METSO'S CUSTOMER MAGAZINE FOR THE PULP AND PAPER INDUSTRY No. 2/2011

results pulp & paper

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How to gain maximum revenue at minimum cost, while managing risks, optimizing quality and keeping customers satisfied in ways that are environmentally sustainable?
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Dear reader,

"Working as One to be Number One" is Metso's renewed vision. This guiding principle crystallizes the way Metso has been working for decades in the pulp and paper industry. We are proud of the excellent cooperation within our company between all the papermaking, pulping, energy, process and automation experts. These resources, together with the valuable input of our customers, have enabled us to develop and apply world-leading solutions, products and technologies to enhance customer performance. Metso's continuous, innovative product and solution development differentiates it from other suppliers. Today, a lot of this development is focused on helping customers optimize the usage of energy and raw materials, reduce waste and improve productivity. Automation plays a very important role in this task and in the results achieved.

Metso has a wide network of automation experts operating close to customers around the globe. This everyday cooperation with customers gives us a deeper insight into real needs, and, combined with Metso's technologies, helps us create innovative solutions, a more sustainable business for our customers and a more sustainable world for all of us.

We have the widest automation offering for the pulp and paper industry, with many globally leading products. "Working as One to be Number One" also means that we want to be number one in all that we do for our customers. This is clearly stated in Metso's automation strategy.

You, as our customers, are entitled to expect results and help from us in reaching your goals, as stated in our customer promise: "Expect results". By challenging us, you, in turn, will help us create innovative, forward-looking products, services and solutions that enable both of us to succeed. Let's continue this fruitful cooperation!

Sakari Ruotsalainen
President,
Process Automation Systems

in this issue

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Metso's knowledge-based services are close to the customer, and local experts are supported by the latest information technology and the best industry experts from around the world. A wide portfolio of asset management products is available for maintenance planning and proactive maintenance. Read more on page 10.

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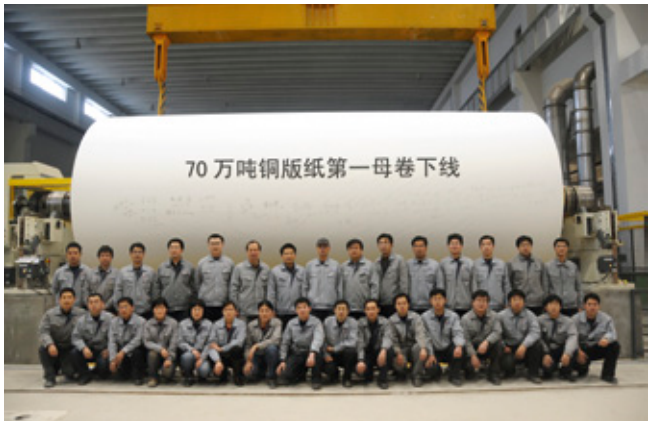
News in brief

Reporting start-ups



The first parent roll from PM 8, the Metso-supplied coated fine paper production line at Shandong Huatai Paper, on January 18, 2011. Photo: courtesy of Shandong Huatai Paper.

Shandong Huatai Paper starts up their fine paper line

PM 8, the Metso-supplied coated fine paper production line at Shandong Huatai Paper Co. Ltd, successfully came on stream on January 18, 2011, in Dong Ying City, Shandong Province, China.

The 8.1-m-wide PM 8 has an annual dimensional production capacity of close to 700,000 tonnes of coated and uncoated fine papers within the basis weight range 80-200 g/m^2. The paper machine design speed is 1,800 m/min and the coater design speed is 2,000 m/min.

Metso's delivery included a complete Metso OptiConcept paper machine from headbox to reel. The paper machine line also comprises a re-reeler and an off-machine coater with coating stations, off-machine OptiLoad multinip calenders, winders, a parent reel handling system and a comprehensive Metso automation system package. The production line was started up with a Metso wet end machine clothing package.

"The PM 8 start-up was successful thanks to the state-of-the-art equipment supplied by Metso and the strong co-operation between Huatai's and Metso's project teams. Based on the good experience with Metso, Huatai is looking forward to producing high-quality art paper in the near future," states **Wei Lijun,** General Manager of Huatai PM 8 art paper line.

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SCA starts up their tissue making line in Mexico

The Metso-supplied tissue making line at SCA in Mexico successfully came on stream on November 15, 2010, at SCA's greenfield mill site in Ciudad Sahagún, Hidalgo State, close to Mexico City. The new PM 1 line has an annual production capacity of 60,000 tonnes of high-quality facial, toilet and towel grades.

Metso's scope of delivery comprised a complete turn-key tissue production line. The production line is fully Metso-engineered and optimized with regard to energy savings, production efficiency and quality. The scope of supply included a tissue machine, deinking plant, effluent plant, stock preparation system, a mill-wide automation package, and all other auxiliary equipment and systems needed for the mill. Transport, installation, training, start-up and commissioning were also included in the delivery. The combination of Metso's wide hardware portfolio and extensive know-how and project services has created a highly competitive production unit.

"Within Metso we have the best professionals and very committed people to make such an extensive project as this possible. The installation at the site was finalized timely with high quality and in flawless cooperation with the SCA project team," says **Dan Finnerman,** Vice President, Project Management, Tissue business line, Metso.

The civil engineering and building construction was handled by SCA. Special attention was paid to the interaction between the civil engineering and Metso's plant design.

"Metso supplied a very complete solution for the tissue mill. The SCA project team worked closely with Metso throughout all phases of the project. The support and cooperation from Metso was excellent and the tissue machine start-up went very smoothly," said **James Haeffele,** Vice President, Tissue Technology for SCA North America and Project Director for the Sahagún greenfield tissue mill project.

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Hayat Kimya starts up their tissue machine

A Metso-supplied Advantage DCT 200 TS tissue production line successfully came on stream on December 18, 2010, at the Hayat Kimya A.S mill in Yeniköy, which is located near the city of Izmit in Turkey. The Hayat Kimya TM 2 started up smoothly on schedule and produced a good-quality saleable product from the very beginning.

"We reached a successful start-up in a record short time of 13 months from signing the contract thanks to good cooperation

A Metso Advantage DCT 200 TS tissue machine successfully started up at the Hayat Kimya A.S mill in Yeniköy, Turkey, in December.

and the efforts by the Metso personnel. In light of the short time, the start-up was a great success for all of us. This cooperation will continue and I am convinced we will continue production with a very good paper quality," says **Lütfi Aydin,** Paper Mill Director at the Hayat Kimya mill.

Metso's delivery comprised a complete tissue production line, including a stock preparation system and an Advantage DCT 200 TS tissue machine. The delivery also included an extensive automation package.

With a width of 5.6 m and a design speed of 2,200 m/min, the new line has a design capacity of 70,000 tons of high-quality facial, toilet and towel grades per year. Raw material for the new line is virgin fiber. The production line is optimized to save energy and to enhance final product quality.

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Metso starts up two new-generation refiners

In November 2010, Metso successfully started up the first two OptiFiner Pro refiners at Koehler Greiz GmbH & Co. KG's mill in Greiz, Germany, and Sappi Fine Paper's Biberist mill in Switzerland. OptiFiner Pro is a revolutionary low consistency refining concept introduced by Metso in the summer of 2010.

The first start-up at the Greiz mill was on deinked pulp for trim refining/deflaking. The Greiz mill produces colored recycled papers and board for office, school and graphics applications. The mill's target is to break the fiber bundles, shives and other impurities with the minimum refining degree change. According to **Ulrich Mallon,** Technology and Quality Assurance Manager at Greiz, "The delivery, installation and start-up was very smooth and on schedule. We are currently running the optimization phase, but compared to the old machine we have already observed significant energy savings."

The second OptiFiner Pro started in mid-November at Sappi's Biberist mill, replacing four conventional conical refiners in a eucalyptus stock preparation line on a coated fine paper machine. The Biberist mill produces coated woodfree paper for the graphic arts and offset printing industry, as well as woodfree uncoated pre-printed paper for office, pre-printed and offset applications. **Stefan Franke,** Development Engineer at Sappi Biberist, says the mill's targets for energy savings and quality improvement have been met: "Energy savings are as expected with good strength development and strength improvement with the same specific refining energy."

The OptiFiner Pro is a revolutionary new low consistency refiner with a very compact design. In conventional refiners, the fibers travel the full length of the refining zone, suffering excessive impacts that lead to increased fines and weakening of the refined fibers. Many fibers, as much as 70% of the total, may not be treated at all. To combat this, OptiFiner Pro feeds the stock evenly across the bars directly in the refining zone where the fiber treatment occurs. All of the stock is treated equally, providing higher refiner loadability and better energy efficiency. Flexibility in operation is gained, as well as easier installation owing to its smaller physical size.

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Fujian Liansheng Paper starts up their containerboard machine

The Metso-supplied PM 3 containerboard machine at Fujian Liansheng Paper Co., Ltd. in Zhangzhou City, Fujian Province, China, successfully started up on February 9, 2011.

PM 3 produces fluting within the basis weight range 80–120 g/m^2. The annual production capacity of the 6.4-m-wide (wire) machine is around 300,000 tonnes and the design speed is 1,100 m/min. The production line was started up with a Metso wet end machine clothing package.

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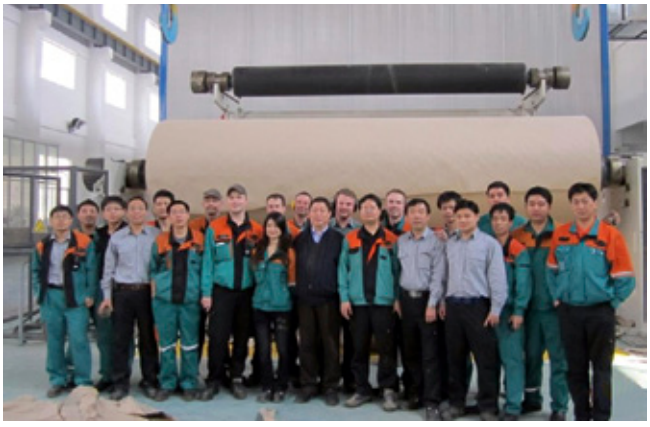
OptiFiner Pro on deinked pulp for trim refining/deflaking at Koehler Greiz GmbH & Co. KG in Germany.



The start-up groups from Fujian Liansheng Paper and Metso at the first parent reel.

Nine Dragons Paper Industries starts up two Metso-supplied containerboard machines

The two Metso-supplied containerboard machines of Nine Dragons Paper Industries, a subsidiary of Nine Dragons Paper (Holdings) Ltd., have successfully been started up in Taicang, Jiangsu Province, China. The testliner machine PM 29 came on stream on January 15, 2011, and the fluting machine PM 30 on January 31, 2011.

PM 29 is a three-ply multi-Fourdrinier machine with a WinDrum winder and produces testliner in the basis weight range 115–175 g/m^2. The PM 30 is equipped with a ValFormer shoe blade hybrid former and a WinDrum winder, and produces fluting in the basis weight range 70–90 g/m^2. The wire width of both machines is 7.25 m.

Both machines started up at a record-breaking speed. The time from stock on wire to sheet on reel was only five hours at PM 29 and three hours at PM 30. This was made possible through careful installation and meticulous testing of the production lines.

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Reporting latest orders

Wash press for Mondi Richards Bay

Metso is to supply Mondi's Richards Bay mill in South Africa with a new wash press. The Mondi Richards Bay mill, commissioned in 1984, produces more than 720,000 tonnes of bleached pulp per year, mainly using eucalyptus from their own plantations as raw material. Start-up of the new wash press is scheduled for the end of 2011.

Metso's delivery will include a TwinRoll Evolution wash press, basic and detailed engineering, and site services. The new wash press will allow Mondi to improve the existing brown stock washing process at the mill.

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Metso expands its maintenance cooperation with SAICA

Metso and SAICA have made an outsourcing agreement on the mill maintenance of Saica Containerboard UK Ltd's paper mill at Partington in the United Kingdom. With this multi-year agreement, which became effective as of January 11, 2011, Metso will assume full responsibility for the establishment of maintenance operations, mill maintenance and management of improvement projects for the power stations, stock and paper production facilities and water treatment equipment at the Partington mill.

The containerboard production line at the Partington mill will also be supplied by Metso. The line is scheduled to start up in the first quarter of 2012.

SAICA and Metso have a long history of maintenance cooperation: the companies have operated a joint venture for the maintenance of the SAICA mills in Zaragoza, Spain, since 2005, and Metso has had a mill maintenance unit serving the SAICA Venizel mill in France since 2007. Based on this cooperation and Metso's other maintenance references, SAICA and Metso have together developed a maintenance outsourcing model for SAICA's Partington mill. The model optimizes the use of proactive, condition-based, predictive, preventive and corrective maintenance and is based on Metso's streamlined reliability centered maintenance (RCM). The model ensures the highest possible equipment efficiency and cost optimization.

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Pulp mill equipment for Eldorado Celulose e Papel

Metso is to supply a new recovery boiler and evaporation plant for Eldorado Celulose e Papel S.A.'s new greenfield pulp mill investment in Brazil. The start-up of the new plant is scheduled for Q4/2012.

"The capacity and features of the equipment supplied by Metso relate not only to the return on investment but also to the search for solutions that bring high technology to sustainable industrial processes. An example is the recovery boiler supplied by Metso, which represents a clean-energy-generating process using a renewable raw material – in this case, eucalyptus biomass residues," says **Carlos Monteiro,** Industrial Director, Eldorado Celulose e Papel S.A.

Metso has achieved a very strong position as a supplier of recovery technology in the recent greenfield pulp mills projects in Brazil. "The order reinforces Metso's leading position as a supplier of extra large size recovery boilers and recovery lines for the global pulping industry," says **Kai Mäenpää,** Vice President, Capital Projects, Power business line, Metso.

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Metso to rebuild tissue machine for Syktyvkar Tissue Group

Metso will rebuild the existing PM 1 tissue line of the Syktyvkar Tissue Group, JSC at their Syktyvkar mill in the republic of Komi in Russia. The first stage of the rebuild of the line is scheduled to be completed at the end of this year.

Metso will rebuild the PM 1 tissue line to be of the Advantage DCT 100 type, similar to the mill's PM 2 tissue line built by Metso. The first stage of Metso's delivery will comprise a Metso deinking line with stock preparation equipment and an Advantage DCT 100 former section, including an OptiFlo II TIS headbox, a press section, an Advantage AirCap hood and a reel. The delivery will also comprise Metso QCS and DCS systems.

The 2.7-meter-wide PM 1 tissue machine is designed for a speed of 1,600 m/min and the line for a daily production of 75 tons of tissue.

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Metso to supply installation and commissioning services for Amcor in Australia

Metso will supply Amcor Packaging (Australia) Pty Ltd with installation and commissioning services as part of its new B9 machine project for a containerboard line at its Botany Mill in Sydney, Australia.

The main order for the containerboard line was received from Amcor and published in 2008 and an add-on order for this line was received from Amcor and published in 2010.

The new order will comprise the installation of the containerboard machine equipment for the B9 line and supervision services related to commissioning, testing and start-up, as well as training services. The installation and services package will complement Metso's extended scope of supply to Amcor and strengthen the project implementation.

The Botany Paper Mill B9 will generate high-quality recycled paper from waste collected throughout the Sydney area, and will produce paper-based products across a wider range of weights and create packaging that is lighter, more efficient and more environmentally friendly.

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metsoDNA control system for Sappi's Stockstadt mill in Germany

Metso will supply a modern metsoDNA control system for the Metso/Valmet winder type JR 1000 delivered to Sappi Fine Paper's Stockstadt mill in Germany in 1992. The system upgrade will enable adapting production line No. 2 at the Stockstadt mill to the constantly changing market requirements. In order to adjust to the increasingly stringent safety requirements and bring the JR 1000 winder to the newest level of safety engineering, modifications will also be made to the winder's safety devices and its surroundings.

The rebuild is planned for the summer and fall of 2011.

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Metso concludes an agreement to supply pulp mill key technology to Suzano in Brazil

Metso has concluded an agreement to supply all main technology for the 1.5-million-tonne greenfield pulp mill of Suzano Papel e Celulose S.A., to be built in the state of Maranhão in the northeastern part of Brazil. Start-up is scheduled for the first half of 2013. A stock exchange release regarding the advanced negotiations between Metso and Suzano was published on March 1, 2011.

Metso's scope of supply covers the main parts of a greenfield pulp mill comprising 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. The new mill will produce 1.5 million tonnes of bleached eucalyptus market pulp per year.

"The order from Suzano emphasizes Metso's strong capabilities as a full-scope supplier for the global pulp industry. It is a result of the hard work our dedicated and knowledgeable employees have done to develop and provide leading-edge technologies," says **Pasi Laine,** President of Metso's Paper and Fiber Technology.

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Jeesr Industries orders tissue line

Metso will supply the Moroccan Jeesr Industries with a complete tissue production line for their mill in Berrechid, close to Casablanca. The line is scheduled to start up in the fourth quarter of 2012.

Metso's delivery will include a complete production line with stock preparation equipment, an Advantage DCT 100+ tissue machine, a rewinder and wrapping equipment. The production line will be optimized to produce top-quality tissue paper at low energy and water consumption levels. The delivery will also comprise an extensive Metso automation package.

With a width of 2.85 m and an operating speed of 1,800 m/min, the new production line will produce around 30,000 tonnes of high-quality facial, toilet and towel grades per year. The raw material for the new line will be virgin pulp.

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Metso to rebuild a relocated paper machine for Grupo Unipak in Mexico

Metso will rebuild a relocated fine paper machine for the Mexican Grupo Unipak, S.A. de C.V. PT. at their new mill site Grupak Hidalgo in the municipality of Emiliano Zapata in Mexico. The start-up of the relocated and rebuilt machine is scheduled for the first quarter of 2013. The relocated machine originally comes from the USA.

A 5.6-m-wide fine paper machine will be reconditioned and modified to manufacture recycled containerboard grades in the basis weight range of 70-195 g/m^2. Metso's delivery will comprise a modernization of the forming section. Metso will also modify the dryer section, air systems, steam and condensate system as well as stock preparation system with a new dry end pulper.

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Reporting awards

The Arne Asplund Mechanical Pulping Award 2011 has been granted jointly to Mr. Keith B. Miles, Dr. Marc J. Sabourin and Dr. William C. Strand

Mr. Keith B. Miles.

Dr. Marc J. Sabourin.

Dr. William C. Strand.

The Arne Asplund Mechanical Pulping Award 2011 has been granted jointly to **Mr. Keith B. Miles, Dr. Marc J. Sabourin** and **Dr. William C. Strand** for their work on how to control the mechanical pulp quality as well as the energy consumption, utilizing the concept of refining intensity directly or indirectly. Their combined contributions have greatly advanced our understanding of how to optimize the efficiency of the TMP refining process. The award will be presented at the International Mechanical Pulping Conference in Xian, China, on June 28, 2011.

Mr. Keith B. Miles was employed at Paprican (today FPInnovations), Pointe-Claire, Canada, in 1968 and throughout his long professional career as Principal Scientist remained faithful to the Mechanical Pulping Division at the Institute until his retirement in 2010.

Mr. Miles has published many early pioneering studies on the fundamental mechanisms in chip refining, based on measurements of refining zone temperature distribution, plate gap, dynamic disc alignment and shaft thrust. He has also developed a breakthrough theory of steam and pulp flow in the refining zone. The generally accepted concept of refining intensity that has emerged from his work has been a valuable tool in processing design and control of the relationship between specific energy and pulp quality in chip refining processes.

Dr. Marc J. Sabourin, Ph.D., is a graduate of Manchester University of Science and Technology in the UK. He has worked in the pulp and related supplier industry since 1986 and currently holds the position of Global Director at Andritz Inc.

Dr. Sabourin has made a number of contributions to improving energy efficiency in the chip refiner processes, putting fundamental studies from Pulp and Paper Institutes like FPInnovations (former Paprican) and KCL into practice, and adapted the concept of refining intensity defined by Miles and May by using high disc rotational speeds for energy efficiency in optimizing the refiner processes.

Dr. William C. Strand, Ph.D., graduated from the University of Idaho in Moscow, USA, in 1989. His work began with the Royal Institute of Technology in Stockholm in 1983 and continued in cooperation with Sunds Defibrator (today Metso) and Stora (today Stora Enso). During that time he studied the fundamental mechanisms in the refining gap and called attention to the importance of using a high production rate to reduce energy demand in refining.

In 1989, as a founding partner of Pacific Simulation, Dr. Strand began the development and implementation of the advanced pulp quality control systems for which he is most highly recognized. He has developed Forgacs' pioneering work on how to characterize mechanical pulp by applying advanced mathematics. Dr. Strand's creativity in how to develop software has enabled the implementation of his fundamental ideas in a large number of mill applications.

The Arne Asplund Mechanical Pulping Award Foundation, responsible for appointing the winner of the award, was established in 1985 to commemorate Dr. Asplund's contribution to the pulp and paper industry worldwide. The award was established to promote the development of new technology in the manufacture of high-yield pulp in refiners and is awarded to a person or persons in recognition of outstanding achievement in the research and development of mechanical pulping technology. The award consists of gold medals and an honorarium of SEK 25,000.

The award was made possible through a donation from the Sunds Defibrator Company, currently part of Metso, to the foundation in 1985. The Chairman of the Foundation is Professor Hans Höglund of Mid-Sweden University.

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Metso establishes new Tissue Technology Award for energy-saving innovations

Metso has established a Tissue Technology Award to promote university students' and scientists' work on energy efficient innovations applicable to the tissue making industry.

A total prize of 25,000 USD will be awarded for the best innovations.

The Tissue Technology Award will be given every second year and the first winners will be announced at the Tissue World conference in Nice, France, in 2013.

A sovereign jury will appoint the winners according to a specific selection process. The jury will comprise representatives from Karlstad University, Sweden, the Energy Square organization and Metso's Tissue business line.

"Energy efficiency is a crucial issue for the tissue industry globally and it takes a wide perspective and open minds to explore new areas for innovation," says **Marco Marcheggiani,** President, Tissue business line, Metso. "As the clear market and technology leader in tissue, Metso intends this award to stimulate innovative work outside our own organization."

Detailed information about the Metso Tissue Technology Award, including the application regulations, can be found at www.metso.com/tissueaward.

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AUTOMATION TODAY

How the times have changed!

Pulp and paper process automation has come a long way in the 50 years since pneumatic controllers were the norm, papermakers relied on weigh scales, hot plates and their physical senses, and information was stored in dusty paper archives. The modern mill is equipped with a complete spectrum of on-line process and product quality measurements, intelligent instrumentation and valves, unified distributed process control and quality control systems, and information management systems, all of which are currently an indispensible part of pulp and paper manufacturing. Moreover, in recent years, process automation and information applications have played a significant and increasing role in assuring consistent quality, higher productivity, lower energy/raw material costs and an environmentally sustainable operation.

Extending lifecycles, lowering costs

Modern greenfield pulp and paper mills are universally equipped with state-of-the-art process control and management infrastructures that go all the way from "chipping to shipping" – as in the slogan coined a number of years ago. However, there are still numerous mills started up in previous decades which need to change with the times in order to retain low-cost, high-quality and viable operations. The core issue for many mills is that automation infrastructures set up 15 to 20 years ago are getting a little long in the tooth, and may be starting to cause production outages due to reliability or security deficiencies. In many cases, these mills have recognized the need for change and have taken appropriate action. Moreover, they are increasingly managing the lifecycle costs of automation networks and counting the total costs of ownership. Today, automation renewal or migration programs are having a positive impact on extending the lifecycles, and lowering the costs of ownership.

The operator's companion

Perhaps one of the major outcomes of modern automation has been its huge impact on the roles and working effectiveness of process operators. Systems are now more consolidated and the information available to operators is more visible and clearer. As a result, the idea that a process control system is a decision-making aid now takes on new meaning. The availability of real-time information enables operators to change their approach from one of merely reacting to problems, to one of analyzing, managing and ultimately preventing them – all in pursuit of more efficient and profitable pulp and papermaking.

The process and product quality information to be gained from modern automation systems allow managers, supervisors and operators to follow process and product quality disturbances all the way from their upstream sources, and to nip them in the bud before they show up as problems in the warehouse or the customer's plant. Data that was previously blurred is now crystal clear, and is often the focal point for morning production meetings or the trigger for longer-term continuous improvement programs. With shared data, people in a mill can work as a team, to achieve better results and solve common problems. This culture of information sharing is the way of the future.

Mark Williamson is a Journalist Engineer who documents technological solutions and customer results. He has 40 years of experience in the pulp and paper industry, 35 of them closely connected to process automation and quality control.

Process automation systems

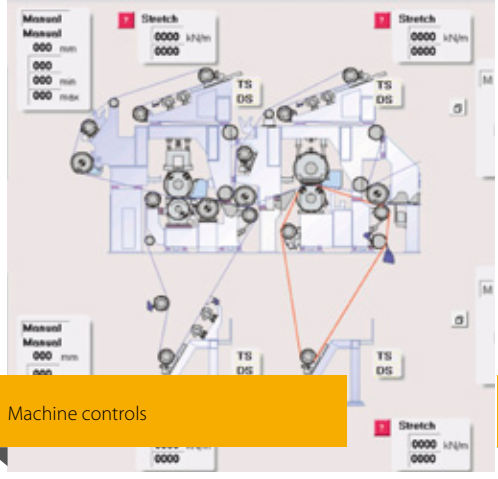
Services

Advanced process controls

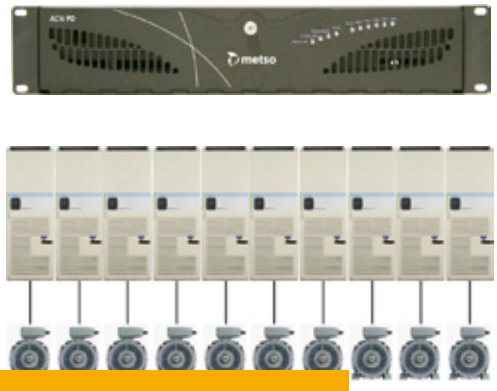
Analyzers and measurements

Quality control system

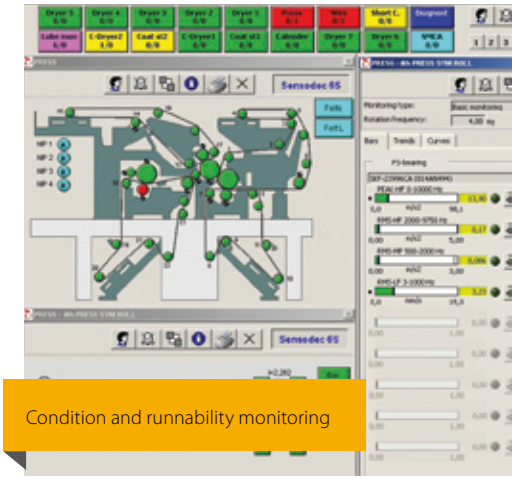
Paper quality profilers



Machine controls

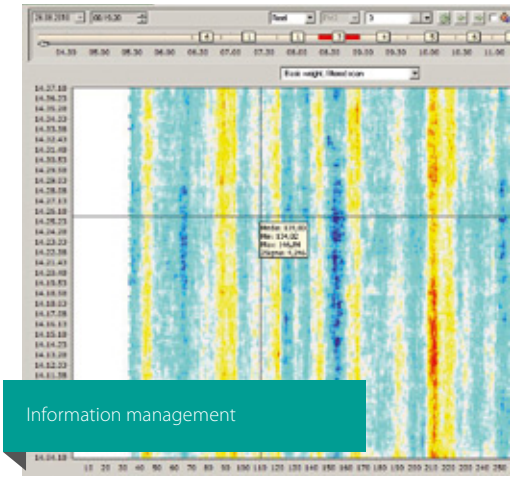


Drive controls



Condition and runnability monitoring

Web break analysis & inspection



Information management

Valves

Metso's solutions encompass all aspects of pulp and paper manufacturing and energy generation. **Metso can offer solutions and turnkey responsibility for customers ranging from small paper producers to the largest integrated mills.**

Metso's full-scope automation delivers results

TEXT Risto Lehtimäki, co-writer Mark Williamson

How to gain maximum revenue at minimum cost, while simultaneously managing risks, optimizing quality and keeping one's customers satisfied in ways that are environmentally sustainable? These are the questions that pulp and paper makers face every day at the mill.

Successful production at today's mills requires the constant, intensive use of information. Production professionals such as operators, production managers, maintenance engineers and development engineers work hard to attain their performance goals. The best results are achieved when they all work together.

Modern automation makes all of this possible. Metso has built its automation know-how on a thorough understanding of customer processes and machinery. Metso has also been a pioneer in developing the industry's most comprehensive automation offering, based on single network thinking. Metso believes that all components of the automation system – process controls, machine controls, quality controls, drive controls, condition monitoring, web-break analysis and inspection, and process optimization – should be implemented in the same environment. This also applies to the industry's leading specialty analyzers, measurement instruments and valves. As a result, users can collect and combine information from different sources, using the same information tools and engineering applications. This leads to easy decision-making, since the automation system is there to serve users and provide tangible results.

This article will present some recent cases, showing how customers have achieved results through Metso's technology and automation know-how.

Easy-to-implement systems

Metso has consistently built systems that are easily implementable in projects all around the world – wherever and whenever pulp or paper is produced.

Liu YanBo, Production Manager at Sun Paper: "The start-up was handled professionally within seven days, and since that time no unplanned shutdowns have occurred."

Fast start-up at Sun Paper through efficient project management

Efficient project management resulted in the recent successful start-up of Sun Paper's new 220,000 tpy ECF kraft pulp fiberline in Shandong province, China. High-quality pulp has now been produced for one year at Sun Paper's pulp mill – with the highest level of customer satisfaction.

The automation package was based on proven Metso DNA technology. The Metso scope of supply also included a wide range of intelligent field devices and analyzers, including consistency transmitters, over 300 valves, a kappa analyzer and a pulp brightness analyzer, as well as alkali measurements indicating liquor strength in the digester.

Liu YanBo, Production Manager, was responsible for managing the project. "Metso was a very reliable partner, and played a vital role in enabling us to learn the pulp making process," he says.

The fiberline project was implemented in a very short time period – only 10 months from contract to start-up, according to Liu YanBo. Nevertheless, there was no rush. Every phase of the challenging project was carefully planned by both parties beforehand. In the view of Liu YanBo, effective communication was the key to success. Metso's experts worked seamlessly with the customer to make this happen.

Migration becoming necessity

Twenty years ago system technology tended to be fractionated, with separate DCS, QCS, drive control and machinery control systems, and the newly emerging information technology systems. Some of them were classic "black boxes", whose visibility was limited to operators or service people. Some data was transferred through cumbersome data links, but to a large extent the operator interfaces, control panels and methods of operating were disjointed and scattered about the control room.

After many years of technology/user interface development, today's modern Metso DNA system is truly integrated and presents a common, easy-to-use interface for process operators, engineers and service technicians. Quality controls, process controls, machinery controls and interlock diagnostics, as well as drive controls, are now consistently managed and diagnosed. This has had a major impact on engineering and service costs, since the system components and engineering configuration procedures are common.

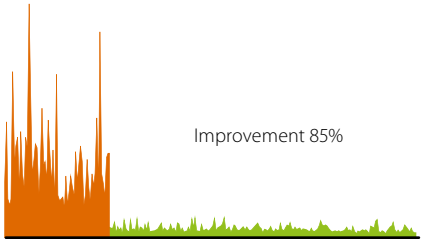
Upgrading QCS for premium quality

The measurement and control capabilities of QCS systems have been upgraded regularly over the years. As a result, there is high potential for quality and productivity improvements on many paper, board and tissue machines. New measurements, higher profile resolution, more responsive controls and new-generation actuators have all contributed to the results achieved by customers.

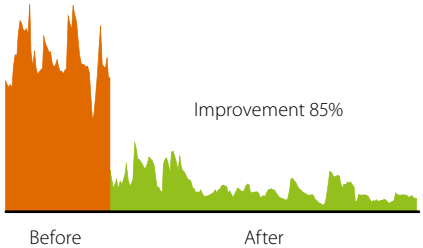
Stora Enso's coated graphic board mill at Kaukopää, Finland is a case in point. The mill's objective was to produce a premium quality product on board machine 2, but they realized that their existing quality control infrastructure was not up to the task. The mill therefore replaced the aging 1980s QCS with a brand new four-scanner Metso system, including new multi-coat sensors, and new CD control and CD profile actuators for grammage, moisture and coating weight on four stations. According to the mill, their quality targets for the new EnsoCoat product have been easily met. This gives them an improved market position and opens up their products for many more applications and end users. The stability of quality from run to run is also much better, and there is less broke and more output on BM 2.

In another similar automation renewal project, Nordic Papers in Säffle, Sweden replaced its old 1980s QCS systems and gained much more uniform quality and 60% less sheeting waste in the converting mill. The renewal also lowered their service costs.

Coat Weight MD 2-sigma



Coat Weight CD 2-sigma



The uniformity of MD and CD coating has improved substantially on the Stora Enso Kaukopää mill's BM 2, which has led to more consistent product quality and more satisfied customers for Stora Enso.

Results with services

Maintaining high process availability and optimized performance always gives a clear competitive edge. These features form the backbone of Metso's service and asset management concepts. Metso's knowledge-based services are close to the customer, and local experts are supported by the latest information technology and the best industry experts from around the world. A wide portfolio of asset management products is available for maintenance planning and proactive maintenance.

Access to critical machine vibration data is available at a moment's notice in the machine hall, in the maintenance shop or on engineers' desktops. SCA's **Roland Stadlhuber** demonstrates.

On-line diagnostics improve uptime, lower service costs

The SCA Laakirchen mill in Austria monitors its intelligent control valves and field transmitters through Metso's system, giving repair technicians and operators readily accessible information about the correct or incorrect functioning of field devices. If a problem is detected early by the system, corrective actions can be taken at the right time to avoid process upsets and potential downtime. Maintenance planning is streamlined and made cost-effective.

Siegfried Schober, Automation Project Manager at SCA Laakirchen reports on the value of this tool: "The asset management tool can be used to detect unnecessary valve movements, which may indicate developing problems and initiate a valid reason for maintenance actions. The remote desktop access to the field transmitters has been very useful for ensuring remote sensor readings are consistent with lab values. This avoids time-consuming field calibrations."

The benefits of Metso's on-line machine condition and runnability analysis systems have been well documented over the years. By analyzing current and historical trends of machine vibrations, it is possible to avoid costly failures and production outages. Thus, the mill's mechanical assets are protected and workers' safety is ensured. Condition-based maintenance planning is very effective at maintaining uptime at lower cost, since only the required maintenance is done at the most appropriate times.

Specific applications for specific business needs

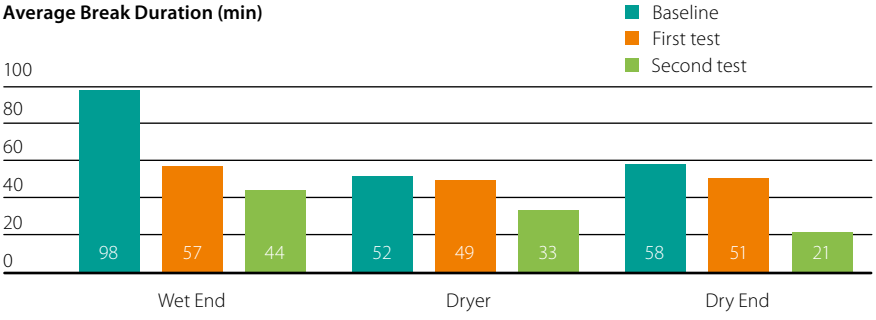
Metso's products and technologies are designed with the specific business needs of pulp and paper makers in mind. These needs include uniformity, operational reliability and cost savings.

Wet end controls improve machine efficiency

The development and application of wet end controls has been one of the major advances in QCS applications compared to legacy systems. Model-predictive wet end controls stabilize the paper machine wet end during start-ups and break periods, thereby producing consistent sheet quality during unstable periods of operation. By reducing the time to rethread and return to prime quality, papermakers can realize a major boost in paper machine efficiency and a very attractive return on investment. But this web quality stability during break recovery periods must be achieved at the wet end first, well before the sheet reaches the reel.

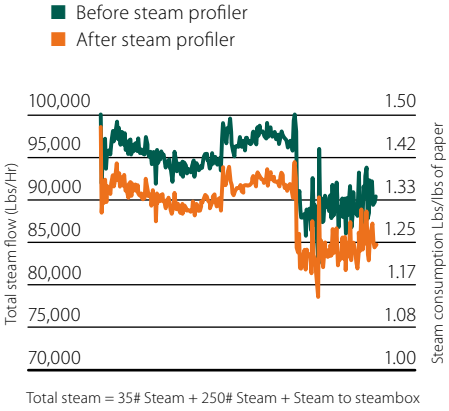
With good payback in mind, Domtar Paper Company LLC in Kingsport, Tennessee, USA invested in Metso's wet end furnish, retention and charge measurements and model-predictive controller. The measurements and controls were implemented on the 345 inch trim K1 paper machine, which produces copy paper. All objectives were met. Break recovery times were reduced significantly, as the sheet threads more consistently after breaks. As proof that a stable machine is often a faster machine, K1's speed and production rate was higher during the evaluation period after the control was implemented.

Break duration times have been reduced substantially on Domtar Kingsport's K1 machine.



Efficient use of steam energy and higher production

Ponderay Newsprint in the USA installed a Metso steam profiler in the press section of their newsprint machine and achieved a return on investment of over USD 600,000 per year, due to more efficient use of steam energy than was possible with the previous steambox. The improved moisture profiles contributed to better product quality, as well.



In a post-installation trial on Ponderay Newsprint's PM 1, steam consumption was reduced by 3.59 tons/h by a Metso steam profiler. Average mill statistics indicate an overall saving of 3.2 tons/h, which translates into a saving of USD 610,000 per year.

Higher dryness after the press section not only helps to increase machine productivity, but also improves product quality. Smurfit Kappa's Ania board mill in Ponte all Ania, Italy replaced an aging system on board machine 3 with Metso's quality control system, which included a steam profiler.

Dr. Massimiliano Listi, Mill Director at Smurfit Kappa, Ania: "Production speeds are up about 4% on average."

Dr. Massimiliano Listi, Mill Director, explained the goals of the QCS investment: "First of all, the main target was to improve CD moisture uniformity. Moisture is so important and challenging nowadays, since new higher-speed corrugating processes are more sensitive to moisture variation. But we still had to support the cost of the investment through increased production capacity," he says. And that extra production capacity would come from the higher dryness provided by the steam profiler. At the same time, cross-direction and machine-direction uniformity was improved with the extra sheet dryness provided by the Metso steam profiler in the press section.

Moisturizing profilers also contribute to better sheet quality. In many board grades an even moisture profile means the board remains flat throughout the converting process, thus improving the competitive position of board makers.

Systematic process development provides good payback

Metso has developed and refined advanced process controls for pulping and recovery lines for the past twenty years, and today the results they produce are even more relevant. These model-based controls, many of which are based on Metso process analyzers, optimize the productivity of pulping processes, reduce energy and raw material consumption, and help to make mills more environmentally sustainable. Of course, these controls must be based on a solid, secure automation infrastructure.

For several years now, Zellstoff Rosenthal's kraft pulp mill in Blankenstein, Germany has made significant efficiency and productivity improvements by employing Metso's advanced process controls in the recovery line. The first step was to upgrade the mill's previous Metso automation infrastructure to metsoDNA. This modern platform de-bottlenecked the system's capacity, solved servicing and security problems and opened the door to advanced process controls. In 2005, causticizing optimization increased the Effective Alkali (EA) of the white liquor by 4.6%. In 2007, lime kiln optimization cut lime kiln energy consumption by 3% and increased reburned lime production by 20%. In 2008, bleaching optimization of the D stage in the bleach plant lowered chemical consumption and stabilized the process. All these factors led to increased pulp production and greater chemical and energy savings.

A recent addition, in 2009, was recovery boiler optimization, which pushed the liquor burning capacity up by 2.8% to 2,030.7 metric tons of dry solids per day. "The controls follow process changes more accurately, resulting in stable running of the boiler. These facts prove that the different shifts have streamlined their ways of operating the process," confirms **Thomas Ludwig,** Zellstoff Rosenthal's Process Control Engineer. Consequently, the steam generation from the boiler jumped to 268.5 tons per hour, corresponding to an increase of 2.2%. The variation of the superheated steam temperature dropped by 55.7%, thereby improving the turbine efficiency.

Gross energy production increased by 1.57 MW, calculated from the mill`s steam network architecture and steam turbine efficiency. The energy produced by the recovery boiler is regarded as "green energy", providing an extra bonus when sold to the national grid.

The control center of Zellstoff Rosenthal's pulp mill.

Lime kiln optimization cut lime kiln energy consumption by 3% and increased reburned lime production by 20% at Zellstoff Rosenthal's mill.

Benefits achieved by recovery boiler control	Results
Liquor burning capacity	+2.7%
Steam production	+2.2%
Superheated steam temperature	+5°C
Standard deviation (1-sigma)	-55.7%
Total power generation	+2.4%
Flue gas NOx	-17.9%
Flue gas TRS	-68.4%

The multiple benefits of recovery boiler control included higher "green energy" generation and lower emission levels at Zellstoff Rosenthal's mill.

Process information at your fingertips

In a modern mill, fast and accessible process information is a vital lifeline for solving problems and improving process stability and product quality. Metso's information management solutions help pulp and paper makers to track process and quality upsets at their source, and prompt operators and process supervisors to take corrective actions that will avoid problems later when the products are in the warehouse.

Decision-making made easier

The process information management system (PIMS) at Veracel Celulose's 900,000 tons per year bleached eucalyptus kraft pulp mill in Brazil's Bahia State is both comprehensive and unique in its scope. Process data is consolidated and transformed into graphical displays, statistical charts and customized reports to help in decision-making at morning meetings and in planning long-term process improvements. However, the PIMS system goes much further than a typical IT system by consolidating on-line and laboratory quality data and using this information to classify pulp lots into quality categories. Using PIMS data, the movements of the pulp lots are managed and followed through Veracel's delivery chain.

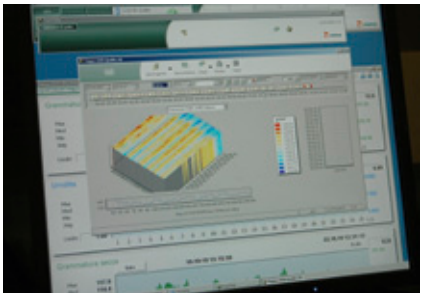
Ronaldo Morales Aguilar, Fiber Line Coordinator, and other process area coordinators, use process overview displays to easily identify any current process or quality problems, so they can set the agenda for the daily meetings. "It runs like a management DCS," says Aguilar. "Our learning curve has been assisted by PIMS, and our strategies for de-bottlenecking and process improvements are based on this system," he adds.

More detail with QCS diagnostics

Accessible and immediately useful product quality and process information is also a strength of today's Metso IQ QCS systems. At the Smurfit Kappa Ania mill in Italy, the more precise measurement resolution and the diagnostic capability of the new system allow mill staff to see much more detail on machine stability and product quality. "MD disturbance measurement is much improved and the Fourier analysis in the system is a very powerful tool," says Dr. Listi, Mill Director.

Monitoring board quality during production runs has been helped considerably by Metso's graphical quality reporting package which displays two and three dimensional representations of board quality and how it changes and responds to operator adjustments. This product quality documentation will be used to track final product quality and follow-up any claims.

Ronaldo Morales Anguilar of Veracel Celulose: "PIMS runs like a management DCS."



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Sustaining results

Change has become the rule in pulp and papermaking. It involves continuous development, in both the mills and the organizations running them. Automation develops together with organizational and process changes and needs. Truly scalable automation and information management environment has been designed to support user interaction and process reliability, and to secure the whole life cycle of operations.

Metso's advanced user interaction tools are deeply rooted in customer needs. Role-based and task-oriented interfaces allow users to concentrate on critical production information.

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HIGH-PERFORMANCE TURN-UPS WITH

High-pressure water and a tiny drop of adhesive

TEXT Petri Mustonen **PHOTOS** Per Anders Sjöquist

Ortviken's **Sofia Sandén,** Process Engineer, and **Lennart Wiström,** Project Manager, are pleased with the new Water Jet Turn-up Device. Interviewee **Sofia Burström,** Process Engineer, was occupied elsewhere.

A group of excited SCA Ortviken PM 1's off-coater's personnel have gathered on the small walkway on the tending side of the 1990-installed OptiReel reel. The group wants to follow the performance of Metso's freshly installed Water Jet Turn-up Device (WJTUD) with adhesive pick-up. The reel is accelerating an empty spool up to machine speed and the group is anxiously waiting for the next turn-up. Finally, the primary arms with the next spool move forward and a few seconds later the nip closes. Silently, the tail is picked up with a tiny drop of adhesive and the spool is wrapped with the first layer of paper. Reeling continues smoothly without interruption. The Water Jet Turn-up only causes a few pieces of stamp-size paper to fly through the air and land on the floor. The previously silent group starts to smile and clap their hands.

The project kick-off meeting took place on a sunny day in Ortviken, Sweden. Was the wonderful summer day a good sign for this project? The dialog between the SCA Ortviken and Metso project groups was good and fruitful from the very early stages of the project, and was a key factor in the good outcome of the project.

Lennart Wiström, SCA Ortviken's Project Manager, explains the reason for the investment: "Turn-up efficiency with the knife was very high, but the disadvantage of the old turn-up method with the higher machine speed was the vibration caused by the paper bundle being sucked in between the inner paper layers. Also, the old knife turn-up method was loud and the cause of a lot of large pieces of paper flying around. So, the main goal was to reduce the vibration and wear in the OptiReel reel during turn-ups." Reducing the bottom waste was also considered important.

"Now, with smoother turn-ups, we have the possibility and confidence to increase the speed and maintain it during the turn-up sequences", says **Sofia Burström**, Process Engineer from SCA Ortviken. "And

"Now, with smoother turn-ups, we have the possibility and confidence to increase the speed and maintain it during the turn-up sequences", says **Sofia Burström,** Process Engineer from SCA Ortviken.

The first paper layer after turn-up; the surroundings stay clean and the bottom waste is low with the Water Jet Turn-up Device.

for the operators it means less cleaning after each turn-up and less waste paper to take care of. Compared to the past, the Water Jet Turn-up is silent. Overall, the operators and maintenance groups like this investment," adds Lennart Wiström.

Metso can provide customer mills with expertise in project handling, quick installation of the Water Jet Turn-up Device and smooth commissioning. Furthermore, Metso's deep knowledge of the reeling process enables smooth, easy and effective projects.

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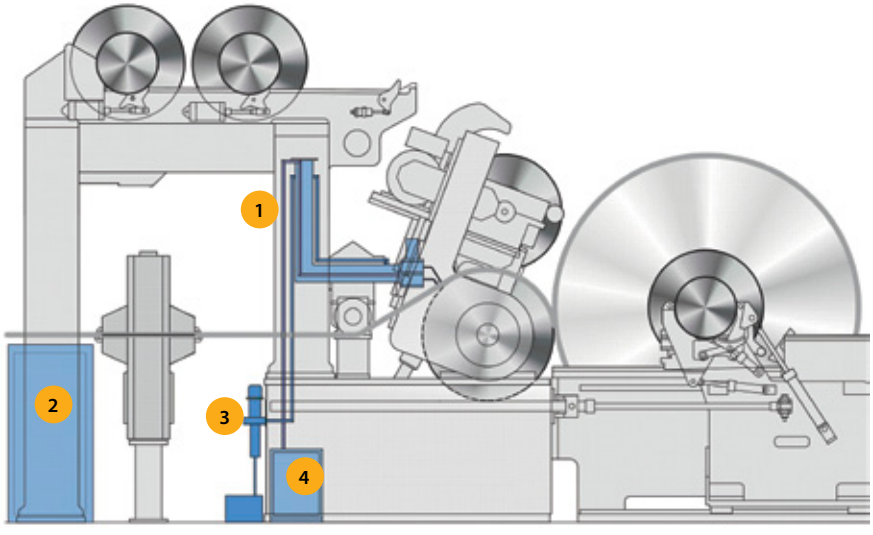
With relatively few components, the Water Jet Turn-up Device is quick to install.



Water Jet Turn-up system

1. Water jet cutting beam
2. Servo cabinet
3. Adhesive unit
4. High pressure unit and water tank

Believing in pulp & paper

PASI LAINE, METSO PAPER AND FIBER TECHNOLOGY'S NEW PRESIDENT

I interviewed **Pasi Laine,** the incoming President of Metso's Paper and Fiber Technology (and deputy to the Metso group's new CEO, **Matti Kähkönen**), at the company's global headquarters in Helsinki, Finland. At the time of the interview, Laine had only been in the post for approximately one hour! However, with a background such as Laine's – with over 22 years experience immersed in the very depths of Metso's pulp, paper, automation and power operations - he is far from a new-comer to the business and the down-to-earth Finn appears to be a solid choice to have at the helm of the company as it tackles future challenges.

TEXT Mark Rushton, Editor, Pulp and Paper International

So, how does it look from the hot seat of one of the leading suppliers to the world wide pulp and paper industry? Laine says: "Well, I may have only been in the post for a short while, but I have spent the previous three months travelling around and really getting a grip on our global situation. That has involved two trips to Brazil, one to China, and of course a number of visits to our facilities in Sweden and Finland, and I have to say that from where I stand, Metso's Paper and Fiber Technology is in great shape."

"Because of the global nature of the pulp and paper business there is a lot of adjustment that has to take place in different regions and markets, which includes the appointing of all the right people down the line," continues Laine. "One of my key objectives in this appointment is to make sure we maintain, progress and evolve this ethos which has become one of our priorities over the years. Personnel - particularly local to our operations around the world - are instrumental to our success. An example of this is that in Brazil we have a highly skilled Brazilian team, and in China, we have a highly skilled Chinese team, which all helps to maintain a close link with our customers and an ability to communicate all the features of our technology and service offerings across the complete pulp and paper scale."

The "Old World" is still a big world

Laine's busy schedule so far, and more importantly the destinations of those visits, perhaps reveals what the company sees as the "hot" areas of the world when it comes to pulp and paper. Laine

responds: "Actually, whilst Latin America and China are important, the fact is that all regions of the world are important to us. Take for instance North America; this region may not have many capital projects going on, but it is still a vital player in the production of pulp and paper – in fact somewhere around 40% of global pulp production is still produced in the region. It is also a massive market for paper products, and therefore the paper production that serves it. So North America in turn is vital to Metso for the service business it generates for us."

The service business within the Paper and Fiber Technology represents a healthy 41% of its total sales, and Europe is also key in this area. "The European region is again of high importance," stresses Laine. "The "Old World" is still a big world; capacity and consumption is high and we have good demand from customers in Europe. Again, this is mainly in the service and rebuild markets, but as we all know, high value new capital projects pop up every now and then. So as far as we are concerned, Europe is still a vibrant region and will continue to be so."

Laine started out as an automation engineer programming DCS systems, a task which he says he can still confidently carry out. Originally beginning his career with Metso in Toronto, he moved back to his home country of Finland at the end of the 80s, and then had various stints in sales and automation in both Germany and the UK, at what was then Valmet Automation. This was followed by a stint in automation as Finland country manager, then a couple of years back in pulp and paper, and then the first major responsibility as head of Metso's Valves business. For the five years preceding his appointment as President of Paper and Fiber Technology, Laine was President of Metso Automation, at the same time as being in charge of Metso's Energy and Environment Technology, which also encompasses power and recycling.

"And yes of course, Latin America, China and the rest of Asia are incredibly important to us. In the case of Latin America, the pulp capacity increase is a big part of our business in the region, but there is also the opportunity in the coming years of the increase in papermaking capacity. China is and will remain interesting to us, particularly over the next five to 10 years for two reasons; new capacity of papermaking, and the increasing service market due to the growing installed base of modern machines."

Areas of growth

According to paper industry analysts in terms of business segments, packaging and tissue are showing the most growth, which are also areas that Metso has strong offerings in. In fact on the packaging side, Nine Dragons, one of China's rapidly rising producers, has recently started up two brand new Metso containerboard machines. Laine comments: "In terms of capital projects, board machine production is prolific, particularly in China as the packaging market continues to rise, and we believe that this market will continue to be strong. Of course we plan to remain as the leading supplier in that market."

"The tissue area is looking really good as well," continues Laine. "And the good thing about this product is that it is not so China-centric, and is generally made and produced where it is consumed. We are currently building machines in several countries. We have done a lot of work on our tissue machine offerings, and have developed good modular concepts. This is a market that continues to look promising."

Metso's Paper and Fiber Technology spends around EUR 50 million on R&D annually. Laine says: "R&D in the growing regions and business areas is vitally important to us going forward. We currently have most of our research facilities and pilot plants in the Nordic countries, and one of the challenges we have is developing R&D facilities in the growing regions."

Keeping in the current strong position

One of the big questions that everyone likes to know when a new president comes in, is what, if any, changes are going to be made? Laine says: "The management team in Paper and Fiber Technology at Metso have been hard at work over the last few years making their own changes and adjustments, mainly to respond to market conditions and the fact is Metso has to continue to be agile and constantly challenge the way we do things. But I don't see it as my role to come in and make sweeping, radical changes. I strongly believe that we have to continue in exactly the way we have been operating, but in some areas we have to quicken the pace, and certainly throw further challenges at the competition. The main thing in my estimation is to keep us at the current strong position at the same time as constantly improving."

"If there are any areas I am looking at to make further changes, it will be in the manufacturing and service footprint," continues Laine. "For instance a lot of production and engineering is carried out in Scandinavia and then shipped to customer sites all over the world. Logically the next step would be to have a close look at how we can reduce that footprint and perhaps move some manufacturing closer to the customers. And on the service front, it is critical to develop the service core all the time. In the service business, you can't take big steps, you have to do everything on a small scale, consulting with the customer constantly. This is an area we will be working on."

When commenting on his particular management style, Laine admits to being more orientated to the overall holistic operation as opposed to being purely sales or production driven. He says: "Because of my engineering background, I am more inclined to make machines work, rather than sell them, but my strength is in picking the right team for all areas and making sure that the whole organisation is functioning as well as possible."

Does Laine have a message for Metso's customers all around the globe about the future? "All the people working for the Paper and Fiber Technology business at Metso believe in pulp and paper. When you look at this business in a global sense, you see that it is a fascinating and most importantly, a growing industry. And when you take into account the sustainability factor, and the fact that half of what is used as raw material in the paper industry is from recovered paper and the other half is from renewable resources, what better industry could we choose to be in?

"Metso is a proud and committed supplier to this great industry, and it is also one of the largest. So whether it be pulp, paper, board or tissue, we are ready to challenge all players in any segment and market area."

Shandong Bohui Paper's expansion plan becomes reality

Shandong Bohui Paper Co., Ltd. in Zibo, Shandong, China has the ambitious goal of becoming the largest coated board producer in China. The BM 2 board machine supplied by Metso is an important step towards the big target. So far, the modern technology has gained market acceptance by ensuring high end-product quality with superior smoothness.

TEXT Sari Lammi-Lehtonen & Pauliina Purola **PHOTOS** Hannes Frigård & Jouni Kemppainen

Founded in 1994, Shandong Bohui Paper Co., Ltd. is a large-scale enterprise with an annual paper and boardmaking capacity of approximately 1.25 million tons. With 5,000 employees, the company's leading products include coated board, printing and writing paper, testliner board, gypsum board, and kraftliner board. Shandong Bohui Paper's mill also produces pulp for its own use and for sale.

"Our main products now are coated boards including grades from 170 to 400 gsm, and we aim to develop our high quality folding boxboard production in the future," explains **Yang Yanzhi,** Executive Vice General Manager and Project Director of the Shandong Bohui Paper BM 2 project.

"To become someone in the high-quality folding boxboard market, we needed to increase our capacity by 300,000 tons annually. The BM 2 investment was needed for this purpose, as well as to help achieve the cigarette board quality that makes us a strong player in the market," he continues.

Full-scope supply from Metso

Metso's scope of supply comprised an all-online coated board machine from headbox to winders with related stock preparation and air systems, as well as a BCTMP (bleached chemi-thermomechanical pulp) plant. The complete automation systems package included quality controls, as well as runnability and condition monitoring systems.

The line's technological features include a three-ply multi-fourdrinier forming section equipped with ValFormer shoe blade forming technology and a ValZone metal belt calender, enabling raw material savings compared with conventional calenders, and ensuring excellent printability of the board. Coating drying is carried out with energy-efficient PowerDry Plus air dryers that consume up to 50% less energy than conventional infrared dryers.

The BM 2 was started up with Metso fabrics in the forming, press and dryer sections and Metso's BlackBelt shoe press belts.

The quality of the folding boxboard has to be high to be turned into these fine end-products.

Minimum investment with maximum profit

Metso was chosen to be the only supplier for the BM 2 project from pulping to finishing. According to Yang Yanzhi, a single-supplier project reduces problems and costs and increases working efficiency.

"Working together with a global board technology professional such as Metso sim-

ply means combining minimum investment with maximum profit," Yang Yanzhi explains. "A professional partner helps you find the parts of the investment where it is possible to make savings and to utilize technology advantages to gain a better price for better end-product quality – thus to increase profit."

"On the other hand, a true partner is also known for its ability to find solutions. Metso has been very good at this. For instance, with a design speed of 800 m/min we have managed to reach an operating speed of 830 m/min as a result of our combined efforts. And we are now working together to achieve 900 m/min."

Equipment, forest, people

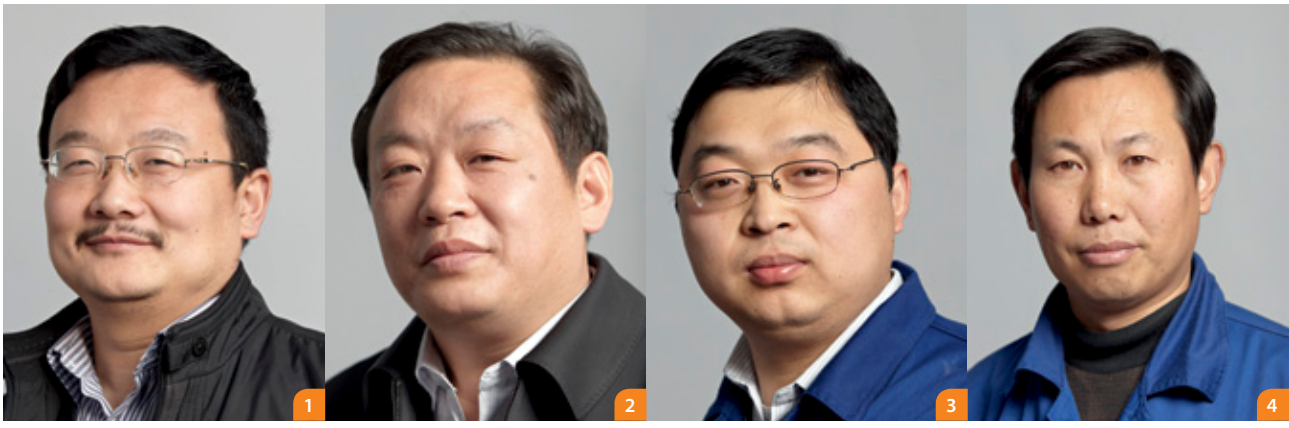
Cheng Li, who is responsible for the process of the whole boardmaking line commented on the growth plan as follows: "To become not just the largest, but the best folding boxboard producer in China, we have to meet the customer's demand."

"For this we need the best possible machine with advanced technology solutions. Modern technology is the key to the growth. It enables us to produce excellent quality at lower cost."

1 Yang Yanzhi, Executive Vice General Manager and Project Director of the Bohui BM 2 project: "A professional partner helps you find the parts of the investment where it is possible to make savings and to utilize technology advantages to gain a better price for better end-product quality – thus increasing profit."

2 Hu Anzhong, Vice General Manager of Shandong Bohui Paper.

3 Sun Shixiang, Vice President, Automation, Shandong Bohui Paper.



"Furthermore, we need the best possible raw materials, which is why we make our pulp ourselves, and, to ensure the lowest raw material cost, we also prefer having our own forests," explains Cheng Li.

"Last but not least we recruit the best people throughout the entire country. And this is the biggest challenge because we want the most talented people from the pulp and paper industry to ensure our long-term development," he concludes.

In Zibo City, the hometown of Shandong Bohui Paper Co., Ltd., one can also find traditional Chinese beauty..

Modern technology as competitive advantage

The Vice General Manager of Shandong Bohui Paper, **Hu Anzhong** is especially pleased with Metso's modern and well-equipped board machine's capability to produce better board quality than the previous machines, by improving features such as smoothness and flatness. He considers the mill's modern technology to be a competitive advantage for higher stability and lower cost.

Describing the benefits of their Metso technology advantages, he explains: "The BM 2 features several technology highlights that improve quality stability. For instance, the ValFormer helps achieve better paper formation."

4 Cheng Li, Process Manager, BM 1 and BM 2, Shandong Bohui Paper.

"In the coating section, the PowerDry Plus air dryers enable better energy efficiency compared with traditional infrared dryers. In addition to a cleaner environment, they are easy to operate and maintain."

Smoothness and flatness accepted by the market

"The end products from BM 2 are sold in the domestic market and smoothness and flatness need to be at the required level," Hu Anzhong points out. "We used to have some problems with this, but thanks to ValZone, which has a very long metal belt calendering nip of over one meter, our end product smoothness, and especially the flatness, have been accepted by the market."

Automation reduces human effort and cuts costs

As **Sun Shixiang,** who is responsible for automation for the mill, puts it: "Automation is the soul of the machine and it keeps the production process in order, reducing human effort and cutting costs." For Shandong Bohui Paper BM 2, a high automation level was applied to help achieve the target quality and production goals. "We have integrated the machine, process and quality control systems with extensive condition monitoring into one system which allows them to work together," Sun explains. "Our operators and process engineers can monitor and maintain all I/Os and controls through any of the mill's computer displays.

"The Quality Control System comprises six scanners and five CD profile controllers, including IQDilutionPro, IQCoatPro, and IQAquaPro which help us keep CD profile at a good level," Sun Shixiang concludes.

Better environmental performance

After its first year of operation, the BM 2 has also proven its good environmental performance with several energy-saving results. For instance, water consumption has been only 6 m^3 water consumed per board ton.

Electricity consumption per ton is also expected to decrease together with the increase in production output. As for further energy savings, the coating drying for BM 2 is completely taken care of with

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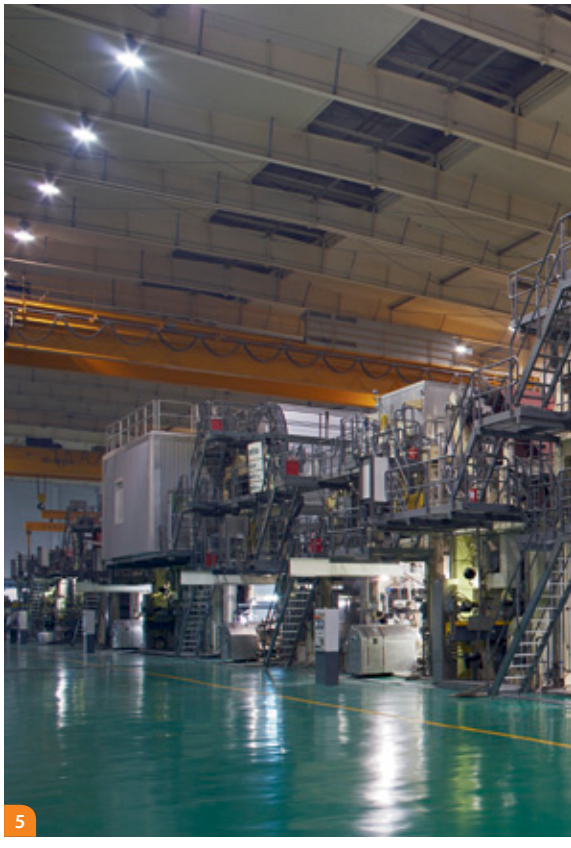

5

1 **The quality inspection** of the board is both visual and highly automated.

2 **Here, at the very end of** the dry end, the soft calender polishes/finalizes the top quality board and ValReel smoothly reels the board into parent rolls.

3 **To achieve the quality** requirements, the 3-ply multi-fourdrinier forming section is equipped with ValFormer technology.

4 **The ValZone metal belt** calender produces board with high printing quality.

5 **To produce high-quality** board for the pharmaceutical, cigarette and cosmetics industries, the board machine has a comprehensive finishing end.


2


3

4

high-energy-efficient Metso air dryers, e.g. PowerDry Plus air dryers, which have an energy efficiency of approximately 70%. Consequently, the air dryers ensure gas consumption is very moderate.

Three service records at start-up

As for service, Metso has put in a lot of effort to exceed all expectations locally in China. With a new service center in Zibo, Metso reduces customers' maintenance costs and provides all maintenance facilities within an easy distance.

"I strongly believe that we will not have any worries with our Metso equipment. Metso points out problems that may occur before anything happens, and if something happens we know they will help us out," says Yang Yanzhi.

"Metso has convinced us by breaking three service records just during the start-up. The first record is the shortest installation time ever, only six months. The second record is the shortest threading time of just ten hours, and the third one is the least board needed for production test running, just 260 tons," he sums up.

Results seen in the order log

The top management at Shandong Bohui Paper is satisfied with BM 2's first year results.

"The increased market share is the best evidence of a successful production line. Firstly, our products gained extensive market acceptance and, secondly, our orders for cigarette board, which used to be between 8–10,000 tons per month, have now increased to 10–15,000 tons," says Yang.

"With end products such as medicine, cigarette and cosmetics packages, we expected both production and quality increase," Hu states.

"The original production goal was set for 27,000 tons per month. We have achieved this with a record of 30,000. Customer feedback shows that quality is better than before. So, we can reach our daily production target while keeping our customers happy," Cheng comments.

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TEXT Kare Väisänen

Interested in reducing your doctoring costs for soft-covered suction or grooved rolls to one tenth of your present costs? Metso's new ValDual blade does just that and delivers optimal doctoring results even in the most challenging positions.

ValDual

Low-cost doctoring in challenging soft cover positions

ValDual blades are lightweight and easy to handle.

Doctoring costs fell from EUR 60,000 to EUR 4,800

A paper mill used an air blade to doctor its soft-covered press suction roll. The mill's reported annual doctoring costs amounted to EUR 60,000 (EUR 40,000 for compressed air and EUR 20,000 for blades). The suction roll had also twice required regrinding after the carbon fiber air blade had touched the soft roll surface.

After a ValDual blade replaced the air blade, total annual operating costs fell dramatically and now amount to EUR 4,800. And there is no further risk of roll cover damage.

"Water removal and sheet dry content after the press section have been at least at the same level as with an air blade," says the operations manager for the mill in question.

ValDual in operation.

Plastic has traditionally been considered the only blade material suitable for the doctoring of soft roll covers as it will not damage them. However, plastic blades fail to provide optimal doctoring results due to insufficient doctoring loads, or then bend and let most of the water pass by under heavier loading.

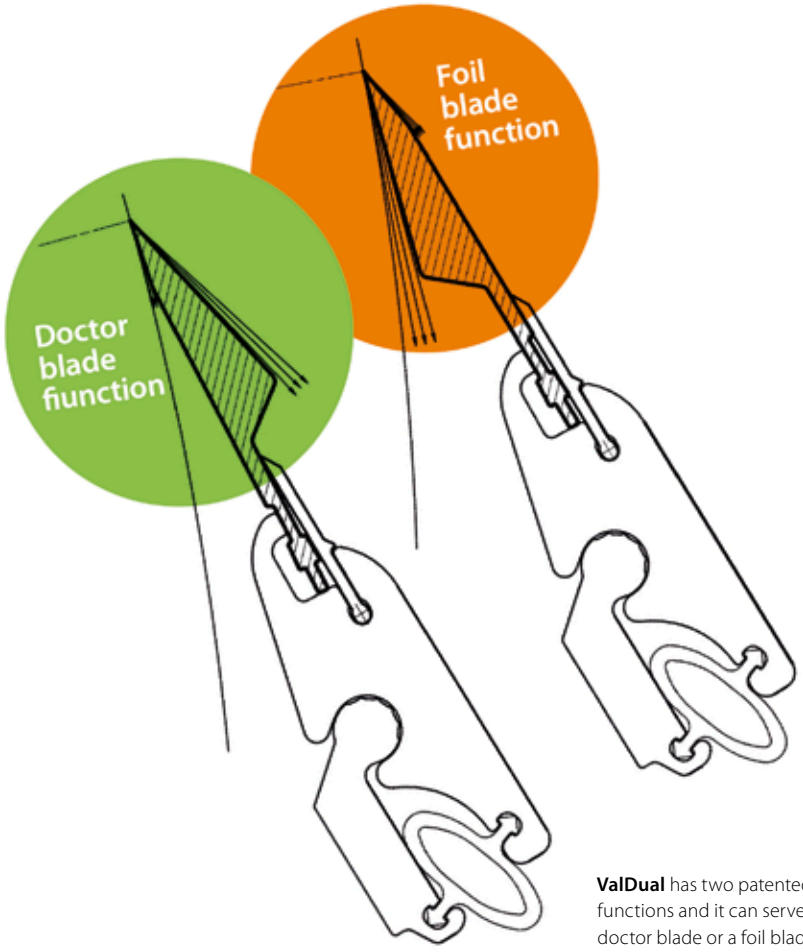
Another alternative is to use an air blade, which will yield good results until it inevitably gets clogged. Furthermore, the use of compressed air to aid water removal dramatically increases operating costs and carbon fiber air blades can damage the roll surface, which will then require regrinding. It is thus no wonder that many mills prefer to run their soft-covered suction rolls without doctoring. This practice keeps the roll covers safe, but it also results in poor water removal.

A new material applicable to all challenging covers

Metso's new ValDual blade solves roll doctoring problems in difficult positions. It is made of an UHMW-HDPE (ultra-high-molecular-weight polyethylene - high density polyethylene) compound applicable to all challenging covers, including polyurethane, transfer belts, belt rolls as well as hard covers, G-bands and the steel shells of suction and grooved rolls. With ValDual, there is no risk of cover damage to any type of surface.

Foil blade or doctor blade

ValDual's patented construction and protected design make it ideal for the doctoring of grooved and suction rolls. It can be used as a traditional doctor blade or a foil blade.



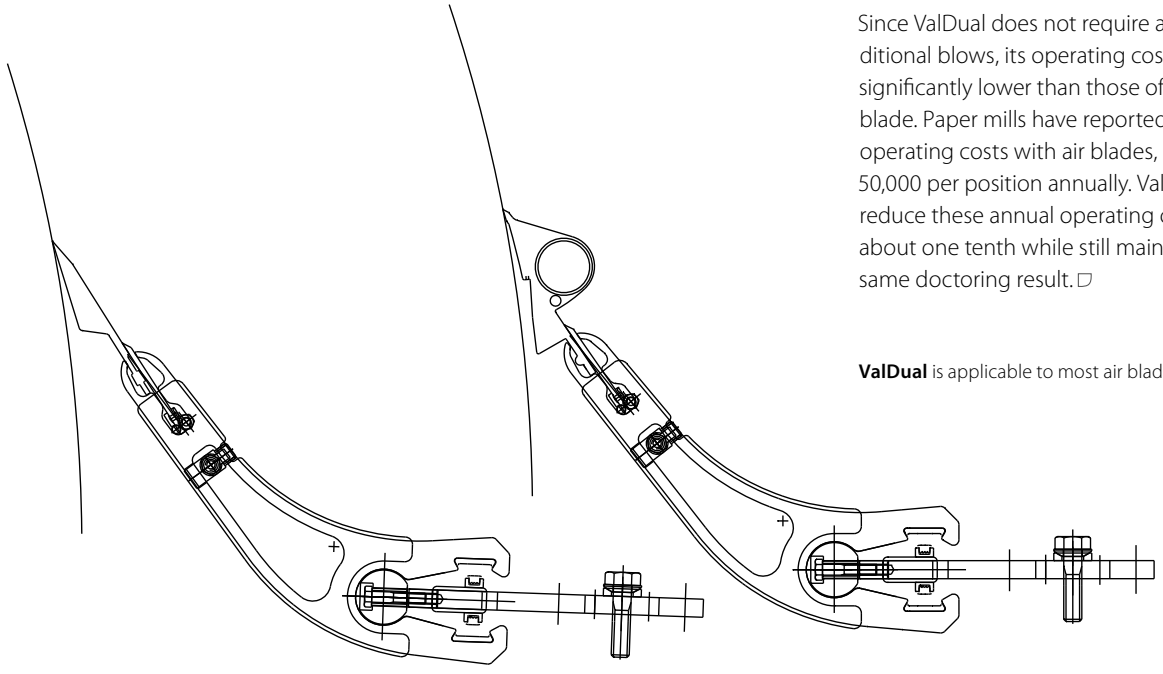
ValDual has two patented functions and it can serve as a doctor blade or a foil blade.

When used as a doctor blade, its stiffness enables higher doctoring loads and thus provides better water removal than traditional plastic blades while still treating the roll cover just as gently. Due to its geometry, ValDual will not let water through like a traditional plastic blade.

When ValDual is used as a foil blade, its stiffness in the machine direction and flexibility in the cross direction enable it to follow the roll surface and reach a more optimal doctoring result than traditional foil blades.

Operating costs lowered to one tenth of earlier costs

Since ValDual does not require any additional blows, its operating costs are significantly lower than those of an air blade. Paper mills have reported very high operating costs with air blades, up to EUR 50,000 per position annually. ValDual can reduce these annual operating costs to about one tenth while still maintaining the same doctoring result.



ValDual is applicable to most air blade positions.

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TEXT Marjaana Lehtinen

Excellent BlackBelt experiences

"It runs like a roll!"

Those very words exclaimed by a papermaker are probably the highest compliment a shoe press belt can earn. Based on the experiences gained with about a hundred belts, BlackBelt has lived up to the expectations set on it.

"Papermakers want a shoe press belt to perform well until the next planned shutdown – and BlackBelt has done exactly that. It survives for a long time in harsh conditions and keeps water removal at a high level," says **Satu Hagfors,** Product Group Manager, Belts, PMC business unit at Metso.

Since its introduction in 2008, this new-generation shoe press belt has proven its reliability in dozens of paper, board and pulp machines. It has performed extremely well even in the world's fastest-running newsprint machines. So far, hundreds of BlackBelts have been ordered and delivered, and invaluable user experience has been gained from far more than a hundred belts.

"In 2010, the BlackBelt order backlog doubled. News of good results travels fast among papermakers," Hagfors adds.

Unique in many respects

BlackBelt is a direct descendant of Tambelt 3G, the well-known blue shoe press belt, from which it has inherited many excellent properties, including good dimensional and running stability. It also features Tambelt's patented V-groove, which has proven its dewatering properties in many paper and board machines all over the world. This groove geometry retains its void volume even under the highest loads.

BlackBelt is available in smooth, grooved, semi-grooved and discontinuously grooved designs, and with a double or triple layer reinforcement structure depending on the application.

More accurate void volume change measurement

During shutdowns, Metso now uses a new belt scanner to measure void volume changes in the belt. It is even more accurate and reliable than the old one that was introduced in 2007. The measuring results enable papermakers to plan the timing of the belt change better.

New capacity and new plans for the future

There are plans to increase the production capacity of BlackBelt in 2012 to meet the steadily growing demand. According to Hagfors, product development is also active.

"We are continuously working on new ideas but it's too early to talk about them yet," Satu Hagfors adds, somewhat mysteriously.

Secret no. 1: raw material

One of the major differences compared to Metso's earlier belt, Tambelt, is the new raw material. Countless elastomer formulas were tested in Metso's laboratory to find the right combination of durability, flexibility and chemical resistance for BlackBelt.

The new polyurethane has excellent dynamic properties and retains its modulus over a wide temperature range. Therefore, its properties remain stable throughout its whole life. The wear is minimal, even in harsh conditions.

Secret no. 2: inner surface quality

The BlackBelt shoe press belts are manufactured by centrifugal casting. According to Hagfors, there is no other manufacturer in the world who uses this method to cast as large products as Metso does. The largest diameter of the BlackBelt shoe press belt is 1,800 mm and the maximum width is 14 m.

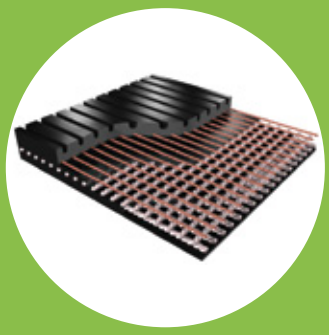
The casting method produces a smooth, shiny inner surface, which, combined with a friction-reducing treatment, results in as low friction as possible between the belt and the shoe. This, in turn, keeps the inner surface in good condition and reduces energy consumption. The solution has been developed in cooperation with Metso's shoe press specialists.

Secret no. 3: structure

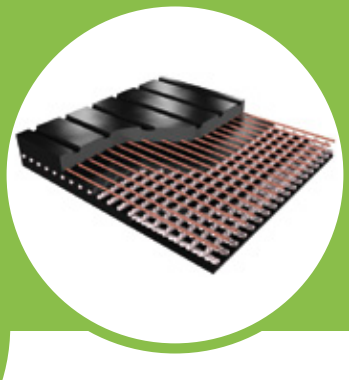
The optimized 3G structure is yet another thing that makes BlackBelt stand out from its predecessor and other shoe press belts on the market. The belt has reinforcement yarns in three layers, which increase both dimensional stability and mechanical strength.

In operation, this unique structure means reliability and a long life. "Thanks to this structure, the belt runs in a stable way without wobbling and doesn't come into contact with the machine frame. Doctoring is easier too," Hagfors remarks.

"In 2010, the **BlackBelt** order backlog doubled. News of good results travels fast among papermakers."

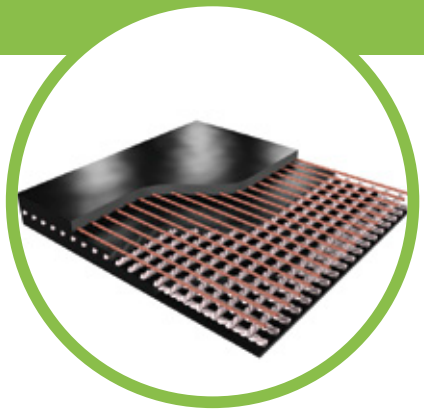


Grooved – Grooved belt for fast paper machines.



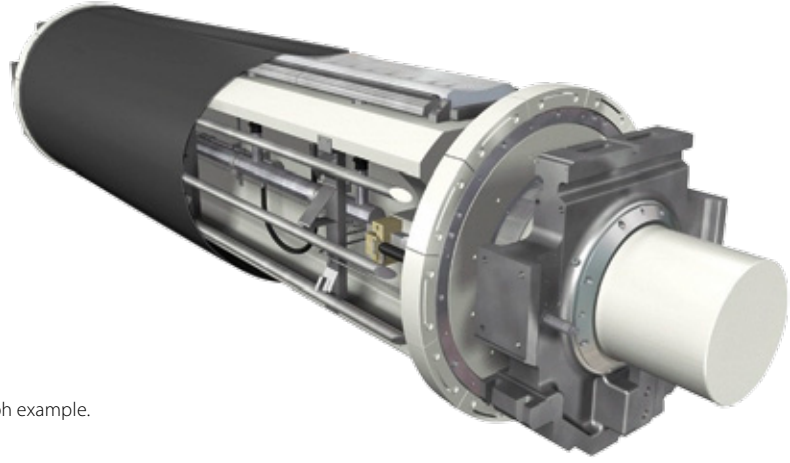
Semi-grooved (SG) – Semi-grooved belt for high water content to add to the void volume of the press felt. The water is sucked out of the grooves by the felt. Target grades pulp and fluting.

Discontinuous grooves (DG) – Discontinuous grooves prevent water flowing backwards in the nip.



Smooth – Plain belt for shoe presses with no nip dewatering. The press felts carry the water to the uhle boxes.

SymBelt roll with BlackBelt shoe press belt.



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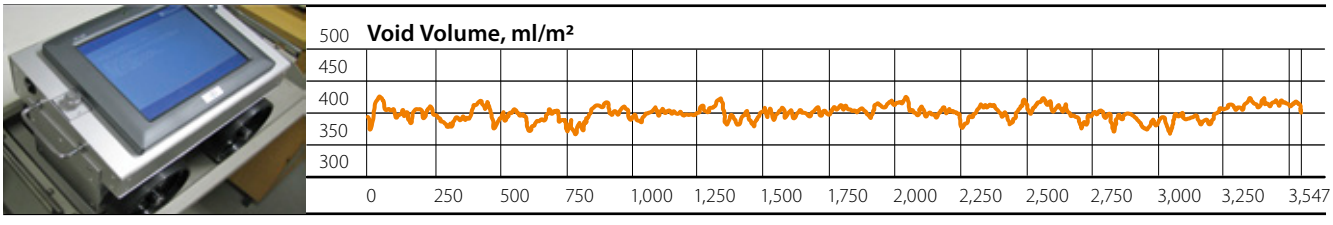
Belt scanner and graph example.



TEXT Marika Mattila

An unreliable and slow manual tail threading process, a high volume of threading waste and other tail threading problems cause costly downtime for many production lines, and can also compromise operator safety. Upgrading the process by evaluating the current situation and finding the best solutions for automated, reliable and fast tail threading is a worthwhile investment.

Safety and efficiency through total tail control

Steps to efficient and safe tail threading

To hit on the most optimal solution, the first step is to evaluate the current tail threading process – the condition of the equipment and the efficiency of the process – to identify problem areas. The optimal upgrade solutions can then be found. Total tail control is about managing the whole process around tail threading, not just the equipment.

Correct solutions for each need

Metso's advanced tail threading solutions are suitable for all types of paper, board and tissue machines. This has been achieved through process know-how and expertise gained in various tail threading projects for both new lines and upgrades.

Ropeless tail threading conveyors represent the most advanced threading solutions. The conveyors' vacuum is created by foil nozzles and the rotating belt controls the tail exceptionally well, even during process variations. Combined with a digital break recording and web monitoring system, the information received provides a very useful tool for troubleshooting and analyzing breaks. This keeps the paper machine consistently running at its top efficiency. FoilForce1 is the flagship of Metso's conveyor tail threading technology. Over 1,400 units have been sold worldwide.

Based on the tail doctor technology, TailDoc is an outstanding solution for automated tail threading in double-fabric dryer sections. The doctor blade separates the sheet tail from the dryer cylinder surface and compressed air is blown under the tail to guide it to the next fabric nip. It is easy to replace the existing threading system with TailDoc due to its minimal space requirements.

A suitable combination of tail threading systems and tail cutting devices are available for every grade and machine geometry. Tail cutting is performed with water jets or mechanical cutters, providing better controllability and uniform tail quality for the tail threading process.

Tail threading services secure operational efficiency and reliability

Proper tail threading services will maintain tail threading efficiency at their target levels and allow papermakers to focus on the core aspects of their business, such as quality development.

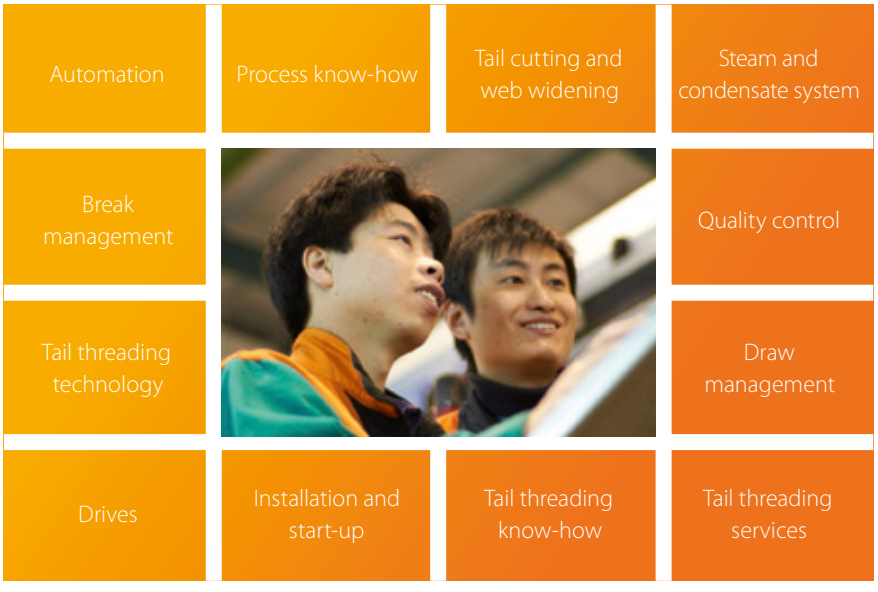
With a tail threading study, the main problem areas in the existing process can be identified and eliminated with the help of Metso's experts and their recommendations. Correct preventive maintenance actions bring savings in maintenance costs and ensure equipment availability and reliability. A Metso service agreement is designed to secure the optimal operation of the equipment, reduce threading times and improve maintenance efficiency. It is the right tool with which to better manage overall operations around the tail threading process in a systematic way.

Economical tail threading improvement investment

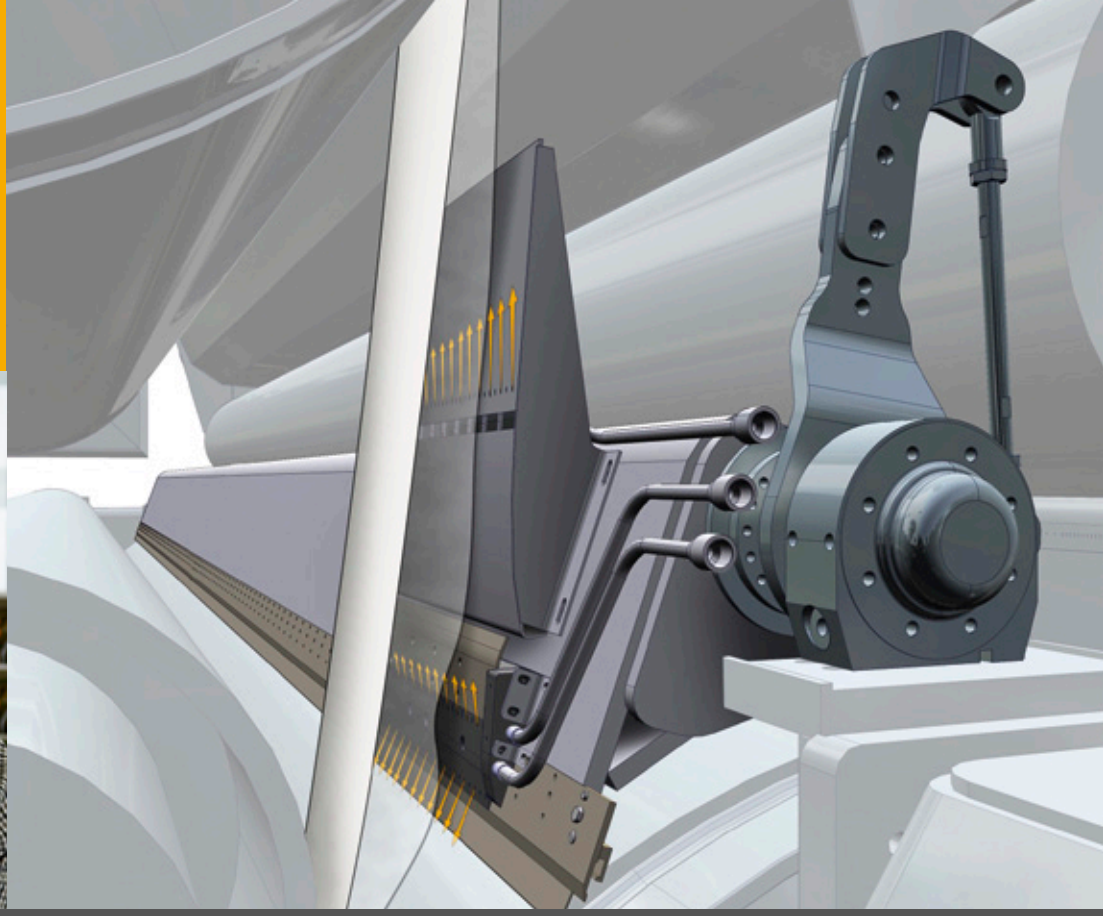
Tail threading improvement investments where unreliable and slow tail threading systems are replaced with automated and safe solutions are generally very cost-effective and the related payback periods tend to be short. In a case where the threading time was cut by one-third through replacing the existing rope system with TailDoc tail threading units in the double-fabric area, the investment's payback time was just a few months – and the amount of tail threading broke was diminished.

In addition to safer and more time-efficient operation, an upgraded tail threading system saves energy. Upgrading the tail threading process on a newsprint machine with a trim width of 8.0 m reduced the break time by about 30%, which meant annual savings of EUR 130,000 in energy costs.

Having total tail control throughout the machine clearly enhances production line efficiency.



TailDoc works invariably well at start-ups and in exceptional situations where rope-assisted tail threading is difficult. TailDoc allows greater moisture variations and is also insensitive to speed changes.



"We are dedicated to developing reliable, simple and easy-to-use solutions for hands-free tail threading. Consequently, this means a safe and seamless threading process for operators," says **Veli-Pekka Koljonen,** Metso's tail threading specialist.

Metso's automated tail threading solutions: Benefits visible on bottom lines

Significantly shorter tail threading time compared to conventional rope systems.

Enhanced operator and mechanical safety by eliminating close calls and rope accidents.

Increased production line efficiency and reduced unexpected downtime.

Savings in energy and maintenance costs.

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Ropeless tail threading solutions

Press section
- **PressForce** vacuum conveyors
- **TailShooter** tail threading plates with assisting **TailRoll** tail feeder

Dryer section
- **SingleForce** for single-fabric areas
- **DoubleForce1** vacuum conveyors for double-fabric areas
- **TailDoc** for double-fabric areas

Size press
- **FoilForce1** vacuum conveyors
- Low friction tail plate systems

Coater-calender-reel open draws
- **FoilForce1** vacuum conveyors
- Low friction tail plate systems

Tail threading with ropes

Dryer-sizer-calender-coater-reel
- **TailRope** solutions

Tail cutting solutions

Forming and press section
- **TailSquirt** water jet cutting

Dryer section
- **DoubleJet** or **TailJet** water jet cutting
- **TailCutter** for heavy grades

Tail threading services

- Tail threading study
- Preventive maintenance
- Service agreement

Metso provides full coverage of tail threading solutions throughout the production line.

TEXT Nigel Farrand

Keeping on the pressure

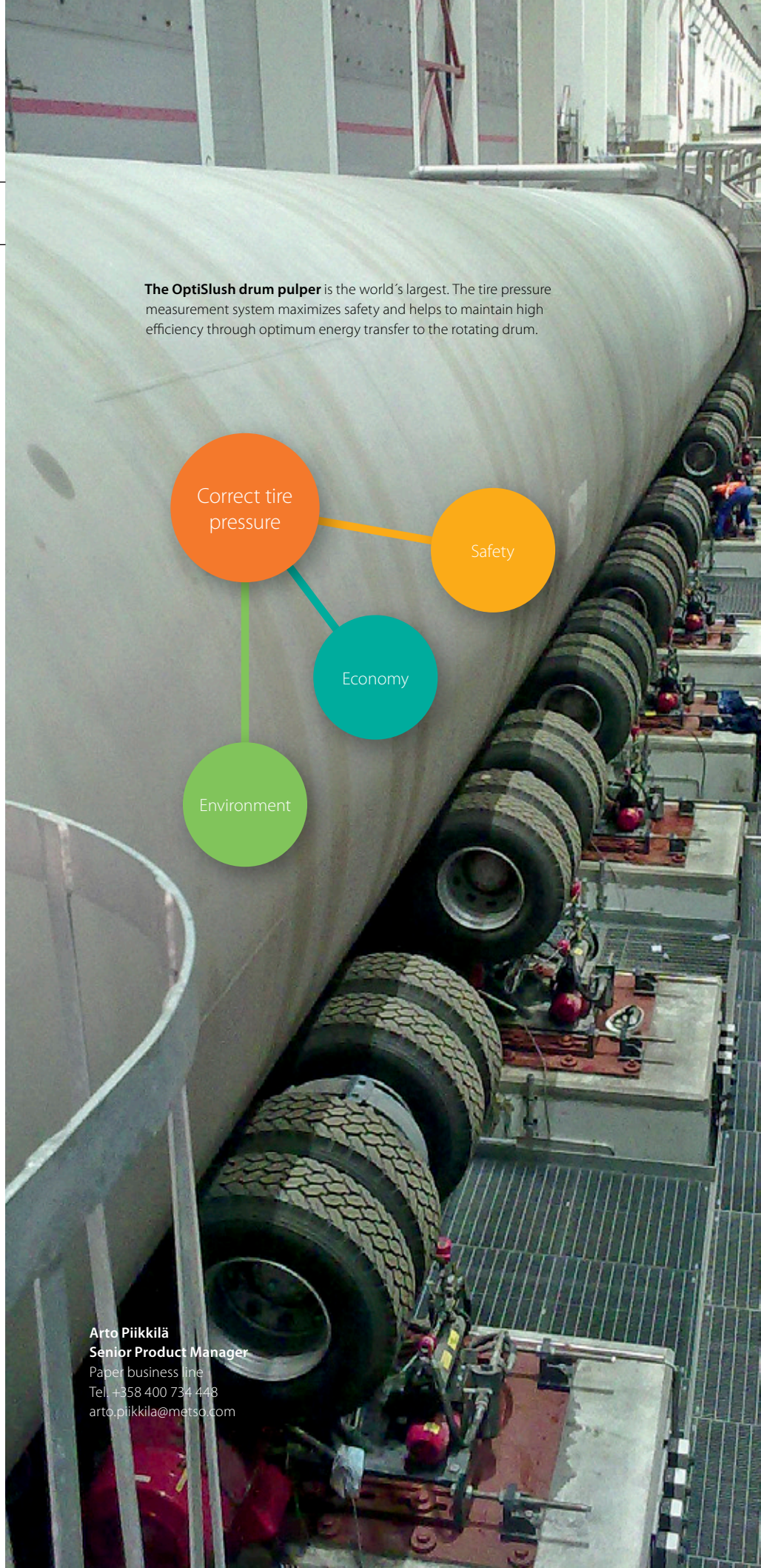
To ensure low noise levels and minimum vibration, Metso uses rubber tires to both support and drive OptiSlush drum pulpers and debarking drums. As with the tires on an automobile or truck, maintaining correct tire pressures is important for safety, economy and tire life. However, with a hundred tires on a large drum pulper, it is a laborious job to check each one and also raises safety concerns for the employee unlucky enough to be given the task. Metso has developed a remote monitoring system to continuously measure the pressure of each tire automatically and eliminate manual measurements.

Early warning

Tire pressure measurements taken during a process stop when the tires are cold give incorrect readings and, usually, no warning of impending failure due to a loss of pressure. Metso's online measurement system continuously measures the tire pressures using a wireless pressure sensor on each rotating tire. This makes it possible to monitor the tire pressure and give early warning of a potential problem, like a slow leak, without interrupting production. The tire pressure, transmitter temperature and transmitter status information can be transferred in digital form to the process control system, where pressure values, temperatures and trends, as well as alarms, can be displayed.

Increased safety and economy

Under-inflated tires cause uneven load sharing and excessive sidewall wear, leading to blowouts, as well as increasing rolling resistance, which makes them overheat and wastes energy. Correct tire pressures help to maintain high efficiency through optimum energy transfer to the rotating drum and maximize tire life. With proper pressures, the tire lifetime on a drum can be increased significantly. Metso's tire pressure monitoring system eliminates the regular time-consuming manual checks of many tires in tight and hazardous spaces, and improves safety, saves energy and increases tire life.



The OptiSlush drum pulper is the world's largest. The tire pressure measurement system maximizes safety and helps to maintain high efficiency through optimum energy transfer to the rotating drum.

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SHANGHAI PROSPEROUS PAPER AND METSO

Celebrate ten years of cooperation

In March 2011, Shanghai Prosperous Paper Co., Ltd. (SPP) and Metso renewed their annual roll grinding agreement, this time celebrating its tenth anniversary. This fruitful cooperation started right after Metso opened its Wuxi Service Center in China in 2001.

TEXT Martin Yang

SPP is located in the Baoshan district of Shanghai City and owned by Potential Industries Inc (90%) and Shi-Dongkou Economic & Trading Co. (10%). It entered the Chinese newsprint market in 1998 and is known as the garden paper mill because 20 percent of its plant grounds are covered by green areas. Based on a business philosophy of "environmental protection, people-oriented", the company operates a high-speed newsprint line with an annual capacity of 140,000 metric tons. It has been acknowledged as a leading technology enterprise by the Shanghai Government several times.

"We benefit from the grinding agreement since it enhances our working methods and enables us to use Metso's professional help. All this reduces costs and increases reliability," Vice Maintenance Manager **Qian Jianmin** points outs.

"We save a lot of time and costs through the grinding agreement. Metso has a lot of professional experts globally, and we have also learned a lot from Metso," says **Peter Chou,** General Manager of Shanghai Prosperous Paper (on the right), shaking hands with **Xie Daorong,** General Manager, China, Service Business Unit.

"Metso has introduced important innovations to the Chinese paper industry as well as given major support to us. It has shown commitment to its customers and enabled them to succeed," says General Manager **Peter Chou.** "There is a professional team in China to provide efficient service at reasonable prices."

The main targets in signing the roll grinding agreement were high production value, production cost savings and better end-product quality. "I appreciate Metso's strong support to us in these areas during the past ten years," Peter Chou comments.

Lower costs and professional help

Metso registers and documents all SPP roll grinding data, including the grinding date, the solution implemented and information about any problems or previous damage to the roll. These records help to produce the best possible grinding result for each roll. Metso also feeds the data in the customer's maintenance information system, which reduces the mill's roll maintenance costs.

High efficiency thanks to scheduled regrinding

The representatives of SPP and Metso meet regularly to discuss any potential roll problems and plan roll regrinding schedules in order to avoid unplanned downtime due to rolls and to maintain high efficiency. Troubleshooting and quickly finding optimal solutions to problems are also part of the deal.

The service agreement further ensures that roll grinding turnaround times remain short even during vacation and peak production times.

In addition to roll grinding, cooperation between SPP and Metso also includes roll covers, spare parts and roll maintenance.

Local service is much appreciated

"Local service is the communication bridge between the Chinese and Western cultures; Metso combines the good sides of them both. It also introduces new know-how, technology development and solutions to China," Peter Chou remarks. "We are willing to strengthen our cooperation with Metso in a much wider area after having received support from them even in the most difficult times."

In addition to Wuxi, Metso also has modern service centers in Guangzhou and Zibo to address the needs of the Chinese market locally. All of them are equipped with the latest technology and staffed by seasoned professionals.

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BRAVIKEN PAPER MILL

Increasing production capacity with Metso LC-refining

A project aimed at increasing production capacity from 500 tpd to 1,000 tpd and improving the quality of thermo mechanical pulp for newsprint production is being carried out in several stages at the Braviken paper mill in Sweden.

TEXT David Wold

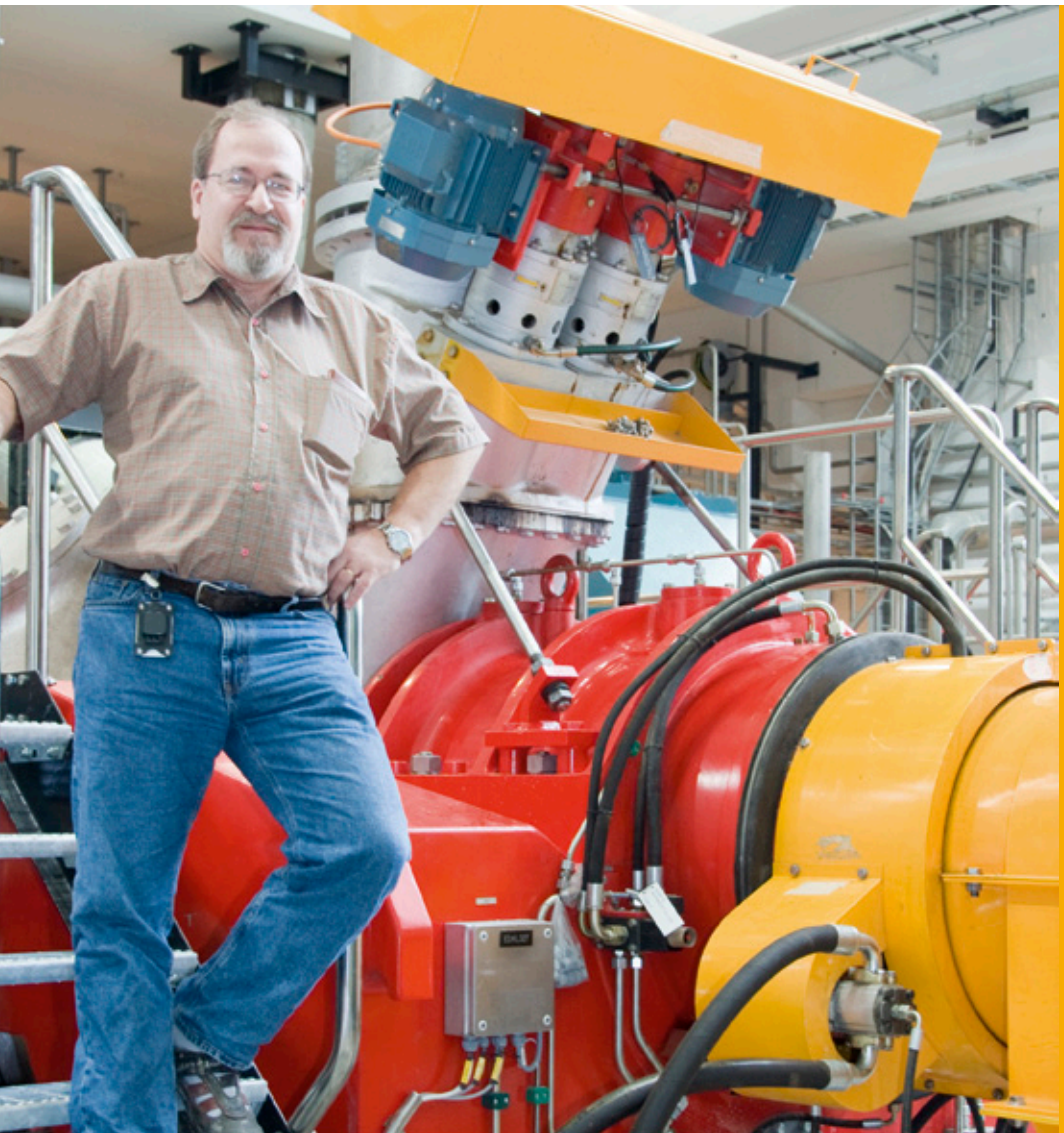
The first stage involved rebuilding the screening room. During the second stage Braviken and Metso staff installed an OptiFiner RF-5 low consistency refiner in the mill's N line for refining secondary rejects.

"This is a rather complicated project," says **Lennart Nilsson,** who is the TMP Production and Wood Handling Manager at the mill. "But with Metso's always professional technicians helping us, we carried out the task without any surprises."

Metso's low consistency OptiFiner RF-5.

"We looked at Metso and, in our view, their OptiFiner RF-5 offered us the best possible control of the refining process. Because this machinery has only one gap to control and no floating rotor, it's easier to control. And that's one of the reasons our operators really enjoy working with it.

"Start-up was at the end of 2010. But we can already see that our targets for increased capacity and uniform and stable quality are definitely achievable," says Lennart Nilsson.



The Braviken paper mill belongs to Holmen Paper, a member of the Holmen Group, a leading producer of printing paper in Europe.

Braviken has three paper machines, PM 51, 52 and 53, that produce 790,000 tons per year of improved and colored newsprint, telephone directory paper and MF magazine paper from thermo mechanical pulp produced from spruce wood and DIP on three pulp lines. The mill employs approximately 560 people.

Lennart Nilsson, TMP Production and Wood Handling Manager at Braviken paper mill.

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M-REAL HUSUM

It can be worth trying something new

TEXT Annica Börstell

Metso's goal is to continually develop and improve its products and materials and stand at the forefront of new technology. However, launching new innovations is not always an easy task and you need to understand that mills are hesitant to try out products and new solutions where references and history data are not yet available. After enduring a number of problems with its previous roll cover for press rolls, M-real Husum in Sweden was prepared to be the first mill in Scandinavia to try out the completely new composite PressRhino cover.

PressRhino is a new composite roll cover designed for center rolls and other hard-covered press rolls. The aim has been to develop a cover that has better doctoring and release properties, among other things.

"Our previous cover caused several sheet breaks and the doctoring result was not as good as we would have wanted either. The edge of the paper sheet was long and the sheet flutter caused the edges in the next position to wrinkle," explains **Peter Sundqvist,** Production Engineer at Husum's PM 6. "We were looking for a roll with better release properties and gave Metso the chance to present their new composite roll cover."

Recovering with PressRhino

An existing roll was sent to Metso's roll service facility for recovering and in February 2010 the roll with the new cover was installed in the second press position in M-real Husum's PM 6. After about six months, in October of the same year, M-real Husum carried out an assessment of the cover. The analysis showed that the release properties had significantly improved when compared with the previous cover. In addition, the paper sheet had become more stable and the sheet flutter had been reduced considerably.

"At the same time as we installed the new cover, we also fitted the press with a new drive system. These measures have meant that we have been able to operate with speeds up to 60 m/min faster than before. PressRhino solved the problems associated with the edges wrinkling, which, in turn, contributed to the speed increase we have witnessed," continues Sundqvist. "We haven't discovered any wear on the cover so far – we expect to use it for another year and then carry out a new assessment."

Peter Sundqvist,
Production Engineer
at Husum's PM 6.

"Looking back, we're really pleased that we took the chance to try out a completely new product – the cover has worked excellently. Confirmation of this is the fact that in January we decided to cover the roll in the upper position of the third press using PressRhino as well," explains Sundqvist.

New PressRhino cover even in the third press

"We have the same problem of unsatisfactory doctoring result in this position as we previously had in the second press but we believe that the problem will be solved once we have installed the new cover."

The key features of the PressRhino roll cover are the release properties and the doctorability, together with the requirement related to maximum cover lifetime and durability. At the heart of this development is composite material knowledge, i.e. knowledge regarding reinforcing fabrics, resins and fillers. In PressRhino, cover hardness, surface characteristics and cover structure have been carefully selected.

Services concerning runnability and roll cover condition also play an essential role. As a full scope supplier, Metso can provide a wide range of services to ensure maximal performance of their roll covers. Typical services are nip calculations, nip impressions, roll cover surface studies and consultancy tasks regarding doctoring and showers.

PressRhino Technical data		
Roll color	Mint green	
Hardness	91 +/-1 ShD	
Cover thickness	12.5 mm	0.5"
Grindable thickness	Up to 5 mm	0.2"
Maximum temperature	115°C	240°F
Maximum loading	Over 350 kN/m	2,000 pli

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SCA expands its tissue

TEXT AND PHOTOS Ingemar Myrén

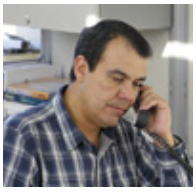
The greenfield site provided an opportunity to build for both beauty and efficiency. The building housing the DIP line and tissue machine is at the back.

Big and beautiful are the thoughts that flash through a visitor's mind upon arrival at SCA's new tissue facility near Sahagún in southern Mexico. Started up in November 2010, the USD 210 million greenfield mill would make any owner proud. As the site was flat and open, SCA could lay out the plant in the optimal way and implement state-of-the-art practices. The tissue line is dedicated to producing toilet tissue from sorted office waste – 50% sourced in Mexico and 50% imported from the US. Mexico City is assumed to be the market for most of the finished tonnage.

business in Mexico

SCA's project plan

SCA's project plan was based on using a small number of vendors, each supplying a large package of equipment. **Jim Haeffele,** Vice President, Technology, for SCA's North American tissue operations explains why SCA chose to go 'almost turnkey': "Who you partner with and how well you manage every aspect of the project is more important than the execution method." Jim Haeffele had been appointed to direct the Sahagun mill project following his success eight years earlier in leading SCA's first large greenfield project at Barton, Alabama. He has worked for SCA for 28 years.



Santiago Garza López, Engineering Projects Director (left), **Jim Haeffele,** V.P. Tissue Technology SCA, N.A. and **Cristian Hernández Hernández,** Project Engineer (right).

One of the first people on board the Sahagun venture was **Santiago Garza López,** Engineering Projects Director. "The project started in mid-2008 by seeking a suitable site for a new mill in Mexico. One major reason for selecting this site near Sahagun was the good supply of water. We found three large wells, each with enough capacity to supply one tissue machine. In addition, the land is flat with good soil, and we could acquire a large area – 103 hectares (255 acres). The SCA Sahagun project has now been successfully completed and, in my personal opinion, we have installed the best available technology in the mill. Our challenge for the future is to attain and maintain the good results expected by the company," says Lopez.

Metso at Karlstad, Sweden was awarded the major share of the project, including the complete process (engineering and automation system) all the way from the waste paper conveyer right up to and including delivery of the jumbo rolls to the jumbo roll storage. In addition, Metso received an auxiliary package order that included the electricity, water treatment plant, natural gas piping and steam boiler. The Metso-supplied tissue machine is an Advantage DCT 200TS, 5.5 m wide. The reeling concept is split reel, 2 x 2.75 m, with mechanical (rotating knife) sheet slitting. The maximum operating yankee speed is 2,000 m/min at 14.5 gsm reel basis weight. The total production of the line is 60,000 tpy of toilet tissue.

Being very conscious of the importance of a good working environment during project execution, Haeffele encouraged all suppliers and the SCA project team members to work closely together, share responsibilities and swiftly resolve any issues in a fair way.

Says Haeffele: "Something I thought was unique was that we worked very hard to develop partnerships and friendships. We deliberately spent time together and did a lot outside the project to build rapport and a cohesive team. For a project of this magnitude, our team of SCA, Metso, the other vendors and construction workers performed very well."

Producing good fiber from waste paper

When it comes to rating the quality of tissue paper, the saying among tissue makers is: "What goes in comes out." In essence this is true, although the modern tissue machine is able to influence quality, mainly in the creping process and by 'sheet design' (layering). Consequently, the Sahagun mill needs to feed the tissue machine with good fiber in order to obtain high quality tissue. The challenge is to find, retrieve and clean the good fiber hidden in the waste paper. Approximately 60%, by weight, of the waste paper going into the DIP (Deinked Pulp) line comes out as furnish for the tissue machine. The

The plastic-covered cartoon figure imbedded in the waste paper bales will not cause any problem in the DIP line according to **Ramón Guajardo Reyes,** (right) who is responsible for tissue production.

remaining 40% reject consists of plastic, metal, strings, non-usable fibers and paper fillers (ash).

How is the quality of the incoming waste controlled in order to avoid the DIP line being pushed outside its operating window? "After start-up, the most complicated area was the deinking plant," admits **Ramón Guajardo Reyes,** Production Manager at SCA. "We had a few issues, but my team kept on working until they were resolved. The line now works very well. We always check the quality of the waste arriving at our storage. The paper is classified by our technicians, and after that my deinking plant team prepares a mix for the next 24 hours of operation. The variation in quality going to the pulper is actually very small."

Jim Haeffele agrees. "So far, in this early stage of operating the Metso deinking plant, the removal of trash, stickies and dirt and achieving the right brightness look very promising. The deinking plant appears to be performing very well." When asked whether SCA is getting the results in hard numbers that they expected, Haeffele responds: "Quite honestly, yes, the output is what we expected. We've agreed on a set of parameters for dirt count, brightness, yield – basically a large part of the performance guarantee for the deinking plant – and so far, the result is as we specified."

The high consistency pulper is of a rotating drum type, the Metso HC-50. Reject from the pulper is conveyed to a press station and converted into bales. The DIP line concept is pulping-flotation-dispersion-bleaching-washing-bleaching. The waste paper passes through no fewer than 12 process stages before the good fiber reaches the tissue machine stock system. Alternate consistencies, chemical dosing and other parameter settings influence results in both furnish quality and operating efficiency, while making the process more complex. This really emphasizes the need for crew training.

Training strategy

Roberto Caballero, Plant Director, entered the project when plans were being made for recruiting and training people for the new facility. "The first thing we did was to try and understand what it meant to build a facility like this in a new region. So we drew on SCA's experience in other locations, such as in Barton, Alabama, which helped us a lot. Our plan was to set up 'a critical mass' – a percentage of the total number of mill employees who would be experienced and would hold key positions in various areas. The new recruits – the 'green people' – would then be able to get guidance and support. We also split the entire recruiting process into four groups – we called them 'waves' – each with a specific purpose. The first wave consisted of the leaders who developed the training plan in detail and wrote all the role descriptions for the remaining waves. Their task was also to develop the main strategy for starting up the mill. In order to prepare our people for the training programs of our equipment suppliers we sent them, for a few weeks, to our existing SCA mills in Mexico, where they were able to see and learn from similar processes. Later, when

The HC-50 drum pulper in the Sahagun mill is Metso's first application for tissue paper.

Roberto Caballero, Plant Director in charge of planning the extensive training program for the new mill. Right: SCA and Metso working together in the control room.

the Metso training started, they already had questions and were well prepared. Very few of the new people were expected to speak and understand English very well. In order to maximize the training efficiency, we used simultaneous translation in all training sessions and later in the field practices," explains Caballero.

Jim Haeffele, who has a reference base from the Barton mill expansions, comments: "The training result is as good as you can expect for all 'green people' in a new facility. It's as good as I have seen. The Metso training was also excellent."

Metso's Advantage DCT 200TS machine

The Advantage DCT 200TS machine is based on the following concept: an OptiFlo headbox, dual pressure rolls, 18 ft. diameter yankee dryer, Advantage AirCap hood and OptiReel reel. There is no in-line rewinder. The reel uses cores and inflatable reel spools in an automated loading and changing process. The two jumbo rolls off the reel are handled through a plastic wrapping station, prior to being elevated down to the parent roll storage on the first floor.

Tissue Machine Main Data	
Type	Advantage DCT 200TS
Production (at 18 gsm, 100% efficiency)	207 t/24 hrs
Sheet design	Single-layer
Paper width on reel	5,500 mm
Max. operating speed (yankee speed)	2,000 m/min
Basis weight range on reel	14.5–18 gsm
Creeping ratio range	13–20%
Yankee diameter	18 ft (5,500 mm)

The headbox is of a single-layer design. The yankee steam and hood air temperature is generated by burning natural gas. By using a second pressure nip for maximum sheet dryness to the yankee, SCA has traded energy cost against capital and maintenance cost for the pressure roll. Full width turn-ups are not applicable due to the split reel operation. However, with the advanced reeling nip (spool/drum) control system, it is possible to make "tail cut turn-ups" at high speed.

Keeping on schedule

Says Haeffele: "The project started up exactly on time, with the Metso schedule being integrated into the civil schedule. We had a Civil Construction Manager from SCA's Swedish operations, **Magnus Jinnerot,** who was on site and was instrumental in making sure that the buildings and surroundings were ready for Metso. We had to cooperate very closely to make this master schedule work to the exact day."

There is a consensus among the SCA representatives, both local and corporate, that the SCA Sahagun greenfield mill has been a success. **Gunnar Söderqvist,** who led the Metso team effort on site agrees: "The cooperation between Metso, SCA and the other companies on site worked extremely well. Since we were responsible for all the tissue line equipment, our main interface was the building. We used a common model and shared the same 3-D information. The engineering instructions were followed strictly by the contractors. I do not recall that we had to move or redo a single floor penetration. Safety was also very good during erection of the tissue line, with just a couple of minor injuries. I've been doing site project work for 30 years and I rank this as the best so far."

Creating a clean, light and open working environment for a crew working on a tissue line is certainly an investment that will yield a good return.

Standing on top of the project is **Gunnar Söderqvist,** Senior Project Manager, Metso. In addition to the complete tissue line, Metso's scope of supply included water treatment, steam generation, electrical and other auxiliary items.

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EARTHQUAKE-DAMAGED

Arauco boiler restarts after seven months

A magnitude 8.8 earthquake off the coast of Chile left one of Celulosa Arauco y Constitucíon S. A.'s recovery boilers 550 mm off its project elevation. At the busiest time, nearly 600 workers were simultaneously completing various repairs in the boiler building.

TEXT Taisa Noetzold

Glauco Reis, Metso's Site Manager.

Júlio Cozer, Metso's Project Manager.

The boilers existing in modern pulp mills are designed to withstand extremely adverse conditions involving high pressures and temperatures. One of the biggest earthquakes ever recorded hit Chile on February 27, 2010 with an impact so great that it lowered one of Arauco's recovery boilers 550 mm off its project elevation, due to the deformation of its support structure – enough to interrupt more than two decades of production on the equipment.

After the earthquake, which measured 8.8 on the Richter scale, Arauco's 500,000 ton/year pulp line no. 2 was paralyzed, causing the company to seek a fast solution and accurate damage estimates. According to the Arauco team, Metso's service was excellent. In no time they had a team in the field and experts assessing the situation. Together with the customer, Metso was able to define the engineering solutions necessary for reconstructing the equipment – a task that was concluded in a record seven months.

"This project proved to be very challenging. The first job was to inspect the extent of the damage – and to do it while dealing with frequent after-shocks, and without knowing how stable the building really was," says **Jorge Fuente-Alba,** Power Sales Manager at Metso.

Glauco Reis, Metso's Site Manager, confirms that repairs were carried out under extraordinary conditions. "The boiler literally had to be disassembled, supported momentarily, re-raised and suspended for its supports to be repaired – a task that required very accurate calculation in order to prevent further damage due to movement of the equipment."

The fact that the boiler had originally been supplied by Gotaverken (later acquired by Metso) was not the only factor in the decision to rely on Metso's services. According to the Arauco team, the company needed a supplier that understood all the necessary project areas, i.e. inspection, engineering design, manufacture, assembly control, training, support at the start of production and operational control. Arauco also needed a flexible partner that could adapt to the situation-in-hand, and provide a highly experienced team.

After conducting a comprehensive inspection of the entire equipment, Metso concluded that a lot of the damaged parts could only be detected after the start of repairs. "Therefore, our field team conducted complementary inspections every day to detect any problems that could compromise the integrity of the boiler. This also established a direct line of contact between our project team and the customer, resulting in quick action to correct any nonconformities observed," says Reis.

According to Fuente-Alba, Metso's team worked as safely as possible by installing temporary supports to ensure the boiler's stability. "The goal was to make the repairs rapidly, without any major accidents," he says.

Approximately 30 Metso employees, including Brazilians, Swedes, Chileans and Finns, worked on site to attain the main objective of putting the boiler back into its original position. During the busiest period, the Metso team coordinated the efforts of nearly 600 workers subcontracted by Metso and Arauco to complete various repairs inside the boiler building.

Jorge Fuente-Alba, Power Sales Manager at Metso

"This project was demanding for Metso because it had to be conducted in a short period of time while demonstrating world-class competence and the flexibility to adapt to the needs of our client – and all this in the face of overwhelming and unpredictable forces of nature," says **Júlio Cozer,** Metso's Project Manager.

Large-scale challenges

From Arauco's perspective, there were a number of challenges in the project. According to Arauco, the first was to determine whether the boiler could be recovered, after locking and raising it, and whether the damaged parts could be redesigned and manufactured within a short period of time. In Arauco's view, restarting production on schedule was a top priority, as the mill played an important role in the Arauco Group businesses.

According to Reis, Metso's major goal was to ensure that the boiler could resume the continuous burning of liquor within seven months. "This involved project planning, manufacture, transport, disassembly, assembly and commissioning, in a true marathon race," he explained, noting that all activities had to be performed at mill shutdown pace, with three work shifts every 24 hours, Monday to Saturday, in order to comply with Chilean labor legislation.

Due to the tight deadline, engineering, production and construction were performed simultaneously. "Smooth coordination between Metso, Arauco and the other project suppliers was crucial, and all equipment that was ready was sent directly by

The major challenges of the restoration

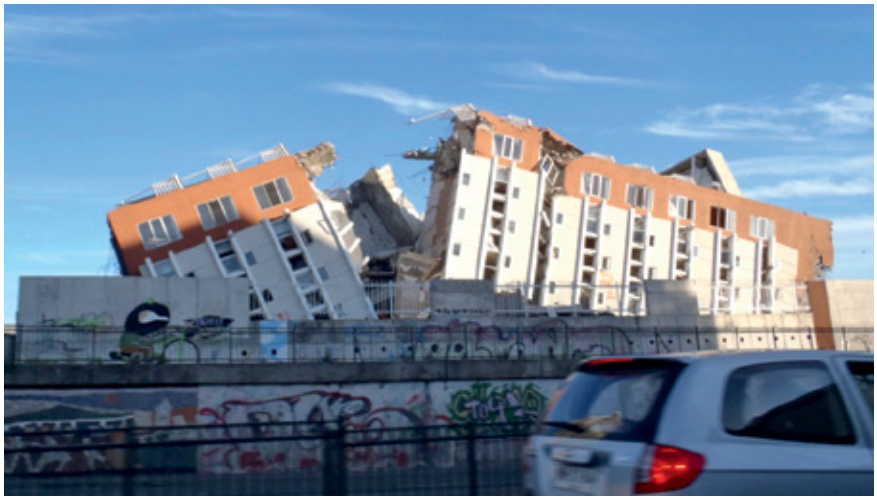
Determine if the boiler could be recovered Lock and lift the boiler
Design and manufacture the damaged parts within a short period and coordinate their transportation by air
Ensure the integrity and durability of the remaining part of the boiler
Begin production on schedule

Improvements implemented in the restoration

Redesigned and reinforced emergency stop systems for seismic tremors
Upper beams and supports recalculated and reinforced with better quality materials and welded to the columns
Liquor firing system replaced by a more recent technology
New boiler burners
Primary air input cleaning system replaced and modernized

air," says **Jörgen Kollberg,** Project Manager for the restoration of Arauco's boiler. Thus, 116 economizer panels, weighing over 300 tons, arrived in Chile by air.

One of the biggest cargo planes in the world, the Antonov 124, was used on four occasions to carry 93 tons of equipment per plane, from the Landvetter airport at Gothenburg in Sweden to Arauco in Chile. As a result, even the plane's transport racks had to be created and manufactured in a short time span to withstand a deceleration of 3.5 g in the event of an in-flight emergency.



Buildings in Arauco city damaged after the earthquake.

The lifting

At the time of the earthquake and when in operation, the Arauco recovery boiler weighed 3,800 tons. Even when empty for repairs, it still weighed 1,000 tons, which required a considerable amount of creativity and flexibility by the teams involved in the restoration. To facilitate the work, the boiler was lifted from below, employing an engineering move that was used for the first time in the world, since the boiler was designed to remain suspended only from the top.

During this operation, the Metso engineers and technicians had to reduce the weight of the boiler by disassembling all the equipment of ECOs 1 and 2, as well as the generator bank element. As noted by Metso's expert, Reis, the biggest challenge of the restoration was not just substituting the equipment, but disassembling the entire support structure. "We had to leave the boiler temporarily supported, reassemble it, and then replace it in the correct position – which had never been done before in any other mills."

During this maneuver, the boiler walls were also reinforced. Ten hydraulic jacks were used, each with a lifting capacity of 350 tons.

In the first stage, two sets of hydraulic jacks were used, one over the drum and the other under the boiler, lifting the equipment to the height necessary to begin repairs on the building structure. As a big part of this structure was in precarious condition, it was completely replaced during the project.

After this, a second lift was carefully performed and controlled by a team of 20 experts from Metso. This required technicians with specific functions to be positioned at different levels of the building to check each detail of the move and closely monitor the results.

Finally, on October 22, 2010, new hangers were installed and the hydraulic jacks were removed. The first steps towards the most intensive phase of the project had been taken.

New technology introduced

The damage to the Arauco recovery boiler presented an opportunity to introduce more advanced technology. Therefore, rather than simply replacing the equipment, Metso's restoration incorporated several technical improvements that turned the boiler into a state-of-the-art piece of equipment.

According to Reis, this included sanicro pipes in the furnace, new start-up and load burners, new smelt spouts and new black liquor burners. "The boiler is now like new," he says.

The Arauco team emphasizes that several other improvements were made during the restoration, including redesigned and reinforced emergency stop systems for seismic tremors. With respect to civil construction, the upper beams and supports were recalculated and reinforced with better quality materials and welded to the columns. In addition, the liquor burning system was replaced by more recent technology, new burners were installed in the boiler, and the primary air cleaning system was replaced and modernized.

Positive results

Arauco also notes that Metso supported the entire commissioning and production start-up of the boiler, which took place on January 28, 2011. Commercial operation began shortly thereafter, in the second half of February. Arauco could see excellent results right from the start of production, as had been anticipated. There were no accidents in the seven months of restoration, and the boiler is presently operating at high output.

For Arauco, the entire project was a learning process, requiring a high level of technical knowledge and experience from the companies involved. "We wouldn't have been this successful, if it hadn't been for the commitment to results and the working spirit of the Metso team, the Arauco team and all other participants in the project," was Arauco's conclusion. According to Cozer of Metso, no work can have good results without the full participation and commitment of all parties involved. "And the project in Arauco showed exactly the philosophy of teamwork practiced by Metso, that always ends with excellent results for our client," he says.

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SAPPI BIBERIST

Saves energy with new refiner

TEXT Nigel Farrand

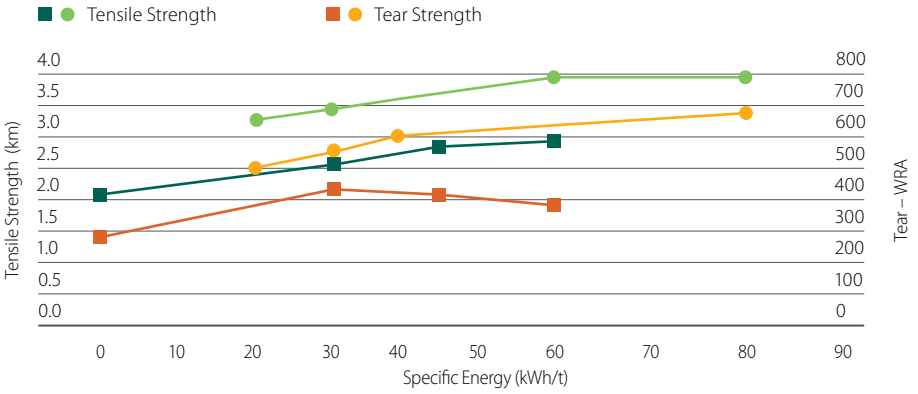
Sappi's Biberist Mill in Switzerland produces coated fine paper for the graphic arts industry/offset printing, as well as uncoated fine paper for office, preprint and offset applications. The mill's three paper machine lines, producing a total of half a million tons of paper per year, require a lot of electrical energy. When Metso offered new refining technology that promised energy savings as well as improved hardwood fiber treatment, the mill initiated a fast track project to put the concept into practice. In November 2010, the PM 6 eucalyptus refining line at the Biberist mill became one of the first installations of the new OptiFiner Pro refiner.

Sappi's Biberist Mill in Switzerland produces coated fine paper.

PM 6 produces 70,000 tpy of uncoated office grades. Furnish to the machine is approximately 80% Brazilian eucalyptus and refining plays a crucial role in developing the fiber properties. Low-intensity refining is needed in order to achieve the necessary fibrillation of the fibers without cutting, and for PM 6, this was achieved with six conical refiners. Typically, four refiners used in series gave acceptable results, but the high no-load power consumed by the multiple refiners contributed nothing to the overall fiber treatment. The introduction of the new refiner concept from Metso and subsequent pilot trials in Finland proved that one OptiFiner Pro refiner could replace the series refiners, improve the refining result and offer substantial energy savings.

Pilot trial

In August 2010, Metso performed trials with Biberist's eucalyptus stock at its Anjalankoski paper technology center. As well as proving the feasibility, the trial provided operating guarantee figures for the subsequent installation. Refining curves produced in the pilot trial showed that Sappi's targets of reducing energy consumption and still realizing the full potential of the stock were achievable. To get the best from the short eucalyptus fiber requires a fine bar pattern that with a conventional refiner reduces hydraulic capacity and efficiency. The new OptiFiner Pro refiner enables a remarkably higher installed power and throughput, raising the refining efficiency. The improved fiber flow allows a smaller rotor and reduces the no-load power by half compared to a conventional refiner.



Comparison of existing results from four refiners on PM 6 with pilot trials carried out at Metso's Technology Center in Finland.

- 4xClaflin – Tensile
- Pro 1 – Tensile
- 4xClaflin – Tear
- Pro 1 – Tear

Stefan Franke, Development Engineer (left) and **Heinz Läderach,** Project Leader from Sappi Biberist with the new OptiFiner Pro installation.

The mill has been very satisfied with the performance of OptiFiner Pro. Quality and energy savings have been as promised with noticeable increases in tear and tensile strength. Other benefits have been reduced noise – OptiFiner Pro is much quieter – and the mill expects substantial savings in maintenance after replacing six refiners with one.

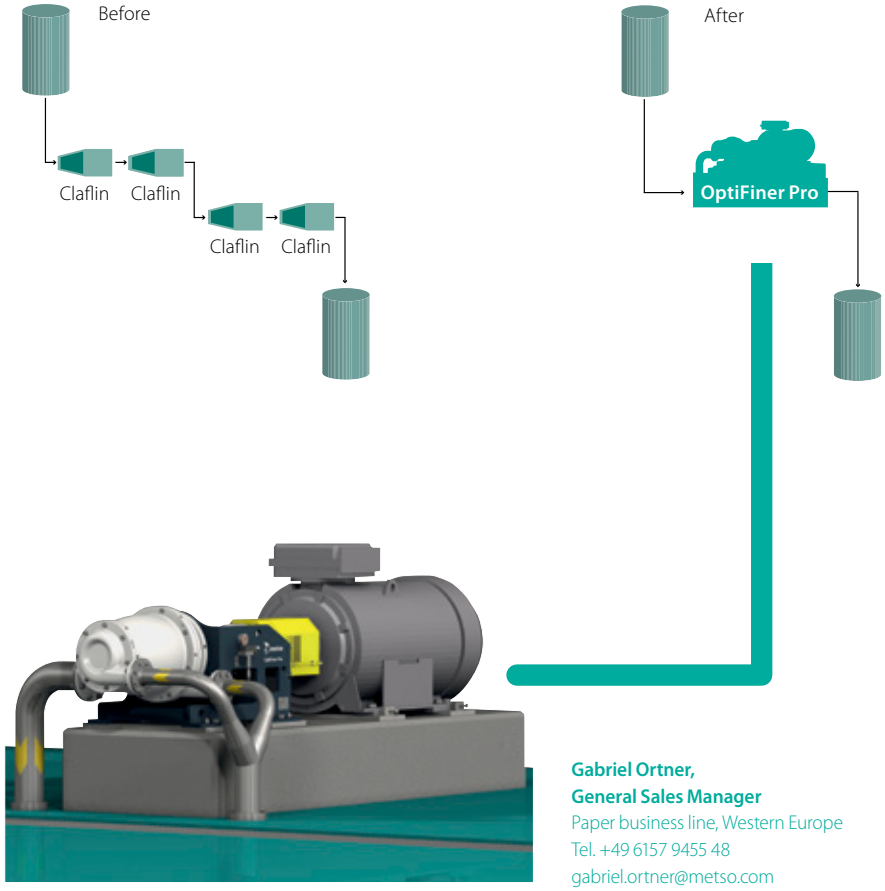
Trouble free start-up

Heinz Läderach, Sappi's Project Leader, remarked that delivery and installation was fast. The compact size of the refiner was a big advantage as space was limited next to the existing six refiners. After start-up, the results were immediately promising. The fiber development with the new refiner was at least equal to, if not better than, the Finnish pilot trial. To begin with, the refining target was the same Schopper-Riegler level of 17-23 °SR, as with the four old refiners, which meant about 25 kWh/t refining energy use (about 150 kW power draw). **Stefan Franke,** Development Engineer at Sappi Biberist, commented that "The new technology is impressive, energy savings are as expected with good strength development at the same specific refining energy."

Continued success

After a month in operation, the specific energy target was increased to 75 kWh/t with the refining degree increased to 25 °SR. This allowed a reduction in the softwood content to the machine and the softwood refining energy could be reduced. At the end of January 2011, after just over two months of operation, the mill confirmed that the new refiner had met the operational guarantees with 60% energy saving compared to the old refiners.

Refining process with OptiFiner Pro refiner before and after



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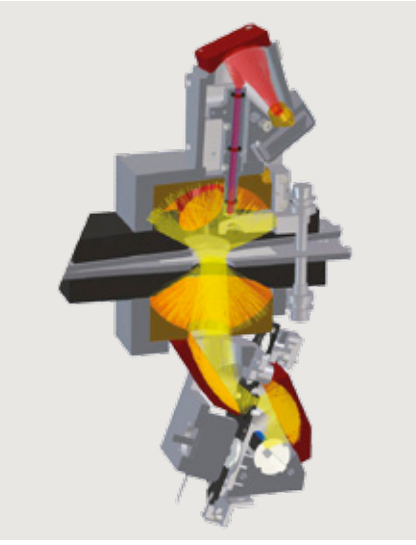
Metso around the world

Automation

Tissue makers say goodbye to nuclear Orders for non-nuclear tissue sensor

Thirty-two Metso IQ Fiber Weight Measurements have been sold since its introduction in 2009. Installed on tissue machines using virgin pulp or 100% recycled furnish, IQ Fiber has eliminated the need for a traditional basis weight sensor with a nuclear source. Mills are now saving both the time and money previously needed for nuclear safety training, licenses and the specialized service and safety requirements.



IQ Fiber simultaneously measures fiber weight and moisture on a tissue machine and its accurate scan averages and high-resolution CD profiles provide a solid foundation for machine- and cross-direction oven dry weight controls.

In addition to excellent measurements results, IQ Fiber users have reported lower maintenance and cleaning requirements, leading to increased productivity. The response speed and signal to noise ratio of IQ Fiber are significantly better than traditional nuclear sensors. This improves the detection of transient or cyclical variations and adds a significant troubleshooting capability to the system to perform detailed online variability studies and to make process improvements.

Construction

Fassa makes sustainable quarrying a reality

Operating a full-scale quarry in the middle of Italy's famous tourist area along Lake Garda sounds like mission impossible. However, Fassa, the leading Italian producer of lime and plaster, has made sustainable quarrying a reality. With the help of Metso, the company's new primary stage has been excavated entirely underground.

As a result, Fassa's Monte Budellone quarry is highly eco-efficient and totally dust and noise-free for the environment. The noise caused by the primary crushing stays inside the excavated underground gallery and dust is efficiently filtered from the outgoing air.

Power

Coal fired boiler to biomass boiler in Poland

Metso is to convert a coal fired boiler to a biomass fired boiler for Elektrociepłownia Tychy S. A. in southern Poland. The conversion is part of EC Tychy S. A.´s production capacity reconstruction program and focuses on the necessity to increase the share of renewable energy production and to adapt to the EU's new, tough emission requirements that will come into force in 2016.

Since 2000 Metso has received several orders to convert coal fired boilers to biomass fired boilers in Poland, which in general requires strong incentives in green energy projects. EC Tychy's cooperation with Metso emphasizes Metso's strong capability as a full-scope supplier of bioenergy solutions, as well as Metso's many years of service expertise in conversion and modernization of existing power plants.

Recycling

Shredding Serbian soya

Metso Denmark achieved an important breakthrough into a new market.
An M&J shredder was sold for the first time to a customer in the Republic of Serbia.
This was also the very first time a customer wanted to field M&J shredder technology in conjunction with the processing of soybeans.

Metso Denmark delivered an M&J 4000S-10 shredder to Sojaprotein AD, one of the most important soybean processing companies in southeast Europe, late in 2010. The design of this mid-size stationary shredder features two powerful asynchronous shafts that help avoid bridging, which is often a problem when shredding soybean straw using traditional equipment.

The new M&J shredder helps Sojaprotein AD ensure an uninterrupted supply of shredded material as fuel, with consistent specifications in terms of size and density. It makes sure that the material is finely grained, so that it burns as cleanly and efficiently as possible, improving the overall cost-effectiveness of furnace operations.

More power to your process with Metso DNA

The power of **Metso DNA** lies in its single system architecture. It is the only automation system available today that includes all functions – process, machine, drive and quality controls, as well as information management and mechanical condition monitoring.

With its compatibility Metso DNA ensures faster start-ups, shorter shutdowns and higher availability. It evolves to your mill needs and adjusts to changing requirements throughout the entire life cycle.

Combining decades of experience and widespread process know-how, Metso DNA delivers you enhanced process efficiency and improved results.

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