TAPPSA Journal
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PEER REVIEW PAPER

Analytical Pyrolysis: A rapid and versatile tool for the pulp and paper industry

An ecosystem approach to strategic industrial water management

Tissue and integrated cogeneration

6 areas for maintaining career relevance in an age of robotics and artificial intelligence

INTERVIEWING **DAVID HATHORN**

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Quarter 2 2017

TAPPSA

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The triumph of the human spirit

Dear TAPPSA reader,

As I write this some of the most beautiful parts of our country have been ravaged by wild fires, demonstrating the destructive power of nature and sending thousands of lives into turmoil, devastation and confusion. Homes filled with memories and treasured possessions have been razed to the ground.

My heart broke when I heard that parents and children who had succumbed to smoke and flame at their home, and that two firefighters – 24-year-old Bradley Richards and 63-year-old John Blaauw – also died in a heroic line of duty.

The Western Cape Disaster Management Centre described the fires as one of the most destructive blazes in recent memory, apparently worsened by the super storm that hit Cape Town; a storm which also claimed lives, damaged schools, homes and businesses.

It's at times like these that we feel helpless, but it takes just one person or company to start a chain reaction of calls to action.

A few days ago, I delivered some items to a local business that had already filled four trucks with donations destined for Knysna. This was just one business, in one town. Over the weekend, a number of other drop-off points were announced, while a Johannesburg businessman rallied volunteer firefighters to fly to Knysna to lend support – apparently more than 200 people put their hands up to help. Kulula agreed to sponsor flights for 100 qualified fire fighters and corporates and NGOs have opened fundraising channels for people to donate.

According to the website www.goodthingsguy.com, community members in Nelson Mandela Bay came to the rescue of firefighters as their trucks ran out of water. Executive mayor Athol Trollip made a public appeal for mobile water tankers to be brought to the entrance of a college on the outskirts of the municipality. In 10 minutes the first truck had arrived; two hours later more than 100 vehicles had delivered tens of thousands of litres.

News24 reported that as of Sunday morning 11 June, over R32 million in cash had been donated to help aid relief efforts by banks, supermarkets and non-government organisations. ABSA, Standard Bank and FNB each donated R10 million while Gift of the Givers has received almost R2 million in corporate donations, including R700,000 by Discovery and R500,000 by Old Mutual, as well as smaller sums by private individuals.

It is incomprehensible that so many will have to start from scratch – whether they lived in informal settlements or the suburbs. I keep asking myself how people come back from this. And then I see the generosity of others, how people open their doors, wallets and hearts. Like a phoenix rising from the ashes, the bustling Garden Route will have to rebuild and regrow.

Humanity can be awful and dastardly, but there are times when it surprises you with its beauty and goodness. **As citizens and companies, we can be part of that beauty. Step in where you can. Find a drop-off point to deliver some non-perishable food, toiletries or other bare essentials.** Or simply hold our country's people in your heart, thoughts and prayers.

Samantha

EVENTS

Forest Science Symposium
PIETERMARITZBURG | 18-20 JULY
www.icfr.ukzn.ac.za

International Symposium on Wood, Fibre and Pulping Chemistry
PORTO SEGURO, BRAZIL | 30 AUGUST - 1 SEPTEMBER
www.iswfpc2017.com

IndiaCorr Expo
DELHI, INDIA | 14-16 SEPTEMBER
www.indiacorrexpo.com/

MIAC 2017
LUCCA, ITALY | 11-13 OCTOBER
www.miac.info

2017SAEEC Conference
EMPERORS PALACE CONVENTION CENTRE | 14-15 NOVEMBER
www.saee.org.za

CEPI European Paperweek
BRUSSELS, BELGIUM | 28-30 NOVEMBER
RISI has partnered with CEPI to host the annual PPI Awards on 29 November.
www.cepi.org/EPW

Visit www.tappsa.co.za for a more comprehensive list of events.

A fond farewell to 65 years of working with print

For close on 20 years, **Derrick Hayes** has formed an integral part of the TAPPSA team in his capacity as proofreader of the *TAPPSA Journal*. Following his official retirement this year, we thought it fitting to celebrate not only his history with TAPPSA but his greater career in the print industry that spans two continents and 65 years of unique history.

Derrick and previous editor Jodie Watt at his retirement tea.

Derrick entered into the printing trade at just 15 years old, when he served a six-year apprenticeship as a lithographic printer with J. Howitt and Sons of Nottingham England, from January 1951 to January 1957. His apprenticeship was interrupted at the age of 18 to serve a compulsory two years in the British Armed Forces, following which, Derrick became a qualified printed on 15 January 1958.

To sunny South Africa

Following two very bad winters in England, Derrick was lured to South Africa's sunnier climate by letters from his older brother, who worked at Electric Printing Works in Doornfontein, Johannesburg. Through his brother, Derrick met one of the owners of Electric Printing Works in London, who offered him a job as a machine minder and got him through the interview at South Africa House. "I accepted the job offer and sailed to South Africa on the *Cape Town Castle*," explains Derrick. "I arrived in Cape Town in March 1960 to driving rain and a gale force wind. Welcome to Sunny South Africa!"

Derrick describes Johannesburg in 1960 as "very clean and quiet", with a significantly smaller population than today. "The cars were mainly Chevrolet and enormous. I had never seen such huge cars in England," he recalls. "There was no problem walking home at night after finishing a shift, I can't imagine doing the same today in Johannesburg."

After just over two years, Derrick left Electric Printing and started up an in-house printing section for a company. "After a few not very happy months, I received a phone call from one of the owners of Electric Printing Works asking me to come back. I accepted his offer and moved back again as a printer. A short time later, Electric Printing joined forces with Record Pac and another company, and the amalgamation resulted in Interpak which to my knowledge is still one of the biggest printing groups in SA with firms in Johannesburg, Pietermaritzburg and Cape Town."

Down to Durban

Derrick was soon made Works Manager of Record Pac, a position he held until he moved to New Zealand in 1980. This was an unsuccessful move and, after a few phone calls back to South Africa, Derrick accepted the position of Works Manager at Interprint in Durban, part of the Interpak Group.

Connecting with TAPPSA

"My next move was to Fishwick Printers in Melbourne Road as Works Manager, where I stayed for about two years, after which I became Works Manager at Group Editors until the late 90s." It was here that Derrick forged a link to TAPPSA. "I met Jane Molony and Roland Streathfield at Hirt and Carter to pass the *TAPPSA Journal* for printing," explains Derrick, "and as I had picked up a few proofreading mistakes as well, they asked me to proofread the Journal, which I did for many years. I met Roland through Sappi when he worked there and I did testing of paper for him when I was at Group Editors."

Derrick began proofreading the *TAPPSA Journal* in 1998, and since then, Derrick believes the publication has improved in all ways, from content and pictures to advertising. When asked what he has enjoyed most in his position as proofreader of the Journal, Derrick replied that he has always enjoyed meeting and working with people, particularly Jodie Watt (previous editor and current layout artist for the Journal) and Kathy Bennett at Fishwicks Printers (who is responsible for printing the *TAPPSA Journal*).

"What I will miss most is not having to look for spelling mistakes. I can't even read *The Mercury* without looking for mistakes, of which there are plenty!" says Derrick. And the most common mistake that he has to correct time and time again in the *TAPPSA Journal*? "The most common mistakes are in American articles as they can't spell English, only American, and also I can't believe how many times I delete the comma after the word 'and'."

Derrick will be spending his retirement strolling and birdwatching in Bulwer Park, Glenwood, which his apartment overlooks, and going to eat at the various eateries that the area has to offer. We wish Derrick much happiness and peace in his well-deserved retirement, and thank him for such a tremendous service that he has given to TAPPSA and to the print industry at large. ■

Editor's note: Thanks a ton, Derrick! I mean tonne...

THE MANUFACTURING INDABA 2017

Growing South African manufacturing

The fourth edition of the annual Manufacturing Indaba is fast approaching and, with the country heavily focused on growth solutions and the future trends for the manufacturing sector, participants eagerly plan for two remarkable days.

The Indaba has in the past attracted key industry leaders, policy makers, academia and potential leaders. "The two-day event provides a platform to explore strategies that are tantamount to building South Africa's manufacturing future for 2017 and beyond."

Philippa Rodseth is the Executive Director of the Manufacturing Circle. Rodseth believes that we need to focus on three key areas in building South Africa's manufacturing future. "First, we need to increase the competitiveness of our manufacturing sector. We can achieve this by improving our skills base and our national, provincial and local infrastructure.

"Second, to attain a supportive international trade position, we can implement support incentives such as the newly launched Agro-processing Support Scheme (APSS) and support for the downstream metals industries, and by having a pro-active trade tariff regime.

The third aspect would be to promote the reputation of South African manufactured product. "We can achieve this by buying local, both in the public and private sector." The planned keynote addresses and panel discussions will focus on the future of manufacturing in South Africa, mainly centred around the role of manufacturing, how to build a stronger manufacturing sector, and the growth sectors for the future. The informative and interactive sessions allow the exploration of strategies for growth and competitive advantage, including the productivity debate and efficient cost reducing strategies that aid growth.

The Indaba provides a platform for Government and the relevant stakeholders to interact, giving them the opportunity to achieve clarity regarding incentives available to local companies, and, just as fundamental, ensure foreign investment through government incentives on offer, assisting the establishment of global companies in the South African manufacturing sector.

In order for South Africa to compete internationally, technology and its effect on the manufacturing industry across the world and in South Africa will be a pertinent topic. Key participants will focus on new potential growth, showcasing manufacturing opportunities for financial assistance and access to finance for the industrial players.

The event is hosted in partnership with the Department of Trade & Industry, the Department of Science & Technology, the Department of Public Enterprises, the Manufacturing Circle, the City of Ekurhuleni as the Host City and the NCPC-SA. ■

Save the date!
The 4th annual Manufacturing Indaba will be hosted at Emperors Palace in the City of Ekurhuleni from 27 to 28 June 2017. The event will comprise a two-day conference and exhibition. www.manufacturingindaba.co.za

FACILITIES MANAGEMENT EXPO

Facilities Management Expo highlights need for better focus on paper recycling within businesses

From 10 to 11 May, the Paper Recycling Association of South Africa (PRASA) made its presence known at the Facilities Management Expo at Gallager Estate.

While a number of people within offices and business parks do recycle at their work areas, many were not sure as to where the paper ended up. Some visitors cited that they have seen paper recycling going into the same refuse bags as general waste at the end of the day. "There is a real need to engage more with facilities managers as they are people who procure cleaning and waste management companies," says PRASA operations director Ursula Henneberry.

"We had a number of enquiries from businesses wanting to improve their recycling practices, and it was also a fantastic opportunity to highlight that the responsible use of sustainably produced paper can go a long way in meeting their 'green goals'."

Henneberry adds that PRASA's participation was such a success that they will be exhibiting at the Cape Town edition on 18 October. "It was also great being next door to coffee suppliers – who use paper cups."

Save the date!
PRASA will be exhibiting at the FM Expo in Cape Town on 18 October.

INDUTEC 2017

Pumps and pipes, valves and water in the limelight

INDUTEC 2017 ran from 17 to 19 May at the Gallagher Convention Centre, Johannesburg with a special focus on the pumps, valves and pipes (PVP) sector in sub-Saharan Africa. Pumps, Valves and Pipes Africa 2017 is the 10th edition of this large and comprehensive tradeshow dedicated to the industries that are involved in the conveyance of liquids, gasses and slurries.

INDUTEC also hosted two key industry conferences over the three days: PVP Live and WaterTec, both endorsed by the Department of Trade & Industry (dti).

Kamagelo Mampane, Chairman of the State Owned Entities Procurement Forum (SOEPF), was unequivocal in his enthusiasm and positive focus on the vital role it plays in both ensuring economic purchases for the public sector combined with positive support for local business. He was one of the panelists for the session overcoming local industry challenges at the first day of the PVP Live 2017 conference programme, where he explained the vital balance between successful production but also ensuring job opportunities for local people. “People want to be involved, they ask ‘what can we do?’ and in that way they can be integrated into the supply chain. It’s about collaboration.”

Reducing the pressure, simplified

During one of the PVP Live sessions, Peter Telle, of Ultra Control Valves, shared that leaks are a part of every water supply system in the world, but in southern Africa these losses pose a threat to future water security. Reducing the pressure, especially during low demand, can offer huge savings – on both the essential resource itself and in financial terms, he told his audience. Pressure reducing valves (PRV) are the natural choice but can only really operate at a 3:1 ratio (reducing pressure for example from 12 bar to 4), but sometimes that’s not enough, he explained. He said there are four or five brands in South Africa, some operate by a timer, others by detecting changes in demand. They cost around R50,000 ($3,700) but they are maintenance intensive and Telle noted “too complicated” for local conditions. “When the automated valve starts playing up, often engineers simply disconnect them, which is a costly loss,” he said.

He explained to the delegates how to increase the reduction in pressure above the 3:1 ratio; PRVs can be run in series, theoretically offering 9x reduction in pressure. “But that can encourage cavitation,” he said. Cavitation is the formation of bubbles or cavities in liquid. These develop in areas of relatively low pressure around an impeller. As these bubbles collapse, they trigger forces within the pump, causing significant damage to the impeller and/or the pump housing.

A simpler system could work well in Africa to reduce water loss through leaks and he showed the audience a new acquired ratio valve (ARV) with no controls and a Maric flow valve, which is able to operate with soiled water. He showed how they operated successfully in large buildings, ensuring adequate water flow but offering huge savings from high-rise buildings and hotels to street level properties.

CLOCKWISE FROM TOP LEFT. Peter Telle of Ultra Control Valves; “This transport box would take more weight, but I don’t want to damage the exhibition hall floor,” says Jan Vreken, Kimmo managing director; Kamagelo Mampane, Chairman of the State Owned Entities Procurement Forum.

Paper products at a pumps and valves trade show?

Not everyone at INDUTEC 2017 was exhibiting pumps, valves and pipes: one smart business was targeting the transport sector with some of the strongest cardboard boxes in the world. KIMMO, which counts some of the world’s leading names amongst its clients, offers a solution to traditional wooden crates that is cheaper and stronger. “The cardboard honeycomb is amazingly strong, it’s lightweight and offers huge advantages compared with traditional transportation,” said Jan Vreken, KIMMO Managing Director.

The South African company has an enviable list of clients and saw an opportunity at INDUTEC to meet both visitors to the expo, and the exhibitors themselves. “I’d rather be the sole cardboard box exhibitor at a show like this where our transport solution is a real benefit, than one of dozens at a transport show,” said Jan, smiling. He agreed to be photographed on top of a 600kg paper roll, perched on a pallet, which had its total weight borne by the honeycombed cardboard crate. “It would take more weight, but I don’t want to damage the exhibition hall floor,” he said.

KIMMO has been operating for 10 years and turned its attention to the honeycomb version three years ago. ■

ICFPA ROUNDTABLE 2017

Global forest and paper industry revisits commitments to sustainable production

"The global forest and paper industry stands firm in achieving its sustainability commitments based on its common values. Today's conference provides us with an opportunity to reaffirm these values in today's interconnected and fast-paced world," said Peter Oswald, Mondi Group CEO designate, who chaired the eighth biennial international CEO Roundtable in Berlin, Germany, in mid-May.

Hosted by the International Council of Forest and Paper Associations (ICFPA), more than 20 forest-based industry CEOs and association leaders from around the world met to discuss industry innovation, sustainability aspects, current political aspects and future trends that may impact the industry at local and international levels.

The leaders reiterated that their commitment to scientifically based long-term targets, regardless of politics. While some key performance indicators are plateauing, CEOs upheld their intention to reducing energy consumption and emissions related to company activities.

Keynote speaker Professor Dr Michael Hüther, economist and director at the Cologne Institute for Economic Research, provided insights on the effects of global political disruption on the forest-based industry. He pointed out that President Donald Trump is actually correct in that globalisation has not been good for the USA manufacturing sector. However, the solution lies not in populism and protectionism but rather in regionalisation. By developing clusters and regional hubs of excellence, a country can revitalise the local economy.

The meeting also emphasised the importance of carbon neutrality, and in that context mandated the ICFPA to carry out research and benchmark the performance of other industries.

Reflecting on its purpose and mission

On its 15th anniversary, the ICFPA also reflected on its purpose with the release of a new statement for the future: "To benefit global society through collaboration with industry, governments and non-governmental organisations on public policies that facilitate the manufacture of sustainable products from virgin and recycled forest-based resources that meet human needs for information, packaging, housing, hygiene, energy and other innovative products."

"We need to see the forest-based industry as a leading sector when it comes to the development of innovative products and processes that benefit society," says Jane Molony, who recently took on the role of ICFPA president. "With a forward-looking view on the natural resources, we can collectively ensure their availability for future generations while benefiting the present."

"To benefit global society through collaboration with industry, governments and non-governmental organisations on public policies that facilitate the manufacture of sustainable products from virgin and recycled forest-based resources that meet human needs for information, packaging, housing, hygiene, energy and other innovative products."

The ICFPA has also updated its mission, broadening the scope of the organisation to represent an innovative forest-based industry: "To serve as a forum for global dialogue among national and regional industry associations and their leadership, to cooperate in the development of common positions on issues of mutual interest, to represent the forest, paper, wood and forest fibre-based industries with global policy organisations, and coordinate action and distribute information through member associations."

"The global forest products industry has made significant investments in research and has been developing new products and technologies to make the best use of wood and fibre-based products. We are an innovative industry with a key role to play in the transition towards a greener and more sustainable economy that will benefit current and future generations" said Molony. "With this purpose statement and revised mission, we look forward to promoting the interests of the forest, paper, wood and fibre-based industries in global venues and serving as a resource for policy makers and other stakeholders in the years to come." ■

Save the date!
The next CEO Roundtable will be in Canada in 2019.

The function of the ICFPA
The ICFPA serves as a forum for global dialogue, co-ordination and co-operation. It represents 17 pulp, paper, wood and fibre-based associations from 35 countries, including many of the top pulp, paper and wood producers around the world.

ICFPA celebrates 15 years. Pictured here are the ICFPA committee members that attended the Berlin meeting in May.

Jane Molony elected president of the International Council of Forest and Paper Associations

Jane Molony, who is well known in the pulp and paper sector, was recently appointed as president of the ICFPA at the recent CEO roundtable in Berlin (see page 6).

Jane Molony and outgoing ICFPA president, Elizabeth de Carvalhaes.

Molony has been the executive director of the Paper Manufacturers Association of South Africa (PAMSA) for nine years. Her first introduction to the industry was in 1996 through her role as publisher and editor of the TAPPSA Journal and later through her appointment as executive director of TAPPSA until 2008.

She is a passionate ambassador for 'all things paper', acting as the representative for the pulp and paper industry and lobbying government and stakeholders on common pre-competitive activities, including energy, education and skills development, environmental and sustainability issues, legislation, research and recycling.

"Across the world, wood, paper and tissue products touch lives every day in ways that often go unnoticed. Without our industries' products, many people would not be able to teach, read or learn; businesses would not be able to ship merchandise, or protect goods; nor would people be able to improve their lives through the basics of personal hygiene."

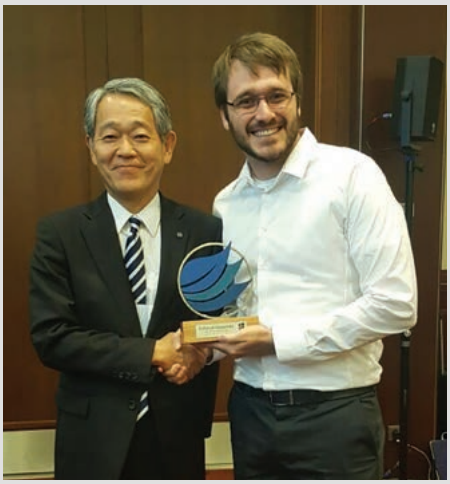
Molony has been actively working with Business Unity South Africa to position the paper industry as a cogeneration partner in the supply of renewable energy to the national grid.

Until recently she was also the chair of the South Africa Book Development Council, an organisation which seeks to increase access to books and boost local book publishing especially indigenous language and diverse content books.

"Forest and paper products also have a great environmental and economic story to tell. It is a story that has been proudly told by the ICFPA for 15 years. I am particularly honoured to take charge of this group of leaders," said Molony upon the announcement.

Molony succeeds Elizabeth de Carvalhaes, president and CEO of the Brazilian Tree Industry, who served as ICFPA president for the past three years. "It has been a privilege to help the ICFPA continue its legacy of advocacy on important issues of interest to this global industry, and I have put significant efforts in communication. I believe this industry has a remarkable story to tell and we are just scratching the surface when it comes to public awareness and understanding of the sustainable benefits of the global forest products industry," said Carvalhaes. "It was a great pleasure and honour to be part of this important forum and network of leaders and Ibá will continue to advocate towards the global forest industry and the plantations based industry locally and globally."

"On behalf of the entire ICFPA, I would like to thank Elizabeth for her leadership and guidance," added Molony. "I look forward to continuing to work with her and the other members of the steering committee to ensure a strong global forest products industry." ■



CLOCKWISE. Esthevan Gasparoto with Fumio Manoshiro of Nippon Paper Industries; Peter Oswald presents a trophy to Koh Sakai; Shuji Fujisawa accepts his award from Dante Parrini of Glatfelter; Ryan Merckel and Sonja Boshoff.

Game-changers lauded by ICFPA

Against the backdrop of the ICFPA CEO meeting in Berlin, the first winners of the new Blue Sky Young Researchers and Innovation Award were recognised. The global award aims to stimulate interest by young researchers carrying out projects in a wide range of activities relevant to forest-based science, products as well as process improvements or other innovation throughout the value chain.

The competition's theme 'Game Changing Technologies for the Forest and Paper Industries – Unfolding Potential of Forest, Paper and Wood-Based Products' attracted nominations from each participating country. This year, 12 projects were nominated by ICFPA members to the international phase.

Japan's Shuji Fujisawa impressed with his project 'Biocompatible nanocellulose/polymer composite microparticles formed by emulsion-templated synthesis' while Koh Sakai, also from Japan, won with her submission on 'Cellulose nanofibres prepared by phosphorylation'. Brazilian Esthevan Gasparoto was awarded for his project, 'Cutting-edge technologies for forest monitoring and measurement'.

Two South African students among finalists

South Africa's Sonja Boshoff and Ryan Merckel (pictured above) won the South African round and were counted among the 12 finalists who made it to the international round.

Boshoff's work looked at the potential of biological and thermochemical technologies for the conversion of solid waste streams from paper and pulp mills into energy. She is currently a research engineer at Mpact Paper, Stellenbosch.

Merckel pitched his research at Catalytic Pyrolysis for Upgrading of Bio-oil. He has recently been selected as an exchange student with Malardalen University in Sweden. He is doing his PhD through the University of Pretoria as part of the PAMSA co-funded project with the Department of Science and Technology.

"The ICFPA congratulates all the participants and the global winners of the first edition of this global competition. We believe it is important to foster knowledge and stimulate innovative research among young researchers. Our industry is a vibrant and dynamic workplace for the future and therefore we will continue our support of students and young professionals", said ICFPA President Elizabeth de Carvalhaes. ■

Pulp and paper industry training programmes take top awards
at National Skills Authority conference

Umfolozi Technical Vocational Education and Training (TVET) College, a PAMSA education delivery partner, walked away with several awards at the 2017 National Skills Authority (NSA) conference in late March. The college has for several years been delivering two paper industry-developed programmes, backed by funding from the Fibre Processing and Manufacturing (FP&M) Seta.

According to Umfolozi's deputy principal for academic services, Elsie du Toit, the college was awarded two golds and a silver at the event held on Thursday 23 March.

One of the gold awards for the best skills programme was presented to Umfolozi for the pulp and paper occupational programme (PPOP).

The PPOP, developed by PAMSA and pulp and paper industry expertise through FP&M Seta funding, caters for full-time employees who want to expand their knowledge base of pulp and paper operations. It is a distance-learning component and is quality-assured by the FP&M Seta.

"The PPOP closes an important education gap by expanding the knowledge base of pulp and paper operators, giving them the theoretical and practical training required by the companies for which they work, without them having to leave the mill premises," says PAMSA's education manager, Olga Bezuidenhout. "We are extremely proud of Umfolozi for making this project the success that it is, and grateful for the financial support of the FP&M Seta."

Taking the silver award for the best placement programme was the National Certificate – Vocational (NCV) for Process Plant Operations (PPO) and its pulp and paper making technology placement project with Umfolozi. This programme imparts specialised industry knowledge, giving learners an advantage when being placed in a pulp and paper manufacturing environment. NCV level 4 learners are placed at various pulp and paper mills across the country to complete six months of experiential training and adequate exposure to the working environment.

"We are delighted that our partner projects which have undergone significant fine-tuning over the past few years have gained this prestigious recognition," adds Bezuidenhout. "We enjoy a fantastic partnership with Umfolozi TVET College and the FP&M Seta, and are grateful for the support of the pulp and paper industry which plays a vital role in producing renewable, recyclable products that we all use every day. The fact that we can empower people with important technical skills is the cherry on top."

Pulp and papermaking is a specialist field of chemical engineering involving the study of processes required for converting raw materials such as wood into pulp and paper products. A career in pulp and paper involves a wide variety of experience and skills and people wishing to pursue this avenue must have a basic knowledge of chemistry and physics, and an aptitude for solving problems logically.

TOP. Representatives of the Pulp and Paper Occupational Programme meeting held in May. From left: Zak Zwane – Mondi Richards Bay; Tharif Hanif – Lecturer, Umfolozi College Mandeni and Project Leader for the PPOP; Phindile Nsibande – Assistant Director: Curriculum, Umfolozi College Richards Bay; Elsie Du Toit – Deputy Principal of Academic Services Umfolozi College Richards Bay; Olga Bezuidenhout – Education and Training Manager, PAMSA; Desmond Harper – HR Consultant for learning and development at Coastal Hub, Sappi Umkomaas; Noekie Jansen van Rensburg – PPOP Co-ordinator, Umfolozi College Mandeni; Kumaren Manikam - Training Consultant, Sappi Stanger / KwaDukuza; Victor Sibiya – ETDP, Mpact Piet Retief; and Johnny Modiba – FP&M Seta. **ABOVE.** Umfolozi TVET college, PAMSA and FP&M Seta representatives at the National Skills Authority conference in March.

Umfolozi's second gold award was presented for the best artisan development programme coordinated by Sifiso Magwana and executed in partnership with the Department of Social Development at Vuma Farm.

The NSA awards aim to celebrate excellence by recognising best skills development practices across all skills development implementers and National Skills Fund projects in various categories; recognise work placement opportunities created through various learning programmes; and mobilise business, government, community and providers to ensure the realisation of the National Skills Development Strategy III goals. ■

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Interviewing **David Hathorn**

In early February 2017, David Hathorn, Mondi Group CEO, announced his intention to retire. David has served in this capacity since 2000, when the packaging and paper group was still housed within the Anglo American portfolio. Over the years David has led the company through major change, especially the demerger from Anglo American in 2007. This move led to the establishment of Mondi as an independently listed company.

His 26 years of experience in the packaging and paper industry is backed by strong financial and commercial experience of the sector. David is a graduate of the then University of Natal where he studied a Bachelor of Commerce. He is also a chartered accountant. He completed articles with Deloitte & Touche in 1987, whereafter he joined Anglo American plc in 1989 as a divisional finance manager, based at their Marshall Street offices.

In 1991, David moved to Mondi. He worked through the ranks as finance director and then general manager of Mondi Europe until 2000, when he was appointed CEO of the Mondi Group.

David stood down officially as Group Chief Executive Officer and as a director of Mondi plc and Mondi Limited at the AGM in May. David has since been working alongside Peter, and will continue to work in an executive capacity until his retirement in February 2018.

Global advisory and fund administration firm Maitland has recently announced the appointment of Hathorn to the Maitland Board as a Non-Executive Director. Hathorn will also act as Chairman of the Audit and Risk Committee of Maitland International Holdings plc.

TAPPSA Journal had the privilege of interviewing David.

Professionally speaking

Apart from establishing its independence as a listed packaging and paper group, what was the biggest change that Mondi – regionally here in South Africa or internationally – had has to navigate during your time as CEO?
An important development was Mondi's expansion in the late 1990's into higher-growth emerging markets including central and eastern Europe. Mondi was one of the first movers and our investments into modernising and growing our operations in this region have contributed significantly to our success.

What stands out as your most significant accomplishment during your tenure?
A key focus for me was on ensuring that we delivered value to our shareholders.

The pulp, paper and packaging sectors have experienced some interesting times over the past two decades. Rewind 26 years, and what would you have never anticipated in the industry?
The 2008 economic crisis had a big impact on the industry, including Mondi. However it also offered us opportunities because we had a strong balance sheet and we were able to invest in our operations when many others could not, e.g. our lightweight recycled containerboard machine ECO7 and state-of-the-art corrugated box plant at Świecie (Poland).

Don't overload an organisation with new initiatives. Ensure you have talented leaders, set the requirements and then delegate responsibility to empower them.

DAVID HATHORN

What has been the hardest part of your job over the years?
From a personal perspective, all the travelling and regularly being away from my family.

Looking back at your career, knowing what you know now, is there anything that you would do differently?
With hindsight there are of course a few things I would have done differently. However one of the real privileges of working with the people I have worked with at Mondi is that we trust each other. We know that understanding the real situation is critical to being able to make quick and effective decisions. So yes we have got things wrong over the years, but we have been honest enough with ourselves and with each other to acknowledge it's not working and find a solution quickly. Overall, the decisions we have made together have positioned Mondi very well for the future.

What will you miss most?
The exceptional people I have worked with, who have both challenged me to think differently and supported me along the way.

And what won't you miss?
The regular business travel.

How will you be preparing mentally for retirement?
While I am not planning on taking on a full-time role again, I do hold a couple of non-exec positions and am exploring others. I am excited about having time to focus on other things too, like my family and friends!

Lighter side

What is the best advice you ever received and which you would want to share with readers?
Don't overload an organisation with new initiatives. Ensure you have talented leaders, set the requirements and then delegate responsibility to empower them.

Kindle or paper book? And why?
Paper book. I am old school like that.

Last book you read?
Shantaram written by Gregory David Roberts.

What is one piece of technology you can't live without?
My iPhone.

If I were to ask a group of people who know you well to give me three words that best describe you, what answers would I get?
I am not good at answering questions like this. So I asked a few colleagues to help me out and they came back with: Focus. Integrity. Passion. ■

OPPOSITE PAGE: David Hathorn with the Mondi board at the Melrose Arch offices in 2015.
BELOW: In 2014, the Mondi board visited the group's forestry operations in Richards Bay.

ENERGY EFFICIENCY

Two industry leaders join forces on shared path towards higher efficiency

Tissue and integrated cogeneration

Valmet and Solar Turbines Incorporated, a Caterpillar company, are collaborating to further develop their common activities in the integrated cogeneration field. With a special focus on the tissue production process, the chief aim of the joint energy optimising system development is to reduce tissue mills' production costs and improve energy efficiency.

A natural outcome

Valmet has been a leader in the cogeneration field for over 15 years, delivering the first plant in Italy in 1998. Since then, Valmet has constantly developed and optimised the tissue production related systems, gradually enlarging its scope of supply. Today, it includes all the equipment necessary from the turbine flange onwards. In addition, Valmet has successfully delivered and installed more than 200 Yankee hoods and 85 Advantage AirCap hoods worldwide for over 25 years.

Solar Turbines supplies gas turbine electrical generators ranging from 1 to 22MW and has installed 26GW of power generation equipment (from single generation packages to full cogeneration plants) and more than 15,000 gas turbines in the world including 1.6GW in the pulp and paper industry alone.

Valmet and Solar Turbines have completed numerous projects together in the past few years. This new cooperation represents a natural evolution of a strong relationship. Mutual trust and individual expertise in the different fields have played an important role in laying the foundations for this new agreement.

Integrated cogeneration for tissue machines

Cogeneration, the combined production of electrical or mechanical and thermal energy obtained by the same primary source, has become a well-established technology in tissue production. A cogeneration plant is built of a gas turbine connected to an electrical generator. Its exhaust feeds a heat recovery system, generally consisting of a waste heat steam generator and, in some cases, one or more exhaust/water heat exchangers.

A tissue machine (producing about 100 t/day) uses about 5 t/h of steam. The total electrical consumption of the whole production line, including the ancillary equipment, is about 4,5 MW. Of the tissue machine heat needs, only the steam production is typically covered by the cogeneration.

But if all the electrical consumption needs are to be covered, the exhaust heat generated by a properly selected gas turbine exceeds the capacity to obtain the 5 t/day of steam necessary to the tissue machine. Therefore, there is a remarkable potential to increase the energy efficiency.

As a solution provider, Solar Turbines offer services for energy project development, from feasibility studies to engineering, procurement, construction and commissioning of the project including financing solutions. Its customers include utility companies and production or processing industries that require efficient energy solutions. Their packages are known for their reliability and availability backed by a knowledgeable local field presence (50 field service offices worldwide). Their unique Equipment Health Management system is a proactive technology-based service, powered by the InSight Platform™ technology.

Getting the full package to customers

The Valmet cogeneration concept (named Advantage™ ReGen™) uses part of the gas turbine exhaust fumes in the hood. The fumes unused in the hood are, in turn, mixed with the flow exhausted from the hood and directed into the waste heat steam generator for further recovery processing.

Over the years, both companies have developed the proficiency in feasibility studies at discovering the best configuration of a cogeneration plant. Integrated gas turbine cogeneration has been successfully applied to both conventional and textured tissue production processes.

Based on the analysis of energy costs on installed or future tissue machines, the best strategies can be defined to benefit from government subsidies or any other form of subventions. Valmet and Solar Turbines' strength resides

ABOVE. The Lucart Castelnuovo di Garfagnana (Lucca, Italy) plant after the rebuild to integrated cogeneration.

LEFT. The Solar – Valmet representatives, from left to right: Benoît Fécamp, Paper & Tissue Market, Global Market Development; Aad Den Elzen, Business Development Director, Solar Turbines Power Generation; Jan Erikson, VP Sales, Tissue Mills Business Unit; and Paolo Vezil, Product Sales Manager, Valmet.

in the experience acquired over time and in the deep knowledge of both processes - tissue production and drying and cogeneration. The advanced control system is essential to minimise interferences between the two processes and guarantee a reliable production of both tissue paper and energy.

Game changing tissue drying

The real game changer comes from the utilisation of the turbine exhaust gases directly for tissue drying. The exhaust flue gases, naturally clean and odourless, can be directly conveyed to the drying process of either conventional, textured or structured products. Thanks to the typical heat-to-power ratio of the gas turbines which matches the tissue machine's, the cogeneration fulfills both the thermal and electrical needs of the tissue production.

The energy efficiency of the global system is increased and energy costs are drastically reduced. This optimisation is also made possible by the high availability of Solar gas turbines (compared to other power generation technologies). Besides the savings, an important benefit of this cogeneration system is to reduce or avoid the impact of unplanned machine shutdown due to unstable power grids.

Energy optimisation also reduces environmental impact, as energy efficiency improves, while greenhouse gas emissions diminish. At the same time, costs related to tissue drying are nearly or completely eliminated, as shown by the recent installation in Lucart, Stabilimento di Castelnuovo Garfagnana, Italy. This paper mill represents a perfect example of how integrated cogeneration can be applied to reach remarkable energy savings.

Even the speed record of Hayat TM2 in Turkey (2210 m/min obtained with a Valmet DCT200TS machine and two Taurus 70 gas turbines by Solar) has been achieved with integrated cogeneration, while keeping the hood burners off and with no impact whatsoever on the process.

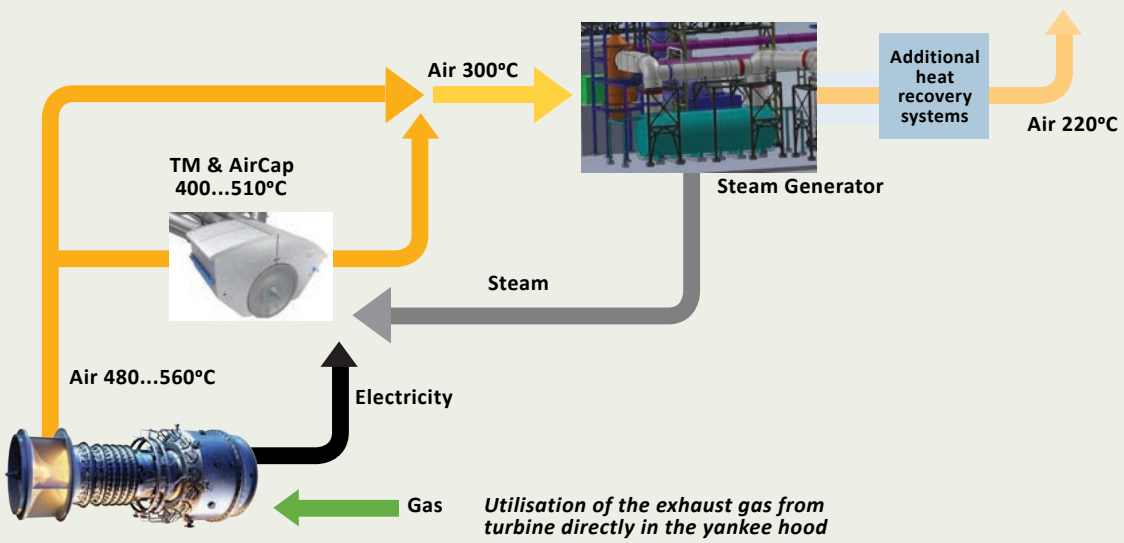
Ultimate integration

"The development cooperation between Valmet and Solar Turbines aims at providing the tissue producers with the ultimate integration of a cogeneration system to a tissue machine taking into account the different customer needs and the energy market where the tissue production is located" says Paolo DellaNegra, Manager, Sales Department, Valmet.

"The target of the Valmet - Solar Turbines agreement is to propose a game changer in the tissue mill energy management, bringing together the best in class of tissue production and power generation" says Benoît Fécamp, Paper & Tissue Market – Global, Market Development - Power Generation, Solar Turbines. ■

www.valmet.com, www.mysolar.cat.com

BELOW. Typical flowsheet of an integrated cogeneration system



Utilisation of the exhaust gas from turbine directly in the yankee hood

COARSE SCREENING

Screening developments improve yield
and quality from OCC and mixed waste furnishes

Recycled fibre processors are constantly faced with the conflicting challenge: how to process highly contaminated furnishes to optimum levels of cleanliness while still minimising yield losses. This article discusses some recent and proven developments in coarse screening that help improve the situation.

Recycled fibre applications pose difficult challenges. Each sub-process must operate at the highest (optimum) efficiency in order to remove the maximum amount of contaminants – while still yielding good fibre at a cost that makes the application economically attractive. Virtually all mills today are faced with furnish degradation with increased debris levels. Debris is more prevalent in old corrugated containers (OCC) and Mixed Waste furnishes. Some mills try to manage debris removal in the pulping loop through double or continuous detrashing. There are other solutions that require minimal or no capital and leverage the mill's existing assets.

More versus less

Recycled fibre processing balances the desire to remove more and more contaminants (which suggests installing more equipment) with the critical need to improve yield (which suggests less equipment in order to minimise potential points of fibre loss). What can a mill do to improve this situation? One approach is to optimise the coarse screening loop.

The coarse screening loop

Virtually all recycle mills incorporate a coarse screening loop into their flowsheet. There are several ways to configure a coarse screening system; however, the basic functions remain the same:

- Screening for debris removal
- Deflaking to minimise fibre loss
- Rejects separation and the concentration of plastics

These steps can be performed using a variety of equipment; however, the goal is to minimise the amount of equipment to lower the mill's operating and maintenance costs.

Screening for debris removal

OCC systems have high debris loading. Many mills are converting from screen baskets with holes to baskets with slots to increase removal efficiency.

Early coarse screen baskets had drilled holes typically ranging from 0.055-0.079 inches (1.2-2.0 mm) depending on the furnish. These baskets are good for removing large and coarse debris, but poor for removing smaller debris and stickies. This increases the burden of higher debris levels in the incoming feed to downstream equipment, which is being tasked with achieving excellent removal efficiencies with very little fibre loss.

More recently, screen baskets with slots, typically 0.016-0.030 inches (0.4-0.75 mm), have been utilised. However, these slots typically have the same wire/profile shape as those in fine screens, even though the role of the coarse screen is primarily 'barrier screening' to protect downstream

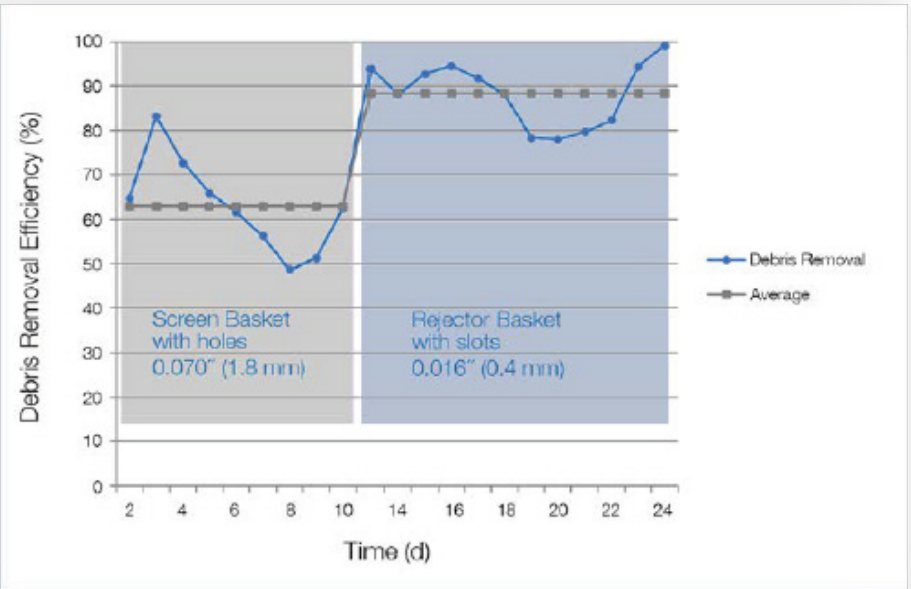
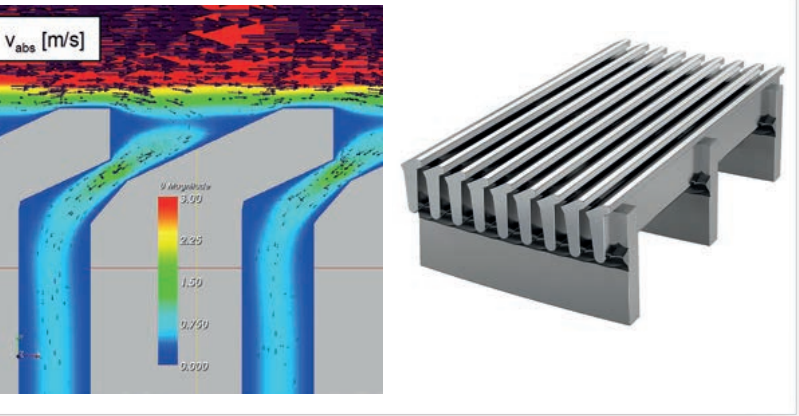


FIGURE 1. The primary benefit of converting from holes to slots in the coarse screen basket is to increase coarse debris and stickies removal early in the process to take the strain off downstream equipment. This graph illustrates the typical stickies reduction results from a hole-to-slot conversion.



(ABOVE) FIGURE 2. Flow analysis of ANDRITZ Bar-Tec Rejector wire. Cross-cut of a Bar-Tec Rejector profile.

equipment, as opposed to the 'probability screening' function of a fine screen.

Enter the ANDRITZ Bar-Tec Rejector basket for effective removal of coarse debris with lower energy requirements. The Bar-Tec Rejector is the only basket in the market today with a wire profile for the coarse screening loop.

Increased angle of repose. Computational Fluid Dynamics (CFD) analyses were performed to optimise the Rejector's turbulence and passing velocities. Conventional wire profiles require debris to make a 90° turn in order to be accepted. The Rejector requires the debris to make a 120° turn – a more difficult path for the debris to take. There is also a unique channel that greatly improves debris removal and improves basket life.

FIGURE 4. DRUM 450 Dolphin rotor for coarse screening. The rotor creates optimal pressure pulses (positive pulse for debris removal efficiency and negative pulse for cleaning to minimise plugging).

(BELOW) FIGURE 3. Linerboard Results. This mill replaced the OEM wear components in three screens with the Bar-Tec Rejector basket and an optimised rotor design. This increased the capacity so dramatically that the mill was able to shut down one screen. Note the debris removal increase and power decrease.

	Drilled baskets 0.051" (1.3 mm) hole Profiled	Bar-Tec Rejector basket Slot 0.020" (0.4mm)
Rotor	S Type-3 vanes	LR DRUM 300
Tip speed	23.2 m/s	23.2 m/s
Capacity per screen	~ 227 t/d	~ 417 t/d
Diff. pressure (psi)	3.5-4.0	2.7
Power consumption	60-63% on 200 hp	54% on 200 hp
Consistency **FEED** **ACCEPT**	 2.5% 2.4%	 2.5% 2.3%
Debris removal	42%	69%
Screens required	3	2
Power savings	None	Shut down a 200 hp motor ~ USD 60,000/yr
F-A freeness drop	Normal 50-80 ml	none

Reduced energy to clean the slots. Conventional wire profiles, upon completion of the negative rotor pulse to clean the basket, draw the accepted stock/water back through the basket in a flow that is perpendicular to the feed pulp stream. This increases energy consumption. The back flush flow in the Rejector is in the direction of the rotor rotation, improving the negative pulse effectiveness and minimising energy consumption.

Increased area for chrome. The Rejector wire has significantly more land area (the top of the wire) for the addition of chrome, which increases basket life.

Smaller slots for stickies removal. Although the coarse screening loop is typically not the place where stickies are removed, the slot size, profile height, and angle of repose of the Rejector allow for substantial stickies removal. With fewer stickies in the accept pulp, there will be reduced stickies in the feed to the fine screens.

Improved energy efficiency. A variety of different rotor types can be used in the coarse screening loop. For simplicity, these rotor types can be categorised as being "open" or "closed." While ANDRITZ supplies different rotor types for all OEM screens and applications, the most popular for many applications is the low-energy DRUM 450 Dolphin rotor.

The DRUM 450 Dolphin rotor is specifically engineered for coarse screening. It is a closed design that is ideal for eliminating fibre hang-ups. This DRUM 450 Dolphin rotor is specifically designed for maximum capacity as the arrangement of its foils prevents debris from being trapped between the rotor and the basket.

Slot Width	Rejector 0.024" (0.6 mm)	Rejector 0.024" (0.6 mm)	Change
Pressure screen	UV500	UV500	
Rotor	OEM drum rotor	DRUM 450 Dolphin	
Rotor tip speed	18.5 m/s	18.5 m/s	
Capacity	480 bdmt/d 850 m^3/h	560 bdmt/d 970 m^3/h	+ 17% + 14%
Power consumption	48% (120 kW)	39% (97.5 kW)	- 19%
Specific power consumption	6 kWh/bdmt	4.2 kWh/bdmt	-30%
Energy	none	USD 22,680/y	22.5 kW * 24 h/d * 350 d/y * USD 0.12/kWh

FIGURE 5. DRUM 450 Dolphin increased throughput plus energy savings. The size and placement of the foils on the rotor achieve excellent runnability at high consistencies and increased capacities.

It has been documented that the DRUM 450 Dolphin rotor can achieve 15-30% energy savings compared to a conventional foil rotor. This is mainly accomplished due to the creation of optimal pressure pulses, allowing the rotor to operate at lower tip speeds.

The foils on the DRUM 450 Dolphin body are streamlined to minimise drag and the "pumping effect" that disturbs stock flow inside the screen. The foils also create a strong negative pulse for effective cleaning of the screen basket, which minimises plugging even with highly contaminated furnishes. The foils themselves are individually replaceable to reduce maintenance costs.

Rebuildable cylinders save time and money

To reduce maintenance costs, ANDRITZ offers in-mill rebuildable screen baskets. Only critical wear components are replaced. The Bar-Tec U-Tune basket design can be used in coarse and fine screens from virtually every OEM. It is especially useful in high-pulse OCC applications since it can be easily rebuilt at the mill site.

FIGURE 6. The Bar-Tec U-Tune in-mill rebuildable screen cylinder.

The Bar-Tec U-Tune is constructed with two screen liners joined by a patented and removable middle ring. This provides the option of having different profiles or even different slot sizes in the feed and reject sections of the basket, or to replace the part of the cylinder (top or bottom) that is damaged. The cage, rings, and flanges are reusable and rebuild time is typically less than two hours.

Most recycle mills are looking for ways to optimise their coarse screening capabilities with minimal capital and operating costs. Much can be accomplished with no-capital solutions such as the ANDRITZ Bar-Tec Rejector basket and the DRUM 450 Dolphin rotor. Operating and maintenance costs can be further reduced with the Bar-Tec U-Tune rebuildable basket design.

The results will be increased debris removal, reduced power consumption, lower overall wear parts costs, and minimal fibre loss – for both brown and white furnishes. ■

RESEARCH AND DEVELOPEMENT

Valmet celebrates 1,000 customer pilot trials at its Tissue Technology Center in Karlstad, Sweden

On Thursday May 4 Valmet Tissue Technology Centre celebrated its 1000th external customer pilot trial in Karlstad, Sweden. The very special occasion was celebrated together with the Tissue research cluster managed by RISE, who are conducting development work together with the Valmet R&D team.

The centre has a long history of being a base for Valmet's tissue technology research and development, as well as for joint development with customers. Many of the world's leading tissue producers have utilised this unique resource to develop and verify their products and processes, over the years.

"We are proud to announce the historic milestone of 1,000 pilot trials together with customers. Counted in trial days this results in well above 3,000 days of pilot machine operations. All these days and all great cooperation with tissue and paper producers from all over the world, as well as partner suppliers to the tissue industry has given us tremendous knowledge, experience and insights in the tissue making process. We are excited to continue this journey together with our customers," says Karl-Johan Tolfsson, manager of the centre.

The centre is a unique resource for cultivating and realisation of ideas, innovations and verifying new technologies. It plays a significant role in Valmet's own tissue technology development but it is also utilised by our partners and customers to improve their product quality and machine performance and find the best solution for their requirements.

Valmet's own R&D centers and pilot machines form the backbone of the company's research and development work. Altogether, Valmet has 16 R&D centres and pilot facilities located in Finland, Sweden and Portugal. Valmet's research and technology development work aims to ensure an advanced and competitive offering of technologies and services for current and future customers, enhance raw material efficiency, and promote the use of renewable raw materials. ■

Eduardo Izquierdo, Director at FPC, part of the Tissue research cluster, is checking the paper quality together with Karl-Johan Tolfsson, Manager of Valmet Tissue Technology Centre

MILL NEWS

Novus adds resourceful link to its value chain

What do you do when you operate one of the largest printing houses in the country and you want to effectively close the loop on 'waste'? You acquire a tissue manufacturing plant. This is what Novus Holdings (formerly the Paarl Media Group) did in June 2014 when it acquired Correll Tissue.

The acquisition of the now 17-year old plant marked the group's expansion of its paper manufacturing operations by using its own recovered paper in the production of tissue and towel.

The newest member of the Paper Recycling Association of South Africa (PRASA), Correll Tissue operates a tissue manufacturing plant in Phoenix, north of Durban, supported by a national distribution network. Staffed by 218 people, it produces quality tissue for a growing market with its core focus on the production of jumbo reel wadding products for conversion by other tissue converters into a vast range of consumer products such as toilet paper, facial tissue, kitchen towels and serviettes.

The mill comprises two tissue machines – a 2.75m-wide paper machine with the capacity to produce 70 tonnes per day and can function at speeds of 900m per minute. The second machine is 2.45m wide with a daily capacity of 30 tonnes. It has also commissioned two biomass boilers for efficient energy use.

In terms of feedstock, the mill uses both virgin and recycled fibre. "The bulk of our raw material comes from the group's extensive printing operations, and is supplemented by imported softwood pulp that is not available locally," explains Conrad Rademeyer, Novus Holdings group executive: coldset and tissue. He adds that these import costs are offset by the sourcing of local hardwood pulp.

All jumbo reels produced consist of 100% recycled material.

The plant is equipped with a Krofta Supercell dissolved air floatation clarifier, sedimentation tanks and an Alfa Laval decanter centrifuge.

The de-inking and hot disperger plant (installed in 2012) helps improve the pulp quality in the stock preparation phase. The unit finely disperses wax and ink particles to below visibility level to create a homogenous fibre stock for the production of tissue paper.

ABOVE (LEFT TO RIGHT). BS Baosuo 2 ply rewinder in action. TM1 tissue machine, which will be refurbished and Toscotec crescent formed added.

BELOW. The bulk of Correll Tissue's raw material is sourced from the Novus printing operations.

TM 1 rebuld on the cards

In December last year, Toscotec announced that it had been awarded the contract to rebuild TM1 at Correll Tissue, with the start-up of the rebuilt machine scheduled for the second half of this year.

The scope of supply will include a major rebuild of the existing fourdrinier tissue machine into a Modulo crescent former with a new Toscotec Headbox-SLT. The delivery also includes a rebuilding of the existing approach flow system and the felt run, as well as the Yankee dryer doctoring system.

Electrification and control system for the new parts, erection supervision, start-up assistance and training will complete the Toscotec's package. The new machine parts will be designed for a future speed of 1,000 metres per minute with a reel width of 2,460mm.

Water-wise tissue production

Like many businesses in the sector, Correll Tissue is making strides to reduce its water footprint. To date, the company's investment in recycling processes has resulted in 90% of the plant's water requirements being reprocessed. "We have implemented a three-pronged approach: chemical advancements with the aid of two trusted suppliers, the procurement and installation of water treatment equipment, and driving awareness around water conservation among employees," says Rademeyer.

"Water treatment and recycling is key, and this equipment enables us to re-use a lot more in our processes. Any tissue plant is water-hungry, and we are very conscious of how much we use, especially in light of recent drought conditions," he says.

The de-inking and hot disperger technology also helps remove micro-stickies that can build up in the system, while cleaning process water allows for a higher base whiteness in tissue.

"This gives us the option to either reduce the amount of fluorescent whitening agents required or substitute the fibre with lower grade recovered fibre," notes Rademeyer.

For example, waste water can go into the centrifuge of a solids count of 3,000 parts per million (PPM) and after solids separation, the filtrate is less than 200 PPM. This allows the company to use the filtrate for other applications as well.

RIGHT. Correll Tissue supplies parent reels to other tissue converters.

BOTTOM, LEFT AND RIGHT. Two Kara biomass boilers have been installed along with an on-site steam management system.

Energy challenges

One of the biggest challenges, he believes, involves optimal drying and its impact on energy consumption.

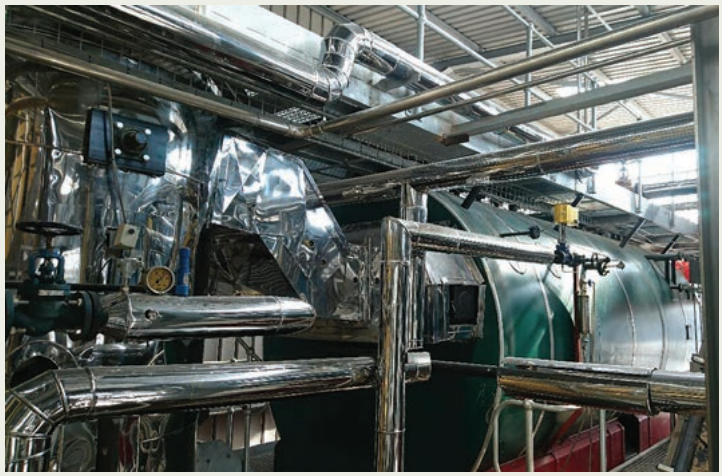
"The challenge for us is to balance the cost of steam and gas-reliant drying to minimise water removal costs," he says, explaining that two Kara biomass boilers have been installed along with an on-site steam management system. These boilers are fuelled by wood chips around the clock and produce 10 tonnes of steam per hour at a minimum of 10 bar pressure.

"The greatest steam savings can be garnered in the wet-end of the machine and we try to maximise the water used on the former section and in the presses, to reduce the overall steam requirement."

While high, energy costs of the disperger are offset by the comparatively low cost of waste paper it produces.

"Although the disperger is energy-hungry, the concrete high density tower we use is very well insulated and retains heat which generally results in higher white water temperatures which contribute to quicker drainage and higher solids off the wire, providing for a small offset on the yankee steam requirement," he says.

Rademeyer closes off by saying that the industry is primarily dependent on technology for efficiency, but the ultimate challenge in tissue paper manufacturing remains using all the resources at one's disposal to the maximum while running operations as cost-effectively as possible. ■



SUPPLIER NEWS

Solenis launches new wet-strength resin

Solenis, producer of specialty chemicals, has introduced a new generation of wet-strength resin, G1.5 Kymene™ 1500LV, to help tissue and towel manufacturers in North America address a full range of compliance needs while providing cost-in-use efficiency.

Responding to the implementation of the GHS (Global Harmonised System for classification of chemicals) and further market demands and the decision of major retailers to reduce 'priority chemicals' from their sourcing initiatives, Solenis intensified efforts by introducing new chemistries that deliver more concentrated products and reduce volatile organic compound (VOC) content. The new generation of Kymene resin is part of this initiative.

G1.5 allows existing Solenis G1 users to move to a cleaner product in a more cost-efficient manner without sacrificing quality. Compared to G1 wet-strength resins, G1.5 resins have lower levels of hazardous, possibly carcinogenic VOCs, including 1,3-dichloropropanol (1,3-DCP), 3-monochloropropan-1,2-diol (3-MCPD), aminochlorohydrin (ACH), polymer-bound CPD (PB-CPD) and total adsorbable organic halogens (AOX). At the same time, they deliver high solids, high performance, and have excellent storage stability.

Solenis has created a wide range of Kymene products to meet the varying regional requirements and budgets of tissue and towel producers. G1.5 wet-strength resins are a good option for papermakers who need higher solids and low VOCs but do not need the advanced quality of the company's G2, G2.5 and G3 technologies.

"The goal with every new generation of Kymene wet-strength has been to increase functionality while improving health and safety objectives," said Jerome Banaszynski, marketing manager, Tissue and Towel, North America. "Our full family of Kymene products gives customers more flexibility to build a cost-effective wet-strength programme along a pathway of incremental improvements. The G1.5 product is a great next step for our G1 customers wanting to adapt to changing industry requirements while delivering products that are both functional and safe for consumers."

Kymene resin benefits from a robust supply chain. Solenis operates four manufacturing plants across the USA, all of which produce G1.5 Kymene 1500LV resin within easy reach of any mill in North America. ■

This year marks the 60th anniversary of the discovery of a chemical additive that has helped to facilitate the change from acid to neutral pH papermaking conditions. With Kymene, Solenis invented polyamidoamine-epichlorohydrin (PAE) resins in the 1957 and has continuously improved the product. Kymene wet-strength additives work during the curing process to help papermakers improve the wet strength of grades intended primarily for the consumer market. They provide a number of value-added benefits, including improved wet strength, improved retention and drainage, enhanced creping control, improved dry strength, reduced chemical costs and improved machine efficiency.

ANDRITZ TAD tissue machine destined for USA

ANDRITZ has received an order from First Quality Tissue to supply a PrimeLineTAD tissue machine with complete stock preparation for its mill in Lock Haven, USA. The TAD (Through-Air-Drying) tissue machine has an annual capacity of approximately 70,000 tonnes while the TAD technology generates the improved softness, absorbancy, and bulk over superiority, over products made using conventional processes. ANDRITZ has previously supplied two TAD machines to First Quality Tissue's Lock Haven mill. Start-up is scheduled for 2019. ■

RIGHT. 3D sketch of an ANDRITZ PrimeLineTAD tissue machine.

Photo: Andritz

Repeat order for Valmet's Advantage THRU-AIR tissue line from USA's First Quality Tissue

Valmet will supply a complete Advantage ThruAir tissue line to First Quality Tissue (FQT) in the USA. The new production line is planned to be started up in the second quarter of 2018 and it will add 70,000 tonnes of ultra-premium quality tissue to the company's annual production.

Valmet has previously delivered three Advantage ThruAir lines to FQT's Anderson mill. They were started up in 2011, 2012 and 2016.

"Once again we have been awarded with the opportunity to continue to support FQT on their expansion plans in the ultra-premium tissue category.

"The fact that this is the fourth machine shows that we can deliver according to very high expectations and we are excited to continue the very good partnership with FQT ", says Jan Larsson, Director of Tissue Technology Sales, North America at Valmet. ■

Kadant Solutions launches improved creping holder

Earlier this year, Kadant Solutions launched its Conformatic™ AL creping holder which is designed for use in all Yankee doctor positions including cut-off, creping, and cleaning.

Significant upgrades to the holder's adjustability were achieved with a proprietary adjustment mechanism, allowing for precise control of the holder profile across the entire Yankee face without the need for edge fingers.

The robust construction is designed for today's high-performance tissue machines and features a self-conforming liquid tube, a backup blade, and a quick removal feature that allows the holder to be removed for cleaning and maintenance. Optional smart features can be integrated to provide real-time process feedback such as vibration and load. The holder is available in new doctor systems or as a retro-fit to existing Conformatic holders.

According to Jerry Vandoros, director of tissue market sales at Kadant Solutions, "The Conformatic blade holder is the industry standard when it comes to tissue making, but we knew it could be even better. With this next generation model, the Conformatic AL, we focused on features that would make it easier to use and minimise risk to the Yankee."

Vandoros continued, "The proprietary adjustment mechanism allows for effortless bi-directional adjustment, with enough movement to accommodate even the most extreme Yankee crowns. The new design uses adjustment screws to maintain the desired positioning and eliminates the need for edge fingers. As the operating duty these holders are exposed to is extreme, we increased the load capability of the conforming tube and designed a carbon fibre backup blade that will eliminate issues caused when running stainless steel blades." ■

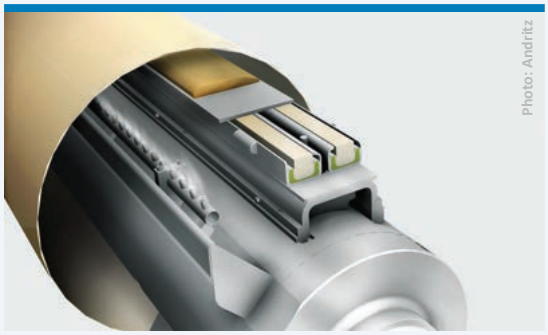


Photo: Andritz

The ANDRITZ tissue machine for PMI, Algeria, is fitted with PrimePress XT Evo, the latest shoe press technology.

Algeria's PMI orders ANDRITZ tissue machine with steel Yankee and shoe press

ANDRITZ will supply Paper Mill Investment (PMI) with a tissue machine with steel Yankee and shoe press to its new Algerian plant that will produce high-quality facial wipes as well as toilet and towel papers. PMI has expansion plans in several countries in the Middle East and North African region.

The new PrimeLineCOMPACT tissue machine has a design speed of 2,000 metres per minute and a paper width of 2.85 metres.

The tissue machine is equipped with the company's shoe press technology (PrimePress XT Evo) which, thanks to the energy-efficient design, improved dewatering and reduced need for thermal drying, minimises energy consumption. The 16-foot PrimeDry Yankee is made entirely of steel and enables a high drying capacity.

The order includes a complete ANDRITZ stock preparation for virgin pulp with a capacity of 135 bdmt/day. Start-up is scheduled for the first quarter of 2018. ■

MACHINERY

SKF and Valmet's 60-year partnership evolves with the times

Valmet's partnership with SKF began in 1951, when the first papermaking machine to carry the company's name was equipped with SKF bearings. Since then the two companies have broadened and deepened their relationship. SKF bearings, associated components and services are now used on Valmet machinery on a global scale, and now in the latest phase of a 60-year partnership, SKF is helping the global supplier of pulp and paper equipment meet the challenges of a changing industry.

SKF bearings for Valmet.

As versatile and ubiquitous as paper for the layman, the industry that makes it – and countless other variants - has changed dramatically in recent years. Contrasting the decline of printing and writing grades, packaging and tissue have shown rapid expansion in emerging markets; and let's not forget the move towards cellulose-based materials and composites.

"The demand for newsprint actually went down about a decade ago," says Jyrki Laakkonen, Valmet's category manager, Supply Chain. "Currently, newsprint represents slightly more than 5% of global paper and board demand. At the same time the demand for printing and writing papers has decreased slightly. On the other hand, growing global trade, e-commerce, demand for renewable packaging solutions and emerging markets growth have contributed to increased demand for packaging grades."

SCALING DOWN BRINGS FLEXIBILITY

It's these and many other changes that have driven a dramatic shift in the types of equipment used by the paper industry, and in the location of its production sites. "Ten years ago, paper production was all about economies of scale," says Arto Huttunen, Global Strategic Account Manager at SKF. "Customers wanted the largest, fastest and widest machines, and they expected those machines to last for 20 or 30 years of continuous production."

Today, however, there has been a shift to smaller, cheaper and more flexible equipment. "Instead of 11m wide rolls, many modern machines use 6m or 7m rolls," says Huttunen.

Smaller machines offer a host of advantages, he notes, from simpler, cheaper logistics, thanks to the lighter weight of components, to a quicker return on investment, something that is critically important in fast moving, volatile markets.

As its markets have evolved, so has Valmet's design approach. The company's latest OptiConcept M machines, for example, use a modular design to simplify specification, assembly, operation and maintenance. Compared to conventional designs, the OptiConcept M design requires up to 40% less space. The approach also allows mills to optimise machinery investments according to their needs, providing increased flexibility to change the type and grade of material produced or to adjust capacity as demand changes.

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In a world where flexibility, efficiency, low cost of ownership and rapid return on investment have become so important, every detail of its machine designs is critical for Valmet. As it has done so often in the past, the company has looked to SKF to help it find innovative solutions for its latest generation of machines.

"The biggest, fastest machines would have design speeds of up to 2,000m per minute," says Huttunen. "Specifying bearings for the loads and speeds involved often called for tailor-made solutions. With the modern, smaller machines with design speeds of up to 1,700m per minute, it becomes possible to use standard components, which can provide significant savings in capital and maintenance costs."

"It is a completely new, modular way to build a board or paper machine, with significant savings in energy, water and raw-material usage, built-in safety and usability, and a smaller carbon footprint through compact design," says Laakkonen.

BETTER BEARINGS

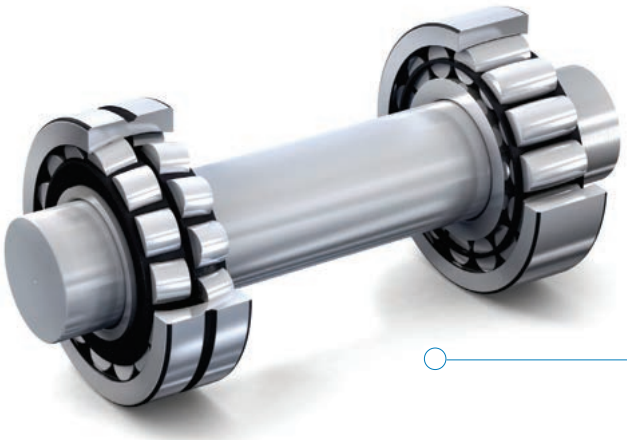
Using standard parts doesn't mean Valmet relies any less on SKF expertise, however. The bearing maker uses its deep knowledge of materials science and rotating equipment to help Valmet's engineers select precisely the right size and grade of bearing for each application.

"Our advanced bearing life calculation models mean we can recommend the right product to suit the end-customer's operating conditions and lifetime requirements," says Huttunen. "Frequently, that means they can use a solution that is 50% cheaper than they might have chosen if they'd relied on more traditional selection approaches."

Other approaches focus on reducing operating costs for Valmet's customers. Replacing oil-lubricated bearings with units that are sealed and lubricated for life means one less thing for customer maintenance teams to worry about, for example. SKF is also working with Valmet to capture the opportunities offered by the industrial Internet. Integrated condition monitoring technology is helping the company to improve the support it provides for hundreds of machines around the world, and it is also providing rich data on real world operating performance that can be used to inform and refine future designs.

Our advanced bearing life calculation models mean we can recommend the right product to suit the end-customer's operating conditions and lifetime requirements. Frequently, that means they can use a solution that is 50% cheaper than they might have chosen if they'd relied on more traditional selection approaches.

ARTO HUTTUNEN
(GLOBAL STRATEGIC ACCOUNT MANAGER)



ABOVE SKF self-aligning bearing system CARB.

Manufacturing costs and lead times are equally critical in the modern paper machinery sector. SKF's global footprint is also of particular importance to Valmet here, allowing the supply of locally manufactured components to the company's production sites in China, for example, as well as ensuring it can support its customers with service parts and analytical expertise all over the world.

Designing and building equipment that costs less and provides faster payback for customers is every bit as demanding as making the largest, fastest machines of the past, concludes Huttunen. "Valmet has asked us to bring ideas from our experience with a wide range of different industries, from car manufacturing to wind power. I'm sure that together we will be able to find many more innovative solutions." ■

BELOW SKF SensorMount indicator

With roots that stretch back to the end of the 18th Century, Espoo-based Valmet Oyj has evolved to become one of the world's most important providers of capital equipment, automation and services for the paper, pulp and energy sectors. Today, the company employs more than 12,000 people on five continents, and operates 16 R&D centres, 34 production units and 100 service centres across the globe. The group's sales in 2015 were just under €3 billion, divided roughly equally between equipment manufacturing and industrial services.

PRESS FELTS

Best of both worlds
in tissue felt design

In 2011 Heimbach launched a new research and development project to marry the advantages of its most significant press felt design groups – the non-woven design group Atrocross and the multi-axial design group Atromaxx. Both belong to the modern felt designs portfolio and Heimbach's advanced technology bases (ATB).

Atrocross and Atromaxx press felts are offering comprehensive product ranges in their respective design groups to meet the requirements of press felt application. Each design group has prominent advantages such as short break in time and high nip dewatering capacity of Atrocross or the great flexibility of base weave combinations of Atromaxx to meet individual and particular requirements. This is important for well-engineered and customised press felt application. Further to these two modern press felt design groups, Heimbach also manufactures the classically woven, respectively laminated base weave felt designs.

"Even though our existing product spectrum is sophisticated, the company keeps on improving its existing product lines and developing new products," says Franz Kiefer, strategic product manager at Heimbach. The result was the Atrojet brand which boasts a new press felt design merging the advantages of multi-axial and non-woven technology.

Inside Atrojet

"With the multi-axial non-woven technology, our Heimbach felt designers can meet the particular requirements of press felt positions even better," remarks Kiefer, adding that the structure of the inside base is what gives Atrojet its distinct features. The inside base on the paper side consists of a unique non-woven layer made of machine direction (MD) yarns only. This gives it greater strength, evenness and smoothness of the paper-side base. The MD yarn structure is arranged diagonally – the characteristic multi-axial angle which improves collapse resistance by increasing crossing points of all yarns.

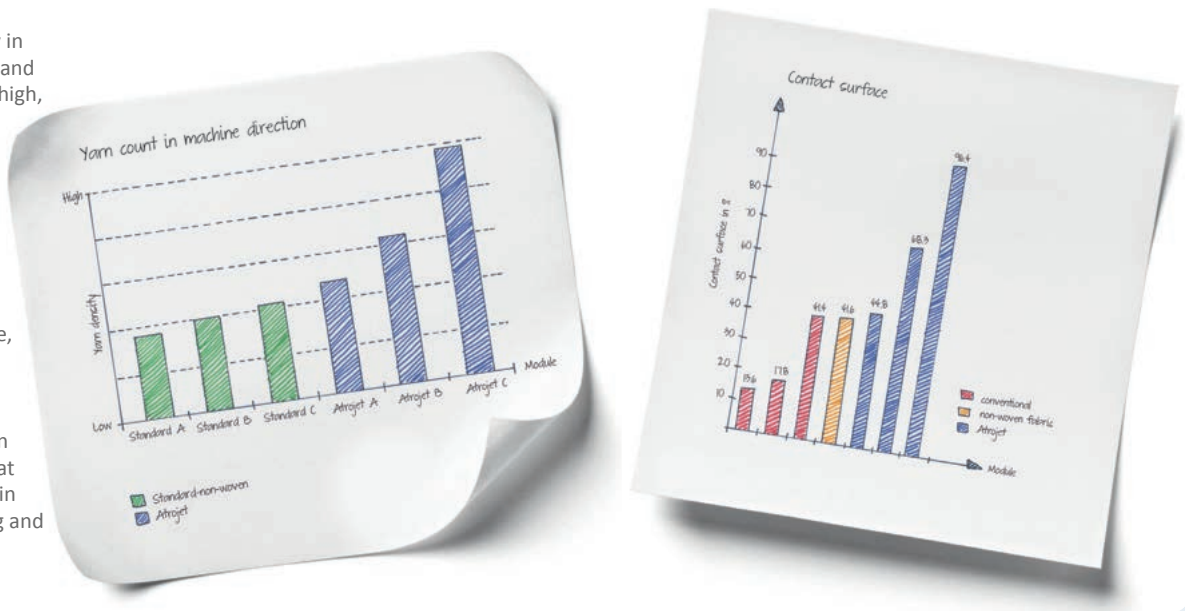
An added feature of broader flexibility is offered because the non-woven paper side layer can comprise different ply twist yarns as well as different yarn diameters and flexible yarn count.

The evenness and uniformity from inside the felt provides smooth felt surfaces through high contact area. The homogeneous and high contact area of Atrojet base is said to be superior among press felt technologies. Homogeneous compact felts are important features for tissue felt application regarding even pressure transmission at the press nip which is key for even dewatering and even CD profiles of the paper.

The roll side base of Atrojet felts is made of multi-axial arranged components, and is selected based on customer requirements around void volume, mechanical strength, as well as the number of nip or shoe press positions, uhle boxes and vacuum rolls involved.

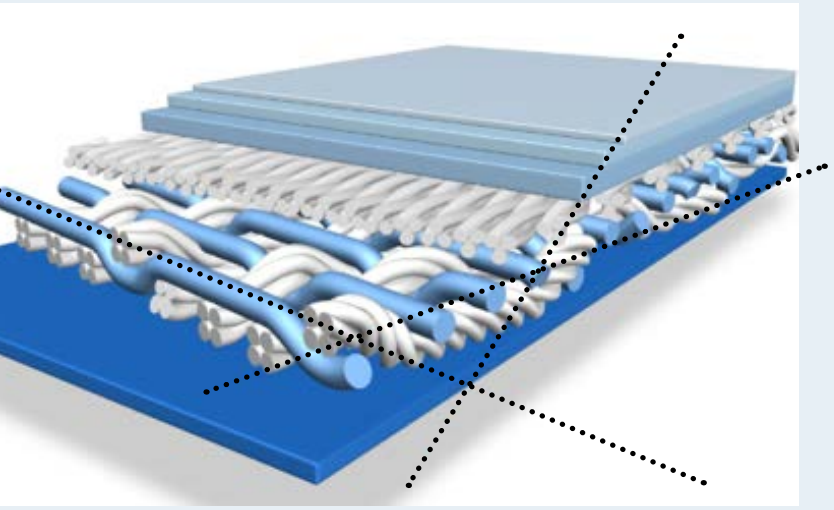
Variation and adaptability

A typical tissue machine could present the performance of a press felt in the proper light.



RIGHT. More flexibility in terms of yarn material and yarn count: From very high, dense yarn counts with thin twisting or monofilaments, to moderate or low yarn count.

FAR RIGHT. With its uniform machine direction yarn structure, Atrojet has far greater surface contact than conventional bases. This leads to more even pressure transmission at the press nip resulting in very steady dewatering and even CD profiles.



ABOVE. Increased number of crossing points of all yarns is the leading feature of multiaxial felt technology.

A lifetime mileage of >100,000 km while passing about six million nip cycles and handling >50,000 m³ of water are normal requirements for a tissue felt. The level of performance is expected to be at a steady high level all along the service life of a felt. "Our modern press felt designs are high-tech products which meet these requirements," comments Pirig, also a strategic product manager at the company.

Where there is little variation in process parameters, the felt design can be fine-tuned to its maximum performance under those standard conditions. As parameter variations increase, so does the challenge of achieving an adaptable felt design.

A typical example of varying process parameters are paper grade changes which include machine speed and paper weight changes but also affect usage of different furnish compositions like virgin pulp or recycled fibres as well as usage of wet strength resin or dye and fixative.

Planning with flexibility

Production planning is vital for the smoothest possible transition of process parameters during machine clothing lifetime. "But these days flexibility can be key too, especially for just-in-time deliveries where sudden process changes do occur," notes Pirig.

A press felt must tolerate such changes. Pirig notes that the Atrojet design flexibility has the required adaptability for those changing conditions. The product's homogeneous and strong inner structure also contributes to high fibre batt anchorage. Atrojet has shown its robustness towards harsh high pressure (HP) shower cleaning which can prevent felt clogging, for instance when changing from virgin pulp to de-inked pulp and/or producing non-wet strength to wet strength grades.

Atrojet is able to take up even long-term laminar HP showers at pressure ranges of >30 bar.

Heimbach has made a significant investment in its new Atrojet manufacturing facility, and has been in production since early 2016. "We really feel that Atrojet represents the next evolutionary step in the felts sector," concludes Kiefer. ■

Voith AdvancedPRODUCTS improve paper production in former, press and dryer sections

With FormMax, PressMax and DryMax, Voith achieves a higher level of performance for the paper machine by using the optimum combination of products in the paper production process. In the former, press and dryer sections, the Voith products combine perfectly with one another as AdvancedPRODUCTS, to lower operating costs, increase productivity, improve quality and provide a safer workplace for operators.

The Green Bay Packaging mill team in Wisconsin, USA, has found that the FormMax approach has realised all of these goals in their forming section. The drainage is more uniform, dry line on the wire is more level, sheet breaks have been halved, chemical cleaning and hazards are significantly reduced, and the paper strength target is achieved using a lower basis weight.

This FormMax solution includes the DuoShake to optimise fibre orientation through high-frequency shaking of the breast roll and to achieve good formation and a low tensile strength ratio. In addition the DuoCleaner Excell traversing cleaning system on both wires is significantly more effective than high-pressure showers. It gives more uniform cleaning of the surface and structure of forming fabrics. The Voith I-Series forming fabric will be installed later this year as part of the continuing optimisation programme. ■

ABOVE. The DuoShake optimises fibre orientation through high-frequency shaking of the breast roll. The result is good formation with all paper grades and a low tensile strength ratio. **INSET.** DuoCleaner Excell is an efficient cleaning system for consistent and uniform cleaning of the surface and structure of forming and press fabrics.

INDUSTRY REPORT

Riding waves of change

Education and training in the SA pulp and paper sector

It was the Greek philosopher Heraclitus who is reported to have said that 'the change is the only constant in life'. Navigating change in any sphere and doing so successfully is not an easy feat; even more so when it comes to ensuring that the pulp and paper sector has access to a diverse pool of qualified people to keep papermaking on a roll.

TAPPSA Journal spoke to PAMSA's education and training manager Olga Bezuidenhout about the lay of the land. "The education and training landscape for the pulp and paper sector is undergoing significant changes, mainly due to structural changes at government level as well as the introduction of a new quality council which is responsible for all occupational and trade qualifications, the QCTO."

"These changes make it particularly challenging for mills and companies to plan appropriately in line with their own training and development needs," says Bezuidenhout.

One can understand that even though the wheels of change turn slowly, industry cannot afford to stand still or leave training unattended.

Matching skills to industry needs

Another challenge is that the quality of graduating learners don't always meet industry standards which means that mills need to 'top up' the training and bridge the knowledge gaps. "PAMSA is working with industry and various education partners on collaborative projects that will address the industry-wide gaps, thus saving industry both money, time and resources."

"For a number of years, PAMSA has been involved on both ends," she notes. The 'feeder end' where PAMSA partners with TVET colleges and universities, and at the absorption end by understanding the principal needs of industry while ensuring that paper manufacturers are party to qualification development.

In 2015, PAMSA was appointed as the development quality partner (DQP) to work on four sector qualifications under the QCTO and for the past few years has been working to update its education ladder.

Given the various education and training opportunities within the sector, the education ladder outlines three paths for those who work full-time, school leavers and those students from TVET colleges with Grade 10-12 or a technical matric.

"It is important for industry to keep in mind that the current pulp and paper qualification ladder is changing. This will influence their education and training development processes," adds Bezuidenhout, adding that PAMSA is committed to keeping industry aligned on the changes and providing them with the opportunity to get involved.

Making way for new QCTO qualifications

The three unit standard based certificates (National Certificate: Pulp & Paper Operations - NQF level 2 and 3; the Further Education and Training Certificate: Pulp and Paper Operations NQF level 4) and the Pulp and Paper Occupational Programme (PPOP) will be phased out from 2018 and replaced by two QCTO qualifications for full-time employees, namely Pulp Process Controller and Paper Process Controller. Each will have an NQF level 4 exit with built-in part-qualifications with exit level of NQF level 2 and 3. "These two qualifications have been submitted for review by the QCTO board and we are eagerly awaiting feedback," explains Bezuidenhout.

The third qualification, that of Paper and Packaging Collector, is also under review by the QCTO board. This will formalise the Paper Recycling Association of South Africa's entrepreneurship training course, currently being run as a four-day workshop.

The course has been re-designed to intensify the various practical and financial modules to NQF Level 2, resulting in the informal collectors having a recognized qualification on completion of the course.

On matters relating to the unit standard based tissue conversion qualifications (National Certificate: Tissue Conversion NQF level 2 and 3, and the Further Education and Training Certificate: Tissue Conversion NQF level 4) are being aligned to a QCTO qualification. "We are calling on the tissue industry to provide input and expertise into this process so as to ensure that the end product is of benefit to the mills," appeals Bezuidenhout.

On the matter of Work Integrated Learning (WIL), the format was due to be dropped by the Durban University of Technology; however the motion was rejected by the Council on Higher Education. "This is good news for industry," she explains.

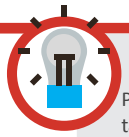
There are also various changes to the engineering and related qualifications at the Universities of Technology and curriculum changes to pulp and paper related qualifications offered via Unisa.

Where to next?

Bezuidenhout shares that a number of collaborative projects are on the cards to support industry in terms of the changes and to guide the industry through these phases of change.

Hub of excellence in the making

In partnership with Umfolozi TVET College Mandeni campus, the FP&M Seta and PAMSA has set up a *Pulp and Paper Centre of Excellence* which aims to serve as a one-stop hub for all pulp and paper related activities, from classrooms to study centres, as well as meeting rooms and facilities for research. The centre, located adjacent to the Mandeni Campus, will be officially opened in August. It will be managed by Noekie Janse van Rensburg as administrative co-ordinator and Tharif Hanif as programme co-ordinator.



Did you know?

PAMSA and TAPPSA offer a number of short courses that can be tailor-made for specific mill requirements. These are available on request.

- Resource efficiency and cleaner production
- Cleaner production focusing on energy
- Hands-on pulp and papermaking
- Wet end chemistry
- Refining basics
- High yield pulping
- Water and effluent treatment

Contact the TAPPSA office for more information.

She highlights some examples including a review of PPOP learning material and aligning it to the new QCTO qualifications; a recognition of prior learning (RPL) project for PPOP learners; a QCTO Pilot Project (including an industry QCTO assessment centre project); and a mathematics and science tutoring project with TVET partner colleges.

Power of effective partnership

PAMSA is currently reviewing partnership agreements with the FP&M Seta and the Ekurhuleni East (EEC) and Umfolozi TVET colleges based in Gauteng and KwaZulu-Natal respectively. "These institutions offer our National Certificate – Vocational (NCV) for Process Operations from NQF levels 2 to 4.

A key element to the success of the NCV will depend on stakeholder involvement as it will have a major impact on the quality of learner. This will be done through various initiatives for example mentorship programmes and tutoring programmes to bridge the gap on essential subjects such as mathematics and science. The current TVET pass rate for mathematics is 30% however industry requires 50%; resulting in a proficiency discrepancy that will not only hamper an individual's career path but also add to a mill's training bill.

Further to this, PAMSA has established pulp and paper partnership committees at both EEC and Umfolozi to work along the FP&M Seta, the respective colleges and industry members in the corresponding regions. "This kind of consultation and collaboration is vital for all stakeholders as we can address issues as they arise, and adjust our course accordingly," notes Bezuidenhout.

With the industry being at a crossroads the world over, the challenge is ever-present to ensure that the cohort of operators can be absorbed, retained and further developed by mills and operations.

Bezuidenhout remarks, "Adaptability is critical at this point. We have to move with changes and ensure that the quality of learners matches the expectations of an industry that itself is evolving."

"By tackling education and training matters on behalf on an already-constrained industry, PAMSA is able to mitigate much of the impact on costs and resources, while seeking to produce better quality of learners and graduates for placement in the pulp and paper sector." ■

THOUGHT LEADERSHIP

Six areas for **maintaining career relevance** in an age of robotics and artificial intelligence

by **RAYMOND DE VILLIERS**
TomorrowToday

It has been said that over the next decade up to one third of today's jobs will be handed over to robotics, AI, and other digital developments. There are many reasons for these changes but predominantly they will be based on higher levels of efficiency and a more desirable cost basis.

There are three basic outcomes to this disruption:

1. We aren't impacted because our jobs fall outside of the affected sphere
2. We are impacted but are able to reskill and move into new areas of work
3. We lose our jobs and remain unemployable for the foreseeable future

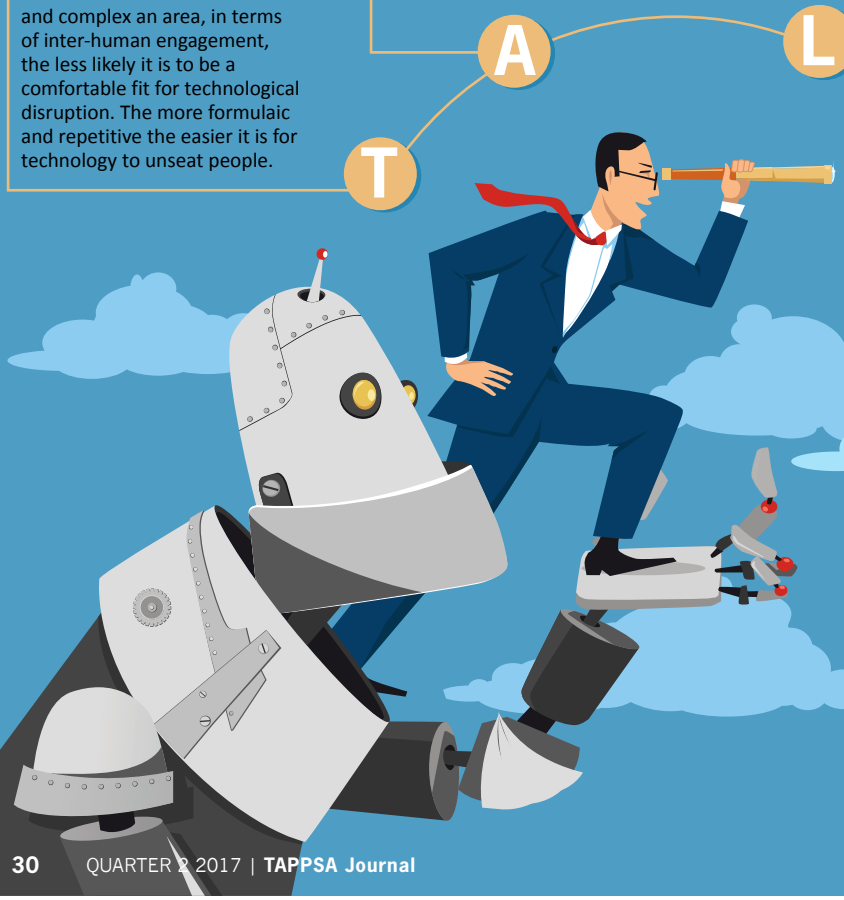
How do we work today to ensure that we fall within the first two groups and not the third? It is all about Talent and being high-performing individuals. In an age of robotics and technological upheaval, one of the basic truths of human society will remain – the cream will still rise to the top.

At TomorrowToday Global we have a framework that sheds light on these dynamics Talent: Re:Defined. It uses TALENT as an acronym for six characteristics that high-performing individuals in the new world of work possess. If you maintain your focus on these six areas, and ensure your ongoing development you will stand a significantly less chance of being in the third group.

Adaptability
Technology relies on programming and algorithms to guide its decisions and actions. Make no mistake, the algorithms and programming being used in today's technology is INCREDIBLY powerful. But, the more adaptive a situation is the more characteristics like intuition, wisdom, and "gut feel" are required – and those will be some of the last areas where technology is able to supersede humans.

Lifelong Learning
In the old economy we could rely on information we had learned a few years ago, or a degree we had, to be relevant and employable…. this is no longer the case in a world of AI and robotics. Technology can be updated with the most relevant information instantaneously. If you are not actively working to do the same thing on a daily basis (not only when HR books you onto a course), you will be redundant before you can spell the word "Redundant". NOTE that learning happens as effectively through new experiences as it does through traditional learning….Lifelong learning means DOING new things, not just reading about them.

Thriving in difference and diversity
AI and Robotics are all about unlocking the benefits inherent in repetitive sameness. This means that the more diverse and complex an area, in terms of inter-human engagement, the less likely it is to be a comfortable fit for technological disruption. The more formulaic and repetitive the easier it is for technology to unseat people.



Experiment (and are okay with failing)
High-Performing individuals have a high tolerance for risk and actively try new things. Experiments by nature fail sometimes…. High-performing individuals are able to learn from failure as effectively as they do from success.

Networked
Social media has shown us how effectively we can build and manage networks and connections using technology. In the new world of work, networking is not just about connecting with others, but about the ability to unlock more value out of the parts of the network than the individual parts themselves hold – quantum theory calls this emergence. 1+1=3

Temporary
In the new world of work nothing lasts forever. The harder you cling onto something the higher the risk that it will take you down with it as the tide of technology rises. To succeed in a world of technology disruption you need to live with a light touch and be prepared to move quickly, easily and immediately – if the situation warrants it.

LEFT. Mpact Foundation Trust Chairperson, Neo Phakama Dongwana (front centre), with some of the Mpact Bursary Scheme recipients. From left, Thembisa Dolopini, Thandolwenkosi Shabangu, Mxolisi Nyauza, Mxolisi Nyauza, Nomsa Mnisi and Thandeka Shabalala
ABOVE. Seen here from left are the KZN-based Mpact Bursary Scheme recipients: Oniel Anderson, Nhlanzeko Ntshangase, Nkosinathi Sithole and Nkosingiphile Nhlengethwa.

Mpact's bursary scheme
gives employees' children a step-up

"If you want to go quickly, go alone. If you want to go far, go together" is an old African Proverb that epitomises Mpact's focus on education. For the first time since its establishment in May 2015, the Mpact Foundation Trust has awarded 15 fully-funded bursaries to children of Mpact employees This will enable them to pursue a tertiary education at any public and accredited higher education institution in South Africa.

Chairperson of the Trust, Ms Neo Dongwana, comments, "We believe that in tackling the education crisis in our country and the affordability of education, we will be able to stimulate prospects of a broad-based social economic advancement.

She adds that our contribution in education through the bursary scheme is one way of making a meaningful contribution to society and a socially responsible way of achieving measurable empowerment of previously disadvantaged communities.

"It was therefore important for us to fund the tertiary education of deserving students who demonstrated the potential to succeed academically, but were otherwise constrained by their ability to fund a tertiary education and the associated costs. We have specifically chosen to fund students at a tertiary level, as we believe our interventions will be most impactful at this level. The myriad of benefits associated with a tertiary education include better opportunities for development, so that students can become productive and socially responsible members of society."

Mpact has spent R1.5 million on the its Bursary Scheme which covers the full tuition and boarding fees, a monthly allowance along with stationery and prescribed books.

"As the Trust grows, we will be in position to support more children through the bursary scheme, and the impact on the communities in which we operate will grow," added Dongwane.

The objectives of the Trust are to pursue empowerment of previously disadvantaged stakeholders with a focus on broad-based groupings, create a sustainable funding structure, complement existing B-BBEE initiatives, and materially improve Mpact's B-BBEE ownership credentials.

The main beneficiaries of the Trust include Mpact employees and their families. Other beneficiaries will include emerging entrepreneurs, suppliers and customers directly or indirectly involved in the packaging and/or recycling sectors; primary, secondary and tertiary education initiatives and other individuals, groups of people or entities that operate within the communities. ■

Mpact's Corrugated employees with their children who received Mpact Bursaries to study at Stellenbosch University. **BOTTOM LEFT:** Charles Jacobs and his son Curtley. **BOTTOM RIGHT:** Ndoda Yona and his daughter Naledi.

COMPUTER-BASED TRAINING

Building learning minds
through computer-based training

Computer-based training (CBT) can deliver a number of benefits to both the employee and the company, not least of which are affordable access, equality of training standards and learning pace, and individual flexibility.

Underpinned by the primary objective of training – to transfer knowledge and practical skills – an important aspect of any training mechanism is the learning curve. This is calculated by dividing the amount of knowledge transferred by the time it takes to learn.

"Comparative studies, conducted many years ago (before computers became multi-media) concluded people learn twice as much in half the time. More recent comparisons that consider retention, conceptual understanding and relevance show that people learn twice as much in a quarter of the time," says Dave Leigh, owner and founder of Matra Engineering Services, adding that this amounts to a tenfold improvement in effectiveness of training.

By using individualised CBT, a much steeper learning curve is obtained. Contrary to this, Leigh says, the curve is very flat using conventional classroom methods to train non-academic people.

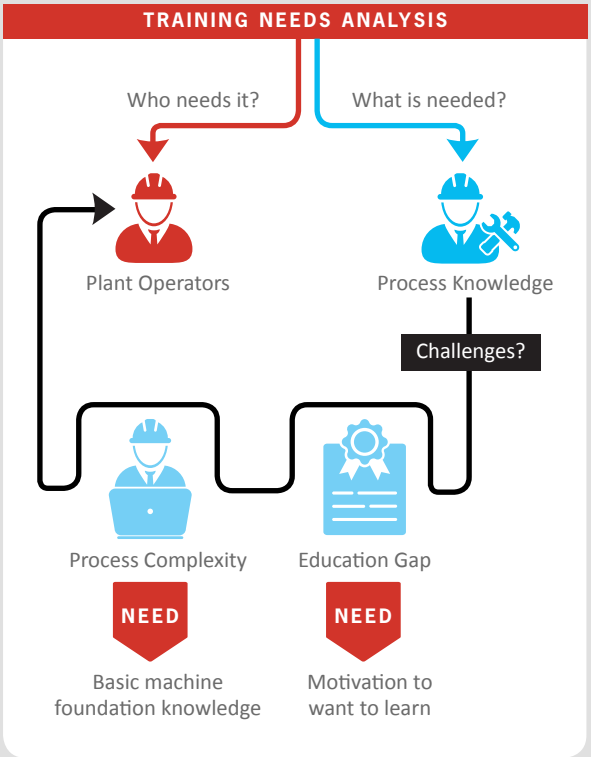
Leigh, a consulting electrical engineer has spent most of this time within the pulp and paper industry and is a firm advocate of CBT. "CBT technology allows us to capture knowledge of experts and deliver this in a format that can be absorbed by non-experts," says Leigh, adding that while Matra's format of CBT has proven successful in the transfer of machine knowledge, the transfer of overall process knowledge demands a lot more effort on the part of all parties.

More recently Matra has produced more generic materials aimed at junior operators in the form of 'Principles of Process Interactions' or POPI (pronounced Popeye). Leigh notes, "It is an interactive tool that is affordable and effective in bridging the gap between spoon-fed knowledge and the skill to apply knowledge, and is aimed at helping plant operators understand the complexities of the processes they control."

Understanding who needs what

A training needs analysis conducted at most paper mills would show that higher priority must be given to empowering plant and process operators with the right knowledge to enhance their trouble-shooting skills. (Fig. 1)

FIGURE 1. Higher priority must be given to empowering plant and process operators with the right knowledge.



Leigh believes that there are two particular challenges that tend to make this training task almost impossible:

1. **The education gap**
   This is not simply a gap in knowledge, but more an issue of the desire to learn. "We just assume that the operator is hungry for knowledge and will be happy to know more about the science behind the plant he or she controls," remarks Leigh. His experience has shown him that a lot of motivation and encouragement is required. (Fig. 2)

2. **The complexity of process**
   Due to the multiplicity and interdependence of the various process parameters, even highly qualified engineers experience great difficulty in establishing the cause of process and quality problems. "Simply teaching root cause analysis will not help an operator who does not even have an understanding of the entire process. And the latter cannot be achieved without first providing a good foundation of basic machine principles."

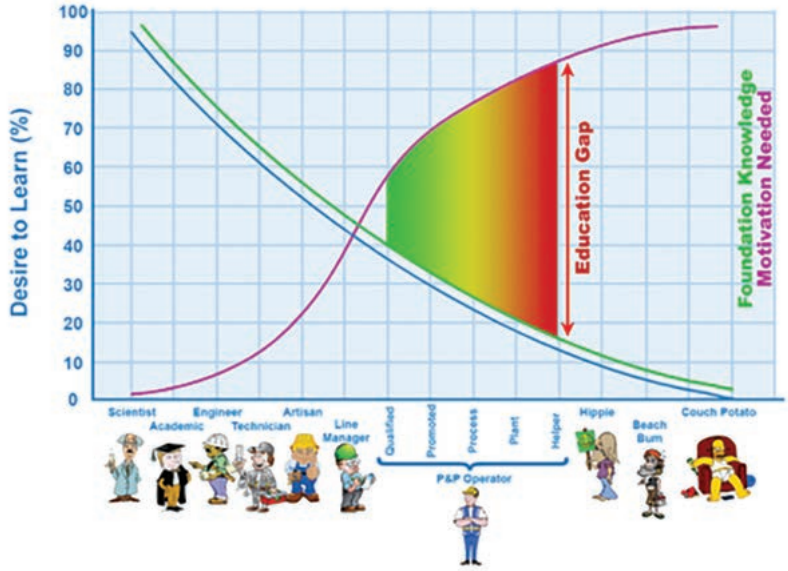


FIGURE 2. The education gap

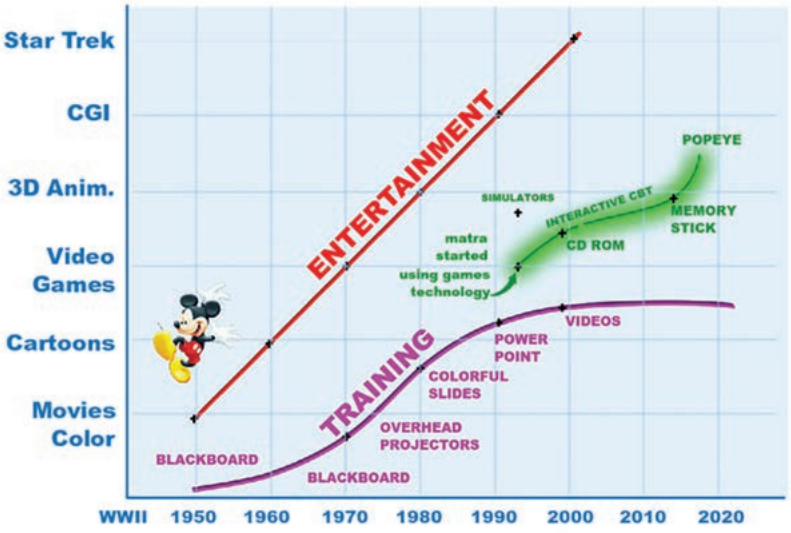


FIGURE 3. The evolution of training tools

The right tools for the job

Faced with these challenges as well as time and cost constraints, mills need to make use of whatever higher level teaching tools are available to support the training effort.

Leigh purports that the most effective 'Tools-of-Communication' have been developed for the purpose of telling stories to children and adults. "The video games industry embraced these tools many years ago." (Fig. 3) However, the training fraternity has been slow to adopt these tools for reasons which are no longer valid. Computers now allow us to go beyond 15-minute videos and slide show presentations.

Leigh argues that Matra Engineering's brand of 'Teach Yourself CBT', delivered on a memory stick, has proven to be very effective in conveying basic facts and intangible concepts to those who lack a science degree. "CBT training materials are already available for the junior operator level." However, by using the same materials as a vehicle, they can add the following:

1. The addition of a Plus button (and a Help button) caters for the more advanced training needs of the senior process operators. Where appropriate a more detailed, more scientific and/or more up-to-date explanation is provided to those individuals who want more knowledge.
2. At the end of the course, Matra adds POPI whereby the operator can start to "connect the dots" and apply the knowledge gained during the training (Fig. 4).

To date, Matra's POPI system is available at the end of the training courses on Approach Flow, Headbox, Press Section and Dryer Section.

This makes it possible to have one single source of training that can serve both ends of the training needs spectrum. An added benefit, Leigh believes, is that the presentation of this training is consistent and requires neither classroom nor extra costs associated with traditional methods.

Finding solutions through understanding

"To meet this training challenge we need to provide a better understanding of the process as a whole; by breaking the big process into a sequence of small sub-processes and machines," explains Leigh. (Fig. 5)

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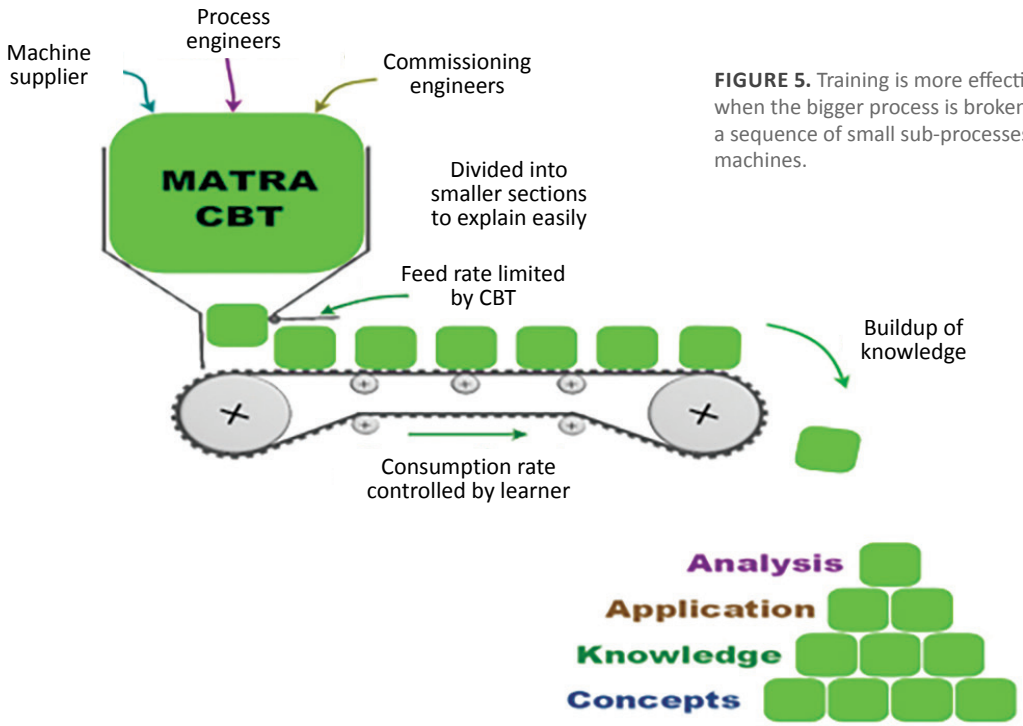


FIGURE 5. Training is more effective when the bigger process is broken into a sequence of small sub-processes and machines.

All variables and parameters which can affect the end-product are shown and made adjustable by the operator. This solution makes use of scenario-based demonstrations of how different variables affect one another.

The operator is allowed to change any variable (via Up/Down arrow buttons) and the programme will reveal how the process will respond, as follows:

- The process is shown in simplified form together with the main inputs and outputs.
- 'Influencing factors' are then added which the operator can also adjust.
- The process responds to the adjustment, which is then explained by animation and narration.
- Most importantly, the programme will describe how the output production and quality parameters would be affected.

The system – which is based on scenarios and only provides the logic and direction of change – could be compared to simulation but without the cost of developing mathematical models and without the long delays which real-time systems must use.

Six principles, six results

Matra's training methodology is founded six principles:

PROGRAMMED LINEAR LEARNING

"We assume that the candidate has very little or no prior knowledge, and thus build up the knowledge base in very small doses and in a carefully chosen sequence," notes Leigh.

The result: no questions, and no confusion.

GRAPHICS

It is assumed that the candidate does not like to read. "So we use pictures and only present text to reinforce a message, rather than to convey a message. The graphics are colourful, attractive and instantly displayed using a Graphic User Interface (GUI)." (Fig. 6)

The result: no lack of attention or concentration.

ANIMATION

Leigh believes that the old norms of who 'has the right background' no longer apply. "Illiterate candidates can be successfully included and catered for in the training programme. We do not presume that the candidate has an 'analytical brain' and can 'work it out for himself' and so we use animation to show what actually happens." Leigh believes that this takes a fraction of time to

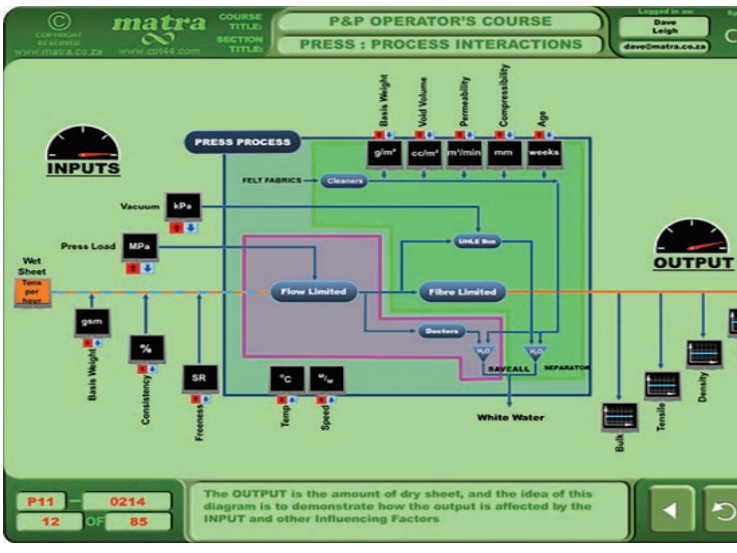
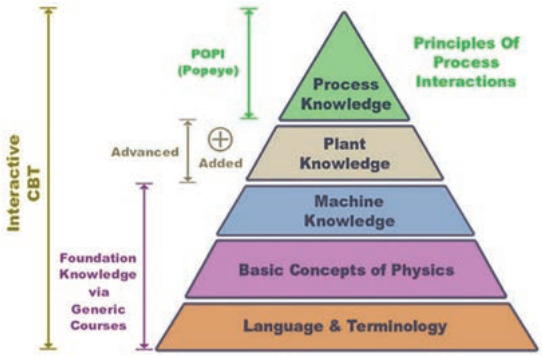


FIGURE 6. Matra's Graphic User Interface

(BELOW) FIGURE 4. Matra's Principles of Process Interactions' or POPI is an interactive tool that is affordable and effective in bridging the gap between spoon-fed knowledge and the skill to apply knowledge, and aimed at helping plant operators understand the complexities of the processes they control.



convey complex concepts. By introducing movement into every graphic, a message can be emphasised, says Leigh.

The result: complex concepts are rendered simply, leaving nothing to the imagination.

SPEECH

Carefully chosen and optimum wording accompanies every graphic image and two different and alternating voices are used to break any monotony.

The result: infinite patience is available.

NAVIGATION

Through the use of three simple buttons, the candidate can go forward, backward or repeat any apsect.

The result: weaker candidates can go as slow as they need while better retention is guaranteed by the facility of repetition.

TESTS AND ASSESSMENT

Candidates are compelled to think for themselves because they cannot move to the next section without answering a few questions. "These questions are designed to motivate and to add a sense of achievement," says Leigh.

The result: greater clarity of understanding and even better retention.

And that's what training is for. After all, it was Benjamin Franklin who said, "Tell me and I forget. Teach me and I remember. Involve me and I learn." ■

SUPPLIER SERVICES

Introducing Valmet Learning Services

Valmet has launched a renewed customer training offering for its customers - Valmet Learning Services - to help improve the reliability and performance of its customers' processes. The new offering is complementing the company's new services approach - Shared Journey Forward - introduced in 2016. And it is available to South African customers.

The organisation-wide training solutions tailored to the customers' needs include customised and standard courses, on-site, off-site, or via the Valmet Online Learning Portal. Furthermore, Training Simulators allow customers to safely practise hands-on procedures and scenarios to strengthen safe behavior and be prepared for troubleshooting and the handling of operational upsets.

"We are planning to promote it more intensely in the EMEA area, including South Africa, during the second half of 2017," explains Emmeli Olén, Director, Valmet Learning Services. "Our web-based courses are globally available via Valmet Online Learning portal." She notes that Valmet has online equipment and process courses in English covering all main pulp mill processes. Other topics include paper making, power generation, automation and boiler safety. A new set of SHE induction courses are currently under development.

"Today, the combined forces of globalisation and digitalisation are challenging companies to develop and continuously expand their expertise, and achieving business targets is not only about optimising equipment and systems. We are launching Valmet Learning Services to better support our customers in training their employees so that they can stay competitive in today's challenging business environment. This is a concrete step toward our vision: to become the global champion in serving our customers," says Jukka Tiitinen, Business Line President, Services, Valmet.

Valmet Learning Services helps customers design their learning paths to progress in their chosen area of interest. Reaching a higher knowledge level not only represents an important achievement for the employees themselves, but can have an impact on KPIs such as reliability, productivity, and product quality.

To make sure Valmet's customers get the most out of their training investment, Valmet Learning Services uses a four-step approach: identify individual skills gaps, design a programme based on the customers' learning targets, deliver training using modern tools and methods, and secure the outcome through evaluation and assessment."We are committed to moving our customers' performance forward. Reducing risks, improving productivity, and increasing profitability all start with the employees. Confident and skilled personnel ensure safe, stable, and efficient start-ups and operations with minimised environmental risks. We help our customers maximise their potential by training their employees," says Olén.

She adds that the regularly scheduled open courses are only available at selected Valmet locations, which currently do not include South Africa, but the same courses can be held locally upon request. ■

Synavax™ signs up Synaafrica

Synaafrica has been appointed as the exclusive distributor for Synavax™ and its insulation and protective coatings. Covering South Africa and the African continent, Synaafrica offers nano-engineered coating technology for energy savings and asset protection to a range of industries including pulp and paper.

"The water-based and low volatile organic compound coating technology represents the next generation of sustainable and eco-friendly insulation in a clear or pigmented liquid form that is resistant to weathering," says John McIntyre, director of Synaafrica.

Synavax™ - a nanoscience solutions and research company - develops and commercialises innovative applications and patented product lines for insulation, corrosion resistance, mold resistance, lead encapsulation, chemical and moisture resistance for equipment and building surfaces to reduce energy costs, protect assets, and improve worker safety.

"Industrial clients typically report energy savings between 10%-25% and building envelope customers typically report savings between 20%-40%, depending upon the application type," he explains.

US-based paper manufacturer Weyerhaeuser was looking for a way to effectively insulate an outdoor liquor tank while also reducing surface temperature and providing protection from corrosion and weathering.

Synavax Heat Shield™ PT was applied as a durable exterior insulation and protective coating. A six-coat application reduced the exterior temperature from approximately 93°C down to approximately 59°C, while also providing corrosion resistance and an insulation solution that would stand up to five to 10 years of weathering.

Another US papermaker was looking for a solution for safe touch insulation on their boilers. McItyre explains that during the trial, Synavax™ showed the plant manager just how powerful our technology works. "Even though heat was radiating around the small test patch where our EPX-H20 coating was applied on the end caps, which of course reduces the overall results, the thermal images showed that our coating resulted in a clear and substantial difference."

In an effort to increase energy efficiency in its paper manufacturing facility and insulate to improve lifespan of sensor units, Seshasayee Paper & Boards Ltd in India partnered with Synavax™. The Translucent PT at a 300 micron (12 mil) dry film thickness (six-coat coverage) was applied to the dryer end covers and showed an average temperature reduction after 30 days (prior to the full 45-60 day cure time being completed) over one dryer of 4.2°C, a 15.7% reduction in temperature, and on another dryer of 9.2°C, an 18.7% reduction in temperature.

TOP: Applying a PT coating on a black liquor tank. **BOTTOM LEFT:** Measuring EPX on a boiler. **BOTTOM RIGHT:** EPX test area on a boiler.

Another piece of equipment insulated to increase sensor and unit longevity was a scanner sensor unit, which showed an average temperature difference of -2.2°C, prior to cure time being completed, while also showing more effective sensor functioning due to the lower temperature. Comfort for approaching the operating unit and increased longevity of the scanner unit were benefits also noted in the paper due to the Synavax™ insulation technology.

Applications areas in the paper mill were noted as: paper machine dryer unit, hot and warm condensate, boiler feed water and process fluid lines, LP steam pipelines and accessories, heat carrying valves and fittings, satellite cooler annulus exterior of lime kiln, heated HFO lines and storage tanks, chiller lines in CI02 unit, CPU-PHE & EOP head covers. Synavax™ coatings are manufactured in the USA, and have been reducing energy costs worldwide for industrial manufacturers and making homes and buildings more energy efficient for over 12 years.

"Synaafrica is incredibly excited at bringing this innovative technology to the African market and look forward to assisting clients with achieving their safety and sustainability goals through the application of the Synavax™ range of products," says McIntyre. ■

Water and power efficiency walk hand in hand

South African industrial companies can manage water usage as part of a wider, integrated strategy for sustainable business.

by **STEPHEN AUSTIN**

PROGRAMME DEVELOPMENT LEADER,
ENSIGHT ENERGY SOLUTIONS

The persistent drought in most of the country over the last couple of years and especially in the Western Cape these last two years should serve as a wakeup call to South African industry and government. We live in a water-scarce country, yet many organisations are failing to manage water usage in a way that reflects just how precious this resource is and how important it is to conserve it.

South Africa is one of the driest 30 countries in the world, with an annual rainfall of less than 450mm, well below the world average of around 860mm a year. As we begin to feel more of the effects of climate change, we can expect to endure more extreme weather conditions, including the possibility of more frequent droughts that last longer.

Agriculture accounts for around 60% of South Africa's water usage and 12% goes to domestic use, according to the Department of Water and Sanitation (DWS). Usage for afforestation makes up 3.7%, power generation accounts for 2.2% and mining and bulk industrial use comprises around 5.7%. Little attention is paid to the industrial sector's use of water, yet it is an area where we can score relatively quick and easy wins.

A growing operational risk

Nonetheless, we are not seeing industrial companies pay much attention to water efficiency, for the simple reason that it is not a major operational cost for most of them. Where energy costs may account for up to 30% of a major industrial company's operational expenditure, water might make up less than 2% of its operating costs. The relatively low cost of water usage for most industrial users, however, belies its importance in production.

From cooling production machinery to making paper pulp to moving minerals, water is the lifeblood of industry. If the water supply to a plant stops, it will not be able to continue production, which will in turn damage its revenues and profits. This is a good reason to embrace water efficiency as a business imperative—another is that the cost of water is likely to rise in the years to come.

The good news is that a strategy for water efficiency can work in lockstep with a company's drive to reduce energy costs and carbon emissions. If you are wasting electrical power in an industrial environment, there is a good chance you are wasting water too (and vice-versa). Imposing discipline on your energy usage will also help to reduce water usage in most cases. This is about looking at your environment in a holistic way and seeing how your various systems and equipment interact with each other.

Ways to use water more efficiently

For example, an organisation that is using inefficient slurries to move minerals around will be pumping more water than it needs to into the system as well as using more power. A small increase in the density of the slurry mixture and a more efficient water pumping system could decrease water requirements by as much as 30%. And in a process plant running equipment that is 30 years old, it's not unusual to be using water pressure four times higher than necessary to suppress dust—a potential waste of both power and water.

Another great example is how poorly optimised the cooling systems are in many plants and factories—if you're using old, inefficient technology, it will be generating more heat than necessary, demanding more water and power to cool it. Another innovation that South African companies could look at is desalination plants to produce fresh water. They can use energy efficient solar sources or recaptured heat from other systems for this purpose.

Ensight has worked closely with a number of organisations on energy efficiency strategies, and when we measure how this impacts on water usage, the results are encouraging. We helped one customer to save around 143,000 MWh in energy a year through a range of strategies—it also reduced carbon dioxide emissions by 142,000 tonnes and saved nearly 5,700 megalitres of water (that's enough water for 76,600 hippos' annual water requirements).

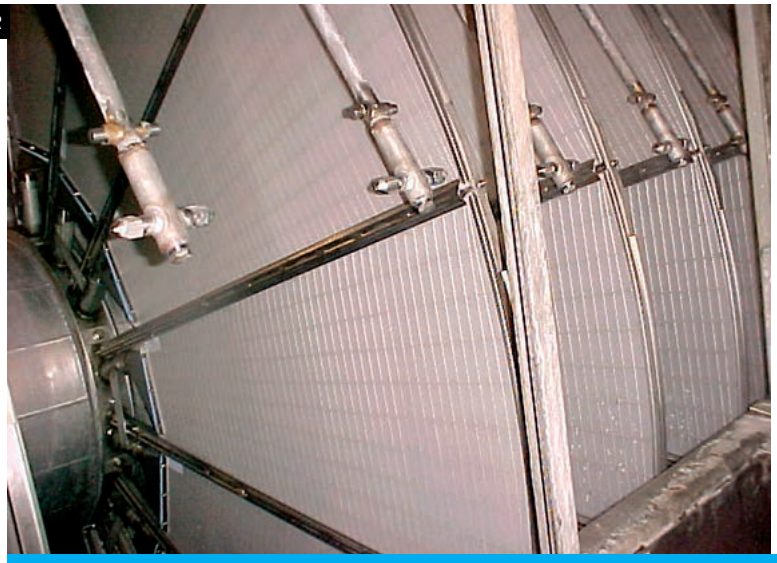
Given the fragile water situation in South Africa, large industrial users should embrace water efficiency both as an essential component of their risk management strategy and as a contribution towards ensuring the sustainability of our country. Using water efficiently can help organisations to meet their energy efficiency and carbon emission goals; it is an integral part of running a responsible and sustainable business. ◪

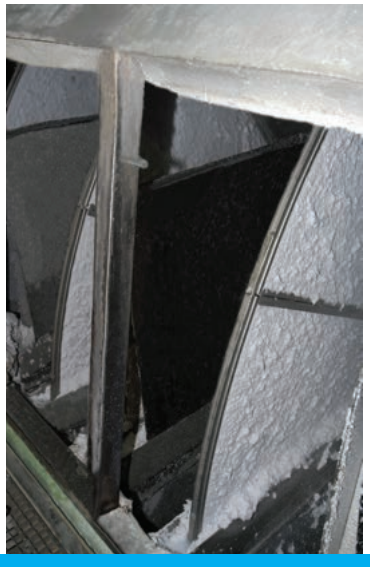
About Ensight Energy Solutions

Ensight Energy Solutions helps companies in energy-intensive industries such as resources to implement efficient solutions that reduce their energy costs and their carbon emissions. Drawing on the expertise of a multidisciplinary team, we work with our clients to reimagine and reengineer the supply and usage of energy across their operations.

Part of the Ensight Group of companies, we have rolled out our Energy Leadership Programme (ELP) for large organisations around the world – from mining work camps and urban shopping centres to eco-tourism resorts. Clients as diverse as Chevron, Rio Tinto, Santos, BHP, Palabora Copper, Richards Bay Minerals and Energy Resources Australia have collaborated with us to optimise their energy costs and design sustainable energy systems.

www.ensight.solutions





SUPPLIER CASE STUDY

GL&V rebuilds disc filter

at Mitsubishi HiTec Paper Bielefeld Mill

GL&V has built up extensive experience along with more than 100 rebuild references since 1990 while developing upgrades and rebuilds for its OEM disc filters. One of its chief goals has been to upgrade current disc filters for future increased production and quality needs, and as a result has introduced several new products for disc filters as an upgrade option.

One such upgrade was in 2010 for Mitsubishi HiTec Paper Bielefeld Mill in Germany which was at the mercy of frequent disc filter crashes. “Our mill experienced three major crashes which caused outages of more than 24 hours each,” laments Alfred Kullik, engineer in charge of the PM3 rebuild.

He adds that the old disc filter also produced only two qualities – cloudy and clear water. The mill really needed a solution that would deliver three water qualities from a single installation: cloudy, clear and super clear filtrates. The option for a super clear filtrate for shower cleaning water would see the removal of an old clarifier that was vulnerable to disruptions.

The Bielefeld Mill, a leading producer of specialty paper located in central Germany, is known for its high end technical expertise and innovation. It produces 150,000 tonnes per annum of specialty papers with two paper machines - PM1 and PM3. It is here where the Giroform self copy paper, Jetscript inkjet paper, Thermoscript thermo paper and Supercote label paper are manufactured. Over 80% of the specialty papers production is for the export market.

A Hedemora® disc filter from GL&V had been installed at PM1 with successful results but a bottleneck on PM3 needed attention. Kullik contacted GL&V, and together they worked on a solution.

The PM3 is a 5,800 mm wire width twin wire design equipped with an online coater and a design speed of 1,200 m/min before the disc filter rebuild. “GL&V proposed a rebuild of the existing BeloitTM 12’6”x 10/20 Polydisc® 3000 disc filter for PM3 white water treatment,” explains Kullik.

The company cites a number of benefits of its Beloit Polydisc® 12’6” disc filter type including increased capacity, reliable operation and superior filtrate quality. Cloths and sectors can be easily cleaned and serviced quickly.
The WellBagTM or WellDrain® cassette covers, together with GL&V’s grid sector concept, fit most disc filters on the market today while their fabric selections may increase disc filter capacity by up to 30%.

The new filtrate valve designed for Beloit Polydisk 3000 filters is said to increase the capacity and improve the filtrate qualities. The self-cleaning knock-off system is designed to prevent build-up of solids, which could lead to plugging of nozzles.

Getting the scope right

The approach flow and the disc filter were the only segments not designed for the speed of the paper machine and so GL&V determined the necessary scope for a successful upgrade.

This entailed ten new high flow discs with grid cassette sectors, including stainless steel fabrics and blank off parts as well as a new filtrate valve with cloudy, clear and super clear filtrates and an additional feed box on the opposite side of existing feed box to improve feed flow to the sector.

Extensions were made on each discharge chute for increased vat level and a new knock-off pipe with inside brush cleaning system was included. There was also an option for 20% more capacity along with a bow screen shower water protection filter.

LEFT. GL&V's unique disc filter parts for different types of disc filters have the ability to handle different process grades, giving it flexibility in process variations and allows the surrounding process equipment to be smaller. This feature is derived from its open sector design.

The rebuild eliminated the old clarifier once used for the production of super clear water for the paper machine showers. The bow screen was also included for additional protection to assure long fibres will not plug the showers. The rebuild provided additional hydraulic capacity while eliminating half of the discs.

Evolution to the cassette system

Disc filter sector development has evolved from foot-mounted plate sectors to an open grid structure cassette system. The foot-mounted sectors were heavy and cumbersome requiring special tools and techniques to attach the sector to the centreshaft. The grid cassette system uses a holder that only needs to be attached once to the centreshaft. Cassette sectors can be slid into the holder and attached from the outside of the filter greatly simplifying the servicing of the filter.

The grid sector allows the knock-off spray water to easily separate the fibre mat from the filter media. Once the sheet is released, the sector is cleaned with an oscillating shower each filtration cycle. The grid sector has an open area as high as 90% allowing thorough cleaning of both sides of the filter media. These are important points to provide optimum filtration and to allow stable operation of the filter.

Meticulous planning

For a cost-effective modification, the two companies meticulously planned for the outage. GL&V designed and manufactured the new high flow cassette grid sectors, new filtrate valve and wear disc, and the new feed box specifically to suit the existing Bielefeld disc filter and to minimise the down time. During the outage, GL&V supervised local welders and fitters provided by Mitsubishi. The rebuild was completed during a 120-hour machine stop.

"Everything was running well from the very beginning because we received such good support from the very beginning. We were very pleased over the project management and for all the engineering help working together with GL&V," says Peter Fink, consultant for the mill.

The former disc filter suffered from numerous cracks and other issues, resulting in regular repairs on the plastic segments and costly down-time. "With the new solution, we don't let our customers down either," adds Kullik.

Kullik agrees that the payback time was a very important factor in deciding the project and generally all projects need to payback between 1,3 and 1,6 years. "We have saved a small amount of energy by shutting down the old clarifier. The white water capacity of the disc filter has been improved and this – along with some other modifications at the paper machine – has enabled us to increase the machine speed and capacity. After the rebuild of the disc filter, we are able to safely run 1,200 m/min!" ■

SUPPLIER NEWS

Valmet to upgrade of washing process area for Stora Enso's Heinola fluting mill

Valmet will supply an upgrade of the washing process area for Stora Enso's Heinola fluting mill in Finland with the TwinRoll Evolution wash press (TRPE) to improve the Heinola's Neutral-Sulfite Semi-Chemical (NSSC) line washing.

"This will be the first fifth generation Valmet TwinRoll wash press delivery to Finland. The press will give more flexibility in production and ensure an improved washing of the NSSC pulp before the board machine, and in that way, improve the quality of the final product," says Lari Lammi, Senior Process Manager at Valmet.

"We want to improve the pulp washing efficiency with moderate washing water volumes. A TwinRoll Press showed to be a compact solution when the alternative washers were more in numbers or bigger in size," says Timo Riuttanen, Process Development Manager at StoraEnso Heinola mill.

The scope of delivery includes the Valmet Twinroll evolution wash press (TRPE) with basic engineering, training and site services as well as spare parts. The TRPE wash press features displacement washing and pressing to 30-32% consistency at 2.5-10% feed consistency. The TRPE wash press is ideal for applications where high washing efficiency and capacity are required. ■

ANDRITZ continues successful tissue machine start-ups for the Hengan Group

ANDRITZ has successfully started up another tissue machine supplied to the Hengan Group, China.

The PrimeLineTM W8 tissue machine started up at Hengan's Chongqing mill is the 13th ANDRITZ tissue machine supplied to the Hengan Group. It has a design speed of 2,000 m/min and a width of 5.6m. The machine is equipped with an 18-foot steel Yankee for energy-efficient drying and safe operation. The scope of supply also included the complete stock preparation plant with ShortFlow concept, which minimises both the investment costs and energy consumption as well as ensures high flexibility for grade changes. The entire automation system was also supplied by ANDRITZ.

The Hengan Group was established in 1985 and is – with around 30,000 employees – one of the leading Chinese manufacturers of hygiene and sanitary products. ■

SUPPLIER CASE STUDY

Paper mill reduces fresh water use by 136,000 kl/year

A North American paper mill that produces towel from recycled, sorted office waste (SOW) and de-inked market pulp consumed over 17,000 kilolitres of fresh water each week as part of the production process. Efforts to reduce its overall ecological footprint and reduce freshwater usage was a major goal for the organisation.

The mill had previously investigated reducing fresh water consumption by reusing the effluent from the dissolved air flotation unit (DAF) as vacuum pump seal water. However, the mill was experiencing inconsistent solids removal by the DAF, limiting their ability to reuse the effluent. DAF performance was severely limited as a result of the varying levels of furnish and hydraulic flow rate of the treated streams causing significant turbidity and TSS (Total Suspended Solids) load swings. As turbidity increased, chemical pumps were manually adjusted in an effort to compensate for the increased loading. These manual operations often led to periods of inadequate chemical treatment which resulted in poor effluent water quality, prompting the mill to send all DAF effluent water to the municipal treatment works.

Improving control, reducing variability

3D TRASAR Technology for DAF from Nalco was implemented to improve control and reduce variability in the effluent water quality. 3D TRASAR Technology for DAF uses advanced sensors to effectively automate DAF chemical control. The technology analyzes the influent flow rate, influent turbidity, and effluent turbidity in real time and optimises the dosage of treatment chemistry to improve overall system performance with advanced proprietary feed forward and feedback control algorithms. Additional DAF operational data can be monitored with automated alarming capability to notify the operations staff of sudden process changes.

Nalco's solution helped to optimise the chemical treatment programmed through a combination of feed forward and feedback control, providing improved control and reduced variability in the effluent water quality of the DAF allowing it to be used as vacuum pump seal water. An alarm notification was established to notify the operations team of any critical process changes.

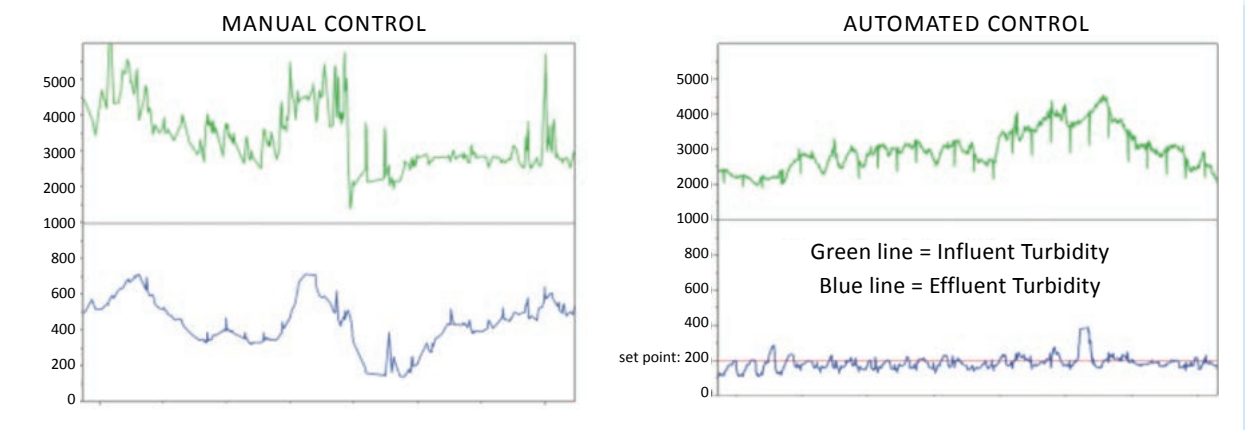
This reuse of the DAF effluent reduced fresh water consumption at the mill by 16% from over 890,000 kl/year to 749,511 kl/year, an annual savings of $535,000.

As a result of the successful implementation, the mill is considering additional potential process opportunities for DAF effluent reuse to further reduce freshwater consumption, including shower water, gland water, and tank level control water applications. ■

Customer Impact	eROI	Economic Results
Reduced fresh water consumption by 16% from over 890,000 kl/year to 749,511 kl/year	Water	$535,000 annual savings

ABOVE. eROI is an exponential value: the combined outcomes of improved performance, operational efficiency and sustainable impact delivered through Nalco's services and programmes.

BELOW. The green lines on the graphs show the variation in influent turbidity. The corresponding blue lines show the effluent turbidity variations. Note that while the influent has high variability, 3D TRASAR technology provides effective control and predictable quality water that can be reused in process applications to reduce overall freshwater demand.



THOUGHT LEADERSHIP

An ecosystem approach to **strategic industrial water management**

by **HELEN HULETT**
TALBOT AND TALBOT

It is a glaring reality that water scarcity is a growing risk to business across Africa. Industrial water use accounts for approximately 11% of total water usage in South Africa. It has been projected that in rapidly industrialising countries, industrial water usage could increase five times over the next 10 to 20 years. How current and projected water scarcity affects business in the long run needs serious consideration and careful management by industry leaders in order to ensure the future of business in Africa.

The water risk to industry is multi-faceted, presenting in a number of ways: escalating water and wastewater costs, more stringent regulations, water supply and quality failures, extreme weather events and even market share loss resulting from a tarnished reputation. All of these impacts are real and have the potential to significantly influence the financial viability of a business.

Managing the risk, however, is complex and can be extremely expensive if managed incorrectly; this often leads most business to avoid altogether until pushed to do so by a supply failure or escalating cost, at which point management is either not possible or at a premium.

Priotise your water risk management

The key to managing water risk is prioritisation and management of the most crucial aspects before they result in a significant cost to the business. Companies need to identify the aspects – such as water availability, changing legislation or extreme weather events – to which each of their operations is vulnerable. These should inform the type and extent of strategic intervention.

This prioritisation process can be undertaken at a cursory level by staying up to date on the water supply and regulatory characteristics of each operation and ensuring this information informs management decisions. However, companies with traditional silo-structured management systems typically struggle to incorporate this information effectively due to the cross-boundary and interdisciplinary nature of water.

The key to managing water risk is prioritisation and management of the most crucial aspects before they result in a significant cost to the business.

Create your business' water ecosystem

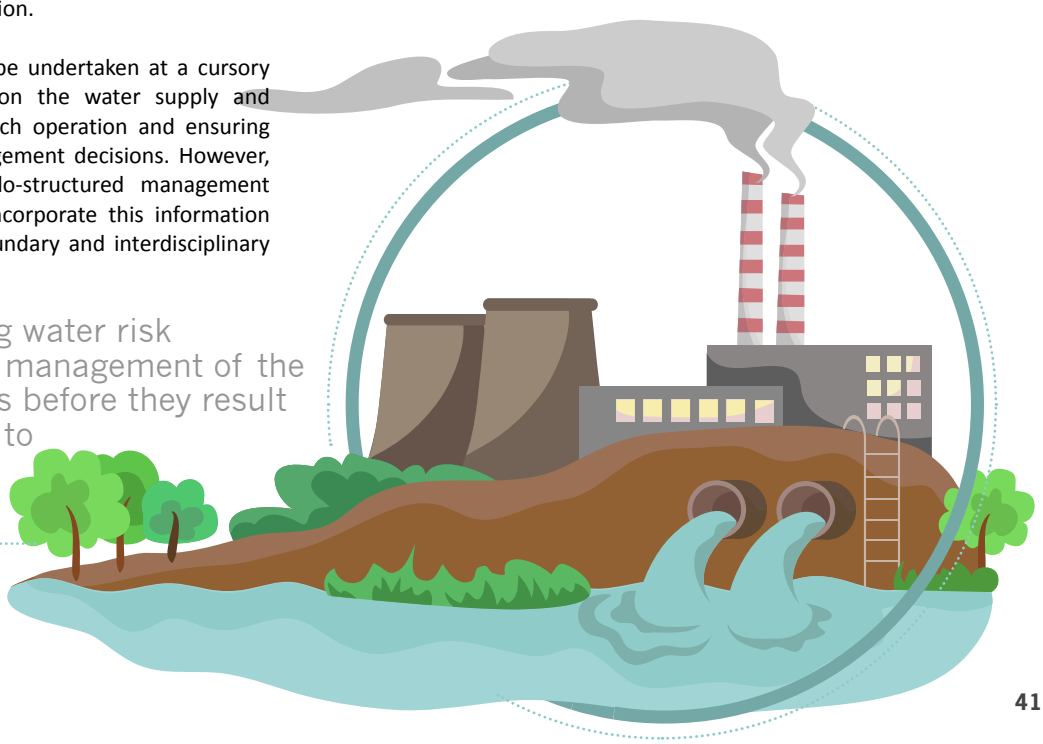
Therefore, developing an 'ecosystem approach' to water management across a company by unpacking all crucial internal and external water interactions is not only extremely beneficial in managing risks, but more importantly, in identifying and optimising opportunities.

An extremely powerful tool for strategy development is using scenario analysis to model an operation's water 'ecosystem' across divisions and incorporate external pressures (such as rising supply costs). It is a tool that is very accessible with the day-to-day technologies available to business.

The benefits of this 'ecosystem approach' are numerous including prioritising spend against risk and opportunity significance, motivating informed CAPEX interventions, ensuring all departments are working towards a common goal and illustrating the 'bigger picture' to a broader audience.

Additionally, any significant changes to the pressures driving the system, a new regulation for example, can easily be incorporated and the strategy adapted accordingly, allowing the flexibility required to manage in a rapidly changing environment.

In the long run an ecosystem approach to industrial water management will play a vital role in ensuring water security, efficiency and improved service delivery, allowing for operational and capital savings and ultimately competitive advantage, while securing the future of business. ■



INSTRUMENTATION

Level transmitter that allows hot installation or removal

N&Z Instrumentation & Control - a supplier of measurement and control instruments and systems to all industrial sectors - specialises in flow, pressure, temperature, level, analytical, data loggers, telemetry, automation, flow surveys and control.

The 60-year old company with offices in Johannesburg, Durban and Cape Town has a number of well-known brands in its product portfolio, including Fuji Electric. There are over 300 Fuji transmitters measuring level, pressure or flow in the South African pulp and paper industry.

Downtime in any industrial environment costs time and money which is why the hot install/remove flange level transmitter from Fuji is a real boon. The level transmitter can be removed for cleaning or servicing even while a tank is in service. This is achieved by using a Fuji transmitter with an extended diaphragm which is inserted through a ball valve mounted on the flange (pictured). This achieves accurate level measurement with easy serviceability.

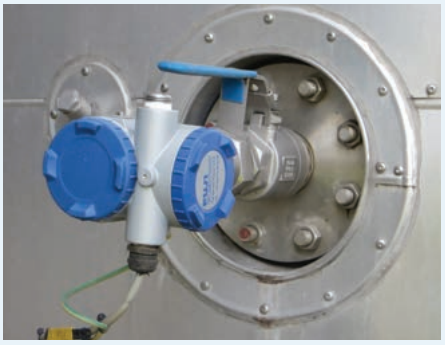
ABOVE. Fuji level transmitter which can be removed for servicing and calibration and re-installed without disrupting tank operation.

Case Study

Cristal Union, one of the largest sugar producers in Europe representing over 9,000 growers through several agricultural co-operatives, has six factories in France. Its factories have more than 450 pressure and level transmitters. These transmitters must be periodically removed for maintenance to ensure that liquid levels and vessel pressures are reliably measured. In the past, vessels had to be taken out of operation and the contents removed before the transmitters could be serviced.

Cristal Union have moved to the Fuji ball valve design which enables them to remove the transmitter at any time, even when the plant is in operation. They have so far converted more than 150 installations to the ball valve design and intend to continue rolling out the programme as the vessels are taken out of service for maintenance.

Other industries using the ball valve transmitters include pulp and paper, chemicals and energy. ■



Fuji level and pressure transmitters with ball valve design at Cristal Union's manufacturing plant in Aulnat, central France. Maintenance teams don't have to take the tank out of service to remove the transmitter for maintenance.

Secure liquid level detection

The Kobold capacitive level indicators type NMC, specifically designed to measure liquid levels in tanks, consist of a measuring probe and a connecting head with a plug-in evaluation module. The instruments can be used to measure water or water-like liquid, chemicals and aggressive liquids, or oil.

Different probes are available to deal with a variety of operating conditions:

- NMC-N: Standard version with metal tanks inserted, their walls undertaking the task of a second electrode. It is applicable for fluid foods as well as for different waters.
- NMC-S: The two-probe sensor for non-metal tanks for operation in aggressive media.
- NMC-T: Especially for operation in non-metal holding tanks and media of lower conductivity, the designed probe consists of an interior probe and a surrounding pipe of stainless steel serving as a reference electrode.
- NMC-H: The electronics of one stick probe of stainless steel is thermally insulated by a special intermediate piece so that the sensor technology can easily handle up to 125 °C.

How it works

The measuring system is based on the capacitive measuring method. The measuring probe and the tank wall, or the second electrode respectively, form the plates of a capacitor; the medium in the tank is the dielectric fluid.

The capacity depends on the medium. The more the medium touches the measuring probe, the higher the capacity.

This change is detected by the plug-in evaluation module and transformed in a percentage display or a 4-20 mA signal. As there are no movable parts, the unit operates almost wear-free. Polytetrafluoroethylene (PTFE) coated measuring probes of stainless steel are available in lengths of up to four metres. Problematic apertures at holding tank base or at the side can be avoided by virtue of a simple and secure assembly from the top.

Kobold is represented locally by Instrotech. ■

Ultraclean eDNA laboratory inaugurated at MoRe Research

MoRe Research in Sweden has invested in a new ultraclean laboratory specially designed for eDNA (environmental DNA) extractions. This is one step in a co-operation between AquaBiota, Stockholm, and MoRe Research where MoRe performs eDNA extractions at the request of AquaBiota. The eDNA technique is well suited for example in the survey of water environments for mill control programmes or legionella control in biotreatment plants.

All living organisms, plants, animals and bacteria leave traces of DNA in the environment in the form of sweat, mucus, faeces, sperm, eggs, hair and dead cells or cell parts. These genetic fingerprints can be found in the environment where the organism has been and are thus called environmental DNA.

Animals drinking water or swimming in a watercourse also leave traces of DNA behind. Today it is possible to ascertain the animals, fish or plants present under the surface of a lake, river or sea by collecting a small amount of water and analysing DNA traces with the aid of genetic methods.

“eDNA gives us completely new possibilities to take stock of the environment and species by using these pioneering molecular methods,” says Johan Spens, AquaBiota. “The method is extra useful when it is important to find rare, shy, harmful or unknown species in an ecosystem. eDNA has developed very quickly during the last 10 years and is now used for a number of different tasks.”

The new, ultraclean laboratory designed for eDNA extractions was recently inaugurated. Micaela Hellström, who has been involved in building several eDNA laboratories, acted as design advisor. “eDNA extractions are one very important part of the whole eDNA chain and this laboratory meets all standards for non-contamination spaces and is run by well-educated and dedicated technicians at MoRe”, says Micaela Hellström, AquaBiota.

“We are very proud of our collaboration with AquaBiota,” says Robert Selling, Manager Analytical Techniques at MoRe Research. “The eDNA technique is primarily used for inventory of natural habitats and AquaBiota uses it for instance in the determination of fish species present in a lake from just a small water sample. We also foresee using the eDNA technique for stocktaking of water environment in relation to mills’ control programmes or for legionella control in biotreatment plants.” ■

The unveiling of Sappi's demonstration plant at Ngodwana Mill that will extract bio-chemicals and hemicellulose from its existing dissolving wood pulp line's pre-hydrolysate stream.

Sappi broadens its **biomaterials footprint**

Sappi recently announced its quarter and half year financial results, stating that its Specialised Cellulose business has benefitted from strong demand and favourable pricing for dissolving wood pulp (DWP), which followed the trends for viscose staple fibre, cotton and polyester.

Plans are afoot to increase its DWP capacity by more than 30% in the next four years at Ngodwana and Saiccor plants to extract maximum value from the wood fibre value chain. The associated biotech developments aim to improve Sappi's position to extract maximum value from the wood.

According to Sappi Chief Executive Officer Steve Binnie, Sappi's Biotech business is making solid progress with the opening of the second-generation sugars extraction pilot plant at Ngodwana and the signing of a global sales agreement with Cellmark of Sweden for Sappi's Lignosulphonate products.

The portfolio under development will expand Sappi's renewable biomaterials offering which include hemicellulose sugars, nanocellulose, biocomposites and lignosulphonate.

Sweetening the renewables market

Officially opened on 5 April, the demonstration plant has been the result of the 2016 agreement by Sappi and Valmet to jointly develop a process to explore the extraction of higher value biorenewable chemicals. At near-industrial size, the plant makes it possible to study the next generation dissolving pulp cooking process and test new ideas in mill scale.

Sappi will extract bio-chemicals and hemicellulose from its existing dissolving wood pulp line's pre-hydrolysate stream. The products finding market application include glycols to de-ice aircraft wings or PET, which is used as raw material for drinking bottles.

The event was opened by Alex Thiel, CEO of Sappi Southern Africa, and followed by SW Engelbrecht, General Manager at Sappi Ngodwana Mill. Thiel acknowledged that "our people have always been our strength, and their positive can-do mind-set and commitment is evident in the exceptional production performance that we are achieving at Ngodwana Mill".

Engelbrecht highlighted the special role that the Ngodwana Mill has played in the development of Sappi since the first sod was turned 53 years ago, in 1964. "That investment reflected the significant growth of Sappi within the South African economy. Almost 20 years later, in 1981, a major expansion and rebuild of this mill began. That expansion set Sappi on the path towards becoming the global company that it is today."

He added, "Sappi's presence in Mpumalanga continues to provide significant benefits to the local economy and through our forestry operations specifically to the rural communities. Over 43,000 people depend on the mill's presence for their livelihood, with the mill contributing over R6,2 billion rand to the province's economy."

Bertel Karlstedt, Business Line President Pulp and Energy, Valmet, highlighted the good co-operation between Sappi and Valmet. "The development of solutions to replace fossil materials with renewable ones and to produce new high-value end products is one of Valmet's research and development focus areas. This project is a concrete example of new opportunities. By working together, we have been

able to combine Valmet's leading technology knowledge with Sappi's process and market insight."

"The plant continues Sappi's strategic move into the biomaterials and bio-energy business fields to extract more value from the production processes and in response to the global demand for renewable materials with a lower carbon footprint," commented Andrea Rossi, Group Head Technology from Sappi.

The plant is a precursor for Sappi to possible commercial scale plants at its dissolving wood pulp mills in Ngodwana and Cloquet in the United States. "Our Lignin business is well established with Biotech trading more than 100ktpa of lignin products," explained Louis Kruyshaar, leader of the Sappi Biotech division.

He alluded to the investment in the Netherlands for a nanocellulose demo plant that will develop product functionality and see application in many everyday products from composite materials to cosmetics.

"Late last year we started our scaled up production capacity of cellulose fibre composites to allow plant scale trials in lightweight plastic and audio applications," he noted.

Making a mark with lignosulphonates

In March Sappi's Biotech division appointed CellMark as the non-exclusive sales agent for Sappi Biotech's HANSA® lignin products, produced in liquid and powder formats in South Africa at Sappi Tugela Mill.

Lignosulphonates are biopolymers that are produced during the production of cellulose with the use of sulfites.

The importance of lignosulphonates as a surfactant, bonding and dispersing agent has continued to grow steadily over the years, and is now considered an indispensable additive in a wide array of industrial and commercial uses such as surfactants, binders, dispersers and emulsifying agents.

The larger majority of South Africa's lignosulphonate capacity is exported to global markets. Two important local applications are as a key raw material in concrete admixture formulations and use in road stabilisation and dust control.

A lignosulphonate based admixture allows concrete to be made with less water. It modifies the rheology of concrete, retaining workability and flow and meeting desired strength at a lower cost and lower water usage.

Open cast mining operations and forestry have very specific safety and productivity issues relating to dust control on haulage roads. Lignosulphonates have shown to be very effective in this regard.

Its renewability and environmental sustainability are an added plus as lignosulphonates have the potential to replace fossil-based materials, such as bitumen, polycarboxylates, naphthalene based dispersants, phenolic binders and other organic materials. They are also easy to use and cost effective.

Lignin produced from the kraft chemical pulping process is predominantly used for bio-energy generation, with the lignosulphonates from sulfite pulping used internally for bio-energy generation or beneficiated and processed into technical lignins for sale to global lignin markets.

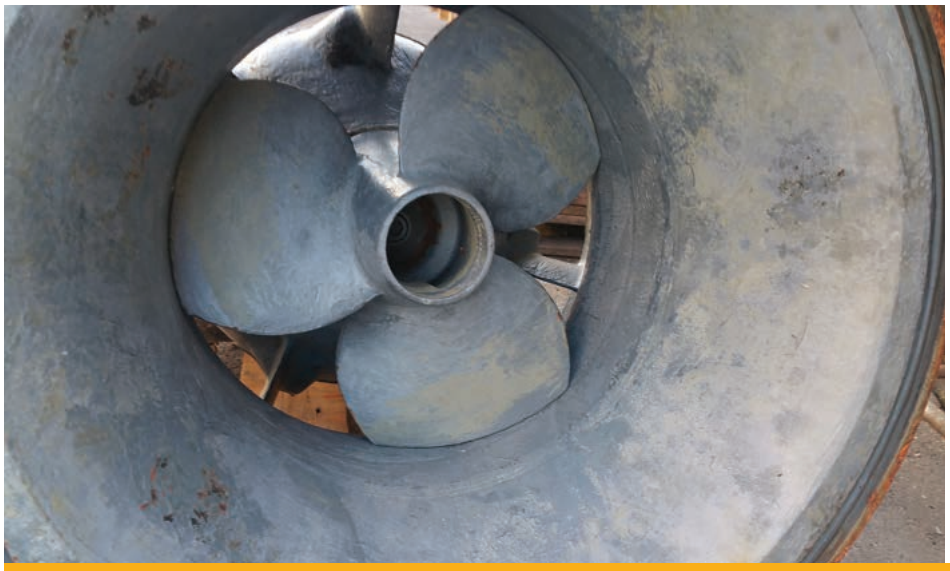
Sappi is the world's largest producer of Lignosulphonates from operations in South Africa and Europe. Kruyshaar notes that CellMark brings an excellent fit to the Biotech business at a stage when accelerated market penetration is key to attaining growth targets. "The partnership, which is built on common core values, will include a joint social investment initiative to benefit rural communities in South Africa."

"We are delighted to represent the Sappi Biotech Hansa quality lignin and offer enhanced lignin solutions to customers,'' indicates Jean-Luc Carrière, Vice President and General Manager Lignin for CellMark Basic Chemicals. He adds, ''This partnership will enable both companies to advance towards their common goal to expand markets and applications for this versatile biopolymer.''

CellMark was founded in 1984 in Sweden as a supply chain service provider and distributor of raw material for the global pulp and paper industry. Today it is a global meeting place for entrepreneurial collaborative innovation with a network of 70 offices in 30 countries. Its platform supports and helps entrepreneurs exchange products and services more efficiently, improves business, and mitigates risk and the impact on natural resources. ■

The development of solutions to replace fossil materials with renewable ones and to produce new high-value end products is one of Valmet's research and development focus areas. This project is a concrete example of new opportunities. By working together, we have been able to combine Valmet's leading technology knowledge with Sappi's process and market insight.

- BERTEL KARLSTEDT, BUSINESS LINE PRESIDENT PULP AND ENERGY, VALMET



SUPPLIER CASE STUDY

Paper mill receives welcome pump protection

Polymeric repair materials and coatings extend maintenance-free operation

by **TOM BELLI**

Regardless of the pulping methods, paper mill pumps are put under immense strain due to the transfer of viscous material throughout the pulping process. Together, the sludge and slurries combine a high solids content, copious amounts of entrained air and often processing chemicals, used to extract the cellulose from the wood fibre. This resulting combination can cause issues associated with erosion, corrosion and chemical attack and the subsequent impact of these damage mechanisms, can truly affect the pump's efficiency.

Initially, damage will lead to rough and pitted surfaces, which will increase friction and lead to a drop in the efficiency of the system as well as increased running costs. If not tackled in time, corrosion-erosion problems may jeopardise the integrity of the component, ultimately causing failure of the equipment. This can be to the detriment of the pulping process and the operation of the paper mill.

In 2010, an Italian paper mill was suffering from particular problems relating to these effects. The casing and internal components of a cast iron, submersible sludge pump were being troubled by immersion in chemically saturated slurries and the pumping of the erosive materials. In fact, the stresses were taking a significant toll on the pump, which was barely lasting a maximum of two years in service before requiring major overhaul and replacement.

Expensive problems

While replacement might be an obvious solution, this was costly. Not only in terms of replacing the equipment but the downtime that was associated with dismantling and installation of new pump components. In addition, replacement usually involves long lead times of weeks, or even months. These periods of limited processing power made it necessary for the paper mill to reduce output, a seriously expensive problem when taking into consideration the regularity of the pump's deterioration.

More importantly, this option did not address the underlying problem. Unsatisfied with their current approach and in search of an alternative, the paper mill contacted Belzona's representative in Italy, BS srl, looking for a viable solution for their consistently failing pumps.

After careful selection, a combination of erosion-corrosion resistant systems was chosen to complete the application. Initially rebuilding the metal loss in the pump using Belzona 1311 (Ceramic R-Metal), the pump was internally coated with Belzona 1321 (Ceramic S-Metal). These systems form a durable protective coating for metal repair and erosion and corrosion protection, simultaneously demonstrating excellent chemical resistance in continuous immersion situations.

FROM LEFT TO RIGHT
After six years in service, the pump components were still in excellent condition (far left). The sludge pump lifespan keeps on extending (centre), with the pump components recoated to ensure functionality continues (left).

Finally, the pump was coated externally using Belzona 5811 (Immersion Grade), designed to preserve equipment operating under immersed conditions from corrosion damage. This created an essential barrier against the chemicals used in the pulping processes.

Extending service life

Overall, this solution aimed to eliminate the need for replacement, reducing the much-maligned downtime associated with regular overhaul. Originally coated in 2010 with Belzona, six years on, the customer opened the pump for mechanical maintenance. Throughout its six-year service life, the pump faced zero downtime due to Belzona erosion-corrosion protection and impressively, the coating was found to be in excellent condition.

However, it was decided to refresh the coatings in order to prepare the pump for more years of service in sludge; therefore, the original coatings were roughened before applying a new layer on top. Not only did this continue to further extend the pump's in-service life, saving the company replacement costs, but ensured that the equipment was protected in the long term against the dangers of erosion-corrosion.

Enzo Arrabito, CEO for BS srl, commented, "This type of application is one that we complete frequently, on small, medium and large scale components. The pump in question was suffering immensely from erosion-corrosion damage; therefore, the client expressed their satisfaction that the lifespan of the pump could be extended significantly through the use of a polymeric solution. At the same time, this reduced their maintenance costs and allowed them to achieve greater efficiency from their equipment. Its immediate effects on performance will be maintained over a long period, reducing power consumption and saving on operating costs." ■

Analytical Pyrolysis: A rapid and versatile tool for the pulp and paper industry

BRUCE SITHOLE[1,2]

Introduction

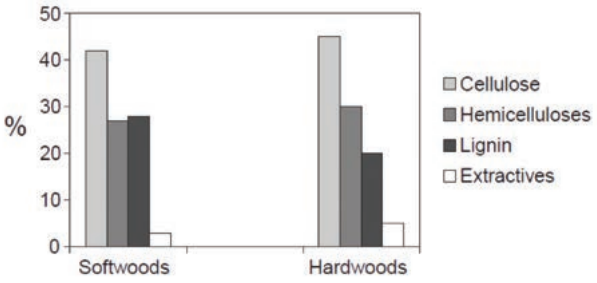
Pyrolysis techniques involve the application of thermal energy to induce the transformation or degradation of compounds. The techniques can be divided into two types, applied pyrolysis and analytical pyrolysis. Applied pyrolysis is concerned with the production of chemicals, e.g. the pyrolysis of coal to generate oil. Analytical pyrolysis deals with the structural identification and quantitation of pyrolysis products with the ultimate aim of establishing the identity of the original material and the mechanisms of its thermal decomposition. Many organic compounds can be analysed by gas chromatography (GC), provided that they are volatile or can be derivatized into compounds that are amenable to analysis by GC.

The analysis of many polymers by normal analytical techniques tends to be difficult mainly because they require that the analytes be brought into solution, and this is usually difficult to achieve. Such compounds are candidates for analytical pyrolysis, which entails applying thermal energy to break them into products that are volatile enough to be analysed by GC. If the pyrolysis is done under controlled conditions and inert atmospheres, the resultant pyrolysis fragments give characteristic patterns that are ''fingerprints'' of the original polymers. Further information on the chemistry of the fragments can be obtained by detecting them by Mass Spectrometry (MS) and, in some instances, by Fourier transform infrared (FTIR) spectroscopy. The pyrolysis can be done by rapid heating (flash pyrolysis) or temperature-programmed heating (slow pyrolysis) of the polymers. Slow pyrolysis products can be sent to a mass spectrometer or the pyrolysis can be done directly in a mass spectrometer.

Analysis of Wood Components

The major composition products of wood are cellulose, hemicelluloses, lignin and extractives. The average composition of these compounds in softwood and hardwoods is illustrated in Figure 1. Cellulose determines the character of wood fibres and enables them to be used for papermaking. It is a polysaccharide of glucose units with the formula $(C_6H_{10}O_5)_n$ where n is the number of repeating sugar units or the degree of polymerization. Decreasing the molecular weight of cellulose molecules below a certain level will cause deterioration in strength of the paper products. Hemicelluloses are polysaccharides of five different sugars from hexoses (glucose, mannose, galactose) and pentoses (xylose, arabinose).

FIGURE 1. Concentrations of major wood components.



These sugars combine with uronic acids to form various polymeric structures that are associated with the cellulose portion of wood or with lignin. The hemicelluloses are susceptible to more degradation and dissolution than cellulose during chemical pulping. Lignin is an amorphous, highly polymerized substance that cements fibres together. It is a very complex polymer consisting primarily of p-hydroxyphenyl (H), guaiacyl (G), and syringyl (S) groups that are linked together in a three-dimensional structure and whose concentrations differ in softwoods and in hardwoods. In general, hardwoods contain traces of hydroxyphenyl groups, 29–35% guaiacyl groups, and 40–60% syringyl groups, whereas softwoods contain traces of hydroxyphenyl groups, >95% guaiacyl groups, and 1% syringyl groups. Usually, lignins are classified as G, G/S or H/G/S lignin depending on the presence of the different groups. The lignin is dissolved during chemical pulping to free the cellulosic fibres. Extractives are a diverse list of compounds that are soluble in water or lipophilic solvents: they include resin acids, fatty acids, fats, terpenoids, phenols and alcohols.

Cellulose

An early study on analysis of microcrystalline cellulose showed that furfural and levoglucosenone were the major pyrolysis products. Small amounts of 1,6-anhydro-3-deoxy-b-D-glucopyranosen were detected. Pyrolysis of glucose and oligosaccharide standards with up to five glucose

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units showed that very small amounts of the cellulose pyrolysis products were obtained. From this, two pyrolysis mechanisms were proposed. Later, Py/GC/MS with high-resolution mass spectrometry identified 96 compounds that were classified into several groups, namely carbonyl compounds, acids and methyl esters, furans, pyrans, anhydro sugars, and hydrocarbons. Levoglucosan was the major product detected.

Carbohydrates

Py/GC studies of carbohydrates have shown that the method can successfully identify the saccharide composition of a wide range of heteropolysaccharides by the ability of the pyrolysis technique to produce individual anhydro sugar fragments which are further separated and identified by GC/MS. However, quantitative analysis of polysaccharides has been difficult when non carbohydrate materials and metals are present, as is the situation with wood and pulp samples. Removing metal ions, e.g. by acid washing, overcomes the difficulty, resulting in the generation of reproducible yields of anhydro sugar products. The technique is applicable to both mechanical and chemical pulps and the resultant pyrograms are similar to those of pure microcrystalline cellulose and a xylan polymer.

The pyrograms reveal differences in the cellulose compositions of the pulps: high-yield mechanical pulps retain their original saccharide content, although some hemicellulose are lost during pulping; lower yield chemical pulps have much higher concentrations of cellulose and much lower concentrations of hemicellulose that is dissolved during cooking. Identities of the pyrolysis products show that almost all the peaks are pyrolysis products of pentose or hexose units.

Lignins

Lignins can be characterized by a number of methods that entail degradation of the compounds, the most common and simplest of which is oxidation with nitrobenzene. However, these methods, including the simplest one, are time-consuming and tedious. Py/GC is ideal for characterizing lignin groups.

The identified compounds included 1-Hydroxy-2-propanone, 2(3H)-Furanone, 2-Furaldehyde, 5-Methyl-2-furaldehyde, Levoglucosenone, 4-Hydroxy-5,6-dihydro-(2H)-pyran-2-one, 5-Hydroxymethyl-2-furaldehyde, 1,5-Anhydro-4-deoxy-D-glycero-hex-1-en-3-ulose, 1,4-Anhydroxylopyranose, and 1,6-Anhydrogalactopyranose

Py/GC has been used to evaluate the uniformity of delignification of beech wood chips by monitoring residual lignin in alkali pulps. Analysis of the samples identified 10 pyrolysis products whose structures were related to vanillin, isoeugenol, syringols, and guaiacols. The calculated S:G ratio correlated with the Klason lignin contents of kraft and soda–anthraquinone beech pulps.Analysis of this ratio in samples of chip slices during a cook can be used to evaluate the uniformity of delignification. The same researchers also used Py/GC to analyse lignin in different paper furnishes including printing and writing paper, wood-containing paper, wood-free paper, and wood-containing coated paper. Their results showed that papers containing hardwood mechanical pulps could be clearly distinguished from the other papers, owing to the presence of syringyl-type pyrolysis products. An advantage of Py/GC over other traditional methods for lignin measurement such as the Klason technique is that it is not affected by the presence of fillers in the papers.

Analysis of Deposits and Impurities

Pulp and papermaking processes are frequently plagued with deposition problems that cause breaks and/or off-quality products in the form of dirt and specks in the product. Such products are culled or sold at below premium prices. Rapid characterization of the deposits is essential in order to find solutions to the problems. Analytical methods have been developed to determine the composition of the deposits; they range from simple spot tests to sophisticated techniques that include solvent extraction and instrumental analysis by FTIR spectroscopy, GC, GC/MS, and scanning electron microscopy. In many instances, the concentrations of impurities in pulp and paper products are too low for analysis by solvent extraction followed by GC analysis of the extracts. FTIR spectroscopy with a diamond cell or a microscope can be used to characterize the dirt spots but it may not give definite answers on the composition of the spots.

FIGURE 2. Py/GC of a lignin sample

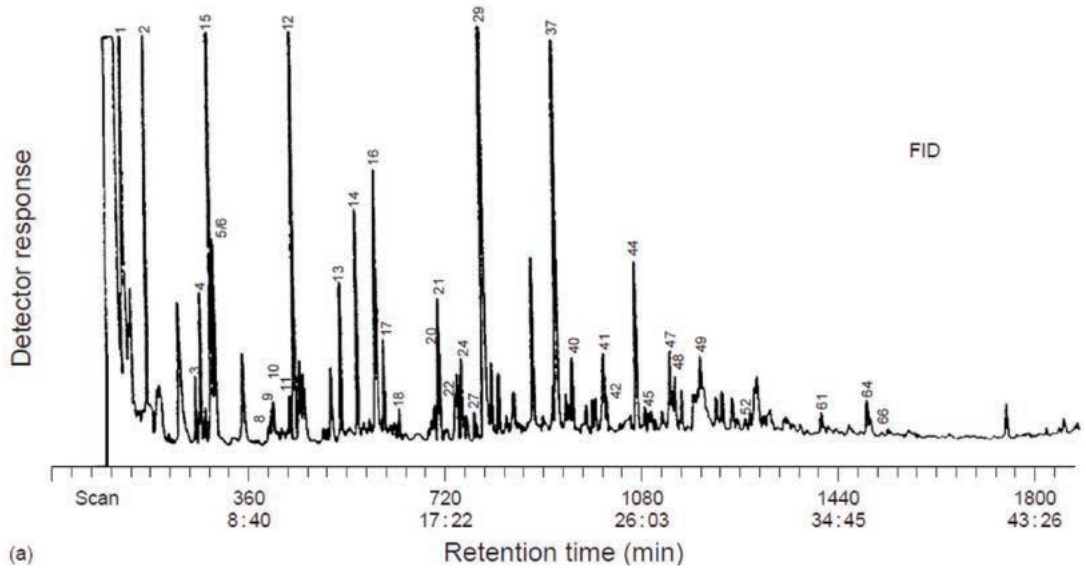


FIGURE 3. Analysis of deposits on foil blades.

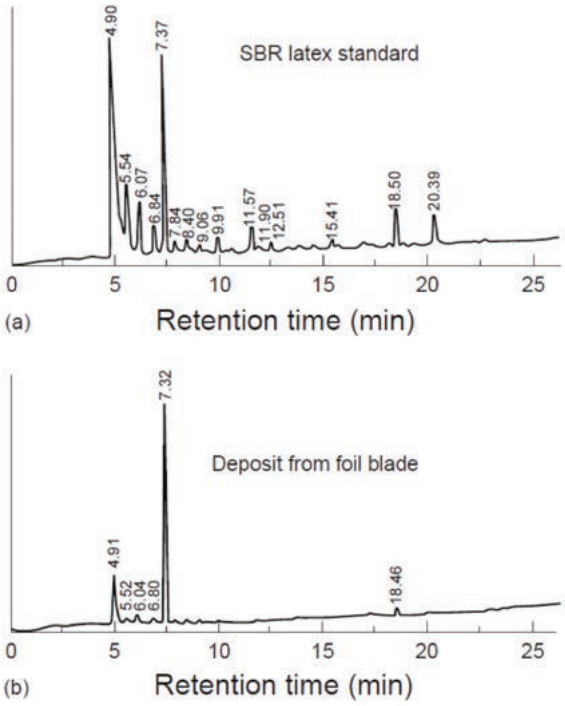
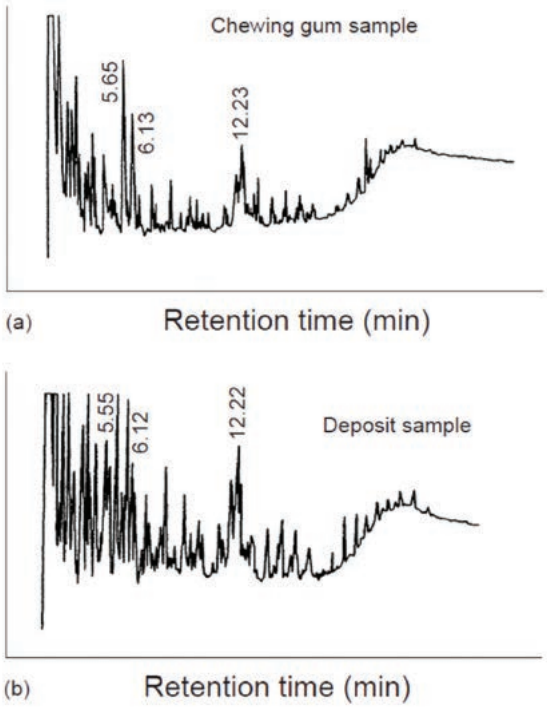


FIGURE 4. Analysis of a mill deposit by Py/GC.



Analytical pyrolysis offers an alternative rapid technique to characterize these deposits. No (or minimal) sample preparation is required and very small amounts are required. The following examples illustrate applications of Py/GC in troubleshooting deposition problems in pulp and paper mills.

Deposit Sample from a Coated Paper Mill

A coated paper mill employing a mixture of groundwood and kraft pulps was experiencing deposition problems on the paper machine foil blades. The deposit was grey in colour and had a rubber-like texture. Py/GC analysis of a sample (see Figure 3 a and b) showed the presence of latex, styrene–butadiene copolymer, in the deposit.

The copolymer is a major component in paper coating formulations. In this case, repulping of off-quality coated paper was the cause of the deposition problem. The amount of latex in the deposit was determined to be 10.3% by comparing the peak area at 7.37 min with peak areas of copolymer standards at the same retention time. The larger peak eluting at 4.90 min was not used for quantitation because its total area was not reproducible, and is probably due to other components in the latex formulation such as stabilizers, preservatives, or emulsifiers.

Sticky Deposit from a Fine Paper Mill

A fine paper mill had a deposit that seemed to have a texture usually associated with sticky deposits found in mills that use or make recycled papers. This was a puzzle since the mill was using virgin fibre with no recycled content.

The texture of the deposit was very similar to that of chewing gum, which led to speculation that chewing gum could have been inadvertently introduced into the mill process. Py/GC analysis of the deposit sample and a sample of masticated chewing gum indicated that most of the peaks in the pyrogram of the deposit sample matched those of the chewing gum sample, as shown in Figure 4 (a) and (b). Quantitation using the peaks areas at 5.65 min showed that there was 80% gum in the deposit.

Streaks on Tissue Paper from a Tissue Mill

A tissue paper mill experienced production problems due to plastic-like streaks that were stuck on to the paper in the dryer section of the mill. Py/GC indicated that the contaminant was due to polyvinyl acetate (PVA). Quantitation of the PVA in the sample showed that the sample was 100% PVA. The polymer had been introduced into the mill system with recycled paper and was melting to cause streaking in the dryer section.

Impurities in a Totally Chlorine-free Bleached Pulp

Py/GC/MS was one of the techniques that was used for the analysis of impurities that occurred during the manufacture of kraft pulp in a mill that practised totally chlorine-free bleaching on Iberian Eucalyptus. Analysis of the material left after solvent extraction showed that it was composed of small particles of isoprene rubber whereas the lipophilic material was constituted of wood extractives.

Analysis of Deposits by Pyrolysis Alkylation

Many of the compounds present in deposits and impurities contain polar groups such as carboxylic acid and alcohols. Their pyrolysis products are difficult to analyse on a GC column, but the analysis can be improved by pyrolysis alkylation of the spots.

Specks in Paperboard

A multilayer paperboard product was contaminated with specks that occurred between the two layers of board. The paper was wetted and the specks were removed with as few fibres as possible. Analysis by pyrolysis alkylation showed that the main products were resin acid and maleo-resin acid methyl esters. Fortified sizes were produced by treatment of rosin with maleic acid (or maleic anhydride) to form maleo-resin acid adducts. The presence of these compounds in the specks was therefore evidence that fortified rosin size was the cause of the dirt problem.

Py/GC/MS is very useful in tracking down the origin of deposits. Deposits induced by hardwood resin will contain, among other compounds, saturated and unsaturated fatty acids, those induced by softwood resin will contain the same components plus resin acids, those from rosin size will contain only resin acids, and those from alkyl ketene dimer (AKD) will contain derivatives of saturated fatty acids. Py/GC can differentiate among these components. This is very useful for mills that sell market pulps to customers who blend the pulps with others from different suppliers. If the customers experience deposition problems, Py/GC can help in determining which pulp or process caused the deposition problem.

Analysis of Deposition Problems in Coated Papers

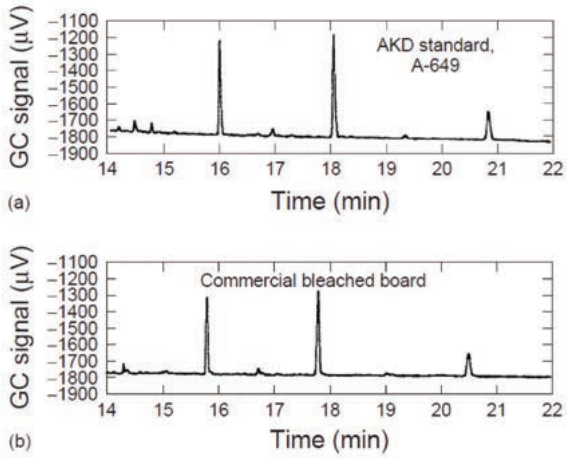
Coated papers are made by coating with formulations that contain latexes. If the finished product does not meet specifications, it is reslushed and added to the papermaking furnish. The use of this reslushed furnish, termed coated broke, can cause sticky deposit problems because of the latex components that contain tacky materials. Such deposition problems are called white pitch to differentiate them from the deposits caused by wood resin that tend to be black and/or brown. The major component of latex is a tacky styrene butadiene rubber.

The white pitch problems are often solved by gradual introduction of the broke into the main furnish. Knowing the amount of latex in the broke is useful in determining how much of the broke should be added. Py/GC has been used to determine the amount of latex in coated broke. Py/GC of a commercial latex sample showed that the main pyrolysis products were butylene,methyl methacrylic acid, and styrene. Quantitation of latex in the broke was calculated based on the peak intensity of the styrene peak. Analysis of a mill sample showed that 68% of the latex was in the fines fraction of the broke, 28% was in the coarse fibre fraction, and 3% was associated with dissolved and colloidal substances.

Analysis of Rosin Sizing Agents

The sizing of paper entails attaching or anchoring of sizing agents on to cellulosic fibres. Determination of the amount of size present on sized papers is difficult to do by solvent extraction because the solvents do not remove the bound sizes. Py/GC with on-line methylation using TMAH has been used to measure rosin sizing agents in paper. The pyrolysis products, methyl esters of the rosin adducts, were used to measure the rosin size. The rosins retained in the paper were determined with a standard deviation of about 1%.

FIGURE 5. Analysis of AKD sizing agent by Py/GC.



Analysis of Alkyl Ketene Dimer and Alkenyl Succinic Anhydride Sizing Agents

AKD and alkenyl succinic anhydride (ASA) are neutral sizes added to paper and board to impart hydrophobicity. These sizes are considered to be reactive sizes that react with cellulose fibres thereby imparting the hydrophobicity. Because these sizes can hydrolyse during storage or in the papermaking process before they react with fibres, it is important to ascertain how much of the compounds are present in sized sheets in order to optimise the sizing process. It is also important to measure the hydrolysed components as they are sticky and can cause production problems. Methods have been developed for measuring these sizes in paper and deposit samples, but they are long and complex. Py/GC offers an alternative and rapid method for the direct measurement of the sizes in paper samples.

Conclusion

Py-GC is a rapid tool for analysis and characterisation of various matrices. Its versatility is such that it cane bused to fingerprint materials to troubleshoot production problems, and to resolve customer issues. It is an ideal technique in that it requires very little sample handling on very small samples to be analysed. In typical cases, results can be obtained in about an hour – ideal, for example, for troubleshooting runnability problems. ■

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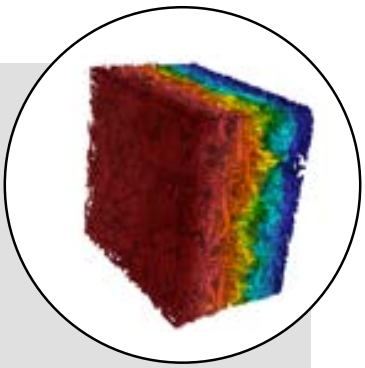


US researchers explore more energy-efficient solutions for the paper industry

Researchers at Lawrence Livermore (LLNL) and Lawrence Berkeley (LBNL) national laboratories in the USA are using their supercomputing capabilities to look at more energy-efficient and cost-saving ways to make paper, targeting 'wet-pressing', the stage where water is removed by mechanical pressure from the wood pulp into press felts that help soak up water before it is sent through a drying process.

The researchers hope to develop a model for flow and deformation of the wet porous paper during the process, saving both energy and money. The project is one of the seedlings for the US Department of Energy's (DOE) HPC4Mfg initiative, a multi-lab effort headed by LLNL to use high-performance computing to address complex challenges in US manufacturing.

"The major purpose is to leverage our advanced simulation capabilities, high performance computing (HPC) resources and industry paper press data to help develop integrated models to accurately simulate the water papering process," said Yue Hao, an LLNL scientist and a co-principal investigator on the project. "If we can increase the paper dryness after pressing and before the drying (stage), that would provide the opportunity for the paper industry to save energy."

The team recently released its final report on the first phase of the pilot project for the Agenda 2020 Technology Alliance, a consortium of paper manufacturers with a roadmap to reduce their energy usage by 20% by 2020. Hao said if manufacturers could increase the paper's dryness by 10% to 15%, it would save paper manufacturers up to 20% of the energy used in the drying -- up to 80 trillion BTU's (thermal energy units) per year and as much as $250 million for the industry annually.

Admittedly, Hao said, improving the dewatering process is no easy task, but by leveraging the DOE's national laboratories' advanced simulation capabilities and HPC resources, along with sufficient experimental measurements and paper machine data, they feel confident they can develop the computational models needed to optimise paper press processes and achieve the goals set by Agenda 2020.

"The scientific challenge is that we need to develop a fundamental understanding of how water flows and migrates," Hao said. "All the physical phenomena involved make this problem a tough one because the dewatering process isn't fully understood due to a lack of sufficient data. This is a collective effort and we really need every piece of the contribution."

LLNL developed the simulation framework integrating mechanical deformation and two-phase flow models, while LBNL developed a full-scale microscale flow model for the complex pore structures in the press felts utilising sophisticated modeling capabilities.

"This was true 'HPC for manufacturing'," said David Trebotich, a computational scientist in the Computational Research Division at LBNL and co-principal investigator on the project. "We used 50,000-60,000 cores at NERSC (National Energy Resarch Scientific Computing Centre) to do these simulations. It's one thing to take a research code and tune it for a specific application, but it's another thing to make it effective for industry purposes. Through this project, we have been able to help engineering-scale models be more accurate by informing better parameterisations from micro-scale data."

Researchers said in order to create a more accurate and reliable computational model and develop a better understanding of a complex phenomenon, they would need to acquire more complete data from the industry such as paper material properties, high-resolution micro-CT images of paper and experimental data derived from scientifically-controlled dewatering tests. ■

Source: www.llnl.gov

CLOCKWISE FROM TOP LEFT. 50t and 500t mobile cranes with 500t positioning the economiser boxes for welding; installation of new economiser banks, 3 and 4, using LTM1500 with guyed main boom of 42m; removal of old economiser banks 1 and 2, with a weight of 116t using LTM1500 with guyed main boom.

Babcock lifts above the challenges at Sappi Saiccor

Operating a 500-tonne mobile crane for 24-hours a day, at heights of 50 metres and a load exceeding 100 tonnes in highly constricted work conditions is no mean feat. These challenges aside, Babcock's plant services business wrapped up an economiser replacement project at Sappi Saiccor four days ahead of schedule, crediting the team's efficiency and planning.

Sappi Saiccor produces a large amount of steam and electricity with its six coal-fired boilers and its MGO2 chemical recovery boiler. It makes use of economisers reduce energy consumption by recycling energy produced or by leveraging environmental temperature differences to achieve efficiency improvements in a safe and environmentally sound process.

The mill commissioned Andritz to replace four economisers for the recovery boiler with Babcock supporting the project with its cranage and full rigging services. Work began on 14 March this year and was completed less than a month later on 6 April.

Lifting above the challenges

Owing to the tough conditions, the crane configuration had to be changed four times during the three weeks while the clearances during lifting the original economisers from the sliding platform also proved demanding for the teams. They had to be mindful of the limited space available and the crane's lifting capacity. In the end, the boiler was returned to full operational capacity three days ahead of schedule.

The pre-lift and post-lift tasks consisted of the installation and removal of the 17-tonne sliding platform, removal and replacement of the boiler venturi pipe through the roof level, and the removal and replacement of various roof steel and other support beams.

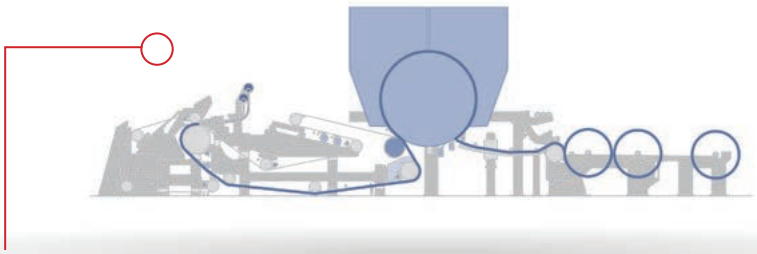
Star of the show

The star of this achievement was the Liebherr LTM 1500, a universal-use mobile crane with an extensive range of boom systems. Liebherr's award-winning VarioBase system allows the crane to be used flexibly and efficiently with precise measuring and control.

This mobile crane has a maximum lifting capability of 500 tonnes at a three-metre radius. The telescopic boom extends to a limit of 50 metres in length and the lattice jib can be utilised in lengths from 21 to 91 metres. Its load capacities can be increased even further with its Y boom guying (a cabled anchor system). ■

SCOPE OF WORK

- Strand jack system and rigging service at a roof level of 50 metres to lower the old economiser units onto a 27-metre high sliding platform, with the heaviest unit weighing 160 tonnes.
- Cranage and rigging services to lift the economiser units from the sliding platform to ground for scrapping and removal.
- Installing the new economisers and precisely positioning the new units at ground level for welding together.



XcelLine: In the last few months, Voith has sold 15 XcelLine tissue machines to customers from all over the world. OnCare: Voith is presenting its networked solutions like OnCare to increase the efficiency, productivity and quality of the entire paper production process supply chain. OTR: With OTR Precise and MiniGrinder, Voith extends its OnSite Yankee Service portfolio.

Voith showcases its tissue solutions at Tissue World Milan

Tissue World in Milan was pipped as the place to be in April when Voith showcased its XcelLine tissue machines, new solutions to increase the efficiency and quality of the entire tissue production process supply chain as well as its Papermaking 4.0 solutions and the new InfiltraDiscfilter – the latest generation in dewatering without filter bags.

Also on show was its new SkySoft ceramic-coated creping blades, the ProTect for safe press fabric measurements and new Yankee service options.

In October 2016 the new generation of XcelLine tissue machines was launched. XcelLine paper machines enable Voith customers to reach the next level of tissue production. All technologies, components, and services are perfectly coordinated and integrated with each other. This interplay guarantees excellent performance over the entire lifecycle of the paper machine. The excellent design, coordination and reliability of all secondary systems also form part of Voith's scope of supply. In the last few months Voith has sold 15 XcelLine tissue machines to customers from all over the world.

Papermaking 4.0 for higher productivity and quality

The Voith XcelLine tissue machines and working environments are going digital. Fast and highly available Internet connections are the prerequisite for systematic integration of digital process tools into the supply chain.

The company offers networked solutions to increase the efficiency, productivity and quality of the entire paper production process supply chain. Systems like OnCare and OnEfficiency are solutions that stem from the Papermaking 4.0 concept.

New technologies for higher efficiency and safety

New tissue machines can be equipped with the new InfiltraDiscfilter. The InfiltraDiscfilter has been built since more than 30 years. Due to the BaglessPlus technology, holes in filter bags are history. Likewise the InfiltraDiscfilter reliably produces excellent filtrate quality which allows to maintain water consumption at a minimum. No additional cost for process chemicals needs to be spent. Very low solids content are a prerequisite to achieve long lifetimes of felts and fabrics. This is why leading tissue makers rely on Voith save all technology.

Another breakthrough technology is behind CFRP (Carbon Fibre Reinforced Plastic) lightweight rolls. Unlike steel, the strength and rigidity of CFRP rolls can be adapted to the specific requirements without altering the installation space required. Moreover, the much lower density ensures a significant weight reduction. CFRP components also offer a range of other benefits, like low thermal expansion or stable running properties and higher operating speeds for a given roll geometry.

The new SkySoft ceramic coated creping blades offer state-of-the-art technology for tissue production and contribute to increase productivity through more consistent tissue quality over the blade lifetime. The highly wear resistant material contributes to longer overall blade lifetime and higher machine uptime. Additionally, SkySoft reduces friction with the Yankee cylinder surface and infinitely adjustable, customisable bevel angles are possible to deliver.

Press felt measurements are essential to guarantee efficient paper production. The operator has to ensure the safety of the personnel. The ProTect system is designed to take reliable press felt measurements at various positions in the press section of the paper machine. ProTect consists of carriage, fixture and any number of traverse beams and can be operated with all available standard portable measurement devices for all kinds of press felt measurements.

OnSite Yankee Service

With OTR Precise and MiniGrinder, Voith extends its OnSite Yankee Service portfolio. With its OTR Precise system, Voith is offering tissue manufacturers a technology for reliably identifying deformations on the surface of a Yankee cylinder. The system uses a precise measurement of tensile force and a 3D measuring process to eliminate the influences of vibration producing a topographical map of the Yankee cylinder surface, at a precision that sets a new benchmark for the industry.

This data forms the basis for precise planning of maintenance cycles, to initiate countermeasures and in this way extend the service life of the cylinder. The MiniGrinder developed by Voith's OnSite Yankee Service enables easy, accurate removal of irregularities and thus restores the Yankee cylinder's ideal crown curve. What is special about the MiniGrinder is its size. It is so compact that it can be used on any tissue machine. ■

Mondi Syktyvkar launches power plant rebuild

Mondi Syktyvkar has launched a large-scale power plant rebuild project, and will be allocating over EUR 100 million to fund this upgrade. Seen as a part of Mondi's approved capital investment programme for 2017 to 2019, the main objective of the project is to safeguard sustainable safe heat and energy generation for the mill and the region.

"Our power plant upgrade is the biggest investment project at Mondi Syktyvkar since the STEP project completed in 2010. The power plant is a central component of the company's infrastructure. We provide around 20% of the regional demand in electricity energy. In addition, we are the only source of heating and hot water for Syktyvkar's Ezhva district, which is populated by around 60,000 people. Our power plant is unique for both Russia and Mondi. It has been in operation for over 50 years and an extensive upgrade programme is required," says Klaus Peller, Managing Director of Mondi Syktyvkar.

During the project a new bark boiler, steam turbine and electricity distribution plant will be built. Mondi has already obtained approval from the state expert assessment department, civil construction permission from the supervisory authorities, and has awarded contracts to main equipment suppliers. The upgraded power plant is planned to come into operation in 2019. ■

ABOVE. The launch event, held on 25 May, was attended by representatives of the local authorities, various partners of the company and Mondi Syktyvkar managers.

Valmet to deliver pulp dewatering equipment and automatic pulper feed system to BillerudKorsnäs' Gruvön pulp and paper mill in Sweden

Valmet will deliver dewatering equipment and an automatic pulper feed system to Gruvön pulp and paper mill in Sweden. The order is part of the investment in a new board machine and rebuild of the existing pulp mill at the Gruvön site. The whole investment is the largest in the history of BillerudKorsnäs and one of the largest in Sweden in recent years.

BillerudKorsnäs is investing in Gruvön mill to meet the growing demand for sustainable packaging solutions for food and beverages globally.

"Valmet's automatic pulper feed system, including bale storage, destacking and dewiring for baled pulp, will make the bale receiving line process efficient and safe, ensuring a good area working environment.

"With the new automatic system, based on Valmet's proven Bale handling with RoboSafety(TM) technology, BillerudKorsnäs will ensure the stock feed for the new board machine with a minimum of operator intervention," says Per Jangdal, Sales Manager at Valmet.

"To adapt pulp production to the new requirements, TwinRoll presses will be placed in close vicinity to the new board machine stock preparation. Our presses will wash the pulp one last time before it moves to the new board machine," says Patrik Lidbäck, Sales Manager at Valmet.

Valmet announced earlier in May 2017 that Valmet will supply an upgrade of the evaporation plant at BillerudKorsnäs Gruvön pulp and paper mill. The start-up of the new equipment is planned for the first quarter of 2019. ■

Forestry SA publishes third edition of Environmental Guidelines for Commercial Forestry Plantations

Forestry South Africa (FSA) has released the third version of its popular Environmental Management Guidelines for Commercial Forestry Plantations in South Africa. Unlike previous iterations, this version is in electronic format and can be found on the FSA website www.forestry.co.za. The objective is to provide updated guidelines on the management of plantation forestry in order to minimise the impacts of operations on the physical environment.

The document is simply presented, with each chapter including a general description of the subject matter to inform the reader of the most important issues. This is followed by a statement of intent describing what a forester should aim for. It also highlights a number of measures that can be applied to achieve the desired outcome.

The guidelines are designed to reduce negative impacts through the application of the law, and best management practices that should result in:

- minimised impacts on stream flow through the removal of alien and invasive species from wetland buffer zones and adjoining rivers;
- reduced impacts on biodiversity through the retention or establishment of natural vegetation corridors between timber compartments; and
- reduced impacts on soil from harvested compartments and roads.

They also deal with conservation measures in unplanted areas, the use of fire to maintain biodiversity as well as the legal requirements for firebreaks. Other topics include integrated pest management, the best silvicultural and harvesting methods, road construction and management, non-timber products and the management of staff housing. The legal requirements pertaining to all activities are included along with a brief discussion of forest and forest product certification. ■

New visual book for Mondi IQ color shows expressive side of tinted papers

Mondi has published an expressive new visual book for its IQ color range of uncoated tinted papers that is itself a piece of art. The 288-page publication 'The Art of Seeing' invites people to take a journey through colour and explore visual phenomena and perception, with vivid colours, creative elements and optical illusions.

Defined as a new approach to colour, the journey into colour begins on the front cover: a visual 'game' with differently coloured cards can be rearranged to trick the eye and change the pattern on the cover. 'The Art of Seeing' demonstrates this flexibility through a series of clever optical illusions that use a variety of printing and finishing methods.

Designers can easily remove colour samples from specially perforated pages to experiment with different ideas and colour combinations. Within the book are samples of all 36 standard colours - ready to be explored and used in creative projects. Johannes Klumpp, Marketing and Sales Director, Mondi Uncoated Fine Paper, says, "We designed 'The Art of Seeing' as a visual tool to really inspire professional printers and graphic designers to use IQ color tinted papers. ■

ANDRITZ AG to supply five circulating fluidized bed boilers to Nine Dragons Paper, China

Nine Dragons Paper has approached ANDRITZ to supply five circulating fluidised bed boilers (Powerfluid) for the utilisation of in-house residual materials. The boilers will be installed at the company's locations in Taicang, Quanzhou, Yongxin, Chongqing and Dongguan. Start-up is scheduled for the second half of 2018.

Only waste from recycling of waste paper (rejects, sludges) undergoes thermal utilisation, and the high-pressure steam produced is used to generate electricity and supply the Nine Dragons paper mills with process steam.

Rejects and sludge are a considerable challenge in boiler operations due to the corrosive substances and impurities they contain, and they require a special design in this regard.

The order marks ANDRITZ's return to the Chinese power boiler market after an absence of almost 20 years. ■

ANDRITZ circulating fluidized bed boiler for Nine Dragons Paper, China

Paper and print still preferred

Two Sides publishes key results of global survey on the attractiveness and sustainability of paper and print.

The recent issue of TAPPI's Paper360 (May/June 2017) features consumer survey results on global attitudes towards paper and print, as well as toward corporate environmental claims promoting digital over paper-based communications.

The article concludes that there is a clear preference for print on paper across all countries and regions analysed (Australia, New Zealand, South Africa, United Kingdom, United States), likely indicating a more fundamental and human way that people react to the physicality of print on paper. Many prefer paper-based communications to digital options for a variety of reasons, including ease of reading, tactile experience, and a lack of internet access.

These findings may also be partially explained by neuroscientific studies that have shown that our brains have a much more emotional and meaningful connection when we read on paper versus screens.

Survey highlights

- 88-91% of respondents agreed that, when responsibly produced, used and recycled, print and paper can be a sustainable way to communicate.
- 85-89% agreed that, when forests are responsibly managed, it is environmentally acceptable to use trees to produce products such as wood for construction and paper for printing.
- 80-85% receiving environmental claims such as "go green – go paperless" believe companies are merely seeking to save costs.
- 62-79% want the option to continue receiving printed information because it provides a more permanent record.
- 72-77% would be unhappy if they were asked to pay a premium for paper bills and statements.

For a full copy of this article, visit www.tappsa.co.za. ■

ABOVE. John MacDonald (Service, Sales and Marketing Manager, Konecranes), John Haarhoff (Managing Director, Demag) and Knut Stewen (Konecranes' Managing Director, southern African countries and Vice President Head of Region: Africa) have been in intense negotiations for several months to integrate the two companies in southern Africa.

Konecranes launches a new low cost overhead crane for lifting needs in emerging markets

Konecranes' new economically priced overhead crane – the CXT UNO – has been developed to give small and medium-sized SMEs in southern Africa access to the company's technology. Based on Konecranes' existing CXT hoist, it delivers many of the strengths of the CXT.

The CXT UNO combines a strong range of features based on a simpler set of components and technical solutions compared to existing CXT products. This straightforward design, together with easy access to spare parts, means that the CXT UNO will be easy to maintain.

A reliable crane designed for everyday lifting

By focusing on the essential features and core components, such as the CXT hoist, the product can be offered at a reasonable price without compromising on quality.

Equipped with a radio controller, it can lift up to 10 tonnes and has inverter-based bridge travelling, two-speed for trolley travelling and hoisting movements. The CXT UNO is sold and delivered as a predesigned package with a well-thought-out selection of functions and limited options.

"The CXT UNO is important for us in today's market because it expands our product offering into a segment where we haven't been present before," says Knut Stewen, Director Africa, and MD of Konecranes South Africa. "The CXT UNO offers customers in this category access to Konecranes' quality and reliability at a very sensible cost in what we believe is a very attractive and competitive overall package. We are very confident that it will be a very popular crane in southern Africa."

A new product based on proven solutions

Capable of lifting loads up to 10 tons up to 9 metres off the ground, the CXT UNO features a two-speed hoisting and travelling design with a fixed pendant controller, tagline festooning, and compact single-girder construction, and can operate over spans of up to 20 metres.

The design draws on input collected in the field and prioritises issues such as quality, reliability in both intensive and less-frequent usage, and ease of maintenance. ■

TWO CRANE GIANTS JOIN FORCES

Following Konecranes' worldwide acquisition of Terex MHPS, which incorporates Demag Cranes, Hoists, Material Handling and Ports Solutions, the two global crane brands will be sharing their considerable combined knowledge and technology.

The acquisition will improve Konecranes' position in the industrial lifting and port solutions market affording substantial growth opportunities in the service business. Konecranes has a long history of conducting routine service inspections, repairs and refurbishment of Demag cranes.

In South Africa the merger also extends to the Wolff Cranes brand which was acquired by Demag in the late 1980s. In terms of the port material segment, it includes handling technology with a broad range of manual, semi-automated solutions under the Gottwald and Noell brands.

Cardboard housing project shows promise

Together with corrugated insulation specialist Bat'Ipac, DS Smith has made cardboard houses a reality in France. Following a 10-year partnership with Bat'Ipac, DS Smith has supported the development of more than 13 new homes in the country, by providing corrugated slabs to form the basis of an innovative new substitute for regular insulation products.

Bat'Ipac was formed following a number of partnerships; packaging specialist DS Smith provides the material required to make the cardboard insulation and Arcobat Group, a house building business in France, have ensured Bat'Ipac has the relevant permission to build the houses.

Designer and founder of Bat'Ipac, Alain Marboeuf, saw a gap in the market to use corrugated in place of traditional insulation products when building new houses. After seven years of perfecting the product and securing the necessary insurance, Bat'Ipac, in collaboration with DS Smith, finished the first test house west of Paris in 2012.

Corrugated has been proven to keep houses cool in the summer and warm in the winter, therefore proving a very versatile and efficient product. "In addition, by taking the corrugated and layering it multiple times, we have discovered that the material is extremely soundproof, providing another great benefit for housebuilders and homeowners."

Bat'Ipac's rapid expansion plans include building 100 houses in the next 12 months. ■

VTT expands bio and circular economy pilot centre

VTT Technical Research Centre of Finland will expand the operation of the Bioruukki pilot centre located in Espoo, from thermochemistry to novel ways of biomass utilisation, recycling of textile fibres and green chemistry technologies. The pilot centre will develop into a new kind of an ecosystem, welcoming companies and research organisations to develop their ideas towards industrial-scale production.

The world markets for bioeconomy and circular economy products and technologies are showing strong growth, and VTT wants to offer its partners an environment and its expertise for the development of new competitive products and processes.

"We are turning Bioruukki into a globally unique technology and business hub for the promotion of bioeconomy and circular economy, and renewable energy sources. New innovations are created at the interfaces between traditional sectors. Bioruukki's special strength is that it allows various industrial sectors to meet under one roof," says Jussi Manninen, Executive Vice President of Solutions for Natural Resources and Environment Business Area at VTT.

In 2019, Bioruukki will house a research entity that is unique in global scale. At Bioruukki, VTT combines different pilot environments into an entity that serves value chains at various stages of development. Combining various pilot projects makes the expensive pilot stage faster and more efficient.

Research facilities for biomass will be completed in late 2017 with the size of the laboratory and pilot facilities designed mainly for the processing of forest biomass and pulp production set to be 2,300 square metres. The objective is to develop methods by which new materials and chemicals could be produced from cellulose with the help of methods such as nanocellulose and fiberisation technologies. This development work supports the pulp mill projects currently pending in Finland.

Bioruukki has been introducing a testing environment for alkaline dissolution and spinning of cellulose-based textile fibres. The environment enables research of a diverse material base, including development of cotton waste recycling. The first test runs will be performed by the European summer.

At the beginning of 2019, a new building will be completed on the Bioruukki site for production of chemicals and new feedstocks using green chemistry methods. ■

Roald Dahl's characters brought to life with paper and cardboard

How did we even miss this? On my hunt for some last minute filler for this issue, I stumbled across an article on a work of paper art. According to the piece, students from Birmingham City University, UK, had brought Roald Dahl's most iconic characters to life with an exhibition of full-sized paper and card sculptures.

The exhibition imagined a 100th birthday party for Roald Dahl, attended by many of his best-loved characters - from Matilda and George to Augustus Gloop and Fantastic Mr Fox.

Every part of the installation is constructed from brown paper and cardboard by students of the university's Design for Theatre, Performance and Events course.

The installation concept was designed completely by the students. Apart from the specialised set lighting, it included a backdrop replicating the look and sound of giants from the BFG walking through the woods.

Among the creations are 12 characters, paper trees and furniture stood a replica of Dahl's original writing chair, reconstructed to the exact dimensions of the real piece which now sits in the Roald Dahl Museum and Story Centre in Buckinghamshire.

Preparation for the exhibition began during 2016, the celebrated author's centenary year. In December the students visited the Roald Dahl Museum in the author's home village of Great Missenden for inspiration.

The show is made up of one kilometre of corrugated cardboard and two kilometres of brown paper, with the first-year students working day and night over 18 days to pull together their creations.

Following his visit to the completed exhibition, museum director, Steve Gardam exclaimed, "What fantastic, creative collaboration."

"So many of his books grew out of the beautiful landscape of the Chilterns, where our Museum is based today, and it seems apt that a great artist - whose main tools were pencil and paper - has been celebrated in an explosion of paper and imagination."

Books referenced in the exhibition included Matilda, Charlie and the Chocolate Factory, George's Marvellous Medicine, Fantastic Mr Fox and The Twits.

Dahl was born on 13 September 1916 and passed away in 1990 having written dozens of books and short stories which have sold more than 250 million copies worldwide.

Some bad news though: the event came to an end on 23 February. ■

Reference: Birmingham City University. 2017. *Roald Dahl creations brought to life in life-size paper reconstruction to mark 100 years since writer's birth*. [ONLINE] Available at: http://www.bcu.ac.uk/news-events/news/roald-dahl-creations-brought-to-life-in-life-size-paper-reconstruction-to-mark-100-years-since-writers-birth. [Accessed 12 June 2017].

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