Hans Müller

Dear Customer, dear Reader,

The twogether issue No 15 in front of you clearly represents Voith Paper Technology's wide spectrum of products and services it offers to the pulp and paper industry as well as its truly global representation.

You will read about the fastest, widest and most productive commodity-grade paper machines of Voith origin as well as such special items as the production of bank note papers. The success of these installations is augmented by our competence in the field of Fiber Systems, Automation, Finishing, Roll Service and Roll Cover technology and last, but not least, the clothing expertise of Voith Fabrics.

The synergies between Voith Paper and Voith Fabrics are well in place and appreciated by our customers. We are in the process of moving our Voith Fabrics headquarters from Raleigh, North Carolina, USA to Southern Germany. We are convinced that this move will further strengthen the positions of Voith Fabrics and Voith Paper (Voith Paper Technology) in the marketplace. In the past business year we successfully integrated Jagenberg's paper technology activities, the recycling and dewatering division of Kvaerner Pulping and Finckh into the Voith Group of companies.

Our focus will now be even more directed towards research and development and the expected growth resulting from new products and services.

Our overall performance in the past business year 2001/02 was quite satisfactory in all business results except for order intake. The overall business environment and specifically that of the pulp and paper industry left its mark. However, the first four months of our new business year (starting October 1st, 2002) showed a remarkable recovery in orders received for the current business year and we are quite certain that we will reach our planned order intake.

With the acquisition phase virtually completed and with the formation of the new Automation Division Voith Paper Technology now offers products and services that are second to none in completeness.

On behalf of all Voith employees serving the pulp and paper industry I wish you an enjoyable read.

Hans Müller,
on behalf of the Voith Paper Technology team

Startup highlights in 2001/2002

Fiber Systems

Stock preparation systems and sub-systems for graphic papers
UPM-Kymmene, Kaipola, Finland.
Papierfabrik August Koehler, Kehl, Germany.
Linde, Malchin, Germany.
Sappi Alfeld, Alfeld, Germany.
Steinbeis Temming Papier, Glückstadt, Germany.
Papeteries Matussière et Forest, Voreppe, France.
Madison Paper, Alsip, USA.
Steyrermühl, Steyrermühl, Austria.
Norske Skog Parenco, Renkum, Netherlands.
Rhein Papier, Hürth, Germany.
Khanna Paper Mills, Amritsar, India.
Abitibi-Consolidated, Baie Comeau, Canada.
Ponderay Newsprint, Usk, USA.
Great Lakes Pulp & Fiber, Menominee, USA.
Marusumi Paper, Ohe, Japan.

Stock preparation systems and sub-systems for board and packaging papers
Knauf Danogips Inlands Kartongbruk, Lilla Edet, Sweden.
Papeteries de Gascogne, Mimizan, France.
Moritz J. Weig, Mayen, Germany.
Yuen Foong Yu Paper, Hsin Wu, Taiwan.
Stora Enso Packaging Board, Kaukopää, Finland.
St. Regis Paper, Watchet, Great Britain.
Hans Kolb Papierfabrik, Kaufbeuren, Germany.
Pactiv Molded Fibre, Griffith, USA.
Potlatch Corp., Lewiston, USA.
Weyerhaeuser, Springfield, USA.
Weyerhaeuser, Plymouth, USA.
Portucel, Viana do Castelo, Portugal.
Solvay, NY, USA.
Norampac, ON, Canada.
Inland Paperboard, CA, USA.
Newark America, MA, USA.
Industria Papeis da Bahia, Bahia, Brazil.
Ibema-Cia Brasileira de Papel, Ibema, Brazil.
Rigesa Celulose Papel e Embalagens, São Paulo, Brazil.
Productora de Papeles Propal, Cali, Colombia.
Fernandez Industria de Papel, São Paulo, Brazil.
Papeles Cordillera/CMPC, Puente Alto, Chile.
Santa Clara Ind. de Papelão, Paraná, Brazil.
Klabin Correia Pinto/Celucat, Santa Catarina, Brazil.
Oji Paper, Fuji, Japan.
Daishowa Paper, Yoshinaga, Japan.

Stock preparation systems and sub-systems for tissue papers
Ssangyong Paper, Chochiwon, South Corea.
Metsä Tissue, Mariestad, Sweden.
Georgia-Pacific, Muskogee, USA.

Paper machines

Graphic papers
SCA Graphic Laakirchen, Austria.
Rhein Papier, Hürth, Germany.

Board and packaging papers
Shandong Rizhao Wood Pulp, China.
Lee&Man Paper, China.
Ibema-Cia Brasileira de Papel/ Ibema, Turvo, Brazil.
Papeles Cordillera/CPMC, Puente Alto, Chile.
Newark America/Fitchburg GBM & Fitchburg LBM, USA.

Tissue
Copamex Industria, Monterrey, Mexico.
Mili Distribuidora de Papeis MP4, Três Barras, Brazil.

Dewatering machine
Aracruz Celulose, Aracruz, Brazil.

Installation and rebuilds
Kübler & Niethammer Papierfabrik, Kriebstein, Germany.
Neu Kaliss Spezialpapier, Germany.
Sappi Austria Produktions-GmbH & Co.KG, Austria.
Koehler Kehl GmbH, Germany.
Papierfabrik Palm, Eltmann, Germany.
Tamil Nadu Newsprint & Papers, India.
AO Solikamskbumprom, Russia.
Torraspapel, Motril, Spain.
UPM Kymmene Kaukas, Lappeenranta, Finland.
Madison Paper Company, Alsip, USA.
M-real, Biberist, Switzerland.
Stora Enso North America, Duluth, USA.
Fritz Peters, Gelsenkirchen, Germany.
Ripasa Celulose e Papel, PM1, PM2, Limeira, Brazil.
Cartiere Burgo, Tolmezzo, Italy.
Cartiera di Villorba, Italy.
Cartiera di Carmignanao, Italy.
Kappa Herzberger Papierfabrik, Germany.
Mayr-Melnhof Karton, Austria.
St. Regis, New Taplow, United Kingdom.
Stora Enso, Tainionkoski, Finland.
M-real, Äänekoski, Finland.
Peters Papierfabriken, Gelsenkirchen, Germany.
Mondialcarta, Lucca, Italy.
Papelera del Principado/Paprinsa, Mollerusa (Lérida), Spain.

MeadWestvaco, Evadale BM5, USA.
Longview Fibre, Longview BM11, USA.
Inland Container, New Johnsonville BM1, USA.
Tembord, Temiscaming BM1, USA.
Weyerhaeuser, Hawesville, USA.
Indústria de Comércio de Papeis e Plástico/Citroplast; São Paulo, Brazil.
Papel, Caixas e Embalagens; Amazonas, Brazil.
Oji Paper, Saga PM5, Japan.
Japan Paper Board, Soka PM2, Japan.
Fiberteq, Danville IL, USA.
Nanping Paper, Fujian, China.
Steinbeis Temming Papier, Glückstadt, Germany.
Zanders Feinpapiere, Bergisch-Gladbach, Germany.
VPH Veiligheitspapierfabriek, Ugchelen, Netherlands.
Hokuetsu Paper, Niigata PM8, Japan.
Oji Paper, Tomioka PM9, Japan.
Chuetsu Pulp & Paper, Sendai PM6, Japan.
Nippon Paper, Ishinomaki PM6, Japan.
Celulose Nip-Brasileira, Cenibra, Belo Oriente, Brazil.
Klabin Riocell, Guaíba, Brazil.
Mili PM3, Três Barras, Brazil.
Melhoramentos Papeis PM7, Caieiras, Brazil.
Klabin Kimberly PM4, Mogi das Cruzes, Brazil.
Irving Tissue, Toronto, Canada.
Riau Andalan, Kerinci, Indonesia.
Productora de Papeles, Propal PM1, PM3, Cali, Colombia.
Cia Suzano de Papel e Celulose, Suzano, Brazil.

Coating technology
Shandong Chenming Paper Holdings, Shouguang, China.
Koehler Kehl, Germany.
Kübler & Niethammer Papierfabrik, Kriebstein, Germany.
Torraspapel, Motril, Spain.
Madison Paper Company, Alsip, USA.
Neu Kaliss Spezialpapier, Germany.
Sappi, Lanaken, Belgium.
Cartiera di Toscolano, Italy.
Bowater, Covington/TN, USA.
Fabrika Kartona, Umka, Serbia.
Reno de Medici, Magenta, Italy.
Arjo-Wiggins, Bessé-sur-Braye, France.
Smurfit Carton y Papel de Mexico, Cerro Gordo, Mexico.
M-real, Äänekoski, Finland.
Madeireira Miguel Forte, Paraná, Brazil.
Steinbeis Temming Papier, Glückstadt, Germany.
Nippon Paper, Iwakuni KC3, Japan.
Hokuetsu Paper, Nagaoka CM6, Japan.
Oji Paper Thailand, Thailand CM1, Thailand.
Mitsubishi Paper, Japan.
Votorantim Celulose e Papel, Jacarei, Brazil.
Ripasa, Limeira, Brazil.
Ledesma, Jujuy, Argentina.

Winding technology – Sirius
SCA Graphic Laakirchen, Austria.
Rhein Papier, Hürth, Germany.
Stora Enso North America, Duluth, USA.
Shandong Chenming Paper Holdings, Shouguang, China.
Madison Paper Company, Alsip, USA.
Rigesa Celulose Papel e Embalagens, Três Barras, Brazil.

Finishing

Janus Concept
SCA Graphic Laakirchen, Austria.
Shandong Chenming Paper, China.

Ecosoft calender
Rhein Papier, Hürth, Germany.
Ningxia Meili Paper, China (2).
Cartiere Miliani Fabriano, Italy.
Nanping Paper, China (2).
Hebei Jiteng Paper, China.
Ripasa Cellulose e Papel, Brazil.
Neusiedler, Ruzomberok, Slovakia.

Calenders
Kishu Paper, Osaka CM1, Japan.
Shandong Chenming Paper, China.
Maanshan Shan Ying Paper Making, China.
Jingxing Paper Group, China.
Lee & Man Paper, China.

Twister/Roll Handling
Steinbeis Temming Papier, Germany.
Axel Springer Verlag, Germany.
SCA Graphic Laakirchen, Austria.
Roto Smeets Deventer, NethOerlands.
Norske Skogindustrier, Norway.
Shandong Chenming Paper, China.

Roll cutting machines
Shandong, Rizhao, China.
Kombinat Goznak, Krasnokamsk, Russia.
Vipapa Videm Krsko, Slovenia.
SCA Graphic Laakirchen, Austria.
Papierfabriken Cham Tenero, Switzerland.
Lee & Man Paper, China.
Oji Paper, Japan (2).
SCA Containerboard, Germany.
Hengan Paper, China.
Rhein Papier, Hürth, Germany (3).
Torraspapel, Motril, Spain.

Recent large orders

Fiber Systems

Stock preparation systems and sub-systems for graphic papers
UPM-Kymmene, Shotton, Great Britain.
Pan Asia Paper Thailand, Singburi, Thailand.
UPM-Kymmene Papier, Schongau, Germany.
Zanders Feinpapiere, Bergisch Gladbach, Germany.
Daehan Paper, Cheongju, South Corea.
Papierfabrik Albbruck, Albbruck, Germany.
Cartiere Sarego Valchiampo, Sarego, Italy.
Hindustan Newsprint, Kerala, India.
Sepoong Corp., Kunsan, South Corea.
Daishowa Paper, Iwanuma, Japan.
Papeteries Matussière et Forest, Turckheim, France.
UPM-Kymmene, Kajaani, Finland.
SCA Graphic Sundsvall, Ortviken, Sweden.
Minfeng Paper Mill, Jiaxing, China.
Gaspesia Pulp and Paper, Chandler, Canada.
Marusumi Paper, Ohe, Japan.

Stock preparation systems and sub-systems for board and packaging papers
Thai Kraft, Wangsala, Thailand.
Wuxi Long Chen Paper, Jiangsu, China.
Cartiera di Cadidavid, Ca' di David, Italy.
Propapier, Burg, Germany.
Brødrene Hartmann, Tondern, Denmark.
Kappa Kraftliner Lövholmens Bruk, Lövholmen, Sweden.
Cartiera Giorgione, Castelfranco Veneto, Italy.
Shandong Bohui Industrial, Bohui, China.
PCA, Tomahawk, USA.
Saica, Zaragoza, Spain.
Papelera de la Alqueria, Alqueria de Aznar, Spain.
Indústria de Comércio de Papeis e Plástico/Citroplast, São Paulo, Brazil.
Adami Madeiras, Santa Catarina, Brazil.
Rigesa Celulose Papel e Embalagens, São Paulo, Brazil.
Oji Paper, Fuji, Japan.
Daishowa Paper, Yoshinaga, Japan.
Marusumi Paper, Kawanoe, Japan.
Daishowa Paper, Iwanuma, Japan.

Stock preparation systems and sub-systems for tissue papers
Georgia Pacific Nederland, Cuijk, Netherlands.
SCA Hygiene Products, Lilla Edet, Sweden.
Kimberly-Clark, Chester, USA.
SCA Tissue North America, Barton, USA.

Paper machines

Graphic papers
Shandong Huatai Paper, China.
Security Papers, Karachi, Pakistan.
Sichuan Jinfeng Paper, Sichuan, China.
Minfeng Special Paper, Jiaxing, China.

Board and packaging papers
Shandong Bohui Industry, Huantai, China.

Tissue
SCA Tissue North America, Barton, USA.
Wepa Papierfabrik P. Krengel, Kriebethal, Germany.

Installation and rebuilds
UPM Kymmene, Rauma, Finland.
Neusiedler, Ruzemberok, Slovakia.
Stora Enso, Veitsiluoto, Finland.
Shotton Paper Company, United Kingdom.
Holmen Paper, Braviken, Sweden.
Papierfabrik Palm, Eltmann, Germany.
Tamil Nadu Newsprint & Papers, India.
AO Solikamskbumprom, Russia.
Norske Skogindustrier, Saubrugs, Norway.
SCA Graphic Sundsvall, Ortviken, Sweden.
Sappi, Ehingen, Germany.
Stora Enso, Kabel, Germany.
Haindl Papier, Schwedt, Germany.
Hansol, Corea.
Mundanjiang Henfeng Paper Group, China.
Neusiedler Ybbstal, Kematen, Austria.
Torraspapel, Motril, Spain.
Neusiedler Szolnok Papirgyar, Dunaujvaros, Hungary.
Cartiere Sarego Valchiampo, Italy.
Kaysersberg Packaging, France.
W. Hamburger, Pitten, Austria.
Sappi Tugela, South Africa.
Mondialcarta, Lucca, Italy.
Cartiera di Cadidavid, Italy.
Cartiera di Ferrara, Italy.
Cartiera di Tolentino, Italy.
Papelera de la Alqueria, Alqueria de Aznar(Alicante), Spain.
Assi Domain, Frövi, Sweden.

Kartonfabrik Buchmann, Rinnthal, Germany.
Indústria de Comércio de Papeis e Plástico/Citroplast; São Paulo, Brazil.
Adami Madeiras, Santa Catarina, Brazil.
Papel Caixas e Embalagens/PCE, Amazonas, Brazil.
Korea Export Packaging, Osan, Corea.
Oji Paper, Saga, Japan.
Japan PaperBoard, Soka, Japan.
Oji Board, Nayoro PM3, Japan.
Koa Kogyo, Fuji PM6, Japan.
Papresa, Renteria, Spain.
Zanders Feinpapiere, Bergisch-Gladbach, Germany.
Papirnica Vevce, Ljubljana, Slovenia.
Condat, Le Lardin, France.
Owens Corning Veil, Apeldoorn, Netherlands.
Trierenberg, Wattens, Austria.
Papierfabrik Schoeller & Hoesch, Gernsbach, Germany.
Radece Papir, Radecde, Slovenia.
VPH Veiligheitspapierfabriek, Ugchelen, Netherlands.
Crane, Tumba, Sweden.
Papierfabrik Louisenthal, Gmund, Germany.
Zhejiang Papermaking Research Institute, Hangzhou, China.
Nippon Paper, Komatsujima PM1, Japan.
Kishu Paper, Kishu PM7, Japan.
Papeles Norske Skog Bio Bio PM1, Concepción, Chile.
Bahia Sul Celulose, Mucuri, Brazil.
Votorantim Celulose e Papel PM2, Jacareí, Brazil.
Votorantim Celulose e Papel, Piracicaba, Brazil.
Cia. Suzano de Papel e Celulose PM8, Suzano, Brazil.
PCE – Papel, Caixas e Embalagem, Manaus, Brazil.
Adami, Caçador, Brazil.
Citroplast Ind. E Com de Papéis e Plásticos, Andradina, Brazil.
Amcor Cartonboard, Petrie, Australia.
Cia. Suzano de Papel e Celulose PM6, Suzano, Brazil.
Riau Andalan PD2, Kerinci, Indonesia.
Papeles Industriales, Santiago, Chile.
Klabin Kimberly PM4, Mogi das Cruzes, Brazil.

Coating technology
Usine de Condat, Le Lardin, France.
Tamil Nadu Newsprint & Papers, India.
Mundanjiang Henfeng Paper Group, China.
Hansol, Corea.
Torraspapel, Motril, Spain.
Minfeng PM 21, China.
Jinfeng PM 3, China.
Shandong Bohui Industry, Huantai, China.
Mitsubishi Paper, Japan.

Winding technology – Sirius
Shandong Huatai Paper, China.
Neusiedler, Ruzemberok, Slovakia.
Stora Enso, Veitsiluoto, Finland.
Papresa, Renteria, Spain.
W. Hamburger, Pitten, Austria.

Finishing

Janus Concept
Bowater, Catawba, USA.

Ecosoft calender
Ibema-Cia Brasileira Papel, Brazil.
Ripasa Cellulose e Papel, Brazil.
Shandong Huatai Paper, China.
Shandong Bohui Industrial, China.
Papeteries des Vosges, France.
Minfeng Special Paper, China.
Shenzhen Wander Color Printing & Packaging, China.
GAP Insaat Yatirim ve Disticaret, Turkmenistan.
Stora Enso, Kemi, Finland.
Neusiedler, Ruzomberok, Slovakia.
Stora Enso Magazine Paper, Kotka, Finland.

NipcoFlex calender
Stora Enso, Baienfurt, Germany.

Calenders
Cartiera di Carbonera, Italy.
Kishu Paper, Osaka CM1, Japan.
Minfeng Special Paper, China.
Bowater, Catawba, USA.
Ibema-Cia Brasileira Papel, Brazil.
Shandong Bohui Industrial, China.
Chung Loong, China.
Huacai, China.

Twister/Roll Handling
Shandong Huatai Paper, China.

Roll cutting machines
Ripasa Cellulose e Papel, Brazil.
Chung Loong, China.
Gojo Paper Manufacturing, Japan.
Stora Enso, Kemi, Finland.
Shandong Bohui Industrial, China.
Sichuan Jinfeng Innovation Industry, China.
Smurfit Nanterre, France.
W. Hamburger, Austria.
Minfeng Special Paper, China.
Neusiedler, Ruzomberok, Slovakia.
GAP Insaat Yatirim ve Disticaret, Turkmenistan.
Cartiere del Polesine, Italy.
Shandong Huatai Paper, China (2).

An impressive demonstration of innovative technology competence

International Customer Conference Graphic Papers, September 4 to 6, 2002 in Salzburg, Austria

Ingo Schmid
Corporate Marketing
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Almost 700 paper industry decision-makers from 195 companies in 38 countries met in Salzburg for this 3-day science dialogue – aptly entitled "Process & Progress" – to learn more about Voith Paper's process competence.

Science Dialog ▶ PROCESS & PROGRESS

4.9.2002

Wednesday, 4.9.2002

The symposium started on September 4 with an international press conference. In dialogues with press representatives, members of the Voith Paper management discussed current projects, opportunities and risks in the future growth market of China. The focus was also on Voith Paper's latest innovations.

After this press conference, the symposium was officially opened by Voith Board member Dr. Hans-Peter Sollinger. In the foyer of Salzburg's new congress center, guests were then able to whet their appetites at the Voith Paper Innovation show, where experts and engineers were on hand for answering all their questions.

As a fitting conclusion to such an striking demonstration of Voith Paper innovation competence, the evening closed with a festive dinner and musical entertainment.

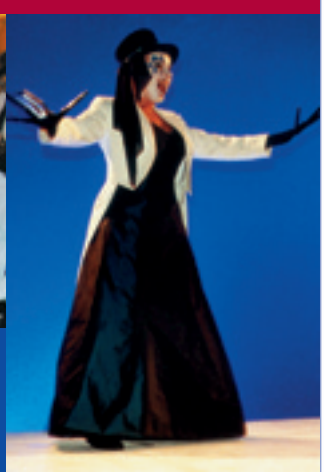
5.9.2002

Thursday, 5.9.2002

The impressive series of papers highlighting this event was introduced by Board Chairman Hans Müller. In his address, Hans Müller focused again on the transformation undergone by Voith Paper from a purely machine-building company into a comprehensive supplier for all paper industry processes.

Accordingly, the central theme of this symposium was the **One Platform Concept**, whereby Voith Paper offers comprehensive customized solutions for all paper grades. The following challenges in the paper industry gave rise to this concept:

- Increasing use of recycled fibers with steadily declining quality
- Rising production speeds
- Higher fillers content
- Lower basis weights
- Ever-increasing demands on paper quality
- Integration of offline processes in the paper machine
- Higher productivity
- Lower production costs.



The One Platform Concept enables optimally custom made solutions for all customer needs, ensuring the highest productivity in every case thanks to dependable well-proven modules. This concept covers the entire papermaking process, from stock preparation to finished product, and is applicable to all paper grades (including board and packaging papers).

With the One Platform Concept, Voith Paper can supply the most productive and cost-effective production line for any paper grade.

Each of the symposium presentations focused on the individual benefits of this concept. The primary need in **Newsprint** production, for example, is cost-effectiveness. For optimal production economy not only are cost-effective machinery and equipment necessary, but also low operating costs, high availability and runnability, and outstanding process stability. As impressively demonstrated by this presentation on the One Platform Concept for newsprint, Voith provides solutions meeting all these requirements.

The presentation dealing with **SC papers** focused above all on printability, while that on **LWC papers** underlined the aspects of quality and cost-effectiveness. As explained in the One Platform Concept presentation for **Woodfree papers**, the main requirements in this case are high quality and high production speeds. With regard to **Specialty papers**, the respective presentation emphasized that due to their enormous variety, the primary need here is for flexible machine concepts.

The audio-visual perfection of these presentations was rounded off by two customer contributions, in which **SCA Graphic Laakirchen** and **Rhein Papier** documented the process competence of Voith Paper. As conclusively demonstrated by the outstanding start-ups in Laakirchen and Hürth recently, Voith's One Platform Concept brings decisive advantages for the paper industry. The round of presentations was summed up by Dr. Hans-Peter Sollinger. He pointed out once again that all the activities and development efforts of Voith Paper are focused on maximum benefit for our customers – the paper industry – with whom close ongoing teamwork is vital for long-term success.

The grand finale on Thursday evening was a gala banquet held in Schloss Hellbrunn, preceded by a reception in the imposing palace courtyard. In this unique festive atmosphere, appropriate for the city of Mozart, guests were able to make closer contacts, customer relations were deepened, and valuable experiences were interchanged. The evening was highlighted musically by stars from the Salzburg Festival, and visually by the spectacular illuminated fountains.

For the seminar papers and other documentation, please contact:
info.voithpaper@voith.com

6.9.2002

Friday 6.9.2002

On Friday morning the symposium participants boarded a historical steam train in Salzburg main station for a nonstop trip to the **SCA Graphic Laakirchen** mill in Laakirchen. Here they were shown around the world's most advanced production line for SC grades. Entirely consisting of Voith Paper modules and components according to the One Platform Concept, this line holds the record for shortest startup time. Fascinated by such an impressive high-tech plant, which gave rise to some very enthusiastic discussions accordingly, our guests then returned in style to Salzburg on their special train for last goodbyes before departing.

The success of this unique event is reflected not only by extremely positive feedback from our customers, with numerous letters of thanks and praise, but also by the outstanding press reports. Voith Paper has impressively demonstrated to the best of paper industry decision-makers, that the **One Platform Concept** integrates unsurpassed technological competence with a matchless spirit of innovation.

High Tech for China –
Highranking guests from the Middle Kingdom at Voith

Markus Wild

Paper Machines Graphic
markus.wild@voith.com

During the international Voith Paper customer conference in Salzburg, Austria, in September 4-6, 2002, Voith Paper was pleased to welcome 650 participants. These representatives from 195 companies and 38 countries were a worldwide gathering of clients with unique technical competence. After the German-speaking group of customers, China, with its about 60 delegates, was the nation sending most representatives. This brought home to the international specialists the continuously growing importance of the Chinese paper industry and its constantly growing importance on the international scale. Highest-ranking representatives and functionaries were able to convince themselves that Voith is a partner with whom to build up and expand the paper industry using state of the art technology. The Chinese companies represented included (in alphabetical order):

Chenming Group
CNTIC (China National Technical Import & Export Corporation)
Foshan Huafeng Paper
Gold-East/Dagang
Guangzhou Paper
Hengfeng/Mudanjiang Paper
Huatai Group
Jincheng Paper
Jinfeng/Chengdu
Nanping Paper
Ningxia Meili Mill
Qiqihar
Tianjin Global Paper

The visit to **SCA Graphic Laakirchen**, Austria, at the end of the customer conference was another highlight (visitors were transported by a historical train from Salzburg right to the middle of the SCA company premises, where a walk through the presently most modern and powerful SCA-Plus machine in Laakirchen started); at the same time, it was the beginning of a series of visits of the Chinese delegation.

Among others, these included a visit to Voith Fabrics in Frankenmarkt, Austria, the Voith headquarters in Heidenheim, the company Lang Papier in Ettringen, Rhein Papier in Hürth and the Kehl works of Koehler, all located in Germany. A schedule which allowed visits to four of the most important reference plants within just one week.

We would like to take this occasion to expressly thank the high-ranking and technically competent representatives of these companies, who made it possible for the first time that such a large delegation from China was granted access to their mills and the Voith-supplied machines.

Lang Papier, Ettringen

This fact is all the more important as these are the most modern Voith machines of the now famous and extremely successful One Platform Concept, producing a variety of products, such as SC paper (SCA and Lang Papier), newsprint (Rhein Papier) and coated thermopapers (Koehler) at the relevant mills.

On the following weekend, the exclusive program of visits for our Chinese guests began.

The Saturday began with the trip to Frankenmarkt to our Voith Fabrics plant. Here, the visitors were able to see with their own eyes the most modern technology used and the absolute technical competence during their impressive walk through the plant.

After a bus trip through the Austrian-Bavarian foothills of the Alps to Munich, Sunday's highlight was the visit to the royal Hirschgarten. Under a picture-book white-blue sky, our visitors were able to enjoy a piece of Bavarian lifestyle during a hearty lunch and good German beer.

The weekend found its completion with a successful dinner in Heidenheim.

The week, with its interesting program of visits, was started by Hans Müller on Monday morning with his introduction to very interesting presentations on the subjects Voith – Engineered reliability, Voith Fiber Systems – Know how for the Chinese Market and Voith Paper Investments in China. In addition, the sale of the 200th ModuleJet was celebrated with a present for Mr. Li, Shandong Huatai Paper Industry Co Ltd (Fig. top left).

After lively technical discussions with the presenters, Dr. Sollinger, Dr. Pfalzer and Mr. Gather, the delegation visited the workshops and the **R & D center** of Voith.

On Tuesday, the connection between the theories presented and practice was to be established. The first reference plant, shown to us full of pride by Mr. Murtola (production manager, Lang Papier Ettringen), was the **PM 5 in Ettringen**, the fastest line for online-SC papers in the world. Mr. Murtola first gave an overview of the Myllikoski group and the mill in Ettringen, then he gave the visitors a tour of the new DIP plant and the PM 5.

August Koehler, Kehl

To round off the day, and as a stop on the way to the next reference mill, we visited Neuschwanstein castle with our guests.

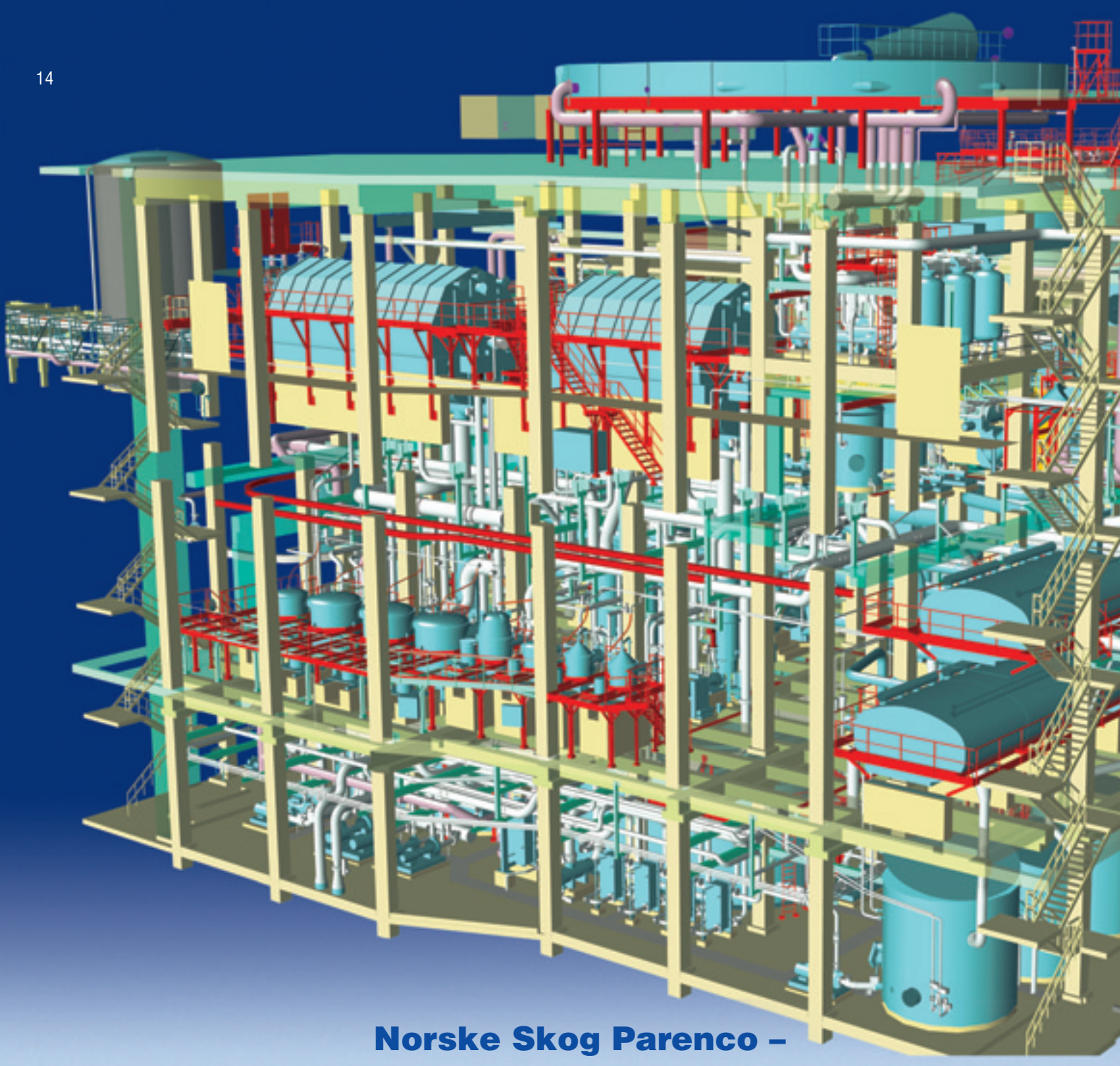
Wednesday began with the visit to the latest newsprint mill in the world at **Rhein Papier in Hürth**, which, like Lang Papier, also belongs to the Myllikoski group. We were welcomed by Mrs. Murtola (plant manager) and Mr. Schmidt (project manager). After a brief introduction, we could see the DIP plant and the PM.

The PM was started up with the world record speed of 1,560 m/min and has, in the meantime, already been producing at a speed of 1,912 m/min for short periods of time. Part of this noteworthy success is due to a totally new kind of collaboration between the supplier and customer, which includes a service agreement for maintenance. It is the goal to unify the core competence of the paper manufacturer with the core competence of the plant supplier, making use of synergy effects in order to ensure a high overall efficiency and high economic efficiency of the operation.

After the visit to Rhein Papier, a boat trip on the Rhine brought us closer to our next highlight of this reference trip, and it also allowed us to hold discussions and have dinner together.

This further highlight was a visit to the company **August Koehler in Kehl**, where on Thursday morning we were able to visit the new PM for thermopapers with Mr. Boschert (division manager). At this mill, a PM and offline coater produce thermopapers. Nine months after startup and intensive cooperation between the companies Köhler and Voith Paper, the line is already producing above design speed at 1,460 m/min.

This was the successful end to a week that was consistently interesting both for the guests and Voith due to the numerous intensive discussions and the positive feedback, and which left lasting impressions. With the assurance of another meeting in the near future and good cooperation, we said farewell to our guests at the Frankfurt airport.



Norske Skog Parenco –
more than happy with their new FOI 6 stock preparation line

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Just what Parenco wanted: finished stock in only 14 days. In December 2000 Parenco BV (at that time fully owned by Haindl Papier) awarded Voith Paper Fiber Systems the engineering contract for a new stock preparation line (FOI 6, Flotatie Ontinking) at their Renkum mill in the Netherlands. The scope of supply also included various existing system rebuilds as well as all key components.

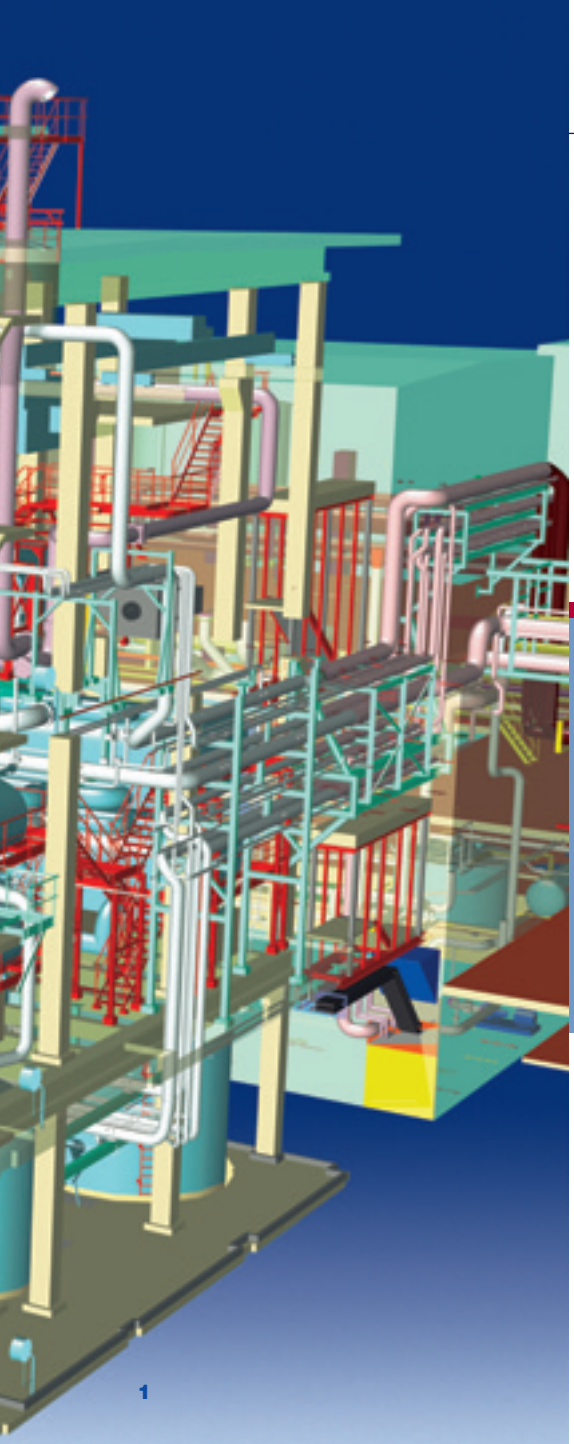

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Fig. 1: *3-dimensional computer simulation of the new FOI 6 stock preparation line.*

Fig. 2: *The Norske Skog Parenco mill in Renkum, Netherlands.*

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After the design and installation of two new stock preparation lines/rebuilds at the Augsburg and Steyrermühl mills, this was the third large order Voith had received from Haindl within a very short space of time.

Key reasons for winning this repeat order were the extremely short and problem-free commissionings in Augsburg and Steyrermühl, thanks to Voith's precision engineering.

In addition to a higher production capacity, the customer's objective with this project was to increase the use of recovered paper furnish whilst maintaining or improving product quality. The outdated FOI 2 stock preparation line was shut down after successfully commissioning the FOI 6 line.

Haindl's project team of engineers from the Parenco mill and from the central engineering department in Augsburg proved itself very well, making ideal use of the experience gained in Augsburg and Steyrermühl for meeting the specific requirements of Parenco.

When the project got underway at the end of May 2001, contracts were already signed for the sale of Haindl to UPM-Kymmene. To gain approval of this transaction by the anti-trust authorities, however, the Parenco mill had to be sold off to Norske Skog of Norway in order to comply with market competition law requirements.

Since anti-trust board approval was not given until the end of 2001, the curious situation arose that in the meantime UPM people were working for their competitor Norske Skog.

Notwithstanding these rather challenging circumstances, Voith, in close teamwork with the Parenco and Haindl technologists, designed a modern two-loop stock preparation system, including water clarification, rejects handling and sludge treatment.

Voith's engineering contract covered basic and detailed engineering both for the stock preparation process and for the

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Fig. 3: *EcoCell pre- and post-flotation.*

Fig. 4: *IC and LC slotted screening.*

Fig. 5: *EcoDirect disperger.*

automation technology and covered the following scope of supply:

- Engineering of the new FOI 6 deinking line
- Standardization and optimization of the water systems and cooling circuits in the existing FOI 4 and FOI 5 deinking lines, analogue with the new FOI 6 line
- Engineering of a new MC stock storage system
- Engineering of a new central millwide system for sludge treatment
- Optimization of existing additive systems and planning of new ones (such as soap preparation)
- Millwide system analysis, including balancing of stock, water, thermal energy and COD, as well as simulation of future production conditions
- Development of a millwide process water management concept.

Voith also supplied the following key quality-relevant stock preparation subsystems:

- 2-stage hole screening and heavyweight cleaning, comprising HC cleaning, MultiSorter, Combisorter and LC cleaning
- 2-stage EcoCell pre-flotation **(Fig. 3)** with five primary and three secondary cells, including two deaeration cyclones for installation in the foam tank
- 3-stage IC slotted screening (0.25 mm C-bar technology), comprising MultiSorters in the first two stages and the proven MiniSorter as final stage **(Fig. 4)**
- 4-stage LC slotted screening with 0.2 mm C-bar technology, comprising MultiSorters in the first three stages and likewise a MiniSorter as final stage **(Fig. 4)**
- The recently developed EcoDirect disperger **(Fig. 5)** with direct heating and preceding equalizing screw
- 2-stage EcoCell post-flotation with five primary and two secondary cells including deaeration cyclone.

Thanks to our colleagues from the Voith facility in Vaassen, we had no communication problems in holding our training for operator and maintenance personnel in the dutch language. The erection work was also carried out in close teamwork with our Netherlands colleagues.

The Voith Paper joint-venture partner Meri, Munich, was responsible for installation and commissioning of an existing Deltapurge, which had been taken out of service some time ago. Installed on the roof of the new FOI 6 building, it has a water clarification capacity of 25,000 l/min. Meri also supplied the new rejects handling and disposal system designed for all three stock preparation lines, including magnetic separator, shredder and compactor.

As previously at the UPM-Haindl mills in Augsburg and Steyrermühl, Voith's patented AP2000 (Advanced Process

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Fig. 6: *AP 2000 concept with mixing pumps.*

Fig. 7: *Screw presses and disc filter.*

2000) engineering concept was implemented here (Fig. 6). Since lack of space precluded the installation of a conventional system with chests, the compact and operationally cost-effective AP2000 concept, with its virtually closed-loop design and high degree of automation, was selected here.

With the new stock preparation concept, the papermaker can now group start the entire line in only ten minutes, and shut it down in about twenty minutes, including flushing. Another welcome highlight for the plant operator is certainly the production control system, which enables the required production to be precisely set with a single command. The millwide water management concept and its accompanying control system also proved extremely welcome. With this system, the water volume throughout the mill is automatically maintained constant for various production conditions.

The new FOI 6 stock preparation line, in combination with various rebuilds (FOI 4/FOI 5/PM 1/PM 2) as well as measures derived from the results of the system analysis (not forgetting the new water management philosophy!) have helped Parenco move further towards becoming one of the leading deinking plants in terms of efficiency and runnability.

The high degree of automation has not only simplified operation and increased reliability, but has also ensured meeting Parenco's requirement for a central control room for all three stock preparation lines.

Collision checks were continuously made during the planning phase, using Voith's 3-D computer simulation system. Thanks to this and by using it during installation of the pipework, costly and time-consuming alterations were largely avoided during erection. In addition, the piping supplier was able to prefabricate a great deal of the pipework based on the precision isometrics provided by Voith Paper.

Early in the engineering work, Norske Skog Parenco engineers were able to also use the 3-D computer simulation to check design accessibility, as well as maintenance-friendly and operational reliability.

A significant factor for the successful commissioning, particularly of the modified existing systems, was the exemplary tie-in work. In close teamwork with production management, even the shortest shutdown times were fully used for connecting the complex pipework and for adjustment of software, etc.

One of the main reasons, however, for this picture-book deinking line start-up was the several weeks of software tests carried out prior to commissioning. Every single function of the 1,400 control cir-

Harald Fichtl
Walter Rummler
Ben Kortekaas

Norske Skog Parenco



We hold Voith's comprehensive system competence in high esteem

Renkum can look back on a very long tradition of paper production, dating from the original mill in 1720. The mill as it stands today was founded in 1912.

The two paper machines at Norske Skog Parenco today produce standard and improved newsprint with basis weights from 45 to 56 g/m². Annual gross production is around 500,000 t.

We mainly use recovered paper as our raw material. This consists of a mixture of ONP and OMG which is prepared in three deinking lines. The overall recovered paper content is 75%, and we add 25% TMP. It is interesting to note that until well into the eighties, the ratio of deinked stock to TMP was exactly the opposite.

With an overall investment of 65 million Euro, we are systematically pursueing our quality strategy. The new FOI 6 line has, of course, increased our flotation stock capacity and this opens up future possibilities for the furnish mix. This investment certainly has further potential for cost savings and quality improvements.

Our existing water system would have been inadequate for the additional production capacity after installing the new FOI 6 line. We therefore attached great importance to carrying out a millwide system analysis. Based on this analysis and the millwide water management concept proposed by Voith we can now increase our product quality and operating reliability for various operating conditions by maintaining a higher constancy in quality and process, whilst still complying with the strict limits set by the various authorities. All at minimum investment costs.

Voith not only had to design a new stock preparation line for us, but they also had to integrate it into a complex existing structure with limited fresh water resources and restricted effluent volumes – all without affecting the flexibility of our furnish recipe.

Along with the specific know-how of our former colleagues in the Augsburg central engineering department and our own Norske Skog Parenco technologists and production people, Voith's complete system competence has provided us with an outstanding concept for efficiency and quality enhancement. With the measures we have implemented together with Voith, we can look to our mid-term objective of becoming one of the world's most efficient recovered paper preparation plants.

We sincerely thank Voith for the excellent cooperation, and wish them all the best for the future, too.

Fig. 8: *The new MC stock storage towers.*

cuits was simulated and thoroughly tested during this time.

Despite the tight schedule and very demanding requirements, the commissioning team was thus able to deliver high-grade stock to the new MC storage system only two weeks after beginning the start-up phase in July 2002 **(Fig. 8)**.

With this modern technology, Norske Skog Parenco have passed another important milestone in their long and impressive recycling track record. Voith is proud to be a partner in this development, but we also take this as a commitment. A commitment to continue contributing towards the economic success of Norske Skog Parenco, and to the strengthening of our partnership.

We wish Norske Skog all the very best for the future – and not only in Renkum!

1

New DIP 5 for 600 t/24 h finished stock at Pan Asia Paper, Jeon Ju, Korea – just 10 months from contract signing to start-up

Leo Engelmann

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"As you make your bed, so you must lie in it." This German proverb perfectly describes Pan Asia Paper's mill in Jeon Ju (Chonju) in the South West of Korea. Green lawns and fountains (Fig. 1) with shady groups of seats do not necessarily suggest that you have just passed the entrance gate to a highly efficient paper mill. This pleasant environment obviously strongly motivates the people working here since the visitor will find the paper manufacturing plant just as well-looked-after as the green areas.

This impression is underlined when the Vice President of Production, Young-Jae Kim, states that the employees are the greatest asset for efficient production.

Founded in 1965 under the name of Saehan Paper Co. Ltd., the mill has been a member of the Pan Asia Paper Group since 1999. Pan Asia Paper is a cooperation between Norske Skog, Norway and Abitibi-Consolidated, Canada, with its head office in Singapore.

Further production plants are in Chongwon, Korea, in Thailand and in China.

In 2001, seven paper machines produced 1,007 million tons of paper in Jeon Ju. Together with the Chongwon mill, Pan Asia Paper covers more than 50% of the newsprint demand in Korea. Approximately 25 % of the production is exported.

The main raw material for the paper machines is provided by 5 deinking lines for the preparation of recovered paper, together with 2 TMP plants.

This makes Pan Asia Paper in Jeon Ju the paper mill with the world's highest capacity for the production and processing of DIP stock.

An interesting point worth mentioning here is that in 1995 the Korean government awarded Pan Asia Paper, Jeon Ju, a prize for environmentally-friendly paper production.

Fig. 1: *Pan Asia Paper in Jeon Ju (Chonju), Korea.*

Fig. 2: *Protector System.*

Fig. 3: *Hole and slot screening (foreground) and part of the EcoCell deinking system (background).*

For the most recent of the 5 deinking plants in Jeon Ju, DIP 5, which started up in July 2001, Voith Paper was awarded the contract for delivery of the key plant components and machines in August 2000.

A long-standing partnership developed during the time the orders for the DIP 3 and DIP 4 plants were being processed and this provided valuable experience for the smooth cooperation on the DIP 5 project.

The plant is designed for 600 t/24 h of finished stock and fully reflects the latest state of technology. The furnish today consists of approximately 70% Korean ONP, 20% European ONP and approximately 10% American OMG.

DIP 5 deinking line

The Protector system **(Fig. 2)** immediately following pulping ensures highly efficient removal of contaminants such as glass, paperclips and sand so that today, after more than 12 months' operation,

Young-Jae Kim
Vice President Production, Pan Asia Paper, Jeon Ju

"Cooperation based on partnership is the basis for a successful project."

Kyoung-Yong Lim
Production Manager DIP 5, Pan Asia Paper, Jeon Ju

"In the production line from DIP to paper machine, quality and productivity is improved by direct feedback from the paper machine as 'customer'."

Fig. 4: *Disc disperger.*

Fig. 5: *In grateful recognition of the excellent cooperation and satisfaction with the achieved results, Pan Asia presented Feridun Dormischian, representing Voith Paper Fiber Systems, with a commemorative plaque.*

there is no basket wear worth mentioning in the subsequent 3-stage MultiSorter and MiniSorter hole screening system (Fig. 3).

The production manager of the new DIP 5, Kyoung-Yong Lim, emphasized the excellent results achieved with the EcoCell Flotations I and II (Fig. 3), consisting of a total of 11 primary and 3 secondary cells as well as 2 deaeration cyclones. The DIP 5 plant is up to 5 % more efficient than the previous plants in removing printing inks whilst at the same time the use of chemical additives has been significantly reduced.

The configuration of 6 primary and 2 secondary cells in Flotation I and 5 primary and 1 secondary cell in Flotation II achieves a brightness of between 70 and 72 ° ISO as needed on PM 5 for the required particularly bright paper grades.

Flotation I is followed by 3-stage LC slot screening (Fig. 3) with MultiScreens and MiniSorter (all with 0.15 mm C-bar screen baskets), and a disc disperger (Fig. 4).

For heating and thickening a SpeedHeater, two disc filters and a Thune screw press were supplied by Voith Paper AS, Tranby, Norway (the former Kvaerner Recycling and Dewatering Division).

The screw conveyers between the process stages were delivered by the Voith subsidiary B+G Fördertechnik, Euskirchen and Voith's joint venture partner Meri supplied two Sediphant machines and a gravity table for reject handling and sludge treatment.

Apart from the process machines themselves, the Pan Asia Paper project team were able to smoothly integrate Voith's engineering requirements into the overall planning.

Here, too, the experience gained from previous joint projects had a positive influence. It was therefore no problem at all for Pan Asia Paper's experienced planning department to take over the process, control and instrumentation details prepared by Voith and integrate them into the overall system planning.

All interfaces were clearly defined in detail and agreed by the specialists from both companies during the project meetings held in Jeon Ju. The reward for these meticulous preliminary discussions was a record erection and start-up time.

The machines were installed by local companies, supported by erection specialists from Ravensburg and Tranby. Punctual deliveries, excellent preparatory work by the construction company and the competence of the erection companies meant that the time schedule for the complete plant could be met exactly.

The preparatory work by all parties involved was so thorough that the plant was able to start up production, supported by Voith's commissioning engineer, in July 2001, approximately 10 months after contract signing.

Pan Asia Paper is fully satisfied with the new DIP 5 plant's production performance in terms of quality and quantity of the finished stock as well as overall runnability of the deinking plant (Fig. 5).

1

Khanna Paper
joins the top ten paper producers in India

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Not far away from the magnificent Golden Temple (Fig. 1) in the city of Amritsar (Punjab), the unassuming Chairman of Khanna Paper Mills , B. M. Khanna, runs a highly successful operation, supported by his two sons Rahul and Saurabh. The start-up in March 2002 of a new Voith 200 t/24 h deinking plant, the largest to-date in India, has firmly put the mill up among the top ten in paper production in India.

From a very modest 500 kg/24h of board in 1964, Khanna today produces around 300 t/24 h of both board and writing and printing papers. With the new installation, Khanna has also become the first paper mill in India to produce their high quality writings and printings from 100 % deinked woodfree recovered paper.

Designed according to the latest state of the art technology and automation, the deinking plant comprises the following main process equipment:

- High consistency pulping, followed by high density cleaning and hole screening.
- EcoCell pre- and post-flotation for efficient ink removal (Fig. 2).
- Fine cleaning with the new generation of EcoMizer cleaners and fine screening with narrow slot widths of 0.15 mm, using proven C-bar baskets.
- The desired high final stock brightness is ensured by peroxide bleaching in the recently developed EcoReact HC bleaching tower as well as by hydrosulfite bleaching.

The whole stock preparation plant is controlled by only one plant operator using a DCS system.

The project was carried out in close cooperation between Khanna Paper, Voith Paper Fiber Systems in Ravensburg, Germany and Voith Paper Technology (India), based in Calcutta. The latter is a joint venture between Voith and Larsen & Toubro.

200 t/24 h deinking plant catapults the mill into the big league

"In Voith Paper we have found a trustworthy, competent and reliable partner for the present and future projects."
Saurabh Khanna, Technical Director, Khanna Paper Mills.

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1

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Hürth PM 1 – the world's most modern newsprint line breaks new records

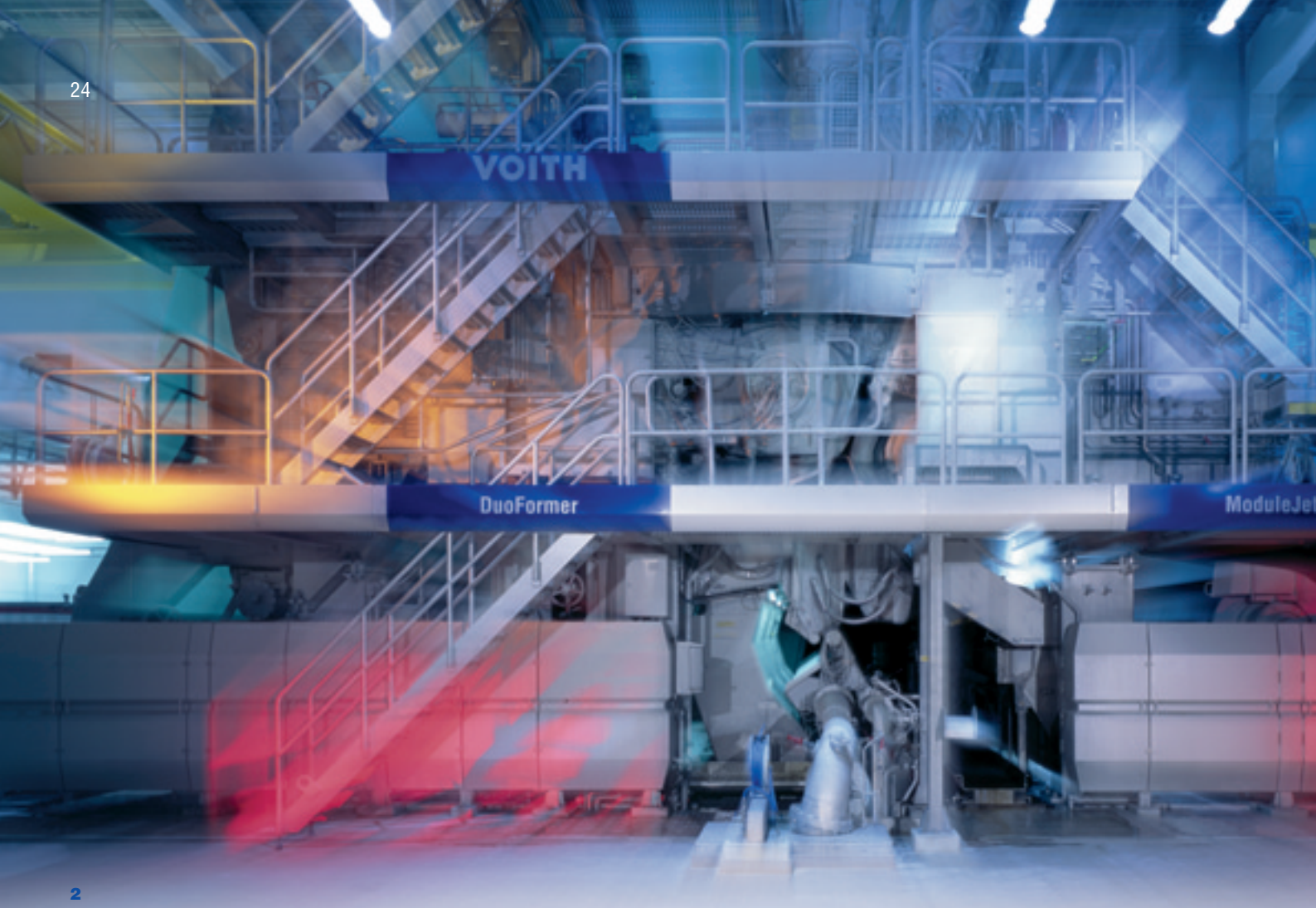
This entire project and commissioning impressively shows what can be achieved through an optimal combination of meticulous planning, innovative technology, and competent personnel both on the side of the supplier and the customer. Bernhard Schmidt, Rhein Papier GmbH project manager, sums up the Hürth PM 1 project execution and results as follows: "In the record time of only 12 months from construction start to first paper on the Sirius reel, we completed an exceptional project together with Voith. Hürth PM 1 is certainly one of the greatest successes in our entire company history".

The customer

Rhein Papier GmbH is a new subsidiary of the Myllykoski Corporation, which was founded more than a century ago. Myllykoski is present in all key paper markets around the world, and specializes in coated and uncoated graphic printing grades. About three million tons of paper are produced annually on 19 machines in the nine Myllykoski mills.

The decision for this modern newsprint line was made in December 2000 in view of the serious shortage of newsprint at that time – a good many publishers and printers had great difficulty during 2000 with paper supplies. Successful negotiations were held with potential paper customers even prior to this decision.

On April 27, 2001 – after hardly 4 months of intensive project work – the contract



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was signed with Voith Paper for the delivery of a complete new production line for newsprint, from stock preparation to slitter/winder.

Decisive for the award of this contract was above all Voith Paper's comprehensive know-how in graphic paper production from 100 % recovered paper.

The location near Cologne, Germany, was selected, since most large consumers are in the vicinity of the new production line, which is the only major secondary fiber processing plant of this size in the region.

Project summary

After deciding on the location in May 2001, detailed project planning started immediately, in order to comply with the very tight time schedule:

Construction work started in July, and as of November Voith's representatives were continuously on site. The erection phase began in December 2001, and to ensure ongoing compliance with the schedule, up to 900 erectors were required at peak times. Production start-up was planned for August 1, 2002, but this goal was reached considerably earlier.

On July 4, 2002 Voith Paper and Rhein Papier celebrated the first paper at the Sirius reel.

Hürth PM 1 plant manager **Anne Murtola** was very enthusiastic about the smooth start-up of this paper machine:

"We beat the start-up deadline by almost a month – and even at the world record start-up speed of 1,560 m/min. That was the crowning achievement of this outstanding project team!".

Not long afterwards, Hürth PM 1 already produced paper to market quality standards.

At that time, the production line was in the initial optimization phase – and after only six weeks another record had been broken: the machine was briefly run up to a speed of 1,912 m/min. Never before had this happened so soon after commissioning, and the machine clearly has the potential for continuous production at speeds exceeding 1,900 m/min.

The key reasons for the success of this project can be summarized as follows:

- Innovative technologies
- Single-source delivery
- A forward-looking and quality-oriented maintenance concept
- Excellent time management.

Voith Paper's "One Platform Concept" systematically developed over the last five years was implemented here for the first time with nearly all its modules. Hürth PM 1 comprises a ModuleJet headbox, DuoFormer TQv, a tandem NipcoFlex press section, TopDuoRun dryer section,

Fig. 1: *Rhein Papier GmbH, Hürth, Germany.*

Fig. 2: *PM 1 former section.*

Fig. 3: *Dry end with Sirius reel.*

Technical data

End product	Newsprint made of 100% recovered paper furnish
Average production speed	1,800 m/min
Maximum production speed	2,000 m/min
Design speed	2,200 m/min
Wire width	8,900 mm
Web width	8,150 mm
Production	280,000 tonnes per year

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softnip calender and Sirius reel. Apart from the actual paper machine including quality control system, Voith also supplied all the stock preparation machines, as well as all the fabrics from Voith Fabrics.

The unusually short construction time of only 12 months is the fastest worldwide for this kind of production line so far.

A unique maintenance concept has been implemented with Hürth PM 1 for the first time in Europe – Myllykoski closed a service contract with Voith covering the entire maintenance of the mill's machinery.

Routine on-site maintenance is done by the customer's personnel, while for all complex service and repair work a qualified VIS team (Voith Industrial Services) is on call. This outsourcing concept originated from Rhein Papier's need to concentrate on its core competence of paper technology and production.

To shorten commissioning time and ensure optimal start-up, comprehensive on-site training courses were held for the customer's personnel. Furthermore, Voith provided Rhein Papier with two project managers throughout the realization period. After intensive support during the erection and commissioning phases, our experts are currently on site for consulting and support with optimization.

Teamwork with the customer

Both sides were delighted with this smooth teamwork. Thanks to the customer's efficient and highly qualified team, who tackled this tight schedule very professionally, no delays of any kind occurred.

Prior target settings

The ambitious goal set for this project was to build the world's most modern and cost-effective production line for standard newsprint – without exceeding the budget and without compromising any quality standards. To ensure optimal results, previous project experience and resulting synergies were to be integrated.

The commissioning target was to break the world start-up curve record for this type of production line, and, in the long term, to attain a stable operating speed of 1,800 m/min.

Today, all these goals have already been reached. Only three months after start-up, Hürth PM 1 was producing paper to the very highest quality standards. As confirmed by end customers, excellent printing results were already attained with the first paper deliveries.

As for the targeted speed of 1,800 m/min, this was already exceeded at the beginning of 2003.

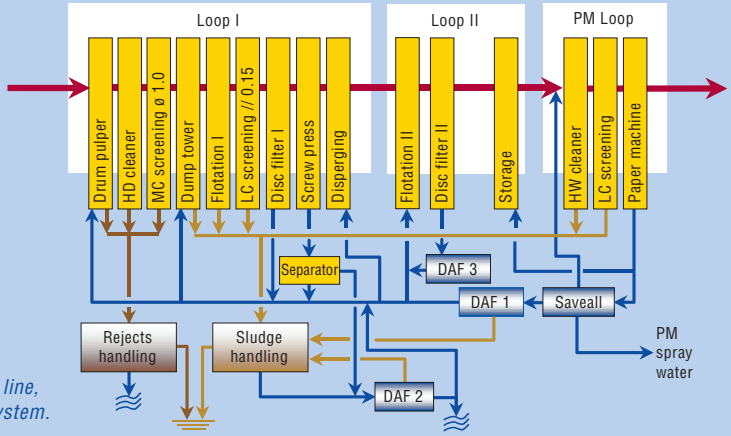

Fig. 4: *Deinking line, 2-loop system.*

Fig. 5: *B+G raw material handling equipment.*

Stock preparation

The Hürth PM 1 stock preparation line (Fig. 4), delivering 880 t/24 h oven-dry finished stock from 100% recovered paper, also reflects the overall project philosophy. Only by combining well-proven components, modules and process stages with system innovations and close teamwork can such a fast and successful commissioning be realized.

Voith supplied all the key stock preparation equipment, from drum pulper charging to thickening, storage, rejects and effluent treatment, as well as broke pulping.

Recovered paper furnish charging

The B+G Fördertechnik charging system for mixed furnish from 40 to 60% ONP and OMG handles loose paper as well as bales. The scope of delivery comprised the entire conveying system including bale dewiring and breaking as well as levelling drum (Fig. 5). Bale feed can be up to 70% of total charge, and in this connection a performance check shortly after commissioning showed a bale dewiring efficiency of more than 98%.

TwinDrum drum pulper system

Immediately after commissioning the TwinDrum (Fig. 6), the enormous potential of this pulping system in terms of throughput and finished stock quality was apparent. Production capacity with maximum drum charge is around 1,700 t/24 h air-dry.

The Voith TwinDrum uses separate rotating pulping and screening drums (with displacement body inside the pulping drum), connected via a transfer station. This enables selective optimization of pulping and screening to suit the respective furnish *(for more details, see twogether 9)*.

Pulping and screening results with the TwinDrum are far superior to conventional drum pulpers with regard to deflaking, gentle fiber treatment and avoidance of contaminant size reduction. The screen drum rejects are practically free of fibers thanks to intensive washing and screening, thus reducing overall fiber losses in stock preparation.

Cleaning and screening

To prevent deposits and stringing, the drum screen accepts tank is tapered down. At this point the stock is already coarse screened using 8 mm holes.

The stock then passes through six high consistency cleaners with intermittent rejects discharge.

The 3-stage forward-flow MC coarse screening system comprises three MultiSorters in the first two stages followed by a MiniSorter as final stage – all with baskets with contoured 1.0 mm holes. The practically flake-free stock quality demanded by this fine perforation is ensured by the efficient TwinDrum pulper system. Hole screening accepts are pumped to the two storage towers, which operate free of deposits.

Flotation I and II

The Hürth PM 1 flotation system was, up to the time of commissioning, the largest EcoCell line ever delivered by Voith, with a finished stock capacity of 880 t/24 h oven-dry (Fig. 7). It includes a pre-flota-

Fig. 6: *TwinDrum pulper system.*

Fig. 7: *EcoCell deinking line.*

Fig. 8: *EcoDirect disperger.*

Fig. 10: *Anne Murtola, mill manager Rhein Papier GmbH with Roland Rauch, project manager Voith Paper Fiber Systems.*

Fig. 9: *Broke pulper.*

tion stage with six primary and six secondary cells delivering the accepts forward, and a post-flotation stage with five primary and three secondary cells.

Fine screening

Pre-flotation is followed by an effective 4-stage LC slotted fine screening stage with 0.15 mm C-bar technology. Stages 3 and 4 are both in tandem layout and enable efficient stickies removal. This has an extremely favourable effect on paper machine runnability.

Disperging

For efficient dirt speck reduction, stickies disintegration and deinking, the next stage is disperging (Fig. 8) with two EcoDirect dispergers.

Steam is injected directly into the housing of this new disperger type, so that no prior heating screw is required. The high stock consistency required for disperging (up to 30%) is ensured by the preceding thickening stage I with disc filter and two screw presses.

Disperging is followed by post-flotation, thickening stage II, and finally by storage of the finished stock.

Effluent and rejects handling

The Voith Paper joint-venture partner meri supplied all the rejects handling equipment including channel rake, magnetic separator, shredder and compactor.

Rejects from the cleaners are handled by a Sedimator, while the coarse screening rejects are handled via Elephant filter and compactor for disposal. Meri also supplied the entire effluent treatment plant, comprising three Deltapurge machines.

Sludge is dewatered by two gravity tables, plus Elephant filter and sludge presses. Effluent is pre-cleaned by Elephant filter and microflotation before passing to the effluent plant.

Other equipment

Voith also supplied all the broke pulpers for the paper machine and the two slitter-winders (Fig. 9).

What does this project say about Voith?

This project has once again demonstrated Voith's innovation competence, not only in developing new concepts, but also in carrying them out efficiently.

Voith concentrated, as always, on customer needs and developed solutions optimally meeting them through:

- complete system delivery
- uniform standards
- clear interfaces with other suppliers
- taking over machine servicing and maintenance, thus enabling the customer to focus on his core activities of production and end product marketing.

World records broken by Hürth PM 1

- Production start-up only 12 months after beginning site work
- Start-up speed of 1,560 m/min
- Production speed of 1,912 m/min only six weeks after commissioning.

Laakirchen PM 11 –
State-of-the-art production line for SCA-Plus grades; a challenge for LWC paper

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Paper Machines Graphic
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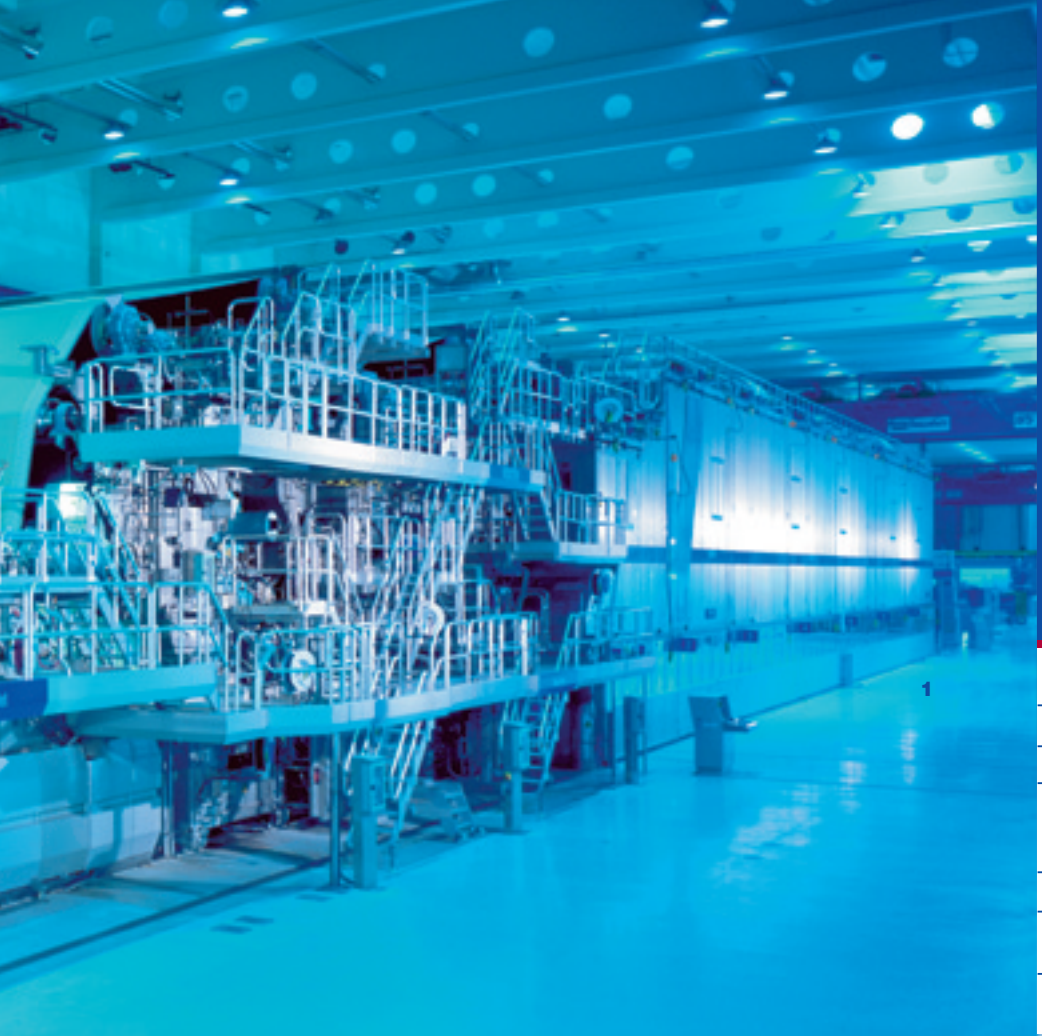
In September 2000 SCA Graphic Laakirchen ordered a new paper machine from Voith Paper, complete with offline Janus MK 2 calender, to produce high-grade SC-papers for offset and rotogravure printing. The commissioning of this new line in May 2002 was particularly successful – numerous quality parameters very soon exceeded all expectations.



Technical data of PM 11

Wire width	9,650 mm
Finished sheet width	8,700 mm
Design speed	2,000 m/min
Planned annual output	
Phase 1	240,000 tons
Phase 2	360,000 tons
Basis weight	38-65 g/m^2
Paper grades:	SCA-Plus, offset and rotogravure printing papers
Production start-up	May 2002

Fig. 1: *Laakirchen PM 11.*

Fig. 2: *Schematic layout of Laakirchen PM 11.*

After forty years of excellent service, the old Laakirchen SCA PM 3, delivered by Voith in 1962, was ready for its well-earned retirement, and duly replaced by PM 11 after commissioning.

This new Voith paper machine 11 was started up well before the deadline. It went on line five weeks earlier than planned, and very soon proved its potential for meeting the required quality standards. Due to limited availability of stock, its operating speed is restricted to 1,300 m/min during the initial phase.

The great success of this project is attributable to the intensive cooperation between SCA and Voith, with clearly defined responsibilities down to the last detail, and precise control thanks to interface protocol reporting.

Thanks to primary target-setting by Voith for the key mechanical and plant engineering partners, the paper machine was rapidly integrated into the overall process on a systematic and well-proven basis.

Professional project management ensured full compliance with the erection and installation schedule.

Special attention was paid to acceptance testing of individual prefabricated components at the various production locations. Functional trials were done in advance on the units and control systems.

A comprehensive test schedule was drawn up to ensure compliance of all the PM 11 components with specific requirements.

The production line commissioning was systematically organized right down to the last detail. As shown by the results, this guaranteed smooth and trouble-free startup of the entire line.

Fig. 3: *Stock preparation.*

Fig. 4: *Wet end: tandem NipcoFlex press.*

Fig. 5: *Dry end: TopDuoRun and Sirius reel.*

Fig. 6: *Paper machine efficiency development.*

Fig. 7: *Janus MK 2.*

Fig. 8: *VariTop slitter-winder.*

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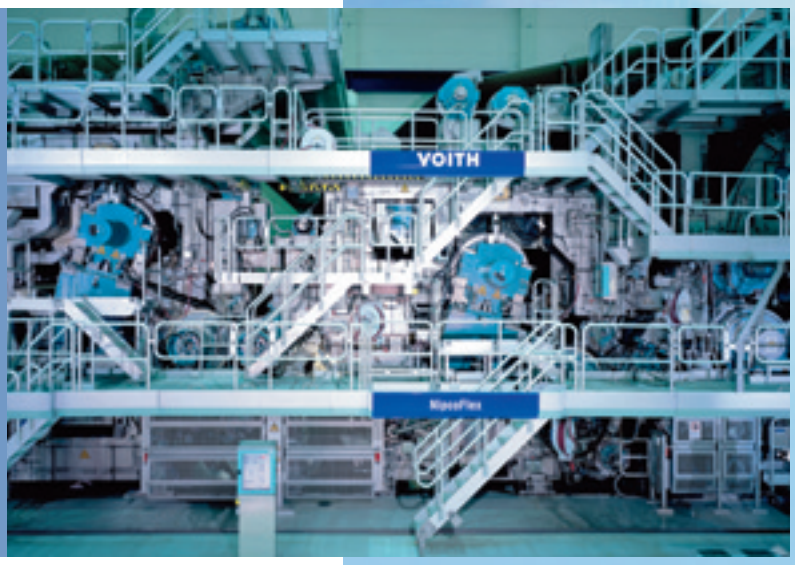

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Based on the One Platform Concept, this production line includes the following components:

- ModuleJet headbox
- DuoFormer TQv
- Tandem NipcoFlex press
- TopDuoRun dryer section
- Sirius winder
- Offline Janus MK 2 calender
- VariTop slitter-winder
- Roll transport system
- Twister roll packaging machine.

Concept

Sheet formation and subsequent drainage in the press section of this new paper machine take place under fully controlled conditions. The result is uniform product quality in every respect.

"The unprecedented profile uniformity both in the machine and cross-machine directions, and absolute surface equality on both sides of the sheet, ensure smooth running in the printing press without any folding – which also helps to enhance printing efficiency", says Wolfgang Kühnel, manager technical customer service at SCA Graphic Laakirchen. *"Thanks to close teamwork with PM 11 manufacturer Voith Paper and our SCA Graphic Research department in Sweden, we arrived at an intelligent combination of numerous production factors ranging from the design concept and furnish composition to the finished product".*

Goals set for SCA Laakirchen

The construction permit for this project was already applied for in 1991. Primary objective was to replace the old PM 3, dating back to 1962, setting the following implementation goals:

- Investment costs not to exceed Euro 225 million.
- Production capacity increase to 484,000 tons p.a.
- Paper product quality as least as good as with Laakirchen PM 10, and significantly better than with Laakirchen PM 3.
- Project completion time 21 months.
- State-of-the-art but well proven technology.

Development target

The future-oriented key concept for this new paper machine was "convertible", since the current quality gaps between SCA and LWC grades will probably cease to exist before long. This assumption decisively influenced the entire paper machine concept.

Production tonnage increase and the paper machine operating speed of 1,800 m/min apply both to the SCA and the LWC alternatives. The question as to

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the final concept was to be answered during the development of PM 11, for which intensive research work started prior to commissioning and will continue for some time to come.

The PM 11 concept embodies the development potential for producing SCA-Plus paper of the highest quality. If LWC quality standards can than be reached closing the gap between the two grades, a quantum leap will have been reached with a single machine concept at the highest operating speed.

Partnership type cooperation between the paper machine operator and supplier

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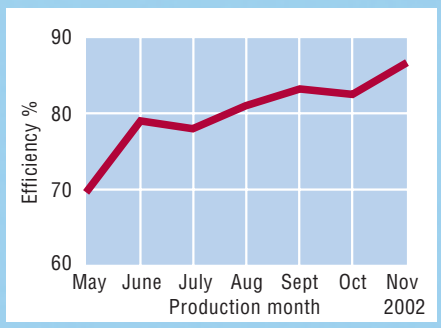

throughout the entire project makes this development possible. All concerned are well aware of the great challenge involved, and even the most difficult problems are being tackled systematically with a view to long-term solutions.

At the present time, six months after start-up, the success of this approach has been confirmed. The new Voith Paper line with EcoCell flotation, paper machine, Janus calender, slitter-winder, roll transport and Twister packaging machines not only produces outstandingly high quality rotogravure and offset printing grades, but also sets a milestone with the specially developed Grapho Nova

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Mark Lunabba

Chairman of the Board SCA Graphic Laakirchen

Not even a year after startup, we can already report extremely successful operating results. Our ambitious production targets have been exceeded, and from the quality point of view, PM 11 represents a new epoch. This success has certainly not been achieved by chance, and is not only attributable to the joint know-how of both partners in this project: Voith Paper in paper machinery and SCA in printing papers. Decisive in my opinion for these outstanding results is the exemplary teamwork and open cooperation between our two companies.

grade for high quality printing press papers.

Voith Paper congratulates SCA Graphic Laakirchen on this impressive new production line, and shares their pride in what has been achieved so far. The enthusiastic feedback from our customers, after viewing this new line following the recent symposium in Salzburg, impressively confirms again Voith Paper's competence in comprehensive customer and product-oriented solutions.

Company overview

SCA Graphic Laakirchen is one of Austria's longest-established paper mills. Founded in 1867, the company was taken over in 1963 by Wilfried Heinzel and expanded. In 1988 it was acquired by Svenska Cellulosa Aktiebolaget (SCA) of Sweden. With 550 employees, SCA Graphic Laakirchen turnover for 2001 totalled 233 million Euro. Production in Laakirchen exclusively consists of supercalendered (SC) rotogravure and offset printing papers.

Fig. 9: *SCA Graphic Laakirchen.*

Fig. 10: *PM 11 inauguration with the SCA team.*

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Picturebook start-up of the new Voith line for coated fine papers at Shandong Chenming Paper – 4 months ahead of schedule

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In December 2000 Shandong Chenming Paper Holdings Ltd. ordered from Voith Paper a four-station offline coater and two Janus MK 2 calenders including reel transport system for their Shouguang mill in China.

Chenming, a Chinese paper industry leader for some years now, is entering the market for coated fine-grade papers with this new line. Over the next three to five years the Shandong Chenming Paper Group will be expanding its gross annual production of all commercial grades from 400,000 to more than 1,000,000 mtpy. Efficient sales logistics systems already exist in a good many of China's medium to large industrial centers, and export business with Asian and American markets is currently being expanded. A further step in this direction has now been taken with a completely new greenfield paper mill, using exclusively virgin fibre furnish with the highest brightness.

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Figs. 1 and 2: *Shandong Chenming Paper Holdings Ltd., Shouguang mill.*

Fig. 3: *4-station offline coater with two Janus MK 2 calenders and reel transport system.*

Fig. 4 and 5: *4-station offline coater.*

Technical data

Coating line		Janus MK 2 calender	
Product range	wood-free coated fine papers, coated label printing papers	Maximum operating speed	1,000 m/min
Basis weight	90-250 g/m^2 (final, after calendering)	Design speed	1,100 m/min
Coating stations	4 for double coating or 2 for single coating	Trimmed web width	4,555 mm
Maximum operating speed	1,400 m/min	Max. line load	300 N/mm
Design speed	1,500 m/min	Surface temperature Flexitherm rolls	120°C
Maximum web width	4,635 mm		

Project goals

To reach the ambitious production target – 250,000 mtpy. of A-grade coated paper – the customer formulated the following requirements:

- Modern technology with the latest innovations.
- Fastest possible implementation.
- Start-up at high operating speed, and fast compliance with guaranteed product quality.
- Domestic market leadership in wood-free coated and calendered grades, and greater access to export markets.

Coating line

This coating line is fed from a continuous unwind with automatic flying splice. The four coating units incorporate modern Dynamic Coaters with JetFlow-F applicators and two Profilmatic C cross-profile control systems. Each drying section comprises a gas-heated infra-red dryer and three steam-heated air dryers. The first two coating stations can be by-passed to enable either single or double coated paper production. Four pull stacks for tension control (two of which felted) and the two sheet edge controllers

4 ensure a safe web run. The coating line is completed by a Sirius reel equipped with Eco Change water-jet cutter for turn-up to minimize broke.

Janus MK 2 calenders

The two offline Janus MK 2 calenders are 10-roll units with flying splice unwind and reel. Loading is inline by roll carts. Two plastic covered Nipco rolls in top and bottom positions generate the necessary line load and enable zoned profile control. Adequate heat transfer is ensured by the four independently controlled thermo-rolls in positions 2, 4, 7 and 9. A separate thermal system is provided for the plastic covered intermediate rolls. User-friendly operation and maintenance is facilitated by a mobile inner platform and two mobile external stairways. The two cooling rolls reduce the temperature of this sensitive high-grade product prior to reeling.

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Fig. 6: *Production capacity.*

Fig. 7: *Overall line efficiency.*

Fig. 8 and 9: *Janus MK 2 calender.*

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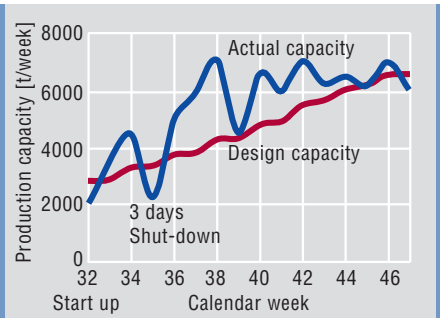

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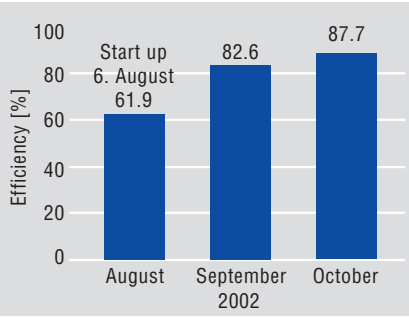

Systematic automation concept for the entire line

The PCS 7 process and quality control system for the coating line and the two calenders comprises various intercommunicating networked systems. Incorporated in the coating line are five scanners, two automated cross-profile controllers, and a RollMaster winding hardness controller on the Sirius reel. All relevant quality and production data are processed by a database server for report downloading throughout the mill via Internet browser.

Two Caltronic machine direction profile gloss controllers on the calenders are linked with two scanners. Here again, each calender is equipped with a PCS 7 process controller with integrated quality control module. The networked database in the coating line is incorporated in the overall reporting system.

By early detection of abnormal machine vibrations, a Voith monitoring system with 64 sensors ensures much greater operating reliability.

Project implementation

The success of this project was founded on efficient detailed planning at all levels right from the start. This already began by preparing everyone involved in the project for the new concept and the different approach required accordingly. Enormously helpful thereby was the intensive ongoing communication – not only by paperwork but also in the form of regular project meetings on site. Valuable support was provided in this respect by the experienced staff of Voith China.

The resulting greater flexibility ensured that all the customer's additional needs were taken into account without delay. In fact with such harmonic teamwork between customer and supplier, success was programmed from the outset.

Thanks to comprehensive and systematic project management at all the Voith Paper locations involved in this project, all targets were jointly met with regard to delivery and erection, commissioning and operator training.

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One of the main reasons for this picture-book start-up was the early start made on customer staff training, differentiating thereby between mechanical and electrical (instrumentation) system operating and maintenance personnel. After basic theoretical instruction, practical training was done on the actual production line. This was followed up by an in-depth refresher course during the start-up phase.

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Chen Hongguo

President Shandong Chenming Paper Holdings Ltd.

"I am very pleased to see the huge success, made possible that our Chenming Paper Mill chose Voith Paper as supplier for Coater and Calender for our PM. This is the result of both sides' efforts and cooperation. Therefore, I hope Voith Paper, the first-class supplier in the world, and we will become permanent partners in the future."

Erection work, which commenced on time at the beginning of February 2002, was done by the customer's subcontractor in 24-hour operation during the peak phase. As a result, the contractually agreed erection time of 10 months was shortened to 4.5 months.

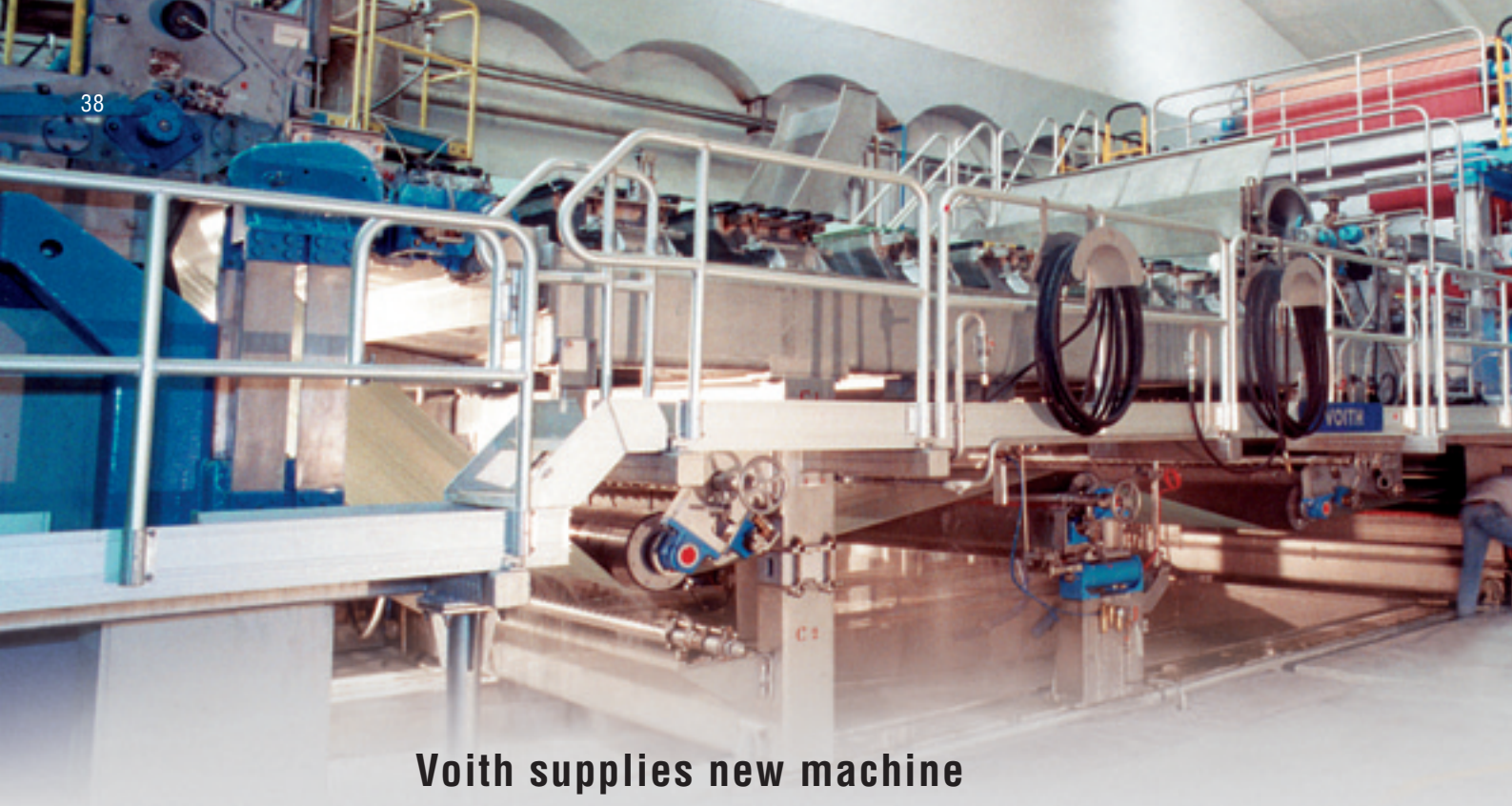
The first operating tests began only two weeks after the final site deliveries.

On August 6, 2002 the coating machine and first Janus calender were started up at 1,000 m/min. Only eight days later the coating machine speed was increased to 1,200 m/min.

The goal of operating the coating machine at maximum speed of 1,400 m/min two months after commissioning was already reached after 23 days.

Twelve days after start-up a run-time efficiency of 91 % was attained. And on day 16 the 1,000-ton milestone was passed with a daily production of 1,123.5 metric tons of coated art paper. On August 16, 2002 the second Janus calender started up on schedule, likewise at 1,000 m/min.

The product gloss and smoothness values for double coated fine grade paper exceeded requirements from the outset, and are now taken as a benchmark for other lines of this kind in China.



Voith supplies new machine for decorative papers to MD Papéis

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MD Papéis, founded 112 years ago, located near the city of São Paulo, Brazil, always matched tradition with modernism. Recognized as a traditional producer of specialty papers for industrial use, MD Papéis is once again one step ahead in the segment of decor papers for plastic laminates.

Concentrating on present markets and products, but with its eyes focused on the future, MD Papéis invested US$ 25 million in the new line for decor papers, with latest generation equipment, aiming at high quality and production.

The supply

In February 2001, MD Papéis signed a contract with Voith Paper for the supply of the new production line for decor papers for plastic laminates. The basic scope of the project included the erection of a new PM on the old MP 3 site, comprising, among other items, the supply of equipment for stock preparation, a new forming section, a new press section and a new dryer section. The target was to ensure the production of high quality products at competitive operational costs.

The future

The total MD Papéis capacity for decor papers is now sufficient to not only supply the Brazilian market but also other South American markets. After the start-up of the new decor paper machine, MD Papéis is planning to expand its exports, increasing its share in the worldwide market from 1.5% to 5%.

Fig. 1: *The new PM for decor papers.*

Fig. 2: *Scheme of the new PM.*

"Considering the present market requirements, it is important to foresee the customers' expectations and to offer quality papers, that meet the excellence standards and even surpass the technical and economical goals", said the MD Papéis management during the recent machine inspection at Voith Paper.

The new machine for decor papers represents state-of-the-art technology, and is specially designed to produce "world class" decor papers, including both solid color papers and base papers for printing.

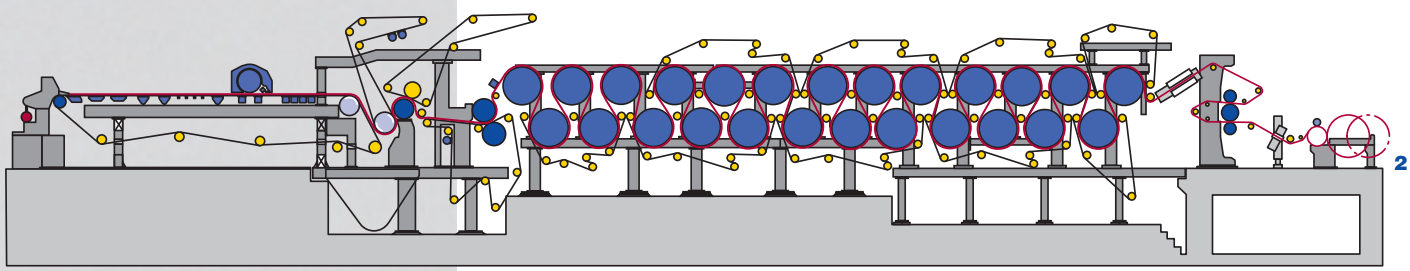
The investment

MD Papéis is recognized worldwide for dominating different process and product technologies applied to several types of specialty papers for industrial use. This investment, in particular, aims to satisfy the present and future demands in this segment, by tripling the current production capacity of decor papers, as well as incorporating special surface characteristics to the product. These targets are to meet the very high demands on printability by the laminated flooring market, which now shows significant increase throughout South America, following trends observed in Europe and in the USA.

The start-up

The machine start-up was very successful. Production of the first paper roll was on July 31st, 2002.

The new PM 8 is designed to produce 90 t/day of decor paper with 50-150 g/m^2 basis weight, 2,600 mm paper width and at a speed of 450 m/min maximum. With such characteristics, the new machine will allow quality and productivity gains that will certainly allow to develop new markets.



Rubens Bambini Jr.

Business Director of MD Papéis

Taking into account its future production capacity, its strategic geographical location and, also, a very efficient team, MD has clearly elected decorpaper as the core business.

Partnership

The partnership between Voith Paper and MD Papéis has resulted in the most advanced equipment for the production of decor papers with the same characteristics as the best European papers, satisfying the continuous innovation requirements of the furniture and civil construction industries.

Sirius for Duluth PM 1 – Production increase after extremely short rebuild time

At the end of June 2001, Stora Enso in Duluth, USA, placed an order with Voith for the exchange of the existing reel on PM 1 for a Sirius reel. The decisive factor for the placement of the order with Voith was the technologically outstanding ranking of the Sirius in comparison to other winding systems available in the marketplace as well as the guaranteed extremely short rebuild shutdown period.

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Pre-assembly *17.6.2002*

Stora Enso, the market leader in magazine, newsprint and fine paper grades as well as packaging board produces 633 t/day of supercalendered SCA and SCA+ papers at the Duluth mill.

With the exchange of the reel the primary goal is to minimize the amount of broke at the reel. This goal was achieved by the following measures:

- Increase in the rewind diameter from 2,350 to 3,300 mm. This means a 50% reduction of wound rolls per day.
- The optimal roll structure with Sirius technology reduces the amount of non-usable paper to a minimum.
- Reduction of sheet breaks at roll change by the EcoChange S system.

The expectations placed in the Sirius were met from the very first roll. Stora Enso Duluth expects to save costs of almost 5 million U.S. dollars per annum by this investment.

A special challenge was the short delivery time and the extremely short shutdown period. Only $9^1/_2$ months passed between the placement of the order and delivery. The short project phase required considerable efforts on the part of all those involved. In parallel with the installation of the equipment supplied by Voith, consisting of the Sirius, an automatic parent roll transport system and the Fibron VTT 3000 tail transfer system, in connection with the enlargement of the rewind diameter, Stora Enso had to make modifications to the parent roll logistics. Besides the rebuild of the unwinds at the supercalenders and winders, new and stronger overhead cranes had to be installed because of the significantly higher parent roll weight.

Working through all of these packages within a very limited time period was possible only thanks to the excellent cooperation during the project and a very pragmatic work style with short decision paths between Stora Enso and Voith.

22.6.2002

To be able to implement the extremely short rebuild time, the Sirius had to be installed on the existing sole plates. This was only possible with the very compact layout, designed specially for this reel exchange in a few days. The type of design is characterized not only by a minimization of the Sirius installation modules, but also includes the useful integration of the control components, equipped with bus technology, into the installation modules.

Before the shutdown of the PM, the Sirius was installed in line with the system already producing paper. Just 76 hours after the last parent roll change at the old reel, the Sirius was completely mounted mechanically and electrically and the I/O checks concluded.

An extraordinary performance in installation was followed by a start-up that was of world-class standard. Just 54 hours after termination of the installation work the PM was able to resume production and the first parent roll of saleable SC base paper was wound up on the Sirius. This start-up performance can be rated all the higher because, with General Electrics, a drive supplier was selected that had until then not been able to gain any experience with the electric drive of the Sirius. Added to this is the fact that the installation of the new Fibron VTT 3000 tail transfer system was also one of the first of this kind of application. The shutdown period planned by Stora Enso was shortened by half a day despite these challenges and the very high safety standards for the installation and start-up work in the USA.

This excellent performance with regard to project handling, installation and start-up is an important milestone for future reel exchange projects. The great challenge to exchange an existing reel in a few days for a Sirius was taken up and solved par excellence. A result that the customer and supplier can be proud of and which has shown that **"twogether – it is possible"**.

Patrick Moore

Mill Manager Stora Enso North America, Duluth

Downtime – 5.5 days on a 6 day budget. There was an excellent working relationship between Stora Enso and Voith. The Voith commissioning crew also did an excellent job. Pre-erection on site was an obvious benefit in shortening the length of the downtime. We have been able to make jumbo reels almost from day one.

Lee&Man Paper – high speed linerboard machine on a high speed track

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The new high speed linerboard machine no. 4 for Lee&Man Paper Mfg., Co., Ltd. in Dongguan/China started up on September 22, 2002, only 12 months and 10 days after the contract coming into force! After the first reels of paper were produced, the experts from Lee&Man and Voith Paper are convinced that the new high-tech paper machine no. 4 will achieve all expectations within a short period of time. PM 4 started up with 127 g/m² corrugating medium at a speed of 936 m/min.

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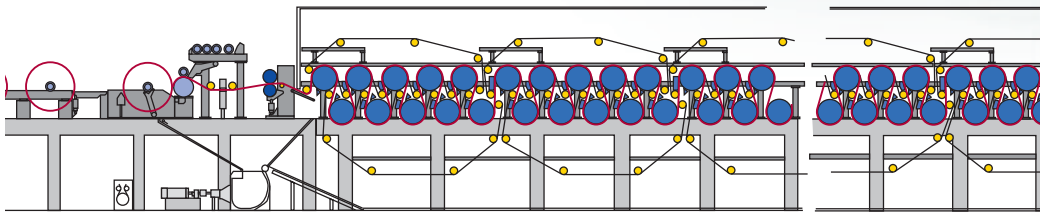

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Lee&Man Paper Mfg., Co., Ltd. is a privately owned, fast growing company in China's paper industry, located in the city of Dongguan, approx. two hours north of Hongkong in the province of Guangdong, China. Founded in 1994, Lee&Man has already become a leading manufacturer of packaging paper in China through continuous innovation in technology and production methods.

Voith Paper signed the first contract with Lee&Man for key components of the paper machines no. 1 and 2 in May 1995. PM 1 and PM 2 were supplied by our, at that time, joint venture partner LPMC (Liaoyang Paper Machinery Corporation). Both machines together are producing 350 tons/day of linerboard.

The contract with Voith Paper for the paper machine no. 4 came into force on September 12, 2001. The new machine is designed for producing 1,000 tons/day of testliner and corrugating medium in a basis weight range of 90-200 g/m².

From the early stage on, Lee&Man put a lot of attention on a short project schedule.

All involved project members had to take extra steps and extra efforts during the handling of the project to achieve the set goals regarding the time schedule. Good planning of the Voith Paper project activities regarding engineering, purchasing and manufacturing activities, was essential to deliver the equipment ahead of the contractual delivery dates, which had already been very optimistic. On the customer side, the plant engineering and the civil work were also completed within a very short time. Only due to the close collaboration of the project teams from Lee&Man and Voith Paper during the en-

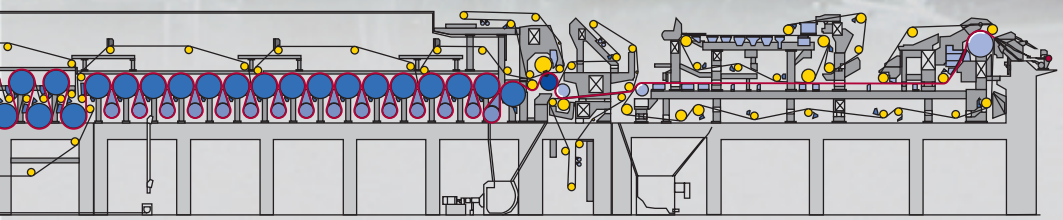

Fig. 1: *PM 4 of Lee&Man Paper Mfg., Co., Ltd. in Dongguan, China.*

Fig. 2: *Scheme PM 4.*

tire project, including site installation and commissioning of the plant, the first paper was produced on September 22, 2002, two months ahead of the contractual start-up date.

By manufacturing essential components, the Voith Paper subsidiary in Liaoyang has also contributed decisively to the project.

Paper machine concept

The "one platform" machine concept conforms to state-of-the-art technology.

The sheet forming section includes a DuoFormer Base (gap former) for the back layer and middle layer and a TopFormer F with Duoformer DK for the top layer, ensuring excellent formation and thus optimum printability on the top side of the sheet.

The DuoFormer Base is equipped with a two-layer MasterJet M2 headbox with the

Milestone dates

2001-06-22	Signing of contract
2001-09-12	Contract coming into force
2002-06-28	Last equipment delivery
2002-08-24	Certificate of end of installation
2002-09-22	Start-up (2 months ahead of contractual start-up date)

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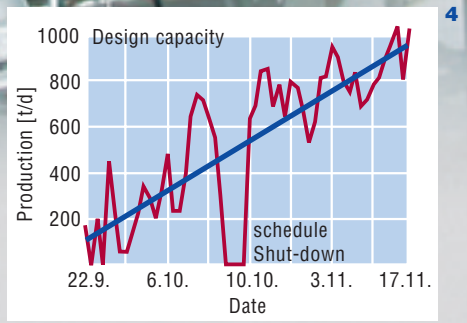

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Layout data PM 4

Product	Corrugating medium and testliner
Basis weight	90 - 200 g/m²
Wire width	5,980 mm
Paper width at the reel	5,500 mm
Operating speed	631-1,104 m/min
Design speed	1,250 m/min
Production capacity	1,000 t/d gross

well proven ModuleJet dilution water system for the middle layer.

The ModuleJet system, together with the Profilmatic M control system, warrants optimum basis weight CD profiles and allows for independent adjustment of fiber orientation.

The DuoFormer Base, exclusively developed for packaging paper grades in the upper speed range, ensures optimum utilization of the fiber potential in terms of strength properties. Lee&Man is the first customer in Asia utilizing the advantages of a gap former for producing packaging grades.

A MasterJet F headbox is installed on the TopFormer F. The DuoFormer DK provides top side drainage, enhancing the drainage capacity, formation and smoothness of the top layer.

The press section is a closed tri-nip DuoCentri NipcoFlex press using the well proven NipcoFlex technology, which provides excellent sheet dryness with optimum strength properties. The closed sheet transfer throughout the press section ensures excellent runnability at high operating speeds.

The dryer section consists of 3 single-tier groups (TopDuoRun) with DuoStabilizer

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Fig. 3: *DuoFormer.*

Fig. 4: *Start-up curve.*

Fig. 5: *Reeler TR 125.*

Fig. 6: *The start-up team at the first tambour.*

boxes, followed by 4 conventional top and bottom felted dryer groups. A special feature of the dryer section is the exceptional quick ropeless tail threading system for ease of the threading process. The tail transfer from the last dryer to the hardnip calender is handled by an automatic Fibron VTT Turbo vacuum tail threading system. DuoCleaners for conditioning of the dryer fabrics are installed on the first and second group top dryer fabrics and on the fourth group bottom dryer fabric.

Following the dryer section is a two-roll hardnip calender enhancing the smoothness of the top side.

The reel is a conventional type TR 125 for a roll diameter of 3,500 mm with an automatic reel spool magazine.

Start-up

A start-up curve is influenced by a lot of factors, some of the most important are surely a good cooperation between the project teams and highly motivated people working together to reach the same goal. It is obvious that the Lee&Man production and maintenance teams with a number of well-trained and skilled people are extremely motivated.

As already stated, the paper machine started up with corrugating medium of 127 g/m^2 at an impressive operating speed of 936 m/min. The first paper was already sold and successfully converted.

Two months after the start-up, the main grades and main basis weights had been all successfully produced over extended time periods. The production curve of the first two months leaves no doubt that the capabilities of this high-tech paper machine are far beyond the expected and designed parameters.

The guaranteed gross production capacity of 1,000 tons/day was already reached within the first two months.

After only two months of operation, it can be claimed that the term **"high speed"** runs like a red line through the entire project Lee&Man PM 4. Lee&Man PM 4 is a **"high speed"** paper machine at a **"high speed"** track throughout the engineering, manufacturing and installation phase with a **"high speed"** commissioning and start-up phase.

Voith Paper thanks Lee&Man for the excellent cooperation and teamwork throughout the project and is looking forward to a good and successful relationship of both companies in the future.

6

1

Successful rebuild of board machine 2 at Mayr-Melnhof Karton, Frohnleiten, Austria

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On September 8, 2002, board machine 2 at Mayr-Melnhof's Frohnleiten mill in Austria restarted after an outstandingly successful rebuild. The goal was to improve product quality and increase production capacity. To this purpose, Voith Paper supplied, installed and commissioned five suction cylinders and seven FloatLip formers including white water circuit and vacuum system, together with a NipcoFlex press. So far, five NipcoFlex presses have been installed by the Mayr-Melnhof group, two of them in Frohnleiten. Thanks to the outstanding teamwork and coordination among all the companies involved, this rebuild was completed in less than two weeks. Even the first board produced after start-up showed a significantly improved quality, thus upholding the correctness of Mayr-Melnhof's investment decision.

Fig. 1: *Mayr Melnhof Karton GmbH und Co. KG, Frohnleiten mill.*

Mayr-Melnhof Karton and its parent mill in Frohnleiten, Austria

With an annual production capacity exceeding 1.5 million tons, the Mayr-Melnhof Board Division is Europe's largest producer of folding boxboard from secondary fiber. The parent mill of the Mayr-Melnhof Board Division is located in Frohnleiten, Austria, where two board machines are in operation.

In January 1999, board machine 3 was rebuilt by Voith Paper into a multi-ply fourdrinier machine with NipcoFlex press (wire width 5,000 mm, operating speed approx. 550 m/min). The main product is coated folding boxboard made of 100% recycled furnish.

Board machine 2, a multi-ply cylinder machine (wire width 3,200 mm, operating speed approx. 250 m/min prior to rebuild), also produces coated folding boxboard from 100% recycled furnish.

Rebuild of board machine 2

An internal analysis done by Mayr-Melnhof revealed the necessity of extensive modernization investments. Board machine 2, which had undergone several rebuilds, with some parts being more than 50 years old, could no longer keep up with today's quality and production requirements. Mayr-Melnhof, therefore, decided to rebuild the stock preparation line and wet end in 2001 to improve product quality, and to install a shoe press to increase production capacity.

In May 2001, Voith Paper received the order for a FloatLip former including white water system. During a brief shutdown in October 2001, this FloatLip former for producing the back ply was installed and put into operation on an existing suction cylinder. Mayr-Melnhof were thus able to familiarize themselves and gain operating experience with the FloatLip former prior to the extensive rebuild planned for summer 2002.

In August 2001, Voith Paper won the order for five suction cylinders for producing the filler plies, including four FloatLip formers, to replace the existing cylinder mould units without vacuum. The scope of supply was rounded off with a white water system, a vacuum system and pneumatic controls. The previously delivered FloatLip former for the back ply was intended to be used for the filler ply after the rebuild in September 2002. In addition, a double-felted NipcoFlex press was ordered to replace the existing first press, including hydraulic and electrical controls.

The FloatLip former installed for the back ply in October 2001 improved the formation results that Mayr-Melnhof ordered another two FloatLip formers from Voith at the beginning of 2002. In the end, seven FloatLip formers will replace the two existing formers for back ply and top ply and five formers for filler plies.

Further Mayr-Melnhof investments for modernizing board machine 2 include a new screening system for filler plies, a new DCS system for the wet end, and a new hall crane for the 25-ton NipcoFlex press roll. Numerous modifications and structural measures are also scheduled, such as machine building extension with installation opening, overhauling and reinforcing of joists, supports, etc.

Installation and start-up

In order not to exceed the agreed shutdown time, Voith Paper did preparatory work during the regular shutdowns. Furthermore, all tasks possible without shutting down the machine were completed between the end of July and August 25, 2002.

During the pre-assembly phase, Mayr-Melnhof renewed the screening system for filler plies, added an annex to the building to accommodate switch rooms and a control center, and completed the infrastructure required for transport and installation of the new components.

As soon as board machine 2 was finally shut down early on August 26, 2002, a number of installation personnel started dismantling the equipment to be replaced and all basement equipment in the area of the new suction cylinders.

Fig. 2: *NipcoFlex press.*

Fig. 3: *Board machine 2 after the rebuild. In the foreground, the suction cylinders for filler plies with FloatLip formers.*

2

Key data of board machine 2

Wire width 3,200 mm
Design speed of new equipment 400 m/min
Max. operating speed 350 m/min
Main products: coated folding boxboard 350 - 500 g/m^2.

Main rebuild components

Wire section

- 7 FloatLip formers
- 5 suction cylinders
- Splash water trays and walkways
- 6 control panels and pneumatic control system
- White water circuit with:
  2 white water tanks;
  7 centrifugal distributors, 2 of them with dilution water control for CD profile optimization;
  various water separators;
  complete piping and hoses
- Vacuum system: complete, including piping.

NipcoFlex press

- including electrohydraulic controls.

Spare parts for wire and press sections

Installation, start-up and optimization

- Complete installation of wire section
- Supervision of installation of NipcoFlex press and relocating of existing 2nd press
- Supervision of start-up and optimization of wire and press sections.

In parallel, the structural work was already started. For example, several floor zones had to be completely replaced, the machine beams and chests had to be overhauled, and new foundations had to be made. All this work was completed according to schedule in day and night shifts around the clock.

The machine components to be reused were overhauled in Mayr-Melnhof's repair shop and modified as required. A few days after shutting down the board machine, with construction work still in progress, the first components were reinstalled. Installation of the NipcoFlex press delivered just in time started only five days after shutdown.

The smooth sequence of work was ensured by daily coordination meetings among all partners involved and continuous checking against a jointly prepared installation schedule.

All electromechanical inspection work was completed on time on September 6, 2002, and after start-up of all the new and existing equipment, the first parent roll of board was wound just before midday on September 8.

Optimization

Thanks to the customer's highly competent operating personnel, saleable board was already produced on the start-up day. Due to the experience gained with the first FloatLip former on board machine 2, and several years of experience in NipcoFlex press operation on board machine 3, the start-up was finished without any problems within a short time.

Immediately after production was again started on this machine, an optimization program was initiated in order to fully exploit the benefits of this new concept at higher operating speeds. By installing FloatLip former headboxes for the top ply

3

and back ply and five new suction cylinders for the filler plies, the CD basis weight profile was improved by up to 50% for all grades.

Replacing the straight press with a double-felted NipcoFlex press has so far allowed the maximum operating speed to be increased by about 15%. This limit is currently set by the existing machine components. The higher operating speed is reached due to a higher dryness after the press section and an improved evaporation behaviour of the base board as a result of its higher porosity. The high bending stiffness of the folding boxboard is not affected by the increased operating speed.

Despite the higher operating speed, formation with the new FloatLip former generation is better than prior to the rebuild. Uniform formation is an important factor for coated board surface quality, and thus for good printability.

By carefully adjusting the entire board machine 2 to the enhanced base board properties, the product quality even at significantly higher operating speeds is comparable to that on the advanced board machine 3. Although it is more than 50 years old, board machine 2 will remain competitive for a long time to come.

FloatLip former design and technology

The latest FloatLip former generation features the following innovations and benefits:

- Top lip evenly supported over its entire length
- Uniform distribution of the suspension across the machine width
- Replaceable step diffusor inserts to generate optimum turbulence
- Improved profile and formation characteristics
- Ease of operation and maintenance.

This allows to selectively improve the technological properties of board and packaging paper, thus significantly upgrading the cylinder forming technology.

The centrifugal distributor at the beginning of the flow channel of the FloatLip former ensures uniform and homogeneous distribution of the suspension across the entire width, thanks to the radially arranged hoses of equal length. Air and lightweight particles are continuously removed through a vent pipe on top of the centrifugal distributor.

The step diffusor principle is applied to produce optimum turbulence in the FloatLip former. Special inserts are used to adjust the microturbulence to the operating conditions and furnishes for each grade of board or packaging paper. These inserts can be replaced in the course of a rebuild later on.

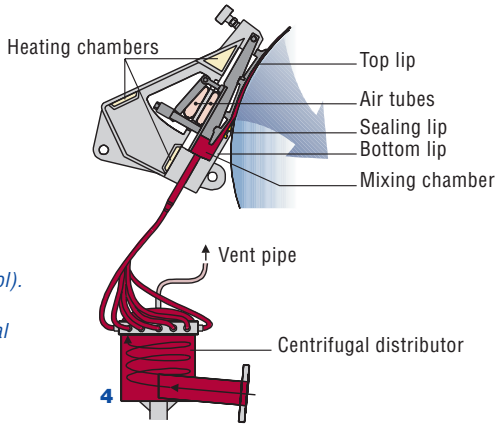

Fig. 4: *FloatLip former with centrifugal distributor (without dilution water control).*

Fig. 5: *White water tank with centrifugal distributor on top.*

Fig. 6: *The Voith rebuild team.*

Dipl.-Ing. Martin Mühlhauser, Director

Production and technology, Mayr-Melnhof Board Division

5

6

"After the extremely successful modernization of our board machine 3 by Voith Paper, we clearly wanted to have board machine 2 rebuilt by the same well-proven Voith team. Although the multi-fourdrinier concept of our board machine 3 had proved successful, we set ourselves the joint challenge of reviving the suction former technology.

And that was certainly the right way to go! This cost-effective rebuild not only meets all the board quality demands of our customers, but also matches the performance spectrum of a high-efficiency board machine.

Our teamwork and mutually respected know-how led to open discussion and flexibility during project implementation. Under such fruitful conditions, the project was bound to be a resounding success."

Uniform support of the top lip by air tubes over its entire length, together with a torsion-resistant stainless steel structure of the supporting beam, ensures a constant slice geometry and constant profiles independently of the operating pressure. By varying the pressures in the air tubes, the throat gap can easily be adjusted during operation to suit the operating and drainage conditions.

The top lip is pivot-mounted in the slice area. This pivot has been optimized to maintain constant the slice opening set by the limit stops, while increasing or reducing the throat gap.

In order to ensure a constant slice geometry even at higher stock temperatures, the FloatLip former incorporates heating chambers for thermal stabilization.

For further profile optimization, dilution water can optionally be added in the supporting beam area or in the area of the centrifugal distributor.

The nozzle area is sealed towards the cylinder mould or suction cylinder by a quick-change sealing lip of synthetic material at the end of the bottom lip. Special lateral seals of synthetic material are arranged at the edges to limit and seal the drainage zone between top lip and cylinder mould or suction cylinder.

To facilitate maintenance, the entire FloatLip former can be swung away from the cylinder mould or suction cylinder by means of pneumatic cylinders, thus allowing machine-wide access to the top lip and throat gap.

All new cylinder mould formers (with or without vacuum, or with top section exhaust system) as well as the existing ones can be fitted with the Voith FloatLip former.

Process simulation –
Virtual papermaking

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With growing demands on paper machine efficiency as well as product quality, a deeper knowledge of all papermaking processes is essential. In order to identify the effects of each machine component on product characteristics, increasingly complex testing is required. However, the high costs involved often preclude carrying out enough tests to eliminate statistical error. Furthermore, some machine sections are inaccessible to measuring devices.

Today's vastly more powerful computers enable a new discipline for tackling these problems: process simulation. Given a computer model, extensive research can be done at comparatively low cost. For example, the effects of varying individual input parameters can be studied, design parameters and machine settings can be optimized, and a deeper knowledge can be gained of the physical processes involved. In fact simulation results often deliver more detailed data than test measurements.

In this connection Voith Paper has formed a team for compiling simulation models of papermaking processes. This provides other departments with valuable support in optimizing existing concepts and developing new ones, as well as in identifying and overcoming technical limitations. By applying the accumulated know-how gained from individual projects to new developments, increasingly sophisticated simulation models can be developed with spending less and less time.

Mill operators benefit directly from simulation technique (Fig. 1): it enables machine concepts to be tailored to their individual requirements, thus optimizing product quality. Furthermore, early simulation minimizes development risks both for new installations and rebuilds. And by knowing in advance the effects of machine settings on process stability and product quality, commissioning times can be significantly shortened.

As shown in Fig. 2, the simulation procedure is based on the laws of physics. In papermaking these are primarily the laws of thermodynamics, fluid flow and materials mechanics. The mathematical simulation model is established by combining

Fig. 1: *Customer benefits of simulation techniques.*

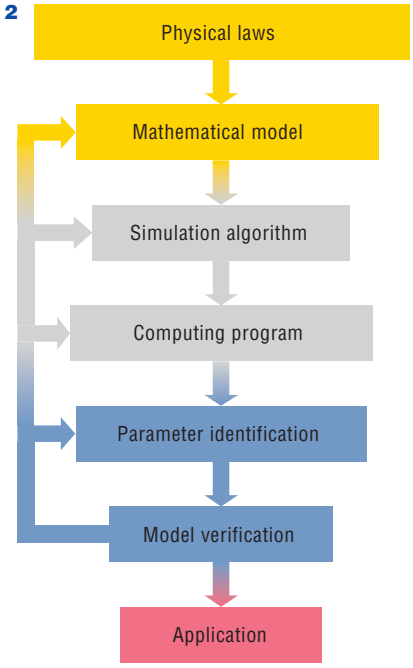


Fig. 2: *Simulation procedures.*

Fig. 3: *Aspects for further study in individual papermaking processes.*

the respective equations, but only seldomly is a purely analytical solution possible; in most cases numerical methods have to be applied. Apart from converting the simulation algorithm into a computer program, the system parameters also have to be defined, for example by laboratory measurements. Before it can be applied by the user, the simulation model has to be verified by comparison with test results and adapted as necessary. In other words, simulation only partially replaces research on the test-bed. Only by combining the two, an efficient R&D tool can be developed.

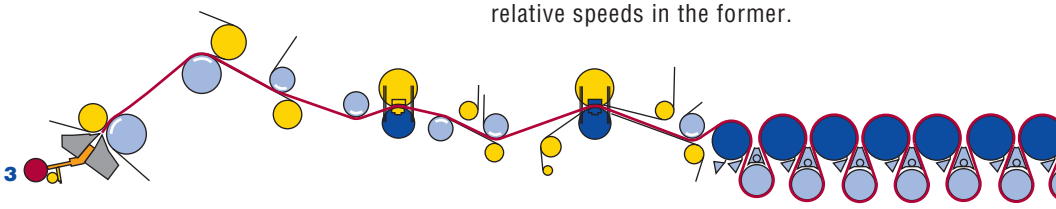
Typical of papermaking technology is the wide variety of tasks in each process stage (Fig. 3). In the headbox, for example, simulation can provide information on stock mixing efficiency with the dilution water, on jet geometry and on fiber orientation. Simulation of the drainage process in the former shows how the fibers and fillers are redistributed by the vacuum elements. Particularly interesting is also a simulation of the drainage mechanisms in presses, showing the effect of various machine parameters on attainable dry content. It also indicates the flow velocity between web and felt, which influences the paper surface quality. The main information derived in the drying section, apart from evaporation efficiency, concerns the web run behaviour and web shrinkage characteristics. Among the coating information obtainable by simulation are the flow characteristics, while winding technology simulation helps to optimize the paper roll structure and roll changing procedure.

The common features of individual processes are so important, that a single simulation group for the entire papermaking process is very worthwhile. Various points in the process are governed by the same laws of physics, as follows:

- The **laws of materials mechanics** apply to nearly all process simulations. They define elasticity, viscous or plastic behaviour, and stock characteristics such as viscosity and permeability.
- **Fluid dynamics** simulation is required above all in the approach flow section, headbox and former, as well as in the presses and for the various coating technology methods.
- **Press nip** analysis is required at several points in the paper machine, including the press section and calender.
- Apart from the web itself, the felts and wires also travel through the paper machine at high speed. **Web run simulation** is therefore an important core competence of the simulation team.

As a typical simulation project, we analyzed the top and bottom wire speeds in a former. Since the tensions in wire loop sections vary widely, the wire stretch and the speeds also vary accordingly. Ideally, both wires should run at the same speed when in direct contact with each other. This not only avoids shear stress in the web, but also minimizes wire wear in the edge zones.

The simulation model converts the vacua on the suction elements into friction forces, using the coefficients of friction measured between bars and wires on our test facility. Fig. 4 shows the simulated relative speeds in the former.



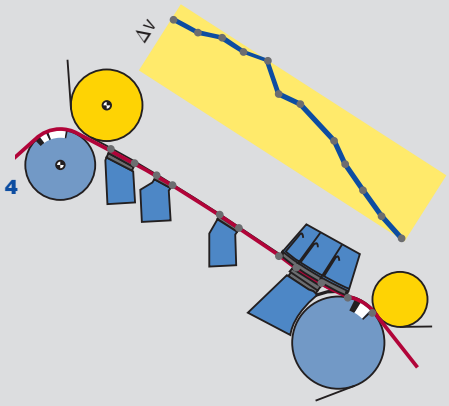


Fig. 4: *Aspects for further study in individual papermaking processes.*

Fig. 5: *Sheet water drainage velocity in the z-axis direction on a shoe type first press.*

Fig. 6: *Sheet dry content distribution in the first press.*

Fig. 7: *Dry content in the second press.*

Another example is press drainage simulation. For that material characteristics such as rheology as well as paper and felt permeability are required, which can be measured in the laboratory. By iterative computation, the simulation program works out a solution complying both with Darcy's law and mass retention for the water and air phases.

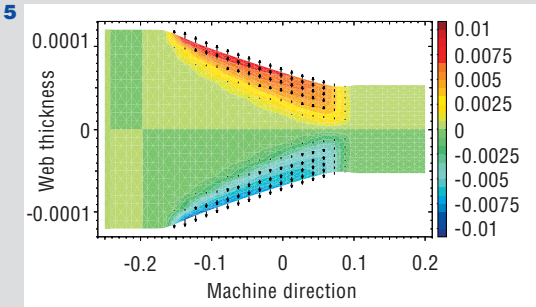
Simulation results are shown in the following for a tandem shoe press. Fig. 5 shows water flow velocity in the z-axis direction as the web passes through the first press. Drainage is at first restricted to the two paper surfaces, but extends deeper on the way through the nip. As seen at the outer contour of the cross-section, the web expands elastically again to some extent after leaving the press.

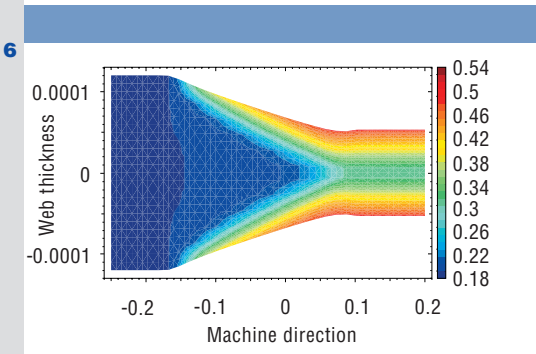
The respective dry content is shown in Fig. 6. On the paper surface quite high values are already attained after leaving the press nip, while the water content in the center remains relatively high.

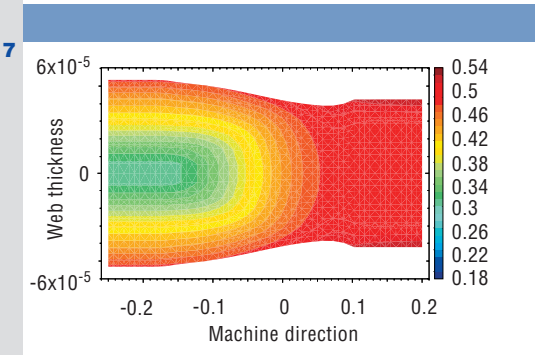
Dry content distribution after passing through the first press serves as ingoing profile for the second press, where, as shown by the dry content distribution in Fig. 7, compression now extends right into the sheet. No further water is removed from the outer layers except near the nip centre, since only in this zone is the pressure higher than that attained in the first press.

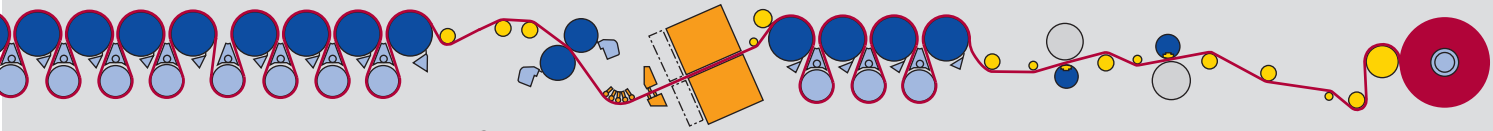
It becomes apparent from both examples that simulations may provide more insight than could be obtained from measurements. Once the numerical results have been validated against data measured at experimental paper machines, the computer programs can be run inexpensively to study the effects of extensive parameter variations.

Based on current and future projects, the Voith Paper simulation group is going to build up expertise in the modelling of a wide range of sub-processes. In the long term, the individual models will be combined to form a complete model of the entire papermaking process.









Dry section
Heat flow
Web run
Shrinkage

Coating unit
Sizing flow
Contact vibrations

Winding technology
Paper roll structure
Reel change

1

Alsip PM 1 –
conversion from newsprint to LWC

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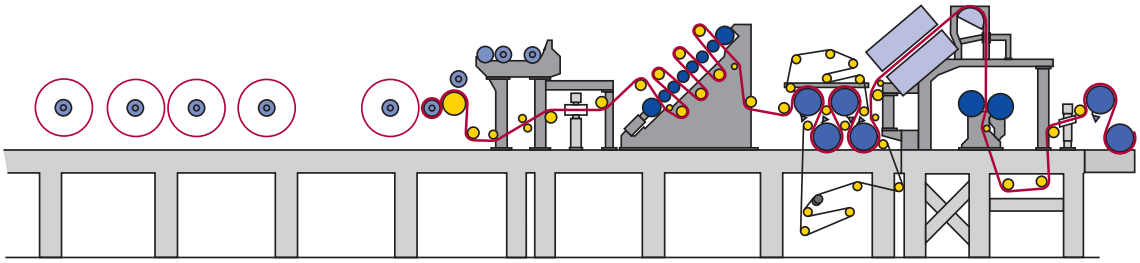
Madison Paper Company, Alsip is located 16 miles southwest of downtown Chicago, in the Village of Alsip, Illinois. The facility is strategically located to serve a huge Midwest customer base. The mill is one mile east of the I-294 North-South Toll way, adjacent to the Calumet Sag Waterway, a commercial shipping channel, and is served by the local railroad. Madison Paper Company, Alsip is owned 100 % by the Myllykoski Corporation of Helsinki, Finland.

The mill was originally built by The Field Corporation to supply newsprint produced from 100% recycled fiber to their newspaper, the Chicago Sun-Times. Construction of the mill, known as FSC, commenced in 1966 and was completed in 1968. In 1987, the mill was purchased by an Australian industrial conglomerate. Until 1989, newsprint represented 100% of the mills output. In 1993, senior management of FSC purchased the assets of the facility and began an investment to enable the mill to produce brighter, stronger, and cleaner 100% recycled paper, which would be suitable for business papers such as forms, envelopes and tablets; commercial printing papers such as inserts; book papers, and newsprint.

On June 8, 2000, Madison Paper Company, Alsip purchased the assets of the facility and immediately launched an aggressive strategic initiative to convert the facility to LWC printing papers.



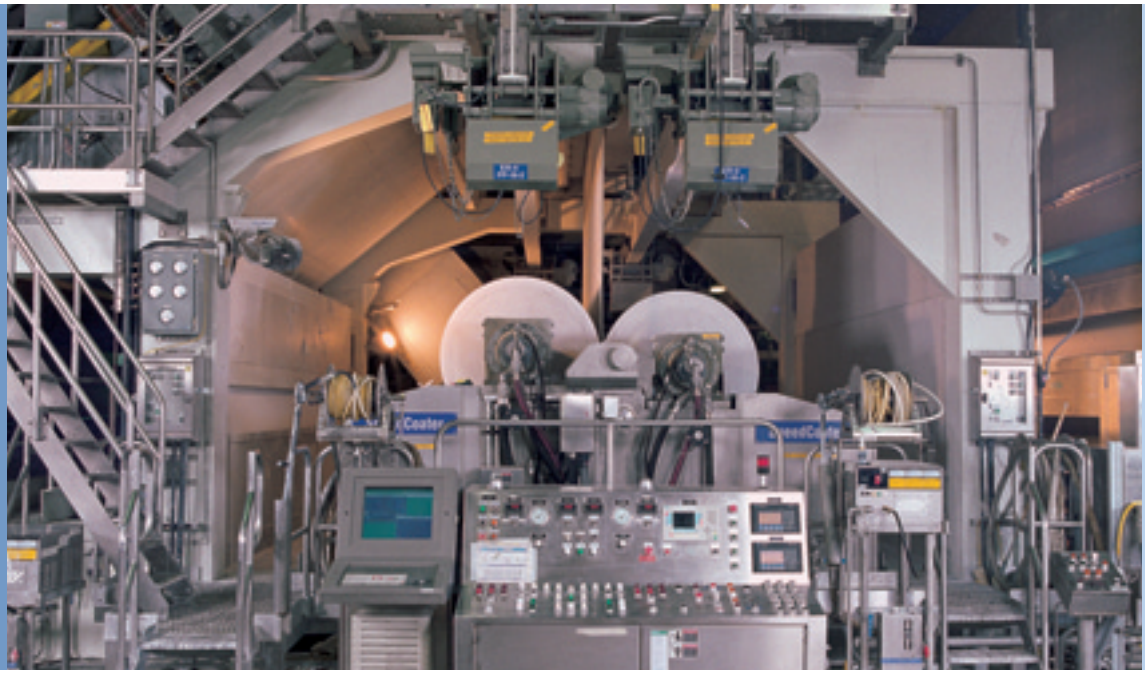


Fig. 1: *Madison Paper Company, Alsip, Illinois, USA.*

Fig. 2: *SpeedCoater.*

Technical Concept of the Paper Machine

Based on the positive experience with Voith Paper at the Myllykoski mill at Lang Papier, Ettringen, Voith Paper was asked to conduct a feasibility study for producing Light Weight Coated paper (LWC) with high recycled fiber content. Extensive testing at the Voith Technology Centers during February 2000 indicated that this ambitious goal could be achieved with Voith Paper process technology. As a result, Madison Paper Company, Alsip purchased an on-line SpeedCoater, Janus MK 2 Calender, and Sirius Reel in September 2000 for the re-build of the dry end of their PM 1.

SpeedCoater

The film coater system consists of a 0 degree inclined SpeedCoater with an upward web run that applies coating to both sides of the paper simultaneously. The coating application system includes a blade beam applicator nozzle with metering rods for each roll. After the SpeedCoater, the web moves through the web stabilizer and air turn, both of which are re-located existing equipment, and then through a new two-zone air flotation dryer. Voith Paper also provided new paper rolls and spreader rolls for the web run.

Production of LWC paper grades with the SpeedCoater provides considerable benefits over the more conventional two blade coating station method. These benefits include significantly lower capital investment costs and reduced space requirements. Higher machine productivity is another benefit of a SpeedCoater.

Janus MK 2 Calender

The Janus MK 2 calender consists of eight rolls and is capable of calendering paper grades ranging from newsprint through high quality LWC. The calender has a width of 242 inches, and is designed for a maximum line load of 2,700 PLI (475 N/mm). The Thermo Rolls are designed to operate with a maximum sur-

3

face temperature of 300 °F (150 °C), and are equipped with the high performance CeraCal type cover. In order to achieve the highest LWC quality targets under high calender loads, Safir S type covers were selected for the Nipcorect rolls and Intermediate soft rolls.

Along with the fixed platform system and movable stairs located on the side of the Janus MK 2 calender for maintenance access, this calender is also equipped with the first movable inner platform that is designed to enhance access to significant control and mechanical maintenance points.

Sirius Reel

The Sirius reel winding system was installed immediately after the Janus MK 2 calender with no pull stack between the two systems. This Sirius reel is one of four in North America. This type of reel provides precise and sensitive nip load and sheet tension control by moving the Senso-Roll (reel drum) throughout the winding process. The winding process is further optimized for build up of excellent parent roll density with the highly effective continuous center torque control.

Lastly, the EcoChange S integral component of the Sirius reel sheet separating device minimizes paper loss during turn up of the parent roll.

Tail Threading System

Tail threading systems were also supplied by Voith Paper. The SpeedCoater/after dryer system consists of a Fibron Flip Tray Transfer Device to the SpeedCoater and two distinct rope threading systems – one for the SpeedCoater and the other for the after dryer section. The Janus MK 2 calender/Sirius reel system consists of a Fibron TT 3000 vacuum conveyor to thread the tail to the calender, and a rope system through the calender and Sirius reel. This rope threading system is the first of its kind due to the fact that there is no pull stack between the Janus MK 2 calender and the Sirius reel. The Sirius reel is equipped with a small pressure roll to assist in the tail threading process.

Fiber Systems

As part of the overall project to re-build their PM 1, Madison Paper Company, Alsip completely re-built their deinking

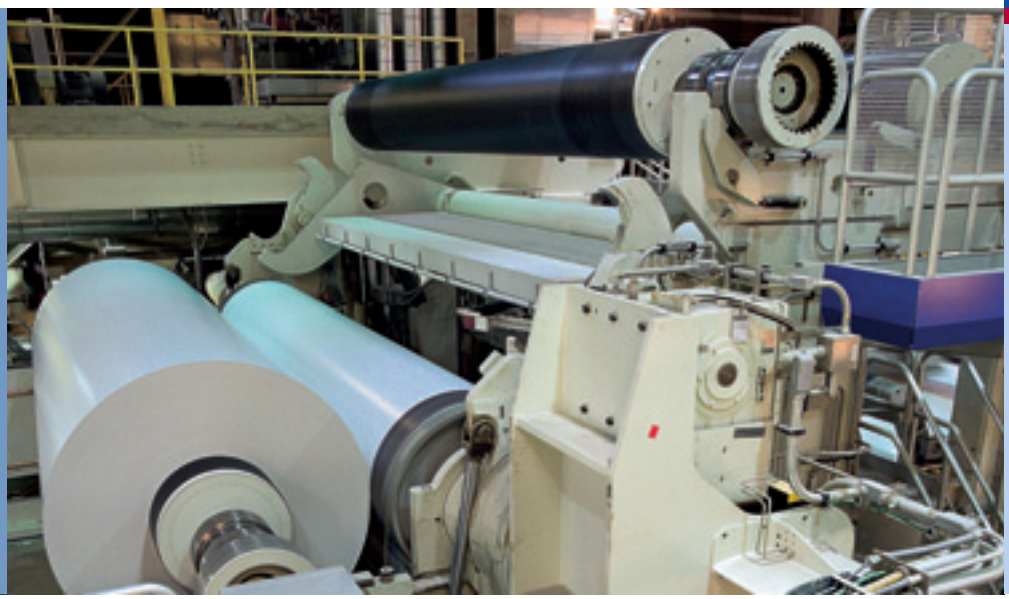
Kevin J. Kuliga

President of Madison Paper Company/Alsip

"I offer my personal thanks to all who have contributed to this most demanding and exciting project. With the support of Voith and Myllykoski Group marketing, technical, engineering, and operating specialists from our companies in the US, Finland, Switzerland, and Germany, all of the LWC product quality targets have been met or exceeded. Our product is being very well received in today's most competitive market."

Fig. 3: *Janus MK 2.*

Fig. 4: *Sirius.*



plant. Voith Paper provided six primary and two secondary pre-flotation EcoCells for the removal of ink before bleaching. Post-flotation, also EcoCell, was a five primary and a single secondary cell design.

Voith Paper also supplied a complete peroxide bleaching system. The system consists of the new EcoDirect disperger with direct heating, the transport screw conveyor system to HC bleaching and the new EcoReact HC bleaching tower, the first of its kind in North America.

At the same time two coarse screens were re-furbished.

For the PM 1 stock preparation, a stacked-bale material handling system and a kraft pulper were installed for handling bought-in kraft softwood. The material handling system consists of transfer conveyors, a down-ender conveyor, and manual de-wiring equipment.

Delivery of all of this equipment to the Madison Paper Company, Alsip job site was handled in a unique manner. Due to the geographically close distance between Alsip and the Voith Appleton operation (around 220 miles), Madison Paper Company accepted Voith's proposal for "Just in Time" delivery of many of the various components.

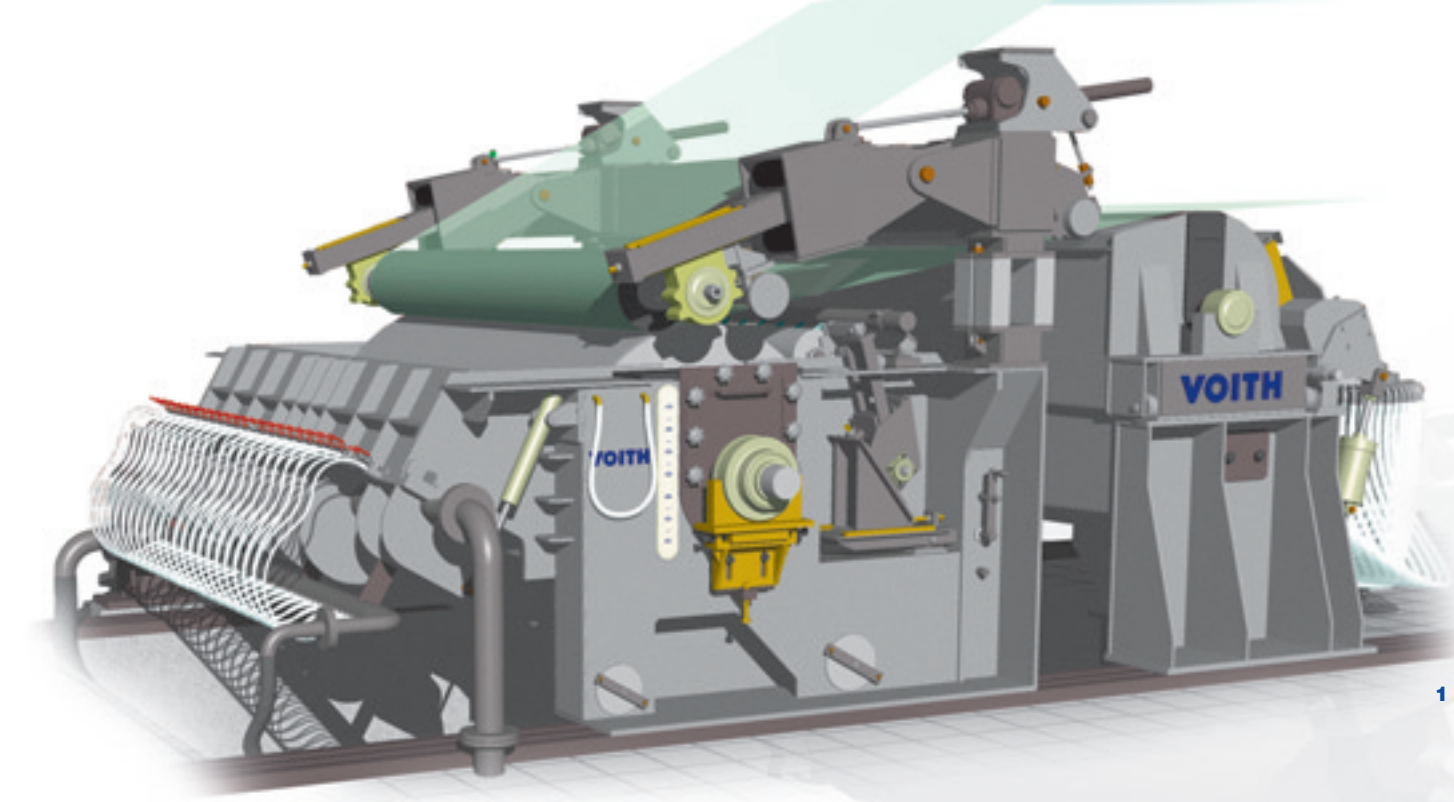
The Voith site personnel, in coordination with the general contractor, customer, and Voith Appleton shipping personnel, arranged for the delivery of the necessary components to the job site just in time for installation.

In January 2002, the Madison Paper PM 1 machine, resumed operation, successfully producing first newsprint and then SCC paper.

LWC production commenced on February 23, 2002. Shortly after production of coated paper, Madison Paper Company has been receiving positive comments from their customers regarding the quality of their LWC sheet.

The present operating speed of the paper machine is 2,750 feet per minute. Current LWC production is 125,000 tons/year.

The coated basis weight ranges from 38# to 50# per 3,300 ft^2 (56 to 74 g/m^2) with a gloss target of 50 Gradner. The LWC furnish contains 80% DIP (deinked) fiber.



1

Small and sophisticated – Production lines for banknotes and security paper

Wolfgang Neuß
Special-purpose paper machines
wolfgang.neuss@voith.com

There are only about thirty producers of banknote paper worldwide, most of them state-owned companies. Their total annual output is very low at around 140,000 ton – comparable to that of a single newsprint machine over four or five months. However, this is a question of supply and demand. Every country naturally wants to have a stable currency, with a limited circulation of durable legal tender. That is why banknotes are not in steeply rising demand and play such a small role in global paper production – but only quantitatively!

Qualitatively, however, banknote production is one of the most highly esteemed traditions in the art of papermaking. Due to the necessarily secret ingredients and processes involved, the alchemistic mystery formerly attached to papermaking still exists here to some extent.

The skills and perfectionism required for manufacturing these special-purpose papers apply even more to the production machinery. Voith Paper is clearly the global market leader in this sector, both with regard to design and construction.

Indeed, banknote paper production lines are one of the best references for Voith Paper's know-how in meeting the most demanding customer requirements. They also reflect our reputation for total reliability when confidential matters are at stake.

Fig. 1: *Banknote paper machine for Pakistan.*

Fig. 1: *Worldwide banknote production.*

Fig. 1: *Contract signing with Security Paper Ltd. in Pakistan.*

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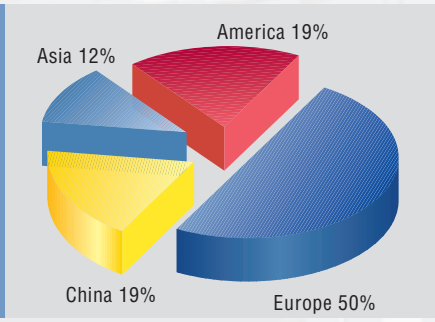


3

Market situation

There are only about thirty producers of banknote paper worldwide, most of them state-owned companies. Their total annual output is very low at around 140,000 ton. As shown in **Fig. 2**, the greatest world market share of banknote paper production is still in Europe. However, Asia is clearly a growth market with high potential for banknote paper machinery.

The Chinese market is deliberately emphasized in this diagram. Over the last fifteen years, ten new production lines for banknote paper have been installed in China. For nine of these, Voith Paper either supplied the entire machinery or the main production components.

Banknote paper machines and equipment are developed and built at the Voith Paper Düren plant, where vast experience has been accumulated in this discipline. In June 2001, the Düren team received another order from Asia, this time placed by Security Paper Ltd. for a new production line in Pakistan **(Figs. 1 and 3)**.

Banknotes are to be produced here in compliance with today's international quality and security standards. The new machine will be installed next to the first one commissioned in 1969, which will then be used mainly for passport and identity card production.

This new machine centers around a cylinder mouldformer concept, newly developed by Voith Paper two years ago, combining modern headbox technology with the latest innovations in step diffuser and dilution water control systems. The second cover layer embedding the security thread is produced in a shortformer, and the machine also incorporates a 2x2 Ecosoft calender. Apart from the paper machine as a whole, the scope of supply also includes most of the stock preparation line, as well as a winder and a cross-cutter.

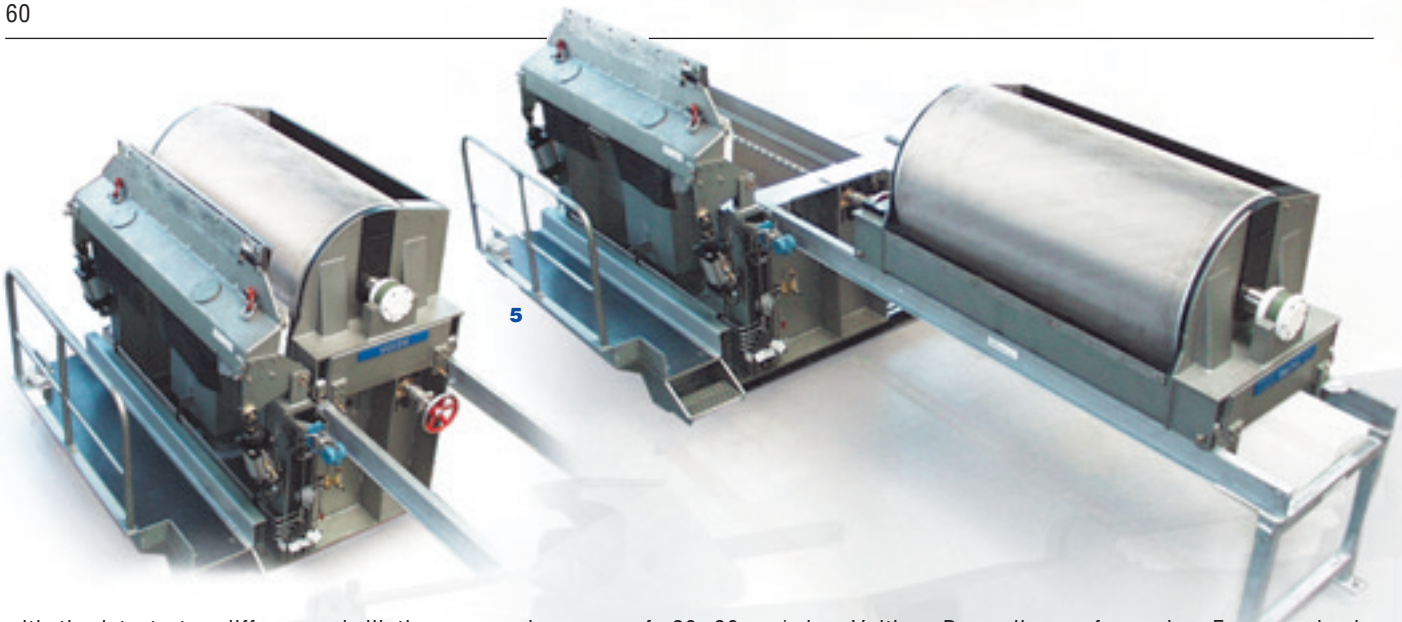
Market upswing with the new Euro currency

With the advent of Euro currency and respective innovation requirements, the European market for banknote paper machinery has experienced an upswing over the last few years. Many experts regard the new Euro banknotes as the world's safest from the forgery point of view.

Making paper according to these high security standards, increasingly double-ply technology is used, where Voith Paper is the market leader. In nearly all Europe's banknote paper machines, the second layer is produced by a specially developed shortformer **(Figs. 4 and 5)**. Six of these are already in service in Europe alone, and a seventh is just about to be commissioned.

A sophisticated and flexible technology

With few exceptions, banknote paper is produced on synchronous cylinder mouldformer machines – the only technology enabling a multitone watermark. As mentioned, Voith Paper has developed for this purpose a new cylinder mouldformer combining modern headbox technology



4 5

with the latest step diffuser and dilution water control innovations. This state-of-the-art system is already well-proven on several banknote paper lines.

A key component of this new cylinder mould concept is the expansion cylinder (Fig 6), which holds several modules in tension. In one of these modules, the watermark for the respective banknote paper is embossed. Since banknotes of different sizes in various currencies are generally produced on the same machine, frequent wire changing is necessary. To facilitate wire mounting and removal, tensioning and release, an expansion cylinder was developed with an ingenious mechanism enabling its diameter to be enlarged or reduced by up to 30 mm – while fully maintaining geometrical precision and concentricity.

Banknote paper machines have a web width up to 2,800 mm, with an operating speed range of 20-90 m/min. Voith Paper's shortformer and cylinder mould-former technology with expansion cylinder are playing an important role in combating banknote forgery more efficiently in the future.

6

Special materials for special needs

Requirements such as forgery prevention and extreme durability put banknote paper production in a class of its own. In this age of sophisticated copying systems and clever forgers operating worldwide, a good deal of technical sophistication is required to keep each banknote an inimitable original.

Security features start with watermarks and security threads incorporated in the paper, together with embossed surfaces and holograms. The printing process adds further features, some of which are visible to the naked eye while others can only be detected with special equipment. Formerly, when security measures were not so extensive, numerous amazingly good forgeries came into circulation. Since then, however, nobody has ever succeeded in forging modern banknote paper without detection – one to zero for papermakers, and of course for paper machine manufacturers as well!

Depending on face value, European banknotes last ten months to five years before they are taken out of circulation. During their life, they change hands millions of times and are folded many thousands of times. They frequently go through the washing machine, are heated, damaged and ironed out again. To withstand such treatment, a special kind of furnish is required, which is why banknote papers contain up to 90% cotton (Fig. 7).

Only for security paper not exposed to such treatment is bleached chemical pulp used instead of the much costlier cotton. This kind of paper is used, for example, for passports, identity cards, credit cards, checks, securities certificates, postage stamps and the like.

Some people seem to think that banknotes will stand up to anything – even lighting a cigar. However, we have not yet attained such technological heights...

7

Figs. 4 and 5: *The Voith Paper shortformer.*

Fig. 6: *The expansion cylinder developed by Voith Paper.*

Fig. 7: *Cotton, the primary raw material used for banknote paper production.*

1

Advanced roll covers and services in China

Facilities open April 2003!

Robert Kietaibl

Voith Paper Service China
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Fig. 1: *Voith Paper Service Center, Kunshan, Jiangsu Province, China. Headquarters for Voith Paper Service, in China, 5,400 m² manufacturing space, 80-ton lifting capacity.*

Voith is a company with both, global scope and regional focus. At Voith the word commitment comes to life in tangible form – through modern facilities that make a meaningful impact on the markets they serve. Voith operates more than 25 service centers around the world. Each is strategically located to provide critical service support to local and regional markets.

The market for paper and packaging materials in China continues to grow rapidly. With this growth comes demand for improved operations and product quality. China's importance to the pulp and paper industry has since long been recognized by Voith Paper, and Voith Paper is now investing into two service center in China.

Voith's two new service centers located in Kunshan near Shanghai, Jiangsu Province and DongYing, Shandong Province represent a critical resource to meet these dramatically increasing needs. The technical services available at these centers create exceptional opportunities for paper producers throughout the region. Voith Paper Service's two newest facilities offer Northeast Asia (China, Japan, Korea, Taiwan) greater opportunities for increased profitability and growth.

Voith Paper Service China broke ground in Kunshan, in August 2002 and Dong Ying in September 2002 and will start up

Fig. 2: *Ground Breaking Ceremony Kunshan.*

Fig. 3: *Mr. Li Jian Hua and Mr. Kietaibl.*

Fig. 4: *Ground Breaking Ceremony Dong Ying.*

2

3

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commercial production in April 2003. More than 150 guests from the local authorities in Kunshan City, led by the secretary of the party Mr. Lei Zhang from Dong Ying City, led by the secretary of the party Mr. Shi Jun and from Guangrao City, led by the secretary of the party Mr. Tian Zhenyu, were attending these ground breaking ceremonies. From Voith's corporate board Dr. Hans Peter Sollinger was attending.

Especially at the Ground Breaking Ceremony at Dong Ying, where Voith is building a mechanical service center next to the paper mill Huatai, Mr. Li Jian Hua, President of Huatai Group, expressed the great importance of having local access to Voith's advanced roll covers and services. Previously, papermakers in Northeast Asia often had to send their rolls for service to Europe or the US, a process that took several months due to the long shipping distances. Now, the paper mills in the region will have access to the same service and expertise in Northeast Asia, saving both time and money.

Voith's new Kunshan and Dong Ying service centers offer extraordinary capabilities. These facilities reflect Voith's extensive experience in servicing the pulp and paper industry. Every facet of their design and operation is engineered to give you the highest level of quality and service available in Northeast Asia.

The new Voith facilities in China are fully equipped with latest state-of-the-art equipment for producing roll covers, crane systems, lathes, grinders, drilling

5

Fig. 5: *Voith Paper Service Center, Dong Ying, Shandong Province, China. 1,200 m², 60-ton lifting capacity.*

Fig. 6: *Voith Paper Service locations world wide.*

and balancing machines and all the modern technology necessary to ensure fast turnaround of the highest quality products and services. Rolls with a length of 15 meter and 2 meter in diameter can be handled on all manufacturing equipment.

The China service centers are well-staffed with technicians who receive specialized training not only on site, but in Europe and North America, as well. As a result, you can be sure of expert workmanship, provided by experienced people well-prepared to meet any challenge.

And while Voith is a worldwide leader in the production of papermaking equipment, our expertise extends well beyond servicing our own equipment and rolls. Voith professionals provide expert service for any equipment and any roll used in the market.

Voith Roll Covers

- Rubber
- Polyurethane
- Composite

Voith Roll Maintenance Services

- Suction roll disassembly, internals inspection and repairs
- Variable crown roll disassembly, pressure testing and repairs
- Bearing inspection and replacement
- Journal repairs and head fits
- Cooling system inspection, repairs, and replacement
- Precision grinding
- Balancing
- Drilling covers

Access for paper makers to combined and concentrated resources in Kunshan as Voith Paper Service China and Voith Fabrics Kunshan operating out of the same location, our technicians of both divisions cooperate very close for our customers advantage.

With the continued growth of the Chinese market, Voith Fabrics is making investments to further develop Kunshan as a state-of-the-art forming fabrics operation. The complexity of dewatering technology can be discussed on site and tailor made solutions for each application will be developed between our customers, Voith Fabrics and Voith Paper Service.

Feel free to contact us at any time under our general email address for Voith Paper Service China:
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1

EnduraClean – a functional surface for paper machine components

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Service
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Surfaces of many components in paper machines are, nowadays, engineered to meet specific requirements to improve their functionality and performance. Covers and coatings are frequently applied on OEM components and offered to the industry as service products.

EnduraClean is a new surface coating system (cover) tailored to provide a unique combination of anti-adhesion and wear resistance. It has been specifically developed for any paper machine roll or drying cylinder suffering from excessive build-up of foreign particles (debris) and/or from build-up of deposits.

Lead-in dryers and any rolls or drying cylinders following coaters and size presses are prime candidates for this coating system. The surface characteristics of the coating significantly reduces the sticking tendency and also allows doctoring to easily remove any accumulation of foreign particle build-up.

The EnduraClean surface coating system is being applied on-site, in the machine and during a scheduled machine shut-down. Multiple rolls or dryers can be coated simultaneously to minimize the total processing time.

2

On Site Grinding

Prior to the application of the EnduraClean coating system and depending on the condition of the roll or dryer, it might be necessary to re-condition the surface of the component by grinding. Rolls or drying cylinders which have been doctored heavily to remove deposits, are often grooved or damaged.

The Cylinder Service Group operates various types of grinders to re-condition drying cylinders in the machine. For safety reasons, all grinding machines are remotely controlled, incorporate dust

extraction systems and will restore the required cylinder shape and surface, fast and efficiently.

Dryer to dryer diameter tolerances (group tolerances) for cylinders running in drive trains, are always maintained.

EnduraClean Coating System

The on-site coating system consists of:

- Sand blasted bond surface
- Thermal sprayed, corrosion and wear resistant base coating
- Thermal sprayed adhesion layer
- Sintered Teflon® surface layer.

Sand Blasting

Prior to applying the thermal sprayed coatings, the surface must be properly prepared. Sand blasting has a dual function; it cleans the surface from contaminants and it increases the specific surface area, which assures bonding of the thermal sprayed coating system.

Thermal Spraying

A High Velocity Oxygen Fuel (HVOF) spray system is used to apply an ultra-dense base coat. This coat is thin, dense and consists of extreme hard carbides in a tough binder, with an overall coating hardness of HV 1,000 (approximately 70 HRc). A very thin "adhesion" layer of the same material is applied on top of this base layer. This adhesion layer functions as wear resistant matrix for the Teflon® compound.

Sintered Teflon

The top layer, and the actual functional surface consists of a sintered Teflon® type compound. This compound is impregnated into the wear resistant thermal sprayed surface. Sintering on-site is done using infrared propane heaters in a controlled heating and cooling sequence.

EnduraClean Characteristics

Non-Stick properties of PTFE (polytetrafluoroethylene) and other derivatives are well known. For years, Teflon® sleeves have been used to provide a non-stick surface to dryer cans. Disadvantages of the sleeves are the inability to doctor these surfaces and the high risk towards accidental damage.

Ultra-hard carbide, ceramic and metal based thermal sprayed coatings are widely used to provide extreme wear and corrosion resistant surfaces on press rolls, calender rolls, Yankee dryers, winder rolls, and doctor blades.

EnduraClean combines the wear/corrosion resistant and non-stick properties in one unique coating system. It will protect the surface, prevents sticking and thus improves the performance of the dryer or roll for years to come.

The EnduraClean coating system has found wide acceptance in paper machines, as numerous dryers and rolls have been coated on site since its introduction. This service product is offered, world-wide, through the Voith Cylinder Service Group.

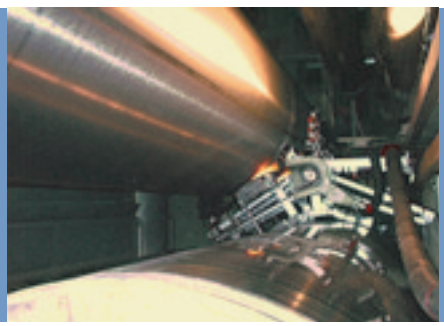
Fig. 1: *Sintering of Teflon coating.*

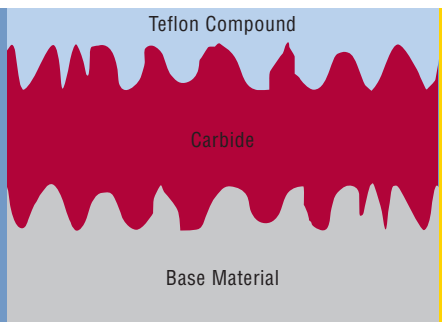
Fig. 2: *EnduraClean surface.*

Fig. 3: *Grinder.*

Fig. 4: *HVOF Spraying.*

Fig. 5: *Schematic coating system.*





The Vector press fabric breakthrough –

smooth paper, smooth production, smooth printing: smoothing the way to higher profits with Vector tri-axial composite press fabrics

The paper industry needs press fabric enhancements that provide better void volume retention, higher after press solids (dryness) and a smoother sheet finish. Voith Fabrics responded with the Vector solution, a tri-axial, non-woven concept. This is the first stage of a multi-platform system of pressing advancements from Voith.

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Eric Arseneault

Voith Fabrics
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Features

- Non-woven, tri-axial polyamide structure
- Improves batt bonding
- Smooth “non-knuckle” pressing surface
- Increases resistance to compaction
- Reduces hydraulic flow resistance

Applications

- Finish-critical positions
- High water handling requirements
- Compaction resistance is critical
- Safer, faster installation (seamed)

Results

- Reduces seam wear
- Eliminates seam mark
- Improves sheet smoothness
- Increases sheet dryness

Even when papermakers do everything right, producing equal smoothness on both sides of the sheet is a formidable task. The challenge to eliminate two sidedness is even greater on high-speed machines. The introduction of Vector’ press fabric technology, level one of Voith’s new Surface Improvement Platform, is not only smoothing out the sheet but also smoothing out production bottlenecks.

Smoothness gains add up to higher profitability through improved quality and fiber savings; a reduction in calendering requirements translates into higher sheet caliper. Perhaps the biggest benefit of all happens beyond the paper mill on demanding printing presses – where more consistent printability on both sides of the sheet occurs.

In a quest to improve on the age-old sheet roughness issue, Voith Paper Technology’s R & D explored the concept of building a laminated construction utilizing non-woven technology to improve overall sheet quality. The idea worked so well that what we now call Vector has become the reference for optimum smoothness in press fabric technology (Fig. 1).

Composite Tri-Axial Design

Voith Fabrics utilizes a unique manufac-

Fig. 1:
Vector 3.

Fig. 2: *Suction box fabric dewatering vacuum levels.*

Fig. 3: *Vector – improved sheet quality (left); Standard 3-layer (right).*

Fig. 4: *Sheet quality – 40% improvement.*

Fig. 5: *Vector seam provides significant improvement in seam integrity.*
Vector 62 days (left);
Standard seam 55 days (right).

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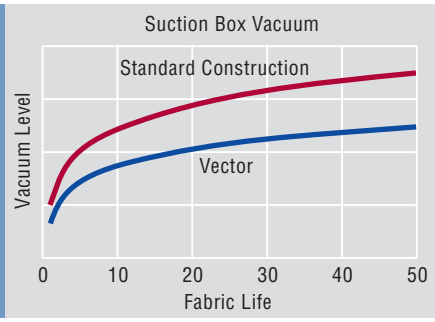

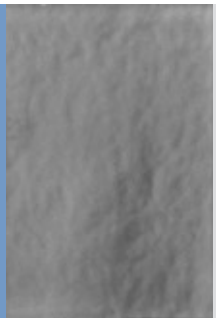

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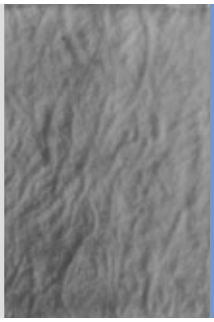

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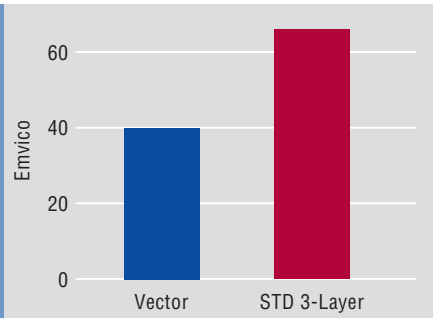


turing process to produce a truly composite fabric.

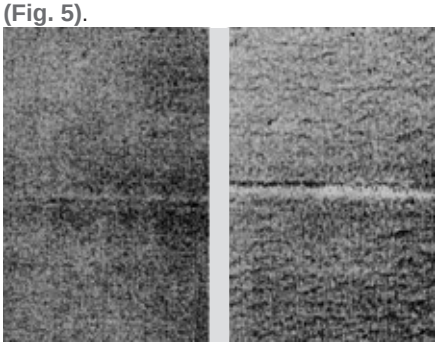
The non-woven element defining the Vector system is made of tri-axially oriented microfilaments. The Vector layer provides a uniform open structure that significantly improves dewatering over extended periods.

In addition to machine direction (MD) and cross-machine direction (CMD) open water removal channels, the tri-axial system provides superior z-direction flow properties in demanding press nips. In combination with the open channels, the Vector offers z-direction resilience which yields higher permeability control over the life of the fabric. Field results confirm that suction box fabric dewatering vacuum levels increase at a much lower rate when compared to other structures **(Fig. 2)**.

In terms of surface uniformity, the Vector technology has enhanced micro/macro scale surface characteristics (knuckle-free pressing). The proprietary pressing surface, exclusive to Vector, is the leading design concept in the press fabric industry today.

Figs. 3 and 4 illustrate the improvement in sheet quality obtained using the Vector technology on a machine producing high-quality board.

Whether the fabric's construction is seamed or endless, the benefits are similar. Improved sheet finish and dewatering capabilities are maintained throughout the entire life of the fabric. Regarding seamed fabrics, the additional advantages of superior flap durability and elimination of seam mark are also provided **(Fig. 5)**.



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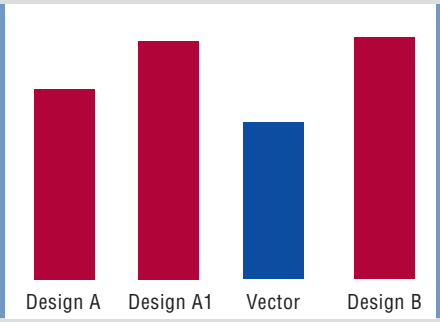
Case Studies: Graphic Paper Producer Smooths the Top-side

An SC paper manufacturer wanted to improve top-side sheet smoothness in order to further improve two-sidedness numbers. Improved two sidedness yields better printing results and therefore higher impact for advertisers and catalog producers.

The modern high-speed machine is producing high-quality SC paper; the press section is a tri-nip configuration including a shoe press on the 3rd press position.

Following the initial investigation, Voith Fabrics elected to target the shoe press position (3rd press) as the best opportunity for providing two-sidedness improvements. It is well known that the long dwell time and unique pressure pulse of the shoe press has the effect of creating a two-sided sheet (felted top/ceramic roll bottom).



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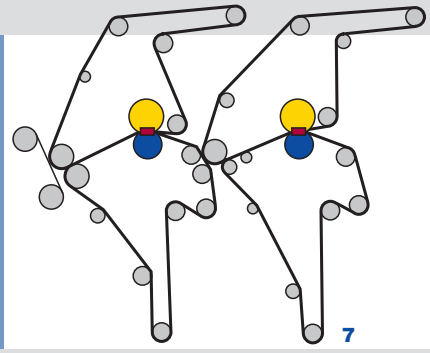

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Fig. 6: *Basis weight standard copy.*

Fig. 7: *Tandem NipcoFlex press configuration.*

After having defined the objectives with mill personnel, the Vector technology was selected as the best design for sheet smoothness improvements.

The Vector 3 press fabric was installed on the shoe press position and provided better sheet smoothness. On average, the top-side PPS figures were improved by 16 percent when compared to Voith Fabrics' standard design and by 18 percent when compared to the competitor's construction.

In addition to significant improvements in sheet smoothness, the Vector press fabric resisted compaction and filling better than previous designs. Suction box dewatering remained high throughout the period of operation (110 g/m^2 vs. 20 g/m^2 moisture drop at suction box) indicating a high level of water-handling capability.

Vector technology has now become the standard design for the 3rd press position and is also being evaluated on other positions in this mill.

Considerable Fiber Savings

Seeking to increase effective press fabric performance, wood-free copy paper producer Weyerhaeuser, Dryden, Ontario, Canada, tried the Vector tri-axial composite on their shoe press position (3rd press). The press fabric ran for 65 days and on average increased smoothness by 3 points (Sheffield) leading to a reduction in calendering requirements.

Because of tighter control of sheet caliper, the mill was able to reduce their basis weight (Fig. 6). According to Scott Beckett, PM 2 production manager, based on their production rate, this represents significant savings in fiber costs. Additional trial work is currently under way.

Smoother Production – Taking a Load Off The Press Section

Visy Recycle Inc. in Staten Island, N.Y. wanted to improve the water handling and efficiency of their press section. Historically, the 1st press nip load had to be reduced at mid-life of the pickup and bottom fabrics. Running at maximum press load during the complete life of the fabrics led to sheet following and picking in the 1st press. The reduction in loading reduced the press efficiency and lowered production.

Their PM 14 is a modern machine producing 120 g/m^2-200 g/m^2 corrugating medium at 950 m/min; the press section is a Tandem NipcoFlex shoe press configuration (Fig. 7).

Voith Fabrics had not previously been a supplier to the machine. After a thorough analysis of the press operation, Voith Fabrics recommended the Vector 4 (Fig. 8) for the Pickup and Bottom and the Vector 3 for the 2nd Top and Bottom. Vector was selected because of its outstanding water handling. The tri-axial Vector technology was engineered to maximize void volume, decrease water flow resistance and improve z-direction resilience.

With the Vectors installed, Visy's production team was able to run at maximum press load for the life of the fabrics. The Vector 4 Pickup and Bottom eliminated sheet following/picking and improved weir flows by 15 percent. Visy was able to increase the speed of the machine on the lightweight grades by over 30 m/min. The machine set a daily production record and a monthly production record while the Vector fabrics were running. The Vector technology has now become the standard design for this press section.

The Vector's principal assets are its ability to improve dewatering and maintain openness throughout its life.

In addition, the Vector's sheet improvement results have established it as the foundation of Voith's newly launched Surface Improvement Platform.

Fig. 8: *Vector 4.*