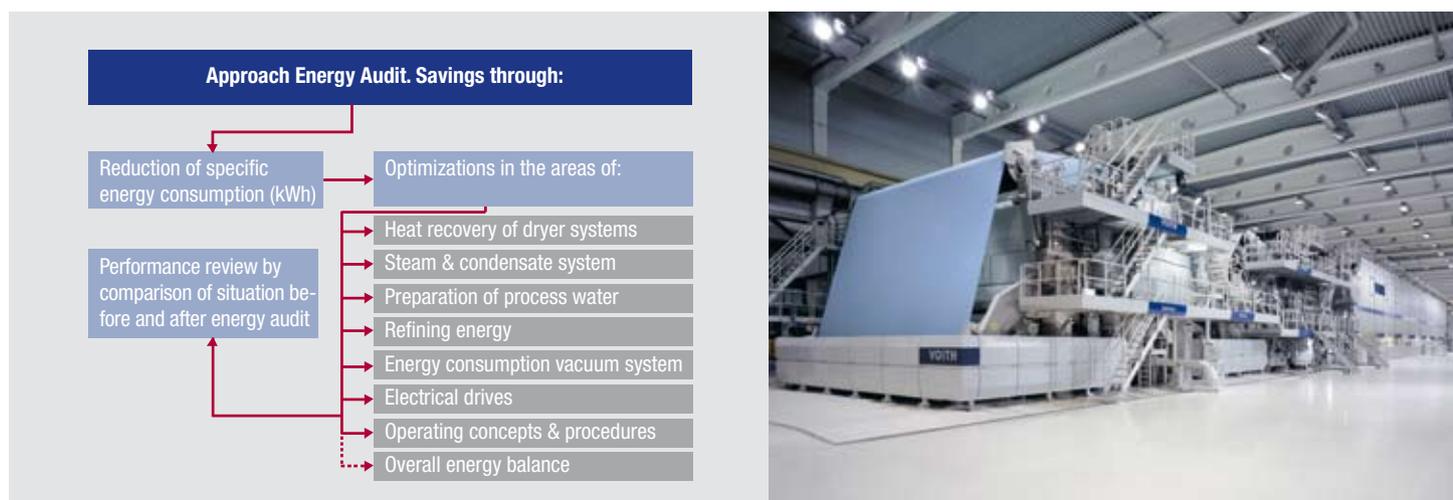


Fig. 1: Process focused on mass consumers.

The Voith process and product engineers are familiar with every step of the papermaking process as well as the latest products and solutions for saving energy effectively. They work closely with the customer to determine the best solutions for the respective situation.

Using state-of-the-art measuring technology the papermaking process is examined on site. The focus is not just on saving energy, but also on evaluating the locations where there is potential for energy recovery or energy production. The customer decides which area of the paper production process

is to be investigated. The energy audit with Voith Paper results in specific solution proposals with detailed cost analysis for each individual situation.

### Energy audit process

The energy-saving potential in the paper production is investigated and confirmed in three phases:

#### First phase: potential analysis

First, the current process data of large-scale consumers is looked at with the customer. The benchmark leads to selecting the key focal areas

which are to be investigated in detail in phase two. The dryer including the hood could be examined, for example. After all, the dryer is responsible for 50% of the energy used in paper production. Or, the actual consumption of the paper machine drive could be examined.

#### Second phase: detailed analysis

In this phase of the energy audit, Voith Paper's process engineers calculate, compile and evaluate the measured data. How much energy is consumed in total? Which measured data are particularly conspicuous?

The data from the customer's paper mill is compared with various parameters: the usual standards, the standards of Voith Paper products and future options. Specific solution proposals to save, recover or produce energy in the production process are now worked on. A detailed report is sent to the customer just a few weeks after the on-site analysis. This report contains:

- A summary of the energy audit
- Tables with all measuring results
- Detailed analysis of the data
- Comparative studies
- Solutions, options
- Voith Paper's recommendations prioritized according to feasibility and economic viability.

**Third phase:  
Offer and implementation**

The most cost-effective solutions that were worked out in phase two (detail study) form the basis for an engineering offer to the customers. Once the

customer has decided for a go, Voith Paper experts perform the engineering and implement the solutions. Efficiency monitoring confirms the economic viability of energy savings.

**Case study of an energy audit**

What form does an energy audit take in practice? Using an example, the individual steps will be shown in detail. In consultation with customer the air handling system on two paper machines with the associated steam and condensate system and hot water cycle (paper machine B only) have been determined as the area to be audited. Measurements were recorded and the existing processes were investigated and analyzed from the point of view of feasibility, the necessary investment cost and economic efficiency.

**Paper machine A**

Output: 130,000 t/a  
Product: Newsprint  
Main basis weight: 45 g/m<sup>2</sup>

Raw material: Recovered paper, TMP  
Sheet width at reel: 5,300 mm

The evaluation of measured data and process data on paper machine A led to the following results for the air handling system:

- One option achievable in the short term is to save steam by making modifications in the steam and condensate system of the production hall heating.
- There is no economically attractive modification possible in the area of the heat recovery system expanded in 1994.

**Paper machine B**

Output: 190,000 t/a  
Product: LWC and newsprint  
Main basis weight: 57 g/m<sup>2</sup>  
Raw material: Recovered paper, TMP  
Sheet width at reel: 5,400 mm

At paper machine B the air handling system, production hall air condition-

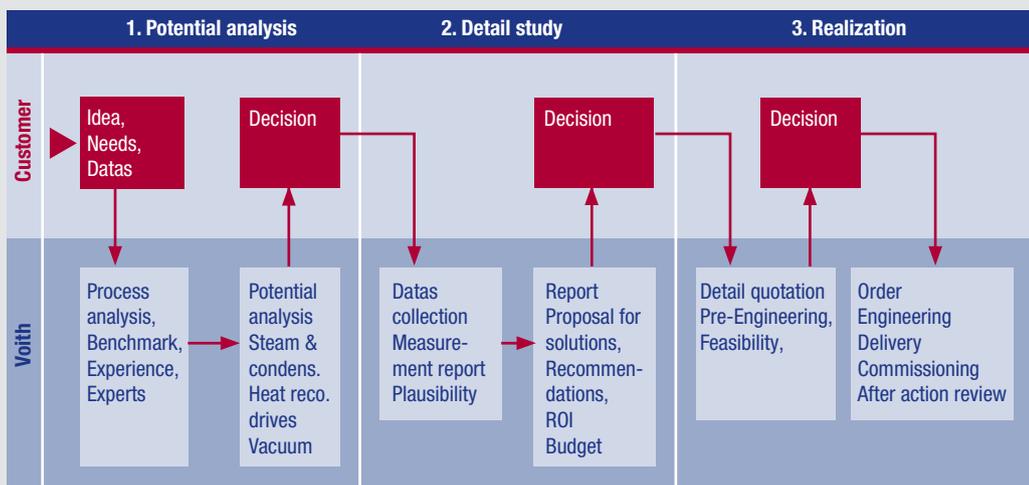


Fig. 2: Energy audit phases 1-3: step-by-step to an individual solution.

ing and hot water cycle were examined thoroughly. The measurements and process data show that energy savings can be implemented economically for the air handling system and also the hall ventilation.

**The following solution proposals were formulated:**

**Air handling system**

- Operating mode with lower hood intake air temperature
- Savings of energy through expanding the heat recovery systems and integrating a waste water heat recovery process.

**Hall ventilation / air conditioning**

- Optimizing the operating mode through optimum use of the heat recovery energy from the hall air conditioning system thanks to Voith EOS (Energy Optimization System), resulting in a ROI in less than a year (details Fig. 3).

As a follow-up contract to the completed energy audit, detailed engineering – including quotation for the conversion of the heat recovery systems, ducts system and integration of waste water heat recovery in the process water cycle – was carried out for the air handling system. Here, too, a ROI of less than 1.5 years could be shown. Voith Paper energy audits produce the following results:

- Solutions for sustainable energy savings
- Unlock hidden potential
- Amortization period usually < 1 year
- Complete customer satisfaction

Many references confirm these results.

**Contact**



**Raimund Rembeck**  
 raimund.rembeck@voith.com

**Infobox**

The following sub-systems may be part of an energy audit:

- Hood and air handling system
  - Dew point measurement and hood balance
  - Air flows, humidity, air temperature
  - Insulation, leak and corrosion tests
  - Operating window for fan
- Drying cylinder
  - Cross profiles and heating curves
  - Siphons
  - Evaporation calculations
- Steam and condensate system
  - Review of concept
  - Assessing components (valves, pumps, separators, pipe routing etc.)
  - Actual values and operating window
  - Evaluation of operating point
- Heat recovery
  - Balance
  - Checking heat exchanger capacity
  - Calculating maximum load and economic load
- Hall ventilation
  - Balance
  - Air volumes, temperatures
  - Testing hot water cycle
- Process water treatment
- Energy for refiners
- Energy consumption vacuum system
- Electrical drives

**Results of case study Paper machine B**

Investment energy audit Saving optimization controls machine related air systems	ROI = 0,3 a
Investment Energy Optimization System (EOS) Saving optimization controls hall ventilation	ROI = 0,5 a
Investment alternative hood exhaust air 3 Saving inclusive wastewater treatment plant	ROI = 1,4 a
Investment alternative hood exhaust air 1&2 Saving inclusive wastewater treatment plant	ROI = 1,3 a
<b>Σ Required investments</b>	<b>ROI = 0,9 a</b>
<b>Σ Saving potential</b>	



Fig. 3: Amortization period < 1 year for a high degree of customer satisfaction.

Fig. 4: Solutions for sustainable energy savings.



*The virtual winder is a functional and graphic computer model which is connected with the real control system.*

The virtual winder facilitates the real work in reality

## Training simulator used successfully

**Steep start-up curves with new machines mean hard cash for the operating company. Of course, the operating team can only achieve such picture-perfect starts when it is familiar with the machine from the outset. The Voith training simulator now sees to that for the first time. All technical workflows can be already run through in advance independently of the real system.**

In contrast to the paper machine that continuously produces with constant speed, a winder works discontinuously. The parent roll is accelerated to operating speed and decelerated in sufficient time before reaching the finished roll diameter. The cut finished rolls are end-glued and discharged. A new core set is supplied and the start glue is applied. The next operational cycle begins. After approx. 5 wound sets the parent reel is unwound. The empty reel spool is lifted

out and the next parent reel is inserted. The beginning of the paper web must be brought to the inserted core set. Depending on the machine type, this is done manually or automatically. With a modern winder, practically all processes can be automated. This increases not only productivity but also work safety. But the multitude of automatic movement courses also involves high control complexity. Movements are carried out pneumatically, hydraulically and

electrically. The PLC (programmable logic controller) coordinates all technical workflows. Precision and dynamics of the drives are the decisive precondition for the productivity of the machine and for the quality of the cut rolls.

### The reality

In the ideal case, a fully automatic winder cuts one roll set after the other without intervention of the operator. But in



reality, malfunctions in the process workflow are unavoidable. Paper is a sensitive product. Initial tears, breaks, holes, imperfections or contamination by the glue lead to technologically contingent malfunctions. Damaged or displaced sensors and actuators are causes for technical interruptions in the automatic system cycle. The winder is no easy challenge for the operator. The complex workflows are secured against one another in a complex manner. The number of inputs and outputs processed in the software are even larger than in the case of a paper machine. At the same time, 80% of the programmed functions are necessary to cover the numerous special cases after a malfunction and to get back into automatic mode. A multitude of screen pages are available to the operator on the operator monitors and terminals, so that he/she can configure the automatic mode

and diagnose malfunctions. For safety reasons, many areas of the machine are fenced in and not directly visible to the operator. The comprehensive diagnostic functions and locking displays are important aids for the operator in order to ensure smooth operation of the machine.

In order to prepare oneself for the demanding tasks, nowadays usually only the real machine is available. With on-the-job training, the necessary moves are learned and experience is acquired. Paradoxically, this lasts all the longer the more the machine works without malfunctions. Training in eliminating malfunctions is best done when practically solving problems. But how should this accumulation of faulty automatic workflows be achieved in reality, and who wants to do it anyhow? The virtual winder is a genuine alternative here. Based on so-called hardware-in-the-loop simulation in connection with animated 3-D design graphics, it is a perfect training simulator.

### The training simulator

The initial basis is a functional computer model of the winder. This program simulates the entire sensor and actuator system in functionality and dynamics. Connected to the simulation PC are the PLC, the operator workstation and the terminals. The original software of the machine is installed on these devices. No software adaptations for the simulation workflow are undertaken. This ensures that the virtual winder behaves exactly like its real counterpart, down to the very last detail. The 3-D design data is the basis for visualization of the technical workflows. This data

is prepared with a special program and converted to the VRML format. Afterward, courses of movement can be defined. The simulation program activates the animations. Camera positions integrated into the graphics allow viewing of all courses of movement. The zoom function can enlarge every detail.

With the simulator, the entire process workflow of a winder can be represented in real time, in slow motion or in time lapse. Error situations and malfunctions can be activated and repeated as often as needed. And the best thing is: nothing really breaks down and the bothersome cleaning up after a web break is easily taken care of with the press of a button.

### Summary

The virtual winder is a functional and graphic computer model that is connected to the real controller. A training simulator is thus available to the operator with which all technical workflows can be run through. The use of the original design data and the original controller ensure that the virtual winder behaves in an absolutely realistic fashion. Secure mastery of complex workflows can be practiced on the simulator without danger and without interfering with production. That is the best precondition for high productivity of the real winder.

### Contact



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NipSense and NipMaster for optimized dewatering

## Perfect Team play in the Nip

In times of rising energy costs and resource shortages, the identification of saving potentials in a paper machine becomes more and more important. The biggest saving capacity certainly can be found in the press section. But which measures can be taken? Trials are expensive and time consuming. NipMaster can help.



Screenshot of NipMaster.

NipMaster is a software tool which models and analyzes roll covers. Instead of expensive trials and failures, the modeling of roll covers becomes

more and more important. NipMaster helps to quickly identify potentials and implement steps to improve the machine efficiency.

### Felts integrated into NipMaster

Roll covers and felts are equally important for the dewatering of the nip.



Using data from NipSense, NipMaster creates a video that enables one to observe the nip closing precisely.



*Pull-in of NipSense mat.*

In cooperation with Voith Paper Fabrics the behavior of the clothing in the nip was tested. The efficiency of new felts was compared to used ones. The results of these tests, like changes in compressibility, thickness and void volume were integrated into the NipMaster, enabling the tool to calculate nip width and nip loads with and without felt. The calculation is based on complex material models – this is unique within the industry. The evaluation of the dewatering capacity is defined by the available void volume in the covers and felts. Here, it is important to analyze the capacity when the covers and felts have reached their life end.

More than 500 nip positions worldwide have been calculated and optimized with NipMaster thus far. The experienced outcomes enrich the know-how data base of Voith Paper constantly.

For example, the improvements on an LWC machine:  
A steel suction roll was installed on the machine. NipMaster calculated how the dewatering situation would change if

a polyurethane cover is installed. The results showed a clear increase in dewatering capacity. The paper mill decided to install SolarFlow. The effective outcome was an increase of dryness of 1% after the 4th press and elimination of shadow marking.

### NipSense

But just a software is not enough. Besides the analysis of moisture cross profile and conditioning of felts and covers, it is also important to know the real nip conditions. Theory and practice are combined by NipSense, the electronic nip measurement from Voith Paper Rolls. The measured data can be easily analyzed with NipMaster. The software translates the data into a video showing the nip closure procedure. The dewatering efficiency can only be increased with a proper closure of the nip. NipSense already identified weaknesses in nip conditions:

- Identification of unaligned nip closure and definition of correction measures
- Adjustments of nipco rolls
- Check of crown calculations

A nip allowing a uniform moisture cross profile is of crucial importance; not only for optimized dewatering, which leads to energy savings in the drying process, but also for optimum paper quality. NipMaster and NipSense ensure this.

### Contact



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**Alois Mohr**  
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One of 40 gap formers for board and packaging papers running worldwide - DuoFormer Base at Jass Schwarza.

How to make a successful concept even better

## DuoFormer Base II – a step towards the future

**Increasingly lighter basis weights, higher machine speeds and ever decreasing raw material quality – these are the three challenges many papermakers are facing today. To cope with this situation, the new DuoFormer Base gapformer in its second generation has been developed.**

Putting the more than 40 Voith Paper gap formers used in the board and packaging industry all over the world together, results in an impressive amount of operating experience.

The benefits of the gap former concept have been proven in a large number of production lines. Several records with regard to speed and

specific output have been reached. Now, why should anyone want to change this tried and tested concept?

The answer is quite simple: Changes in the market require an adaptation to the present situation. The share of recycled paper used as raw material will even increase in the future, result-

ing in more contaminants and consequently poorer dewatering properties of the fibres.

Apart from that, the demand for lighter papers without raising the speed leads to a reduction in tonnage. A closer look at the gap formers sold so far reveals a clear trend: Ever increasing machine speeds and decreasing

basis weights. In order to follow this trend the target of the further development was to adapt the concept.

**Ambitious development goals**

Various customer suggestions resulted in the corners of further development. Besides higher drainage capacity, operating stability, clean design and the reduction of the investment costs were improved. Other attributes like process stability even with varying raw material quality, excellent technological values over a wide speed range, reproducibility of technological parameters and easy grade changes were equally ensured. The operating window also needed to meet present and future demands for light basis weights.

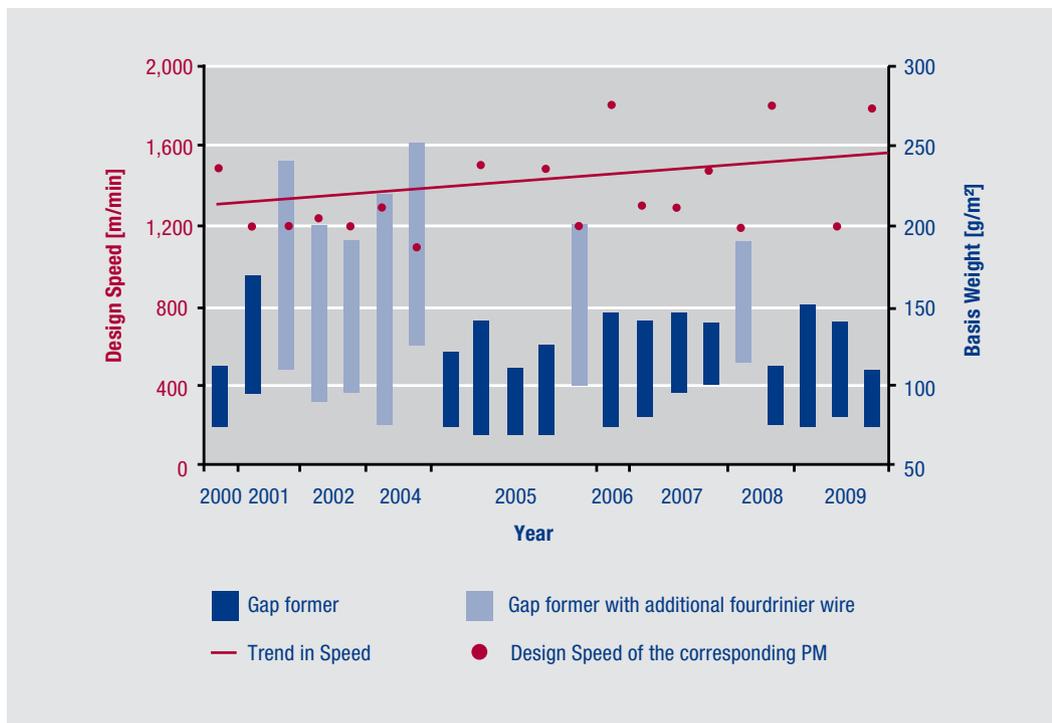
The Voith Paper engineers focused on optimal accessibility during operation, simple maintenance and excellent clean design. The clean design features specific advantages: Lower build-up of mist by showers, for instance, and less deposits. Therefore, operational disturbances caused by web breaks can be reduced.

Great importance has been attached to a high-grade integration of the automation system. The proven OnControl process control system based on the Siemens PCS-7 platform was adapted to satisfy the special requirements of the paper industry. The entire visual display system is process-oriented and quickly gives the operator a current overview at any time. The subordinate machine logic is tai-

lored to the technological needs. During normal operation, start/stop sequences allow easy and quick handling. While doing service and maintenance work, the focus is on occupational and machine safety.

The control loops are easy to operate thanks to the visual display system, offering different views for the analysis and diagnosis of failures and alarms. With OnC LoopSpy, the operator has a very powerful tool, helping him to diagnose and visualize online the cause of any alarm or failed switching operation directly on the screen, thus considerably increasing control transparency.

The settings of the former have significant influence on paper properties.



Fourdrinier paper machines with low operating speed and high basis weight range are decreasing. The trend clearly goes towards higher speeds and lower basis weight - the domain of the gap former.

With OnV VirtualSensors it is possible to predict parameters like strength (for example SCTCD). This enables an optimization of the former settings at an early stage.

**Secrets of dewatering**

As is commonly known, the major part of drainage takes place in the inlet area. Therefore, forming roll and jet channel request special attention.

Decisive concept changes in the twin-wire area are a higher forming roll wrap angle, a shortened blade section, reduced vacuum zones, as well as a modified water flow.

Practical experiences have shown that a larger wrap angle on the EvoFlow F forming roll has a positive ef-

fect on drainage capacity. Increased roll drainage positively influences the strength values required for packaging papers. The blade section has been shortened, thereby ensuring good formation and gentle handling of the moist web.

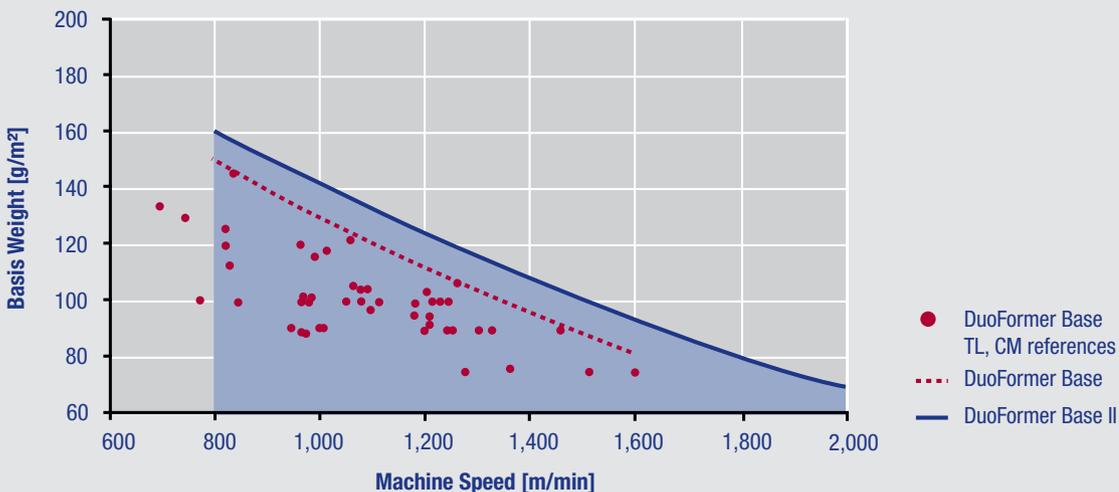
The drainage at the forming roll is mainly determined by four parameters: the wire tension; the open volume of the roll shell, the suction zone length, as well as the vacuum level in the suction zone. EvoFlow F with its shrunk-on wire and honeycomb design, is the market leader when it comes to void volume due to the highest open volume available. For better wearing protection, the forming roll can be coated with CeraForm ceramics. In this case, the shrunk-on wire is not required.

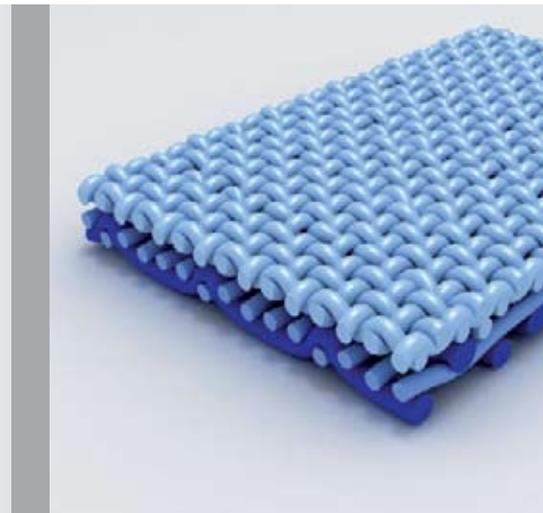
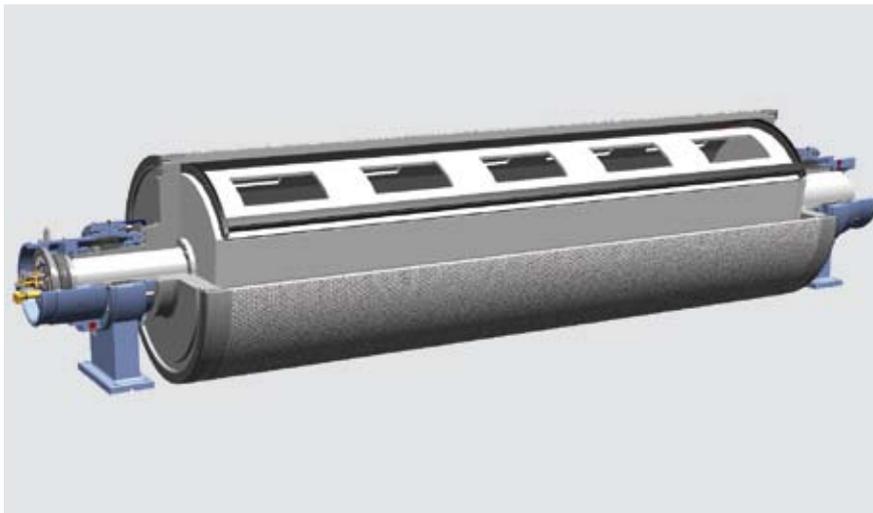
Due to an optimized web guidance combined with good web run stability, a lower design height of the former was the result.

**HiVac instead of suction couch roll**

The high-vacuum box (HiVac) has been successfully used in graphic paper machines for many years. Adapting it for packaging papers was therefore nothing but a logical consequence. For light and medium-weight paper grades, the HiVac is used as the last dewatering element instead of a suction couch roll. It improves the drainage capacity, eliminates the maintenance required for a suction roll, reduces investment costs and provides an energy saving potential for

*The use of the DuoFormer Base II permits up to 200 m/min higher speeds at the same basis weights.*





*Forming roll EvoFlow F and forming wire MultiForm – concentrated Voith Paper know-how for the new DuoFormer Base II.*

vacuum depending on the box's length.

The HiVac can increase dryness after the wire section by a higher percentage compared to the solution using a suction couch roll. The amount of water in the web before the pick-up roll is lowered by more than 10%, thus reducing the water absorption in the pick-up felt.

### **Understanding the process leads to success**

To get the most out of the gap former, a thorough understanding of the whole process is required. In particular the wires play an important role, and requirements are diverse: High initial drainage capacity, excellent fiber support, smooth and trouble-free operation and runnability, optimal wire stability, as well as long service lives, just to mention a few.

Choosing the right forming wire application starts with understanding the customers needs with regard to paper quality, drainage capacity and runnability. A balance is achieved by selecting a wire design suited to the requirements. Using abrasion-resistant materials helps to ensure maximum wire lifetime while maintaining a high paper quality.

With MultiForm, Voith Paper Fabrics developed a complete product portfolio to meet the customers' requirements.

The results of constant product-related development of forming wires were quite logically integrated into the further development of the DuoFormer Base II.

Each detail in the new concept perfectly fits together.

Excellent dewatering conditions (dewatering shoe, water guidance),

the good clean design as well as the bundling of know-how in the areas of forming roll and wire design are self-evident. Optimally matching components are required to achieve superior paper quality and machine performance – no matter what challenges the future may hold.

### **Contact**

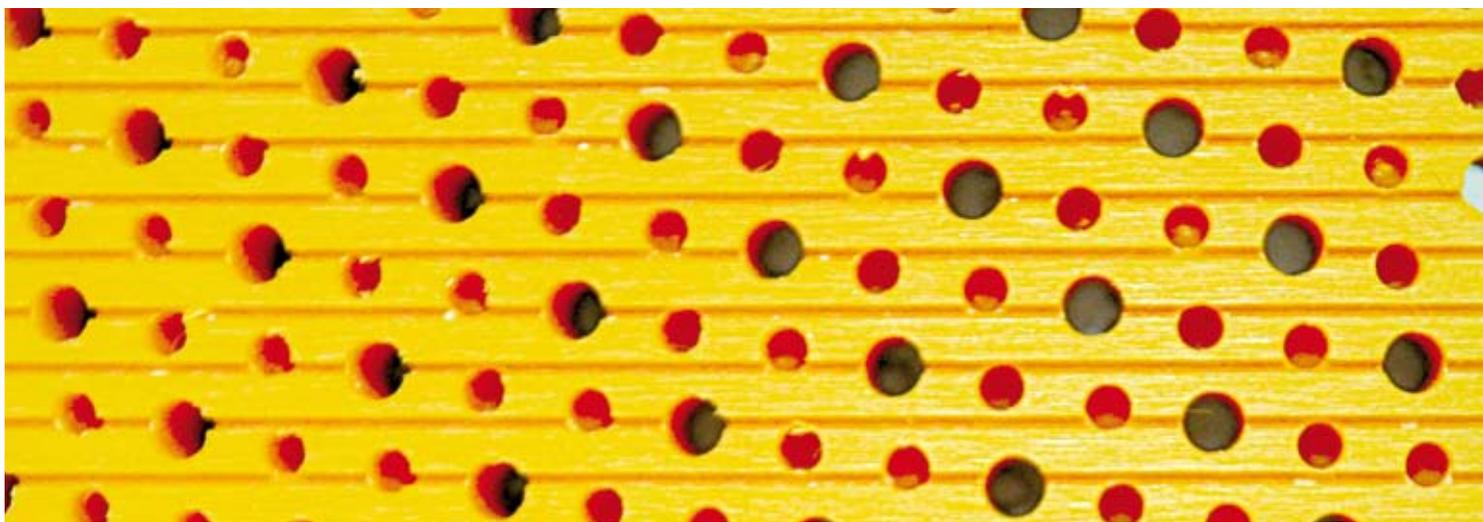


**Wolfgang Schwarz**  
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New polyurethane roll cover increases production and saves energy

## SolarSoft – the magic word for perfect tissue

**Rubber roll covers in tissue manufacturing are notorious for after hardening and heat development. SolarSoft, a polyurethane roll cover developed for tissue, minimizes these issues, while providing potential for energy savings and production gains.**



*Possible surface design of SolarSoft.*

Due to material limitations, rubber roll covers are problematic in tissue manufacturing. One of the most common problems is after hardening of the rubber. Typically a rubber cover will after harden 20 to 40% over its life. This hardening changes the performance of the roll. Another unfavorable characteristic is heat generation due to rubber's dynamic properties. Heat generation results in excessive cover temperatures, which can reduce cover life or require internal water cooling of the roll.

Despite these limitations, rubber covers are still often used in the tissue industry. In North America, Voith's T-Master II runs on the largest machines – up to 7.6 m (300 in) wide,

and on the fastest machine: 2050 m/min (6700 fpm). Hence Voith Paper is pursuing a two-part-strategy to meet the ever increasing demands of the tissue industry. On one hand, the current rubber roll covers will continue to be improved.

On the other, a new polyurethane roll cover has been developed especially for tissue. Polyurethane mitigates the hardening, heat generation, and wear resistance issues associated with rubber. Polyurethane also offers advantages in dewatering and reduced variability formerly unachievable with rubber. The result of this development effort is SolarSoft – its successes argue for itself:

### **Longer run periods – SCA in Ortman, Austria**

A SolarSoft cover has been installed in SCA Ortman's PM 9 machine since October 2007. An inspection in September 2008 noted that the surface still looks nearly new after eleven months of operation. Historically, rubber covers at this mill had to be removed after eight months in operation.

### **No internal cooling – WEPA in Müschede, Germany**

Stephan Frank, Plant Manager of WEPA Müschede stated the following: "Until now the pressure roll was covered with rubber covers, therefore water cooling was absolutely neces-

sary. Some time ago the water cooling failed and the rubber cover was destroyed within a few hours. The maintenance costs for the cooling were very high. Now SolarSoft has been in operation without cooling for several months. During the next planned downtime, the cooling will be permanently removed. This saves us time and money.”

Rubber, being a weaker material is limited to a maximum open area of approx. 30%. The stronger polyurethane allows the maximum open area to increase over 40%. Polyurethane covers can also be grooved more effectively than rubber, which provides another way void volume can be increased to customize the cover. Increasing the surface open area and void volume provides opportunities to increase dewatering at the press. Increased dewatering has three potential advantages; production increases, reduced energy consumption, or potential to increase the use of recycled material. All of these opportunities reduce cost while minimizing the environmental impact of the operation.

**Increase in production through speed increase**

A standard rubber covered suction pressure roll with 19.8% open area

was converted to SolarSoft with additional blind drilling (31.7% open area). This change immediately allowed a machine speed increase in excess of 100 m/min, using standard machine settings. The Mill Process Leader said, “This change looks to be a major move forward for this mill, giving us a potential increase in production up to 5 tons per day. The roll was changed from the standard rubber cover without changing anything else on the paper machine; we restarted without any problems and immediately saw a speed increase in excess of 100 m/min. We see no reason now, given some continued experience, why the spare roll cover should not be replaced with the same Voith Solar polyurethane cover.”

**Saving raw materials through optimized dewatering**

Another example of a dewatering advantage is from a tissue mill in North America. Initial installation of SolarSoft achieved three production records because the cover dewatered better. Since then, the mill has been able to increase the recycled paper content considerably without significantly reducing the production rate. This is something that had been impossible with the previous rubber

cover. The end result is significant raw material savings as well as an improved environmental impact.

**Infobox:**

**SolarSoft Benefits:**

- Better dewatering through increased variety of surface designs and excellent dynamic properties
- Better tissue quality through tailor made surface designs
- Longer lifetime of the cover through very good wear resistance
- Higher tissue quality through constant nip conditions during operation
- High level of operating safety and machine availability through outstanding strength and elasticity
- Optimized safety through minimizing the subsequent damages in particular injuries of individuals

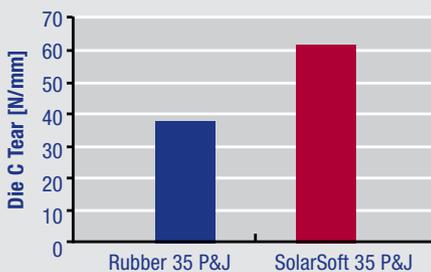
**Contact**



**Dr. Benno Bader**  
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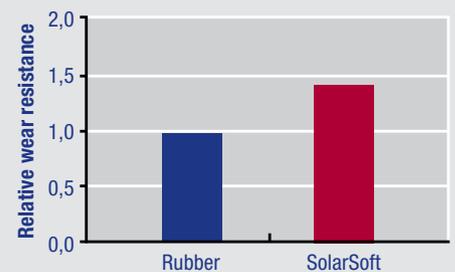
**Joseph Oyler**  
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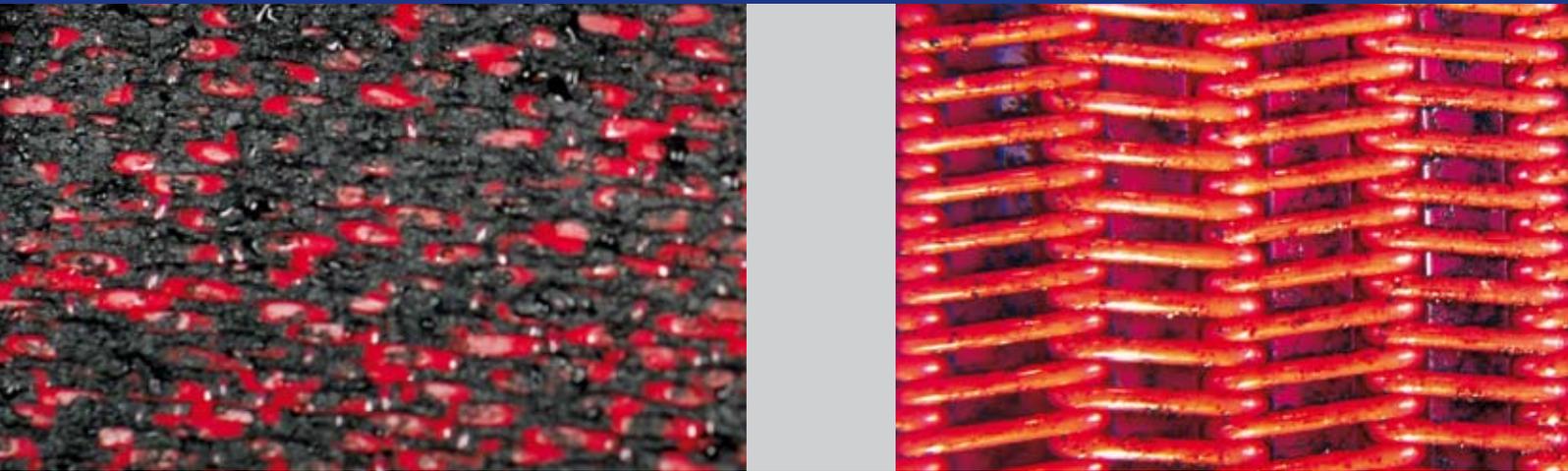
*Tear strength*



*Hardness change*



*Wear resistance*



Contaminated and cleaned Dryer Fabric. Contamination on the surface is effectively removed with the DuoCleaner Express.

Making a huge difference in the dryer section

## Improving the drying process using PrintTech LFC with Linx technology

**PrintTech LFC spiral dryer fabric with Linx technology combines into one fabric the advantages of different designs such as easy to clean and high abrasion resistance.**

Higher machine speeds and increasing use of recycled fiber are placing greater demands on low permeability dryer fabrics for fabric cleanliness, better overall wear resistance, improved tail threading and reduced break frequency.

### **Fabric Cleanliness**

To maintain a clean fabric in the early dryer sections has always been a priority for papermakers. Besides helping to achieve high sheet quality and maximum heat transfer, a clean fabric also ensures good transmission of under-pressure for effective sheet control and less sheet breaks. Fabrics are often removed prematurely due to heavy contamination.

In PrintTech LFC, the X-shaped stuffers have a special design. They work together with the spiral structure to ensure that high pressure cleaning water jets are deflected. Thereby, the surface scabs are removed effectively.

The cleaning effect of different fabric designs has been tested on a state-of-the-art Pilot Cleaner test rig at Voith Paper facility in St. Pölten, Austria. Test samples were cleaned with high pressure jets at 350 bar for 4 seconds. The test results confirmed PrintTech LFC with Linx Technology is the easiest to keep clean. During continuous dryer fabric cleaning, it is possible that too much water is carried on the surface of the fabric

causing re-wetting of the web and creating other paper quality issues. The tests also prove that the higher the surface void volume, the greater the risk of re-wetting.

Linx technology produces a spiral fabric with the lowest surface void volume among all the spiral designs in the market. Working together with modern cleaning systems, such as Voith's DuoCleaner Express, PrintTech LFC with Linx Technology consistently delivers a cleaner fabric with lowest re-wetting to meet the expectation of papermakers.

#### **Better overall wear resistance**

A further concern is reduced life and damage caused by abnormal wear.

For normal woven designs, the seam area, being the weakest link of the fabric, will experience quicker wear and fail prematurely, with potentially high risk of damage to the machine. PrintTech LFC with Linx Technology

is 250% stronger than most woven designs and has 40% more material to resist wear.

#### **Successful on the machine**

On a high speed graphic paper machine in Asia, the average fabric life on the 2nd dryer section had reduced from 95 days to 40 days due to abnormal roll side seam wear caused by pitted roll surfaces.

Due to its superior wear resistance, PrintTech LFC with Linx Technology improved the life by 68% and was removed safely at a scheduled machine shut after 160 days. This translates to a potential fabric cost savings of thousands USD per year. The customer was extremely pleased and rewarded Voith Paper Fabrics with repeat orders.

#### **Summary**

Many dryer fabrics have short lives due to either contamination or fabric

wear or sometimes, a combination of both. By choosing PrintTech LFC with Linx Technology, and combining it with a good cleaning system, these problems could easily be overcome. Longer life and fewer fabric changes translate to economic benefits, less machine downtime, higher production and lower operational costs.

The above benefits together with achieving reduced break frequency and improved sheet quality leads to happier faces in the paper mill. In conclusion, PrintTech LFC with Linx Technology can truly make a huge difference in the drying section.

#### **Contact**



**Jiew Poh Liew**  
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*The structure of the PrintTech LFC is optimized with specially designed filler yarns.*





*“We are very satisfied with the exceptional performance of the IntensaPulper and also plan to equip other production lines with this pulper.”*

*Akihiro Yamamori (left) and Mitsuaki Fujimoto (right), Oji Paperboard, Oita Mill, Japan.*

Energy-saving pulping concept for recovered paper fibers

## Success for IntensaPulper IP-R in Japan

**Voith IHI Paper Technology has received the “Sasaki Prize” from Japan TAPPI for the new IntensaPulper. The new pulping concept is catching on outstandingly in Japan: eight new IntensaPulpers were ordered in the last 18 months and another four pulpers were converted to IntensaTechnology.**

The IntensaPulper IP-R is based on the IntensaPulper IP-V which was designed for pulping virgin fibers. With the IP-R model it is now also possible to pulp recovered paper. In comparison to conventional LC (low-consistency) pulpers, substantial structural changes were implemented. On one hand, the rotor in the vat was eccentrically placed; on the other hand, the transition from the bottom of the pulper to the cylindrical wall takes place in a flow-optimized fashion with a double-cone bottom (we reported on the new development in the last issue of *twogether* magazine). Together with optimization of the flow guide elements in the pulper vat, an energy saving of up to 25% is thereby achieved.

### Progress for the Paper Industry

In Japan, the IntensaPulper IP-R was a success from the very beginning.

The first model was installed in January of 2007 at Oji Paperboard in Oita, where it replaced a conventional LC pulper. Its eccentric vat has a volume of 50 m<sup>3</sup>. With an actual input power of 420 kW, this IntensaPulper is for pulping Japanese OCC (JOCC). It is distinguished by its high capacity and an improved pulping action. In the production quantity of up to 850 t/d (air-dried), there are only half as many flakes today as before the installation of the IntensaPulper IP-R. Since the first startup, seven other IntensaPulpers were ordered in Japan and four pulpers were retrofitted.

After the new pulping concept was awarded the “Palme de l’Innovation” in October 2007 at the ATIP trade fair in Grenoble, France, an official distinction in Japan also did not fail to materialize: in May 2008, Voith IHI received the “Sasaki Award” from Japan TAPPI for development of the

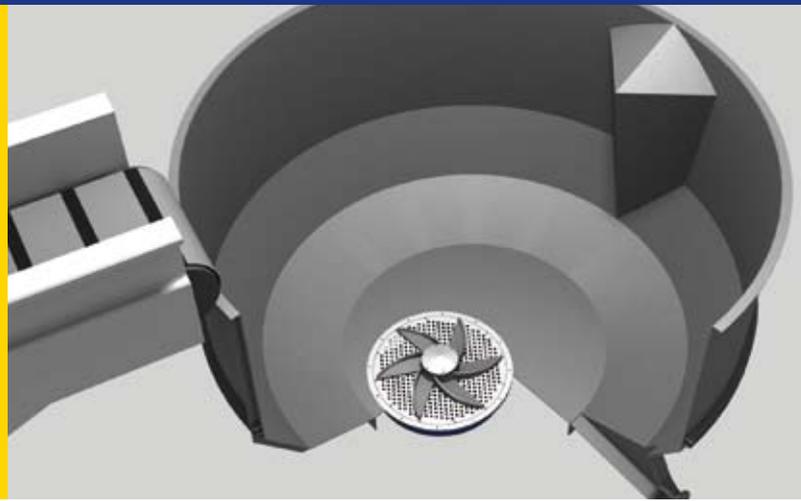
IntensaPulper, which was characterized as great progress for the paper industry. “Actually, no one in Japan could imagine that there could be an even more efficient and better LC pulper than the hitherto commercially available pulper,” says Masakazu Eguchi, Manager of Stock Preparation Engineering department, Voith IHI Paper Technology in Japan. “But now the IntensaPulper is the non plus ultra.” Already more than 20 IntensaPulpers IP-V and IP-R have been ordered worldwide from Voith Paper.

### Conversion with profit

Existing LC pulpers can be upgraded to the current state-of-the-art with so-called IntensaTechnology. An “IntensaTechnology conversion set” consists of a flow geometry adaptation in the vat and a simple rotor conversion or exchange that accompanies a speed correction, depending on the system.



The Japanese Sasaki-prize certificate.



The new IntensaPulper IP-R.

The effect of these measures is impressive. “In a specific case, we optimized a Hydrapulper in a Japanese paper plant in such a way that the specific energy requirement was reduced by 50%,” according to Masakazu Eguchi. With an actual input power of 560 kW, 450 tons of recovered paper per day

(air-dried) had previously been pulped at this facility. After the conversion with IntensaTechnology, the power input is only 420 kW, although the production quantity was increased to 750 t/d. Two other Japanese facilities that process JOCC as raw material were likewise successfully converted.

#### Contact



Naoyuki Iwashige

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## Customer trials at the Voith Paper FTC in Ravensburg

# The birthplace of new solutions in stock preparation

**The Voith Paper Fiber Systems Technology Center (FTC) in Ravensburg focuses entirely on stock preparation – which influences the complete paper manufacturing process. At the FTC, Voith Paper develops customized process and system solutions that often set benchmarks for the future.**

“We always had problems with contaminants in our stock preparation line that caused papermaking irregularities,” explains Christopher Kaessberger, head of stock preparation at Rieger Paper, Trostberg.

Voith specialists came to the rescue by thoroughly testing and analyzing his stock preparation system with several simulation trials in the FTC. In teamwork with the customer, they

then worked out a highly efficient screening system that has effectively banned this problem ever since. At the heart of the FTC is a highly versatile trial facility where stock preparation processes for all paper grades can be reproduced under realistic production conditions. This is complemented by a state-of-the-art paper analysis laboratory. The Voith FTC not only solves customer problems, but also works out superior solutions in stock prepa-

ration. “Quality, costs and sustainability are always the primary criteria in papermaking,” points out FTC trial engineer Yvonne Waibel, “Which is why many of our trials are aimed at using lower-cost raw materials while increasing yield and reducing overall process energy costs.” More importantly, in every case is to complying with quality requirements, at the same time minimizing investment and operating costs.



The worldwide network of Voith Paper Technology Centers.



TwinFlo refiner with energy-saving Pluralis filling.

**Flexibility à la carte**

Our FTC team experts show how process risks can be minimized both for rebuilds and new installations. “That helps our customers to reach decisions on plant modernization and investment in future-oriented technologies,” says Armin Volk, European sales manager of Voith Paper Fiber Systems. The FTC is so flexible that not only individual machines and subsystems can be tested, but also complete systems. Depending on scope, trials generally take one to four days.

“It is important to us that our customers get the individual support they expect,” explains Armin Volk, “That is why our laboratory services are also

available to them whether or not they take advantage of the FTC trial facilities.” Voith customers frequently use this fully equipped paper laboratory for analyzing samples from their own stock preparation lines.

Customer trials at the FTC incorporate the latest Voith Paper product developments. For example: the new energy-saving Pluralis refiner fillings, or the energy-efficient IntensaPulper.

**A worldwide network**

The FTC belongs to the global network of Voith Paper technology centers that cooperate as a worldwide team. All the latest findings at our Heidenheim and Krefeld trial centers in Germany, Motomiya in Japan, and São Paulo in

Brazil flow into the FTC activities. This network also enables stock, prepared in the FTC, to undergo further trials on one of the Voith paper machine test facilities. Apart from the board and packaging paper machine also located in Ravensburg, these include, for example, the graphical paper machine test facility at the Paper Technology Center (PTC) in Heidenheim. Our customers therefore profit from the networked synergy of Voith development findings worldwide.

**Contact**



**Harald Hess**  
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*“We were very impressed by the comprehensiveness of this test facility, the conclusive test results, and the professional competence of Voith Paper’s test engineers.”*

*Christopher Kaessberger, stock preparation line manager at Rieger paper mill in Trostberg, Germany*

Guess where the paper comes from for the latest children's bestsellers

## The Voith connection to “Inkheart” and “Skogland”

Books have always been a big favorite with children and teenagers alike. The same still holds true today. In 2007 alone 15.4 percent of all sales in the publishing sector were books for children and teenagers. And although the content of the current, most popular children's books could not be more diverse, they all have one thing in common: the paper they are printed on comes from a Voith paper machine.



The origins of the paper for the latest edition of the children's classic “The Curse of the Darkling Mill” (published in German as “Krabat”) can also be traced back to a Voith paper machine. The big-screen version of “Krabat” just stormed the movie charts. For its publisher, Thienemann, this re-presented a welcome opportunity to commission a new edition of the book. The wood-free, FSC-certified paper for the 269-page novel originates from Munkedals, one of a total of three production sites belonging to the Swedish papermaker Arctic Paper. Voith Paper's PM 5 was installed at the Munkedals paper mill back in 1953,

and since then it has been producing predominantly book paper in combination with another paper machine.

The paper from Munkedals seems to enjoy great popularity for use in books for children and adolescents. For example, the paper for the centenary edition of the timeless children's classic “Pippi Longstocking,” and for Kirsten Boie's latest “Skogland” novel, were also supplied by this Swedish papermaker. Along with Cornelia Funke's “Inkheart,” a political fantasy novel for children, the novel “Verrat in Skogland” (“Treachery in Skogland”) was ranked right at the top of the

bestseller lists for children's and adolescent fiction. And – almost no surprise by now – the paper for “Inkheart” also comes from the Voith paper machine in Munkedals.

The paper for “Das kleine Herz/The Little Heart” by Wolfgang Joop, on the other hand, comes from Uetersen in northern Germany. This is where paper producer Stora Enso's two paper machines produce various papers including the wood-free, glossy, double coated book paper of the kind used for “The Little Heart.” Both the PM 1 and PM 2 in Uetersen originate from Voith and were installed in 1950.



*A certificate declares that the printed product is allowed to bear the logo "CO<sub>2</sub>-Offset Printing" with ID. This means that it is made carbon-neutral.*

## Carbon-neutral printing of twogether magazine

# Protecting the environment concerns us all

Climate change is omnipresent. More and more consumers are making a conscious decision to purchase products made using ecological and sustainable processes. Carbon-neutral printing, too, is gaining interest in the public eye. The printing and media industry is striving to achieve a long-term reduction in CO<sub>2</sub> emissions through a climate initiative, in which Voith Paper is also involved. At the

core of this initiative is the calculation and reduction of greenhouse gas emissions, which includes all CO<sub>2</sub> emissions produced directly or indirectly by printing. A CO<sub>2</sub> balance is then created for the printed product, and the amount of CO<sub>2</sub> generated is offset by climate protection projects.



## Conveying knowledge on press technology – anywhere in the world

# Customer-oriented blended learning with Norske Skog



*Dr. Georg Kleiser and Axel von Noorden, responsible for the Norske Skog customer training, conveyed their knowledge throughout the world.*

"Blended Learning" describes teaching concepts in which a didactically useful link between traditional "classroom learning" and PC- and Internet-based learning is made. It combines the advantages of onsite instruction and e-learning. A cost-benefit analysis of blended learning and a previous onsite seminar with the same contents yields

cost advantages for blended learning. In principle, the number of participants is unlimited, and learning is location-independent.

This results in less absenteeism and eliminates travel times and costs. In cooperation with the global paper manufacturer Norske Skog, Voith Paper organized a blended learning event for the first time ever – for multiple locations simultaneously and perfectly tailored to company-specific requirements. Participants from 25 different Norske Skog locations – spanning the globe from Europe to Thailand to Brazil – were connected in real time via the Internet and followed the presentations given by the Voith technologists in Heidenheim, Germany. Equipped with headsets, the technologists conveyed their knowledge on press technology and communicated directly with participants throughout the world.

### Customer Comment



**John Hofmans**  
Specialist Paper,  
NS Technical Support  
& Development

"NS Academy, Norske Skog's internal training program, found a perfect partner in Voith. The training material as well as the lecturer have been highly appreciated by the participants. Thanks for this great cooperation."

### Contact



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Voith Paper Environmental Solutions wins coveted environmental award

## Green Apple Award for reduced water use



*Jan Telensky (right), owner of the resort AquaCity, Poprad, Slovakia and lead sponsor of the Green Apple Awards handed over the coveted environmental award to Werner Geßler (left), General manager of VPES.*

The shortage of water is increasingly becoming a problem. Therefore, the industry must find ways to conserve water. Voith Paper Environmental Solutions (VPES) is developing products and technologies that reduce the use of water in paper production.

And it did not take long to garner the first accolade for this resolute commitment to the environment: on November 10, 2008 VPES received the renowned Green Apple Award. Every year the independent British

“Green Organization” awards this prize, which is regarded as one of the most prestigious environmental awards in the U.K. The judges award prizes to companies, local authorities and individuals in 25 categories for sustainable projects and products. Werner Geßler, General manager of VPES, accepted the Green Apple Award for the “European Company” category at an official ceremony held in the House of Commons, the British parliament building in London.

Mondi and Voith Paper go head to head in rafting competition

## “adventure day twogether”

At the end of August Voith Paper invited Mondi SCP and Mondi Packaging Ruzomberok from Slovakia to an “adventure day twogether 2008” at the Slovakian whitewater slalom park at Liptovsky Mikulas. 45 participants registered for the event, which was attended by over 70 people representing all paper machines in Ruzomberok.

In the rafting competition each team was made up of employees from a PM. Eight customer teams and a Voith team then competed against one another. Of course the competition got very heated and the capsizing of some of the rafts was part and parcel of the action. There were five rafting rounds, two for training purposes and three competitive courses. In the end the “Kalamita” from Mondi’s PM 18 was the proud

victor. It negotiated the challenging whitewater course in the shortest time. Apart from the rafting, a quad bike course, and archery provided some variety in the day’s entertainment. In the course of this day

full of sporting challenges and many private conversations and “shop talk” there was plenty of opportunity to strengthen and develop our interpersonal relationships.



*Mondi and Voith “twogether” after a successful day of rafting.*

Voith Siemens Hydro

## Over 20 million Euros invested in state-of-the-art hydro power laboratory

**Voith Siemens Hydro Power Generation, together with its customers, partners and employees, celebrated the 100<sup>th</sup> anniversary of its hydraulic laboratory, the Brunnenmühle, in mid-November. "Going Beyond – 100 Years Brunnenmühle" was the claim that expressed clear leadership over time in hydro power technology as pushed by Voith Siemens Hydro.**

The festivities opened up with a hydro symposium, focusing on solutions and opportunities provided by hydro power in the face of current global growth and booming energy demand. On top of that, views of the latest development in hydro power and ocean energies, the increasing importance of sustainability, reliability and environmentally-friendly solutions were key points of the presentations.

The official 100<sup>th</sup> anniversary of the Brunnenmühle was celebrated with an opening ceremony held in Heidenheim on Friday, November 14. Of course there was a birthday gift: a newly equipped laboratory as well

as a new additional office building with an overall investment of more than 20 million Euros. After 18 months of work, visitors saw the extension and enhancement of hydraulic test rigs and new high-performance computers for flow simulation in hydraulic, magnetic, and electrical fields of hydro units.

Friedrich Voith had already started to look at more precise predictions 100 years ago in order to investigate the behavior of hydro machines. He acquired the Heidenheim Brunnenmühle mill and turned it into a hydro turbine testing laboratory. With his construction of an upper reservoir

above the Brunnenmühle, this lab became Germany's first pumped storage plant with an exceptional 100 meters of head for testing of turbines. Back then and today, latest technologies, methods and tools were the basis for development in the Brunnenmühle – making it the world's most modern and high-performing model testing institutions for hydro power.

### Contact



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*The newly equipped laboratory.*



*Festive gala dinner for the Brunnenmühle's 100<sup>th</sup> anniversary.*



*Roland Kuehnel, Voith Siemens Hydro (left) and Braam Conradie, Eskom, shaking hands after contract signing in Johannesburg.*



*Planning, erection and conversion of piping systems – Voith Industrial Services can offer all the necessary services from a single source.*



*The Voith Radial Propellers keep floating offshore platforms stable by dynamic positioning, whatever the weather conditions.*

## Voith Siemens Hydro

### 140 million Euro order from South Africa

Eskom, the major South African utility, has awarded a contract to Voith Siemens Hydro for the equipment supply for the Ingula pumped storage project close to the city of Ladysmith in eastern South Africa. This region is contributing a major share to the country's electricity generation. Order value runs up to 140 million Euros. Voith Siemens Hydro will supply the complete electro-mechanical equipment with the four pump-turbines at a rated output of 342 megawatts each, four motor-generators and the complete automation and control system for commissioning in 2013. The Ingula pumped storage plant is being built close to the city of Ladysmith in eastern South Africa.

With start of operation in 2013, Ingula's four pump-turbine units will significantly contribute to grid stabilization by pumping water with excess electricity during low demand periods to the upper reservoir and releasing it from there again for peaking energy generation.

## Voith Industrial Services

### Strategic acquisition strengthen its position

Voith Industrial Services is based in Stuttgart and has in the past focused its activities mainly on the automotive industry. But for some time now it has been working on expansion of its range of services to processing industries. The acquisition of the Ermo Group early in 2008 laid the foundation stone for further growth in this sector and is also a further important step towards implementation of the strategy calling for expansion of its range of services. Voith Industrial Services is now well on the way to becoming a specialist provider of comprehensive services for processing industries. It now offers a broad spectrum of services closely related to industrial production – including standstill management, plant maintenance and audits, construction of storage tanks, piping systems and allied equipment. It can also offer engineering and other services for modernization, conversion, dismantling and re-erection projects planned by companies in the processing industries. It now employs some 1,350 qualified personnel in Europe for provision of services to the processing industries alone.

## Voith Turbo

### Market division Marine expanded

The demand for offshore vessels with maneuverable and efficient propulsion systems is on the increase. For this reason, Voith has decided to expand its competencies in the offshore area. By reviving the production of the Voith Radial Propeller, Voith Turbo resorts to proven and solid know-how and evolves into a special supplier for the offshore industry.

A second important step within Voith's corporate growth strategy was the establishment of Voith Turbo Marine Engineering GmbH & Co. KG in Rostock.

Radial Propellers keep floating offshore units stable by dynamic positioning, whatever the wind and weather conditions. To achieve this, an offshore platform is fitted with up to eight propellers. Increasingly extreme drilling depths make offshore facilities with dynamic positioning a necessity: today, extraction activities for the raw materials oil and gas take place in deposits situated at over 3,000 meters below sea level.

# Voith Paper

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