twogether

Paper Technology Journal

News from the Divisions:
Engineering as the key competence.

Lang Papier PM 5 – 16 months of successful operation.

Schongau PM 9 – an investment for the future.

New orders from the People's Republic of China.

SAICA 3 PM 9 – fastest paper machine for Corrugating Medium.

Nipco – 25 years of system know-how.

Paper Culture:
Another type of Global Player.

11

Contents

Frontispiece:
Heidenheim Fencing Centre,
with participants in the
27. Summer Olympics
in Sydney – Schongau PM 9.

Hans Müller,
President and CEO
Voith Paper

Dear Customer, dear Reader,

Since this is the first issue following the closing of our business year 1999/2000, it is appropriate to quickly review the events during this period.

The Scapa plc Group's integration is, for the first time, fully reflected in the Voith Group's consolidated figures and has had a correspondingly substantial and positive impact on the overall business volume we perform with the Pulp and Paper Industry. The strong growth, however, is not only due to acquisitions, but has also been supported by the excellent demand for our well-appreciated core products and services.

Voith Paper and Voith Fabrics together had an order intake of 3,200 million DM (_ 1,630) and sales of DM 3,000 million (_ 1,530). The growth rate corresponds to an impressive 30 %, when compared to the previous business year.

The past year has been particularly demanding for our Voith Paper team as we started-up a total of 15 new production lines representing a record number in the history of Voith. These machines are equipped with new technology, such as the TQv former, the Tandem NipcoFlex™ press concept and new former concepts for the board and packaging industry. Also, the world's fastest corrugating medium machine has been started-up successfully and in record time.

Much of the confidence that customers show towards Voith is based on the all-encompassing process know-how that the Voith team has amassed over the years. This is also supported with a worldwide service network, which now includes Voith Fabrics, that is second to none in the field of pulp and paper.

We want to take this opportunity to express our appreciation to our customers worldwide and look forward to a continuing good relationship.

Yours sincerely,

Hans Müller
on behalf of the Voith Paper Team

HIGHLIGHTS

Startup highlights in 1999/2000

Fiber Systems

Recovered paper stock preparation lines and systems for graphical grades
SAPPI Fine Papers, Mobile, AL, USA.
Appleton Papers, W. Carrollton, OH, USA.
Bowater, Catawba, SC, USA.
Kimberly-Clark de Mexico, Morelia, Mexico.
Chapelle Darblay, Grand Couronne, France.
Koehler, Kehl, Germany.
Rio Pardo Industria de Papeis e Celulose, Santa Rosa do Viterbo, Brazil.
Compania Suzano de Papel e Celulose, Suzano, Brazil.
Fabrica de Papel Ledesma, Jujuy, Argentina.
Condat, Le Lardin St Lazare, France.
Papierfabrik Hermes, Düsseldorf, Germany.
Haindl Papier, Augsburg, Germany.
Norske Skog, Skogn, Norway.
SOPORCEL, Lavos, Portugal.
Papierfabrik Utzenstorf, Utzenstorf, Switzerland.
Quena Newsprint Paper, Kous, Egypt.
Gebr. Lang, Ettringen, Germany.
Daehan Paper, Chongwon, South Korea.
PanAsia Paper Chongwon, Chongwon, South Korea.
Aspex 3, Indonesia.

Recovered paper stock preparation lines and systems for board and packaging papers
Paperboard Industries, Toronto, Canada.
Papel Misionero, Misiones, Argentina.
FS-Karton, Neuss, Germany.
Cartonnerie de Pont Audemer, Pont Audemer, France.
Papierfabrik Schoellershammer, Düren, Germany.
General Company for Paper Industry (RAKTA), Alexandria, Egypt.
SAICA 3, Zaragoza, Spain.
Pfleiderer Teisnach, Teisnach, Germany.
Sande Paper Mills, Sande, Germany.
SCA Packaging Obbola, Obbola, Sweden.
Genting Sanyen, Bantig Selangor, Malaysia.
Ruby Macons, India.
Asia Kraft, South Korea.

Recovered paper stock preparation lines and systems for tissue
Kimberly-Clark de Mexico, Ecatepec de Morelos, Mexico.
Kimberly-Clark, Mobile, AL, USA.
Kimberly-Clark de Mexico, Ramos Arizpe, Mexico.
WEPA Papierfabrik, Giershagen, Germany.
Fabrica de Celulose e Papel da Amazonia, Belem, Brazil.
Sepac-Serrados e Pasta de Celulose, Mallet, Brazil.
Klabin Kimberly, Cruzeiro, Brazil.
Sangyong Paper, Yongi-gun, South Korea.
Kimberly-Clark, Philippinen.
Fort James Nederland, Cuijk, The Netherlands.

Waste paper stock preparation lines and systems for other grades
Sihl Landquart, Landquart, Switzerland.

Paper machines

Graphic papers
Quena Newsprint Paper, Kairo, Egypt.
Produits Forestiers Alliance, Donnacona, Canada.
SOPORCEL, Lavos, Portugal.
Haindl Papier, Schongau, Germany.
Perlen Papier, Perlen, Switzerland.
August Koehler, Kehl, Germany.
Papierfabrik Hermes,Düsseldorf, Germany.

Board and packaging papers
SAICA – Sociedad Anonima Industries Celulosa Aragonesa, Spain.
Republic Paperboard Company, Lawton, USA.
Zhuhai Hongta Renheng Paper Product, China.
Modern Karton Sanayi ve Ticaret, Corlu, Turkey.
Shandong Rizhao, China.

Tissue
San Francisco, Mexicali, Mexico.
Occonto Falls Tissue, Occonto Falls, USA.
Cascades Services and Achats, Rockingham, USA.

Installations and rebuilds
Fort James, Kunheim, France.
Roman Bauernfeind Papierfabrik, Frohnleiten, Austria.
Patria Papier & Zellstoff, St. Gertraud, Austria.
Lövholmens Bruk, Sweden.
Cartiera Tolentino, Tolentino, Italy.
Zellstoff und Papierfabrik Rosenthal, Germany.
SCA Fine Paper, Stockstadt, Germany.
Union Industrial Papelera, Spain.
Smurfit Towsend Hook, Snodland, Great Britain.
Mondialcarta, Diecimo, Italy.
Daio Paper Corporation, Mishima PM 5, Japan.
Daio Paper Corporation, Mishima PM 6, Japan.
Daio Paper Corporation, Mishima PM 7, Japan.
Daio Paper Corporation, Mishima PM 8, Japan.
Bosso Carte Speciale Mathi, Canavese, Italy.

FS Karton, Neuss, Germany.
Ahlstrom Corporation, Kauttua, Finland.
Moritz J. Weig, Mayen, Germany.
Nagoya Pulp Gifu Mill, Japan.
Longview Fibre, USA.
Atlantic Packaging, Canada.
Consolidated Papers, Wisconsin, Rapids, USA.
Consolidated Papers, Kimberly, USA.
Schoellershammer Industriepapier, Düren, Germany.
Ziegler Papier, Grellingen, Switzerland.
Munkedals, Sweden.
Japan Paperboard Industries, Soka PM 1, Japan.
Koa Kogyo, Fuji PM 6, Japan.
Nippon Paper Industries, Yufutsu, Japan.
Nippon Paper Industries, Ishinomaki, Japan.
Champion Papel e Celulosa, Mogi Guacu, Brazil.
Champion International, Sartell, USA.
Usinede Condat Le Lardin, Condat Map, France.
Trierenberg Holding, Tervakoski, Finland.
Fabrica de Papel Ledesma, Jujuy, Argentina.
August Koehler, Oberkirch, Germany.
Peterson Scanproof, Norway.

Coating technology
Repap New Brunswick, Miramichi, Canada.
Zhuhai Hongta Renheng Paper Product, China.
StoraEnso Corbehem, Corbehem, France.
StoraEnso Research, Imatra, Finland.
Papelera del Aralar, Aralar, Spain.
Champion Papel e Celulosa, Brazil.
Dong Ying Xie Fa Paper Industry, China.
SCA Finepaper Stockstadt, Stockstadt, Germany.
Steinbeis Temming Papier, Glückstadt, Germany.
Georgetown, USA.
Bastrop, USA.
Fabrica de Papel Ledesma, Jujuy, Argentina.
SOPORCEL – Sociedade Portuguesa de Celulose, Lavos, Portugal.
VPK Oudegem, Oudegem, Belgium.
Perlen Papier, Perlen, Switzerland.
Kanzan Feinpapiere, Düren, Germany.
SAICA – Sociedad Anonima Industries Celulosa Aragonesa, Spain.
Burgo Stabilimento di Chieti, Chieti, Italy.

Winding technology
– Sirius
Haindl Papier, Schongau, Germany.
SOPORCEL – Sociedade Portuguesa de Celulose, Lavos, Portugal.
Perlen Papier, Perlen, Switzerland.
Produits Forestiers Alliance, Donnacona, Canada.
SAICA – Sociedad Anonima Industries Celulosa Aragonesa, Spain.

– Pope reel winders
Roermond Papier, The Netherlands.
Haindl Papier, Schongau, Germany.
Holmen Paper, Hallsta, Sweden.
Modern Karton Sanayi ve Ticaret, Corlu, Turkey.
Papierfabrik Hermes, Germany.
August Koehler, Oberkirch, Germany.
Quena Newsprint Paper, Kairo, Egypt.

Finishing

Janus concept
Haindl Papier, Schongau, Germany.
Produits Forestiers Alliance, Donnacona, Canada.
August Koehler, Kehl, Germany.
Perlen Papier, Perlen, Switzerland.

Ecosoft calenders
Holmen Hallsta, Sweden.
SOPORCEL – Sociedade Portuguesa de Celulose, Lavos, Portugal.
Quena Newsprint Paper, Kairo, Egypt.
Portals Overton, Great Britain.
Dong Ying, China.
Papierfabrik Hermes, Düsseldorf, Germany.
Boading Banknote, China.
Sun Paper, China.

Calenders
Perlen Papier, Perlen, Switzerland.
Sun Paper, China.

Paper roll cutting machines
SOPORCEL – Sociedade Portuguesa de Celulose, Lavos, Portugal.
Quena Newsprint Paper, Kairo, Egypt.

Twister/Roll Handling
SOPORCEL – Sociedade Portuguesa de Celulose, Lavos, Portugal.
Quena Newsprint Paper, Kairo, Egypt.
Steinbeis Temming, Temming, Germany.
August Koehler, Kehl, Germany.
Maul Belser, Nürnberg, Germany.
Klabin, Brazil.

Automation

Perlen Papier, Perlen, Switzerland.
Charles Turner, Bolton, Great Britain.
Gebr. Lang, Ettringen, Germany.
Huatai Paper, Dawang, Dongying City, Shandong, China.
Haindl Papier, Schongau, Germany.

HIGHLIGHTS

Recent large orders

Fiber Systems

Recovered paper stock preparation lines and systems for graphical grades
Kimberly-Clark de Mexico, San Rafael, Mexico.
Stora Enso, Wisconsin Rapids, WI, USA.
International Paper, Pine Bluff, AR, USA.
SAPPI Fine Papers, Mobile, AL, USA.
Appleton Papers, W. Carrollton, OH, USA.
Kruger Newsprint, Bromptonville, QC, Canada
Bowater, Catawba, SC, USA.
Daishowa, Quebec City, QC, Canada.
US Alliance, Coosa Pines, AL, USA.
SP Newsprint, Newberg, OR, USA.
Kimberly-Clark de Mexico, Naucalpan, Mexico.
Madison Papers, Alsip, IL, USA.
West Linn Paper, West Linn, OR, USA.
Steyrermühl, Steyrermühl, Austria.
Pan Asia Paper Korea, Seoul, South Korea.
Pan Asia Paper Thailand, Bangkok, Thailand.
Papierfabrik August Koehler, Kehl, Germany.
MD Papier, Plattling, Germany.
Papierfabrik Utzenstorf, Utzenstorf, Schweiz.
SAPPI Lanaken,Lanaken, Belgium.
Huatai Paper, Shandong, China.
Fabrica de Papel Ledesma, Jujuy, Argentinien.

Recovered paper stock preparation lines and systems for board and packaging papers
Cartones Ponderosa, San Juan del Rio, Mexico.
Longview Fiber, Longview, WA, USA.
Propapier, Burg, Germany.
Genting Sanyen, Bantig Selangor, Malaysia.
Papierfabrik Schoellershammer, Düren, Germany.
SCA Packaging New Hythe, Aylesford, Great Britain.
Leipa Georg Leinfelder, Schwedt, Germany.
Sande Paper Mills, Sande, Norwegen.
Kappa Graphic Board, Hoogezand, The Netherlands.
SAICA 3, Zaragoza, Spain.
CMPC, Puento Alto, Chile.
Rizhao, China.
Swiecie, Poland.
Cartiera Niccoli, Carbonera, Italy.
Companhia do Papel do Prado, Tomar, Portugal.
Klabin Fabricadora de Papel e Celulose, Lajes, Brazil.
Propal, Cali, Kolumbien.
Santa Clara Industria de Pasta e Papel, Candoi, Brazil.
Celulose Irani, Vargem Bonita, Brazil.
Orsa Celulose e Papel, Itapeva, Brazil.
Citroplast – Ind. e Com. de Papeis e Plasticos, Andradina, Brazil.

Recovered paper stock preparation lines and systems for tissue
WEPA Papierfabrik, Giershagen, Germany.
WEPA Papierfabrik, Müschede, Germany.
Oconto Falls Tissue, Oconto Falls, WI, USA.
LPC Group, Leicester, Great Britain.
Carta Fluminensa Ind. e Com., Rio de Janeiro, Brazil.
Papeles Industriales, Santiago de Chile, Chile.

Paper machines

Graphic papers
SCA Graphic Laakirchen, Laakirchen, Austria.
Jiangxi Paper Mill, Nanchang, China.
Japan Paperboard Industries, Geibo, Japan.
August Koehler, Kehl, Germany.
Minfeng Paper Mill, Jiaxing, China.

Board and packaging papers
Rebox, USA.
Visy Paper, Australia.
Papeles Cordillera/CMPC, Chile.
Oji-Fuji Mitsui, Bussan, Japan.

Tissue
Copamex, Mexico.

Installations and rebuilds
SCA de Hoop, Eerbeek, The Netherlands.
Longview, USA.
Moritz J. Weig, Mayen, Germany.
FS Karton Neuss Mayr Melnhof, Neuss, Germany.
Oudegem Papier, Dendermonde, Belgium.
Segezha Pulp & Paper Mill, Segezha, Russia.
Cartiera di Carbonera, Camposampiero, Italy.
Neusiedler, Kematen, Austria.
Stora Enso Magazine Paper, Reisholz, Germany.
Nippon Paper Board Geibo, Japan.
Georg Leinfelder, Schrobenhausen, Germany.
Irving Paper Mill, Canada.
Zaktady Celulozy i Papieru “Celuloza”, Swiecie, Poland.
Inland Empire, USA.
Tohoku Paper, Akita, Japan.
Indah Kiat Serang, PM 3, India.
Indah Kiat Serang, PM 6, India.
LPC Leicester, Great Britain.
Kolicevo Karton Proizvodnja kartona, Slovenia.
Stora Enso Imatra, Tainionkoski, Finland.
Stora Enso, Uetersen, Germany.
Newark America, Fitchburg, USA.
Papierkombinat Archangelsk, Russia.
Technokarton Mayen, Germany.
Copamex, Mexico.
Steinbeis Temming Papier, Glückstadt, Germany.
Inland Empire, Millwood, USA.
Kruger, Corner Brook, Canada.
Westvaco Corporation, Evadale, USA.
Sappi Fine Paper, Stanger, South Africa.
Felix Schoeller, Weißenborn, Germany.
Koa Kogyo, Fuji, Japan.
Hokuyo Paper, Nayoro, Japan.
Daio Paper Corporation, Mishima, Japan.

Oji Paper, Tomioka, Japan.
Hokuetsu Paper Mills, Niigata PM 7, Japan.
Hokuetsu Paper Mills, Niigata PM 8, Japan.
Willamette Industries, Hawesville, USA.
Grünewald Papier, Kirchhundem, Germany.
Steyrermühl Papier, Austria.
Burgo Stabilimento di Chieti, Italy.
Julius Glatz Papierfabriken, Neidenfels, Germany.
Jinjiang Paper, China.
KFPC-Celucat, Brazil.
Cartiera Nicoli, Carbonera, Italy.
Schoellershammer Industriepapier, Düren, Germany.
West Linn Paper, Oregon, USA.
Mingfeng Special Paper, China.
Inland Empire Paper Company, USA.
Champion Papel e Celulose, Mogi Guacu, Brazil.
Haindl Papier, Schwedt, Germany.
Productora de Papeles Propal, Propal PM 1, Venezuela.
Productora de Papeles Propal, Propal PM 3, Venezuela.

Coating technology
Papelera del Aralar, Spain.
StoraEnso Veitsiluoto, Finland.
StoraEnso Kabel,Germany.
Cartiere Burgo, Verzuolo, Italy.
Oji Paper, Oji, Japan.
CNTIC Trading, Rizhao, China.
Mitsubishi HiTec, Hillegossen, Germany.
Papierfabrik August Koehler, Oberkirch, Germany.
Papierfabrik August Koehler, Kehl, Germany.
Sappi Muskegon, USA.
Neusiedler, Kematen, Austria.
UPM-Kymmene, Kaukas, Finland.
Modo Paper Hallein, Hallein, Austria.
Sappi Fine Paper, Stanger, South Africa.
Felix Schoeller, Weissenborn, Germany.
Sant Joan Les Font, Torraspape, Spain.
Montananesa, Torraspape, Spain.

Winding technology
– Sirius
Papierfabrik August Koehler, Kehl, Germany.
SCA Graphic Laakirchen, Laakirchen, Austria.
Shandong Chenming Paper, Chenming Shouguang, China.
Jiangxi Paper Mill, Nanchang, China.

– DuoReel
Stora Enso, Uetersen, Germany.

– Pope reel winders
Papierfabrik August Koehler, Kehl, Germany.
SP Newsprint, Newberg, USA.
Roman Bauernfeind Papierfabrik, Germany.
Frantschach Swiecie Spolka Akcyina, Swiecie, Poland.
Shandong Rizhao Wood Pulp, China.

Finishing

Janus concept
UPM-Kymmene Tervasaari, Finland.
SCA Laakirchen, Austria.
Chenming Shouguang, China.

Ecosoft calenders
BlueRidge Paper, USA.
Rizhao, China.
Oji Paper, Japan.
Linan Jinjang, China.
Visy Paper, Australia.
Yang An, China.
Papierfabrik August Koehler, Kehl, Germany.
Mitsubishi Hillegossen, Bielefeld, Germany.
Fabriano Miliani, Italy.
Century Paper, Pakistan.

Calenders
UPM Kymmene Kaukas, Finland.
Felix Schoeller, Weissenborn, Germany.
BlueRidge Paper, USA.
Rizhao, China.
Arkhangelsk, Russia.
CMPC – Procor, Chile.
Frantschach Swiecie, Poland.

Supercalenders
Ahlstrom La Gère, France.

Twister/Roll Handling
Great Northern Paper, USA.
SP Newsprint, USA.
Bacell, Brazil.
Papierfabrik August Koehler, Kehl, Germany.
Maul Belser, Nuremberg, Germany.
Roto Smeets, The Netherlands.
Biegelaar & Jansen, The Netherlands.
StoraEnso Hagen, Germany.

Roll cutting machines
CNTIC Trading, Rizhao, China.

Automation

JSC Solikamkbumprom, Solikamsk, Russia.
UPM-Kymmene, Kaukas Paper Mill, Lappeenranta, Finland.
Daio Paper, Mishima Mill, Iyomishima City, Japan.
Sonoco, Hartsville, South Carolina, USA.
Sonoco, Rockton, Illinois, USA.
Westvaco, Evadale, Texas, USA.
Yibin Paper Industry Group, Yibin, China.
PT Pabrik Kertas Leces, Probolinggo, Indonesia.
StoraEnso Fine Paper, Uetersen, Germany.
CMPC – Procor, Puente Alto Mill, Chile.
Pachisa, Chihuahua, Mexico.
Mitsubishi HiTec Paper Bielefeld, Bielefeld, Germany.
SCA Graphic Laakirchen, Laakirchen, Austria.
Modo Paper Hallein, Hallein, Austria.

Super startup of the stock preparation and groundwood bleaching lines for PM 3 at Haindl Papier, Augsburg

The author: Andreas Heilig, Fiber Systems

As a leading European producer of printing papers from woody and recycled grades, Haindl Papier decided in 1998 after an intensive test and planning phase, to invest about 800 million DM in their "New Dimensions" PM 3, one of the most ambitious and innovative projects in the paper industry. Designed for an output around 400,000 tonnes p.a., this machine produces LWC offset paper with basis weights ranging from 39 to 70 g/m². Haindl regards the furnish mix of 25% each recycled paper, groundwood, virgin kraft pulp and pigments as revolutionary.

The Haindl corporate philosophy is to increasingly use recycled paper even for superior grades – naturally without sacrificing product quality, and improving it wherever possible. This can only be achieved, however, with highly sophisticated process technology including the appropriate water treatment and rejects and sludge disposal systems.

For the new PM 3 line, Haindl therefore awarded Voith Paper Fiber Systems, Ravensburg, Germany, in December 1998 a design planning contract covering the entire process, control and instrumentation engineering for stock preparation and groundwood bleaching. In close teamwork with the Haindl engineers, Voith Paper worked out a 3-loop stock preparation system with intensive water cleaning, and rejects and sludge treatment. This stock preparation line, with an output capacity of 380 t/24 h, uses recycled furnish consisting of mixed household collection grades.

Compared with conventional lines using two loops, this system has a third loop consisting of a thickener followed by dilution with clarified water. As a result, the stock preparation and paper machine water loops are very well separated, thus freeing the paper machine very effectively from troublesome colloids and dissolved contaminants.

1

2

Fig. 1: Partial view of the storage towers and bleaching pipes.

Fig. 2: First-stage LC fine screening with 0.2 mm C-bar™ slotted basket.

Fig. 3: HTD 700 disperger.

Fig. 4: Flotation I and II: primary cells on the right, secondary cells on the left with stickies flotation. Service accessibility of the entire line is exceptionally good.

Fig. 5: Foreground: Disperger I with screw press and heating coil above. Background: Disperger II.

Fig. 6: One of the four Deltapurge water cleaning machines.

Fig. 7: Polymeri additive processing for water cleaning and sludge treatment.

The main quality-related stock preparation processes were supplied by Voith Paper Fiber Systems as follows *(Figs. 2 to 5)*:

- Flotation I, 2-stage with forward feed from the secondary stage
- LC slotted screening with 0.2 mm C-bar™ technology
- Stickies flotation as fine-screening end stage (new patented concept)
- Disperging I
- Flotation II, 2-stage with forward feed from the secondary stage
- Disperging II.

Our joint venture partner meri, Munich, Germany, was responsible for all the water cleaning systems consisting of four Deltapurge machines with associated Polymeri additive processing plants *(Figs. 6 and 7)*. meri also supplied the rejects treatment and disposal plant including magnetic separators, two shredders, compactor and sedimator.

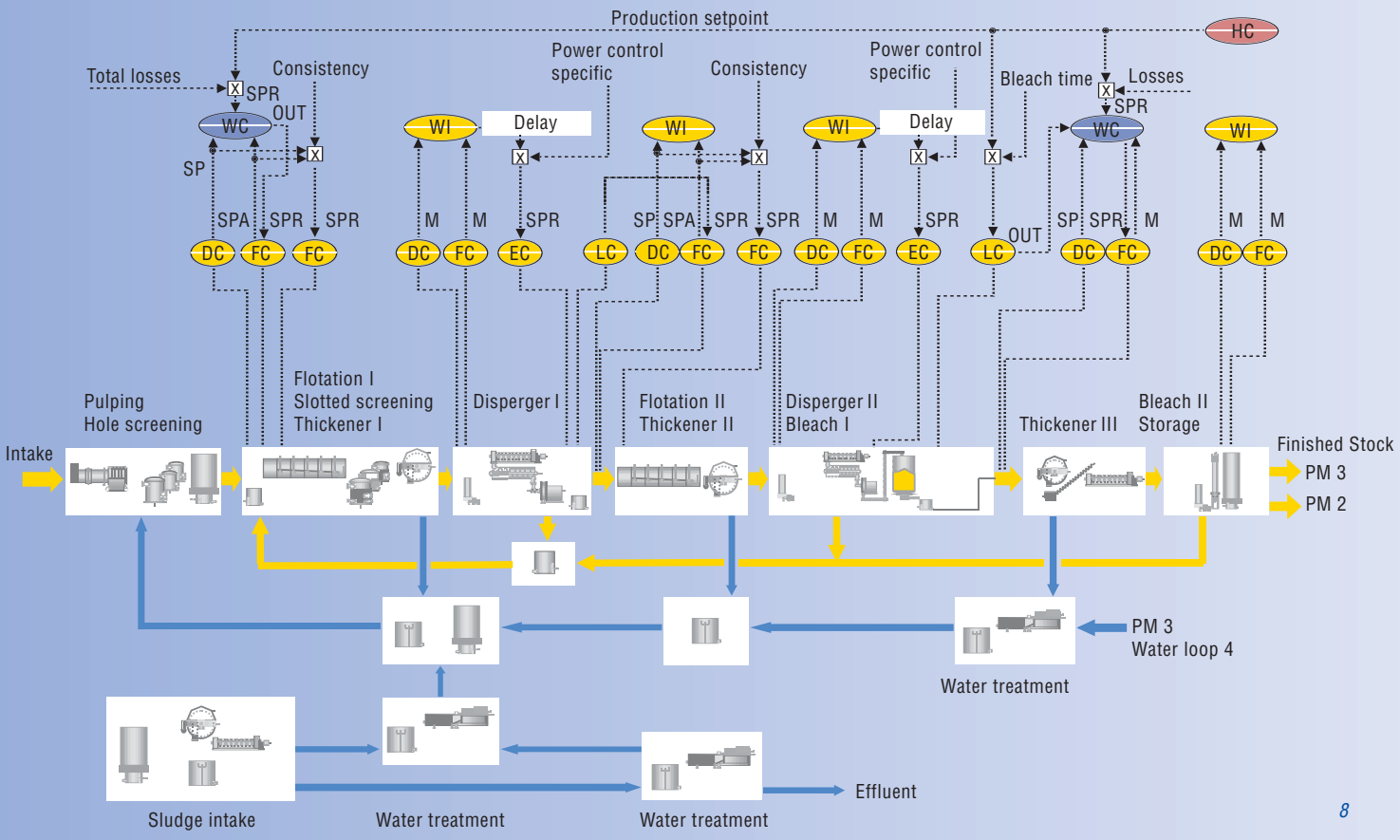
4

5

6

7

3



8

The 2-stage high-consistency peroxide bleaching section for groundwood, with a capacity of 300 t/24 h, is located next to the stock preparation line. The necessary connections and preparations for future addition of a third bleaching stage were already taken care of at the planning stage.

For the first time at Haindl Augsburg, the patented Voith Paper engineering concept AP 2000 ("Advanced Process") was applied. After thorough investigation by the Haindl specialists, this concept was systematically implemented in a largely closed-loop and very highly automated process.

The entire new stock preparation line can thus be run up with a single "Main start" command in only 20 to 30 minutes, and shut down again including flushing. Another highlight in user-friendliness is certainly the production regulation system, which enables the precise parameters to be set with a single control organ *(Fig. 8)*.

Thanks to the high degree of automation, not only is line operation simpler and more reliable, but Haindl's requirement for a single control desk on PM 3 for the stock preparation line as well as the paper machine was also met *(Fig. 11)*.

During the design phase, interference checks were continuously made on the 3D simulation system. This largely avoided time-consuming modifications during erection work. Furthermore, the high-precision isometric drawings supplied by Voith Paper enabled the piping subcontractor to deliver largely in the prefabricated condition.

Early in the design stage, representatives of Haindl and the trade association closely checked the 3D model for plant accessibility, maintenance-friendliness and operating safety *(Figs. 9 and 10)*.

Another important reason for the smooth progress of this entire project was the exceptionally good cooperation with the Haindl Augsburg project team *(Figs. 12 and 13)*.

One of the main reasons for such a perfect stock preparation line startup, however, was several weeks of software trials prior to commissioning. Every single one of the 1384 control circuits was simulated and thoroughly tested.

Despite the high demands and pressure of time, this enabled the commissioning team, with the support of deinking specialists from Schongau and Schwedt, to pump finished stock from the storage tower to the PM after only one week of commissioning in mid-May 2000.

With this innovative technology, Haindl has set yet another milestone in their long and successful recycling tradition. And as so many times in the past, it was

9

10

11

12

our privilege to play a role in this development. To us this is not only a matter of pride, but also of obligation. We look forward to continuing our decades of deinking partnership for the ongoing success of Haindl Papier.

13

Fig. 8: Production control diagram for the new PM 3 deinking line in Augsburg.

Fig. 9: CAD 3D model at the design stage of Augsburg PM 3 DIP line.

Fig. 10: Overall view of the DIP line immediately after commissioning.

Fig. 11: Central control desk both for the DIP line and PM 3.

Fig. 12: Part of the Haindl Augsburg and Voith Paper Fiber Systems Ravensburg commissioning team for the DIP and groundwood bleaching lines.

Fig. 13: Bernd Schindler (left), machine design group leader, and Wolfgang Krodel, group leader recycled paper and groundwood/ bleaching, Haindl Papier, Augsburg.

Lang Papier PM 5 –
The new online concept for SC papers: 16 months of successful operation

The authors:
Ingolf Cedra,
Rudolf Beißwanger,
Paper Machines Graphic

In this age of the Internet and digital technology, the global market demands increasingly efficient machine concepts for competitive low-cost paper production and marketing. Voith Paper has taken up this challenge. With the new SC online concept, we have set a decisive milestone in the development process toward more efficient and lower-cost production of high quality grades. With the installation of the first 6-roll Janus calender in their PM 4, Gebr. Lang GmbH in Ettringen set the stage for a total of five online Janus technology installations so far. The big market success of the new SC-B grade with a DIP content of 80 % played a key role in the decision for their new PM 5, again supplied by Voith Paper.

Fig. 1: Lang Papier PM 5.

Fig. 2: Process consideration as a whole…

Fig. 3: Offline-online comparison.

Project schedule

As shown below, the time schedule set for this project was extremely tight:

End of May 1998: Machine order placed with Voith Paper, start with the civil-work of the PM building.

December 1998: New building completed.

January 1999: Start of paper machine erection.

July 1999: Start of commissioning.

22.8.1999: First paper production – earlier than planned thanks to the committed efforts of the entire team.

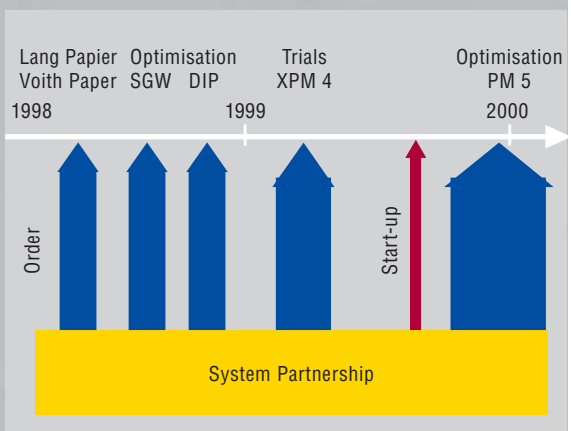
System partnership

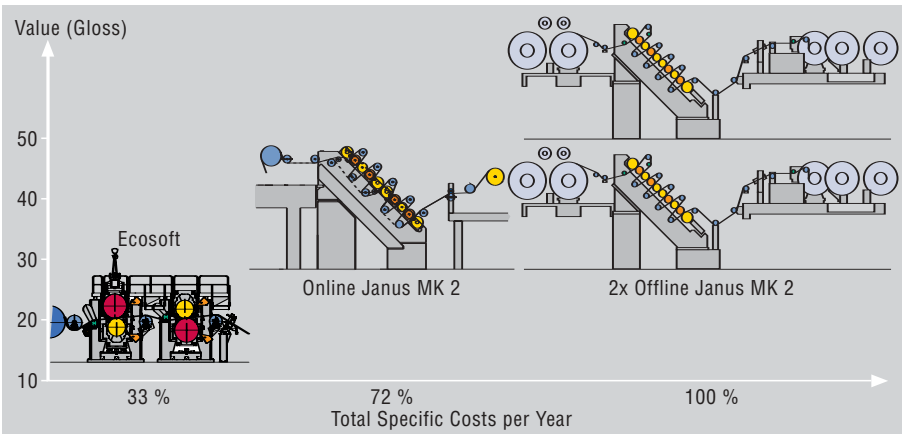
Due to the strategic importance of this project both for Lang Papier and Voith Paper, a technology partnership team was founded at the same time as contract signing *(Fig. 2)*. This team was responsible for joint product development including numerous tests at Voith Paper Heidenheim (pilot paper machine No 4) and Krefeld (Janus facility) as well as on the existing PM 4 at Lang Papier, and also for identifying any quality risks in connection with the new production line.

Online versus offline – Demands on the online concept

A fair comparison of online and offline calendering technology today shows a significant cost advantage for online calendering *(Fig. 3)*. However, offline calendering still gives the best SC qualities and printability due to the significantly lower operating speeds. With ongoing consistant process optimization, SC-A+ qualities will soon be attainable by online calendering as well, provided that the following conditions can be met:

- Maximum overall line availability
- Optimal overall process stability

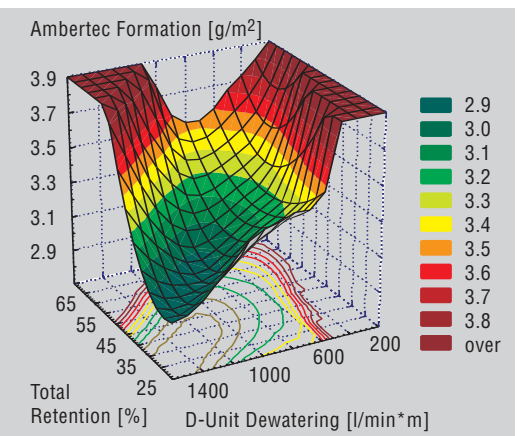




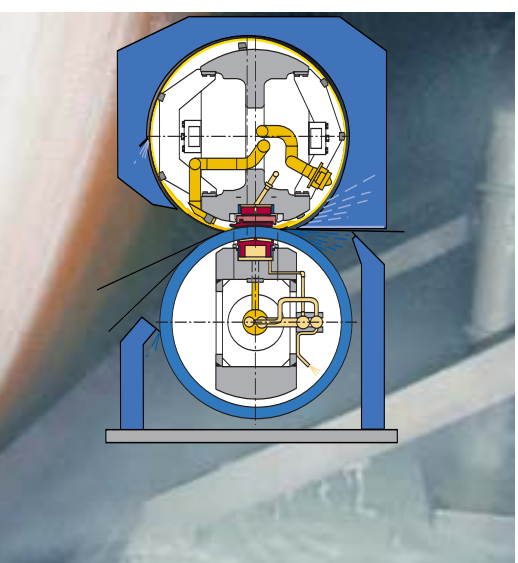
4

5

- Defectfree web, minimize webbreaks and running time losses
- Symmetrical drainage for symmetrical sheet structure in the z-direction
- Maximal dry content after the wet section, for gentle strength
- Consistently good MD and CD profiles for basis weight, fillers and moisture content
- Optimum moisture profile, both CD and sheet cross-section, with 10 % initial moisture content into the Janus calender.



6



7

Paper machine concept *(Fig. 4)*

The most innovative components in this paper machine are the Tandem NipcoFlex press section and the inclined Janus MK 2 calender for newsprint and SC grades. The machine is thus based on the new **"One-Platform Paper Machine Concept"**. With a maximum production speed of 1,800 m/min and a wire width of 8.9 m, this is one of the fastest and largest SC paper machines.

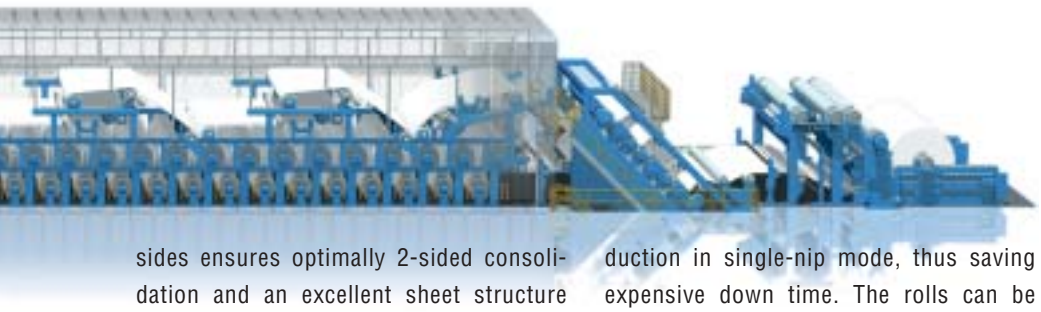
Thanks to narrow-zone Profilmatic control, the **ModuleJet dilution headbox** enables extremely good basis weight cross-profiles for all grades. With accurate tuned gap adjustment, fiber orientation has been optimized to deviation tolerances within ± 3°. Suspension drainage is by **DuoFormer TQ**, well-proven for SC papers. This incorporates the following standard components: forming roll, top wire suction box with four opposite forming blades *(D-section in Fig. 5)*, wet and flat suction boxes, wire suction roll and high-vacuum suction box. This arrangement of rotating and stationary drainage elements easily results in a dry content of more than 18 % into the press section. Since the main SC characteristics are primarily determined during formation, gentle 2-sided drainage is extremely important. Forming performance as a function of retention and blade drainage is shown in *Fig. 6*.

The 4-felted **Tandem-NipcoFlex press** section, used for the first time for these grades, comprises two shoe presses. Thanks to the long shoe of the NipcoFlex roll, each of these ensures very long dwell times in the press nip *(Fig. 7)*. Decisive for mechanical drainage is the press pulse, the product of line force and dwell time. At an operating speed of 1,600 m/min this is almost twice as high as in a conventional roll press. The dry content of 54 to 57 % attained in SC production also means a very high initial wet strength, and therefore much less risk of mechanical overstress on the web.

For a further increase in dry content and good control of the moisture profile, a profilable **ModuleSteam** unit is installed between the two presses. Apart from these runnability factors, symmetrical press drainage on the top and bottom

Fig. 4: Concept of PM 5.

Fig. 5: DuoFormer TQ – D-unit, the quality tool.



sides ensures optimally 2-sided consolidation and an excellent sheet structure accordingly – indispensable for good printability *(Fig. 8)*.

The **TopDuoRun** single tier dryer section comprises 38 dryers, and incorporates a moisturizer for correcting the cross-direction moisture profile at a very high initial web moisture content of the entering the Janus calender.

In contrast to offline calendering, another challenge with the online concept is **tail threading** through the calender at production speed. Fibron transfer conveyors are therefore used before and after the Janus calender, and ropes in the calender itself *(Fig. 9)*. Due to its different production modes for newsprint and SC grades – single-nip top/bottom or multinip modes – PM 5 makes particularly high demands on the transfer process.

The new **Janus MK 2** has eight rolls and is inclined at 45° *(Fig. 10)*. This not only facilitates tail threading, but above all ensures mechanical stability of the calender stack even at the highest speeds. Due to the 45° inclination, 30 % of the roll mass loading is already compensated. If required, hydraulic compensation is also available to ensure a constant line force at all nips. A special advantage of this new calender generation comes into play with PM 5: calender rolls not in use can easily be changed during newsprint production in single-nip mode, thus saving expensive down time. The rolls can be lifted from the frame by hydraulic cylinders into a convenient position for the crane.

The advanced **Sirius winding system** enables excellent control of Niploads, web tension and center torque throughout the winding process including parent roll change. To this purpose, the Sirius has a primary and a secondary center wind assist. As a world innovation, parent roll oscillation is now possible right on the paper machine, which significantly improves the quality particularly of jumbo reels.

Findings during commissioning

It was a new experience for the operating personnel to set the low web tension required from a centre roll without any visible draw. Commissioning of the Tandem NipcoFlex press was a big challenge, particularly conditioning the four press felts. The correct interplay of high-pressure showers and Uhle box soon turned out to be critically important. In teamwork with the felt manufacturers, felt qualities were improved over the first few months to meet the new requirements of the tandem NipcoFlex press. Rapid felt response for a higher dry content on startup was found to be essential for secure web threading. With regular felt

Fig. 6: Formation versus D-unit and retention.

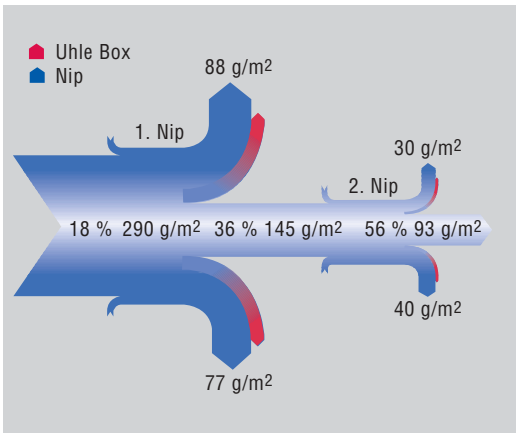
Fig. 7: Effects of nip dewatering
- *high dryness*
- *proper felt conditioning*
  - *good moisture profile*
  - *long felt lifetime.*

Fig. 8: Water balance of a Tandem-NipcoFlex-Press; SC 55 g/m², v = 1,520 m/min.

Fig. 9: Tail threading with Fibron.

Fig. 10: Janus MK 2 in operation using all nips.

8



9

10

11

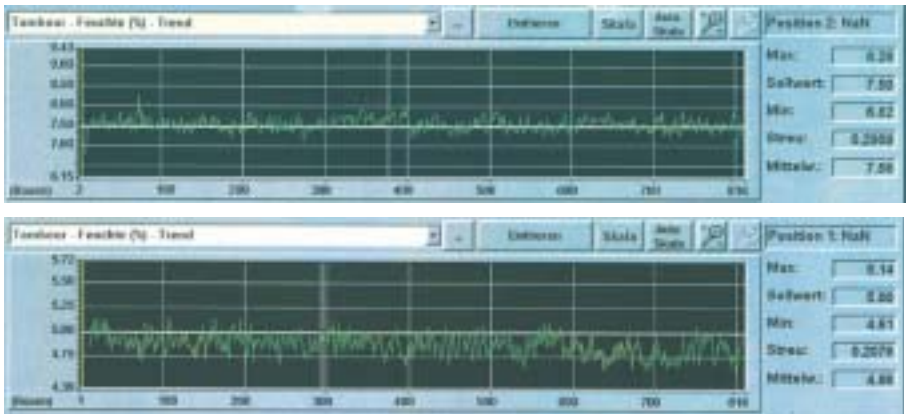


Fig. 11: Moisture profile at reel.

Fig. 12: Basic data of PM 5 in 2000.

Fig. 13: LPT plus – trials for roughness-optimisation v_{PM} = 1,450 m/min; 55 g/m²; 31 % ash.

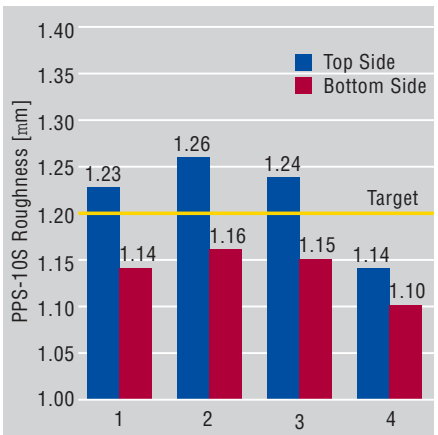
Fig. 14: LPT plus – trials for cobb-optimisation v_{PM} = 1,520 m/min; 55 g/m²; 31 % ash.

Fig. 15: Quality ranking of woodcontaining grades.

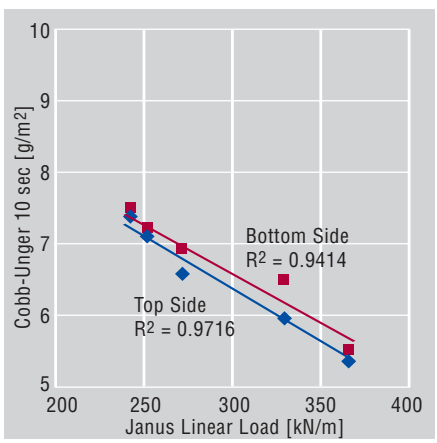
12

	Newsprint	SC
Speed [m/min]	1,400-1,560	1,400-1,600
Basis Weight [g/m²]	40-48.8	45-55
Filler [%]	10-15	25-32
Press Load [kN/m]	950+1,150	950+1,150
Dryness a. Press [%]	49-51	54-57
Janus Load [kN/m]	105-130	250 -380
Furnish	85% DIP 15% SGW	75% DIP 20% SGW 5% Kraft

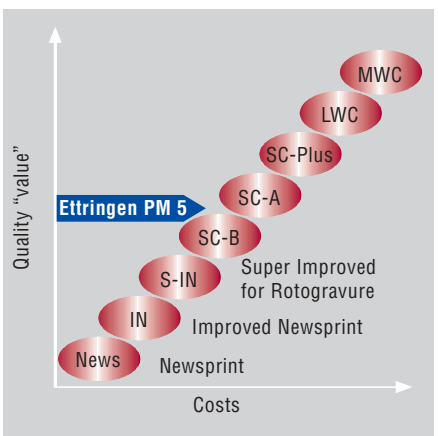
13



14



15



condition monitoring and drainage monitoring at each felt location, moisture cross-profiles were stabilized at 2-sigma values of 0.18 to 0.30 % (abs.) on 816 data boxes *(Fig. 11)*. After further optimization measures in the press and transfer system, SC production speeds were increased as follows *(Fig. 12)*:

- December 1999 1,500 m/min
- February 2000 1,560 m/min
- July 2000 1,600 m/min.

SC quality

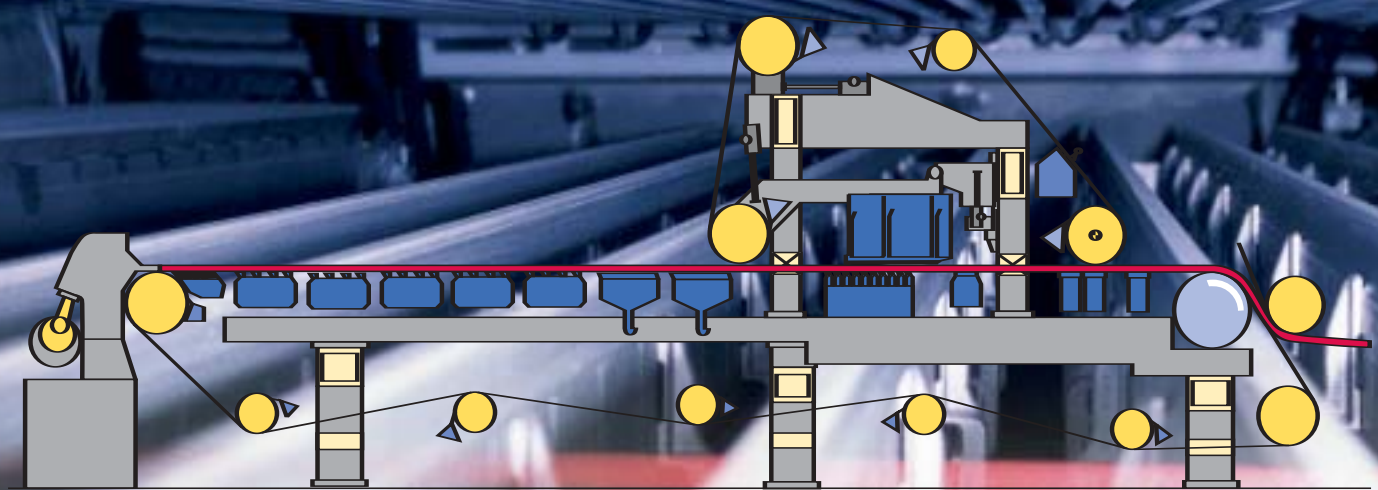
The following quality data have been attained so far for the new SC-grade produced by Lang Papier (LPT plus) at 1,520 m/min:

- Ambertec formation norm. < 0.40 √g/m
- Bendtsen porosity < 20 ml/min
- PPS-10S < 1.20 µm *(Fig. 13)*
- Gloss 45° (Hunter) > 45 %
- Cobb-Unger 10 sec < 6 g/m² *(Fig. 14)*

These are the best quality figures ever achieved in online SC paper production. With ongoing product optimization, rotogravure printability will further improve to the point where supercalendered SC-A paper is hardly any better *(Fig. 15)*.

Claus Palm, mill manager at Lang Papier Ettringen, had this to say about commissioning the new PM 5:

"The future-oriented COMPACT PM 5 project represents a huge success for all of us. In record time, the world's most modern SC production line was installed. Thanks to first-class teamwork between Voith Paper and Lang Papier, we can now produce high-quality SC grades efficiently and cost-effectively. With the commissioning of our new deinking line in October 2000 and the recommissioning of PM 3, our production capacity will double compared with 1998 to 560,000 t.p.a. We can thus look to the new millennium with assurance."



1

The authors:
Cordula Mraz,
Reinhard Leigraf,
Paper Machines Graphic

The DuoFormer D – a success story

The DuoFormer D has been an outstanding success ever since its market launch in 1984. To meet rising demands on paper quality – in particular with regard to formation and costs – the DuoFormer D is the optimal tool. It is used for all mass and special grade papers at production speeds up to 1,200 m/min. Last but not least: the DuoFormer D is very effective for modernizing outdated formation concepts.

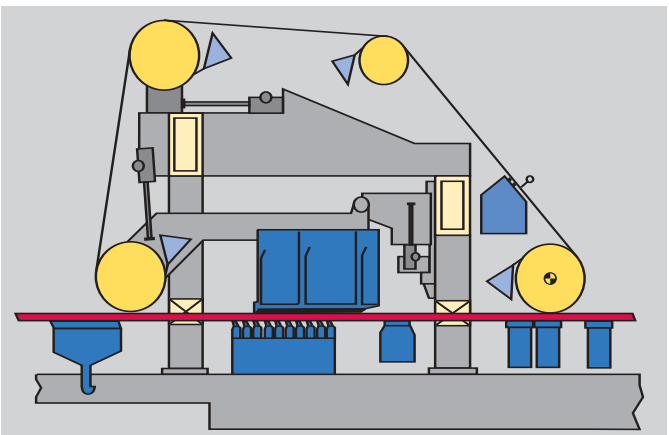
So far the DuoFormer D has been installed in nearly 200 paper machines worldwide, with wire widths ranging from 1.5 m to almost 10 m.

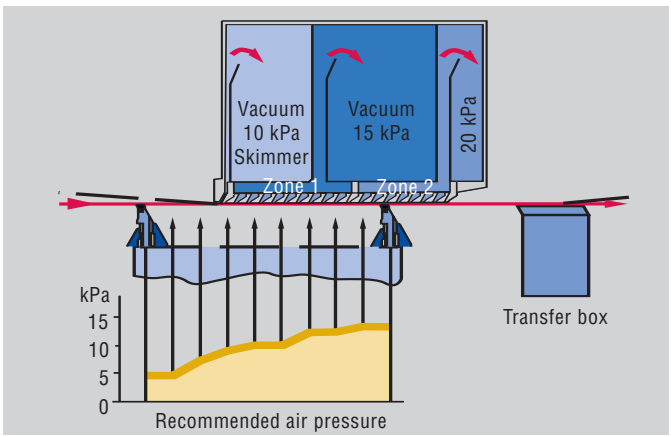
The DuoFormer D concept

The DuoFormer D

The DuoFormer D *(Fig. 1)* is a hybrid former, i.e. the suspension is predrained on a fourdrinier section. Afterwards follows the twin wire section with significant upward drainage. The top wire unit can be

2





3

installed both on new machines and on existing fourdrinier machines. The latter is facilitated by the fact that the twin wire path only deviates slightly from the fourdrinier wire line.

The twin wire section of the DuoFormer D

The top wire *(Fig. 2)* is fully cantileverable and has 4 rolls, of which the lead-out roll is separately driven. The wire line is arranged so that all rolls are located on the inside. Only the high pressure shower for wire cleaning is situated outside the top wire.

The drainage section in the twin wire part of the DuoFormer D comprises a top wire suction box, underneath this the forming box in the bottom wire, and the transfer box for parting the top and bottom wires.

The **top wire suction box** is mounted on a swivel arm together with the lead-in roll. It has three zones: the vacuum skimmer, the first and the second suction zone. Whitewater removed through the top wire is raised by vacuum over a weir into compartments of the top wire suction box inside which it is led to the drive side of the machine *(Fig. 3)*.

Within the top wire suction box area is the **forming box** integrated in the bottom wire. This has ten **forming blades** which are separately guided, i.e. they are not mechanically linked to the neighbouring blades. Three of these blades are located in front of the top wire suction box, while the other seven are situated between the blades of the latter. They are pressed against the wire by pneumatic pressure hoses *(Fig. 4)*.

The top wire suction box and forming blades comprise an integral unit known as the D-section.

Wire changing with the DuoFormer D

Since the top wire loop of the DuoFormer D only has interior rolls and this former is extremely compact, wire changing is very simple. It is only necessary to raise the top wire suction box and lead-in roll by spindle drives, and retract the forming blades *(Fig. 5)*. At the same time the stretch roll is moved to the wire changing position. Then the top wire can be cantilevered and the intermediate parts of the drive side frame removed. Depending on the width of the DuoFormer D, the outer high-pressure shower can either be cantilevered as well, or it has to be removed. The predraped wire can then be retracted.

Wire changing can be carried out by a well-versed team in less than one hour.

Positioning the top wire unit

To ensure optimal paper quality for various applications, such as LWC (30 g/m^2) on the one hand or coated raw paper (110 g/m^2) on the other, the predrainage section must be equipped in each case for the specific drainage characteristics. The length and arrangement of the predrainage section elements are therefore optimized by computer methods for each individual paper machine. This ensures that the suspension level and consistency before the twin wire section are within the right range for the specific drainage behaviour.

Fig. 1: DuoFormer D.

Fig. 2: Twin wire section of the DuoFormer D.

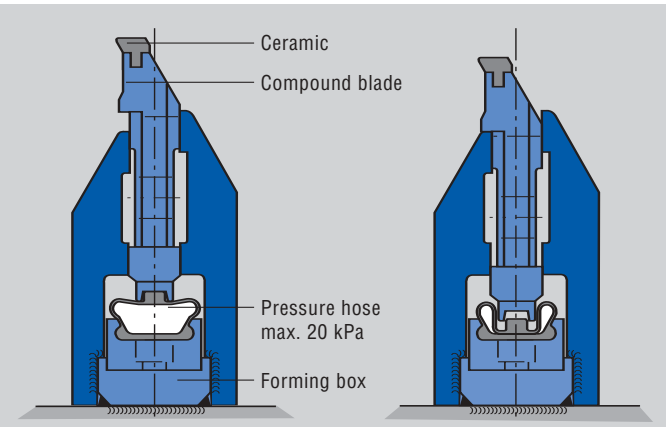
Fig. 3: Vacuums and pressing forces.

Fig. 4: Forming blades.

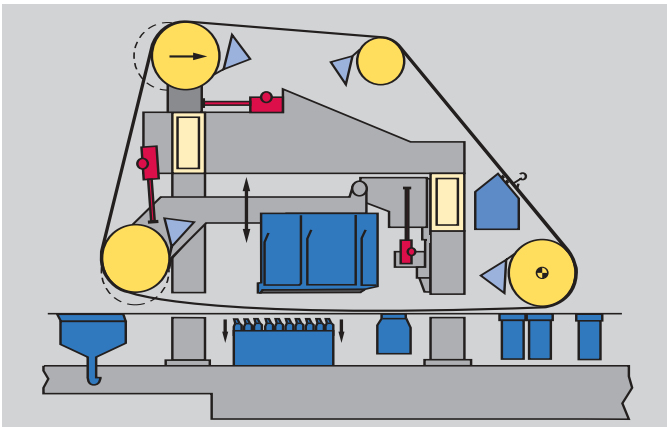
Fig. 5: Wire change position.

Fig. 6: Drainage effects.

4



5



Drainage

Drainage capacity

The production speed of a conventional fourdrinier section is restricted by limited drainage capacity due to their limited length, and by dandy roll spraying which increases with operating speed.

Thanks to the additional top wire drainage, the DuoFormer D has a much higher drainage capacity. No spraying occurs as with the dandy roll. For this reason production speeds up to 1,200 m/min are easily possible with the DuoFormer D. This limit is set by turbulence occurring on the suspension surface in the fourdrinier section.

Drainage process in the twin wire section

In three drainage sections – the skimmer, suction zone 1 and suction zone 2 – top side drainage takes place over a very short distance from **initial drainage** to sheet consolidation. Drainage starts at minimum pressure, passing through a **pressure pulse zone** and ending under vacuum at the **transfer box** *(Fig. 6)*.

Initial drainage through the top wire starts before the skimmer blade, i.e. the first blade of the top wire suction box. In this zone the top and bottom wires are brought together on the first flexible formation blades. Whitewater is pressed thereby through the top wire, removed by the skimmer blade and drained upwards.

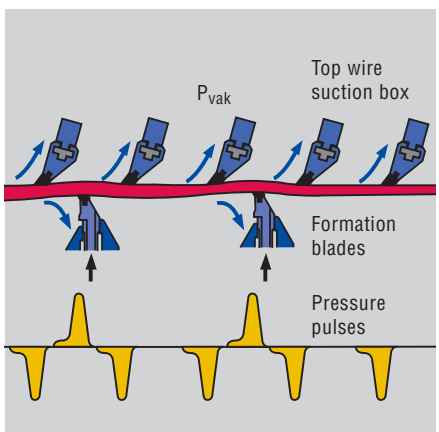
In **suction zone 1** drainage takes place at low vacuum. Drainage forces are mainly applied by the blades, so that the resultant pressure pulses cause relative motion between the fibres. Flakes produced in the predrainage section are thus broken down again.

The higher vacuum in **suction zone 2** dries the sheet to the point where it is consolidated enough to facilitate wire separation on the transfer box.

Drainage quantities

Fig. 7 gives an overview of water quantity distribution on the DuoFormer D. In the predrainage section about 50 to 60 % of water from the headbox is removed. Only a small part of the remaining quantity is

6



removed downward in the twin wire section. Most of it is removed by the Skimmer and drained upwards in suction zone 1, so that only very little water has to be removed in suction zone 2.

Paper quality

Particularly important for paper producers is a high product quality over the applicable range of basis weight and refining degree. This requirement is not met by conventional hybrid formers with

forming roll or shoe. With the DuoFormer D, however, drainage pressure characteristics depend only on the forming blade pressing force. The flexible forming bars can adapt to varying drainage conditions, i.e. various layer thicknesses, while the blade pressing force remains constant.

Formation

Fig. 8 shows a comparison of forming results over suspension thickness at the first blade, on the one hand with the roll or shoe type hybrid former, and on the other with the DuoFormer D. Not only is formation quality with the DuoFormer D higher due to the shear forces applied by the blades, but the operating range is much wider with excellent formation results. The suspension thickness corresponds thereby to the proportion of top wire drainage in the former.

Fig. 9 shows the average formation improvement for wood-containing and wood-free grades after rebuilt to DuoFormer D. By far the majority of DuoFormer D paper test samples show above-average formation quality, with Ambertec values of 0.4 to 0.48 $\sqrt{(g/m^2)}$. Particularly a comparison with typical results on fourdrinier machines shows the great potential for improving formation by upgrading to the DuoFormer D.

Tensile ratio

With many grades, only a slight fibre orientation in the machine direction is desirable. The tensile ratio (machine to cross-machine direction) must therefore be as low as possible. This is the case for example with copy paper, label and format papers, as well as numerous special grades.

Fourdrinier machines often produce a flaky sheet structure at low tensile ratio. With the DuoFormer D, on the other hand, a low tensile ratio can be set while still retaining good formation.

2-sidedness

One-sided drainage on the fourdrinier (filtration) causes enrichment of fines and fillers on the upper sheet surface.

With the DuoFormer D this problem is solved by drainage in the twin wire section, which equalizes the fines and fillers content of the upper and lower sheet surfaces.

The symmetry thus attained is impressively demonstrated by comparing ash distribution in a fourdrinier section with that in a DuoFormer D *(Fig. 10)*.

Fig. 7: Drainage components – Drainage quantities depend on basis weight and paper grade.

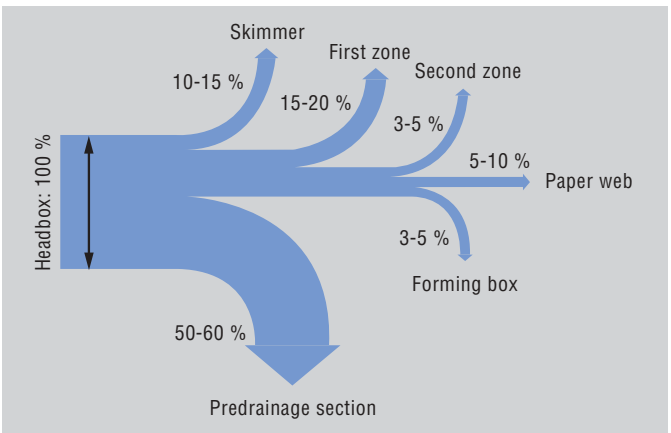
Fig. 8: Formation and drainage pressure with various former concepts.

Fig. 9: Formation improvement by installing a D-section.

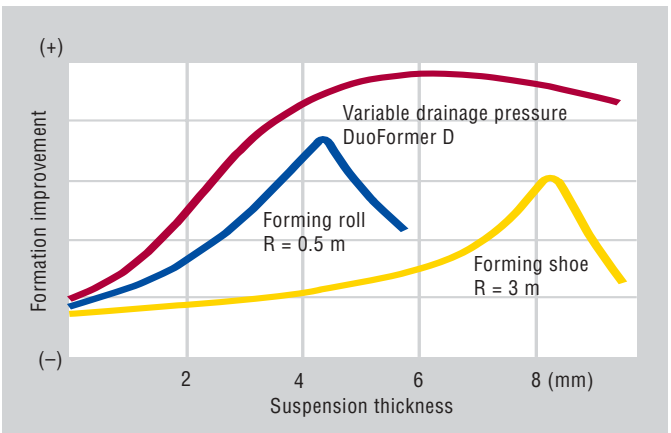
Fig. 10: Ash distribution in the Z-direction.

Fig. 11: The DuoFormer D – a success story.

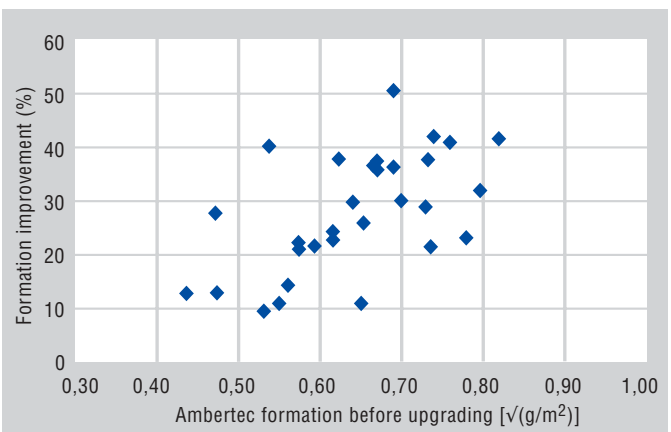
7



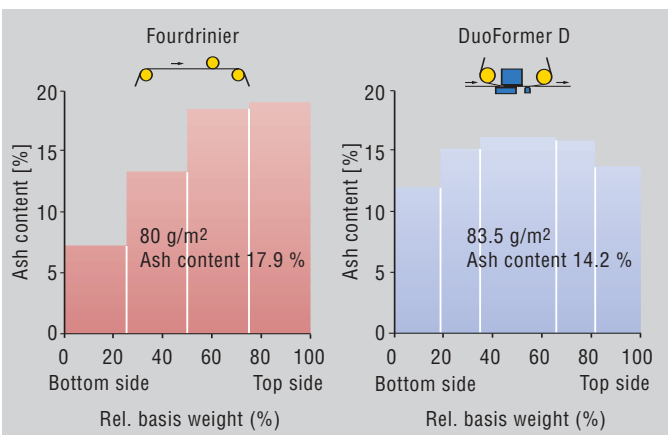
8



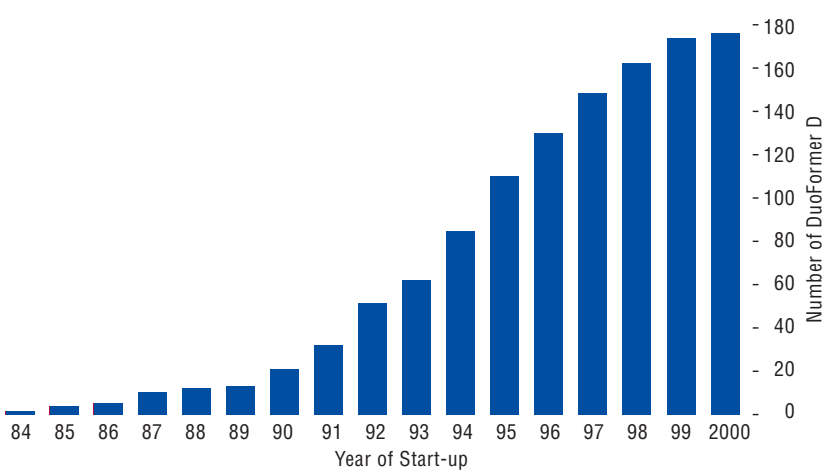
9



10



11



References

Since the first DuoFormer D was commissioned in 1984, this forming concept has proved itself again and again as extremely efficient. Nearly 200 DuoFormer D units now in service bear witness to this high efficiency, cost-effectiveness – and customer satisfaction *(Fig. 11)*.

Schongau PM 9 –
Installation of the latest technology for new SCB-Plus quality from 100 % DIP in 56 days ... an investment for the future

At the end of January 1999 Voith Paper was awarded a contract by Haindl Papier GmbH & Co. KG for replacing a newsprint machine, in operation since 1962 at the Schongau mill, with a new machine for producing high grade SCB from 100 % recycled paper.

Haindl is one of the largest European producers of wood containing roll-printing paper.

On three Voith paper machines, the Schongau mill produces about 650,000 tonnes of printing press paper per year.

Apart from standard newsprint, the wide product range in Schongau increasingly includes improved rotogravure or offset printing grades. Standard newsprint mainly comprises 80 % DIP and 20 % TMP. For the improved grades, exclusively DIP is used.

Targets with the new PM 9 installation were as follows:

- Replacement of a 38 year old paper machine
- High grade SCB production from 100 % DIP
- Greater output
- Long-term workload security.

To ensure overall project cost-effectiveness, the old paper machine had to be replaced as quickly as possible. Furthermore, the old machine had to be dismantled very carefully for sale to a customer in China. As of May 2001, this machine should be producing standard newsprint from recycled paper again at Dongying Huatai Paper.

The extremely short down time was only possible thanks to the extensive preparations made prior to the shutdown of the old machine as well as during the outage:

- Assembly and commissioning of the main hydraulic aggregates
- Structural modifications to the machine building

The author:
Gerhard Kotitschke,
Paper Machines Graphic

1


VOITH
DuoRun

2

- Pre-assembly of all machine components in the suppliers' works
- Tail transfer system design and construction to enable transfer tests from the last drying cylinder to the Sirius winder five days prior to production startup
- Intensive operator training
- Compilation of a detailed commissioning schedule with computer-supported deadline monitoring
- Formation of eight working groups in teamwork with the customer for interchanging experience on comparable installations, avoiding repetition of errors, taking into account the operator's system know-how, and successively improving the system
- Formation of a steering committee for making all main decisions and ensuring compliance with important deadlines.

PM 9 machine layout *(Fig. 2)*

With a working width of 6,100 mm, PM 9 is not a particularly large machine, but its design concept and operating speed of 2,200 m/min make it one of the most modern paper machines worldwide.

This new **"One Platform Paper Machine Concept"** comprises the following components:

- ModuleJet headbox adapted to the new Profilmatic MQ system, which almost instantaneously adjusts the basis weight by intervening directly in the ModuleJet mixing units thanks to a newly developed stock consistency measuring sensor,
- DuoFormer TQv, a state-of the-art vertical former concept for graphical grades,
- Closed draw Tandem-NipcoFlex press section for highest dry content, symmetrical drainage and secure web control,
- TopDuoRun without exterior fabric guide rolls, with open draw after the first drying roll,
- New moisture cross-profile control concept – without rewetting – for SC paper production,
- Janus calender MK 2 inclined at 45 degrees with 10 rolls, divided into two separate stacks,
- Sirius winding system with reel oscillator.

3

The DuoFormer TQv vertical former specially developed for PM 9 is not only attractive, but also has a large forming potential, great flexibility, and easy accessibility for cleaning and changing wires and rolls *(Fig. 3)*.

Based on operating experience with existing Tandem-NipcoFlex presses, the first closed draw press section was installed on PM 9 in Schongau.

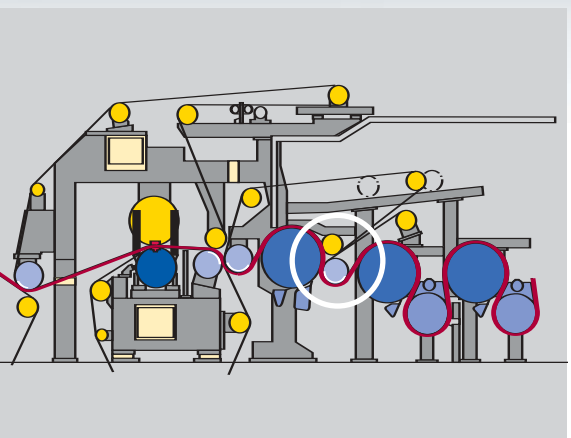
Closed draw in this case means that between individual presses, and between the press and dry section, only slight constant velocity differentials are required with no free web draw.

Fig. 2: Machine concept of the new PM 9.

Fig. 3: DuoFormer TQv in new design.

Fig. 4: Tandem NipcoFlex press with free web draw after drying roll 1.

Fig. 5: Janus MK 2 in operation.



4

5

This goal was reached by modifying the transfer sections after the presses and providing for a free web draw after the first drying cylinder. A velocity differential here of 1.6 to 2.1 % generates the web pre-tensioning required for ensuring troublefree transfer to the first dryer group *(Fig. 4)*.

To meet the high demands for rotogravure and offset-heatset printability of 100 % deinking paper with PCC fillers, a Janus calender MK 2 inclined at 45 degrees was installed. This comprises 10 rolls in two identical stacks, with individual line force control *(Fig. 5)*.

The Janus MK 2 is designed for a line force range of 30 to 500 kN/m and a maximum FLEXITHERM roll surface temperature of 160° C.

Four steam humidifiers provide the additional moisture content and heating required for improved calendering results.

Design is not only a question of taste, but also of style.

While the exterior design of the new PM 9 is truly stylish, its interior embodies the very latest technology *(Figs. 1 and 6)*.

56 days from paper to paper – a world record indeed

Decommissioning and dismantling an entire paper machine ready for assembly at a new location, replacing it with a new high-tech paper machine, carrying out extensive structural modifications, completely reshaping the periphery in part – and recommissioning everything exactly on time – demands overall project planning right down to the last detail together with a well-versed team.

Long before the old PM 9 was finally shut down, structural and assembly work was in progress all over the place.

- Structural work commenced already in June 1999 by building control rooms, offices and social facilities alongside PM 9. The building length was extended with an additional bay, at the same time creating an erection opening for removing the old components and installing the new ones. New concrete foundations were installed for the former and the Sirius winder.
- Between July and October 1999, completely new switch gear rooms were built and part of the equipment installed.
- A new hydraulics room was constructed.
- Already in September 1999 a start was made on connecting and commissioning the approach flow section and heat recovery. This work included in particular replacing the deculator and vertical screens, installing a new heat recovery system, and installing new pulpers.
- The former exhaust aggregates were installed and precommissioned.
- Large auxiliaries such as the lubricating systems, Nipco hydraulics, combi-hydraulics and thermo-oil system were assembled including piping, then

6

Design data of the new PM 9
Paper grade SOG A top T (SCB-Plus)
Design operating speed v_K = 2,200 m/min
Operating speed (phase 1) vB = 1,500 m/min
Basis weight 45-60 g/m²
Ash content in paper 30-34 %
Working width on pope roller 6,100 mm
Furnish 100 % DIP
Fillers Kaolin + PCC

Figs. 1 and 6: PM 9 in new design.

Fig. 7: PM 9 with Janus MK 2 and Sirius.

flushed and commissioned together with the control system.
- The Sirius winder was installed without reel magazine.

Thanks to complete preassembly of all machine sections including piping and wiring, limit switches, etc. in the Voith Paper works, the paper machine erection work in Schongau went ahead rapidly. In some cases the main functions and motion sequences were already tested in the Voith Paper works.

The enormous strategic importance of this project for Haindl Papier and Voith Paper, the extremely short project completion deadline and rebuild time – despite difficult conditions – demanded a quantum leap in cooperation between the paper machine supplier and the customer.

Even the first four months of continuous operation demonstrated the great potential of PM 9 for quality and productivity.

First production results

Dipl. Ing. Artur Stöckler, plant manager at Haindl Papier GmbH & Co. KG Schongau, assesses the project execution, commissioning and initial operating results extremely positively:

After exactly 56 days of rebuild time, the new PM 9 went into service right on time at an operating speed of 1,330 m/min. From the first day on, it has been producing SCB paper in non-stop operation. Haindl's high demands on operating speed, overall efficiency and production output were significantly exceeded after only two months. Thanks to the excellent cross-profile for humidity, basis weight and sheet thickness, online production requirements for SCB paper are ideally met. The low mill waste quota, and above all the positive feedback from numerous rotogravure printers, confirm that this was the right concept to choose.

7

New orders from the People's Republic of China

More newspapers are printed in China today than in any other country – a sign of the times. The People's Republic now has a population of 1.4 billion, and with steadily rising personal incomes, paper and board consumption is growing accordingly. Over the next five years, demand is expected to double from 30 to 60 million t.p.a. This applies to all grades, but particularly coated and uncoated graphic papers.

The Chinese government has therefore launched a comprehensive support program for important priority and pilot projects. Thanks to technical prowess and successful tendering, Voith Paper has already secured several contracts in connection with this ambitious plan.

Among these are some large new orders from **Shandong Chenming Paper Holding Ltd.** and **Jiangxi Paper Co. Ltd.** Both companies are leaders in the Chinese paper industry.

Offline coating system for Shandong Chemning Paper Holding Ltd.
With four JetFlow coaters at 4,635 mm web width and 1,500 m/min operating speed. Also two offline Janus MK 2 calenders with ten rolls each, at 4,600 mm web width and 1,000 m/min operating speed. For single and double-coated woodfree grades with basis weights from 70 to 210 g/m².

Newsprint machine for Jiangxi Paper Co. Ltd.
Incorporating Voith Paper key components such as GapJet headbox with ModuleJet technology, DuoFormer TQv, DuoCentri II press, TopDuoRun dryer section and Sirius winder. For 7,000 mm wire width and 1,500 m/min design speed. Output 540 t/day of newsprint, basis weight 35 to 51 g/m².

Total contract value: DM 210 million

On November 8, 2000 the China National Technical Import and Export Corporation (CNTIC) signed two more large contracts with Voith Paper. This reflects our fruitful cooperation with this organization and Voith Paper's outstanding reputation in "The Middle Kingdom". The first of these orders involves a complete offline coating system, with coater and two Janus calenders, for Shandong Chenming Paper Holding Ltd. The second order entails newsprint and improved newsprint machines for Jiangxi Paper Co. Ltd.

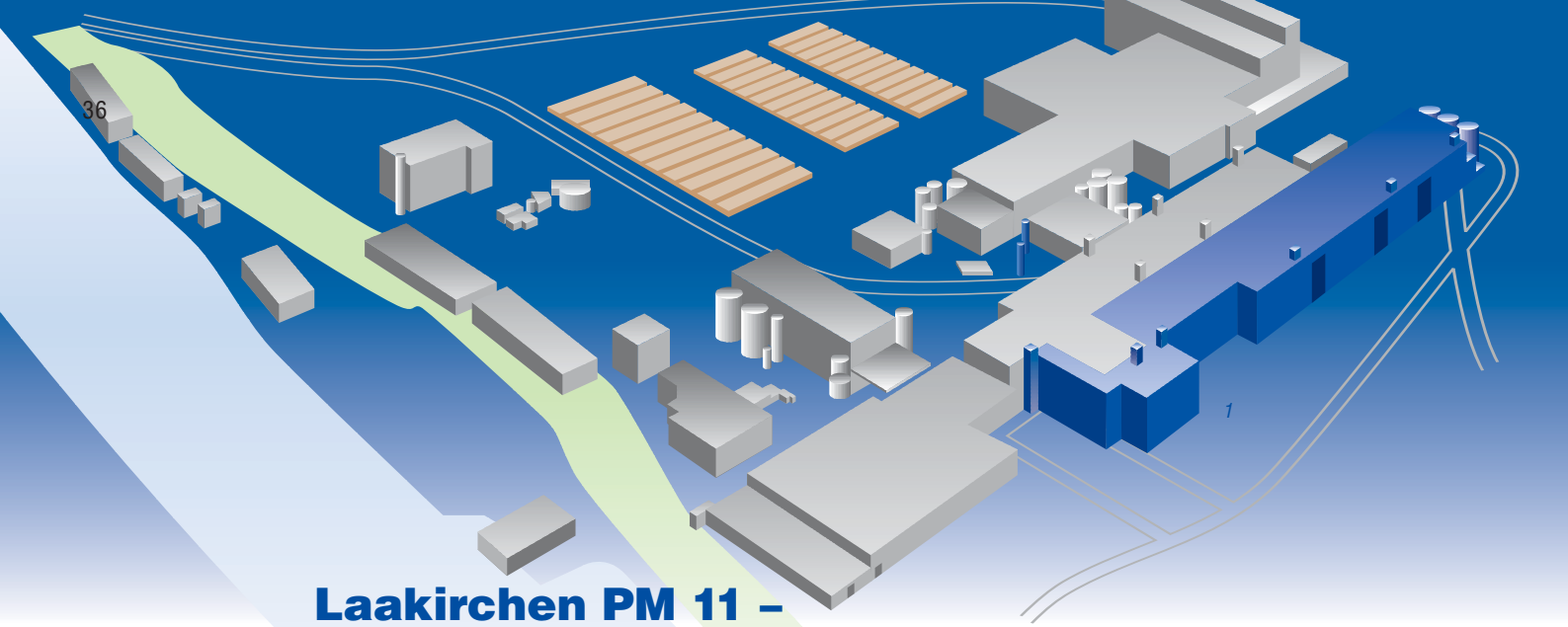
These pictures give some impression of the contract signing ceremony and subsequent get-together in the impressive "Great Hall of the People".

Agreements were also signed for production technology transfer to state machine-building companies. Voith Paper thus meets an important SETC requirement for local production of paper machine parts and line components according to Voith Paper specification.

This is an important contribution by Voith Paper to the partnership required for modernizing China's older paper mills.

The contract signing ceremony – held in the "Great Hall of the People" with high-level delegations from the Ministry of light industry and the State Economy and Trade Commission (SETC) – was broadcast on Chinese TV and radio and headlined in the national press. This clearly reflects the importance attached by China to upgrading its paper industry as part of the enormous national effort toward a modern and competitive state economy.

The commissioning of the new machines toward the end of 2002 and at the beginning of 2003 will be a very special occasion – seventy five years previously, in 1929, the first Voith paper machine in China went on line. It has been followed since then by numerous other machines for practically all grades. This just goes to show that global playing and long-term partnership are not a modern concept by any means.



Laakirchen PM 11 – a challenge for SC-A plus papers

In mid-October last year, the Austrian company, SCA Graphic Laakirchen AG, ordered a new paper machine from Voith Paper. The purpose of this investment is to further expand the market position in high-grade SC-A plus magazine papers, and to enhance mill profitability at SCA Graphic Laakirchen AG.

With a design speed of 2,000 m/min and a web width of 9,650 mm, the new PM 11 will produce 240,000 t.p.a. of SC-A plus graphic papers with basis weights between 52 and 56 g/m^2. The new machine, to go on line at the end of May 2002, is designed for a future capacity expansion to 400,000 t.p.a.

After years of intensive planning, SCA Graphic Laakirchen AG received approval from its parent company, Svenska Cellulosa Aktiebolaget (SCA), for a new PM 11 to replace the smaller and outdated PM 3. The new PM 11 will be erected in a machine room around 300 metres long adjacent to the existing PM 10. The extensive structural work required is already well underway.

The entire new PM 11 line is based on the Voith Paper **"One-platform paper machine concept"**. Unique worldwide, this new concept impressively demonstrates the pioneer role of Voith Paper in partnering the paper industry with future-

2

Technical data of the new PM 11
Wire width: 9,650 mm
Product: SC-A plus, basis weights 52 to 56 g/m^2
Output: 240,000 t.p.a. (phase 1),
400,000 t.p.a. (phase 2)
Design speed: 2,000 m/min

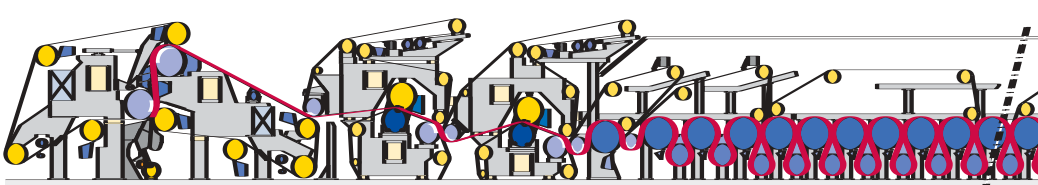


Fig. 1 : Location of the new PM 11 (marked in blue).

Fig. 2: SCA Graphic Laakirchen today.

Fig. 3 : Board Chairman Michael Rogowski (standing in the centre) with his company management and the SCA Graphic Laakirchen/ Voith Paper project team.

Fig. 4: Ole Terland, Board Chairman of SCA Graphic Laakirchen until October 2000, talking with Michael Rogowski and Harry Hackl.

3

4

oriented technologies. The great advantage of this modular concept is that it can be expanded and adapted according to production demands and paper quality requirements.

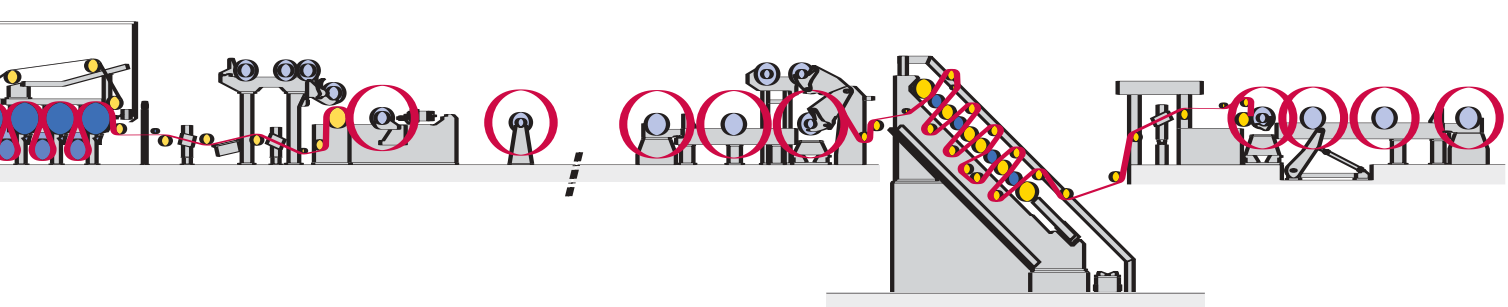
The forming system in PM 11 comprises a DuoFormer TQv with ModuleJet headbox. Maximum dryness and optimal paper quality with minimal 2-sidedness are ensured by a Tandem NipcoFlex press with two double-felted shoe presses. Furthermore, PM 11 will incorporate TopDuoRun advanced dryer technology.

Minimal paper losses and optimal roll quality will be assured by the Sirius winder, and the offline Janus MK 2 technology will ensure optimal calendering results. Our **"One-platform paper machine concept"** has now been implemented for all main graphic grades, with six new paper machines built on this principle:

- Palm paper mill, Eltmann, Germany: newsprint
- Lang paper mill, Ettringen, Germany: SC papers
- Haindl Papier, Schongau, Germany: SC papers
- Soporcel (Sociedade Portuguesa de Celulose), Portugal: woodfree copying papers
- Perlen Papier, Lucerne, Switzerland: LWC offset papers
- SCA Graphic Laakirchen, Austria: SC-A plus papers.

The phase 1 concept of this new machine is aligned to the reputed Laakirchen SC-A plus quality. A big advantage of the Voith Paper **"One-platform paper machine concept"** is that in a later phase, the machine can easily be adapted to future market demands.

For Voith Paper this order is testimony to our pioneering achievements in the SC-online sector, including for example Ettringen PM 5 and Schongau PM 9. The choice of this Voith Paper machine concept by SCA Graphic Laakirchen for first-class magazine papers represents a further challenge in this direction.



Procor – a challenge for Voith Brazil
New production line for corrugating medium and test liner

The author:
Nestor de Castro Neto,
Voith Paper São Paulo, Brazil

In May, 2000, Voith Paper was chosen by Papeles Cordillera S.A., a CMPC Group company, as the supplier of a complete plant for production of Test Liner and Two-layered Corrugating Medium papers, within a basis weight range of 90 to 300 g/m², using mainly recycled paper and pulp in bales.

The CPMC Group is the second major paper manufacturer in Latin America and has 16 paper mills spread over many countries of the continent, producing pulp, printing & writing papers, newsprint, tissue and packaging & board papers. This traditional client has been placing important orders with Voith Paper Brazil in recent years, amongst which we can highlight the Procart project, installed 3 years ago and, that has exceeded the guaranteed production, and a major rebuild of the newsprint machines in Inforsa mill, 2 years ago.

The project named Procor will be implemented in Puente Alto, Chile, where CMPC have already 5 machines running, the new machine will result in the shut down of existing PM 9.The 5.5 m wire width paper machine will have initial production capacity of 150,000 tons/year at a maximum speed of 1,000 m/min, and a total capacity at future of 230,000 tons p.a.

The contract with Voith Paper comprises the supply of the total production line including stock preparation system, the paper machine, the auxiliary equipment, electrification, cranes, piping, project management, erection, start-up and follow-up after the start-up.

With globalization, the Latin American companies have looked for the optimization of their structures, focusing mainly on their core business. This change resulted in a reduction of their Engineering Departments. Voith Paper has realized this and has build up expertise to support the paper industry in implementing a complete paper production line. In the case of Procor, Voith Paper as the main supplier acts as the contractor for the whole project with th following supply:

Fiber System

- Pulper for recycled pulp, including pulper feeding
- Pulper for virgin pulp, including pulp bale conveying system
- High density cleaning
- Deflaking
- Low density cleaning
- Broke system
- Water system.

Paper Machine

Headbox

One MasterJet F/B headbox with ModuleJet for the bottom wire and one MasterJet F/B headbox without ModuleJet for the top wire.

Contract signing by the Papeles Cordillera and Voith Paper management:
Osvaldo S. Martin, Voith Paper São Paulo (on the left); Antonio A. Ruiz-Clavijo, Papeles Cordillera; Kurt Brandauer, Voith Paper São Paulo; Pedro H. Barros, Papeles Cordillera.

Sheet formation
A 29 m long bottom wire with drainage elements and suction roll. A 10 m long top wire, prepared to receive a DuoFormer D. Provision for a second 10 m long top wire.

Press Section
A Tandem NipcoFlex press, the first of the kind in Latin America, with 2 nips for a 1,200 kN/m maximum load and 2 separate pick-up rolls, one between the wire section and the press section and the other, between the first and the second presses.

Dryer Section
The first two TopDuoRun dryer groups of the pre-dryer section are equipped with vacuum rolls and DuoStabilizers.

The after dryer section is equipped with DuoRun groups.

SpeedSizer
For size application on one or both paper sides.

Hard Nip Calender
This calender consists of a vertical two-roll arrangement, with heated bottom roll and EcoNip top roll, for a good paper surface quality.

Reel
With reel spool storage for automated transport and change of reel spools.

Slitter and Winder
Able to manage the whole paper machine production and with capacity to produce sets of up to 8 paper rolls.

Auxiliary Equipment

- Mechanical drive equipment
- Pumps
- Piping and valves
- Steam system
- Vacuum system
- Hood
- Building ventilation
- Cranes
- Paper roll handling system
- Electrification
- Instrumentation
- DCS
- QCS manufactured by Voith Automation

Engineering

- Machine and system engineering
- Basic and detailed engineering for the complete plant
- Process, paper machine
- Project management
- Field management
- Procurement

The erection work on site is expected to start in January, 2001; the commissioning in September 2001; and the start-up is scheduled for December 18, 2001. According to the Procor General Manager, Mr. Pedro Huerta Barros, this project is the beginning of a new era for the CMPC Paper Division, as they have plans to develop this market all over South America, installing similar machines in other countries.

Modern Karton – successful startup of high-tech white top liner machine in Turkey

The author:
Adolf Wachter,
Paper Machines
Board and Packaging

In 1998, EREN Holding, Turkey, decided to extend their production capacities in the field of corrugating medium, testliner and white top liner and placed an order for the delivery of a paper machine with Voith Paper.

The EREN group has more than 2,750 employees in a variety of business segments, ranging from textiles, cement, energy and tourism to paper production.

The paper manufacturer, Modern Karton, is one of the largest companies of this group and one of the largest and most advanced paper mills in Turkey and Europe.

The paper mill is located in Corlu, the Southern region of european part of Turkey, approximately 90 minutes by car from Istanbul Airport.

Corlu paper mill has two other paper machines: PM 1 (2,250 mm, 40,000 tons/year) and PM 2 (2,500 mm, 60,000 tons/year) produce fluting grades from recycled paper and straw pulp (from its own production line).

The concept of the new PM 3

PM 3 is designed for an annual production of 200,000 tons of fluting, testliner and white top liner.

2

Fig. 1: Modern Karton in Corlu, Turkey.

Fig. 2: DuoCentriNipcoFlex press.

Fig. 3: Speedsizer film press.

1

PM 3 is the most advanced paper machine in Turkey and is equipped with components specifically adapted to its production program: It is the first paper machine in Turkey fitted with a ModuleJet™ dilution water control headbox; also, the first shoe press ever used in Turkey has been installed in Corlu.

Secondary fiber preparation system

Andritz AG, Austria, delivered a preparation system for recycled paper with a capacity of 750 tons/day and a deinking line for 400 tons/day.

Wire section

The wire section has one fourdrinier wire for the backliner and one for the topliner, which produces the paper as a top wire against machine direction and couches the topliner onto the backliner.

The stock for both layers is supplied through StepDiffusor™ headboxes with pulsation attenuators, with the backliner headbox being fitted with dilution water control because of the higher basis weight of the layer. This helps to achieve excellent CD basis weight profiles since the dilution water quantity can be adjusted individually across the machine width.

The top fourdrinier wire for the topliner is equipped with a DuoFormer™ D/K. In this hybrid former, approximately 30 % of the amount of water is drained through the top wire, and the formation of the topliner is improved through individually adjustable loading pressures of the dewatering blades.

Press section

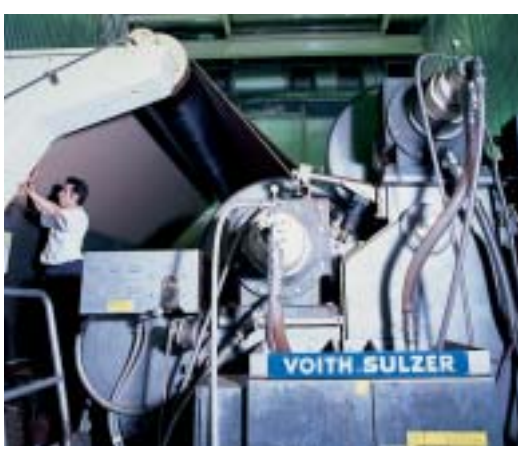
A DuoCentri NipcoFlex™ press was selected for the press section. This complex name stands for a simple, compact and proven Voith Paper standard concept for packaging paper machines for the grades and speeds mentioned above.

After the pick-up suction roll, the paper web runs over a central suction press roll with two press nips (approximately 100 and 120 kN/m).

The third nip is formed by a NipcoFlex™ shoe press with a line force of up to 1,200 kN/m. This design allows maximum dryness and optimum web run without any open draws and thus excellent runnability.

During web threading, the full-width web is taken off the wire, threaded through the press section and directed into the press section broke pulper by a pneumatically loaded take-off doctor installed at the plain roll of the NipcoFlex™ press. For safety reasons, the doctor system comprises another pneumatically ad-

3



4

5 The after-dryer section comprises five single-tier cylinders, with the first (bottom) cylinder being chromium-plated and a two-tier group. Again, performance and runnability are ensured by components identical to those described for the pre-dryer section.

The entire dryer section (with the exception of the film press) is fitted with a ropeless tail threading system, where the tail is transported through the dryer groups by means of air nozzles located at

justable doctor used as cleaning doctor to keep the roll clean and to prevent any damage to shoe, press sleeve or felts in case of any problems with the first doctor.

Dryer Section

The first 14 dryers of the dryer section are single-tiered. The proven DuoRun™ system with perforated dryer fabric rolls, fitted with DuoStabilizer™ boxes for vacuum supply, ensures a smooth web run at maximum speeds. The remaining cylinders of the pre-dryer section are divided into two groups and are arranged in two tiers.

The rolls of these two-tier groups are arranged asymmetrically to provide sufficient space for stabilizer boxes. The task of these boxes is to stabilize the web when leaving the dryer.

The pockets between the dryers are aerated by blowing doctors which blow dry air from the doctor back across the entire machine width into the pockets, thus ensuring a controlled moisture discharge.

The most important data of PM 3:
Net production 200,000 tons/year
Grades: Fluting, testliner and white top liner
Furnish 100 % recycled paper
Machine width after reel 5,000 mm
Operating speed 1,000 m/min
Design speed 1,300 m/min
Basis weight range 90-175 g/m²

Fig. 4: PM 3.

Fig. 5: Dryer section.

Fig. 6: Final section.

the doctors. This system guarantees minimum threading times, greatly improves the runnability of the machine and reduces operating cost (no ropes required).

Film press
A Voith Paper Speedsizer™ is used as starch application unit. This film press, with roll diameters of 1,300 mm, allows a defined application of starch, size or even color with a consistency of up to 13 %, thus saving drying energy in the after-dryer section.

6

Calender
A two-roll hardnip calender arranged upstream of the reel is used for surface treatment.

Reel
A Voith TR 125 reel with reel spool magazine for four empty reel spools and fully automatic change-over system permits roll diameters of up to 3,500 mm.

Start-up

Shortly after start-up on July 29, 2000, the machine produced salable testliner; the white top liner grades produced were of top quality even without major optimization measures.

Voith Paper thanks Modern Karton for the cooperative project handling and wishes them all the best with their new PM 3. Voith Paper looks forward to a good cooperation with Modern Karton in the future.

Ali İhsan Aras,
Technical Coordinator,
on the PM 3 Project

It is our aim to produce high-quality test liner and white top liner from 100 % low-grade waste paper. At the same time, we want to produce low basis weight fluting paper.

To achieve these targets, we have built very sophisticated stock preparation lines for OCC and DIP and very well designed approach-flow systems with all the necessary auxiliary equipment.

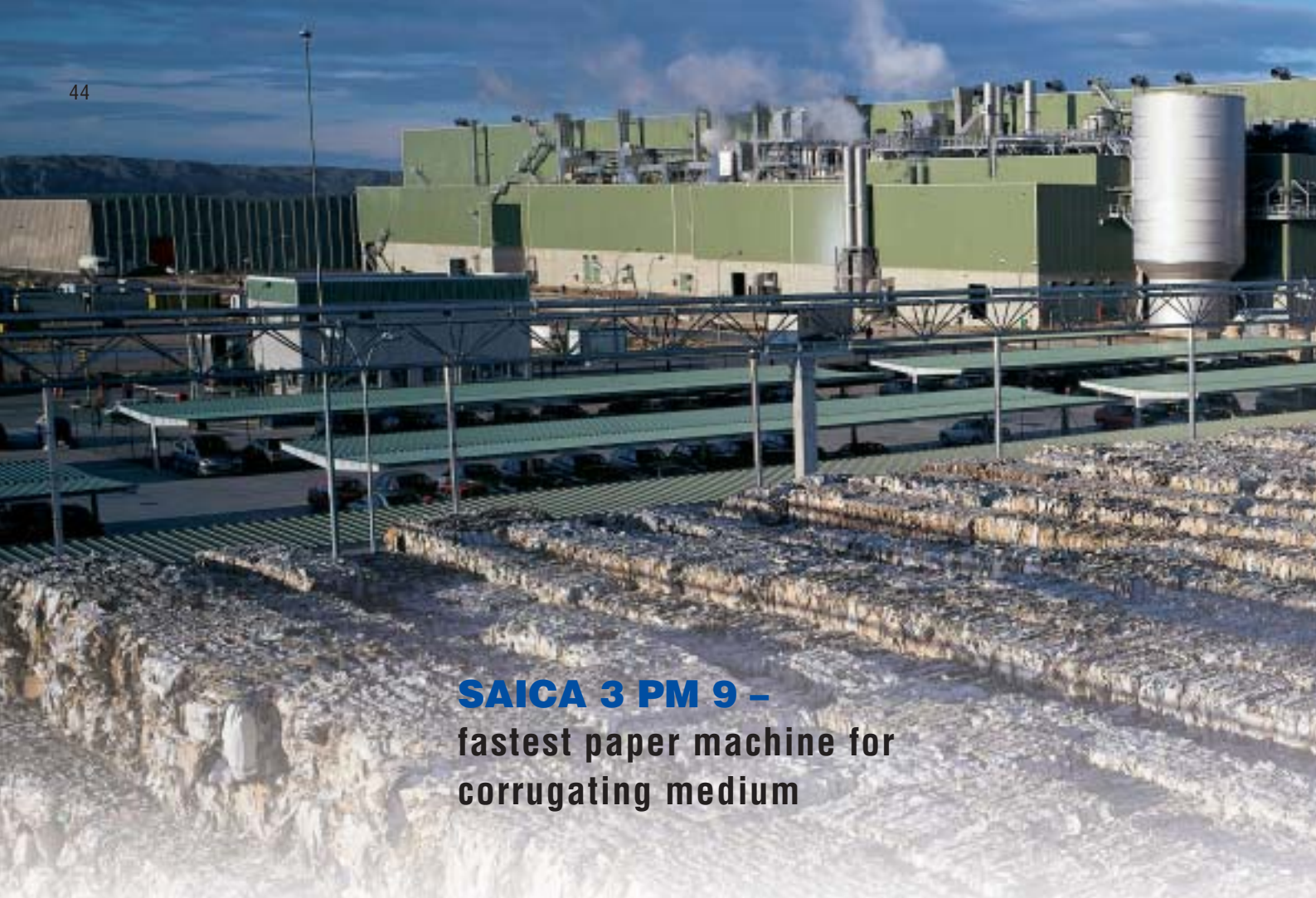
This innovative machine has been producing top-quality paper at high operating speeds (up to 1,000 m/min.) right from the start.

Now we have a production capacity of 200,000 tons per year for our customers in the corrugated case industry located in Turkey and the Middle East. Apart from that, the trim width of 5,000 mm we provide is an optimum size for the corrugated case industry.

We are very proud of our state-of-the-art machines.

The team of Voith Paper and the staff of Modern Karton at Çorlu have done an excellent job.

Modern Karton thanks Voith Paper for the good cooperation, which started with the signing of the contract and lasted until start-up.



SAICA 3 PM 9 – fastest paper machine for corrugating medium

The author:
Helmut Riesenberger,
Paper Machines
Board and Packaging

The new PM 9, in SAICA 3, started up on schedule in early October 2000. Already during start-up, it became clear that this new paper machine for the production of corrugating medium sets new standards for the future:

On October 12, 2000, PM 9 started up with a speed of 935 m/min at a basis weight of 105 g/m^2. No other paper machine for corrugating medium has ever reached such a start-up speed.

SAICA – Spain's major manufacturer of corrugating medium

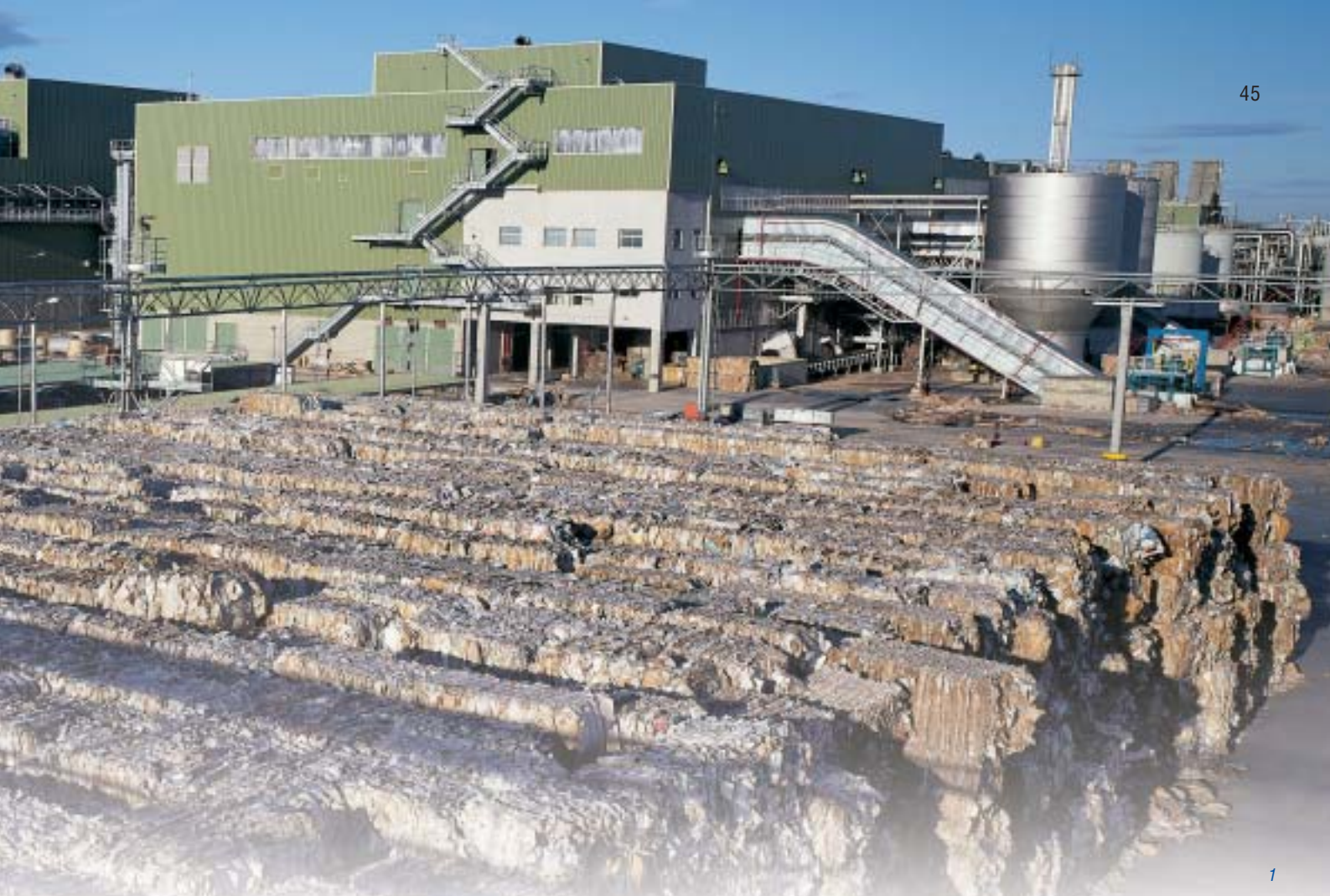
Sociedad Anónima Industrias Celulosa Aragonesa, (SAICA), is Spain's largest producer of corrugating medium and one of Europe's leading manufacturers with an annual production capacity of 850,000 tons. The start-up of PM 9 increases SAICA's capacity by 350,000 tons to 1.2 million tons per year.

In 1943, the first paper machine was put into operation with an annual production of 1,937 tons of corrugating medium. Since then, SAICA has continuously made investments and extended its production facilities. The paper mill SAICA 1, consisting of PM 6 and PM 7, is situated directly in Zaragoza.

In 1992, SAICA 2, located approximately 25 km out of Zaragoza, started production with its PM 8. Already in May 1995, the Board of Management decided to build a new paper machine for corrugating medium in SAICA 3, next to SAICA 2. To follow the ever-growing trend towards lighter paper grades, the new PM 9 was designed for a basis weight range of 75-110 g/m^2. On January 28, 1999, SAICA placed the order for the delivery and installation of the new PM 9 for SAICA 3, including the stock preparation system, with Voith Paper.

Fig. 1: SAICA in Zaragoza, Spain.

Fig. 2: Two-stage MultiFractor fractionation system for a production capacity of 1,200 t/24 h.



1

SAICA PM 9 – the world's fastest production line for corrugating medium

The concept of the new machine sets new standards in many respects. The wire width of 8,100 mm alone is very impressive, but PM 9 far outshines other machines due to its enormous speed: The new production line is designed for a maximum operating speed of 1,450 m/min. In comparison, the fastest paper machines for corrugating medium currently run at approximately 1,050 m/min, which means that PM 9 will run almost 50 % faster than the fastest production lines for corrugating medium do now.

2

Already in the first days after start-up, PM 9 managed to achieve its first speed record: With 935 m/min at 105 g/m^2, the start-up speed of PM 9 was only slightly below the design speed for this basis weight range. Any other paper machine for corrugating medium so far has never reached such a high start-up speed.

The stock preparation system

The stock preparation consists of two complete TwinPulp™ pulping lines, each for a pulping capacity of 850 t/24 h and each with an 80 m^3 pulper supported by a Contaminex™ detrashing system.

This is followed in each line by two-stage Turboseparator™ secondary pulping (2.4 mm screenplate holes) together with rejects cleaners and final stage Combisorter™ hole screening (also 2.4 mm). The full stock stream is then fed to a two-stage MultiFractor™ fractionation system (0.2 mm slots) with a production capacity of 1,200 t/24h. The long fiber fraction is passed through low consistency cleaners and MultiScreen™ fine screening (0.15 mm slotted C-bar™ baskets) followed by thickening in disk filters, then dispersion and refining. The short fiber fraction is low consistency cleaned and also thickened in disk filters. The disk filters were supplied by Andritz AG, Graz/Austria.

Both lines handle EOCC supermarket and household recovered papers. In the future, one line will convert to handling recovered kraftliner and boxboard with a production capacity of 350 t/24 h.

Voith Paper's supply responsibility also included a rejects handling system from the joint venture partner Meri.

The design of the plant was developed in close cooperation with the customer, with the need for extremely high cleaning efficiency and exacting end product quality being particularly important factors, bearing in mind the recovered paper quality used here.

3

Fig. 3: S.A.I.C.A. PM 9
Wire width: 8,100 mm
Design speed: 1,500 m/min
Production capacity: 350,000 tons/year
Grade: Corrugated medium, 75-110 g/m².

Fig. 4: Start-up PM 9.

Fig. 5: SpeedFlow.

Fig. 6: The final section.

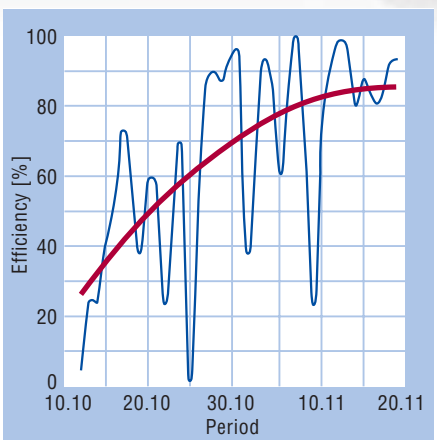
The paper machine

The complete paper machine was delivered by Voith Paper and basically comprises the following main components:

A MasterJet™ G headbox equipped with ModuleJet™ dilution water control ensures optimum CD profiles. The dilution water technology makes it possible to use the profile bar as a tool for adjusting an optimal fiber orientation angle.

The DuoFormer™ Base, developed especially for the production of board and packaging papers, is used for the first time in such a high-speed range. It ensures the optimum utilization of the fiber potential in terms of strength and guarantees high, controlled drainage, as well as excellent formation.

In the press section, the proven Voith Paper shoe press technology is used: Paper run in the DuoCentri NipcoFlex™ press is fully closed, ensuring maximum dryness, good strength values, as well as high runnability. The compact gap former



4

design and shoe press configuration reduce space requirements, which help keep building expenses down.

Paper quality and runnability are central features in the dryer section. The entire dryer section uses a single-tier concept (TopDuoRun™) and is fitted with DuoStabilizers™. It consists of pre- and after-dryer sections. A ropeless transfer system and low-maintenance water jet tail cutters are installed for safe and rapid web transfer in both dryer groups. The first four groups of the pre-dryer section are equipped with DuoCleaners™ for cleaning the dryer fabrics.

A SpeedFlow™ is used to increase paper strength values through surface sizing, followed by an Airturn for contactless transfer into the after-dryer section. PM 9 is, thus, the first paper machine for corrugating medium equipped with the new Voith Paper SpeedFlow™.

The Sirius™ reel, also used for the first time for packaging papers, ensures precise and exact line force control over the entire rewind diameter, as well as maximum efficiency with roll diameters up to 3,900 mm and minimum paper losses during rewinding.

Ahead of SpeedFlow™ and Sirius™ reel, a Fibron system is used for rapid transfer.

Installation and start-up in record time

On February 12, 2000, installation began with the first stand of the after-dryer section being mounted on the foundation

5

6

Statement of Francisco Carilla, Project Manager for the SAICA 3 project

During the last years, there has been a continuous trend towards reducing the basis weight of corrugating medium. When SAICA's Board of Management decided to invest in a new mill for the production of light-weight fluting, we asked the major PM suppliers for references. Soon we noticed that the paper machine we wanted did yet not exist anywhere. After many trials on different paper machine pilot units with different forming and pressing concepts, we finally chose Voith as the supplier for the complete stock preparation line and PM.

During the project development phase, there was a continuous and intensive cooperation between the two project teams, who both tried to provide the best of their experiences in the various fields for designing the plant.

Start-up was performed in a really smooth way, and our first impressions of PM 9's performance and runnability, as well as its paper quality, are very positive. No big problems occurred during the commissioning or start-up phase, and we feel that PM 9 will exceed the project guarantees thanks to the deep involvement and cooperation of SAICA, Voith and the other major suppliers of this project.

7

Fig. 7: The management of SAICA and Voith Paper in front of the new PM.

Fig. 8: Helmut Riesenberger, project manager of Voith Paper and Francisco Carillo, project manager for the project SAICA 3.

8 rails. By mid-August 2000, the first checkouts, drive tests and electro-mechanical test runs were made; and on October 4, stock was on the wire for the first time.

On October 12, Spain's national holiday and probably Zaragoza's most important holiday, Virgen del Pilar, at 00.20, the time had come: The first paper was wound on the Sirius™ reel. As mentioned in the beginning, the new PM 9 started up with the impressive speed of 935 m/min and already on the following day, salable paper was produced.

Although the installation phase had begun approximately two months later than expected due to delays in civil engineering work, the deadlines for the end of the installation phase and for start-up were both met. This was only possible due to the great efforts of the motivated teams of both customer and supplier as well as the intensive and excellent cooperation of all parties concerned. Even after completion of the start-up phase, Voith Paper will continue to take an active part in the optimization of the plant.

Voith Paper thanks all persons responsible for the success of this project and wishes the SAICA group all the best with its new flagship, the world record machine PM 9.

"ahead 2001

Challenge the Future!
Comprehensive Solutions for Paperboard & Packaging

"ahead 2001 – International Customer Conference of Paper Machine Division Board & Packaging
Vienna, May 8-10, 2001

Under the title "Challenge the Future! – Comprehensive Solutions for Paperboard & Packaging", we are delighted to invite customers from all over the world to come to Vienna from May 8 to May 10, 2001 to exchange information and discuss the latest developments in the board and packaging paper industry.

During this meeting, our team and international guest speakers will present the **most recent trends** and **solutions for a successful future**: Based on trend-setting Voith Paper reference projects realized in the past years, we will give you a survey of the most advanced technologies used in practice and their actual benefit for your company, i.e. optimization of your products while reducing at the same time the total costs in the production process.

Enjoy with us and guests from all over the world Vienna in the springtime for a few days! Of course, we have worked out an attractive supporting program for you. – Please make an entry in your calendar for the period from Tuesday, May 8, to Thursday, May 10, 2001.

Our team is looking forward to seeing you in Vienna.

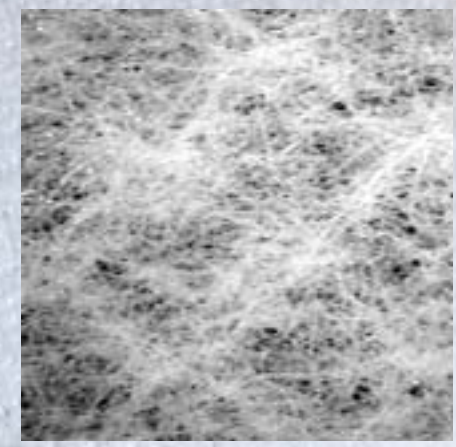
If you are interested, please contact
Voith Paper Board and Packaging Paper Division, St. Poelten, Austria:
Ms Liselotte Stamminger,
fax: +43 (2742) 71883,
e-mail: liselotte.stamminger@voith.com.
Further details will be given under
www.ahead.voithpaper.com
(from February 15, 2001).

"ahead 2001 – Have a look to see what's awaiting you: Evening reception at Palais Ferstel (left), Customer Conference in the Redoutensäle of Vienna's Hofburg Palace (above), 'gemutlich' get-together at Schreiberhaus (below), a typical Viennese Heuriger.

New developments with the TissueFlex™

1

2



The author:
Thomas T. Scherb,
Voith Paper São Paulo, Brazil

Another successful application for TissueFlex™ Technology

The TissueFlex™ technology with the shoe press against the Yankee cylinder, is successfully making papers with high bulk and softness on four operating units. Three other units have already been sold, including two complete new CrescentFormers.

With this new technology, it is possible to choose between an increase of paper quality or cost reduction by saving fibers or by using more recycled fibers. On a machine rebuild, this means a payback period of approximately one year. The investment costs are extremely low when compared to the costs of other technologies.

Most evident is the extremely simple and easy operation. The flexible shoe fits to the Yankee cylinder profile and eliminates the necessity of crowning the press. It also permits the ability to work with different linear forces for different products.

In our twogether magazine No. 8, we showed the TissueFlex™ with the shoe for bulk gain. We are now presenting the bulk and absorption gain optimization for towelling using TissueFlex™ technology associated with patented forming fabrics from Voith Fabrics called DSP (Dimensional Structured Paper). We will also review the new and encouraging results with the TissueFlex™ incorporating the shoe for dryness and production gains.

Significant advancements in towelling

We already proved the bulk and softness gain with different tissue papers and decided to optimize bulk and absorption gains. The TissueFlex™ configuration associated with a DSP imprinting wire improves, even more, the bulk and absorption gains.

Fig. 1: DSP forming fabric.

Fig. 2: Tissue made with DSP.

Fig. 3: Bulk values.

Fig. 4: Water absorption speed.

Fig. 5: Specific water retention capacity.

Fig. 6: Functionality index.

▲ *3 kg/ton Kymene, 20% CTMP, 80% SW*
▲ *7 kg/ton Kymene, 1 kg/ton CMC, 30% CTMP, 70% SW*

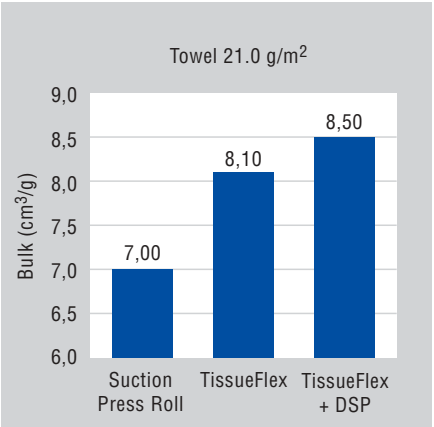
The trials were conducted with a Crescent Former configuration at our tissue pilot machine located in São Paulo, Brazil. The pilot machine is able to run trials in continuous operation, with a production of up to 30 metric tons per day.

The target was to combine the TissueFlex™ effect of producing a less compacted paper with the pattern created by the DSP wire *(Fig. 1)*. The pattern is characterized by small depressions in the paper – with more fiber around and less fiber in the middle of the depressions *(Fig. 2)* – which, due to capillary forces, increase the absorption.

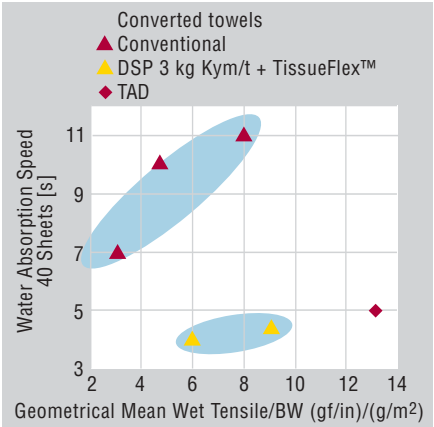
There are two types of absorption measurements: "water absorption speed (sec)" and "specific water retention capacity (gH_20/gfibers)".

Water absorption speed is very important. When you use towel paper to dry a wet surface, and the absorption speed is slower than the movement of passing the towel over the surface, the surface remains wet. In our trials, we measured the time required for 40 sheets, cut in 3" squares, to become totally saturated when put in contact with the water.

Specific water retention is also important, since it measures how many grams of water, per gram of fiber, the paper will retain for a certain period of time. In our trials, we took two sheets, cut in 9" squares, folded them as bellows and immersed them in water for 60 seconds, removed them, and left them for an additional 60 seconds before weighing.



3

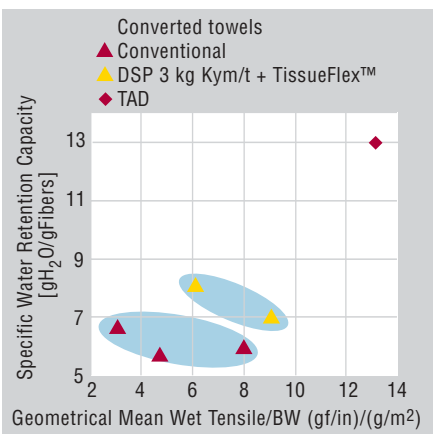


4

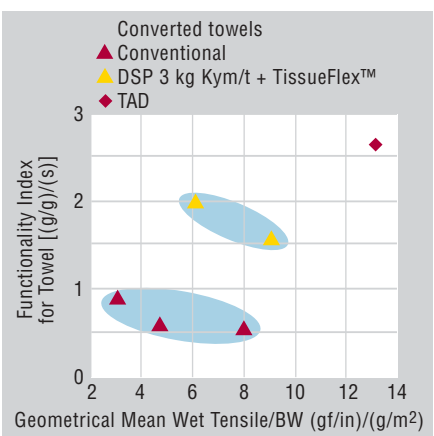
Each market uses one or the other measurement to evaluate their kitchen towel, however, both give a complete evaluation of the towel paper used daily by households.

We define a resulting factor, called "functionality index for towel", which is the specific water retention capacity divided by the water absorption speed. The higher the water retention capacity, the better. The shorter the absorption speed, the better.

Fig. 3 compares bulk values of the TissueFlex™ with and without DSP wire, and shows the additional bulk gain provided by the imprinting wire.



5



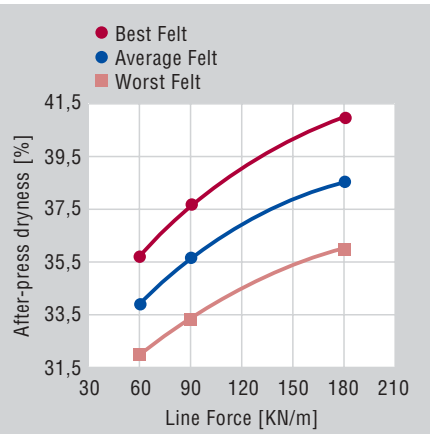
6

Fig. 7: After-press dryness.
50% HW, 50 % SW, V = 1,500 m/min
G = 16 g/m², Cold yankee and Hood.

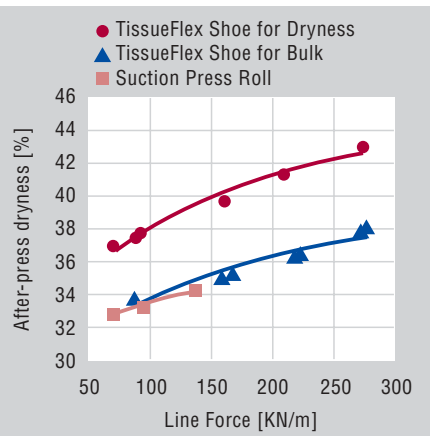
Fig. 8: After-press dryness.
50% HW, 50 % SW
v = 1,500 m/min
Grammage = 12 g/m²
Cold yankee and Hood.

Fig. 9: Bulk.
50% HW, 50 % SW
v = 1,500 m/min
Grammage = 12 g/m²
Cold yankee and Hood.

7



8



9

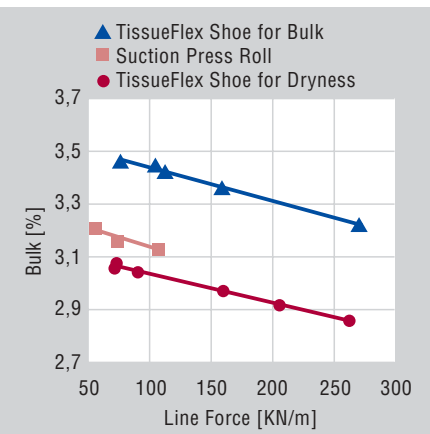


Fig. 4 shows values of water absorption speed for towel paper obtained with TissueFlex™ and DSP wire, in comparison with towel paper produced on conventional machines, as well as with TAD machines.

Fig. 5 does the same comparison, now based on the specific water retention, and *Fig. 6* presents the final balance with the "functionality index" factor, always as a function of the geometrical mean value of the MD and CD wet strengths divided by basis weight.

It is important to note that these are results from the first trials conducted without the use of any absorption additives and special fibers, and without using the best embossing method at the conversion for this type of paper.

In addition to bulk gain, a significant production gain on new and existing machines can be expected.

With the shoe being used for bulk, we received bulk and softness gains for the same line force and without loss of after-press dryness or production, compared to the conventional suction press roll.

Results achieved over a number of trial months show that, when using the best suited felt for the TissueFlex™ and, at the same time, using the shoe for bulk, there is an additional gain in dryness of 1.5%, compared to tests made earlier using a conventional felt, *Fig. 7*.

A significant production gain using the shoe for bulk is also possible, but only on new machines, with a T rib, reinforced Yankee and if operated with higher line forces.

Last year we developed a new shoe for dryness, and production increased with existing machines without losing bulk. The Yankee will still operate under conventional line forces as with suction press rolls.

The reason for the dryness gain is the asymmetrical nip, quick pressure drop and less rewetting of the sheet after the press.

The attached tables compare the results obtained with the two kinds of shoes to those obtained with the suction press roll.

The attached *Figs. 8 and 9* show the differences between the two shoes and the suction press roll, regarding the after-press dryness and bulk, always in relation to the line force.

With the shoe for dryness, a gain of 4% after the press dryness was obtained. This represents a 16% gain of production, operating with conventional line

forces *(Fig. 8, with 90 KN/m)*. There was a slight loss in bulk compared to the suction press roll *(Fig. 9)*. In this case, the payback may occur in less than a year.

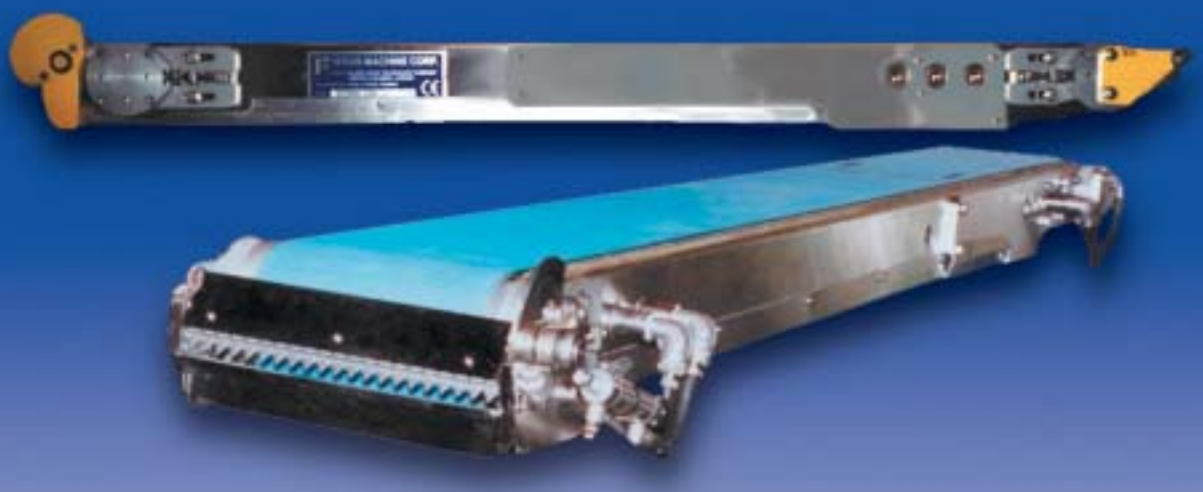
In the case of a new machine with T rib-reinforced Yankee, operating with higher line forces, the gain of dryness after the press may reach 7% *(Fig. 8 with 200 KN/m)*, however, there is a 10% bulk loss in relation to the suction press roll *(Fig. 9)*.

For some market segments, where bulk or softness is not important, a gain of 7% dryness after the press, which would also be an approximate 25% gain in production, would have an extremely strong economic impact.

TissueFlex x Suction Press Roll for conventional line forces:			
Line Force = 90 KN/m	Bulk	handfeel	production
Shoe for bulk with optimized felt	+++ ++++	++ +++	+ =
Shoe for production	=	=	+++
TissueFlex x Suction Press Roll for reinforced Yankees and higher line forces:			
Line Force = 200 KN/m	Bulk	handfeel	production
Shoe for bulk	=	=	+++
Shoe for production	--	-	+++++

Conclusion

The TissueFlex™ technology has proven that it has much to offer. In the case of towelling, the results will be further optimized through the continued development of other DSP wires and the optimization of embossing techniques. It is also possible to have in the same shoe press, a shoe for bulk gain and a shoe for dryness gain. Depending on the product, it is possible to change from bulk gain to production gain in only a few minutes. The same shoe press has two shoes fixed on the same supporting beam. By rotating the internal beam of the TissueFlex™ roll, one or the other fixed shoe can be positioned against the Yankee cylinder.



Fibron Machine Corp. – Voith Paper's total machine threading specialists

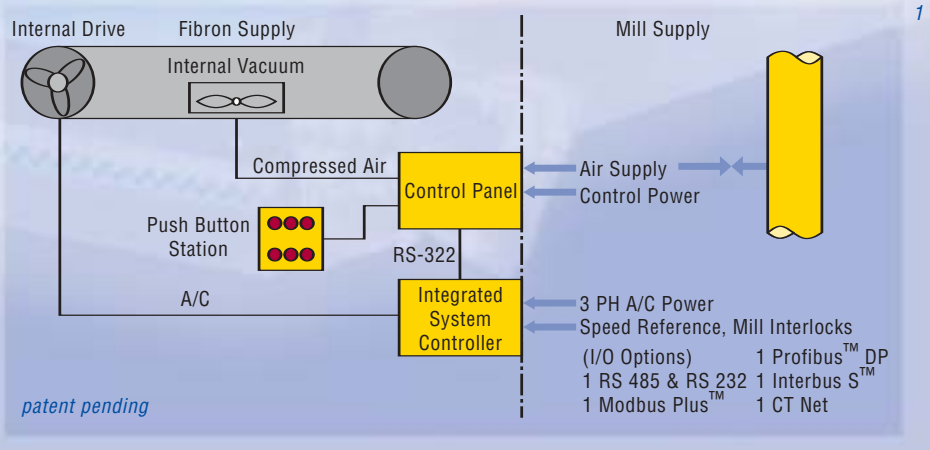
The author:
Allan Broom,
Fibron Machine Corporation,
Vancouver, Canada

Introduces its revolutionary new, patent pending Vacuum Tail Transfer (VTT) conveyor and vacuum technologies for the next millennium.

The new Fibron 3000 is the most advanced, compact VTT system ever developed, and is applicable for all paper and board grades. Each patent pending Fibron 3000 conveyor will incorporate a revolutionary, high power, internal drive with a fully integrated control system and the optimal vacuum source for each application chosen from a complete range of internal and external vacuum options. See *Fig. 1*.

Due to its new compact design and its total package options, Fibron 3000 minimizes mill integration requirements, and simplifies installation and commissioning requirements. For example, as shown in *Fig. 1*, Fibron 3000 has only simple power, air and control requirements from the mill.

Its integrated control system provides the mill with a full range of input/output options including RS 485 & RS 232 Modbus Plus, Profibus DP, Interbus S and CT Net. Most significantly, it provides complete threading system automation and control, including performance logging and remote troubleshooting capabilities.



1

Fig. 1: Fibron 3000™ "Fully Integrated Compact VTT".

Fig. 2: "Stable Vacuum" with VTT Turbo™ Vacuum Concept. Pressured air generates vacuum efficiently through an internal turbine.

It has been optimized for the slowest machine speeds to the highest machine speeds available today, and under additional testing it has been proven at speeds in excess of 3000 meters/minute. Fibron 3000 has proven itself ready for the next generation of paper and tissue machines.

Fibron 3000 is the most compact VTT conveyor threading system ever developed. This opens up a wide range of new online threading possibilities where a traditional VTT conveyor threading system simply would not fit.

Fibron's 30 years of experience and 4800 VTT installations worldwide have demonstrated that optimal VTT solutions are not provided by a "one size fits all" approach. As machine speeds increase and threading application requirements become more complex, Fibron responded with the development of 3 new VTT (Vacuum Tail Transfer) conveyor threading technologies:

VTT 2
VTT Venturi
VTT Turbo

As part of the Fibron 3000 VTT package (also available with our standard VTT conveyor packages) Fibron is able to provide the optimal vacuum technology for each application, by utilizing these three specialized vacuum technologies. This ensures every customer that they will be supplied with the best, most suitable technology to meet their unique requirements and to provide optimal system design and performance.

Each of these technologies generates stable and consistent vacuum levels along the complete length of the conveyor. This is critical for optimal threading performance. There is no pulsation or fluctuation of the vacuum levels down the conveyor during the threading process.

Fibron employs each of the conveyor technologies as required – both in combination with each other – and in combination with other threading technologies such as ropes, to design the most reliable, cost-effective threading solution.

VTT Turbo™ *Fig. 2*

This new, patent pending Fibron conveyor utilizes an internal air turbine driven by compressed air to create stable, consistent vacuum. This technology gives reliable threading performance for all grades, speeds, machine locations and configurations. With only a simple airline required to generate vacuum, its compact, energy efficient design makes it ideal for all space limited applications. It has significantly lower compressed air

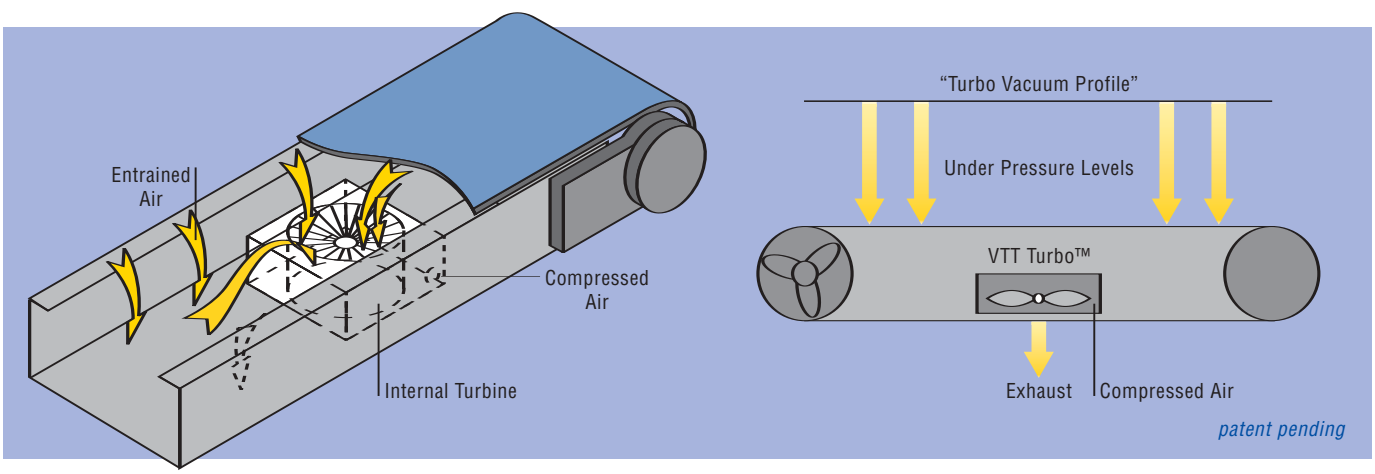
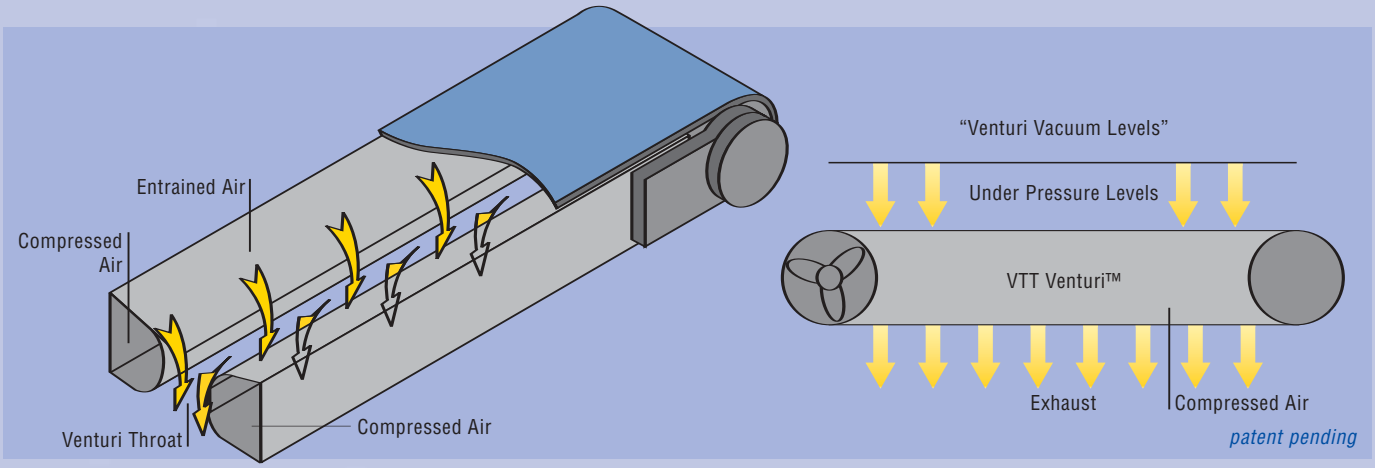


Fig. 3: "Stable Vacuum" with VTT Venturi™ Vacuum Concept. Vacuum is created by entraining air through the belt with a Venturi.



3

requirements than VTT Venturi and can be retrofitted into all existing Fibron conveyor boxes. Additionally a VTT Turbo equipped conveyor is self cleaning as it exhausts through the return run of the conveyor belt.

VTT Venturi™ *Fig. 3*

This new, patent pending Fibron conveyor employs compressed air and the "Venturi" effect to create a stable, consistent vacuum throughout the length of the box, although the high compressed air requirements limit the vacuum levels attainable.

Its compact size and reliable performance make it ideal for machine locations where space is limited and where compressed air supply is not an issue.

It is uniquely suited to tissue applications as there are no rotating parts and vacuum requirements for tissue are lower. Rotating parts are to be avoided as much as possible with tissue due to the dust and associated fire hazards. Additionally VTT Venturi is also self cleaning as it exhausts through the return side of the belt thereby preventing any dust build-up.

VTT 2™

Vacuum Tail Transfer technology, invented and developed by Fibron using an external fan, has a proven record of reliable threading for all grades, speeds and machine locations. VTT 2 upgrades the original VTT system by using 316 stainless steel construction, integrated low profile, head and tail pulleys for improved belt tracking and compact motor mounting for easier installation.

The external vacuum fan has the lowest power requirement of all the vacuum technologies because it uses no compressed air. This makes it particularly suitable for customers with compressed air limitations.

Only Fibron VTT conveyors provide stable, consistent vacuum, handle tail widths from 50-200 mm, and deliver proven, reliable threading for all grades from 8 g/m^2 tissue to 850 g/m^2 board and pulp. Fibron VTT conveyors are reliable for all speeds from 35 mpm to 2,200 mpm, and for all machine locations from the couch roll to the reel. A full range of integrated accessory devices, such as tail rippers, deflectors, reel threaders, calender shoes, stabilization trays and rope threading accessories, ensure optimum full machine threading performance.

Advantages of the Fibron VTT Conveyor Family

- Fibron 3000™ is the most compact conveyor threading system available on the market with a fully integrated drive and control system as standard.
- Full range of technology to ensure optimal system design and performance for every application.
- Full range of accessory products to improve overall threading performance.
- The only Vacuum Tail Threading expert with over 30 years application expertise and 4,800 installations worldwide.
- Proven performance on all grades from 8 g/m^2 tissue to 850 g/m^2 board and pulp; on all machine speeds from 35 MPM to 2,200 MPM; on all machine locations from couch roll to reel.
- Standardized threading procedures, with reliable threading regardless of grade, speed, crew or threading path.
- Reduced downtime, improved revenues.
- Improved operator safety.
- Improved machine efficiency; reduced operating costs.
- Single point responsibility for total machine threading operations from press to reel.
- Maximum flexibility in conveyor operational parameters.
- In house engineering expertise to provide easy integration with other threading technologies for reliable, full machine threading.

Conveyor Technology Summary

General	**Fibron 3000™ VTT**	**Standard VTT**	
Design speed	3,000 mpm	3,000 mpm	
Conveyor box	Stainless Steel	Stainless Steel	
Drive Belt	None	Timing or V-belt	
Drive Motor	5 kW (internal)	2.2 - 5.5 kW	
Possible Speed Difference	Optimized between 0 - 50 %	Optimized between 0 - 50 %	
Integrated Control System	yes	no	
Concepts	**VTT Turbo™**	**VTT Venturi™**	**VTT2™**
Vacuum Created by	Air turbine	Air Venturi	Fan
Stable and consistent vacuum	yes	yes	yes
Vacuum levels (relative)	100 %	60 %	100 %
Internal vacuum source	yes	yes	no
Connection	3/4” hose	3/4” hose	150 mm
Power Consumption	15 kW compressed air	30 kW compressed air	7.5 kW AC motor
Self-cleaning	yes	yes	no
Application			
Upright conveyor	optimal performance	optimal	optimal
Vertical conveyor	optimal performance	good	optimal
Inverted conveyor	optimal performance	good	optimal
Space Limited Applications	optimal	optimal	average
Full range of integrated stabilization devices	yes	yes	yes
Full range of integrated initial tail delivery devices	yes	yes	yes
Full range of integrated conveyor tail rippers	yes	yes	yes
Full range of integrated deflectors and discharge shoes	yes	yes	yes
Full range of integrated ropes threading accessories	yes	yes	yes
Tail width capability	50 - 200 mm	50 - 200 mm	50 - 200 mm
	Note: Optimal tailwidth for all conveyor threading is 100 - 150 mm		

Nipco –
25 years of system know-how concentrated in Krefeld

The authors: Eugen Schnyder, Dr. Rolf van Haag, Andy Theiler, Finishing

The market launch of the Nipco roll dates back to 1974. Its name – short for "nip control" – really hit the nail on the head: for the first time this roll enabled a controlled line load distribution. Today, 25 years later, it is hard to imagine modern industry without the Nipco roll.

"Industry" in this connection mainly means the paper industry, which is the primary user of Nipco rolls. It should not be forgotten, however, that the Nipco roll is also well-established in other industries. The printing industry, for example, uses a large number of Nipco press rolls.

The silver jubilee of the Nipco roll stands for 25 years of impressive developments, as reflected in numerous patents. While the basic principle has never changed, innumerable improvements have been made during this time – and it goes without saying that more will follow. The foundations have been laid for the future, and readers are invited to draw their own conclusions from this article.

It should be mentioned here that reference is specifically made in the following to Nipco technology rather than merely to the Nipco roll, which is a "means to an end". Nipco technology includes the environment in which the Nipco roll operates. This is the reason for our close teamwork with numerous Voith Group specialists and our customers in the paper industry – thus focusing again on the main Nipco application.

The Nipco Krefeld concentration process

Four years ago Voith Paper took over the Nipco Paper business (Nipco technology applications in papermaking) from De Pretto Escher Wyss, Schio, Italy. Two years later the Roll Technology division was taken over from Sulzer Escher Wyss, Zurich. As a result, the entire Nipco know-how accumulated over 25 years is now concentrated in Krefeld.

The Nipco division in Krefeld

Since April 1, 2000 all Nipco activities have been concentrated in the Nipco division, Krefeld. Apart from the existing Krefeld specialists, people now work here who were previously employed at the former Nipco locations in Schio, Italy and Zurich, Switzerland. The division is subdivided into two departments, order processing and development/design:

- Order processing follows up each contract from receipt of order to design and manufacture, final inspection and forwarding. This also covers the associated hydraulics systems including valve aggregates, and coordination

Fig. 1: Hydrostatic support elements – the core of Nipco technology.

with the control and automation systems. All Nipco rolls undergo comprehensive testing.

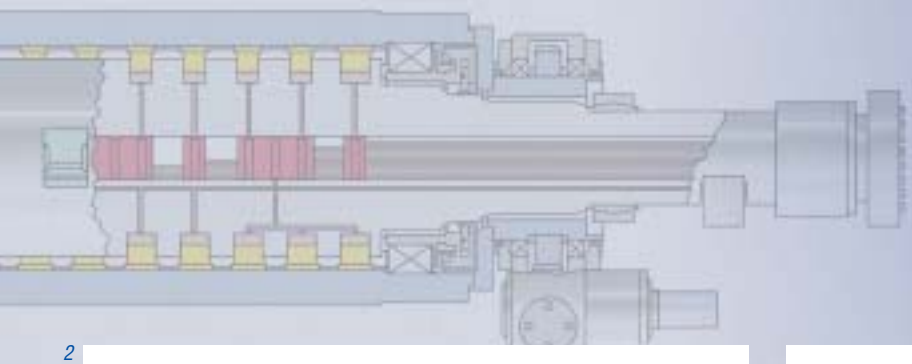
- The development/design department provides all necessary system design tools, continuously optimizes existing roll concepts, and works out new approaches for meeting future needs. Several test rigs are available for systematic component testing.

Nipco technology for the paper industry

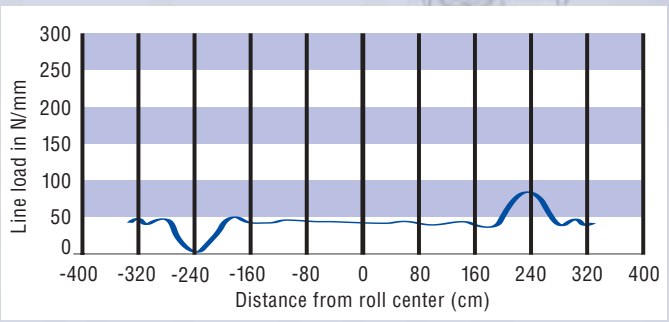
The basic principle of Nipco technology has remained unchanged ever since the first Nipco roll was invented in the early seventies:

Support elements

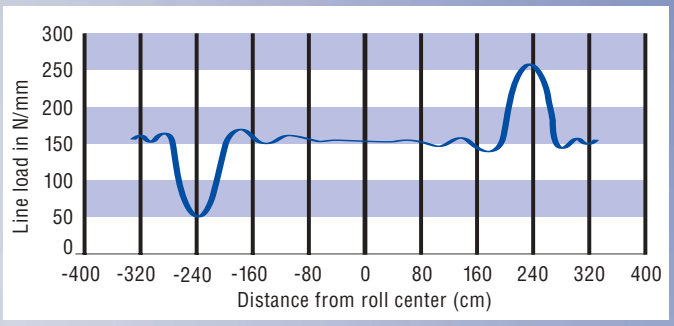
The rotating sleeve is supported by a row of hydrostatic elements mounted on a beam inside the roll *(Fig. 1)*.



2



3



These hydrostatic support elements are controlled in zones or individually to generate a prescribed line load distribution in the roll nip.

Wider, faster and even more sensitive

To meet increasingly demanding market requirements, new generations of Nipco rolls have been developed on an ongoing basis.

For example, the classical Nipco roll has been adapted to higher operating speeds by modifying the oil feed system, bearings and seals. At the same time the papermaker's dream of perfect cross-profile control has come true thanks to development of the Nipcorect roll *(Figs. 2 and 3)*.

Modular design

Nipco technology is based on a modular system. This enables the same basic module to be used both for the Nipco and the Nipcorect roll, with the following technical data at the present time:

- Roll widths from 1,600 to 10,000 mm
- Operating speeds from 1 to 2,500 m/min
- Line loads from 1 to 550 N/mm
- Various sleeve system designs

Nipco rolls normally have 12 to 14 support element zones, while Nipcorect rolls have 30 to 60. The real difference between the classical Nipco roll and the Nipcorect roll, however, is that each individual support element in the latter has its own oil supply. This is thanks to a specially designed pipe-bundle oil distribution system *(Figs. 4 and 6)*.

Precise point-to-point control

Since each support element can be individually controlled, the Nipcorect roll enables precise point-to-point cross-profile correction over a range of almost 0 N/mm to 550 N/mm.

Focus on quality management

All Nipco and Nipcorect rolls undergo a tough testing programme before delivery. To this purpose, our roll test rig has just been modernized *(Fig. 5)*. It is now equipped with extensive data recording systems for the following operating parameters:

Drive capacity	max. 980 kW
Roll speed	max. 2,800 rpm
Web speed	max. 3,000 m/min
Roll diameter	max. 1,120 mm
Bearing centreline spacing	max. 12,500 mm
Axis length	max. 16,000 mm
Hydrostatic oil supply system for up to	60 zones
Oil tank capacity	max. 1,000 litres

A dynamic test rig for rolls with flexible sleeve systems is also available (maximum web width capacity 3,500 mm).

Revitalizing old Nipco rolls

The entire technical data of all Nipco systems delivered since production began are stored in the Nipco division's database. Particularly for rebuilds and modernization, this enables customer needs to be met rapidly and efficiently. For example, existing Nipco rolls can be converted into Nipcorect rolls. Old Nipco rolls have been revitalized in this way for twenty years or so. New elements and interfaces can also be fitted according to need during rebuilds, which are supervised by the same team responsible for

4 *Fig. 2: Line load profile at low nip loading.*

Fig. 3: Line load profile at high nip loading.

Fig. 4: "Small" Nipco rolls.

Fig. 5: Test rig for web widths up to 10,000 mm.

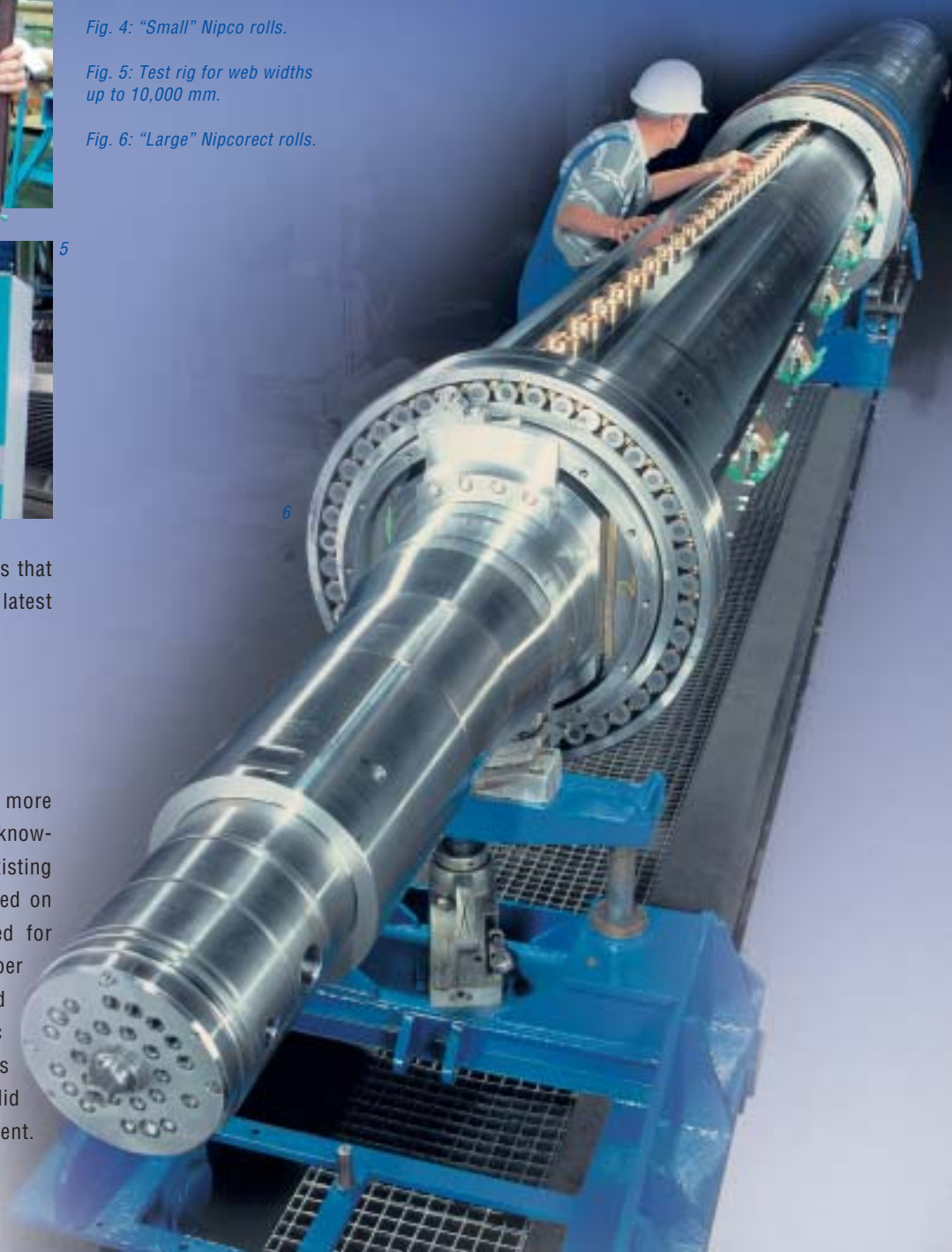
Fig. 6: "Large" Nipcorect rolls.

5

processing new orders. This ensures that customers always benefit from the latest Nipco technology.

Summary

Krefeld is now the focal point for more than twenty-five years of Nipco know-how, thus making optimal use of existing expertise in all prior locations. Based on the numerous Nipco rolls delivered for various applications, our Voith Paper team can offer customers tailored solutions to meet their specific needs. This synthesis of the various Nipco technologies also forms a solid basis for ongoing product development.



6

1

The Cera Family – hard coatings for high demands

The author:
Dr. Hasso Jungklaus,
Service

The Voith Paper service centre in Laakirchen, Upper Austria offers a wide range of hard coatings for paper machine rolls. Known as the Cera family, this range was already developed since 1994 under the former company name Scapa Rolls or Scapa Kern. The best-known family member is CeraLease, which has revolutionized sheet output on the central press roll in more than 300 installations worldwide. After the paper-related activities of Scapa Plc. were taken over by Voith Paper in July 1999, ceramic coatings production and development were concentrated in Laakirchen, also serving the US market from Neenah, Wisconsin and Portland, Oregon.

In conventional press concepts today, the open web run after the central press roll is often a bottleneck preventing any further rise in speed and efficiency. In many cases the web tear strength at this point is less than the tensile force required at some speeds for separating the web from the roll surface. Adhesion forces between the sheet and roll surface must therefore be reduced to facilitate sheet separation without flapping. While these requirements were originally met by the granite roll, the limits of this material soon became apparent at speeds above 1,000 m/min with the additional use of steam blower boxes for better profiling *(Fig. 2)*.

Fig. 1: CeraLease in daily use.

Fig. 2: Granite has its limits.

Fig. 3: Granite microstructure.

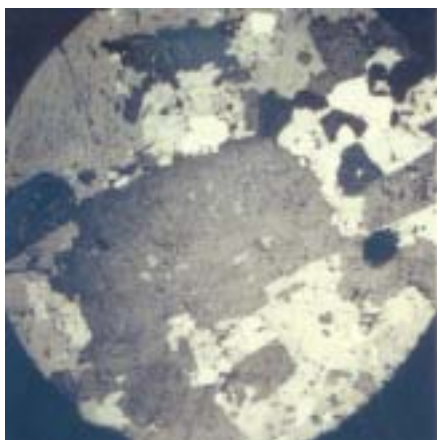
Fig. 4: Surface energy of press roll covers.

Fig. 5: CeraLease surface topography according to paper grade.

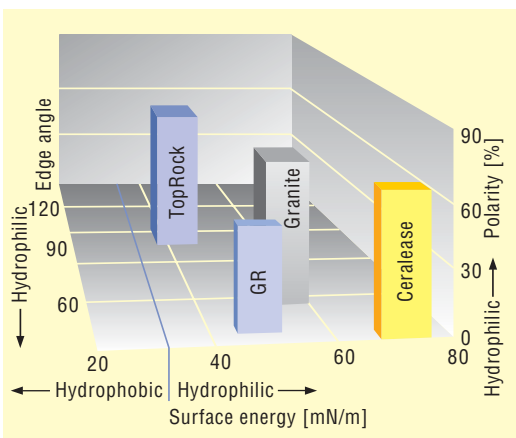
Fig. 6: CeraLease S – surface smoothing by anti-adhesive material filling.

2

3



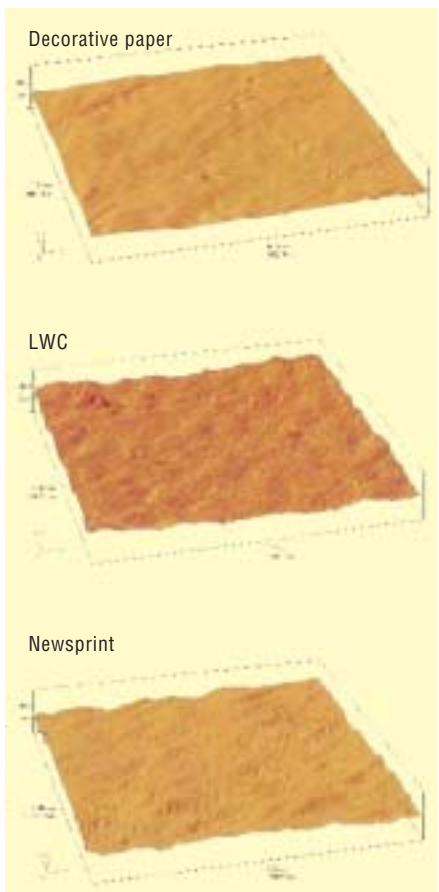
4



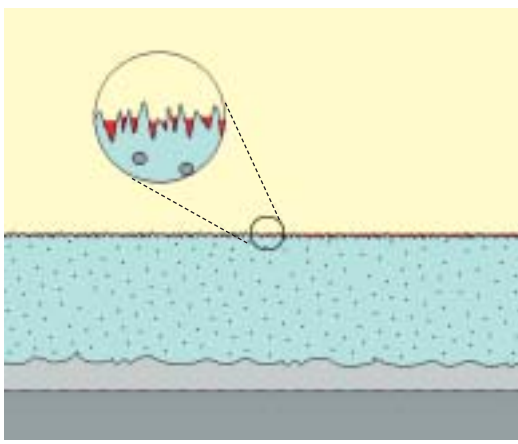
The good sheet separation with granite rolls is due to alternating hydrophilic/ hydrophobic zones generated by the material structure *(Fig. 3)*. Although this is still taken as a benchmark today, modern ceramic covers can substantially extend the associated grinding intervals of 3 to 6 months.

CeraLease press roll covers *(Fig. 1)* with their unique oxide ceramic material meet the highest demands on sheet separation, scrapability, smooth running, cleanliness and form stability. This particularly applies to the latest development, **CeraLease S**. The CeraLease coating has an even higher surface tension than granite *(Fig. 4)*, with a particularly high polar component. This enables rapid and uniform wetting of the roll surface, thus reducing separation forces. A coating topography tailored to the respective paper grade and machine operating speed *(Fig. 5)* supports this effect.

5



6



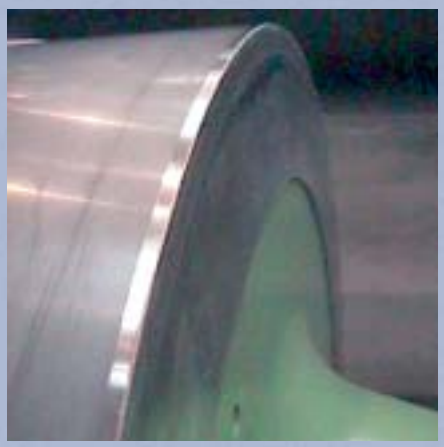
CeraLease S is a further development of the well-known CeraLease ceramic press roll cover. While the oxide ceramic material remains unchanged, the surface is smoothed by an anti-adhesive fluoride polymer filling after grinding and prior to finishing *(Fig. 6)*. The object of this further development was to reduce cover deposits, thus extending operating periods and improving sheet separation. This version also improves on the original

Fig. 7: CeraSize with edge reinforcement.

Fig. 8: The Cera family members for various applications.

Fig. 9: CeraLease coating by high-performance plasma spraying.

7



8

CeraLease	Central press rolls
CeraSize	Sizing press rolls
CeraVac	Suction rolls
CeraVent	Grooved press rolls
CeraGrip	Pretensioning rolls
CeraClean/-Guide	Guide rolls/scraper bar
CeraDry	Drying roll
CeraCal	Calender rolls

hydrophilic/hydrophobic microstructure characteristics of the granite roll.

The "S" filling has resulted on reference installations in up to four times longer service life and 15% less tensile force compared with conventional CeraLease covers. The first field tests have been going on continuously since the end of 1998.

In more than 300 installations worldwide, CeraLease coatings are now first preference for granite replacement rolls. This cover is used on 80 % of the fastest newsprint machines (Holmen Bravikken, Sachsenpapier Eilenburg, ANL Aylesford, Haindl Schongau, Schwedt and Steyrermühl, StoraEnso Kvarnsweden, etc.). For coated raw paper production, operating times of several years have been attained without trimming (Sappi Gratkorn, Sappi Ehingen et al), and wear resistance is outstanding even on smaller machines for decorative grades (Munksjö Unterkochen, Köhler Kehl, Technocell Osnabrück, Malta Dekor Pocznan, etc.). Recently, Scandinavian SC paper producers have also reported considerably less wear and tear with CeraLease S covers compared with competitive products.

Based on their excellent track record, CeraLease covers are also being used for numerous press conversions where outdated concepts are replaced with modern shoe presses.

In sump type sizing presses, another version of the CeraLease cover has proved itself well as an alternative to hard rubber rolls – the CeraSize. Thanks to the operating characteristics of ceramic covers, even the service life of softer rubber rolls is greatly extended. A stainless steel edge protector incorporated in the CeraSize enables the smallest possible face radius for clean pocket transfer without the risk of under-surface corrosion *(Fig. 7)*.

All the coating types available in the Cera family for various applications *(Fig. 8)* are manufactured in the same way: by thermal spraying of molten ceramic or metal powder or wire on to the rotating roll surface. Since the hot particles – at temperatures up to 2,000° C – solidify almost instantaneously on the surface of the roll, it is heated only insignificantly to less than 70° C *(Fig. 9)*.

Other highlights in the Cera family include **CeraVent** and **CeraVac** covers. These hardmetal anti-wear coatings are ideal for all kinds of suction roll or grooved press roll *(Figs. 10* and *11)*, operating in the "naked" condition without rubber or polymer cover. This can greatly extend the service life of bronze sleeves on suction screen rolls, for example, since far less trimming is required.

9

Fig. 10: CeraVent wear-resistant coating for grooved press rolls.

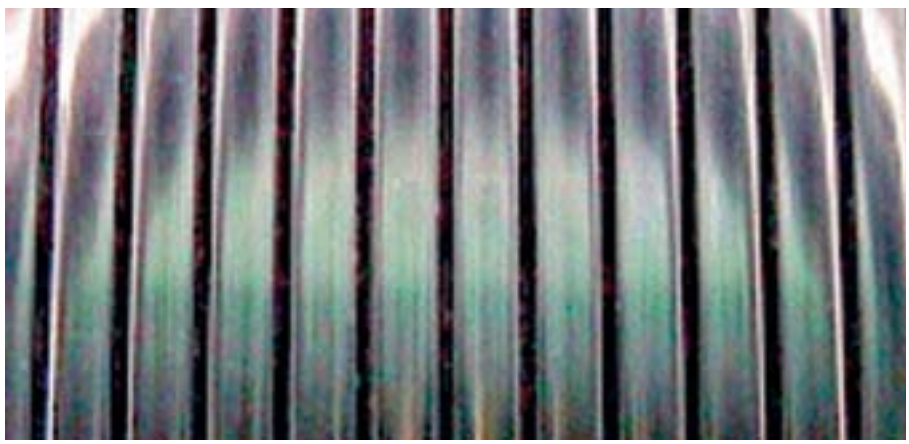
Fig. 11: CeraVac protects suction or vacuum press rolls against corrosion and wear.

Fig. 12: CeraCal in a Mol calender for finishing decorative paper.

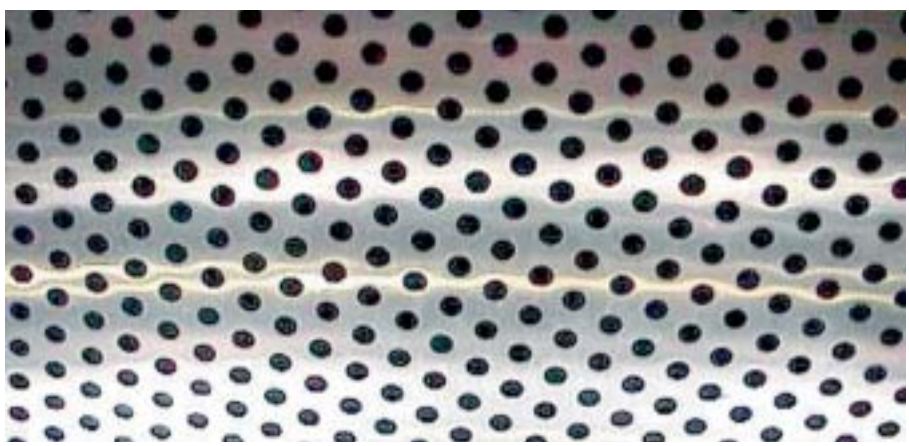
The Cera family members CeraGuide, CeraClean and CeraDry comprise dirt-repelling coatings for all paper machine applications – ceramic coatings for the screen section, paper and felt guide rolls in the press section, and scrapable teflon-filled hardmetal coatings for the drying rolls.

The surface finish of a hard thermo-roll decisively affects paper gloss and smoothness, particularly in the latest soft calenders. The **CeraCal** coating centre in Laakirchen meets this requirement perfectly, particularly with market-leader products for demanding applications such as on-line SC paper calendering or coated art paper calendering *(Fig. 12)*. Thanks to an innovative materials/process combination enabling coating particle sizes in the smallest microscopic range, coating smoothness is maintained over long operating periods even under the heaviest loading.

In summary, tailored roll covers can substantially enhance paper machine efficiency. With rising production speeds and higher availability demands, not only is resistance to wear and corrosion more important, but also optimal roll surface quality and life. The successful track record of our Service division in roll cover developments forms a solid basis for meeting the demands of the future. In this sense, the Cera family of Laakirchen will continue to grow both in quality and quantity.



10



11

12

1

Spectra – a family of composite press fabrics

The authors:
Heikki Kuokka,
Hans Ragvald,
Voith Fabrics

Design of press fabrics

The design of press fabrics is the art of translating a customer's demands for de-watering and runnability into a textile construction. This exercise must be based on hard facts, the Basic Machine Data. The demands described by the basic machine data can however be met with different felt designs. A felt does not run by itself, it is run by the machine crew. Thus it is essential to combine the hard facts with the preferences expressed by the machine crew on how the felt shall work.

Important parameters for the design of press fabrics

- Press loading (kN/m)
- Roll hardness (P&J)
- Surface structure of roll cover
- Machine speed
- Press geometry
- De-watering distribution
- Fabric conditioning
- Temperature
- Type of paper (fillers..)
- Type of fibre
- **The Customer's opinion!**

Success is always based on co-operation. This would explain why a felt design, which is a success on one position, could fail on rather a similar position.

A mechanical component is normally specified by target values like dimensions, material specifications etc., and it can be accepted or rejected with reference to measurements. A press fabric can be described by weight, size, permeability, caliper etc. When judging the quality of the fabric, the quality control measurements are however completely irrelevant. The only acceptable criterion to judge the quality of a press fabric is the performance in the paper machine. If the performance of the press fabric meets the expectations of the customer, the fabric is good. If it does not, the fabric is bad. This means that we do not supply a textile product; we sell a function!

A need for something more

Historically it has been a practice to change as few press fabrics as possible at the same time. This was based on the fact that press fabrics needed "a running in time", while the de-watering was poor until it reached good function and finally tailed off. Felts were run as long as possible, until they almost fell off the ma-

Fig. 1: Elastomer layer.

Fig. 2: Spectra family.

Fig. 3: Sectioned view of a Spectra felt, showing the various layers.

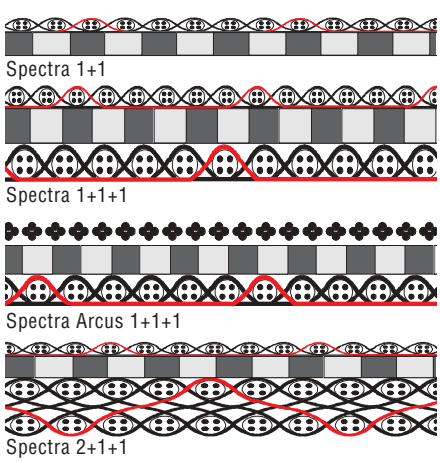
Fig. 4: Composite felts in nip
– The polyurethane layer has a natural elasticity in the Z-direction
– High resilience even after a number of nip passages
– Less caliper losses compared to standard felts.

chine. Focusing more and more on efficiency, the traditional way of running became out-of-date. Machine shuts have to be as few as possible and well planned. More felts, in some cases all felts, are changed at the same time and it is completely unacceptable that the felt performance tails off before planned shuts. The traditional felts based on woven bases and batts struggled to meet those demands, as the bases and the batt fibres, by all means, will be gradually compacted through life. Stable base fabric designs and coarser batt fibres combined with hard pre-compaction became one way to design a fabric with as stable characteristics as possible through life.

A more sophisticated solution is to incorporate a component in the felt, which does not change its properties, even with numerous passages through a hard nip. In the Spectra* concept an elastomeric polyurethane structure is used as the component with retained properties *(Fig. 1)*. The elastomeric layer can be placed under or on top of a fabric or between two fabrics or yarn structures *(Fig. 2)*. For harder nips and high speed, the layer is normally placed between two yarn structures *(Fig. 3)*. The design of fabrics and choice of batt fibres must still be done with care, using all the available data from the press position in question. The polyurethane layer does not do the whole job.

**The composite felts were launched as Spectra in North America and as Olympus in Europe. From year 2000 the global brand name is Spectra.*

2



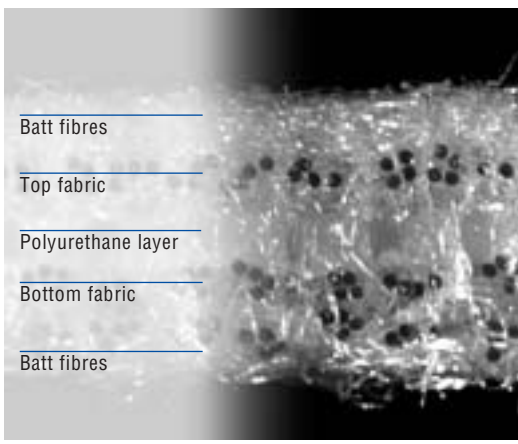
Retained properties through life

In order to test the retained properties under well controlled conditions, a number of comparisons were made using a Spectra and a laminated Omega felt, designed exactly like felts, which have run on the same 3rd press position in a high speed newsprint machine.

The excellent retained caliper for the Spectra design is clearly illustrated with SEM pictures in *Fig. 4*. After 250,000 nip passages the Spectra felt has 84 % retained caliper while the laminated felt has 79 % only. The polyurethane layer itself has 100 % retained caliper!

The retained properties for the Spectra fabrics have been proven in many cases.

3



4

Standard felt before running

Standard felt after running

Composite felt before running

Composite felt after running

Case 1: SC Magazine paper, 1400 m/min, pick-up position

When using competitor felts only three weeks' life could be reached and the performance still tailed off at the end of the life. The machine shuts were thus planned after three weeks' cycles. With a Spectra felt in the position, the first target was to reach the planned shuts with full efficiency, but the ultimate target was to double the life. The first felt had to be changed due to a machine related shut after five weeks, but since it has been well proven that six weeks' life could be achieved.

Case 2: LWC, 1450 m/min, 4th press position

In this hard nip, with linear pressure of 150 kN/m, the felts had to be changed after three to four weeks, mainly because of an increased vibration level. The first Spectra on the position ran for 47 days and the record has later been improved to 56 days.

Case 3: Fine paper, 1400 m/min, 1st bottom press position

In this machine the performance of the 1st bottom felt has a major impact on the efficiency of the paper machine. With competitor felts the performance tailed off towards the end of life, resulting in lower machine efficiency. Already with the first Spectra trial on the position, the performance was very good up to a planned shut, and from used felt analysis there was clear evidence of residual life.

Lower vibration level

Vibrations are the limiting factor for machine speed and felt life in many positions. The felt is often the carrier of vibrations, but quite often the source is to be found elsewhere. Worn rolls or bearings, misaligned shafts etc. may cause vibration, which sooner or later will mark a pattern into the felt. The felt can never absorb vibrations, but with retained resilience it will survive longer in a vibrating nip.

Examples of retained caliper have already been shown, and this has also been proven in practice. One example was given in case 2, but there are more:

Case 4: Newsprint, >1600 m/min, 3rd press position

In *Fig. 5* a vibration trace from the on-line equipment is shown. The period with low and even vibration level is when Spectra ran in this position. The result has been repeated many times since this first trial.

Higher dryness

In most cases the dryness out of the press section of high-speed graphical paper machines are not recorded. On-line systems measuring both nip de-watering and suction box de-watering are good tools and so is the record of draw between the press and the dryer section. Recently, however, we were able to record a Spectra trial in a very efficient high speed newsprint machine:

Case 5: Newsprint, 1600 m/min, 3rd press position

With Spectra in the 3rd press, the mill reports a 0.9 % higher dryness after the 3rd press. Additional machine clothing was all standard designs for the machine.

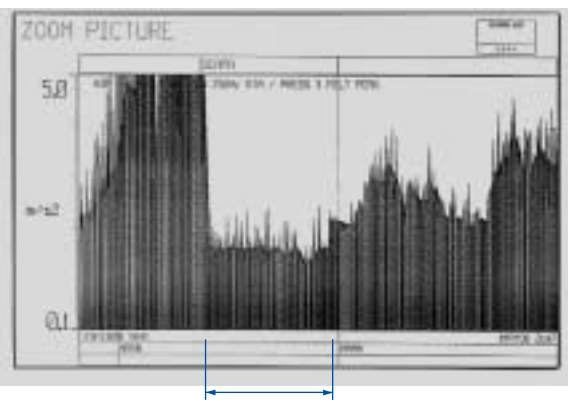
Further development of the Spectra concept

As stated above, the use of the elastomeric layer does not eliminate the skill of developing and selecting the correct combination of yarn and batt layers. The Spectra concept is already in its present state tested on the Tandem NipcoFlex configuration, with excellent performance at Perlen PM 4 and some promising results on Lang PM 5. In order to optimise the composite concept for the Tandem NipcoFlex concept, trials have been performed on the pilot machine VPM4 in Heidenheim. The new concept involves a combination of CMD and MD yarn layers with the elastomeric layer *(Fig. 6)*.

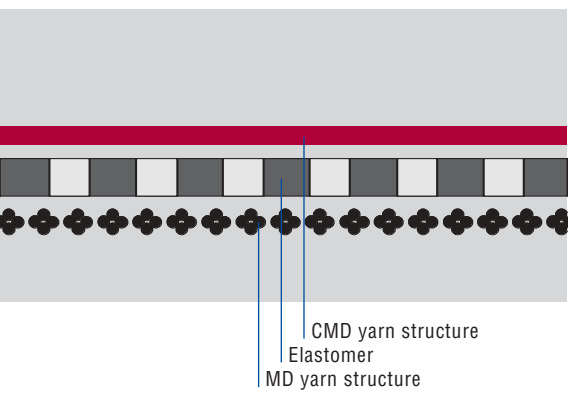
Press felts based on MD and CMD yarn layers instead of woven bases have been available in the market for a long time. Experiences from layers in this direction are quick start-up times, high nip de-watering and good imprints. With the

Fig. 5: On-line vibration measurements high speed newsprint machine.

Fig. 6: Non-woven composite fabric. MD and CMD yarn structures for:
– Quick start-up
– High nip de-watering
– Good impression
Elastomer for:
– Retained properties through life
– Quick start-up.



5



6

addition of the elastomeric layer, the felt properties will be well retained through life and the quick start-up will be further supported.

The experiences from the pilot machine trials are very encouraging and trials on commercial machines will start in January 2001.

Added value

In many cases the Spectra composite felts will be heavier than the competing textile felts, as the density of polyurethane is higher than for polyamide. This means a higher felt price. At the same time the paper industry has focused much on cost reductions, which means that that the pressure on the performance of the Spectra felts has been hard. In many cases the cost for paper machine clothing per produced tonne of paper is used as benchmark. As shown in the example below, this could be very misleading.

A newsprint machine is running a four-week cycle for the press fabrics. During this period it produces 22,000 tonnes of newsprint. The cost of one of the press felts was 30,000 Euro, giving a cost per tonne of 1.36 Euro.

With an improved fabric the production could be raised by 2 % to 22,440 tonnes, but unfortunately the felt was 60 % more expensive, 48,000 Euro. This led to a felt cost of 2.14 Euro per tonne newsprint, which might be regarded as a disaster.

However, 440 additional tonnes of newsprint resulting from an extra 18,000 Euro, is a profitable deal as long as the extra cost per tonne of paper is less than 41 Euro, which is a very low target.

This clearly shows that the felt, which gives the highest paper production, is always the most profitable one!

With the composite concept correctly optimised for batt and base design, it will no doubt be profitable for the customer, independent of the higher price of the fabric.

Summary

The Spectra concept, with an elastomeric layer included in the felt, gives excellent opportunities for high pressing efficiency and retained properties through life. The concept is exclusive for Voith Fabrics.

There are many cases of improved results with Spectra, including good retained properties through life, higher pressing efficiency and lower vibrations.

The Spectra concept is at present further developed for optimum performance in the Tandem NipcoFlex press section.

Since 1994 more than 5,000 composite felts have performed in paper machines for all kinds of paper grades. Trials have been made by our competitors, but so far none of them has been able to copy the technology.

Another type of **Global Player**

Nanking, Valencia, Havana, Seoul, Sydney – Ralf Bissdorf's destinations and competition dates read like those of an extremely busy business manager. Yet this amenable political science student is "only" a sports fencer in the foil discipline keeping up with his tournament commitments.

Runner-up in the Junior World Championships in 1991, German Champion in 1995 and 1999, European Champion in 1998, first place six times in the World Cup tournaments of the last two years, and then overall victory in the World Cup, and as another spectacular moment into the bargain a silver medal at the 27th Summer Olympic Games (photo left) in Sydney – these are the souvenirs which the young man from Heidenheim has collected to date on his trips around the world.

The active spokesman of the German Olympic fencing team, fondly called "professor" by his team colleagues, is sitting opposite us with two other members of the team. To his right is Imke Duplitzer:

Olympic Games 2000: the opening ceremony in the "Australia Stadium", which with a capacity of 110,000 spectators is the largest arena in Olympic history, was completely sold out.

she has signed up with the German Army, has several times been military world champion in épée fencing, and no less successful with numerous World Cup placings and German and European championship titles. To Ralf Bissdorf's left at the table is Marc Konstantin Steifensand, a chartered engineer for nuclear reactor safety and an enthusiastic épée fencer in his spare time. He has been a member of the German national team since 1997, and won the silver medal at the World Championships in 1999.

Imke Duplitzer, several times military world champion in the épée discipline. 10th place individually and 6th team place in Sydney.

Marc-Konstantin Steifensand, silver medallist at the 1999 World Championships. 22nd place individually in Sydney.

Ralf Bissdorf won in the quarter-final against the Hungarian Mark Marsi.

How is it that the sports association of a town such as Heidenheim, with a population of only 60,000, can put up three Olympic fencing participants at the same time? Curious to find out more, we visited the "Heidenheim Fencing Centre". First of all we were told that Heidenheim is regarded among insiders as the "Wimbledon of épée fencing". The "Heidenheim Cup", which has been held here since 1953, is today the world's most important and largest fencing tournament after the Olympics and the World Championships. Some 300 of the world's best épée fencers regularly cross swords in Heidenheim in the first week after Easter. Following the Heidenheim Cup, the "Coupe d'Europe" event is held, in which way, the strongest club teams in Europe establish their annual winning team.

All this began more than 150 years ago. In royal Württemberg, as in all Germany at the time, there was a great deal of freedom of expression, which due to the lack of political parties, was channelled into athletic clubs and student associations in particular. In the annals of the "Heidenheim Athletics Community" of that time there are already details of regular meetings on a Friday with "fencing and exercises", for instance the winter of 1847. Even though the athletic clubs and their fencing sections were disbanded for a time after 1848 as supposed breeding grounds for Republican activities, there always remained a certain weakness for the sport of fencing in Heidenheim, an open-minded, engineering centre which was increasing in importance with growing connections well beyond the state's borders. Not without justification were the inhabitants alleged to possess great skills in precision technology, special mastery of physical laws and lightning-fast reactions.

Things really took off again around 1930, when the first state fencing tournament was held in Heidenheim. In 1950 came the national and international breakthrough. A legendary épée team brought the title of the German team champions to Heidenheim five successive times between 1957 and 1961. 92 German Champion titles, participation in 148 world championships and eight Olympic Games with excellent results in each case – this is the extraordinary record that fencers from Heidenheim have established since 1950.

"How is that possible? Can you earn money by fencing?" This consciously provocative question causes some amusement in our table group. Given the sums of money accumulated today by some of the leading sports disciplines that make exciting viewing, the reply of a member of the management of the "Heidenheim Fencing Centre", who was also present at our get-together, seems almost anachronistic: *"No-one gets rich in our sport! Even at leading international tournaments there is neither starting money nor cash prizes for the winners. Of course we are sponsored by the national and state fencing associations, but for the most part we survive on a great deal of idealism, improvisation, personal commitment and support from mainly regional sponsors, who like the Voith Group of Companies, feel traditionally attached to fencing in Heidenheim."*

Ralf Bissdorf continues: *"To take part in the World Cup, we not only have to invest a great deal of time in training and preparation, but also contribute our share of the costs such as travelling expenses to the venues in every continent. But if you're really addicted to fencing, the whole atmosphere of this sport and the international contacts and friendships that arise from it, you're prepared to make this sacrifice. It's not just for the chance of success! These are experiences, especially taking part in the Olympics, that none of us would want to miss and that remain a lifelong memory."*

This idealism deserves recognition for what has been set up, passed on and achieved. Behind the name "Heidenheim Fencing Centre" and the smart new building on Virchowstrasse (photos at right), is a national centre and a focus of regional achievement where eight internationally renowned trainers and a sports physiotherapist look after some 200 fencers. The centre has three halls with 30 fencing pistes, physiotherapy, body-building and training rooms and a purpose-built, welcoming administration wing. Adjoining this is a day-boarding sport school which enables highly talent-

ed children and teenagers to combine competitive sport with their regular education. At present 40 children are taking advantage of this facility.

But let's return to our Olympic participants. Their description of the stay in Sydney underlines once again the enthusiasm which all three have for their sport. Sydney was unique, from the opening to the closing ceremony. The underlying motto of water, fire, sun and a scenic interpretation of proximity to nature, the spirit and dream world of the Aborigines proved to be utterly fascinating. Above all the people: the easy-going nature of the Australians, their friendliness and open-hearted spirit.

When the small fencing team, on a stroll through the city centre, missed their bus for a punctual return to the Olympic Village in order to get ready for the next event, a fisherman was only too happy to help: he spontaneously invited them on to his boat and took them straight across the bay and said with a smile how happy he was to be able to help.

It's a great thing that experiences of this kind are still possible in the increasingly commercialised world of sport. As a global player we wish all three many more sporting successes in the truest sense of the word, similar friendly acquaintances throughout the world and for the "Heidenheim Fencing Centre" to continue its activities as a source of sporting achievement discipline that in an Olympic sense truly unites people. Voith will continue to support this work. A worthwhile task, don't you agree?
Manfred Schindler

twogether

Paper Technology Journal

Newsmagazine for the
international clientele,
partners and friends of

VOITH PAPER

"twogether" is published twice annually in German and English. Contributions by independent authors do not necessarily reflect the opinion of the publisher. Please address all correspondence and inquiries to the editor.

Published by:
Voith Paper Holding GmbH & Co. KG

Editor:
Dr. Wolfgang Möhle, Corporate Marketing,
Voith Paper Holding GmbH & Co. KG,
Tel. (++49) 73 21 37 64 05
Fax (++49) 73 21 377 0 08
P.O. Box 1970, D-89509 Heidenheim
http://www.voithpaper.com

Editorial coordinator:
Manfred Schindler, D-73434 Aalen

Design, layout and typesetting:
MSW, P.O. Box 1243, D-73402 Aalen

Issue 11, February 2001.

2/2001/21 MA Printed on chlorine-free bleached paper manufactured with Voith Paper Holding machinery.