METSO'S CUSTOMER MAGAZINE FOR THE PULP AND PAPER INDUSTRY No. 2/2012

results pulp & paper

"We are aiming much higher now as a result of this project's success," says Tero Karvinen from Stora Enso.

Rather than being a "call in when needed" participant in mill maintenance Metso now has a full-time presence in many mills. Read more on page 8.

Services at the mill

In our Services business offering, a key value proposition is to support and help our customers meet their business drivers, which include productivity increases and reduction in costs per tonne produced. Our objective is to be viewed as a strong and reliable partner to our customers based on the broad knowledge of the products/services we offer and of the complex processes within a mill. Our target is to focus on long-term cooperation based on agreements. In short, we would like our customers to feel that working with Metso's Services business is both simple and provides benefits.

The best practical examples of this are the multi-year maintenance agreements we have with UPM Plattling (Germany), Saica (United Kingdom) and Amcor (Australia), in which Metso's Services personnel are responsible for daily maintenance of the entire line. It is hard to imagine a closer customer relationship. We receive feedback from the customer about our Services business on a continuous and direct basis, and at the mill the Metso team is fully aware of the customer's goals.

Besides production and availability targets, it should also be emphasized that we consider our most important shared goal to be occupational safety. Metso's Services and the customer's production organization work together systematically to ensure that maintenance is carried out safely and effectively. In fact, occupational safety is taken into account right from the very start, during the equipment design process. Our design engineers always aim to develop process equipment that is easier to service and to keep clean.

The Services at the mill are supported by our regional spare parts and logistics centers and our extensive roll maintenance network. In addition, we have expanded our product offering with process wear parts and, of course, paper machine fabrics. In product services, we are also developing our long-term agreement-based business.

Based on the good maintenance results in paper and board mills, the aim is to develop an equivalent operating model for the needs of pulp mills, tissue mills and power plants.

I believe that the widening cooperation between the process equipment supplier and the mill will bring additional opportunities for further developing the Services at the mill.

Jukka Tiitinen
President
Services business line

in this issue

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The high-quality white top liner produced by Changle Numat Paper Company is used for packing a variety of everyday goods.
Read more on page 46.

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Featured articles

News in brief

Reporting latest orders

Metso to supply Kipaş Kağıt in Turkey with containerboard machine

Metso will supply Kipaş Kağıt Sanayi İşletmeleri A.Ş with a containerboard machine for their new mill site in Kahramanmaraş in southeastern Turkey. The start-up of the new machine is scheduled for 2013.

Metso's delivery will comprise a complete high-technology board machine. "The new machine will utilize gap forming technology, which enables a higher production speed and production efficiency ratio for board machines," says Area President **Hannu T Pietilä** from Metso. In addition, Metso's extensive automation package will comprise process, machine and quality controls.

The new PM 1 will produce fluting and testliner grades out of 100% recycled fiber. The annual production capacity will be approximately 400,000 tonnes.

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Evaporation plant and upgrade of recovery boiler for Billerud in Sweden

Metso will supply a new evaporation plant and an upgrade of an existing recovery boiler for Billerud Skärblacka AB's Skärblacka mill outside Norrköping in Sweden. The goal is to strengthen the mill for the future by improving environmental performance and energy efficiency, and to enable future company expansion. Metso's delivery will contribute to this environmentally-oriented investment.

Metso's delivery will allow a substantial increase in production capacity in the future. In addition, the mill's energy efficiency will be improved, leading to a significant reduction in consumption of fossil oil and external biofuels.

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Reporting start-ups

Saica Paper starts up containerboard line in the UK

The Metso-supplied complete containerboard production line, PM 11, for Saica Paper UK Ltd, successfully came on stream on January 15, 2012 at Partington, near Manchester, in the United Kingdom. The record-breaking start-up speed was 1,105 m/min with a basis weight of 95 g/m^2.

Francisco Carilla, Industrial Projects Director, and **Federico Asensio,** Deputy Managing Director, from Saica Paper, are both very satisfied with the Metso teams in all stages of the project: "In commercial proposals, design, construction, start-up and maintenance activities the Metso teams' efforts responded to our requirements, taking into consideration the technical advice and previous project experiences of our papermakers."

PHOTO: COURTESY OF SAICA.

Saica Paper's PM 11 successfully came on stream with a record-breaking start-up speed of 1,105 m/min.

The new 8.2-m-wide PM 11 has an annual production capacity of approximately 400,000 tonnes of lightweight testliner and fluting grades, out of 100% recycled raw material.

Metso Mill Service will have full responsibility for the mill maintenance operations as well as for maintenance management of continuous improvement programs for the OCC stock preparation system, board production line, power stations and wastewater treatment plant at the Partington mill.

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Metso-supplied containerboard line with multilayer curtain coating starts up at Ji'An Group in China

Ji'An Group's new Metso-supplied containerboard production line PM 3 started up successfully at the end of November 2011.

The Metso-supplied containerboard production line, PM 3, for Ji'An Group Co., Ltd successfully came on stream at the end of November 2011 and the line's curtain coating process was started up on January 4, 2012. The new PM 3 was installed at the company's mill located in Haiyan County, Jiaxing City in Zhejian Province, China. The 7.25 m-wide PM 3 is the world's fastest coated board machine at the design speed of 1,200 m/min with a daily production capacity of approx. 1,900 tonnes of coated and uncoated white top testliner.

"The new PM 3 features an OptiLayer multilayer curtain coating unit that applies two coating layers on the web at the same time in a non-contact operation with no speed restrictions. Curtain coating is a coating method, which gives a full coverage for brown base sheet. The uniform-coverage coating layer makes it possible to run the machine without expensive bleached fiber in furnish. This is a totally new tool for optimizing raw material costs," says **Henri Vaittinen,** Metso's Paper Technology Manager.

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Lila Kagit starts up tissue machine in Turkey

The Lila Kagit and Metso start-up team in front of the first jumbo reel at TM 2 at the Corlu mill.

A Metso-supplied Advantage DCT 200 TS tissue production line successfully came on stream on January 24, 2012 at Lila Kagit's mill in Corlu, about 100 km west of Istanbul in Turkey. This is the second production line supplied by Metso for this company.

The new line using virgin fiber adds another 195 tonnes per day of tissue paper for facial, toilet, napkin and towel products to Lila Kagit's production capacity. This makes Lila Kagit one of the largest tissue manufacturers in Turkey.

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Reporting records

Propapier PM 2 breaks 100 km/h record

On February 23, 2012, the Metso-supplied PM 2 containerboard machine at Propapier PM2 GmbH in Eisenhüttenstadt, Germany, set yet another 24-hour world speed record of 1,675 m/min. The PM 2 thus became the first containerboard machine to break the 100 km/h record. During the record-breaking run, the 10.85-m-wide PM 2 was producing corrugating medium at a basis weight of 80 g/m^2 at a total efficiency of 91%.

This is already the third 24-hour world speed record set by Propapier PM 2 in a fairly short time. The PM 2 was started up in March 2010.

The continuous co-operation of Propapier and Metso teams is helping the Propapier PM 2 to keep breaking records. Photo courtesy of Propapier PM2 GmbH.

"A third world record in a row is truly a great example of results that can be achieved with highly skilled and motivated teams working together, determined to get the most out of modern papermaking technology," says **Jürgen Heindl,** CEO of Progroup AG.

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Metso inaugurates new facilities in Araucária, Brazil

Metso inaugurated its new facilities in Brazil on March 8, 2012. The new facilities, incorporating a machinery production and services unit and an administrative office, are situated in Araucária, a metropolitan area of Curitiba, in the state of Paraná. The facilities will reach full production capacity by June 2012.

The investment value of the construction project was close to EUR 20 million. The new facility is a milestone in Metso's 42-year history in Brazil. "Brazil, along with China, is one of the countries in which Metso is focusing its investments. The Araucária investment will be continued by further increasing the capacity and capabilities of the facilities," says **Celso Tacla,** Area President, South America, Pulp, Paper and Power, Metso.

Metso's new production and services facilities in Araucária, Brazil.

The Araucária plant covers a land area of 60,000 m^2, of which 10,000 m^2 represents the built area, and will generate 150 new jobs and some indirect jobs. Together with the staff transferred from the previous location in Curitiba, the total number of personnel at the Araucária plant will rise to 500 when the operation reaches its full capacity.

"The Araucária plant will improve Metso's capabilities in serving the pulp, paper and power generation industries in South America where Metso has a wide installed base and where several greenfield projects and new production lines are to be supplied to customers, e.g. in Brazil and Chile," adds Celso Tacla, referring to a new cycle of the pulp and paper production expansion in South America.

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Metso's Mika Viljanmaa receives Marcus Wallenberg Prize for ground-breaking work on metal belt calendering

Metso's Mika Viljanmaa, winner of the 2012 Marcus Wallenberg Prize, with a Metso ValZone metal belt calender.

Mika Viljanmaa, who works as Development Manager in Metso's Järvenpää unit in Finland, has been awarded the prestigious 2012 Marcus Wallenberg Prize for his work on metal belt calendering in paper and board making. Viljanmaa will receive the prize at a ceremony in Stockholm, Sweden on October 1, 2012.

According to the Board of the Marcus Wallenberg Foundation, "The 2012 Marcus Wallenberg Prize has been awarded to Mika Severi Viljanmaa for his ground-breaking development of metal belt calendering technology resulting in better paper print surfaces with less fiber materials and higher production efficiency". Furthermore, the invention also paves the way for applications in other paper machine sections with the opportunity of becoming a wider platform technology expected to substantially enhance production efficiency, competitiveness and sustainability of paper and board making.

Metal belt technology improves quality and efficiency, with less raw materials and energy

Metal belt technology has made a major breakthrough as a revolutionary new calendering concept for papermaking. Calendering is done to improve the paper surface and thus print quality. Compared with conventional calendering, advanced long nip metal belt calendering technology enables manufacturing of paper and board with better surface properties at a desired level of stiffness and bulk, but with 3-10% less fiber raw material; in addition it decreases energy consumption and yields higher production efficiency.

It is also suitable for low-cost fibers such as recycled fibers and thus enables development of new cost-competitive paper and board products. The new concept is compact, making it ideal for rebuilds to increase capacity by removing existing production bottlenecks such as yankee dryers or wet stacks.

Mika Viljanmaa is a highly prolific innovator, with a total of 120 protected inventions. 57 of these are related to metal belt technology and Viljanmaa is the sole inventor in 12 of them.

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Productivity is measured in many ways. In a manufacturing environment such as a pulp and paper mill a measurement we use is maintenance hours per tonne (maintenance hours include mill hours, contractor hours and overtime hours). You can improve productivity by cutting maintenance hours and improving equipment reliability.

How do you know if your maintenance organization is productive?

We see equipment reliability as the result of execution of good maintenance practices and good maintenance practices are executed only if skilled people are allowed to work in a good system. The fact is, skilled people cannot be more productive than the system allows them to be.

Assuming you do have skilled craftspeople in your organization, it is the responsibility of a leader to develop, document, communicate and reinforce execution of good maintenance practices. This is done by setting up a work system and processes that allow people to work in a productive way.

To really find out how good your maintenance organization is and how much better it can be, you need to do an independent and objective audit and look at some key benchmark figures. The audit must result in a measurable benchmark showing the gap between how good your organization is compared to how good it can become and a concrete action plan on how to close that gap, including expected results and costs to achieve those results. The potential in improving equipment reliability and achieving lower maintenance costs as a result of better reliability is huge.

The market drives your production plan, which has to be closely linked with planning and scheduling of maintenance activities. When work is planned, and after that scheduled, the system is set right for people to execute (do) maintenance work in a productive way.

After work is completed it is recorded and used to continuously improve. An important activity in that work is Root Cause Problem Elimination (RCPE). If these activities are done right continuous improvement will occur.

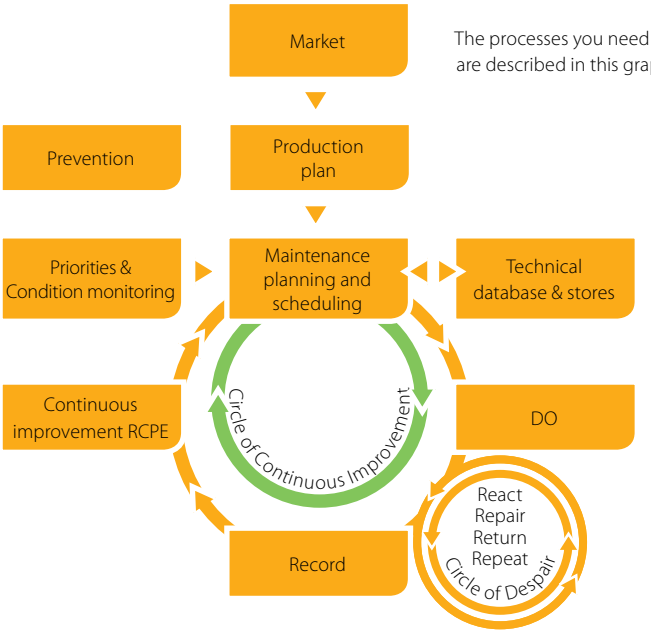
If an organization has to react to real or perceived urgent problems, they start working in the circle of despair. Often times, they repair these problems with low quality because of the urgency and as a consequence this work pattern is repeated.

A maintenance organization with more than 10% weekly/daily work in this circle and more than 5% add on work in shutdown schedules has a significant improvement potential.

To improve productivity

- Prevent problems through better machine alignment, lubrication, filtration, operating practices etc.
- Priorities on work must be right and not abused
- Basic inspections and predictive technologies done by operators and crafts people
- The person planning must have speedy and accurate access to an updated bill of materials and technical documentation.

Christer Idhammar
Founder and Executive Vice President
IDCON, INC.



The processes you need to audit are described in this graphic.

For more information visit www.idcon.com or send email to info@idcon.com

The purposes, methods of delivery and business partnerships defining pulp and paper industry services are changing and have been for some time. The pay-as-you-go or on-request services of years gone by are diminishing and longer-term agreements between Metso and its customers are in the forefront. Such agreements can cover, for example, maintenance outsourcing, roll maintenance services, supply chain management of consumables and process improvement programs.

Widening the horizons of service

TEXT Mark Williamson

These agreements and the Metso - client business relationships behind them are based on maintenance effectiveness, pulp and paper making performance as well as good delivery logistics, inventory control and cost management. Of course, the papermaking know-how developed over many years and in a wide variety of customer mills is an important element which adds even more value to these services.

Full-time presence at mills

Metso is now known as an effective and performance-focused business manager for its clients' physical maintenance needs, consumables supply management and cost controls. Rather than being a "call in when needed" participant in mill maintenance Metso now has a full-time presence in many mills.

Jukka Tiitinen.

Value-added services

Jukka Tiitinen, President of Metso's Services business line, Pulp, Paper and Power, defines Metso's business relationship with customers: "We aim to have a seamless capital equipment sales and service organization to make it easy for our customers to deal with Metso and to take advantage of the added value in our services. That value, which comes from our know-how, will result in more productive and sustainable processes."

With 5,000 employees and 70 service centers Metso's Pulp, Paper and Power service organization is certainly global, but Tiitinen emphasizes the importance of local expertise and customer support. "Our local people are close to our customers and understand their needs, so our local engineering teams can deal with customer without translation," he says. The local people are backed up by the global network of expertise.

Tiitinen explains that Metso's value-added also comes from focusing on services related to a more sustainable operation, including reducing raw materials and resources – including water, fiber and energy. In fact, Metso is dedicating significant research and development efforts in these areas.

Headline news, underlying trends

Juha S Ojala, Metso's Manager of Concept Development for Services, gives his view of the current direction of maintenance services: "There is a clear trend that a growing number of our customers are looking to outsource certain business processes. The prime example is, of course, maintenance outsourcing which now has an important role also in Metso's services portfolio. I believe the next success story will be comprehensive solutions regarding production consumables, such as fabrics. The logic of being able to reduce the cost and performance risk of consumables is compelling."

continued overleaf...

Metso employs 5,000 service specialists serving the pulp, paper and power industries globally.

To address customer needs, Metso has introduced many new and innovative service agreements over the past years. Some of the highlights include:

Flat rate contracts

for machine fabrics that provide paper mills with fully predictable annual costs over a period of 3 to 5 years. Metso manages the fabric replacement scheduling and inventory replenishment. With this type of agreement there is an incentive for both partners to improve fabric longevity and performance. A Metso-owned inventory frees up working capital for the mill and reduces administrative costs.

Maintenance outsourcing

programs in which Metso assumes total responsibility for a turnkey maintenance program to ensure the production line is operating at world-class levels. Less unplanned downtime and significant cost savings are reported.

Roll service agreements

whereby all aspects of roll maintenance and on-machine performance are managed by Metso, including the scheduling and logistics of roll cover regrinding and cover replacements. These cooperative agreements also encourage prolonging cover life, improving on-machine performance and reducing operating costs such as energy.

Process parts agreements

in which Metso manages consumables inventory and availability based on mutual goals for parts performance and process uptime. Again, this can release working capital and reduce mill administration costs.

Process support agreements

which target customer's needs for higher production line productivity and efficiency along with improved competitive product quality and low operating costs.

There are major agreements that have been reported recently in the pulp and paper trade press and are catching the interest of the industry. Saica's whole-mill outsourced maintenance concept appointed Metso as the primary maintenance provider for the new Partington, UK mill for a six-year period, including the mill start-up period. This landmark agreement is based on Saica's positive experiences with Metso-outsourced services over several years and other similar reference production lines in Europe.

Later this year, Amcor Packaging will start up the new Metso-supplied B9 board machine at its Botany mill in Australia with a multi-year mill maintenance agreement. Metso will assume full responsibility for the establishment of maintenance operations, mill maintenance services and management of improvement projects for the stock and paperboard production facilities as well as the mill utilities.

Holmen Paper in Hallsta, Sweden is another example of a mill which has shown its confidence in Metso's maintenance services. They recently signed a three-year contract for comprehensive roll maintenance services through Metso's local roll shops and with an active Metso presence in the mill. The mill expects better production line performance from this agreement, which is in line with many customers' expectations.

Underlying these news headliners there are many other agreements which are not headline grabbers but still define the trends in the services business. These agreements can be as varied in scope and implementation as there are customer needs. However, many are driven by the same basic requirements. New production lines need to start up and reach productivity milestones quickly to ensure that return on investment goals are met or exceeded and to continue on that path of improvement for years after. In the same vein, existing production lines need to improve maintenance effectiveness and production line performance and keep costs in line or reduce them.

Numerous examples of these types of contracts have been customized to local requirements using local staff and facilities.

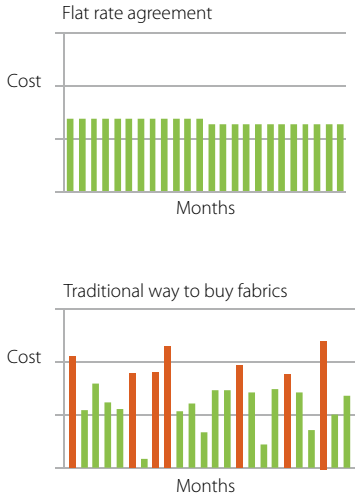
Turned-around approach

Kari Lindberg, Vice President of Services in North America, says Metso started evaluating what changes were needed to services offerings in 2005. "There were a lot of customer enquiries for longer-term agreements so we turned around our approach and methods. Now we are talking about customer needs for process performance, quality and reduced lifecycle costs. Today, our contract-based business is the norm because that is what customers are looking for. We are now into second-generation contracts, and they are a lot easier to renew. Customers have seen the value before and we have shown they can save money by working with Metso," he says.

Lindberg continues, "Our customers are looking for a partner who can help them to improve the total process and that is where Metso has an advantage with our process expertise and global-scale outlook. We can help to continually improve our customers' performance and competitive position," he says.

Roll service was the starting point in North America since it is a Metso strength. "We were able to demonstrate our competence and results, so we leveraged these successes to include other products like doctor blades and fabrics in our service offering."

Regarding outsourced maintenance, Lindberg feels that North American customers are not quite ready but it is an area of opportunity for Metso. "Some company in North America is going to break the ice," he says.



Fabrics flat rate agreement offers full predictability of costs with annual or semiannual adjustments. Both agreement parties have an incentive to maximize production and minimize fabrics consumption.

Complete supply chain management

Jukka Lehto, Director, Paper Machine Clothing says machine fabric flat rate contracts started with a trial customer in 2009 and the number has grown to four agreements today. He says these contracts, which typically run for 5 years, are very customer-friendly since Metso looks after all aspects of the delivery logistics and inventory control. "We take care of the complete supply chain and that means much less bureaucracy and paperwork for customers," he says.

The contracts also encompass a mutually agreed commitment to improve fabric life and performance on the machines. "We aim for decreased clothing consumption, and with these contracts that has the best value for both partners," says Lehto.

Long-term solutions

Hannu T Pietilä, Area President, Asia Pacific region says, " Metso capital sales and services work together for the customers' benefit well beyond the initial start-up period." Metso is responsible for the initial guarantees, of course, but the process assistance that Metso provides is often extended by contracts of 1 to 3 years with specialists on site to ensure that the customer realizes the best productivity and quality.

"We follow up new installations using the good customer relationships we have established during the start-up. Our customers are looking for know-how that we can provide. Over the long-run we can introduce new technologies and provide minor rebuilds to improve productivity and quality," says Pietilä. Riau Paper's Kerinci mill in Indonesia is a good and successful example of Metso's extended process assistance contracts which cover the paper machines and the integrated pulp mill.

Poised for growth

Elio Krummenauer, Services Director for South America, says that Metso is poised to make some major inroads into outsourced service. "There is future for Metso in outsourced services since we have an advantage over other service providers by knowing the process and how to improve production efficiency. Metso is ready for major outsourcing agreements in South America."

Elio Krummenauer.

Two Brazilian service centers in Sorocaba and Araucária provide the facilities and expertise for the region. In fact, the Sorocaba facility is a major roll reconditioning center, processing 300 to 350 rolls per year, and many of those are from other machinery manufacturers. Metso offers contractual services including spare parts and maintenance for specific process areas such as woodyards and pulp baling lines. Krummenauer also points out that Metso in Brazil has a very strong position for contractual valve service for pulp and paper and other industries.

Transition in China

Yingjun Huang, Product Sales Manager in China tells why Metso customers are looking for long-term support: "Currently the Chinese paper industry is facing a very important transition from seeking extra capacity to energy saving and growing in an environmentally friendly way. They need a partner to support them in the long term to increase product competitiveness, decrease production cost, improve efficiency and ensure sustainable development."

Yingjun Huang.

Metso supports its customers through three service centers in China. These centers have state-of-the-art equipment and staff with expertise in maintenance and the pulp and paper making process. Currently there are ten customers supported by roll service agreements with more expected this year. Spare parts and consumables agreements are also growing. "More and more customers like to sign this type of agreement. We also signed a consignment agreement with a customer in South China for doctor blades, sizer consumables and refiner segments," adds Yingjun.

How will Metso services grow in China? "Being close to customers, providing local resources and improving customers' competitiveness," he concludes.

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Curbing energy costs through a blower system rebuild

TEXT Kari U Kokkonen

More than 50% of all paper machines suffer from poor vacuum system operating efficiency due to the traditional design of vacuum systems and slow development of felts. By rebuilding the blower system of its PM N9, Hokuetsu Kishu Paper's Niigata mill was able to achieve about 900 kW savings in its electric power requirements.

Hokuetsu Kishu Paper PM N9
Grade: Woodfree coated paper
Basis weight: 68 g/m^2
Design speed: 1,600 m/min
Trim width: 9,800 mm

Papermakers have lately started to pay more and more attention to the energy consumption and operating costs of their paper production lines due to rising energy prices.

One of the places where efficiency losses often take place on a paper machine is the vacuum system. Many mills have successfully carried out liquid ring pump (LRP) system rebuilds in cooperation with Metso, and related payback times have been relatively short. However, not only LRP systems but also blower systems can drift out of their optimal operating ranges as operating conditions change, especially at felt conditioning. Vacuum system dimensioning values that were just right at the engineering stage may have become outdated over time.

Metso has screened the vacuum system efficiencies of more than 80 paper machines. The clear conclusion from this work is that over 50% of all paper machines suffer from poor vacuum system operating efficiency.

A desktop study revealed efficiency losses

One of the many mills looking for ways to lower its energy consumption is Hokuetsu Kishu Paper Niigata in Japan. Its PM N9 is a 10.7-meter-wide Metso OptiConcept paper machine that started up in 2008.

Metso carried out a desktop study of PM N9's vacuum system to investigate related potential for energy savings. Efficiency losses were estimated theoretically at this stage using available DCS printouts and PI diagrams. This study showed that efficiency losses were approaching 1 MW. The main reason for these losses was the same as at many other mills, namely felt conditioning. Because modern dewatering

The men behind the vacuum system rebuild (left to right): **Katsumi Tanimoto** (Metso), **Masakazu Okajima** (Hokuetsu Kishu Paper), **Daisuke Fujishiro** (Hokuetsu Kishu Paper), **Gabriel Franci** (MAN Diesel & Turbo Schweiz), **Christian Kolb** (MAN Diesel & Turbo Schweiz), **Arto Heikkinen** (Metso), and **Kei Iwanaga** (Metso). Missing from the picture is **Tuomo Saikkonen,** who was the project manager for Metso.

takes place in nips, felt selection and the conditioning of felts need to be rethought.

Pre-engineering verified the estimates

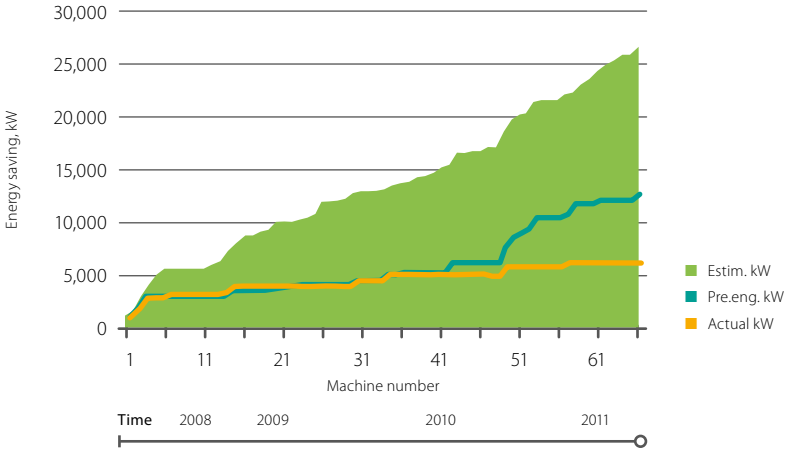
Based on the findings of the desktop study, Metso carried out the pre-engineering of the vacuum system in cooperation with Hokuetsu Kishu Paper and the blower supplier MAN Diesel & Turbo Schweiz.

Theoretical estimations were verified through measurements at the mill. The pre-engineering work included airflow measurements at the machine, verification of efficiency losses and motor loads, as well as comparison of airflows and vacuum requirements against blower characteristics. Recommendations for the required piping and blower modifications were also provided. Based on the results, Metso recommended a rebuild of the vacuum system.

Rebuild – part of an energy savings program

"The target for the blower system rebuild was to save energy by reducing electricity consumption," says **Daisuke Fujishiro,** Production Engineer, Hokuetsu Kishu Paper. "About two years had passed since the start-up of PM N9, and its operation was stable. We listed up low-efficiency equipment whose actual energy consumption differed from our original estimations, and made a new plan for saving energy. The blower system was one of the most significant items on that list as its electricity consumption is high."

The rebuild was part of Hokuetsu Kishu Paper's energy savings program and it was implemented in the course of a scheduled service shutdown in December 2011. It included piping modifications to stop one single-stage blower, speed reduction for a multi-stage blower, overhaul work on blowers, and modification of interlocks and controls in the Metso DNA automation system.



Screening results for potential energy savings available in paper machine vacuum systems.

Efficiency losses in vacuum level control.

Metso's scope of supply covered all process engineering, as well as modifications to the machine controls and blower gearbox. The rebuild and consequent system start-up were carried out in cooperation with Hokuetsu Kishu Paper and MAN Diesel & Turbo Schweiz.

900 kW of energy saved

Once the rebuilt vacuum system of PM N9 was up and running, the improvement was plain to see. According to Daisuke Fujishiro, the difference in electricity consumption was obvious right after start-up. Electricity consumption was about 900 kW lower compared to the situation at the pre-engineering stage with the same paper machine speed and paper grade, which equates to about 400,000 euros per year.

The vacuums on PM N9 were at the required level, and it was even possible to operate the high-vacuum flatbox at a higher vacuum level than before the rebuild.

"During the first month we fine-tuned the operation of the system based on air flow changes and established the optimal way to operate," Fujishiro adds.

The biggest benefit has been a notable reduction in energy consumption. "The results were exactly as we expected. Another benefit is that while we used to have two turbo blowers, we now use only one and have another one as back-up."

A purposeful and attentive approach

Collaboration between Hokuetsu Kishu Paper and Metso was productive. "It was impressive to see how intently and attentively the Metso engineers worked during start-up. I found professionalism in their attitude," says **Masakazu Okajima,** Planning Engineer, Hokuetsu Kishu Paper. "We had many issues that made us anxious about the project. However, we received good advice from Metso and quickly achieved our goal without any major difficulties."

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Seemingly bucking trends, a brand-new EUR 360 million mill complex, complete with a gleaming state-of-the-art Metso paper machine and all the attendant equipment, technology and processes, has recently started production at a brownfield site at Partington, near the city of Manchester in the UK. And it has kicked off well – it is already breaking world speed records.

Saica's PM 11
breaking records from the kick-off

TEXT Mark Rushton

The approach to **Saica Paper UK's** new mill passes directly by Old Trafford – the home of record-breaking English football club Manchester United – which is quite possibly the most famous football club in the world. But, unbeknown to all those football fans who frequent the ground on match days, just down the road plenty of other records are being broken too – this time world speed records on a 8.2-m-wide paper machine which has recently smashed the start-up speed for a containerboard machine, just like a top striker going for an early goal!

Saica Paper UK is a subsidiary of SAICA, a privately-owned Spanish company which is one of the leading corrugated containerboard companies in Europe, producing over 2 million tonnes annually. It has a portfolio of mills and converting plants all over the European continent, in countries including Spain, France, Portugal, Italy and Ireland, and it already has a number of converting plants in the UK, which it acquired from SCA in 2010.

The first question which surely has to be asked is why Saica has decided to invest in the UK which has hardly been at the forefront of papermaking investment over the last decades. It turns out that this is actually a really smart move, as the UK has a burgeoning packaging industry that has been crying out for investment. It also just so happens that this area of Britain has an excellent raw material source of recovered paper.

Federico Asensio, Deputy Managing Director of Saica Paper, is probably the best person to ask about the project as he has taken full responsibility for the start-up at Partington. "The UK and Ireland region is currently SAICA's second biggest market. The expansion here in Manchester is part of the group's strategic plan to deliver our growth targets following our integrated strategy. The UK currently imports a lot

The new PM 11 at Saica Paper in Partington, UK.

of its paper, particularly performance papers for corrugated packaging, which is our specialty. On the raw material front, it exports as much as 50% of its recycled paper, which means there is an excellent source of raw material here. All in all, it made sense for Saica to fill in the gap and compete in this market," he says.

The raw material for the mill is based on old corrugated containers (OCC) and off-cuts and waste from Saica's box and corrugated plants already operational in the UK, but there are plans to also use mixed paper from source-segregated household collections. The mill will require somewhere in the region of 450,000 tonnes annually, which Saica says will come from as close a source as possible, and all of it will come from the UK. The company has been actively working to ensure a solid, stable supply of recovered paper through its SAICA Natur waste management business which has been acquiring recycling companies over the last year. In 2011, the company acquired two operators, Cutts Recycling and Stirling Fibre Group, and then most recently Houghton's Waste Paper, which it acquired earlier this year.

"We are convinced that the best environmental solution is to recycle paper as close to source as possible and the new mill will offer the Manchester area excellent new capacity for its recoverable waste," adds Asensio.

Innovation – nothing new to Saica

Saica has been operational in the paper industry since the company was formed in 1943, and making paper has always been at the core of the business. "The top management approach at Saica has always been that we need to be as close to the 'real' business as possible," explains Asensio, who is also Industrial Technical Director at Saica Paper. "This means that even at board level, we know technically exactly what goes on inside our paper machines, and on the ground at our mills. And we actively strive to work with suppliers on new innovations that will be beneficial all around."

Innovation is a key word at Saica. The company has been at the forefront of some of the newest and most revolutionary technology applications, both in Europe and world-wide, for instance being one of the first producers to install shoe presses on its machines, starting the first co-generation power station in Spain, and being one of the first companies to install an anaerobic waste water treatment system in Europe.

But it is in the production of lightweight containerboard papers that the company really steals the show when it comes to innovation. "Together with our suppliers, we worked on our PM 9 machine in Spain to come up with the technology that would allow us to produce paper at below 105 g/m^2, which at the time was the lowest grade possible. After a lot of teamwork, and a lot of innovation, we were finally able to produce a 75 g/m^2 sheet with the same physical properties as a 105 g/m^2, but most importantly, at world record speed of 1,500 m/min," Asensio says.

Successful cooperation for excellent results

So, there is no doubt that Saica Paper is a proactive, challenging and demanding customer. What made the management team choose to go with Metso for its latest PM 11 installation? "We always look very closely at what the suppliers are doing in terms of innovation, and Metso in particular seemed to be having a lot of success in the field of lightweight production using 100% recycled fiber. We decided to have a closer look and asked them to come up with a solution for the new UK mill. What we were really impressed with was the way they committed to our requests by looking at production cost reductions by cutting down on energy use, as well as looking at a machine that can deliver peak performance. Reducing PM 11's energy consumption is a very important factor for Saica, not just for cost base reasons, it also enables us to reduce the environmental impacts of making paper and reduces our customers' carbon footprint," Asensio says.

Saica ordered its PM 11 machine in March 2010. A complete OptiConcept paper machine, with a wire width of 8.2 m and trim width of 7.6 m and a design speed of 1,700 m/min resulting to approx. 400,000 tonnes yearly capacity, and an approach flow system, pulpers and air system

Metso has taken over the complete maintenance of the mill equipment. Members of the Metso team are **Philip Jeffery,** E & A Engineering Manager (on the left) and **Chris Lord,** Mechanical Engineering Manager.

A single WinDrum Pro high-capacity winder is able to handle the complete production output.

were also included in the order. Metso's OptiFlo headbox and OptiFormer gap former ensure sheet strength and uniformity and the complete production output is handled by a WinDrum Pro high-capacity winder. Metso has also supplied a comprehensive automation package for both the machine and the combined heat and power station at the mill. PM 11 has been installed to produce top-quality, high-performance brown containerboard in the 75-130 g/m^2 range used in the manufacture of corrugated boxes.

The first paper was produced on the machine on Sunday, January 15 earlier this year, an incredible two weeks ahead of the project target. PM 11 also broke the world start-up speed record by achieving 1,105 m/min producing 95 g/m^2. "We were absolutely delighted with the start-up," says Asensio. "Originally, the start-up was slated for February 1, but we were able to produce paper on the reeler 15 days in advance. It then took us only two days to adjust the machine and then produce saleable paper. Even at our PM 10 it took four days to produce paper on the reel and then another seven to apply starch to the paper."

> "Another reason we are so delighted is that not only have we started production 15 days earlier than originally projected, but we have also been able to produce 75 g/m^2 only one month later than the first paper was reeled," adds Asensio.

Asensio glows with pleasure as he talks about his team's performance at the start-up. "Basically, this start-up has gone like clockwork, the Saica project team has been doing a fantastic job right from day one, and Metso has performed superbly in all aspects, right from negotiations through to design, erection, installation and start-up. The project engineers have done a great job at every stage. This is our first big project with Metso, and we have been satisfied with the way the company and project teams have shared their knowledge transparently, and we also feel that they have probably learned quite a bit from us on this project too!" he says.

The teamwork continues

Quite often at a paper mill, when the excitement of a start-up has calmed down, and the real world of production targets and day-to-day challenges takes over, supplier and producer gradually break off as teething problems are ironed out and operators begin to take full charge. However, this is not the case at Saica Paper UK. The company has a fairly unique maintenance agreement with Metso that will see the teamwork continue well into the future. "We are quite proud of the fact that, at Saica, our innovation is not only restricted to technical aspects of paper-making – we are quite good at innovations in management as well. We wanted to take a step forward on maintenance outsourcing and consider it a global service, leaving behind the concept of 'manpower outsourcing'. Several companies were considered for their global maintenance concepts, including non-paper machine builders, and

Saica's maintenance agreement with Metso also covers responsibility for maintenance-related improvements.

A comprehensive automation package is included in Metso's delivery.

finally Metso provided us with a concept that satisfied all Saica's requirements where, crucially, total mill performance is the main key indicator, " says Asensio.

Saica calls the agreement "Global Service Maintenance" in which Metso takes over the complete maintenance of the mill and covers all the suppliers' equipment involved, for instance ABB, Siemens and Voith. The concept also covers all the disciplines, including mechanical, electrical, control and automation. Devised by Asensio himself, the concept is a brand-new one in the paper industry as it is not the common contract agreement of a fixed price per year with a possible bonus. "With our new maintenance agreement, the whole emphasis is based on production at the mill. If the mill does not produce, then it is a mill-wide problem, including the maintenance section which only gets paid on results, " he says.

The maintenance agreement became effective on January 11, 2011 when Metso started the implementation phase and later on will assume full responsibility for the mill's improvement projects related to maintenance, including power stations, stock, paper production and water treatment. Saica and Metso have worked together on maintenance projects before, most notably at Saica's Zaragoza mills in Spain and Venizel mill in France.

There is no doubt that Saica Paper UK will be a very interesting company to watch in the future as it captures market share, and digs deeper to find better, more productive and more profitable ways to throw down challenges for the competition on both quality and price.

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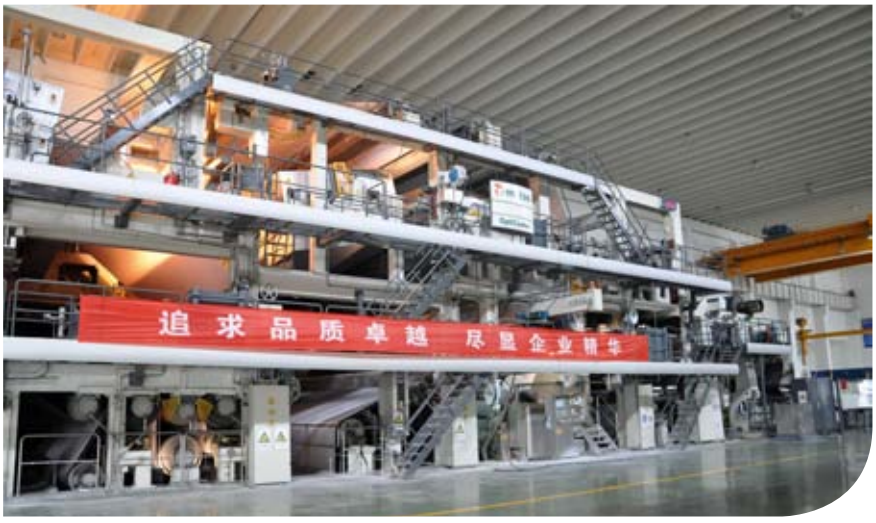

SHANDONG HUATAI PM 8 MAINTAINS

Perfect performance with Metso coater blades

TEXT Martin Yang

No coating process can be optimized without the right coater blades. Shandong Huatai PM 8 provides an excellent example of this fact.

The coated fine paper production line of Shandong Huatai Paper Co. Ltd. started up successfully in Dong Ying City, Shandong Province, China, in January 2011. The 8.1-m-wide PM 8, supplied by Metso, has an annual production capacity of almost 700,000 tonnes of coated and uncoated fine paper in the 80 to 200 g/m^2 basis weight range. The machine's design speed is 1,800 m/min and the coater's 2,000 m/min.

Perfect coater blade performance

Metso has been supplying doctor and coater blades for the whole production line since the start-up of PM 8, as well as providing technological know-how and specialist assistance.

To ensure good coater performance, Metso delivered different blade types for the four coating heads of PM 8. The first and second coating head are equipped with Metso's SteelCote, a traditional steel blade made of tempered blue steel. The third and fourth coating head have Metso's PermaCote nC carbide blades.

The PermaCote nC blade is based on a nanoscale powder sprayed with the newest technology available. A superior microstructure, improved wear resistance, and low tendency for microscale cracking give it a remarkably long lifetime. This nanocarbide blade also provides excellent coating application, even when worn. Thanks to its long lifetime, it delivers long production runs between blade changes, saves downtime, and trims blade inventories.

The performance of the blades on PM 8 has been very good. Coating weight profiles and paper smoothness, for example, have both been stable. Compared to the previous tested supplier's blades, the blade lifetime is at least four hours longer and roughness has decreased a lot.

Multiple benefits

"Metso's technology is reliable. We could really feel the Metso service team's sincere and enterprising spirit in their daily communication and cooperation with our staff," says PM 8 General Production Manager **Chai Junming.**

After the start-up period and optimization of coater running parameters, Metso's coater blades have proved their longevity, improved machine runnability, reduced downtime, and increased production.

Cooperation with Metso has enabled the mill to considerably reduce its consumption of coater blades and energy, as well as lower its blade-related maintenance costs. No wonder that the mill and Metso continue to work together on the development of coating and coater blade services.

Shandong Huatai Paper is a subsidiary of the Huatai Group of companies. With an annual production capacity of 1.5 million tonnes of newsprint and 0.7 million tonnes of coated paper, Huatai is the biggest manufacturer of high-grade newsprint in the world as well as a major coated paper producer.

Also available in Metso's coater blade product family

- **PermaCote Z,** which provides high surface quality and good auto-profiling capabilities.
- **PermaCote nC,** a hard-coated blade that provides a superior surface finish.
- **PermaCote CR,** the high heat resistance of which reduces the risk of burning when run dry. High impact resistance ensures good machine wrap resistance.

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Perfect coater blade performance. From left to right, **Wang Zonglai,** Metso Mill Service Manager, North China, **Li Xianteng,** PM 8 Production Chief, **Li Yunfeng,** PM 8 Deputy General Engineer and **Huang Yingjun,** Metso Product Manager, Spare Parts.

METSO RELOCATION SERVICES

Full-scope relocation partner

TEXT Veli-Matti Miskala, Sanna Siren-Seijesvirta

Relocation and refurbishing of idled machinery has become increasingly common over recent years. With market conditions becoming more challenging, companies have been forced to adjust capacity with demand. As a result, more equipment is being taken out of service or relocated to another mill.

Metso is a leading company when it comes to giving aging machines new life. Metso can provide full-line relocation services, starting from auditing and dismantling of existing machinery to refurbishing and starting up the revitalized line. As an original equipment manufacturer (OEM) Metso is able to offer customers a wide range of services and solutions, process and automation as well as project management know-how. Metso has several references for successfully dismantling, reassembling and starting up plant and equipment of all sizes and complexities of paper, board and tissue machines.

Typical relocation scope includes

- Machine audit
- Equipment match marking, dismantling and packing
- Engineering
- Reconditioning and maintenance
- New equipment and replacement of missing parts (e.g. spares & rolls)
- Machine automation upgrade
- Site services like installation supervision and start-up support.

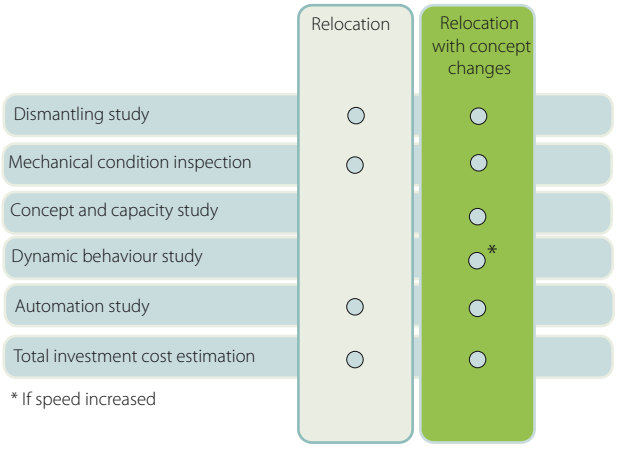
In addition, rebuilding or modernization of the machine is often needed, especially in the case of a production grade change.

Machine audit

Auditing the machine and equipment before dismantling is important and provides plenty of valuable information. This allows the possible defects and missing parts to be confirmed and the required refurbishing actions to take place during the project. If the machine is still operational, different runnability and bottleneck analyses can also be performed and modernizations or upgrades can be planned if needed. As an OEM supplier Metso has plenty of existing reports and measurements from the large installed machine base.

Match marking, dismantling and packing

A meticulous machinery match marking process ensures everything is in order for reassembly anywhere in the world, with

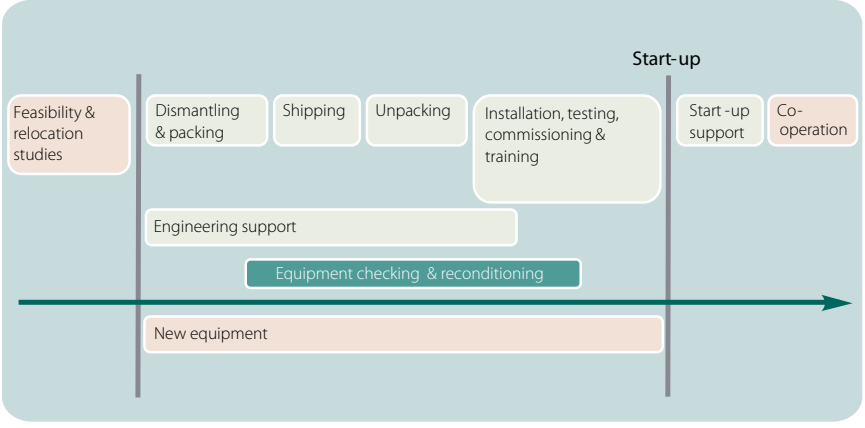


Relocation studies – defining the need and estimating the cost.

detailed, easy to follow documentation. Comprehensive photographic documentation showing equipment before dismantling, after dismantling and after packing is also provided. Skilled labor ensures good executions and packing solutions. Using the same people on dismantling and installation sites is also beneficial.

Engineering

An OEM supplier has the benefit of having all the original drawings and documentation. Metso provides relocation engineering support packages which include a wide range of relocation-project-specific documentation and details. For example, the design data needed by civil engineering to design the machine foundations: static and dynamic loading information and information of allowed deformations, and also foundation drawings with information on anchor bolt and base plate locations. Basic engineering for the process systems and machine automation is also a typical part of the relocation scope.

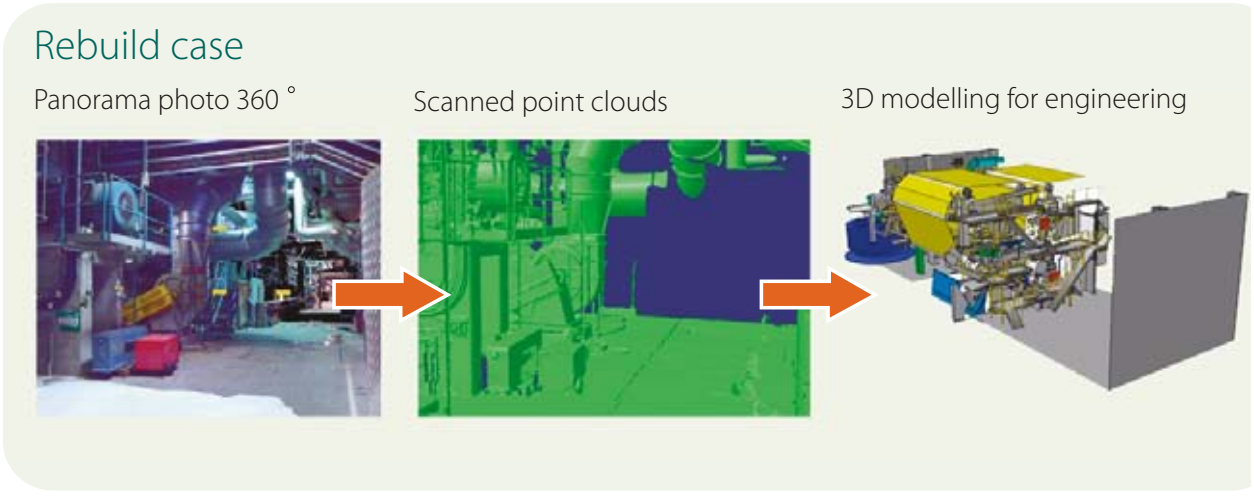


Timeline of a typical relocation project.

Reconditioning and maintenance

When the equipment is carefully audited before dismantling the required reconditioning and maintenance can be easily scheduled to be performed during the relocation project. Rolls can be recovered and suction or deflection compensated rolls can be overhauled in the local Metso service center before delivering to the

Laser scanning of the existing machine before dismantling results in 360° panoramic photo and scanned point clouds which can be utilized in reviewing arrangements or for 3D modelling for engineering.



site. A wide range of condition checks can be done on the equipment like headbox, calender or winder. Onsite refurbishment can also be done on the equipment and frames.

Automation upgrade

Existing machine automation will also be studied before the dismantling phase, to define obsolete and reusable systems and field devices. In many cases the existing automation system and field devices are already out-of-date and spares or start-up equipment is no longer available. The operator interface of the automation is upgraded to a higher level. Local control desk operations are moved to control room displays and field panels with interlock diagnostics. Required local operations are moved to new local control boxes. An automation upgrade is a typical part of a relocation project and Metso is the only automation supplier who can deliver the complete mill automation.

Site services – installation supervision and start-up support

Professional installation supervision and start-up support breathes new life into a machine. The testing and commissioning of a relocated line is much more challenging than in a normal rebuild project. Therefore special attention must be paid to the maintenance stage before the installation to make sure that the machine sections are in good condition to ensure smooth start-up and operation. Close co-operation and continuity after start-up is also important and Metso's global service network supports customers in achieving the set targets and fulfilling expectations.

Project management

Expert project management of industrial relocations leads to the delivery of successful, client-orientated results. Metso has plenty of experience of the successful implementation of small, medium and large-scale industrial relocation projects for a wide range of clients across the world.

Industrial relocation solutions are based on meticulous planning and project management of all aspects of the relocation project from start to finish. Project management ensures a professional industrial relocation service, on schedule, safely and within budget, based on customers' specific goals and requirements.

Metso's commitment to health and safety at work is second to none, with all industrial and engineering relocation teams having full safety certification. While working onsite a safe working environment is the number one priority at all times.

Summary

Metso provides specialist machine relocation solutions for the relocation of plant and production machinery whether it is a single unit of machinery or entire factory machinery relocations. Complete turnkey solutions ensure that all machinery and equipment can be installed in a new location in the same, or even better, condition as the original installation.

Metso, Valmet and Beloit have a large installed base around the world. Therefore Metso has the expertise of the OEM supplier and is able to utilize all the knowledge and existing documentation to provide the right-sized technology and services to meet a project's economical targets.

A complete turnkey delivery from dismantling and relocation to machine rebuild and start-up by one and the same supplier is a safe investment for customers. Co-operation and communication with the same personnel ensure a high-quality final result. Metso is able to offer the whole large scope.

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Successful start-up of relocated Guangzhou PM 1 took place in October 2011.

Long-standing customer relationship was the key factor in the Guangzhou PM 1 relocation project

"Stock on wire on time; paper on reel in only a few hours, machine running with paper at 1,560 m/min only three days after start-up! Thanks to Metso's equipment, technology and excellent project team," explains **Jiang Peng,** Vice General Manager and Chief Engineer of Guangzhou Paper Co., Ltd. The successful start-up of relocated PM 1 was in October 2011.

The originally Metso-delivered Guangzhou Paper's newsprint production line PM 1 started up for the first time in 2006 in Guangzhou City, China. The old mill site, founded in 1936, was located in the downtown area of the city. The infrastructure of the city center mill area was to be converted into a residential area and so PM 1 had to be relocated. The new location of the machine was the Nansha mill located about 60 km away where Metso had previously delivered a PM 9 that was already in operation. An agreement was made with Metso and PM 1 was shut down at the end of 2010.

The Metso delivery included expert services for relocation and a small machine rebuild where one new complete dryer group was added to the dryer section. Machine runnability was also improved with the help of new blow boxes installed in the first two dryer groups. Additionally some new equipment and a runnability monitoring system was installed. Delivery also included relocation-specific engineering such as drawings of the base plates and anchor bolts for the new sections and basic data for mill and civil engineering. Site services included:

- PM 1 dismounting at old site including packing and markings
- PM 1 installation and rebuild at new location
- Resource planning
- Scheduling (installation, commissioning and start-up)
- Testing and commissioning
- Start-up
- Process optimization of PM 1

This means that the technical service was not just limited to the rebuild area, but included the entire paper machine with the applicable processes. In co-operation with the customer the production line was optimized rapidly to enhance good productivity. Metso's local resources were mainly used for site service operations and the machine start-up team consisted fully of Metso's local personnel in China.

"A relocation project is much more complex and more difficult than a new machine line project. Thanks to the long-time good cooperation between Metso and Guangzhou Paper, we can smoothly move this complex machine, successfully restart up again and rapidly increase the machine speed over the situation before shutdown," says Jiang Peng.

STORA ENSO'S NEW MIXER

Saves energy

TEXT Anders Åslund

When Stora Enso's Skoghall Mill in Hammarö, Sweden replaced a 20-year-old O_2 mixer as part of the PFE energy efficiency program, energy consumption for that stage of production decreased by 37%. Another effect was improved pulp quality. We spoke with Project Manager **Mikael Forseryd** and Process Engineer **Pär Eriksson** about the project.

A number of development and refurbishment projects are carried out at Skoghall Mill every year. Mikael Forseryd, Project Manager for the fiber line tells: "The projects range from minor modifications to major replacements and refurbishments. Our old O_2 mixer was from 1992. That may not seem very old, but it was inefficient by modern standards. Development is fast, especially when it comes to energy-efficiency."

Part of the energy-efficiency program

Stora Enso takes part in PFE – the Swedish Energy Agency's Program for Improving energy efficiency in energy-intensive Industries. To date the program has made progress far beyond expectations. The energy saving during the first five years of the program was more than twice the Energy Agency's target.

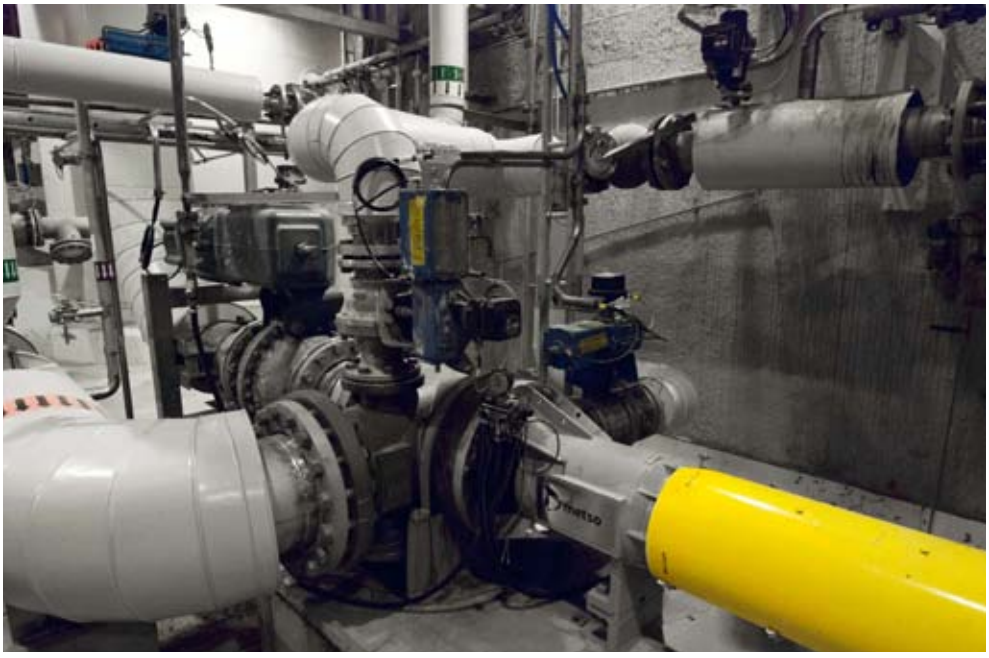
Planning for the replacement of the O_2 mixer began in 2009, when a concept and a demand specification were drawn up, with commitments partly based on the PFE program.

Fast installation necessary

Mixing is a vital stage of production, and all sulfate pulp produced at Skoghall Mill goes through the machine. In other words the mill needed a machine that is highly efficient and easy to install.

"We have a production target of 46 tonnes an hour," says Mikael Forseryd. The mill operates about 8,400 hours and we produce about 320,000 tonnes of pulp a

The Skoghall Mill is satisfied with the new pulp mixer. Persons in photo from left: **Pär Eriksson** of Stora Enso, **Johan Ahlstrand** of Metso, and **Mikael Forseryd** of Stora Enso.



Metso's new, energy-efficient mixer has been in service at the Skoghall Mill since November 2011.

year. The mill normally has one production shutdown a year which gives us a refurbishment window of around seven days, no more. For this project, it meant that everything – taking down the old machine, casting new foundations, re-drawing the pipes and performing a checkout – had to be done in a week, after which the mixer had to be up and running."

Better pulp quality

The new mixer came into service in November 2011, and the effects are already evident.

"We've reduced energy consumption by this mixer by 37% on average," says Mikael Forseryd. "At our production rate that means an excellent payoff time. And we've had no loss of production or problems with it either."

Another unexpected effect of the replacement is improved pulp quality, as Pär Eriksson explains, "The new mixer allows the fiber to keep its straightness. The old mixer had an output of 270 kW, while the new one has 70 kW. A mixer that uses less energy treats the fiber more gently. That was what we hoped for, and we now realize that is exactly what has happened. We have also noticed that the new mixer is very stable and has minimal vibrations, which is good for the machine itself and for the pipework."

Delivery on time

"The cooperation with Metso has gone well," says Mikael Forseryd. "We had a tight schedule and everything went very fast once we had reached a decision – but Metso delivered on time. The installation also went smoothly, despite the fact that the re-drawing of the pipes was more extensive than we had planned."

Skoghall Mill is part of Stora Enso's Renewable Packaging business area, and it produces cartonboard products primarily for food packaging. The raw material used is mainly round timber and sawmill chips (spruce and pine) for two types of pulp: sulfate pulp and CTMP (Chemi Thermo Mechanical Pulp). The mill employs just over 820 people and will celebrate its 100th anniversary in 2017.

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"**We are aiming** much higher now as a result of this project's success," says **Tero Karvinen,** Production Superintendent.

A pearl of a project in Heinola

Stora Enso's Heinola Fluting Mill, situated some 135 kilometers northeast of Helsinki, Finland has produced high-quality fluting since 1961. Fluting is the corrugated part between the surface liners in corrugated board and has a vital impact on the performance of corrugated containers. About 90% of the mill's production is exported, primarily for fruit and vegetable packaging as well as heavy-duty applications requiring good strength properties, such as the packaging of consumer electronics and machine parts. A recent quality improvement project completed with Metso, known internally as the Pearl Project, will help ensure that Heinola remains at the forefront of the competitive fluting market.

TEXT Nigel Farrand

"Our main goal was to improve product quality and uniformity."

Realization of "Pearl" started in spring 2011 with completion scheduled after the September maintenance shutdown. Key ingredients were a headbox rebuild, stock refining improvements and replacement of the quality control and machine control systems.

"Our main goal was to improve product quality and uniformity," says **Tero Karvinen,** Production Superintendent. "We chose Metso to provide the complete package based on experience from earlier projects in Heinola and other Stora Enso mills. Metso's technology and expertise in machinery and automation were very well suited with our desire to use the best available technology to its fullest extent."

Selecting Metso as single source supplier also met another objective of minimizing the project organization within the mill. "In this project, Metso was able to provide certain synergies that had a great impact on the schedule and effectiveness of the work," continues Karvinen.

RetroDilution rebuild

A key quality parameter for fluting is the fiber orientation angle, which affects stiffness and strength as well as runnability on customers' corrugators. "While our quality was good, the variation in fiber orientation angle across the machine was noticeable. We want to give our customers the best runnability possible so this problem needed to be addressed," says **Tuomo Sippus,** Manager of Technical Customer Service and Research & Development.

The machine's existing headbox was rebuilt with RetroDilution, a Metso-developed upgrade that transforms an existing slice-lip-controlled headbox into a modern dilution-controlled one. At the same time the slice actuators were also renewed for fine-tuning of the fiber orientation angle. With stock consistency controlled by diluting locally in the cross-direction, the accurate profiling provides improved end-product quality with very uniform basis weight and fiber orientation profiles.

"The dilution headbox has given us much smaller variation in fiber orientation angle across the machine and improved the moisture profile, both of which provide better runnability for the corrugators," says Sippus. "Earlier, machine speed was mainly limited by the headbox feed pump but now, at least with lower basis weights we have been able to run higher average speeds than previously because of the improved profiles."

QCS replacement

"Replacing our old QCS with Metso IQ was definitely a good decision," says Karvinen, being particularly impressed with the accuracy of the measurements. "Now we have the best possible measurements, which are very exact and reliable. We are still fine-tuning and expect even better results in the future." The traversing scanner is equipped with moisture, basis weight, porosity and formation measurements used in the multivariable CD and MD controls.

Accurate dilution valve positioning on the headbox is achieved with an IQ Dilution Profiler, and now the CD slice profile, which influences the fiber orientation in the sheet, is set with the IQ Slice Profiler controls.

The machine control system was also upgraded with a Metso DNA control system, which according to the operators introduces a new level of control and reporting to the machine. The PLC system it replaced was, in Tuomo Sippus' opinion, a nightmare and changes were very difficult to make. "Now, with DNA Help screens, the operators can see the problem, for instance with break logics, and find the solution," he says.

Refining savings

Stock preparation was also included in the project with three OptiFiner RF-4 refiners, one new and two used ones from another Stora Enso mill, which were inspected by Metso. "We now run five refiners instead of seven, so savings in no-load power are quite remarkable," says Sippus. Refiner-specific energy control resides in the Metso DNA digital control system. "The predictive control supplied by Metso works like cruise control in a car – we have seen huge improvements." This is a significant benefit for Karvinen, "Nowadays, we no longer over-refine the stock," he says.

continued overleaf...

Tero Karvinen, Production Superintendent with **Jukka Mäensivu**, Sales Manager, Metso, and an OptiFiner RF-4 broke refiner, supplied by Metso as a complete turnkey delivery. Refurbishment of a second-hand refiner from the Varkaus mill was done at Metso's facility in Valkeakoski. The refiner was fitted with a new gearbox and motor, new fillings and Metso's innovative turbine housing and is as good as new.

continues...

Stable quality

Basis weight and moisture variations are now 40-50% lower than they used to be. This has also enabled the mill to idle, or at least run at a low level, the remoisturizer at the end of the machine. In addition to the obvious quality improvements, grade change and break recovery times have been reduced. "The way we used to run was the result of fifteen years of optimization with the old system, and after just a few months with the new system, we now have much more opportunity to improve. Now the quality is stable and we no longer have to guess what is happening," says Sippus. Operator acceptance of the new equipment has been fast and Karvinen is impressed with their desire to learn more about the systems and equipment. "Operators are now looking at control room screens that were previously only used by maintenance – they want to increase their knowledge and expertise," he says.

"Overall, we have been very satisfied with the whole project. With just one supplier, difficulties were dealt with quickly and Metso personnel showed a high degree of professionalism throughout. We are now operating on a totally new level and today we can concentrate on things that we never even considered before. We are aiming much higher now as a result of this project's success," Karvinen says. "We also have a service contract with Metso, which gives us the potential for further development and improvements in the future."

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"**The dilution headbox** has given us much smaller variation in fiber orientation angle across the machine and improved the moisture profile, both of which provide better runnability for the corrugators," says **Tuomo Sippus**, Manager of Technical Customer Service and Research & Development.

RetroDilution – dilution control rebuild

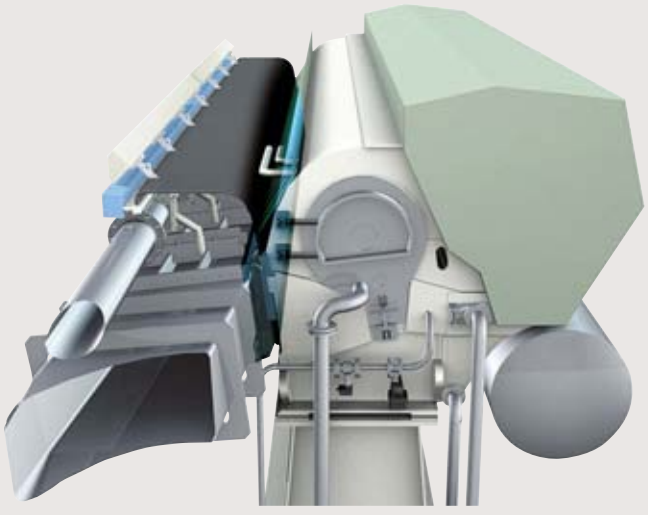
RetroDilution provides a cost-effective way of upgrading an existing slice-lip-controlled headbox into a modern dilution-controlled one during a very short shutdown.

Stock consistency is controlled by diluting locally in the cross-direction. The accurate performance of the dilution profiling improves end-product quality thanks to the very uniform basis weight and fiber orientation profiles. This also leads to fewer breaks and reduced broke, thereby improving machine efficiency.

Dilution control improves profiles and fiber orientation

In a RetroDilution rebuild, a dilution chamber beam is fitted between the existing inlet header and tube bank. The installation time is short. The flexibility of the dilution control system allows the interfacing of the system to the existing mill environment at a reasonable cost.

Reference projects show a response in profile control and sheet stability comparable to the latest dilution control headboxes in the market.



Dilution control benefits

- Uniform basis weight and TSO profiles across the width of the machine
  → improved end product quality and machine runnability
- Basis weight and fiber orientation profiles controlled independently of each other
- Response range is narrow and better shaped than with slice lip control
- Applicable to paper and board grades
- A cost-effective way to transform an existing slice-lip-controlled headbox into a dilution-controlled one
- Short shutdown period of only two to three days
- Installation on-site during a planned annual shutdown
- Fewer breaks and reduced broke
- High-resolution optimizing CD control algorithm
- Sophisticated maintenance and diagnostics tools

TEXT Helene Ekbladh

Within the paper industry, dewiring of pulp bales is often associated with handling that is both costly and hazardous. Metso baling technology, with its Robobaling product series, is streamlining the dewiring procedure achieving higher capacity and better product quality as a consequence.

Safe dewiring with a short take-off distance

Steel wire is used to keep pulp bales together during transportation to the paper mill. Steel wire is an indispensable part of the transport chain, but is often associated with problematic handling. The wire must be carefully removed from the pulp bale to avoid damage to machines caused by remnants and/or an inferior end product. During the past ten years, Metso has focused on becoming the world's leading supplier of products for dewiring installations. Currently, Metso can offer all products required for fully automatic dewiring lines, including control and safety systems. More and more customers all over the world are discovering the benefits of Metso's technology.

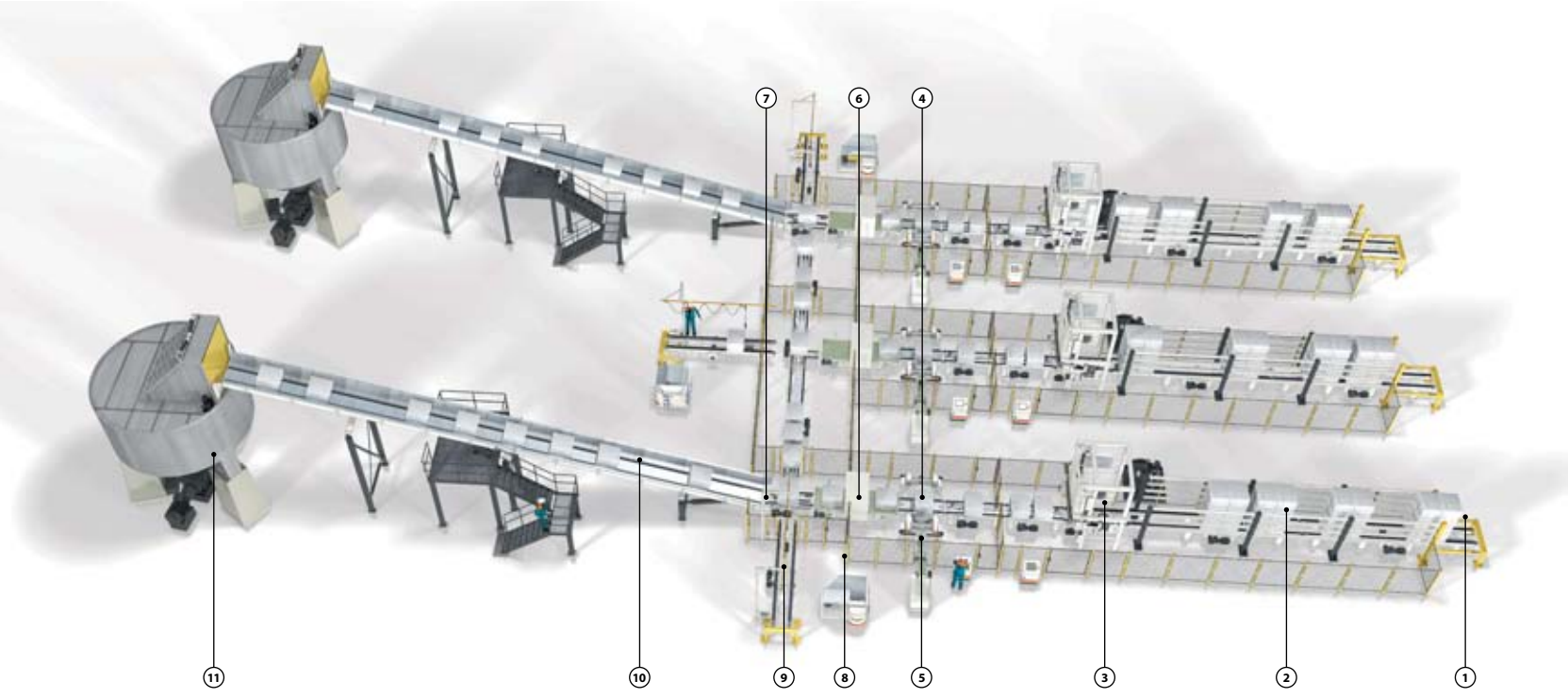
A flexible module system

In many paper mills all over the world, steel wire is still removed manually with the risk of not only cuts and puncture wounds from the sharp wires but also attritional injuries. With machines such as the Robocoiler and the Robostackcoiler from Metso, dewiring can be carried out automatically instead. The automatic machines can be delivered in a number of designs and models customized for handling not only single bales but also bale units of six to eight bales at a time. A complete module system makes it possible to build an individually customized line around the most important machines, with accessories such as conveyors, bale aligners, bale destackers, bale tilters and metal detectors. For example, by combining fixed, movable and/or angled conveyors, the line can be tailored to a broad spectrum of different existing buildings, requirements and conditions.

Unit dewiring machine, Robostackcoiler.

Complete dewiring plant from Metso, from loading conveyor to pulper, including plant equipment and safety fences.

1. Loading conveyor
2. Storage conveyor
3. Unit dewiring machine, Robostackcoiler
4. Bale dewiring machine, Robocoiler
5. Scrap wire conveyor
6. Metal detector
7. Pivot conveyor
8. Wire winder, Robowinder
9. Manual dewiring station
10. Pulper feed conveyor
11. Pulper



Bale dewiring machine, Robocoiler.

Metso Robosafety
Metso focuses on safety and has therefore developed its own safety concept called Robosafety which fulfills the requirements in applicable CE directives with related harmonized standards.

The installation is divided up into safety zones. If anyone enters a zone, all power sources are interrupted. At the same time the intelligent safety system makes it easy to return to production as soon as any problems have been rectified. Robosafety is an option for customers who prefer a ready-made safety solution that complies with local laws and legislation regarding employee safety.

The machines and software are perfectly adapted to each other based on tested mechanical solutions combined with a master process control system. This makes it possible to install and commission the machines within a few days. Machines developed and tested by Metso guarantee problem-free commissioning, not only as individual units but also as units in a chain. Prior to delivery, all units go through comprehensive testing with well-documented operating results. After commissioning, customers know that they have one discussion partner who will take care of all their questions and problem-solving. Metso's service and sales personnel are available wherever in the world the customer is located.

Maximum process control

Metso's dewiring system is characterized by minimum effort and maximum process control. Each bale that comes into the dewiring plant is tracked and monitored using a master control system that provides information about how the bale should be handled along the line.

The bales are transported via the loading conveyor to the unit dewiring machine, the Robostackcoiler, where the bale units are dewired and destacked into single bales to subsequently be further transported to intermediate storage or to be dewired. A single bale enters the Robocoiler for dewiring. The bale is transported into position for the wire to be identified. The wires are cut off and rolled up into compact coils of wire, slightly larger than a ball of twine. These coils of wire are collected in a separate container next to the dewiring machine for recycling.

The dewired bale is then transported through a metal detector before continuing on its way to the pulper. If the metal detector is set off, the bale is transported to the side to a manual dewiring station where the bale goes through a manual inspection and dewiring.

High capacity and rate of dewiring

A fully automated production line can provide several benefits for dewiring. High capacity and rate of dewiring in combination with a high level of safety and availability are characteristics of the units in the Robobaling product series.

The dewiring machine for single bales can handle up to 160 bales per hour, which is a remarkable figure, implying an average of just over 22 seconds for the handling of a bale. This is quicker than manual dewiring and even quicker than other competing dewiring systems.

Follow-ups also show that the automated machines produce better results with regard to the quality of the completed task - Metso's Robocoiler, for example, achieves a rate of dewiring of more than 99% if the bales that are processed are of good quality.

A high level of safety and availability

An automated line minimizes exposure to areas of risk and dangerous operations. The accidents and damage that can be caused by manual dewiring are completely eliminated. Physical contact with the machines or manual handling of the bales is only necessary during the repair of faults, service or, for example, during inspection of a rejected bale when the metal detector is set off. Control and electrification are also integrated in the machines with easily accessible service points which ensure that operation takes place in a controlled manner.

All units are operator-controlled via a user-friendly touch screen panel. The user interface is operator-friendly and instructive for fast and easy operations, enabling maximized production uptime. Ultimately, automated production also involves rational production. The low investment costs and increased uptime imply that the investment can be repaid in a short time.

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TEXT Kari A. Salonen

TwinStar is Metso's product family of high-quality monofilament wires for pulp dewatering.

TwinStar dewatering wires – long life and reliable performance

Twin wire press.

The extensive product range includes various applications such as

- Dewatering of stocks from hard- and softwood, mechanical or chemical pulp, bleached or unbleached pulp
- Dewatering of waste paper
- Municipal sewage and industrial waste water treatment

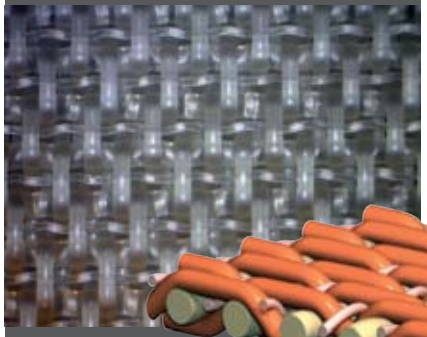
The best possible raw materials are used to ensure the maximum operational life for TwinStar wires. The wires are made of either polyamide or polyester. Polyamide is suitable for twin wire applications where the wire is subjected to high press load or abrasion. Polyester is ideal for gravity table dewatering and conveyors, or twin wire applications where press load is light or moderate.

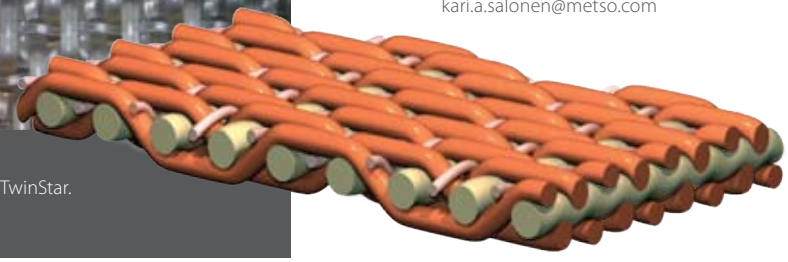
TwinStar benefits

- Trouble-free start-up
- Long life resulting from
  - Excellent stability
  - Wear-resistant designs
  - Extremely strong edge treatment
- Optimum drainage
- Operational reliability

TwinStar provides operational reliability

"Metso's high-quality heat-setting process ensures dimensional stability, which means that wires will not stretch out of their limits in operation. Combining the finest designs we ensure the optimum drainage and longest lifetime – resulting in the lowest cost per tonne of pulp for our customers," says **Kari Salonen,** Product Sales Manager for dewatering wires at Metso.





Structure of TwinStar.

A smooth surface wire

The smooth-surface dewatering wire was developed in cooperation with our customers. The fabric is especially intended for low freeness positions, where the pulp web has a tendency to attach to conventional coarse-surfaced fabrics, thus causing production problems. "The F.S.I. index is 50% larger than that of conventional coarse dewatering wires. The pulp web gets sufficient support and does not get pressed inside the wire structure. The void volume is also higher than in conventional wires, improving drainage and increasing the wire's capacity. State-of-the-art raw materials mean that the wire is extremely durable against pressure and wear," says Salonen.

Our R&D is based on customer needs

Just like all of our fabrics, TwinStar dewatering wires are designed to meet customer needs. At Metso, we continuously carry out intensive in-house R&D, and we value customer feedback and cooperation. This, combined with close cooperation with universities, research institutes and suppliers, is directed at developing and improving dewatering wires for the benefit of our customers. Salonen highlights a customer case in China. The customer started up a new twinwire press pulp drying line successfully with Metso's TwinStar wires in 2010. Since the start-up they have only used TwinStar wires.

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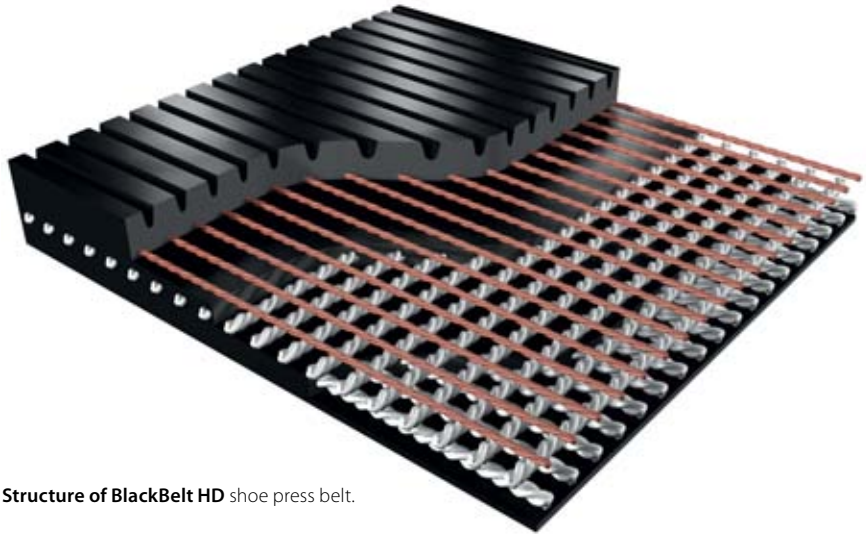
TEXT Ville Lahdensuo

A shoe press indisputably provides advantages compared with a roll press. Although the peak pressure in a shoe press is lower than that in a roll press, the dwell time is significantly longer due to the nip length. This makes it possible to remove more water from the web with a shoe press nip than with a roll press nip. A higher dry content after the press reduces steam consumption in the dryer section and saves energy. Quality properties are also often better with a shoe press, and the correlation between the bulk and the dry content is also more advantageous.

The new BlackBelt HD shoe press belt makes marking disappear



Structure of BlackBelt HD shoe press belt.

In the early days, shoe presses were run with smooth belts, and all the water removed in the nip had to be absorbed by the press felt. In the quest for higher dry contents, grooves were introduced in belts. A typical void volume in the first grooved belts was under 300 ml/m^2, while the open area was under 25%. When the amount of water removed in the nip increased, there was a gradual move towards higher void volumes.

Today, belts typically feature void volumes of 380–520 ml/m^2, with an open area of 30-42%. The open area forms an uneven press profile on the felt because it is only the lands that transfer load on the felt. This profile unevenness together with a long dwell time may, depending on the grade, cause marking. This issue can be solved by using a stiff, heavy felt that evens out the load profile in the nip. However, this has a negative impact on the nip's water removal.

Two mechanisms cause marking

Based on laboratory tests and experience gained in practice, it is possible to distinguish two different mechanisms that cause marking. The most typical groove marking develops when the groove is very wide: the felt bends into the groove, and the press load decreases there which means that the web remains wetter there, resulting in groove marking. It is possible to prevent this kind of marking with a belt with narrower grooves. (Fig. 1a and 1b).

The other mechanism is linked with the distance between the grooves. If the distance is too long, i.e. the land is too wide, water in the web will try to flow to where the groove is. This causes flow marking in the web. It is possible to prevent this kind of marking with narrower lands. When trying to prevent marking, grooves that are as narrow as possible with lands that are as narrow as possible are an ideal combination (Fig. 2a and 2b).

Lands must not collapse under load

Shoe press belts are made of polyurethane, the hardness of which is typically 92-95 on the ShA scale, i.e. elastomer. The material places some restrictions on land dimensions. Lands must not collapse under the load, because this would mean losing the belt void volume, too.

In addition to the surface hardness on the ShA scale, the polyurethane matrix also has a significant effect on the load bearing capacity of the material. When changing over to narrower lands, the internal friction of the material has to be as low as possible in order to avoid the material's internal heat build-up under dynamic load.

Metso has carried out numerous test-runs on the Rautpohja pilot machine in Jyväskylä, Finland, studying how different grooves function. In addition to this, various felt and belt combinations have been tested in a laboratory environment to study the marking tendency.

With the BlackBelt polymer, it is possible to make the lands as narrow as 1.3 mm while the groove depth is 1.3 mm without any risk of the lands collapsing. This was verified with a 1,500 kN/m load when the tilt (=pressure ratio between the shoe's ingoing and outgoing side) was 1.7. The nip flow grew linearly during the test run when the load was increased from 900 kN/m to 1,500 kN/m. If the lands collapse, nip dewatering will decrease when the load is increased. If the load is further increased, the sheet will start to get crushed.

It was possible to increase the groove width up to 0.8 mm with the EcoStar laminate-base felt without any marking. This was how the densely grooved BlackBelt HD (=high density) shoe press belt was developed. In it, the void volume has been maximized without any risk of marking, even on the most sensitive grades. With

the above-mentioned values, the void volume amounts to 380 ml/m^2.

Case: marking had disappeared

The web of a paper machine that produces high-quality newsprint showed marking from all the grooved belts that had been run on it. After the installation of BlackBelt HD, all the visible marking disappeared. In fact, marking could no longer be found, not even in the laboratory! (Fig. 3)

Thanks to Rautpohja's pilot machine it was possible to carry out numerous test runs in a short time and deliver a tested, well-performing product to the customer. In this way, there was no need to carry out test runs on the customer's machine as we already knew that the product would work.

Cooperation between Metso's paper machines R&D and belt product development is very close. New developments are underway.

Figure 1a.
With wide grooves the press load will not come evenly over the belt to the sheet, because on the groove area the pressure against the sheet is lower than on the other areas. Thus, dewatering from the sheet to press felt is smaller and the small scale moisture profile in the sheet is uneven (= marking).

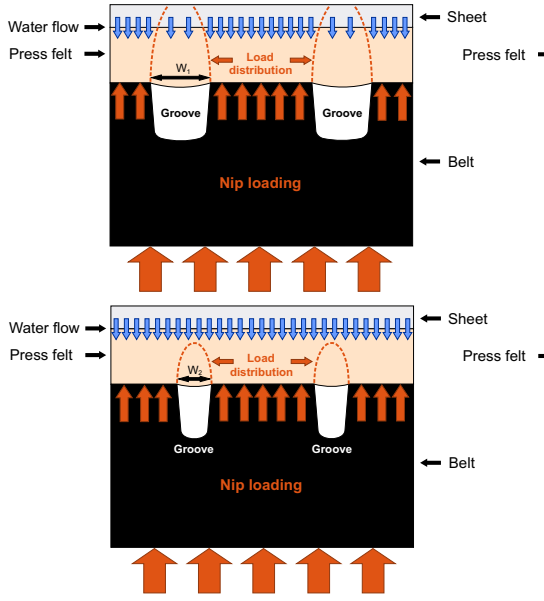


Figure 1b.
When the grooves are narrower the press load comes more evenly over the felt and furthermore the dewatering from the sheet to felt is even, too.

Figure 2a.
With a grooved belt the water can very rarely get straight from the sheet to the groove, as there's always some flow in cmd inside the felt. If the felt is old and compacted and the belt has wide lands, this flow may already start in the sheet causing marking.

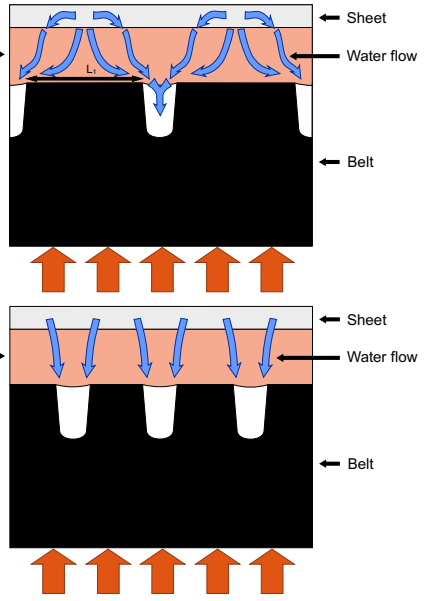


Figure 2b.
Choosing the belt with narrow lands, the water doesn't have to travel such a long way to the grooves, and, thus, the risk of flow marking is smaller.

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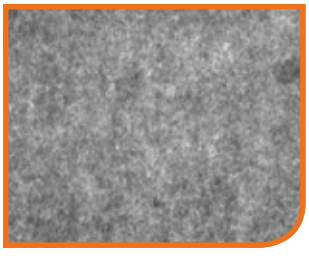
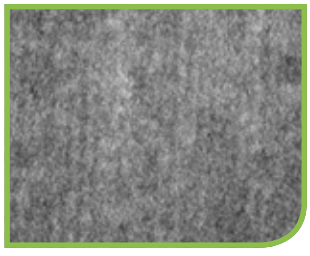
Customer's paper sample done with dense grooved BlackBelt HD and TMO felts.

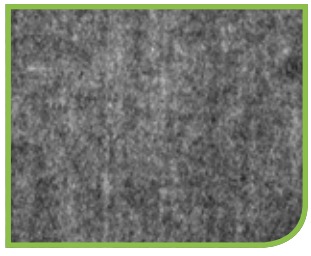


Sample 87045, groove sequence not found, marking intensity 0 MD.

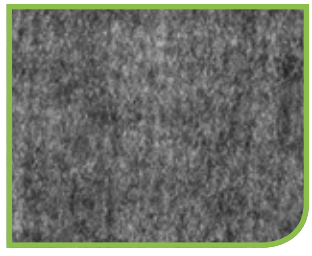
Customer paper samples done with normal grooved belt.



Sample 86947, groove sequence 3.54 mm, marking intensity 67 MD.



Sample 86042, groove sequence 3.49 mm, marking intensity 64 MD.



Sample 90223, groove sequence 3.34 mm, marking intensity 81 MD.

Figure 3. Marking analysis of paper sample (improved news).

TEXT Kerstin Eriksson

Ten meters long, several meters high, and with an impressive weight of 200 tonnes. The pulp wash press, currently being manufactured at Metso's Sundsvall facilities in Sweden, is the largest Metso has ever produced. When completed, it will be delivered to Suzano Papel e Celulose in Brazil, together with eight others, as part of Metso's biggest order ever.

Metso's largest wash press will be delivered to Brazil

New welding robot

In the Sundsvall assembly hall, the employees have been working in two shifts throughout the winter to keep up with production, and one unit in the workshop has been working in five shifts. "We have also acquired a big welding robot which will now be put into operation. It will increase our efficiency and at the same time take care of a lot of the repetitive welding jobs," says **Markus Ajax,** General Manager, Production.

Quality work with efficiency

The workshop operates with good efficiency. "We painted the whole metal workshop by ourselves, so it is very airy and light. A good working environment is one aspect of quality. In addition, we work with lean production to increase efficiency. Everyone takes a greater responsibility. The employees solve many problems themselves without having to ask the manager," says Ajax.

The workshop in Sundsvall will be busy all year. Giant pieces are being produced, especially those for the Suzano pulp mill to be built in Brazil. The two rolls dewatering the pulp are 8.4 meters long with a diameter of two meters. At the far end **Jörgen Boberg**, working in the assembly hall.

Complete pulp mill delivery

Metso's order for Suzano Papel e Celulose S.A. includes all the main technology for the greenfield pulp mill to be built in the state of Maranhão in Brazil. The scope of supply covers wood handling, cooking plant and fiberline, pulp drying and baling, evaporation, power boiler, recovery boiler, causticizing and lime kiln, including an integrated automation solution for all process areas. When completed, the new mill will produce 1.5 million tonnes of bleached eucalyptus market pulp per year.

Suzano Papel e Celulose is a forestry-based company and one of the largest vertically integrated producers of pulp and paper in Latin America. The company's main products are eucalyptus pulp, printing and writing paper and paperboard.

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The nine large wash presses to Brazil are being completed one by one at Metso's Sundsvall workshop. **Magnus Danielsson**, General Manager, Pulp Washing Machinery and Markus Ajax, General Manager, Production, admiring the giant piece.

AT NORDIC PAPER ÅMOTFORS

Metso Rotating Consistency Transmitter

and other Metso instruments optimize consistency control

TEXT David Wold

"**Optimum control** over pulp consistency into the machines was our target," says **Emanuel Danielsson**, Electrical and Instrument Department. "And the latest generation Metso Rotating Consistency Transmitter played no small part in helping us to hit the bull's eye."

When staff at the Nordic Paper mill in Åmotfors, Sweden sought to optimize control over consistency into the mill's two paper machines, instruments from Metso got the job done.

"Optimum control over pulp consistency into the machines was our target," says **Emanuel Danielsson,** Electrical and Instrument Department. "And the latest generation Metso Rotating Consistency Transmitter played no small part in helping us to hit the bull's eye."

The transmitter is positioned after the mixing chest and its function is to control consistency before thick pulp screening. The desired consistency at this point in the process is between 3.0 and 3.5 percent.

Optimum consistency control

Metso Microwave Consistency Transmitter (Metso MCA) performed this task before the rotating transmitter was installed in November 2010. The Metso MCA was positioned directly in front of the paper machines to gain optimum control over consistency. This transmitter now sends measurement results to Metso's quality control system, which uses the information in a feed-forward control of basis weight.

"This configuration works, the result being much better control of basis weight and quicker transitions between paper grade changes. More specifically, with the rotating transmitter positioned where it is, we can gradually increase consistency in thick pulp screening to allow maximum fiber consistency into the paper machines.

"These improvements mean less downtime, shorter running-in times and greater uniformity in the end product. This all boils down to greater productivity, more uniform end product and, of course, lower production costs," says Danielsson.

Mill staff considered installing a Metso blade transmitter in this position, but because a blade transmitter requires installation in a straight section of piping, they opted for the rotating transmitter. The solution was Metso Rotating Consistency Transmitter (Metso Rotary).

Availability as good as it can get

"The new generation rotating transmitter was very easy for us to install. We also found that the instrument is available 100 percent – it can't get better than that. It is also easy to set and calibrate and the operators are happy with it," says Danielsson.

Metso Rotary, Metso MCA and Metso's automation system are just three of a number of Metso instruments employed at the Åmotfors mill. Others include a Paper IQ Plus quality control system as well as Valmet SP and KajaaniRotary consistency transmitters.

Unbleached Kraft pulp from a pulp mill in Bäckefors, Sweden is the raw material for production at Nordic Paper Åmotfors.

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Nordic Paper

Products from Nordic Paper can be placed in two main groups: unbleached Kraft paper and greaseproof paper, both used in a wide range of applications, e.g. sacks and packaging solutions for fish and ice cream as well as cooking and baking products. Production takes place at four mills, three of which are located in Sweden and one in Norway.

The Åmotfors mill has two unique paper machines, PM 1 with a width of 3,600 mm and PM 6 with a width 4,300 mm. The total annual production capacity at the mill is around 45,000 tonnes of unbleached Kraft paper, used for stainless steel interleaving, highly absorbent paper and electrotechnical paper. The mill has 86 employees.

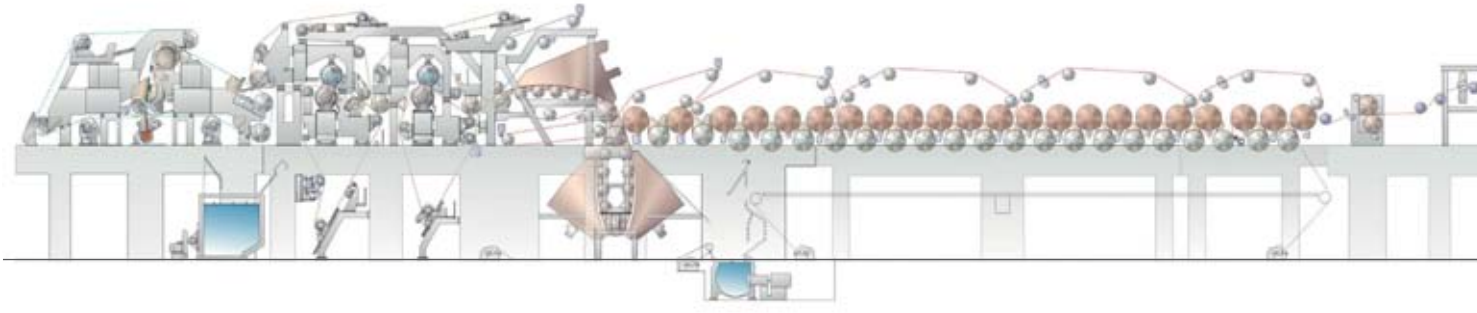
SHOUGUANG MEILUN PAPER PM 6

Cost-effective investment

helps to meet market demand for high-quality fine paper

TEXT David Zheng, Marika Mattila

There is a growing trend in the Chinese fine paper market toward more cost-effective and higher quality paper manufacturing. The motto of Shandong Chenming "to learn more, to be the industry leader, and to surpass oneself" also recognizes this trend, and reflects what really happened when Shouguang Meilun Paper Co., Ltd., a subsidiary of Shandong Chenming Paper, invested in a new fine paper production line. This 11.15-meter-wide paper machine is the world's largest coated fine paper line, producing around 800,000 tonnes of coated woodfree paper annually. Shouguang Meilun Paper wanted to utilize new technology to further solidify its market leadership position, and selected Metso as a major supplier for this challenging project.



PM 6 – new addition to a family of giants

Shouguang Meilun Paper is part of Shandong Chenming Paper Holdings Limited, one of the biggest paper producers in China. The corporate group's annual production capacity totals 4 million tonnes, its revenues exceed EUR 2 billion, and it has approximately 19,000 employees. Shandong Chenming owns the three biggest paper machines in the world, all supplied by Metso. PM 6 is the latest addition to this family of giant machines. This gigantic line started up in June 2011 at the excellent start-up speed of 1,150 m/min.

PM 6 is based on Metso's proven OptiConcept technology from headbox to reel. Metso also supplied two winders. PM 6 produces double-coated high-quality art paper of 70-128 g/m^2 at a design speed of 2,000 m/min. This new papermaking line is equipped with the latest Metso technologies, such as an OptiFormer shoe and blade forming section with a hydraulic OptiFlo Pro headbox and an OptiPress press section with two shoe press nips, along with OptiDry Twin impingement drying, which provides an advanced way to increase machine efficiency and product quality in an energy-efficient manner. The new line also includes an OptiHard calender, an OptiSizer sizing section, two OptiCoat Jet online coaters, and energy-efficient PowerDry air dryers for perfect coating results.

OptiFormer's shoe and blade technology brings unique advantages to gap forming.

OptiFormer vacuum shoe gap forming technology highlights

Excellent paper quality within a wide operating window
- Improved formation
- Improved two-sidedness

High production capacity
- Higher speed
- Improved efficiency

Reduced raw material costs
- Ability to use high filler content
- Low retention chemical costs
- Ability to produce lower basis weights

Economy of initial investment and daily operations

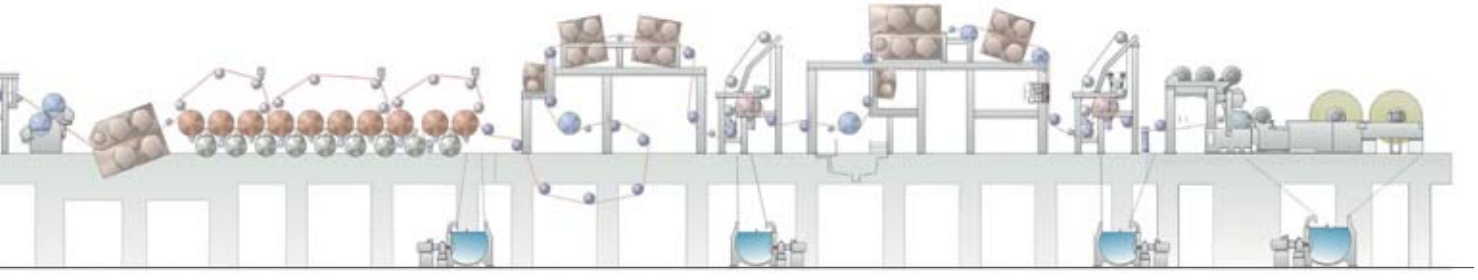
Quality and speed targets achieved quickly with the right technological solutions

The wet end of PM 6 features the latest OptiFormer vacuum shoe gap forming technology with an OptiFlo Pro headbox and an OptiPress straight-through press. These technologies allow high production speeds and production efficiency ratios. End product quality is also top-class – the sheet formation of PM 6 is the best in the world, with normalized beta formation ranging from 0.3% to 0.4%. The two-sided dewatering of PM 6's forming concept produces good retention and a symmetric filler distribution in the sheet, and it also saves a lot of energy since no suction forming roll is needed.

The dryer section is equipped with the unique OptiDry Twin impingement drying technology, as one of three paper machines in the world. In impingement drying, efficient drying of the paper starts right after the press, ensuring excellent runnability. This solution also gives possibility to increase paper bulk by pressing less and still having a high dry content before the cylinder drying section. OptiDry Twin was one of the main tools for the extremely fast start-up.

OptiDry Twin also enhances sustainability. Emissions are reduced while the heat source is natural gas instead of steam from power station. While the dryer section length is reduced compared to traditional

Shouguang Meilun PM 6 employs the latest shoe and blade forming technology as well as OptiDry Twin impingement drying technology.

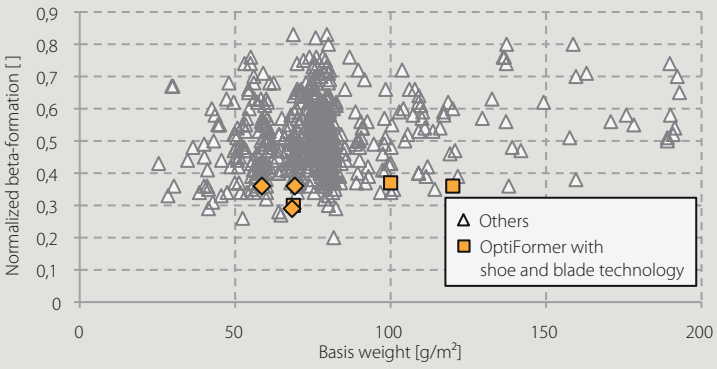


New forming technology yields excellent results – OptiFormer with shoe and blade

Shouguang Meilun PM 6 introduces a new Metso forming section that utilizes innovative shoe and blade technology. The start-up of the line has been excellent, and superior paper quality has been reached from the very beginning. This new concept has been studied extensively on pilot machine scale, and results from running production machines compare very well with these pilot machine results. Formation has beaten all other references. An optimal consistency profile inside the sheet during forming allows shear forces to break down flocs and keep fibers well dispersed in the boundary layer of the fiber mat while maintaining a free stock suspension inside the sheet.

In addition to a symmetric orientation structure attributable to optimized shoe design, the forming section is also capable of producing paper with a very low MD/CD ratio.

Metso's new shoe and blade technology produces a symmetric filler distribution at high filler contents. This is due to gentle initial dewatering before the blade section, which produces filtering fiber mats to maintain good retention and even distribution. This new shoe and blade forming section is very robust to operate, and a variety of different grades can be run without the need to readjust forming parameters, for example. A shoe and blade former allows completely free adjustment of the slice opening, jet/wire-ratio, and jet landing point without causing any sheet disturbances.



New OptiFormer with shoe and blade technology provides excellent end product quality.

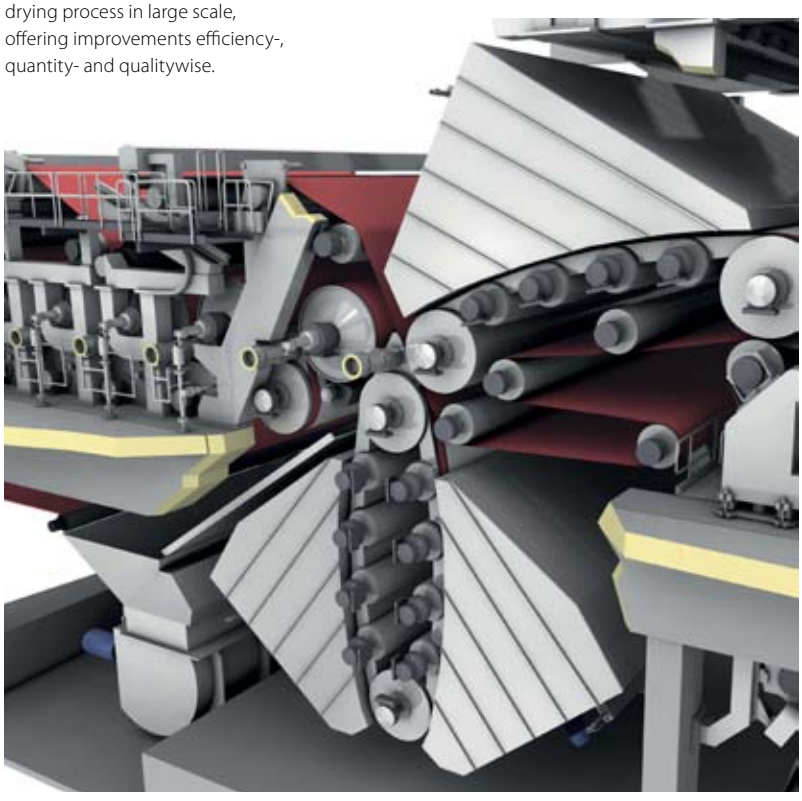
technology, remarkable savings are gained, not only in the number of dryer section machine parts but also a large amount of machine room material will be saved. In the case of PM 6, the number of cylinders was reduced by 29%. This has a positive impact on investment costs as well.

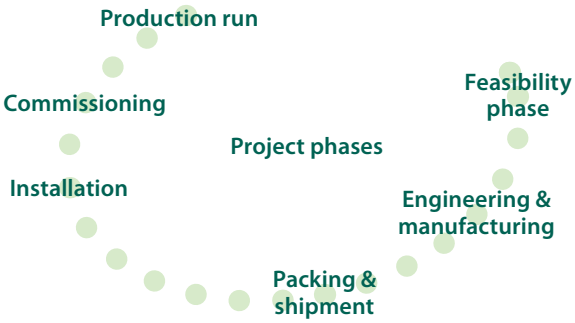
To ensure consistently uniform coating by Metso's OptiSizer, the sheet is pre-calendered after the dryer section with an OptiHard SlimLine calender. OptiSizer is equipped with coating profile control to ensure excellent coating quality. The sheet is coated online at two OptiCoat Jet coaters.

For perfect coating results and energy efficiency, the line is also equipped with PowerDry and PowerDry Plus air drying technology. The energy efficiency of PowerDry air drying is twice that of infrared dryers. This means 50% lower energy costs compared to infrared technology.

At the end of the papermaking line, the double-coated sheet is wound up on a high-capacity OptiReel Plus reel into jumbo rolls weighing 138 tonnes each. The production line is equipped with two

OptiDry Twin changes the paper drying process in large scale, offering improvements efficiency-, quantity- and qualitywise.





Smooth cooperation between Shouguang Meilun and Metso at all stages of the project ensured that all targets were met.

JR1000 E winders and a parent roll handling system. JR1000 E winding technology is the perfect choice for demanding paper grades, such as the WFC produced by PM 6. Metso's comprehensive automation system package includes process, machine and quality controls.

Efficient, well-organized project

Shandong Chenming and Metso have a long collaborative history, starting in 1998. Shandong Chenming has ordered several production lines from Metso over time, including Shouguang PM 1 and PM 2, Wuhan Chenming PM 1, Jilin Chenming PM 12, Jiangxi Chenming PM 1, the Shouguang mill's CTMP line, Shouguang PM 4 and DIP plant, Shouguang PM 6 and BCTMP line rebuild as well as Zhanjiang Chenming PM 1, all with good results.

Shouguang Meilun personnel involved in the project believe that "close and smooth cooperation is essential to work out challenges in projects like this recent one with PM 6, and also to convince both ourselves and our customers that we have the right solution". All targets related to construction and start-up were reached on time. A well-planned on-site training program, including both theoretical and practical parts, complemented the successful start-up of the machine.

"We are very proud to reach our production target (108 tonnes per hour / 2,565 tonnes per day of 115 g/m^2 art paper at 1,580 m/min) in less than three months after start-up," states Superintendent **Li Chunzhi.** PM 6 has delivered superior formation, the bulk desired, and excellent sheet topography and printing properties, providing a very uniform end product.

"There were naturally some problems during start-up, as there always are when several suppliers are involved in a project. But we were both committed to solving those early problems, and we are happy that Metso was able to help us through their extensive experience and expertise. We faced the challenges together, and the result is a project that was extremely successful for us," Li Chunzhi continues.

Smart investment for Shandong Chenming

"Metso not only provided the necessary quality and new technology to us, but also worked together with us to thoroughly understand the needs of the marketplace in order to maintain our competitiveness also in the future," says **Jia Shaojun,** General Manager of the Meilun mill. "With this production line we can further reorient our production in terms of paper grades, for example. This has been a very smart investment for Shandong Chenming, enabling us to meet market demand with new capacity and excellent quality in a cost-effective way," Jia Shaojun concludes.

The PM 6 line started up in June 2011 at the excellent start-up speed of 1,150 m/min. People contributing to the project from left **Zhang Qingzhi,** Vice General Manager of Chenming group, **Jia Jiyong,** Production Manager, **Wang Zhisheng,** General Manager of Meilun Mill, **Jia Shaojun,** General Manager of Meilun Mill and **Wang Jinkun,** Project Manager, Vice General Manager of Chenming Group.

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Hayat moving at world-class speeds

World-class speed tissue machine No. 2 at Hayat Kimya. The machine is a Metso Advantage DCT200 TS.

TEXT Ingemar Myrén

Aim for the stars and you will reach the moon. **Kemal Arslan,** Project Manager at Hayat Kimya san. AS, recalls the negotiations with Metso, "We possibly pushed the performance guarantee values too much. We asked Metso to run the guarantee test at 2,100 m/min at a sheet basis weight of 15 g/m^2 on the wire. We also stretched the values for the paper quality." In September 2009, nine months after start-up, the young and dedicated TM 2 crew had a go at the performance tests. "We missed the moon but managed to reach the stars. We devised the tests ourselves with our regular machine crew. No extraordinary means and measures were taken prior to, or during, the test. The settings of the tissue machine, utilities and support systems were as usual. We met all the performance guarantee values in one day when running at a speed of 2,100 m/min. Half an hour may have been lost stabilizing the sheet, but then we carried out production for eight hours, remaining at guaranteed values," says Arslan.

The Hayat Group in Turkey was established in 1938. The company has two business divisions: wood panelboard and consumer products. Besides tissue, consumer products include hygienic and cleaning products. The group turnover is USD 1.6 billion. Half of this is generated from panelboard and half from consumer products.

Lütfi Aydin, Paper Group Director, set up Hayat's tissue paper production.

After receiving Metso's go-ahead, Hayat made the demanding performance guarantee tests on its own. **Yasar Guloglu** (left), Production Engineer, and **Sabri Cakmak**, Automation Chief Engineer, assumed hands-on responsibility for the test.

Lütfi Aydin, Paper Group Director, was the first man on board when Hayat decided to venture into tissue paper production in 2004. "It was very difficult to find the technical staff and establish the work processes in a company with no experience in the paper industry. Very few qualified and experienced people were available. However, looking at the results, I would say that our hiring process was very successful," says Aydin. He and his team did not hesitate to implement advanced concepts in the first plant, such as a co-gen plant for electricity production and generation of steam and hot air for the tissue machine. "In December 2005, after much hard work, we started up our TM 1. Meanwhile, we were also setting up and testing the co-gen system, consisting of 2x7.5 MW gas turbines, as well as 10 machines, in our new converting plant. In the converting plant, we were running these jobs with only one experienced manager and three experienced technicians while the rest of the operators had no experience. Our task ahead was to produce 47 different converted tissue products, 400,000 cases in total, by March 2006, for launch in early April. On March 22 we finished loading the first truck to a round of applause and on April 1 the products were on the shelves. We are all very pleased and proud of our achievement. Tissue production was up and running within the Hayat Group," says Aydin.

Hayat Kimya proved to be a successful newcomer on the Turkish market. In 2009, 75% of the tissue machine production was converted and the market share reached 26%. The converting percentage of 75% triggered the decision to proceed with a new machine, TM 2. "In this project, the situation was different. Everything we learnt from the first project gave us a good experience base, which was very useful in the negotiations and work processes. After a number of reference visits and long technical meetings with three machine suppliers we ended up choosing Metso. The contract was signed on November 10, 2009," says Aydin.

continued overleaf...

Co-gen plant consisting of 2x 7.5 MW gas turbines integrated with TM 2 (to the right).

Rolf Tellack, Project Manager, Metso.

Hayrettin Kutluok, Production Manager.

Kemal Arslan, Project Manager.

Hayat's fast-moving pace is obviously not limited to the tissue machine. "It surfaced at the second project meeting that we and Metso had a different view on the expected start-up date. **Rolf Tellack,** Project Manager at Metso, predicted March 2011 in line with industry standards and provided there were no major problems. Our plan for start-up was December 2010. This target seemed very optimistic and hardly realistic, even to our boss. However, Metso agreed to get involved and work with the tough schedule. Rolf Tellack did an excellent job coordinating the team efforts in reaching the goal. On Dec 18, 2010, 13 months and 8 days after signing the contract, we made start-up!" explains Aydin.

"Production capacity, efficiency, paper quality and our experience of co-gen were the main decisive factors for us selecting Metso, the co-gen experience not being the least important. Together with Metso we made improvements compared with our existing TM 1 system. We accomplished a system for faster and safer start-ups of the tissue machine and thus higher efficiency. Two to three months into the project we all felt that we had made the correct decision regarding the supplier for TM 2."

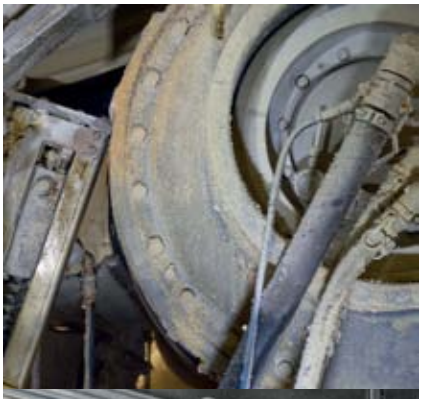
As mentioned above, the contract values for speed performance were set at an unusually high level. "I only understood this later when expert visitors said that they could not believe it," admits Arslan. **Jan Erikson,** Vice President of Metso's Tissue Mills, explains that "During our pre-project meetings and during the final negotiations, our confidence in the capability of the Hayat team gradually increased. We certainly know our machine very well, its robustness, stability and its capability of producing a sheet as to the specified paper properties within the whole speed range of the machine. However, in order to reach the very best performance, a large number of operating parameters must be set correctly for each speed level. We have managed this with Metso's automation system. When it comes down to it though, the machine needs to be in the hands of a skilled crew, willing to push the boundaries. We believe Hayat has this kind of crew."

Speeds in the range of 2,000 m/min are noticeable and will impress both the person on the street and the professional tissue maker. However, what counts, i.e. the bottom line, is the production, the number of cases out of the door. "The machine takeover from Metso went very smoothly. We started up at 1,500 m/min and we had saleable paper on the reel within the first hour. During the first eleven months we produced 60,700 tonnes. Our budget for this period was 53,300 tonnes. Net time efficiency was 96%," says **Hayrettin Kutluok,** Production Manager.

The contracted scope of supply from Metso consisted of a tissue machine, air system, process ventilation, stock preparation, automation and engineering. The process, tissue machine and drive controls are by Metso DNA. The quality control system is Metso Paper IQ. The Advantage DCT200 tissue machine included two options, the headbox dilution profiling system and the MetsoIQ steam profiler, which have been very valuable tools according to Kemal Arslan. "We have had a very good basis weight profile throughout the speed range of the machine. The steam profiler on the suction pressure roll just ahead of the nip

improves the moisture profile of the sheet. With a more even profile we can increase the average moisture content in the sheet by one to two percent. That, in turn, means the same increase in production. Every system that improves the evenness cross machine, also improves the efficiency. Even basis weight and moisture profiles give an even coating which gives an even creping which stabilizes the sheet, and so on," explains Arslan.

Metso IQ Steam Profiler.



Metso Paper IQ Select.

Excellent-quality jumbo rolls. The concept is mixed. Reeling on spools as well as split reel winding on cores.

The Hayat Kimya mill site. The co-gen plant in front of TM 2. To the right, in the background, Hayat is building an automated warehouse, which will be one of the largest in the world.

Looking at the jumbo rolls coming off the machine, there is no doubt that there are very even and stable conditions across the machine width. The rolls look more like good flat grade paper rolls than jumbo rolls of soft high quality tissue.

Determined business expansion

In conjunction with the purchase of TM 2 in Turkey, Hayat ordered a duplicate equipment package from Metso to be installed outside of Turkey. Start-up is estimated for September, 2012. "We are implementing the same project and engaging the same teams, Metso's as well as ours. Including the last mentioned, we have installed three tissue lines since 2004, each with a capacity of 70,000 tpy. In the near future we will go ahead with two other projects, one in Tataristan, Russia, the other in Mersin, Turkey, with tissue production start-up planned in 2014 and 2015 respectively. Both machines in these projects will be integrated with a 60,000 tpy DIP line for each machine. By the end of 2015, Hayat Kimya expects to operate five large tissue machines with a total production capacity of 350,000 tpy," says Aydin.

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Managing doctoring with an agreement

TEXT Annica Börstell

Metso helps optimize the doctoring process in each position of the production line. Besides blade deliveries and BladeStore and BladeCarry storage containers, the services cover expert assistance for solving doctoring problems in the production line. Nine mills in Sweden and Norway have concluded doctor blade handling agreements with Metso.

The Gävle mill of Korsnäs in Sweden has recently joined this group of mills, signing an agreement at the end of 2011.

Biggest benefit is access to expertise

"The reason that we decided to take a closer look at this cooperation concept was the chance to improve the functioning of our doctors, particularly in our paper take-down positions, where all too often the formation of pass-throughs leads to long periods of downtime. We saw a great deal of potential in getting expert help to ensure things worked well. Two other factors that made the cooperation agreement even more interesting were the reduction in the costs of blades and in energy consumption," explains **Krister Säll,** Process Manager for PM 4 and 5 at the Korsnäs Gävle mill. "The help we receive from experts if we have any problems with equipment or runnability quite simply gives us control over everything directly or indirectly connected with doctoring."

"We are in the process of switching to a consignment stock arrangement in order to reduce our tied-up capital. Through the agreement we received some storage trolleys for the blades on the machines, which will enable us to keep all the blades neat and tidy. Up to now stock-keeping and keeping the doctor blades neat and tidy has been time-consuming and not much fun, so we hope that everything will work a lot more smoothly from now on," says Krister Säll.

Krister Säll, Process Manager, PM 4 and 5 at Korsnäs Gävle mill.

"The agreement has improved the logistics and structure of stock management – it is so much simpler nowadays."

Ragnar Karlsson, Supervisor/Process Engineer, KM 7 at Stora Enso Skoghall mill.

Agreement ensures the right blades

"One reason that the mills contact us for help, in addition to unsatisfactory doctoring results, is the decline in resources for taking care of the handling of blades and doctoring equipment," confirms **Dennis Dahlman,** Product Sales Manager at Metso. "There are often large stocks of different types of blades at the mills. This means substantial costs, particularly as a large part of the stock consists of non-sellers. With the doctoring agreement we can ensure that the mills always have the right blades in stock, and of the right material. The latest Radio Frequency Identification system (RFID) even orders new blades automatically. It follows up the inventory on line and detects the take outs from the cabinet. According to this it sends an impulse to Metso's manufacturing unit over GPRS and ensures that the stock is replenished. The mills also have access to the latest blade technology, as Metso develops its own materials," Dahlman continues.

Thorough reviews of doctoring equipment

"An agreement is so much more than just getting the right blades," explains Dahlman. "Every year, we carry out a review of all the doctors on the machines. During this audit, everything to do with the doctoring function and associated equipment is checked and optimized. We also carry out monitoring of the most important positions on the machine every six months."

"We missed the normal procedure of having a major annual review as the agreement didn't come into effect until after the autumn shutdown, but we solved this problem by having smaller reviews at the shorter daily shutdowns," says Krister Säll. "Following the reviews, we receive reports and suggestions as to what needs to be done. We have only recently started our cooperation, so only time will tell us how this new approach will work out, but I am convinced we are on the right path."

"Our maintenance staff take a positive view of the training that is also included in the agreement. The investment has also sent out positive signals within the organization that operation and maintenance of doctoring equipment is important and that it is something we are focusing on," Säll concludes.

Satisfied users of doctoring equipment at Skoghall

One mill with lengthy experience of doctoring agreements is Stora Enso's Skoghall mill in Sweden. "We used to find that the doctoring process was a jungle of different suppliers and products, and planning the maintenance of all the applications was difficult. Getting to grips with all the new blade materials and qualities that were constantly being developed and changed was tricky, too," explains **Ragnar Karlsson,** Supervisor/Process Engineer of KM 7 at Stora Enso's Skoghall mill. "The agreement has improved the logistics and structure of stock management – it is so much simpler nowadays. The annual overhaul of the doctoring equipment has also been of great benefit to us. One thing worth mentioning is the BladeCut equipment – it is absolutely superb. The two we have are frequently used to cut down both used coating blades and other blades. It is a simple, safe way of dealing with long blades that are difficult to handle," Karlsson adds.

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Metso's BladeCarry and BladeStore storage containers help optimize the doctoring process at the mill.

CHANGLE NUMAT PM 1

Producing white top liner in a

TEXT Marika Mattila

According to Ci XiaoLei, Vice President and General Manager of Changle Numat Paper Company, the overall efficiency of the new production line represents a great advance for the company.

novel, cost-effective way

The production of high-quality white top liner using only small amounts of virgin fiber is now a reality for PM 1 of Changle Numat Paper Company, a subsidiary of the Chinese manufacturer Shandong Century Sunshine Paper Group. This Metso-supplied machine makes coated white top liner of 120-220 g/m^2 and uncoated white top liner of 94-200 g/m^2. Coated white top liner is mainly used as the surface layer of corrugated boxes for food, beverages, electrical appliances, and industrial goods. Such end product quality characteristics as high durability and good printing properties are thus required. Changle Numat's new 7.25 meter-wide line started up in November 2010 at the company's site in Weifang City, Shandong Province, and it produces up to 500,000 tonnes of uncoated and coated testliner annually.

Cost-effective coated white top liner concept

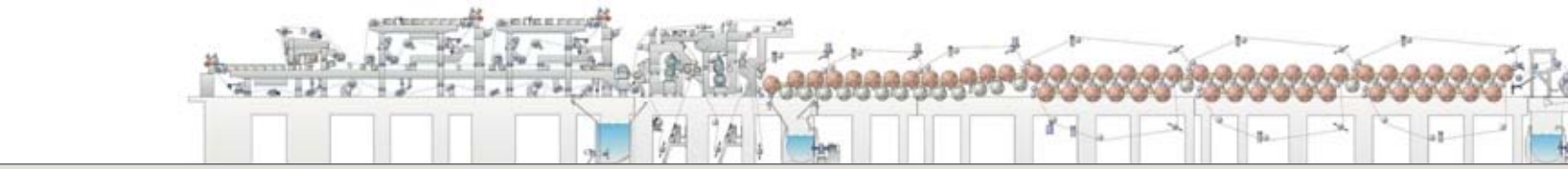
Changle Numat PM 1 represents Metso's latest board making technology from headbox to winder, together with related stock preparation and air systems. The automation system package includes a machine control, process control and quality management system. The design speed of the machine is 1,100 m/min. According to **Ci XiaoLei,** Vice President and General Manager of Changle Numat Paper Company, the overall efficiency of the new production line represents a great advance for the company.

"Changle Numat PM 1 is the first high-capacity production line producing this new type of coated white top liner in China. The company is able to create a market for its new liner grade very smoothly and quickly," says Metso's Senior Paper Technology Manager **Stig Renvall** and continues: "The quality of the end product is mainly based on European standards, and this has now become a benchmark for other producers in China. This PM 1 project means a significant leap forward for the Chinese containerboard industry."

The line's technological features include ValFlo headboxes and a three-ply multi-Fourdrinier forming section equipped with ValFormer shoe and blade forming technology. PM 1's OptiPress press section contains two straight extended-nip presses. "High-quality coated white top liner can be produced with minimal amounts of virgin fiber. One key element is the completely new design of the press section, which is running very well," says **Kyösti Tokola,** Project Manager for Metso. The press section is equipped with two straight nips in the form of SymBelt extended-nip presses. The web is fully supported through the entire press section providing both smoothness and runnability at the same time. The PM 1 line also includes a ValHard hard

"High-quality coated white top liner can be produced with minimal amounts of virgin fiber," says **Kyösti Tokola**, Project Manager for Metso.

Changle Numat PM 1 represents the latest boardmaking technology for coated white top liner.



nip precalender, a coating section with a ValSizer size press and three ValCoat Plus coating stations, as well as a ValSoft soft nip calender and a ValReel reel. Coating is dried with energy-efficient PowerDry and PowerDry Plus air dryers and customer rolls are prepared with a high-capacity WinDrum Compact winder.

Excellent results based on competent project management

Metso's way to manage projects brought additional value to Changle Numat Paper Company and was one of the key factors behind the success of the project. "We have been very satisfied with the collaborative relationship between Changle Numat and Metso throughout the whole project," says Ci XiaoLei.

Metso can provide comprehensive project management services, allowing customers to concentrate on developing their own business. Metso's project management is premised on one dedicated contact person backed up by the experience and expertise of numerous professionals. Project management can cover all steps from the feasibility stage through engineering, installation, start-up and ultimately production. "In the Changle Numat PM 1 project, the desired results were achieved through successful cooperation and good project management," Tokola sums up.

As a result, savings in project costs gained through short lead times, quick start-up, high productivity, and low risk create value for customers. Ci XiaoLei also gives good feedback about Metso's way to manage the PM 1 project: "Firstly, the construction work went fast and installation progressed smoothly. We carried out our own facilities construction work in the course of the project based on Metso's guidance, and we also got effective training periods for our operators. All of these put together made the project a success. I am very satisfied with our collaboration from the signing of the contract through engineering, installation, testing, and start-up, as well as all after-sales processes."

Changle Numat's huge leap as a coated white top liner producer

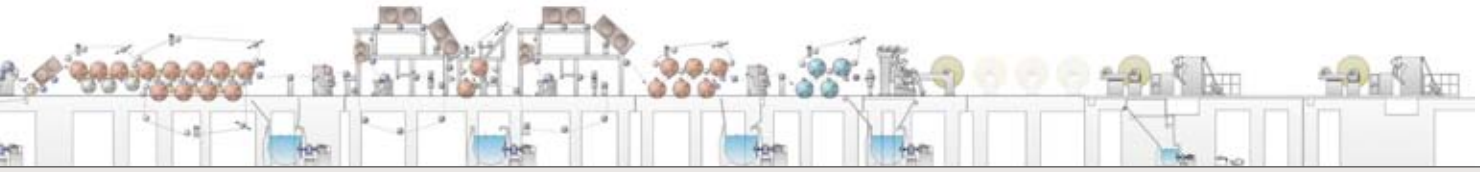
With the start-up of its newest boardmaking line, the annual output of Sunshine Paper now totals 1.1 million tonnes of various board grades. "The completion of the project doubled our capacity compared to the situation before. A higher quality level moved us into a whole new containerboard category as well," says Ci XiaoLei.

The future of containerboard grades, including white top liner grades, looks good. In addition to growth in overall consumption, new products are emerging. The Changle Numat PM 1 project provides a good example of anticipating these future needs.

Metso-supplied Changle Numat PM 1 makes coated white top liner of 120-220 g/m^2 and uncoated white top liner of 94-200 g/m^2 up to 500,000 tonnes annually.

All under the Metso umbrella

More than half of all board made in the world is manufactured with Metso machines. The various supplier names for these machines include Valmet, Beloit, Carcano, Ahlstrom, KMW and Tampella. And the people behind each are highly experienced professionals dedicated to the science and art of board making.



One of the three ValCoat coating stations of Changle Numat PM 1. The functional and innovative design of the ValCoat coating station is based on Metso's coating know-how and experience from supplying over 500 coating applications. Special attention has been given to the station's operability and coating stability.

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"The quality of the end product is mainly based on European standards, and this has now become a benchmark for other producers in China," says Metso's Senior Paper Technology Manager **Stig Renvall**.

NORSKE SKOG GOLBEY PM 2

Downgrading production costs by upgrading the runnability systems

TEXT Paavo Sairanen

HiRun runnability blow boxes are used for improving sheet support at the single-tier dryer groups of high-speed paper and board machines. When improved sheet support is exploited as reduced press-to-dryer draw, the economical benefits are significant.

The latest HiRun blow box design includes features that improve performance and decrease energy consumption. Now these new features are available also as an upgrade package for existing HiRun blow boxes.

Reduced press-to-dryer draw and higher speed with the new HiRun design and upgrade service

Norske Skog Golbey PM 2 in France produces newsprint with a wire width of 10,300 mm and a production speed of 1,800 m/min. The mill was among the first to adopt HiRun technology in 2001. A total of three HiRun blow boxes placed at the start of the dryer section are currently ensuring the runnability of the machine's newsprint production.

All HiRun blow boxes were upgraded at the mill's annual maintenance shutdown in January 2012. The priority in the HiRun upgrade service was to be able to reduce press-to-dryer draw. An additional target was to achieve energy savings in the HiRun fan. The scope of service included upgrading the old blow box design to correspond to the new standards, and a complete box overhaul.

Bruno Tapin, Process Engineer at Norske Skog Golbey PM 2 explaining why this improvement is important to the mill.

Significant process improvement and energy savings

Now, after the successful HiRun upgrade service, there is a much larger operation window available with HiRun blow boxes managing and controlling the dryer section runnability. Press-to-dryer draw was reduced from 3.1% to 2.9% with 15 m/min higher speed than before the HiRun upgrade.

Performance was clearly improved but at the same time the HiRun fan energy consumption was reduced by 45%, which is an extra bonus.

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Metso around the world

Automation

Metso's investment in QCS applications pays off with record-level orders

Metso IQ system deliveries have reached a record level. With proven successful installations over the years, Metso's market share has grown significantly to over 30%.

New Metso paper, board and tissue machines are equipped with Metso IQ systems. However, the substantial growth in Metso system deliveries is coming from replacing the so-called legacy systems, many of which were installed over the past twenty years. Just over 40% of the Metso IQ systems recently sold worldwide have replaced systems originally delivered by other vendors. In North America, that replacement rate was near 50%.

Metso has introduced many new system enhancements in recent years to improve the return on investment. Metso IQ systems have also become easier and less costly to service.

"Metso feels poised to achieve even better results in years to come. It is going to be a hard competition, but both our offering and the company are in good shape for it," says **Juha Koistinen**, Vice President, Control & Measurement Solutions.

Mining and Construction

Metso air classifiers ensure high-quality fly ash production

Using Metso's air classifier technology, Salt River Materials Group (SRMG), based near Scottsdale, Arizona, USA, beneficiates and distributes fly ash to concrete producers, roof tile producers and block manufacturers throughout the southwest.

"The greatest need is consistency," says **Ron Helms**, Operations Manager at SRMG. "Inconsistent fly ash causes a lot of problems for ready-mix producers, so we knew that as long as we were able to provide a consistent product, customers would prefer our product over non-classified fly ash."

A dual 25 tonne-per-hour classification system was installed at SRMG's Cholla facility, and the results were exactly what the team and its customers were looking for.

"The equipment helped us hit our fineness target – and we hit it day in and day out," said Ron. Due to the high quality and consistency of the fly ash, SRMG sold out all the available supply at Cholla.

Bioenergy

Finland's largest pellet-fired heating plant for Tampereen Energiantuotanto

Metso will supply a pellet-fired heating plant to Tampereen Energiantuotanto Oy in Tampere, Finland. The plant will be delivered by MW Power, the Metso-Wärtsilä joint venture. The delivery will comprise a full-scope turnkey boiler plant solution, including all the necessary equipment and commissioning. The plant will be Finland's largest pellet-fired plant, based on a technological solution that is the first of its kind in Finland. Heat production at the new plant will start in late 2012.

Tampereen Energiantuotanto Oy's pellet heating plant utilizes a solution that combines pulverized combustion technology with MW Power's boiler expertise. The pellet fuel is pulverized in separate grinding mills and burned in a pulverized combustion boiler.

Bio-oil production plant for Fortum power plant in Joensuu, Finland

Metso and Fortum Power and Heat have signed a contract regarding a delivery of a bio-oil production plant and a related automation system to the Fortum power plant in Joensuu, Finland. The delivery involves a demonstration plant, which produces bio-oil from forest residue and other biomasses. This bio-oil can be used instead of heavy fuel oil, and, in the future, may be used as a raw material in the chemical industry and biodiesel production.

Bio-oil will be produced by means of pyrolysis. In this process, wood-based biomass is quickly heated up to approximately 500°C, a temperature at which the biomass is vaporized to gases, and the gases are condensed to bio-oil when cooled.

The new bio-oil production plant is scheduled for start-up in the autumn of 2013.

Winner of
2012
Marcus Wallenberg
Prize

"How about a 20 - 70% production increase?"

Say goodbye to bottlenecks, such as the Yankee cylinder and wet stacks. The **ValZone** metal belt calender features a one-meter-long machine-direction calendering zone formed between a heated metal belt and a thermo roll. Its dwell time is about 100 times longer than with a conventional roll nip.

"ValZone improves product quality and also saves raw material through high bulk and bending stiffness. And best of all: it sets no limits on production increases," points out **Mika Viljanmaa,** RTD Manager, and the father of this pioneering technology.

www.metso.com/valzone

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