w.com

Issue 1 · 2006 wangner.communication

WANGNER

Cover Story

Unique surface measurement technique sets new standards

Current topic:
Rising demand and the Kyoto protocol drive energy prices up

Interview:
UPM Schongau – Top quality from PM 7

w.com 1 · 2006

Contents

Editorial details
Published by:
Wangner GmbH
P.O. Box 29 52
D-72719 Reutlingen, Germany
E-Mail: info@wangner.com
www.wangner.com
Editorial staff:
Oliver Baumann, Marion Eggert, Heinz Mauser
Editors / Layout:
NBB Kommunikation, Munich

Photo credits:
Page 10: Mauritius Images
Pages 14 to 17: UPM Schongau

Printed in Germany

Teamgeist – Team Spirit

"The 2006 FIFA World Cup games are over and they have left a positive impression on both fans and visitors. First-class summer weather, public viewing, fan festivals and peaceful World Cup parties: sensational pictures that the entire world took pleasure in viewing. However, one notion at this borderless sporting festival enjoyed an unparalleled revival and spread like wildfire: TEAMGEIST. It was encouraged not only by the official match ball, but was driven by the program – players, fans and hosts participated equally.

Here at Wangner, team spirit is part of day-to-day life, because it is the glue that holds together the ladder to success. And we know that only if individuals give their best will we achieve the overall objective. At the same time however, we not only practice "one for all", but also "all for one". The key is knowing how to be a team player.

This edition of *w.com* provides further proof that betting on teamwork is well worthwhile: The successful development of a unique measuring technique for fabrics and paper surfaces based on the Wangner Surface Analyser was made possible only by relying on interdepartmental teams within our company and continuously maintaining a dialogue with our customers. The methodology offers many benefits, both in the development and application of paper machine clothing *(cover story, page 4)*. Two Pöyry Group experts shed some light on the hot paper-sector topic of rising energy costs *(page 10)* and show how important it is that the paper industry works as a close-knit team to find common solutions. When we read the interview with Josef Eder, PM 7 Production Manager at UPM Schongau *(page 14)*, we can clearly see how important it is for papermakers and their suppliers to work closely with one another. Team spirit is just as important at this production process interface.

As part of her master's thesis "Optimizing a communications concept to provide a basis for customer loyalty", Bettina Lachenmann, a student at the Reutlingen University, conducted a customer survey together with our marketing and sales department. Among other things, she asked readers of our customer magazine w.com to give their opinion on the publication. At this juncture, allow me to thank you very much for your participation and opinions. We regard the average grade of "good" we received as an assessment by the rest of the team, and will make good use of your feedback and improvement suggestions so that we can achieve a score of "very good" next time we do the survey. ■

Sincerely,

Heinz Mauser

Mailbox

Inside Wangner

Zellcheming 2006 – Customer evening under the motto World Cup Soccer.

"You'll never talk alone" was the motto under which Wangner invited its customers at the end of June to the stadium of the first-division team FSV Mainz 05 for the traditional customer event during Zellcheming. In the middle of the historic team's sacred grounds, guests inhaled real stadium air, exchanged the latest industry news items and enjoyed not only the excellent buffet, but also a goal shootout challenge, playing soccer and a live transmission of the quarterfinal game between Switzerland and the Ukraine on the memorial stage.

Fabric design instruction at TU Dresden

At the invitation of TU Dresden, Stephan Ernst of Wangner's application engineering group conducted a seminar in February on the topic of "fabric design" for the students and staff of the Department of Paper Technology. The focus was on different fabric types, their construction and how they are applied in papermaking. Practical exercises rounded out the presentation.

Oliver Baumann forming fabrics product manager for Xerium in Europe

In March, Oliver Baumann, Wangner's product manager, was named Product Manager Forming Fabrics Europe. This gives him the added responsibility of managing Xerium Europe's product portfolio and products, as well as that of launching its new forming fabric sector products.

Tissue seminar in Sweden

In early June, Huyck.Wangner Sweden sent out invitations for its tissue seminar, already the sixth one. This time, representatives from all of Sweden's tissue factories met in Jönköping.

The host presented current developments in forming fabric design and a new generation of seamed felts for tissue machines.

Other presentations centered around the theme of tissue production followed from Stowe Woodward (roll covers), Ciba (chemicals) and BTG (creping blades). Huyck.Wangner seminars are an important industry event. Attendees not only gather considerable new information, but can also catch up on comparing notes with their colleagues in the industry. The right conditions for this were established with a visit to the old Munksjö paper factory. The event concluded with a genuine "Viking dinner", from which cutlery was entirely banned.

Huyck.Wangner Offices in Great Britain and Spain

After successfully establishing Huyck.Wangner's sales organization in the northern countries, the company opened two additional Huyck.Wangner offices in early 2006. Huyck.Wangner in Whitstable, Great Britain and Huyck.Wangner in Zizurkil, Spain now also offer the complete for paper machine clothing product portfolio under the brand name Huyck.Wangner.

Wangner fine paper seminar in Taiwan

The positive feedback from the brown paper seminar held in Taiwan in 2005 led Wangner to expand the presentation to include other types of paper. This year in May, the company conducted a seminar on fine papers together with the local representative Tang Chui from Taichung. Twenty papermakers from various fine paper factories attended. Wangner's Karl Betz and Ralf Schymura spoke about fabric technology, application technology and new developments in the fine paper sector. Troubleshooting was an additional key topic, brought to life for the participants using many real-world examples.

Excellent marks for Wangner

In June, an evaluation of suppliers and disposal companies was conducted at StoraEnso Sachsen's plant in Eilenburg as part of a DIN ISO 9001 and DIN ISO 14001 audit. The audit awarded Wangner 473 points out of 500, an impressive result.

Cover Story

Wangner Surface Analyser

Unique surface measurement technique sets new standards

In the future, the focus will increasingly shift toward printability, particularly for rotogravure printing paper. Paper rushes through advanced printing machines at speeds up to 14 meters per second. Color is applied to both sides of the paper, which then is further processed into a final product. Printers and publishers set high quality standards: shorter printing cycles, more intense and inexpensive colored inks that do not bleed through the other side, sharper contrast and, of course, cheaper paper. All in all, the demands placed on papermakers require an increasingly difficult balance between product quality and production efficiency.

Fillers improve the optical characteristics and printability of graphic papers at a much lower cost than natural pulp fibres. Makers of these types of paper therefore increasingly add as much filler as possible to the pulp to enhance quality and reduce costs. In addition, they try to reduce the basis weight of paper to save on raw materials. At the same time however, requirements for production reliability and processability of the paper produced continue to rise.

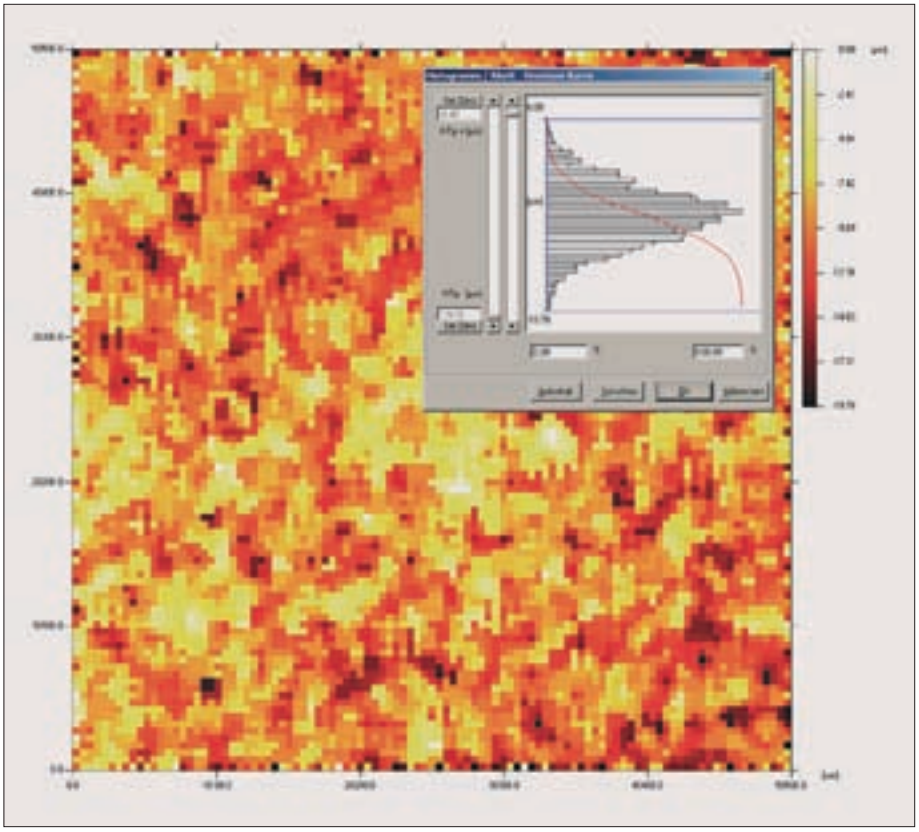
Printers and publishers set quality standards

Both paper strength and achievable filler concentration are becoming more and more important in papermaking. A high filler concentration is particularly imperative for thin papers to ensure that they are sufficiently opaque. The critical factor here is their retention capability, since thinner fibre webs have a lower filtration capacity, which makes filler retention more difficult.

Given these general conditions, the task is therefore to achieve a homogeneous sheet structure with the right pore size and distribution while maintaining high surface quality in the former and the press section. The type of former and press felt used have a significant impact on these parameters.

Wangner, the fabric technology leader for graphic and newsprint papers, has made the paper surface the key focus of development work on new fabric applications. The primary challenge is to develop forming fabrics that are capable of even further improving the paper surface so that it can meet the stricter demands for papermaking, while maintaining high quality and cost effectiveness.

Since the fabric section is responsible for about ninety-five percent of drainage performance related to sheet formation, aligning the clothing with the type of paper machine and its operational characteristics is key. The influence on the quality related parameters of the paper web is greatest here. Because modern systems use shoe-press technology rather than conventional press configurations, specific line pressures are reduced further and further, making the influence of the forming fabric surface more important. It ultimately defines the quality of the paper surface.



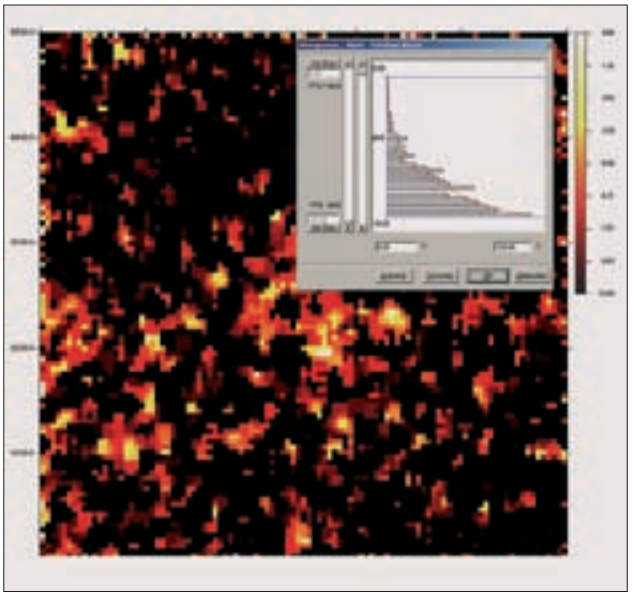
Scanned image with scaling and histogram (Gaussian distribution)

(Nano)focus on fabric and paper surface

In order to perfectly tune the fabric to the paper surface, Reutlingen's forming fabric specialist uses a measuring process that until now has guaranteed the company leadership. Wangner's new Surface Analyser (WSA) makes it possible to not only precisely depict the topographic surface of the fabrics, but also enables graphic and quantitative analysis of the surface structure of the paper.

It uses a transfocal laser with a maximum resolution of 0.001 mm, which can scan the surface with the same precision.

Any variations in fabric topography that could subsequently lead to unacceptable fabric marking on the paper during production can therefore already be detected during development and thus eliminated. Furthermore, WSA measurement makes it possible to define other important parameters related to drainage and sheet formation. For example, during sheet formation, the fabric filters the exiting furnish suspension; i.e., it separates the water from the solid fibre mat. In doing so, it leaves an imprint to the paper. The depth of the mark depends on how deep the fabric penetrates the furnish suspension. The depth of the fabric penetration in turn depends on fibre support and the free surface on the paper side of the fabric, as well as the specific composition of the furnish. Any topographic irregularities on the fabric paper side can mark the surface of the paper. Laser measurement can detect undesirable surface protrusions and eliminate them before they cause a problem. Initial sheet formation in the initial fabric drainage zone is also largely dependent on achieving the right balance between free surface and fibre support. For the first time, both attributes can now be precisely defined, thanks to the Wangner Surface Analyser. Analyzing real measured values makes it easier to design the fabric and provides fundamental information about its construction and its impact on papermaking.



▲ *Paper underside: colored area 42.3%*

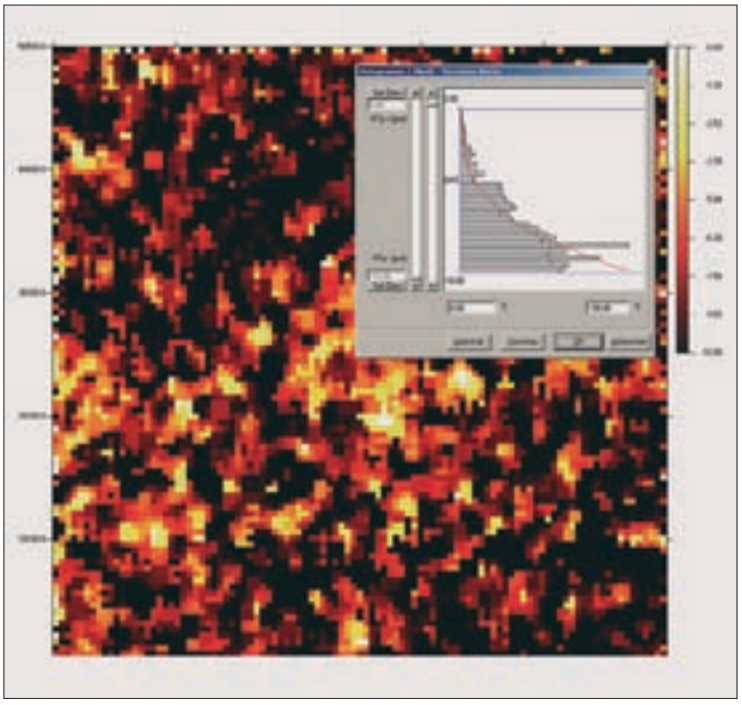


Image showing two-sidedness on a copy paper sample

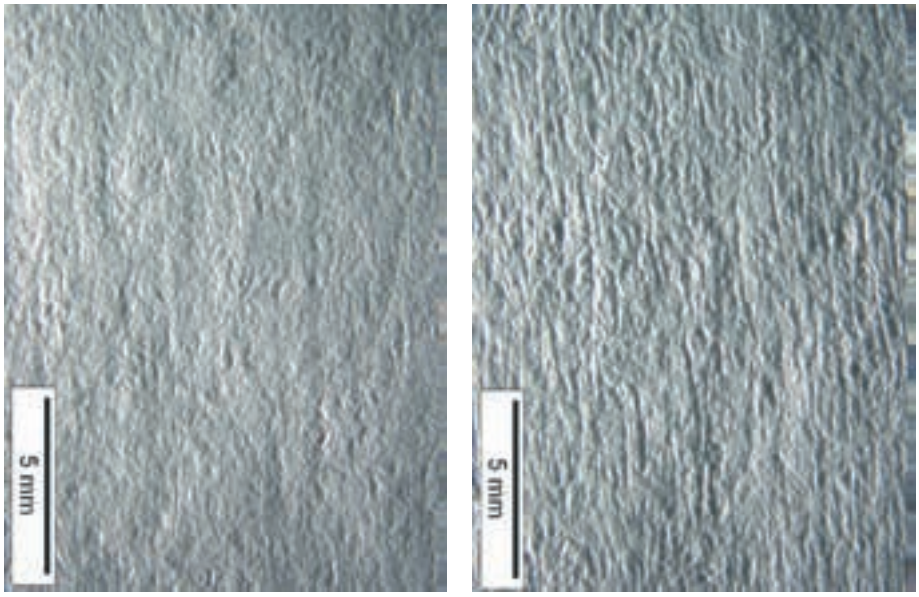
◀ *Paper top surface: colored area 55.7%*

Tracking down paper surface defects

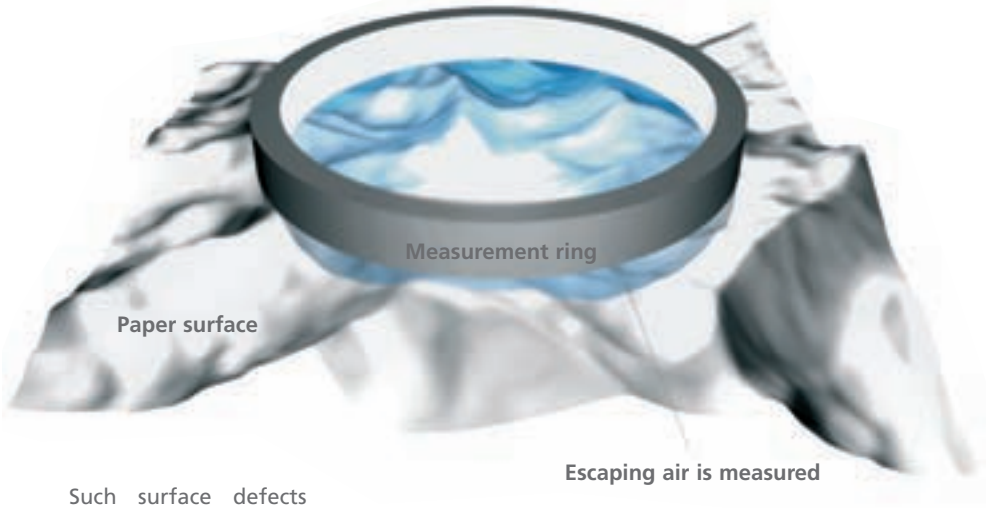
The surface measuring device was specially built for Wangner using nanotechnology components. This device can be used not only to precisely define the surface of the fabric, but also that of the paper. Wangner specialists have now analyzed a number of specific types of paper. Paper printability was the subject of particular attention. A 60 x 60 mm area was scanned to analyze the paper surfaces and their effect on printability. The resolution used for all measurements was one

measuring point per 500 µm in the X and Y plane. A purpose-built vacuum table was used to ensure that the paper lay flat during the scan and to prevent bubbles to form.

There are various ways to measure the surface of papers. "Bendtsen" and "PPS-Paker Print Surf" are widely used. These measurements are based on the "air leak" method, where air flow across a defined surface is used as a measure of surface roughness. These methods are adequate to describe the paper characteristics relating to the following processes that are primarily influenced by paper roughness. However, they are not precise enough for defining the printability of the paper surface, especially for rotogravure printing papers. In general, conventional methods for measuring printability are unable to detect local defects known as missing dots because the measured area is too large. Missing dots are a common problem in the gravure printing process.



Pictures of illuminated paper top surface … *… and paper underside*



Escaping air is measured

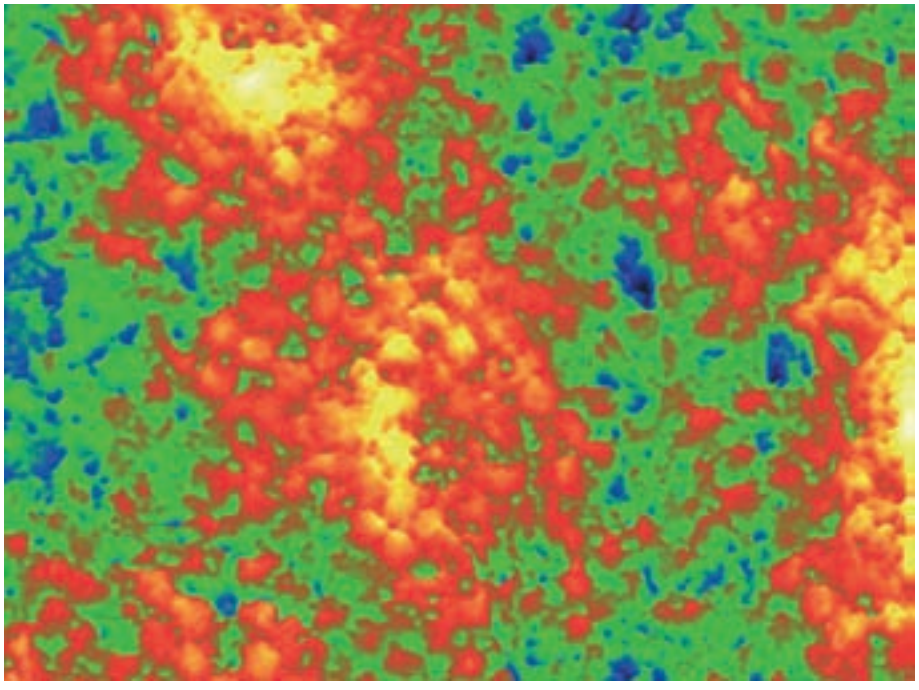
Such surface defects cannot be detected using conventional roughness measurements to assess print quality. Thanks to WSA, which creates a representative image, it is now possible to clearly see these surface defects. This is important, since paper printability is defined by both roughness and how frequently these missing dots occur.

By increasing the resolution, even the smallest depressions or protrusions can be made visible using this technique. Photos taken with an oblique light also help to uncover root causes. This unique measuring method is also used to measure other parameters such as average surface roughness (Ra) or to define gradient.

Standard for optimum printability and runnability

In order to be able to compare roughness for different paper types, it is also necessary to establish a way to classify the different surfaces. The Wangner Surface Analyser captures the various topographic heights in the scanned image and assigns different colors to the surface; i.e., the highest points are white and the lowest are black. A Gaussian distribution is generated from the measured values. The standard deviation is a measure of the surface roughness. Of course, it is also possible to show a section through the scan at a defined depth in order to present the nonconforming or colored area.

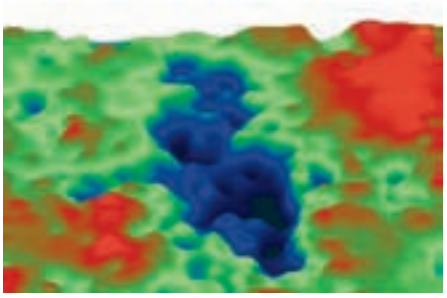
The area ratio is a measurement of roughness. When the section is always cut at the same depth, it becomes possible to compare different types of paper. Wangner is able to show the distinctive influence of paper machine clothing by comparing paper surfaces on the basis of WSA measurements.



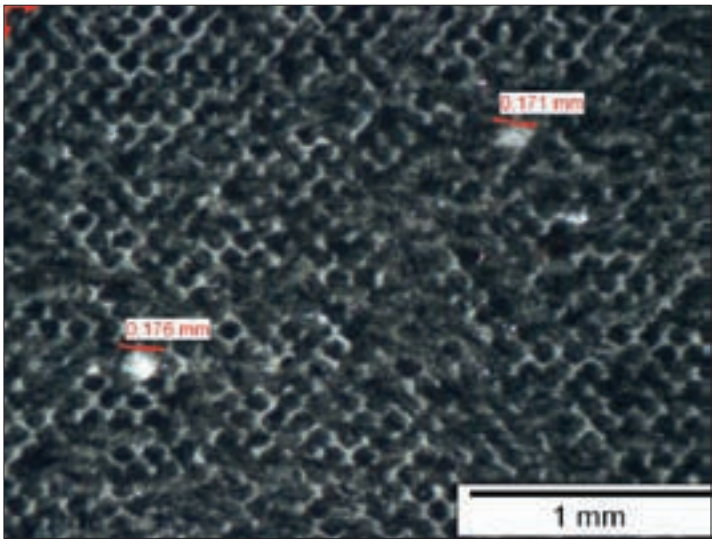
Surface scan of the same surface – missing dots at the lowest levels.

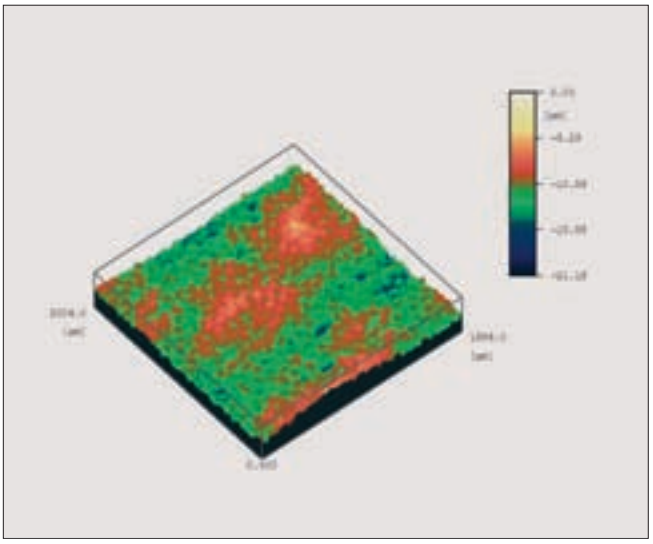
In summary, this advanced measuring technique is not only reflected in Wangner's unique forming fabric designs such as the recently launched Selectra and Compressor product families. Papermakers too benefit from a whole series of advantages.

First and foremost, it means homogeneous sheet formation without any drainage limitations whatsoever, together with a minimum of topographic marking, stable running behavior and improved machine hygiene. But the ultimate benefit is top paper quality that is unsurpassable when it comes to printability and runnability. ■

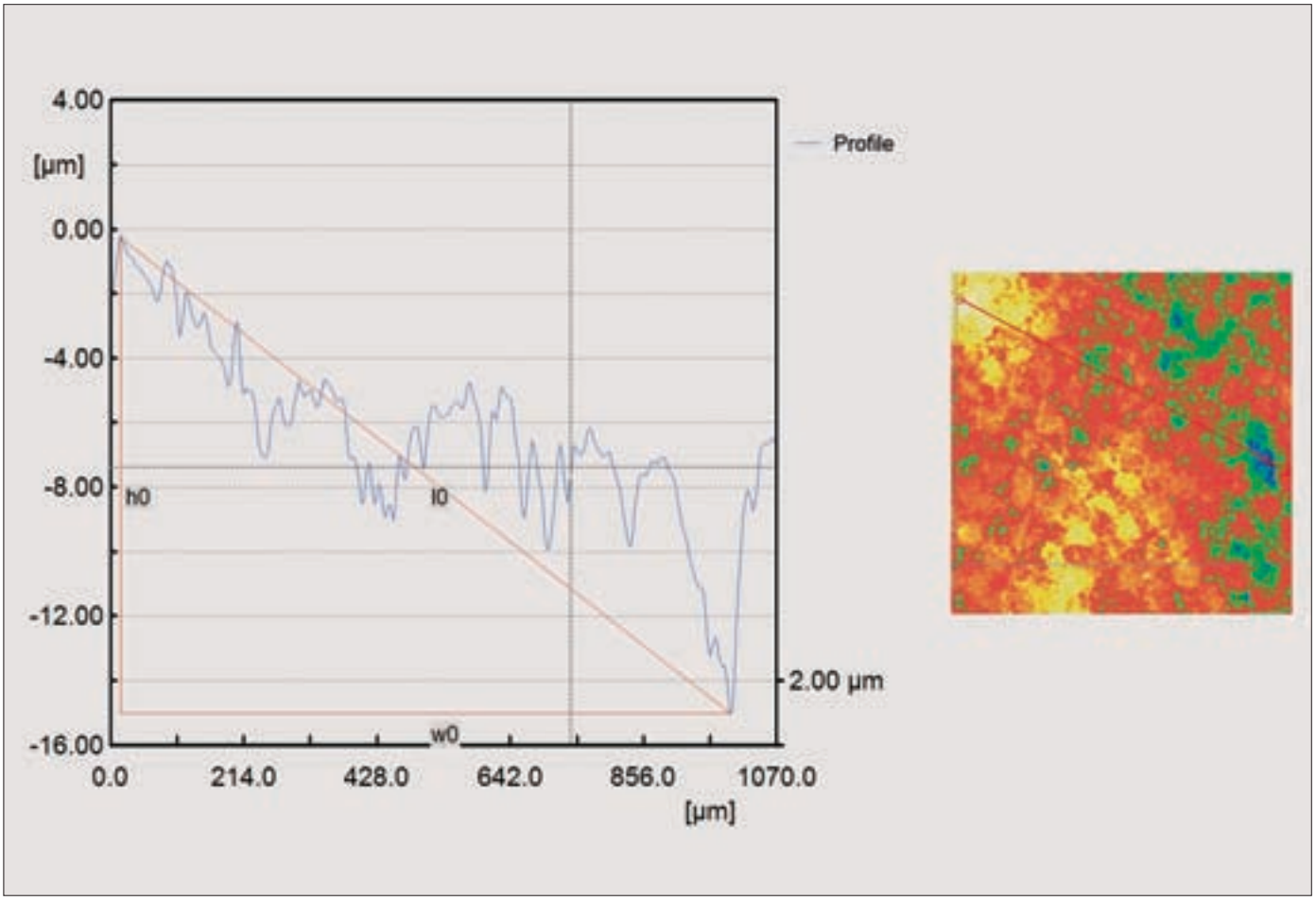


Zoom of a paper surface hole (>15 µm)





Missing dots in rotogravure prints



Profile measurement of paper surface

Meet our staff

Feng Mo – Commuting between cultures

Feng Mo

Feng Mo, 44, has been employed by Wangner for eight years. The sales manager for China has an engineering degree and was formerly a university lecturer. He regularly commutes between his current home in Reutlingen and his native country, China. The following w.com interview clearly shows his positive outlook on merging the influences of the two cultures.

w.com: *Mr. Mo, you come from China. When and why did you immigrate to Germany?*

Feng Mo: I was born and raised in Beijing. After completing my electrical engineering studies in 1985, I worked as a lecturer at the Shenyang University of Technology in northern China. From 1988 to 1992, I worked in Shenyang and Heinan as a sales manager for a Chinese trading company. In 1992, I came to Germany and worked for a Chinese company in Cologne. At that time, it was unusual for a Chinese national to work abroad.

w.com: *How long have you worked for Wangner?*

Mo: I have been employed by Wangner since May 1998.

w.com: *How would you describe the progression of your career at Wangner? What are your exact roles and responsibilities?*

Mo: I have been responsible for the Chinese market from the start and am also responsible for the activities of Wangner's representative office in Shanghai. I rely on head office in Reutlingen whenever I need technical and commercial support. That enables me to act as the link between headquarters and our Shanghai office.

w.com: *What are the most interesting aspects of your job?*

Mo: I like working in sales and the customer contact it affords. Since I also like to travel, the combination of office work and business trips suits me perfectly.

w.com: *Your work requires you to commute between cultures. You regularly travel back and forth between Wangner headquarters in Reutlingen and Wangner's representative office in Shanghai. How often do you do this, and how many air miles do you accumulate on average in a year.*

Mo: Nine to ten times a year, I fly to China for two or three weeks. That accounts for

Feng Mo (2nd from the right) keeps in close contact with the close-knit team stationed at Wangner's Representative Office in Shanghai.

approximately 300,000 km, not considering connecting flights within China.

w.com: *What is your main motivation for taking on the challenge – and sometimes stress - of traveling these distances.*

Mo: I simply enjoy it, and for me it is not stressful. I can live in Germany, but still work in my native country. I like that.

w.com: *You have already worked for Wangner for eight years. Can you look back on your time here and give us an example of a positive professional experience? Were there any negative ones?*

Mo: My greatest success has been that I was able to contribute to making Wangner the market leader for forming fabrics in China. The name Wangner is associated with quality and expertise in China, and enjoys an excellent reputation. And luckily for me, there have been no truly negative events.

w.com: *Your work gives you a solid, insider's perspective of the Chinese paper industry. How do you think it will evolve in general, and above all, how do you assess Wangner's chances of continued success?*

Mo: The Chinese paper industry will continue to grow rapidly and strongly. The largest paper machines in the world now operate in China. Competition is tough, but we are doing everything we can to further expand our share of the forming fabric business. Our structurally bound fabrics, such as the latest Selectra design, will help us achieve our goals.

Feng Mo and his family

w.com: *What are the unique aspects of the Chinese market that we Europeans must recognize in order to be successful?*

Mo: First of all, to be flexible in all areas. Second, to react quickly. The Chinese do not plan on the same long-term basis and in as much detail as the Germans do. Companies must be able to react quickly and unbureaucratically to customer requests. Personal relationships with customers play a huge role and should not be underestimated.

w.com: *You live with your wife and eight-year-old daughter here in Reutlingen. Is it an enriching experience for your family or is it rather difficult?*

Mo: Of course, we live in two very different cultures. My daughter goes to a German school. She speaks perfect German and Chinese. Once a year we visit our relatives in China. Time will tell to which culture she will feel more attached in later life. In my opinion, she can only benefit from this situation.

w.com: *You receive a fortune cookie with the message "Your greatest wish will be fulfilled!" What is it?*

Mo: That my family and I stay healthy! There is a Chinese saying that says: "If man has health, then he can have everything." ■

At Wangner

Girls' Day in Reutlingen

On April 27, 2006, Wangner in Reutlingen opened its doors to twenty schoolgirls from grades five to ten. As part of the national „Girls' Day – Future Prospects for Girls", which is sponsored by several federal ministries and the European Social Fund, the girls were given an insight into the various careers related to fabric manufacturing that they could pursue. Wangner specialists gave presentations on the company's history, as well as an overview of the current product portfolio and information about the development and production of paper machine clothing. At the conclusion of the presentations, Wangner quizzed the participants on what they had learned and handed out a few surprise awards to the young ladies at the end of the event. During a tour of the production facility, the visitors had a look at the looms, seaming machines and heat setting systems and were able to see firsthand the various steps required to make a forming fabric. They also got some hands-on experience in the theory of analyzing fabrics by examining them under a microscope. ■

Current topic

Rising demand and the Kyoto protocol drive energy prices up

By Hiltrud Kinnunen and Tommi Välimäki, PÖYRY Forest Industry Consulting

In May 2006, the price for crude oil was well over USD 70 per barrel – up from about USD 25 in the summer of 2001; huge price increases occurred during the last 18 months. Aside from geopolitical tensions and nationalism in the Middle East and elsewhere, the rise in oil prices in the recent past is largely driven by steadily rising energy consumption worldwide, which cannot be satisfied by expanding oil supply rapidly. Similar price trends can be observed in the natural gas sector.

Energy costs are being pushed higher, not only by rising demand and supply limitations, but also by the implementation of the Kyoto protocol. The Kyoto protocol aims to reduce emissions of the most important greenhouse gases by 5% from their 1990 level before the year 2013. Greenhouse gases stem largely from burning fossil fuels like oil, gas and coal. Expanding energy production that uses fossil fuels therefore increases greenhouse gas emissions, while energy produced using renewable energy sources (wind, solar power, biomass) emits little or no net greenhouse gas and is therefore not part of the Kyoto protocol.

Most European countries, including Russia, have ratified the Kyoto protocol. The EU introduced the greenhouse emission trading scheme as a tool for greenhouse gas reduction in early 2005. The emission trading scheme assigns additional costs to energy produced using fossil fuels. It therefore provides incentives to increase energy efficiency and to use energy based on renewable energy sources. The mechanism is simple: National Allocation Plans assign a certain number of certificates to production installations in energy-intensive sectors, including pulp and paper. When the actual emissions of a production facility are higher than allocated, the operator is obligated to purchase additional certificates on the market. The market price of emission certificates stood at EUR 30 / ton of CO_2 in April before it dropped to less than half that level when it became clear that some European countries had lower than expected emission level.

The factors that have pushed energy prices up in the recent past will continue to have an impact in the future: Energy demand in the world is expected to rise in parallel with economic development, especially in developing countries. For example, today's energy consumption per head in China, which has double-digit economic growth rates, is only about 50% of the world average. Moreover, in the EU, new national allocation plans to be implemented in 2008 will very likely assign increasingly strict emission limits, and add more sectors to the scheme. The recent fall in emission prices might, therefore, be short-lived phenomenon because the purpose of the emission trading scheme is not to ensure low prices but to fight climate change.

Forecasts of oil price developments published by research and financial institutions abound. A scenario with a further 40% rise in the price of oil, bringing the price per barrel to about USD 100, does not seem too unrealistic.

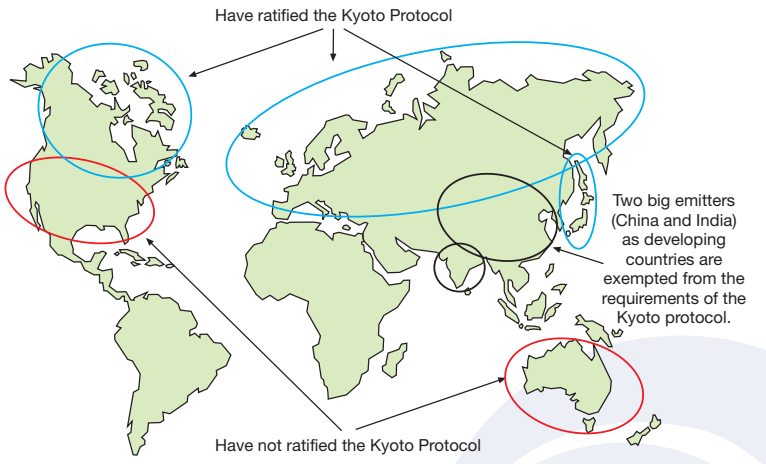
For the paper industry, rising energy prices are more than an energy cost issue

Energy costs have gone up in the pulp and paper industry, although up to now the effect has been mitigated by long-term supply contracts, especially on the gas side.

For the paper industry, the energy issue seems straightforward: with energy accounting for about 10–15% of manufacturing costs, the threatened 40% rise in energy costs would result in a total cost increase in the range of 4–6%. Although this would certainly consume much of the cost savings projected by numerous

Kyoto Blocs

1

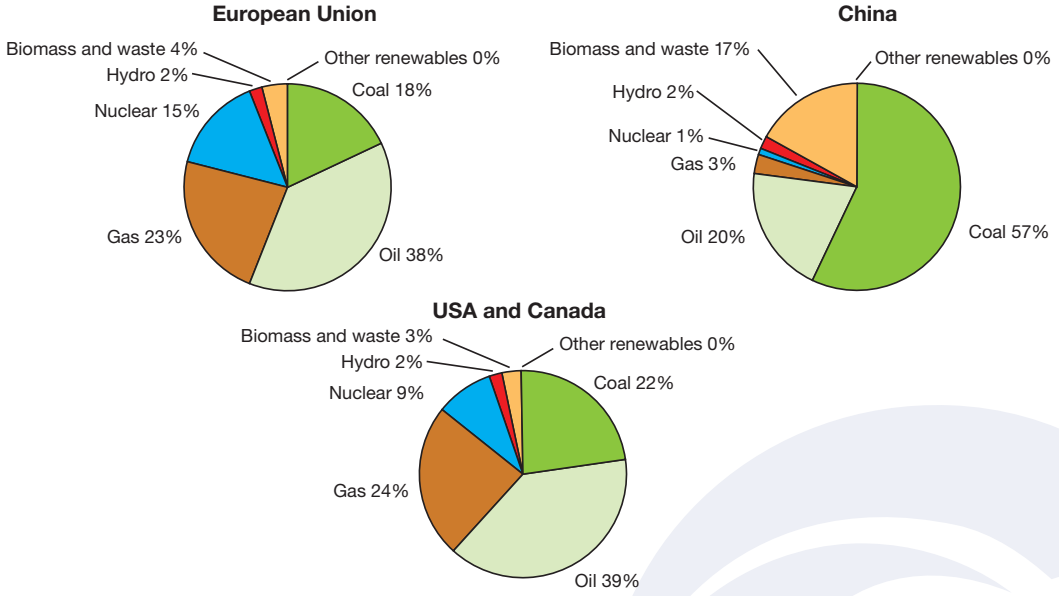


PÖYRY

Primary energy demand in 2002

2

European Union, China and North America (Mtoe)



Source: IEA

PÖYRY

The demand for primary energy and the requirements of the Kyoto protocol, whose signatories are grouped into three blocks, determine the development of energy prices.

efficiency programs in the industry, the risk of such a rise in energy costs would be limited. The same remedies as in the past – energy efficiency measures in the mills and investments into efficient CHP plants, etc. – could be used to limit the impact.

But even in this simplified calculation the effect of rising energy prices is complex if not all companies face the same rise in energy costs: For example, since not all major paper-producing countries have signed or ratified the Kyoto protocol, the relative competitive position of countries and paper producers has changed. All other factors remaining equal, producers in the EU, for example, are at a disadvantage compared to producers in the United States when it comes to energy costs, because the EU's emission-trading scheme to reduce greenhouse emissions increases energy costs in Europe, but not in the United States because that country has not ratified the Kyoto protocol. In short, the relative competitiveness of pulp and paper producers has changed.

In addition, the effects of rising energy prices go beyond direct energy costs. Firstly, energy prices influence the cost of transport fuels, of chemicals and even of personnel if wages are linked to a general price index. Secondly, rising energy prices reduce GDP growth, the biggest single driver for paper demand. Thirdly, as the relative competitiveness of different forms of energy changes due to the different treatment of fossil fuels and renewable energy sources under the Kyoto protocol and other energy-related legislation, the fibre used in pulp and paper production might become increasingly attractive for energy production.

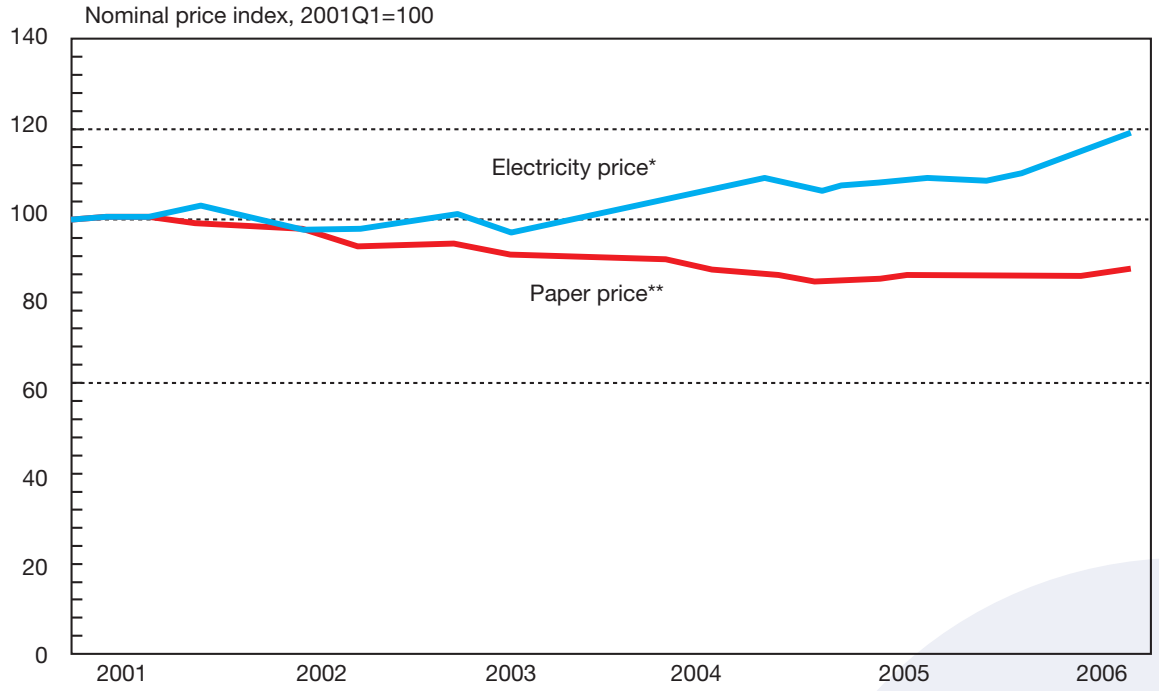
Rising energy prices influence fibre raw material availability and price, independent of whether the paper producer purchases pulp, is integrated into own pulp production or relies on recycled fibre as raw material.

For example, higher energy prices create a threat to waste paper recycling by fueling competition for the main fibre raw material in the production of many paper grades. Mixed waste, as the main recovered paper grade by volume, is very important for the paperboard sector and also, when sorted, as a source, of other recovered paper grades. However, mixed waste in particular faces the threat of ending up as fuel in waste-to-energy plants.

In early 2006, the European Commission's directive for waste incineration (WID) came into effect for all the power plants that have been using waste materials as the main fuel or a mixed-in fuel component. In Europe, pulping mixed waste generates a remarkable amount of residue that has to be incinerated in a waste-to-energy plant. The plant has had to invest in flue gas cleaning to get WID permission to combust waste – and with that investment, its interest in recovered paper increases.

Development of electricity and paper price

3



*Electricity price for industrial users EUR / kWh, average of GER, AUT, FRA, UK, SPA, ITA, SWE, HUN, POL
**Paper & carton average price EUR / t

PÖYRY

The question now becomes: With rising energy prices, will there be an economic base for mixed waste-based paper production when part of that component is already being incinerated to produce energy? At what energy price level does it become economically advantageous to burn all of the mixed waste and skip the pulping process, when there will be some residues that need a modern waste-to-energy plant anyway?

The fibre issue is also interesting with respect to wood as the fibre source for pulp production. Due to the change in the relative competitiveness of fuels brought forth by emission trading, there is increasing pressure to use wood as a raw material for the energy industry instead of the forest industry.

This creates an interesting option for pulp mills capable of generating more power than they need for their own use: they may allocate their wood and chip inflow according to the prevailing market price of pulp and electricity. In the extreme, one could imagine a situation where pulp and electricity changed places as a pulp mill's primary and secondary products.

Figure 5 shows the energy balances of a BHK and BSK pulp mill, as well as average European mills producing newsprint, coated wood-free and folding boxboard. It shows the increasing energy efficiency of pulp mills by comparing a current state-of-the-art mill with a typical mill from the 1970's. While the old mill has to purchase power (the blue bar), the modern mill is a net power producer, with almost half of the BSKP mill's and one third of the BHKP mill's generated power being sold (the light green bar).

Increasing energy costs have an effect on the whole forest industry value chain, of which the pulp mill's option to operate mainly as either a pulp or electricity producer is an illustrative example.

If wood begins to be used primarily to produce energy, the value created from forest ownership would be likely to grow. The opposite would happen to the most energy-intensive paper assets, which are not integrated into pulp production. In Europe today, these assets include the ones producing coated wood-free grades, tissue and sack paper. The grades of cartons with the highest energy consumption per produced tonne with current assets in Europe include, for example, liquid packaging board.

For non-integrated mills, the increased electricity price would also have an indirect effect through the price of purchased wood and pulp. Grades containing wood would suffer from the increased wood prices, as more and more pulpwood and forest chips would funnel to energy use. Pulp mills have the opportunity to optimize between pulp and electricity production, which acts as a driver to push pulp prices up. This would naturally imply hard times for mills producing wood-free grades from market pulp.

In short, rising energy prices and the change in relative competitiveness of different energy sources increase not only direct energy costs in paper production, but also influence all major cost components of a mill. Since the effects are different for different countries, mills with different raw material or fuel mixes, for mills producing different paper grades, and so on, the competitive environment of virtually all paper mills changes with rising energy prices. The fact that the overall

framework of economic facts, legislation and attitudes is changing with time, does not help to reduce complexity. For example, nobody yet knows for sure how the National Allocation Plans in the EU area will look in 2008 and whether other, competing systems will be enacted in countries that have not ratified the Kyoto protocol.

Face the facts and act

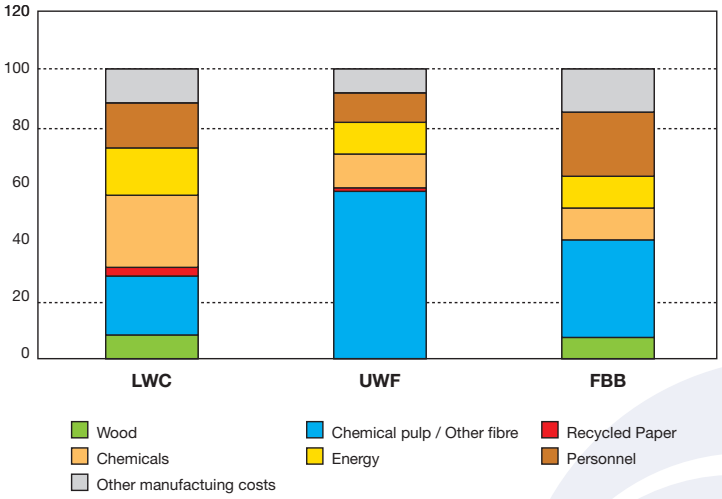
Again, on an operational level, dealing with rising energy costs in the paper industry seems straightforward: In order to fight increasing electricity prices, the options for pulp and paper mills are to generate more electricity, change their fuel mix according to the fuels' competitiveness, save energy in the paper mill power plants and increase process efficiency.

On the strategic level, a company's first priority should be to understand the trends and their drivers, the position of the company as a whole and and of its different production units – in comparison to competitors, and under different future scenarios regarding energy prices, legislation, and competitors' moves. Bigger companies with operations in several countries have the additional challenge to exploit country-specific as well as mill-specific advantages for the benefit of the whole corporation. Questions to be answered include the following: What is the value of integration: especially, what is the best way to create value from fibre? How will the industry structure change due to the competitive re-positioning of companies – who will not be able to survive the cost squeeze? Where are the opportunities for example, when is it better to operate not as a pulp mill but as an energy producer? What could different scenarios about the future development of energy prices and the effects on the pulp and paper industry in different sectors look like? What is at stake; where are the risks?

In our experience, more and more companies want to understand the complexity and the strategic dimension of the rise in energy prices. In that sense, there is hope that the soaring energy prices do not only burden the industry, but make room for new, successful strategies that include the energy dimension. ■

Cost structure of a typical European paper mill 4

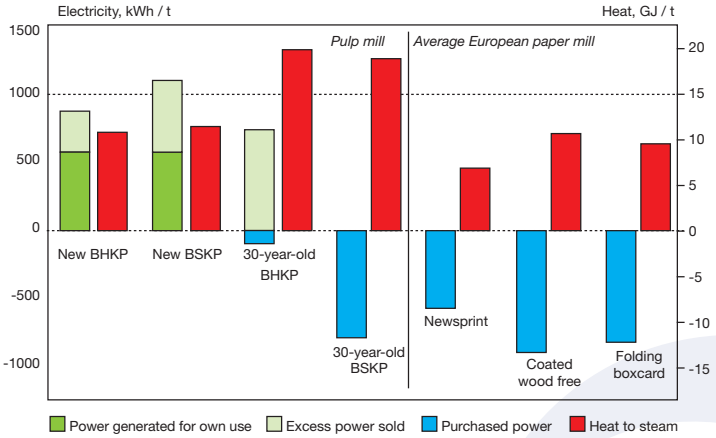
Average European mills' manufacturing cost structure, % of total manufacturing costs



Source: PÖYRY Forest Industry Consulting

PÖYRY

Energy balance of pulp and paper mills 5



Source: PÖYRY Forest Industry Consulting

PÖYRY

Hiltrud Kinnunen is CEO of PÖYRY Forest Industry Consulting GmbH in Freising near Munich. Tommi Välimäki is a consultant at the Finnish office of PÖYRY Forest Industry Consulting.

PÖYRY Forest Industry Consulting is a global consulting company with more than 300 consultants serving companies involved in the value chain that spans from wood to consumers. Among other things, the company builds future energy scenarios for the pulp and paper industry, develops tailor-made energy strategies for corporations and production units, and investigates avenues to improve energy-efficiency throughout the paper production chain.

PÖYRY Forest Industry Consulting is part of the PÖYRY Group, which has over 5000 employees worldwide and offers engineering and consulting services in the fields of pulp and paper, the energy industry and infrastructure and environment.

Contact:
Hiltrud Kinnunen
PÖYRY Forest Industry
Consulting GmbH
D-85356 Freising
Tel. +49 8161 480 66
e-mail: hiltrud.kinnunen@poyry.com
www.poyry.com

PÖYRY

Interview

UPM Schongau

PM 7 – constant top quality for newsprint paper

Schongau is located in Upper Bavaria, one of the nicest regions in Europe. Because of the famous churches, monasteries and pilgrimage sites in the immediate vicinity, it is also known as the gateway to the "Pfaffenwinkel" (priest's corner). Neuschwanstein and Linderhof, the legendary Bavarian king Ludwig's "fairytale" castles, are also a short distance away by car. In 1887, a pulp factory was built on a bend in the Lechs River and at the beginning of the 20th century, construction started on two paper machines designed to produce newsprint. Today, the UPM plant located in Schongau is one of the world's largest production facilities converting waste paper to newsprint. Over 700,000 tonnes of graphic waste paper are consumed here per year. The amount of paper thereby diverted from community landfill sites is about 2,000,000 cubic meters. The plant employs about 620 people, who annually produce about 700,000 tonnes of web paper on three modern production lines; PM 9, PM 6 and PM 7.

w.com wanted to know more about this prominent manufacturing facility and conducted a lengthy interview with Josef Eder, production manager for PM 7.

w.com: *PM7 is the fastest and largest of the three paper machines. What are its key features?*

Josef Eder: PM 7 is the largest machine at the Schongau factory. On it, we produce standard newsprint with a basis weight between 40 and 52 g/m^2. The annual capacity is up to 310,000 tonnes, depending on the basis weight.

w.com: *What raw materials do you use?*

Eder: It is a well-known fact that here in Schongau, our technology for processing waste paper is excellent. The primary raw material used for PM 7 is waste paper. Depending on the paper type, the percentage we use runs between sixty and eighty percent. The rest is thermomechanical pulp (TMP), which we obtain from local sawmills in the form of wood chips. We only need to add a very small amount of filler to compensate for fluctuations in the waste paper. As filler we use PCC, an artificial calcium carbonate. A company called SMI, which specializes in this very white filler, is located right on our factory premises. This leads to excellent synergies related to manufacturing and downstream processing.

w.com: *Where do you get the waste paper?*

Eder: The waste paper originates within a radius of 400 to 500 kilometers from the plant; mainly from southern Germany, but also from the other side of the border, which is very close. We process about 700,000 tonnes of waste paper per year, which generates about 70 percent of waste paper material that we use on the three paper machines. To put it another way, the Schongau plant recycles the same amount of waste paper generated by the entire free state of Bavaria, with its six to seven million households.

w.com: *What makes paper produced on PM 7 special?*

Eder: Our PM 7 production makes us one of the largest papermakers in German-speaking countries, and we pride ourselves on the fact that the quality of the paper we make is extremely constant. Its printability is optimized for both the heatset and coldset process, and we achieve the best specs in the industry. Furthermore – additional to

Settled in one of Europe's most attractive regions: The UPM factory in Upper Bavaria's Schongau is one of the most modern and largest paper factories producing newsprint from waste paper.

the other excellent properties of our PM 7 paper, such as basis weight, moisture content, ash distribution, etc. – we produce very good CD-profiles. These are key criteria for printers, who of course want outstanding quality without shade variations or other fluctuations in the printed image. This includes excellent formation, which we achieve with our paper. One important property is very low fabric marking, which of course relates back to the fabric supplier. Our paper is also very opaque. Since newspapers are nowadays printed on both sides using a four-color process, the newsprint must be very opaque so that pictures on the opposite side do not show through. Since printers producing dailies are under ever-increasing time pressure, we must guarantee the runnability of our paper on the printing press; that is, the paper must not tear or cause a shutdown. We meet all of these requirements.

w.com: *To where do you deliver the paper produced on PM 7?*

Eder: Our main market is Germany. Greater amounts are also going to Italy and Switzerland. The rest is shipped to other countries. Since we have no production plant in Italy, we ship a lot of our product there, whereas in countries that are home to UPM paper mills the amount is of course smaller.

w.com: *PM7 was started up in 1989 and rebuilt in 2001. What changes were made and what was the aim of this rather substantial investment?*

Eder: After commissioning PM 7, no major changes were made for ten years. But the web-break rate kept on rising, even though we continually optimized the machine's performance during that time. We observed that this was not due to a lack of skill on the part of the papermakers, but simply that the machine was being overdriven; i.e., it was running above its limit for longer periods. We started to see problems with the cross-section humidity profile, the dry content in the press section and the open draw. The machine upgrade project focused primarily on improving dry content and achieving a more uniform cross-section humidity profile. By installing a ModuleJet headbox and a high vaccum suction box (Hivac), a new steam box and shortening the open draw in the press section, we managed to address the weaknesses. The web-break rate is now considerably lower. The web used to break between fourteen and fifteen times a day; the number is now reduced to between three and five. The refurbishment also enabled us to operate significantly faster. The speed of PM 7 used to be 1550 meters per minute, but now we run at 1680 meters. Quality also improved, thanks to the ModuleJet. Parameters such as the CMD profile are better and moisture peaks have been eliminated. The machine has a much higher efficiency.

w.com: *Can you express that in numbers?*

Eder: I can only give it to you in terms of efficiency. Based on a theoretical efficiency of 100 percent, i.e., highest production level of the machine in a given time period, the refurbishment has resulted in improving the annual average efficiency of PM 7 from 89.5 to 92 percent. That is substantial.

The Canadian paper industry maintains a kind of ranking list of all newsprint machines in operation. Data are voluntarily submitted every month. Despite its advanced age of almost seventeen years, PM 7 is continuously ranked among the top on this list. I should point out that we are competing against almost new machines, which are only a few years old.

w.com: *How many employees are involved in operating PM 7, and how many shifts do you operate?*

Eder: Sixty-five people, including myself, are dedicated to PM 7. We have four shift crews. Three are at work and one is off; in other words, a very traditional shift model used by many factories.

w.com: *What requirements must paper machine clothing always fulfill? You presently have a Duo-Former CV installed on PM 7, and of course it has very specific properties ...*

Eder: Our former is no longer the most modern. Current machinery being installed elsewhere is two or three generations newer. On the other hand, the former is not any worse because it is already so old. It is what we call a "blade-roll former". That is, expressed in technical terms, the forming shoe, the forming roll is ahead of the suction roll. Modern "roll-blade formers" formers are installed most frequently nowadays. The forming roll is right at the front end of the machines, where it is able to remove a lot of water right away. Our duo former CV is at the limit of its capability when it comes to drainage capacity. We no longer have enough time – we are talking about milliseconds – to remove the water from the paper web. That is why we launched a major project to upgrade the former and increase its speed a few weeks ago. When we have finished, its drainage capacity will be higher.

Of course, we also expect the paper machine clothing dewatering performance to be optimal. Freedom from marking is just as important. Furthermore, a new fabric should not only always have excellent CMD profiles, but also very good wear performance; that is, the more evenly it wears, the better are the CMD profiles over its extended service life. If the fabric wears unevenly, if causes variations in the cross paper profile, like formation. Excellent formation is of course also important for the quality of the printed end product. Long running life enables us to keep shutdowns short. In other words, the fabric should stay on the machine as long as possible.

Optimum, which means low, fibre- and water-carry is another criterion. Former hygiene is important at high machine speeds. If the fabric carries fibre or water, the ex-

UPM Schongau processes about 700,000 tonnes of waste paper annually – as much as that produced by the approximately six million households in all of Bavaria.

cess material "roams" around the entire wet section, coats the frames, drops onto the running fabric and ultimately causes formation problems and sheet breaks. It must therefore be possible to easily clean the fabric and to keep it clean. Papermakers would prefer that the fabric require no cleaning at all, but since this is not feasible, it should at least be as easy as possible to clean. In my opinion, these are the key fabric properties that affect papermaking.

w.com: *What fabric types are currently installed on PM 7?*

Eder: An Optiply forming fabric from Wangner is installed on the top side. It is a little rougher on the running side, because all elements are located on the top side. These consist of twenty-eight ceramic blades, which are drawn across the fabric. On our CV former, the top side is more highly stressed than on new Duo formers because of these blades. We primarily chose the somewhat rougher design because of the wear issues on the top side, which is not really ideal with respect to fabric marking. With regard to quality aspects we will soon install and test the brand new Selectra design. It is a very fine fabric and has a very stable profile. It will improve the formation and possibly create also a higher former consistency in comparison to standard SSB designs. On the bottom side we use Wangner's OptiSpeed, a high quality fabric.

PCC, an artificially produced calcium carbonate, has proven itself as a filler.

w.com: *What triggered the cooperation with Wangner, and what has been your experience with the Reutlingen fabric supplier until now?*

Eder: We started working with Wangner right at the very beginning. As far as I can tell, Wangner has been involved in PM 7's clothing since the machine was first commissioned. At first, Wangner was not on both positions; only on the top side. Since Mr. Enghof started as our Wangner representative, the company has been named the sole supplier for both positions because of the excellent development work that was done on the fabric section of PM 7.

The recommendations made by Wangner and the support we received during testing have been very much in accordance with our needs. We worked jointly on the design that is currently running, and the properties of this fabric optimize the machine's performance. Formation is excellent, and it also performs well with regard to the points I mentioned earlier, including minimal fibre carry and excellent running life. Added to that is the uniform quality of the fabrics; there are no major variations in fabric properties. Of course, it is clear that a fabric also has some variations. However, the tolerances must be very small, so that when it is installed on the paper machine we can be satisfied that the fabric always has the same characteristics and that the associated quality of our paper will be constant.

PM 7: top efficiency and performance for newsprint production.

When we choose a company as a sole supplier, we have to be able to rely 100 percent on its deliveries. In other words, when we release an order, Wangner manufactures the next new fabric completely without intervention from our side. The supply chain is therefore not an issue for us and fabrics are guaranteed to be always available.

Of course, excellent service is also one of the reasons we decided to work with Wangner. This includes regular field service, as well as the company's nearness to the

Schongau plant. This is the only way we are able to acquire the necessary expertise to jointly press ahead with development. A supplier that knows the machine inside and out has no need to assess the present conditions if there are problems, but is able to react immediately. We are very satisfied with Wangner in this regard.

w.com: *Is there anything that you personally would like to see for PM 7, and especially for UPM Schongau?*

Eder: Yes of course. It is very important that we generate profits when we make paper, not only now, but also in the future. It is becoming tougher to compete in the paper industry, and sometimes conditions are distorted. Sometimes raw material prices and costs increase exorbitantly in a particular region. We rely on waste paper, for better or worse. However, in this sector, capacity is steadily increasing and waste paper has now become a scarce commodity in Germany and its immediate surroundings. For us, this is a key issue. In Europe, energy should be available at reasonably competitive rates. But we see a trend that is putting us at a disadvantage, particularly in Central Europe.

My wish for Schongau is that the jobs stay secure. Of course, a necessary precondition is that the quality of our paper remain excellent and continue to improve. This matches our philosophy, which we will continue to pursue here in Schongau.

In addition to the main raw material waste paper, UPM Schongau also uses a small amount of TMP pulp, which is made from wood chips supplied by neighboring sawmills.

w.com: *In closing, we have a personal question: How long have you been involved in the Schongau operations?*

Eder: I have worked at this factory for twenty-three years. I started as a young engineer right after completing my studies and I "got stuck" here. I am now the second oldest papermaker at this plant. Actually, hardly anyone that starts working at Schongau ever leaves. I have to state quite clearly, we are a super team and enjoy ideal labor relations. Here in Schongau, all departments work hand-in-hand.

w.com: *On this fine note, we would like to conclude this interview and we cordially thank you for the information you provided.* ■

Josef Eder (center), UPM Schongau Production Manager PM 7, in conversation with Wangner's Dirk Enghof (r.) and Werner Bartsch (l.).

Wit and wisdom

Sudoku numbers please!

Yes, it's true – there really are fellow humans who adamantly cry "anything but soccer" when friends plan shared leisure activities. But wait … there is a way to help our World-Cup-weary colleagues: with a new popular sport. It's called Sudoku – a placement puzzle intended not only for mathematical geniuses.

No difficult mental arithmetic or adding and multiplying is required here – only simple logic. It is based on a square that is subdivided into a grid of nine quadrants, each of which contains nine cells. Numbers are given in some of these cells. The aim of the puzzle is to enter a number from one to nine in each cell of the grid so that each row, column and subgrid only contains one instance of each number. Actually quite easy if you think of the myriad challenges of a crossword puzzle, where only a high degree of general knowledge leads to success, or think back to the Rubik cube of the 80s, which involved the high art of geometry in three dimensions. Furthermore, Sudoku is popular throughout the world, is portable, can be played by one person and presents absolutely no risk of injury.

Sudoku – which roughly translated from Japanese means something like "a number that stands alone" – now fascinates about 100 million people the world over. The puzzle has been published for years in Asian and North American newspapers and magazines. In the late 90s, Wayne Gould, a pensioned Australian judge, adapted the game for the computer, which allowed it to travel to Great Britain. From there, the puzzle virus infected Europe in short order. British, German, Spanish and French dailies, including renowned papers such as the "Times" and "Die Zeit" offer their readers the puzzle in varying degrees of difficulty. On commuter trains, subways, airplanes or at home on the living room couch – everywhere you look people fiddle with the grids and their empty cells. And even business nomads, whose only fixed location during their stressful daily existence consists of a notebook, cell phone, Blackberry or iPod, use a suitable software version of Sudoku when they finally take time to relax.

Sudoku's dark side

Relaxed??? After quickly solving the easy versions and overcoming their basic fear of disorder, empty spaces and something missing, puzzlers soon summon their courage and dare to attempt the next level of difficulty. And therein lies the crux: one hour, two hours have passed, and still there is no proper home for "1" on the grid. Why? Because there is already a "1" in the second and third rows from the top, and then also in the left and center cell… After four hours, it is finally complete; the grid is populated with numbers and the puzzler is truly proud of his or her logic skills. But in the meantime, social interaction has taken a back seat. There is zero communication with fellow humans, meals remain uncooked and all other basic needs are also neglected. In the workplace, there is a widespread critical lack of concentration, because anything our brains produce in the way of logical thoughts focus only on the as yet unsolved puzzle. It's called addiction. And you can become addicted to Sudoku. If you get up at 6:00 a.m. to wait impatiently for the paperboy, feverishly place countless calls to the Games Sales department for the next version of "Sudoku Total" or await the latest cell phone puzzle edition with shaking hands, you know that you have mutated into a Sudoku freak. The only cure alternatives are a visit to specially trained psychiatrist who will apply appropriate withdrawal therapy or to participate in the first British Sudoku championships in October of this year. But a note of caution: Unless you have already solved at least half of the 6,670,903,752,021,072,936,960 possible variations of the puzzle, you don't stand a chance competing against the professionals. If the prospects of this appear remote, it may be advisable to visit an exciting soccer match instead. ■

w.com
Reader Service:

The items printed on this page are very brief summaries of articles in international trade and business journals which w.com feels may be of interest. These articles can be accessed in full via PDF download at **http://www.xerium.com/wangner**

World paper markets to 2020
Paper demand has grown rapidly despite contraction in North America and saturation in Western Europe and Japan. This latest forecast for long term paper demand and supply looks at what seems contradictory – a slowing demand but explosive growth.

Paper Making & Distribution
April 2006 Code 1/06 – 1

Solides Handwerk statt Feuerlaufen
Allerorts gibt es Projekte des Veränderungsmanagements in Unternehmen. Das Vorgehen unterscheidet sich aber erheblich: Von Feuerlaufen bis zu knochentrockenen Seminarveranstaltungen reicht die Palette. Dieser Beitrag ist ein Plädoyer für ein methodisches Veränderungsmanagement in Unternehmen, dessen Schlußfolgerung verkürzt lautet: Konkretheit, Präzision, Exaktheit, Konsequenz sind entscheidend, auch wenn die Begriffe weniger schick sind.

FAZ – Frankfurter Allgemeine Zeitung
vom 10. April 2006 Code 1/06 – 2

The search for meaningful measures of performance
Effective performance measurement is notoriously difficult to get right, but many organisations view such frameworks as an essential tool for assessing the obligations of individual employees. The issue becomes even more important when one considers how much organisations are spending to capture and analyse data. Measurement is not going away, but neither are the enduring challenges of doing it well.

Financial Times – Supplement "Mastering Financial Management"
June 2, 2006 Code 1/06 – 3

Ursachen von Missing Dots im Tiefdruck
Durch den ständig steigenden Kostendruck sind Papierhersteller und Druckereien gezwungen, zu immer geringeren Preisen zu produzieren. Sowohl die Geschwindigkeitssteigerungen bei Druck- und Papiermaschinen als auch die ständig steigenden Ansprüche hinsichtlich Druckqualität und optischen Papiereigenschaften rücken die Problematik von Missing Dots in den Vordergrund. Der Beitrag zeigt, wo die Ursachen für die Entstehung von Missing Dots liegen, welche nichttopografischen Faktoren dabei eine Rolle spielen und welche Messverfahren sowie Lösungsansätze bereits vorliegen.

Wochenblatt für Papierfabrikation
Nr. 11–12, Mitte Juni 2006 Code 1/06 – 4

Wer vieles zugleich tut, macht nichts richtig
In vielen Berufsbildern gehört sie bereits zum Anforderungsprofil: Die Fähigkeit, mehrere Dinge gleichzeitig zu tun oder, neudeutsch, die Fähigkeit zum Multitasking. Versuche, Aufgaben parallel auszuführen, sind im Alltag reichlich zu beobachten: Während des Autofahrens telefonieren, während des Telefonierens am Computer E-Mails abrufen, die Balanced Scorecard im Unternehmen einführen und gleichzeitig eine Strategie für Osteuropa entwickeln. Alles kein Problem – oder vielleicht doch?

Handelsblatt
vom 13. Mai 2006 Code 1/06 – 5

No holes, no marks, no breaks
Traditional methods of measuring paper thickness (caliper) provide sub-micron accuracy, but at a cost: sensors in contact with both sides of the sheet can and do tear or mark the sheet in difficult applications. Metso Automation has introduced a new sensor called IQ-Caliper-L that removes contact from one side of the sheet to give papermakers accurate profiles with no chance of sheet break or marking.

PPI – Pulp & Paper International
August 2006 Code 1/06 – 6

Energy and power – priced out of business?
Since last summer, it has become 405 more expensive to drive a car, cook a meal and to light and heat a house. It is even more expensive – up to 60% – for industrial consumers like the pulp and paper industry. So, what can a mill do lower its energy bill? The mix of energy sources promoted by governments, energy suppliers and special interest groups include solar, hydro, biomass, onshore and offshore wind power resources. But many of these sources are impracticable for pulp and paper mills for all kind of reasons.

Paper Making & Distribution
April 2006-07-20 Code 1/06 – 7

Tanz der Zwerge
Die Nanotechnik wird unser Leben so gründlich verändern wie Internet und Auto. Weltweit drängen Unternehmen mit neuen Produkten auf den Markt, das Rennen um die beste Ausgangsposition ist eröffnet.

Wirtschaftswoche
Nr. 22 vom 29.5.2006 Code 1/06 – 8

When optimizing paper print performance, minerals matter
Shifting grade mix, quality improvements, environmental concerns and economic factors within the paper industry are encouraging the increased consumption of mineral pigments. At the same time, trends toward higher optical performance and improved print surfaces are occurring in all regional markets and are driving up the global standards of printing and writing papers. These papers have enhanced properties by using the new, next generation, coating mineral pigments.

PPI – Pulp & Paper International
April 2006 Code 1/06 – 9

Systematische Ermittlung von Energieeinsparpotenzialen in Papierfabriken
Die Zellstoff- und Papierindustrie gehört zu den fünf größten industriellen Energieverbrauchern Deutschlands. In den letzten Jahren ist der Anteil der Energiekosten konstant gestiegen. Aufgrund der Struktur der Energieversorgung ist die Papierindustrie von Gas- und Stromkosten besonders betroffen, da dies die wesentlichen Energieträger sind. Der Beitrag zeigt, dass mittels einer systematischen Analyse dennoch Potenziale identifiziert werden können, den Energieverbrauch zu senken und damit auch die Energiekosten.

apr – Allgemeine Papier-Rundschau
Nr. 4, April 2006 Code 1/06 – 10

The balanced scorecard – how to put ideas to work
The balanced scorecard can help a company execute strategy – but only if it makes sense to front-line stuff. There are two main reasons why companies go wrong with the widely used balanced scorecard, according to David Norton, the consultant who created the concept with Robert Kaplan, a Harvard Business School Professor. The latest Kaplan-Norton thinking is that companies need a unit at corporate level, dedicated to ensuring that strategy is communicated to every employee and translated into plans, targets and incentives in each business unit and department.

Financial Times
May 24, 2006 Code 1/06 – 11

Wangner at work