TAPPSA Journal

QUARTER 3 2018
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JOURNAL FOR THE TECHNICAL ASSOCIATION OF THE PULP AND PAPER INDUSTRY OF SOUTHERN AFRICA

Sappi makes way for growth

Virtual reality
in the papermaking sector

Pushing the pulper towards maximum efficiency

HEALTH & SAFETY:
From culture to mental wellness

The art of cutting corners
and the normalisation of deviance

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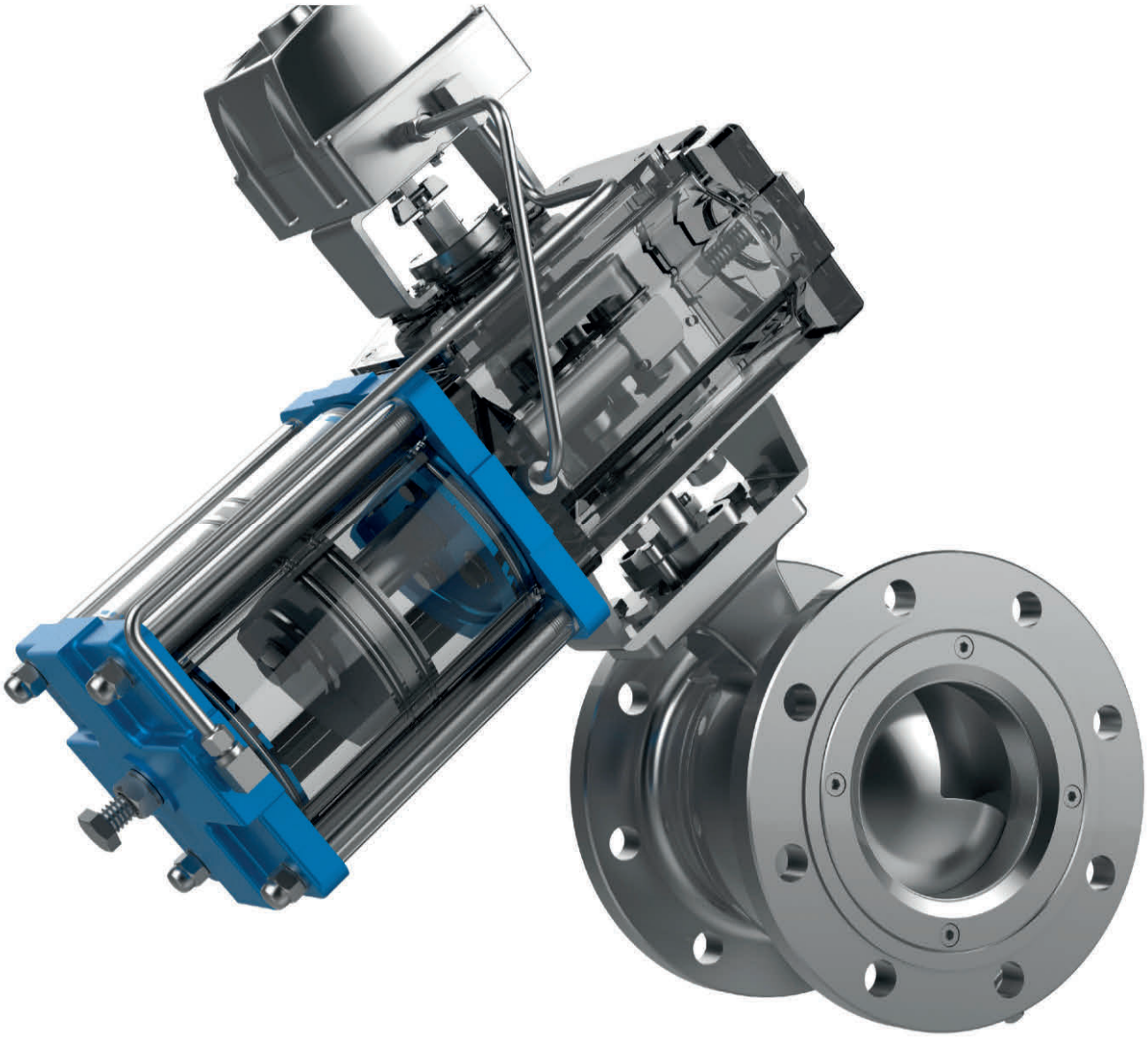
Total Cost of Ownership



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Cover pic: Dissolving wood pulp being prepared at Sappi's Saiccor mill.

Quarter 3 2018

Learning from one another for the sake of our safety

You may wonder why we have articles from the aviation and cement sectors. What do you have to gain from these areas, you may ask? The answer might be nothing, but it also might be everything.

I'm a firm believer in cross-industry learning – especially when it comes to health and safety. I also believe we don't do it enough. Learning from incidents at other companies can go a long way in preventing similar occurrences at our own.

The safety, health and wellbeing of people is not defined by which sector we belong to or which set of 'safety golden rules' we adopt. Safety and health are the outcomes of our investment in systems and procedures – the *hard* stuff – and culture and behaviour – the *soft* stuff.

Be a visible and felt leader

In a 2007 article, Melodie A. Schweitzer, PhD, DuPont Safety Resources, writes: "If you look closely at companies with effective safety programmes that reduce the high financial and human costs of injuries and fatalities, you will see many common factors. For example, accountability is practised at all levels of the organisation. Leading indicators are examined and measured. Communication is constantly being improved. But when you see a company with a truly sustainable safety culture, another factor comes into play—one shared by every company that has ever made the list of the world's safest companies. That factor is felt leadership."

Du Pont defines felt leadership as: 'Respect through action for the well-being of people. It is a public proclamation of an organisation's commitment to caring about people. It is a building block in constructing trust and real-world relationships'.

A lot of managers believe that they don't need to go into the mill or walk the factory floor. They employ people to do that. However, numerous studies have shown that visible felt leadership (VFL) can make a difference.

VFL changes lives, and saves them too

VFL builds relationships. When we're in a relationship, we care. When we care, we look out for one another. And we are empowered to engage our colleagues if they are doing something unsafe or unhealthy. VFL adds value and makes people *feel* valued.

Some managers are reluctant to engage in VFL walkabouts and conversations. "Who has the time for that?" Their desk-based workloads just don't for allow it. The fact is, quality VFL interactions can help drastically reduce workloads by dealing with issues on the spot.

A healthy employee is a safer employee

Are you fit to work? I'm not talking about having a low resting heart rate. Are you mentally present and psychologically well to be at work? These are questions that often go unanswered. When a safety-related incident happens, we ask other questions: why did they break the rules? Why did they not use the correct tools? Why wasn't the machine isolated?

Do we ask: What was on your mind when this happened? Was it financial stress, marital issues, family matters? In the case of a fatal incident, the answers would likely remain unknown.

Mental health is an issue that keeps finding a top spot on news and social agendas. It's a flashing red light, and we need to do something about it. Before it's too late.

Thank you for reading and learning.

EVENTS

MIAC 2018
10-12 OCTOBER | LUCCA, ITALY
www.miac.info/en/

Wastecon
16-18 OCTOBER | EMPERORS PALACE CONVENTION CENTRE
www.wastecon.co.za

Paper and Beyond - Where the bioeconomy meets circularity
16-18 OCTOBER | BRUSSELS
www.paperandbeyond.com

Appita Fibre Value Chain Conference
4-7 DECEMBER | NEW ZEALAND
appita.com/fibre-value-chain-2018

RISI European Conference 2019
11-13 MARCH 2019 | VIENNA, AUSTRIA
www.risiinfo.com/events/

FP&M SETA Skills Career & Development Summit Expo 2018
29-30 OCTOBER | GALLAGHER CONVENTION CENTRE

The FP&M SETA Skills Career & Development Summit Expo 2018 will provide different funding opportunities and learnerships, as funding is one of the obstacles that many young people face when it comes to higher learning, education and training. Contact Beverley Stone on 021 681 7000 or beverley@capemedia.co.za.
www.fpmseta.org.za

Ngodwana Expo: Paper, pulp and forestry technical exhibition
29 NOVEMBER 2018 | SAPPI NGODWANA MILL
Herman Bezuidenhout, herman@interactmedia.co.za

For a more comprehensive list of local and international events, visit www.tappsa.co.za

A life well lived

A tribute to Mike Severin

BY MIKE TRUELOCK

Well known in paper industry circles, Mike Severin (pictured above) passed away on 14 July after a brief but brave battle with cancer. He is survived by his wife Pat and children Robert, Caroline and Ashleigh.

Mike completed a BSc in Chemistry and started his first job as a maths and science teacher at high school level. He worked for Sappi at Ngodwana and Mandini before moving to Enstra in Springs. He also had a 10-year stint at Consol where he later became managing director. Leaving Consol, he decided to return to his passion for teaching.

Mike was head of the Sappi College when I first met him. He had come from a pulp and paper production background to start and head up an education facility established to address the industry's gap in machine operator training. The facility was situated in the CSIR precinct in Pretoria and catered for learners from operating units who were studying towards the 'N' course programmes in pulp and paper. This was at a time before the current skills focus, acts and regulations. Mike led a team of dedicated professionals who had a passion for teaching others and created a hugely successful and respected education resource.

The introduction of unit standard-based curricula came with the requirement to involve all stakeholders in determining the needs of industry and designing courses, registering said material and delivering on new education programmes. Leading a team of experts in their subject matter and successful integration into this new way of delivering a credible education product relied on great people, great leadership and vision. Mike was up to the task.

He had to release his control of a formal education facility and embrace a totally new idea of integrating into a shared service with no real base of operations, yet deliver the same level of education excellence. Added to this, he needed to, together with really dedicated education practitioners, embrace the fact that education needed to be totally integrated with various higher education institutions, workplaces and a sectoral education authority. Always top of mind for Mike was the quality of delivery and assessment. For him, the student was the most important entity in this complex new approach. He managed the changes with dignity and humility and kept his focus on the learner.

After retiring from formal employment, he continued to dedicate himself to setting tests, marking and assessing quality. He was always willing to be involved in an advisory capacity to improve the functioning of technical colleges and the industry, and to focus on operator upliftment.

According to his son Robert, Mike's younger years were spent playing and umpiring cricket, racing pigeons and playing golf. He was also a member of Rotary International and an active member of the Wildlife and Environment Society of South Africa.

He balanced this passion with a love and service to his family. Mike spent his retirement years at his holiday house in Hoedspruit and at home in Springs. He loved nature, with much time spent near the Kruger Park.

Mike, you are remembered for your heart, your commitment and your role in creating and maintaining a legacy of people development in the pulp and paper industry. Yours is indeed a life well lived.

Front from left, winner Braam Steenkamp with Mpumalanga regional winner Maureen Blignaut (H&L Houtkontrakteurs) and Linda Rautenbach (De Witt Trust). Back from left, Bruno Paul (R&V Beleggings) and Anton Uys (Anton Uys Farm).

Sappi Forests announces **FSC Farmer of the year**

The winner of Sappi Forests' Forest Stewardship Council (FSC) Group Scheme Farmer of the Year award is Braam Steenkamp of the Warburton Sawmill and farm in Warburton, in the Mpumalanga Highveld. Braam, a commercial tree farmer, grows pine and eucalyptus trees.

Sappi Forests general manager Dietmar Schroeder said the businesses in Sappi's FSC Group Scheme are exceptional. "I was very impressed with the FSC Group Scheme. Farmers are clearly achieving new levels of excellence in commercial tree farming," he said.

Sappi's FSC Farmer of the Year Award celebrates excellence in the management of plantation forestry on private land. Some 42 farmers in Mpumalanga and KwaZulu-Natal participate in the scheme, and were eligible for the award. Certification is achieved by passing an assessment carried out by an FSC-accredited certification body, with forest management conformity assessed against the FSC Principles and Criteria.

The farms in Sappi's scheme are audited and scored annually by independent auditors to ensure standards are maintained. The top performers are recognised in the Farmer of the Year Awards programme. The overall winner for both KwaZulu-Natal and Mpumalanga is awarded the coveted Bushbuck trophy, and regional winners receive a prized certificate.

Commenting on his accolade, Steenkamp said: "I am excited and proud to be the recipient of Sappi's FSC Farmer of the Year Award. It is testimony of the passion I have for farming, and the hard work and commitment of the people who work for me. Achieving certification is an arduous process, but the benefits outweigh the effort by far. There are numerous advantages to being FSC certified. Amongst others, it streamlines your business processes, and improves your overall operational efficiency.

"FSC also requires close contact with your employees, your neighbours and your local community, which for me, has resulted in a great working relationship with them. I am also guaranteed of a market for my timber, which provides job security to my people." ■

New chairman for Centre Technique du Papier

Olivier Tassel was elected chairman of the board of the Centre Technique du Papier (CTP) in April. He was also appointed as chairman of Techpap, CTP's subsidiary overseeing instrumentation. He succeeds François Vessière.

Tassel first graduated from the EPSCI group ESSEC and then built his career in the paper industry, holding senior management roles in major European groups such as Ahlstrom, Soporcel and Saica. Since 2005, he has been with the French group Gascogne as COO for the Packaging Division, including the Paper, Sacks and Flexible activities. ■

Risi announces its 11th Top 50 Power List

"This is not a scientific study, nor is it a popularity contest; it is purely a ranking put together by the editorial team after speaking to a lot of pulp and paper industry experts from around the world," states Risi, adding that, as in the past, they've chosen to concentrate on leaders from the manufacturing side of the industry.

TAPPSA Journal is delighted that two of South Africa's paper people are featured: Steve Bennie (pictured left), Sappi Group CEO is at position 26 while Jane Molony (pictured far left), in her capacity as president of the International Council of Forest and Paper Associations, is at number 29 (up five notches since last year).

The ICFPA serves as a forum of global dialogue, co-ordination and co-operation. ICFPA represents 17 pulp, paper, wood and fiber-based associations that encompass 35 countries, including many of the top pulp, paper, and wood producers around the world. It has also updated its mission, broadening the scope of the organization to represent an innovative forest-based industry. “The global forest products industry has significantly invested 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,” says Molony. ■

Mondi wins Eurosac Grand Prix 2018 for e-commerce packaging

Mondi has won the Eurosac Grand Prix at the 2018 Eurosac Congress in Malta for its MailerBAG, a paper bag designed to lower the logistic costs and simplify the shipping process. Eurosac is a trade federation that represents the European multiwall paper sack industry.

Catherine Kerninon, General Delegate of Eurosac, commented, “Our jury chose Mondi’s MailerBAG as this year’s Grand Prix winner not just because of its innovative characteristics, but also because it is a clever solution for a huge growing market.”

MailerBAG is a solution that can take the shape of the packed goods reducing the volume that is being transported and as a result the high logistic costs e-retailers face. Moreover, the paper is a more stable material on the conveyor belts at the logistic centres and needs no time to be prepared and filled.

What makes the bag unique and different to other similar market solutions is its ability to be easily closed and returned, due to its flap with a double adhesive strip with release liners. The first adhesive strip securely closes the package for shipment, and the second can be used to reclose the mailer and send the item back in the same packaging.

Made of one-ply, high-performance sack kraft paper in brown or white, MailerBAG also rates highly on sustainability for its light weight, renewable material, recyclability and reusability. It is available in folded or pinch bottom construction, with or without gusset and a patent is pending.

Mondi’s MailerBAG also offers their customers the possibility of premium branding – an important advantage in highly competitive markets. Compared to plastic based solutions, the paper bags can be printed with a great variety of colours for more sophisticated graphic designs. Customers also have the option of choosing a laminated outer ply for a luxurious appearance. ■

BI appoints new product manager for chain and gears

BI, a member of the Hudaco Group and distributor of bearings and power transmission products, has appointed Frikkie Ras as product manager for its chain and gears product portfolio. Ras has over 13 years’ industry experience. He holds a Diploma in Sales and Marketing Management, and is in the process of completing his BSc Engineering degree.

In his new position, Ras will support BI’s 44 branches nationwide by sharing his extensive knowledge of the company’s products with the sales teams. “My primary product focus will be on chains, sprockets, and gearboxes. I will place particular emphasis on increasing the uptake of our chain products in industries as diverse power generation, mining, cement, timber, bottling, and food-and-beverage,” Ras explains. ■

Big words and bright ideas take flight

PAMSA students examine various aspects of pulp and paper processes

The advent of the "sustainable carbon age" has forced many industries to examine their carbon footprint and the effect of their processes on the environment. The pulp and paper industry is no exception as it re-invents itself to meet both the legislative and environmental challenges of the present and future.

On 8 August, the Process Research Unit of the Paper Manufacturers Association of South Africa (PAMSA) hosted its annual review where Masters and PhD students present their research projects.

"This year's collective of eleven students from the universities of Stellenbosch, North West, KwaZulu-Natal and Witwatersrand impressed industry and PAMSA representatives showcased the diversity of research work carried out by our students in search of new and innovative ways to further beneficiate our plantation forests into new products previously not included in the scope of paper manufacturing," says Mike Nash, who oversees the PRU.

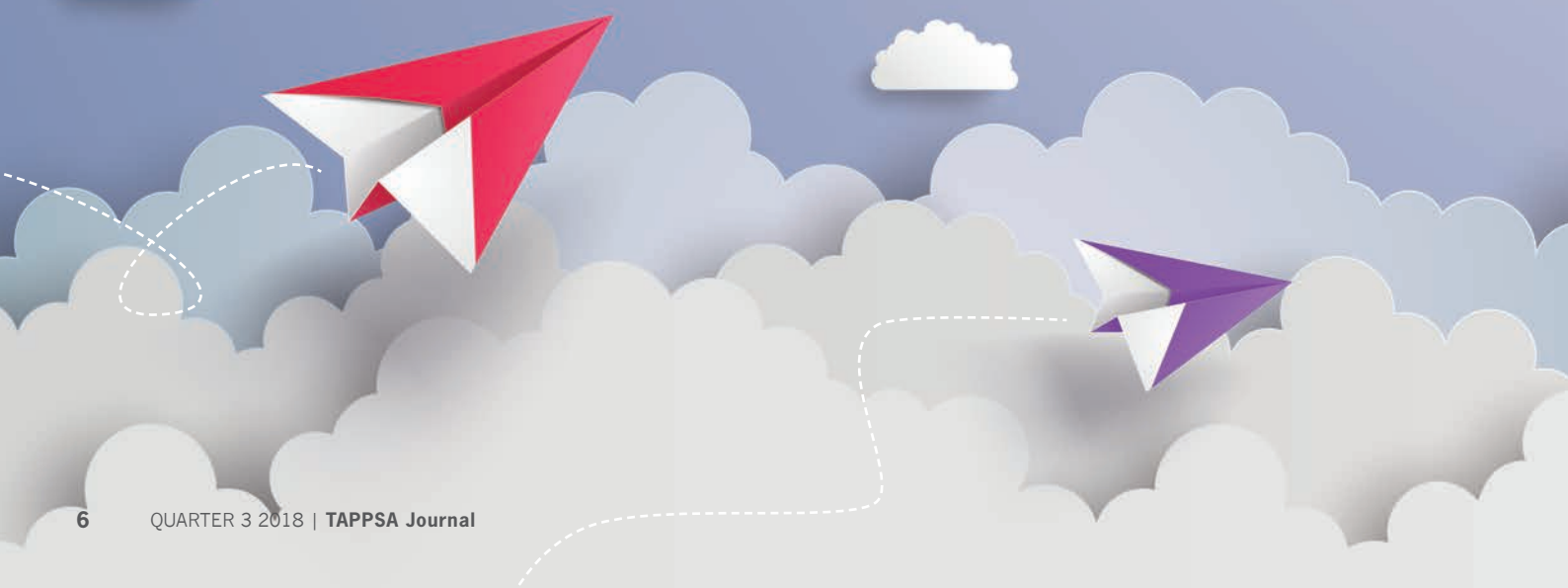
> "The development of novel processes to treat wastewater and sludge streams through enzymatic action or membrane bio-reactors will become an important route to beneficiating streams that were not considered before."

Projects presented ranged from the development of new processes to optimising the valorisation of intermediate and waste streams which will not only serve to reduce environmental and social impact of climate change but do so by producing commercially viable by-products. The biorefinery concept was a common thread in many of the projects which explore products made from sustainable biomass instead of fossil fuels, such as ethanol, formaldehyde resins, biochar and many others.

The development of novel processes to treat wastewater and sludge streams through enzymatic action or membrane bio-reactors will become an important route to beneficiating streams that were not considered before.

The presentations also demonstrated the importance of the bursary scheme in developing young talent, allowing free thinking and novel solutions of industry challenges at a pre-competitive level with the intellectual property available to all.

PAMSA is currently carrying out the selection process for the 2019/2020 cohort of Masters students who will be selected for placement at member companies for the duration of their Masters or PhD studies. "We had a fantastic response this year to the call for applications," says Nash. "The total of 56 applications were shortlisted to 40 eligible candidates. We have held selection interviews with 31, and make the final selection by early September." ■



North-West University

Karina Naude (far right)	*Biochar adsorbents for the removal of heavy metals and volatile organics from an industrial paper mill's wastewater*
Nomtembiso Piyo (centre)	*Fractionation of an acidic hydrolysate from steam-treated wood*

Also pictured are, from left, Maans Marais (PhD student), Gideon van Rensburg (M.Eng student) and Anro Barnard (lecturer at NWU), with Prof Sanette Marx (DST/NRF Research Chair in Biofuels and Other Clean Alternative Fuels), second from right.

Stellenbosch University (left to right)

Andy Chimphango	*The valorisation of paper sludge for green composite materials*
Chante du Toit	*Enzymatic modification of technical lignin to establish viable valorisation routes*
Dominique Trew	*A techno-economic analysis for the production of high quality bio-oil via catalytic pyrolysis of forest residues*
Logan Brown	*Valorisation of paper recycling residue contaminated with plastic into valuable fuel products by pyrolysis*
Farai Chireshe	*Production of an upgraded bio-oil by catalytic pyrolysis of forest residues*
Priya Govender	*Use of lignin derived from South African spent pulping liquor to synthesise lignin-phenol-formaldehyde resins*

University of KwaZulu-Natal

Nigel Chikore	*Lignocellulosic carbon flow analysis of the South African paper industry*
Faith Thembelihle	*Carbon flow analysis of the South African harvested wood products industry*

University of the Witwatersrand

Kavisha Patel	*Design, construction and testing of a lab-scale membrane distillation bioreactor for water purification*

Attitude is everything

For **Nelly Ndlovu**, attitude is everything. She shares a bit of her journey and how she has come to realise that, with the right attitude surrounded by the right people, you can carve out a purposeful path in life and work. Nelly is currently general manager of Mondi Zimele, Mondi South Africa's development arm.

Born and bred in Pietermaritzburg, Nelly obtained a BCom degree in Economics and Supply Chain Management at Rhodes University before gaining experience with organisations including Standard Bank and the Competition Commission. She's also completed the GIBS Leadership Development Programme and has a Master's Degree in Business Leadership.

Nelly joined Mondi in 2006, and has since worked in various procurement management and business optimisation roles. These include driving broad-based black economic empowerment in the forestry supply chain.

Married with two daughters, she describes her family as both her biggest cheerleaders and critics. She enjoys spending time seeing new places and experiencing different cultures with her family.

Professionally speaking

What is your role at Mondi Zimele?

It's my job to carve out our strategic direction in line with the board's milestones and vision. I'm grateful to have the opportunity to be part of an organisation with a purpose, vision and values I believe in. I'm excited about the future that we, as the Mondi Zimele team, will create together.

What is your advice to entrepreneurs wishing to start a business?

My advice would be to focus on planning and learning. Having a great business idea is wonderful, but having sound business management skills, good leadership capabilities, including self-awareness, and an in-depth understanding of your product and market is crucial.

What makes you tick? And what drives you mad?

I enjoy working, engaging and collaborating in teams and seeing visions crystallise into phenomenal achievements. It's great when everyone involved takes ownership, not only of the milestones achieved, but the challenges as well. My pet peeves are arrogance and slackers who negatively influence others.

What stands out as your most significant professional accomplishment so far?

Every milestone and accomplishment has its place in my heart. From being awarded the Cecil John Rhodes Scholarship in

My dad said that in life we will fall, but the important lesson is to rise up, look back at what tripped you and to remove it going forward. This will always resonate with me as I walk the journey of life.

Grades eight to 12 to being selected to participate in Unilever's Introduction to Business Management Congress at university. Another highlight was being made co-recipient of Mondi Forestry's Managing Director's Award.

Rewind to the early years of your career. What would you never have anticipated?

I would never have anticipated the effect of ATTITUDE on my career. It's incredible how much of what we achieve in life is driven first and foremost by attitude.

Attitude is more important than our past, education, failures, successes or what others think or say. We cannot change our past, we cannot change the fact that people will act in a certain way, but we do have a choice about the attitude we embrace every day. We are responsible for how we react to challenges, how we greet the day and how we affect everyone around us.

What has been the hardest part of your job over the years?

The true test of any manager is dealing constructively with non-performance, which can be emotionally challenging. It's hard, but not addressing it would be far worse – for me, for my teams and the organisation.

Who have been your mentors?

A few people and situations have helped shape my career and the person I am today. Early in my career in procurement, my boss would throw us in the deep end with tough deliverables with strict timelines. He wouldn't explain the where, what, who and how. When we achieved our milestones, he would ask what we had learned from the experience. I realised later that he was teaching us some key business competencies – communicating across departments and organisational levels, understanding the bigger picture and the impact of every action and decision on the greater objective. This also meant taking ownership and accountability.

More recently, I worked with an executive coach, an opportunity that helped me to understand, be conscious of and work on my blind spots.

Lastly, 360° evaluations. There was a time when I hated being evaluated or criticised. I didn't like being told I was wrong. In fact, my response was to go into defence mode. Embracing criticism has taught me to accept that I am not perfect and to always strive to improve.

"We cannot change what we are not aware of and once we know, we cannot help but change." (Sheryl Sandberg)

Lighter side

What's the best advice you've ever received?

My dad said that in life we will fall, but the important lesson is to rise up, look back at what tripped you and to remove it going forward. This will always resonate with me as I walk the journey of life.

Kindle or paper book?

Without a doubt paper. I love the authenticity of it. As you turn every page it feels like you're growing with the characters. I must admit, I am starting to change my philosophy because I don't have enough shelf space! I recently loaded some e-books onto my iPad and it brought a level of convenience I did enjoy.

Last book you read?

I'm developing an increasing interest in history, particularly around war and peace. My last book was *The Tattooist* of Auschwitz by Heather Morris, an incredible story of resilience, loss, survival and falling in love in the face of adversity.

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

My iPad and iPhone, I love the user-friendliness of anything Apple.

If we asked a group of people who know you well to give us three adjectives that best describe you, what would they be?

Determined, resilient and initiative-driven. ■

Right: Co-owners Sean O'Sullivan and Bethuel Gwala of Siyanqoba Forestry Solutions, part of Mondi Zimele's entrepreneurial programme

Sappi makes

Timeline of Sappi's sugars extraction capacity journey:

2016

Sappi announced its investment in demonstration capacity at its Ngodwana Mill in South Africa to extract hemicellulose sugars and lignin from its DWP line for eventual beneficiation to higher value products.

Early 2017

The plant, built in partnership with Valmet, was commissioned. After operating for 12 months to demonstrate the extraction of C5 sugars from DWP production, the plant has exceeded all efficiency targets for cost, cycle time and yield.

Later in 2017

Sappi acquired the patented Xylex® technology for the hydrolysis and clean-up of these C5 sugars, and production of a valuable lignin stream.

April 2018

Sappi sanctioned a scale-up demonstration plant for the Xylex® technology to be located alongside the existing sugars plant at Ngodwana Mill. The plant will be commissioned in the first calendar quarter of 2019.

In 1938, South African Pulp and Paper Industries was but one pulp and paper mill producing paper from straw. Today, Sappi has shaped itself into one of the largest names in the pulp, paper, packaging and specialty paper production, innovation and research.

Sappi contributes 1% of South Africa's total foreign revenue from its South African operations and supplies the fruit export industry, which contributes around 4% to the country's foreign revenue, with most of their packaging requirements. Sappi Limited Group CEO Steve Binnie noted that "the Group is pleased to be able to support President Ramaphosa's call for significant investment into the South African economy".

The global dissolving wood pulp (DWP) market, in which Sappi is a weighty player, has yielded some exceptional returns for the pulp producer. This has enabled it to invest some R4.3 billion from 2012 to 2018 to increase its South African DWP capacity. Saiccor's DWP products is used in the production of textiles, pharmaceuticals, beauty and household products, to name a few.

Over recent years it has branched out into biomaterials and biochemicals. In July the Group announced the bolstering of its biorefinery capacity with the construction of a demonstration plant at its Ngodwana Mill in Mpumalanga. This will further scale up its novel Xylex® technology for the production of Xylitol and Furfural.

way for growth

Bold moves in its planet, people and profit vision

In the same month, Sappi made known its involvement as one of the founding partners of The Prince of Wales Global Sustainability Fellowship Programme. And as if July wasn't busy enough, the Group also added a bold vote of confidence to South Africa by putting a R7 billion commitment on the table to upgrade its Saiccor Mill in Umkomaas, south of Durban.

Paving the way

Under the banner 'Project Vulindlela', the investments – a R2,7 billion capacity expansion project and a planned R5 billion over five years in various continuous improvement initiatives and upgrade projects - are a susbstantial boon for the mill's home province, KwaZulu-Natal (KZN). Acting Premier of KZN Sihle Zikalala welcomed this good news. He said 'it was heartening that more and more business organisations such as Sappi continue to express, through actions, their commitment and loyalty to the provincial economy'.

Alex Thiel, CEO Sappi Southern Africa, confirmed that a thorough stakeholder engagement and consultation process is under foot with the relevant authorities and affected communities to obtain the required support for the planned investments. Saiccor Mill and Sappi Forests, which sources and supplies the timber required by the mill, are already major contributors to the KZN economy through job creation, community investment, local supplier programmes, world-class research and development facilities, and training and development programmes.

Collectively Sappi's KZN operations of three mills, forestry operations and sales and export services provide a direct contribution of some R12 billion per annum to the KZN economy. This number rises to R60 billion per annum when reflecting indirect benefits. Project Vulindlela will add a further R1 billion per annum direct benefit to the KZN economy.

Lightening the footprint

The R5 billion will be spent over the next five years on maintenance and upgrade projects to decrease production costs, the introduction of new technology, process optimisation and future-proofing the mill's manufacturing systems. "These investments will secure the mill's future by increasing its global cost competitiveness and significantly reducing its environmental footprint," said Thiel.

According to Thiel, the ongoing cost savings they will derive from these projects amounts to at least R300m per annum. In terms of environmental benefits, "CO_2 emissions will be cut in half and waste to landfill will reduce by 48%. In addition, SO_2 emissions will reduce by 35% and water use efficiency will increase by 17%. All of this while earning more revenue for the province and country and providing a secure future to our workforce, their families and the communities where they live," said Thiel.

To the ends, the mill will be installing a new evaporator, recovery boiler, and screening and washing plant, along with upgrades to bleach plant and pulp machines, improved recovery circuits and additional magnesium digesters. The woodyard upgrade to process increased timber volumes is being finalised.

(Continued on the following page)

Investing in project and portable skills

Vulindlela will increase the mill's production from 780 000 tonnes to 890 000 tonnes per year, and is expected to create employment opportunities for local job seekers through construction companies and business prospects for entrepreneurs from the local communities around the mill.

The peak project period will see between 2,500 and 2,800 contractors working on site at one time.

In January 2018, Sappi launched its Skills Centre near Saiccor Mill to create training and upskilling opportunities for the workforce and for local youth. As part of Project Vulindlela, all general workers seeking employment through Sappi or its contractors will be required to attend training at the Sappi Skills Centre where they will receive basic skills required for job opportunities during Project Vulindlela. This training from Sappi will provide community members with the necessary skills to become more employable or to start their own businesses.

"The commitment we had made and implemented during our previous expansion remains," says Thiel. 'The majority of the workforce will be local community residents employed by contractors on the project". In addition, many other services and products required during the construction phase and beyond will be sourced from local emerging businesses.

Xylitol is a high value sweetener with exciting growth prospects. As a low-calorie sweetener which produces no insulin response, it is suitable for diabetics. It also has positive dental properties.

Furfural is a versatile green industrial chemical derived from C5 sugars with a diverse range of derivatives.

Making the most of wood fibre

Binnie has noted that the company is happy with the progress being made by the biorefinery team, as well as with the value they are deriving from the acquisition and integration last year of the key biorefinery technologies and expert staff from Plaxica.

"Biomaterials and biochemicals are integral to Sappi's strategy of extracting maximum value from wood fibre, our natural and renewable resource. We have taken a significant step towards generating meaningful revenue from this new business segment," he said.

Due for commissioning in early 2019, the planned demonstration plant for xylitol and furfural production will be located adjacent to the existing sugars and lignin extraction plant at Ngodwana Mill. Pending successful results and further approvals it is anticipated that Sappi may construct commercial xylitol and furfural plants adjacent to its mills in the USA and South Africa.

Louis Kruyshaar, executive vice president for Sappi Biotech, explained: "Sappi's biorefinery plans are focused on building a sustainable, profitable business from the manufacture and sale of food ingredients, materials and chemical intermediates derived from the C5 sugars produced as a co-product of our dissolving wood pulp production, and from the lignin produced in our global pulp production."

Co-location synergy

The proposed co-location of the commercial plants at existing mill sites is set to deliver strong integration synergies, and the cost advantages offered by Sappi's scale. Further to this, the Xylex® technology will give Sappi a globally competitive cost base for sugars and xylitol and furfural production.

Once the Xylitol process has been successfully commissioned, Sappi intends to enter the Xylitol value chain with a world-scale production plant. The sugars extraction from its DWP assets combined with the Xylex® and Furfural capabilities will allow Sappi to pursue various partnerships in the furan chemical value chain.

The furan markets are showing strong market pull for new investments due to growth as well as replacing older and smaller unsustainable assets.

Tracking Sappi's sustainability targets

- CO_2 emissions will be cut in half and SO_2 emissions will reduce by 35%
- Waste to landfill will reduce by 48%
- Water use efficiency will increase by 17%
- Earning more revenue for the province and country
- Providing a secure future to our workforce, their families and their communities

Bottom left: Pre-hydrolysis liquor (PHL), containing sugars extracted from wood by water hydrolysis, at Sappi Ngodwana Mill's existing sugars and lignin extraction plant. The new demo plant will be constructed next to the existing plant.
Left: Ngodwana Mill

Partnering with CISL

CISL, a 30-year old institute with 80 staff and a network of 8,000 alumni and 250 companies, will host the Fellowship Programme alongside its existing industry collaborations and executive education programmes to foster an exchange of knowledge and ideas.

Reshaping the future

In another exciting development in its development journey, Sappi is a partner of The Prince of Wales Global Sustainability Fellowship Programme and will be funding research to look at the paper and pulp industry as an initial example and examine drivers including the rise of artificial intelligence and the need to bring carbon emissions to net zero.

The three-to-five year fellowships, announced by the University of Cambridge Institute for Sustainability Leadership (CISL), will attract academics from around the world to identify breakthrough solutions to meet the UN Sustainable Development Goals (SDGs). Currently, eight fellowships have been funded.

Focused on the ninth UN Sustainable Development Goal "Reshaping the future of industry" (SDG9), the Sappi-supported fellowship will aim to build on the company's current engagement with the CISL by investigating how trends of innovation and sustainability will come together to reshape the future of industry.

Speaking at the launch of the Fellowship, Dame Polly Courtice, director of the CISL, said that the Fellowship Programme will create "a rich intellectual space for collaboration between researchers and industry as we seek breakthrough ideas and leadership actions towards meeting the UN Sustainable Development Goals".

"We have been engaging at a group and European level with Dame Polly Courtice and the CISL team since 2013. They have helped and supported our European industry efforts related to the Green Growth Platform, the development of a new low carbon pulp technology (DES), exploring financing options to support industry's transformation and investigating block-chain technology for timber certification," said Binnie at the time of the announcement.

DES refers to Deep Eutectic Solvents[1] which are considered inexpensive and environmentally benign sustainable alternatives to the conventional organic solvents. They can help produce pulp at low temperatures and at atmospheric pressure. Using DES, any type of biomass could be dissolved into lignin, cellulose and hemicellulose with minimal energy, emissions and residues. They could also be used to recover cellulose from waste and dissolve ink residues in recovered paper.

Responsible business in the age of hyper-innovation

Binnie added that the challenge for the pulp and paper industry is how to be much more effective than today, both in its journey towards durable sustainability and to the need for economic vitality and employment for future generations.

"This Fellowship programme and the research it will deliver will help take this work forward. We live in an age of hyper-innovation and we take responsibility for making it work positively. That is why we have chosen a subject which joins the desire and need for sustainable materials with the most revolutionary technology to appear for over a generation – that of Artificial Intelligence.

"We anticipate that the Fellowship programme will deliver students with a profound knowledge and understanding of these issues which will help drive new solutions for us and others, creating exciting opportunities far into the future."

Over and above Sappi's topic of Industrial Transformation, the other confirmed research topics include Social and Environmental Accounting; Investing in Sustainable Communities; Sustainable Health; Radical Innovation and Disruption; the Role of Responsible Business in the Community; Inclusive Growth; Pathways to a Circular Economy. ■

More good news

Sappi's name has also been added among the Top 30 on the FTSE/JSE Responsible Investment Index and the FTSE4Good Index Series. Created by the global index provider FTSE Russell, the FTSE4Good Index Series is designed to measure the performance of companies demonstrating strong environmental, social and governance practices. These indices are used by a wide variety of market participants to create and assess responsible investment funds and other products.

In addition, Sappi has been classified as "Prime" by ISS-oekom, one of the world's leading ESG research and rating agencies for sustainable investments.

[1] www.providespaper.eu. 2014. PROVIDES. [ONLINE] Available at: http://www.providespaper.eu/hydrophobic-deep-eutectic-solvents-promise-play-key-role-making-paper-industry-sustainable/. [Accessed 10 August 2018].

Culture is at the heart of a safe workplace

HARDIE DE BEER
Executive: Technical & Lime, PPC

Creating a safe working environment is a complex issue and requires a concerted effort by all stakeholders over a sustained period of time. It is this understanding that is at the core of the approach by cement and lime supplier PPC to safety at all its operations.

Our industry is particularly hazardous, and the environment lends itself to employees being exposed to dangerous machinery and adverse environmental factors like dust and noise. Maintaining the health and safety of our employees and contractors are thus pressing issues for us, and we give them a lot of thought and attention.

Multiple approaches are necessary

We have learned that there is no single formula for creating a safe and healthy workplace — but there are certain basic principles that can be adapted to create the all-important safety culture without which the desired behaviours will never take root. To achieve this, the company has to engage effectively with the workforce, and empower them to identify risks in their work environments and take appropriate action. A key aspect is to treat employees and managers as partners in the creation of a safe workplace.

It is vital to move towards behavioural safety, which requires employees to act with safety and health in mind as a matter of course. To achieve this requires a sustained effort from everyone. There are several principles that are key to achieve this. Everyone should understand the SMART goals of the safety programme. The SMART goals must be specific, measurable, applicable, relevant and should take place within a designated time frame.

Make safety personal

It is also very important to create a safe environment that is both inspirational and empathetic. Safety has to become internalised into the way people approach their work.

A key element is the quality of the corporate leadership. In particular, executives and managers have to show that they have internalised the safety culture. Talking about it is not enough. Companies have to create a safety culture that will result in colleagues being able to jointly assess and suggest mechanisms to ensure a safe working environment.

An all-in culture

A third foundational principle is that everybody in the company has to buy into the safety culture; it must become the way everybody does things at work. One group cannot opt out. Education and communication are thus key levers in building the culture as well as helping people to acquire the specific competences they need to act safely.

PPC uses a simple yet highly effective way of actualising these principles. We call it Snakes and Hazards, and it uses the well-known characteristics of three common African snakes to make people aware of the kinds of safety risks they face, and what to do about them.

- The puff adder denotes the concealed hazard that an individual must point out to colleagues.
- The python, by contrast, is the hazard that can start off as small and harmless, but that can become life-threatening if it is allowed to grow.
- A third hazard is denoted by the cobra, just as this snake rears up in threat and warning, this type of hazard is both obvious and very real.

This hazard typology makes it very easy to assess the risks in any plant, and has the virtue of being readily understandable across cultures as we have found in our plants across South Africa, Rwanda, Zimbabwe, the DRC, Botswana and Ethiopia.

More importantly, it starts meaningful discussions about workplace safety that are conducive to the creation of a safety culture that is integrated into working patterns.

When it comes to safety, regulation and physical safety equipment have roles to play, but they also have their limits. In the quest for genuine workplace safety, there is only one approach that works: ingraining safety into the way people behave at work and carry out their tasks. This takes time, effort and investment but safe and healthy employees are a priceless asset. ■

MENTAL HEALTH

Keeping it top of mind

Mental health needs attention

Mental illness is a far greater issue in South Africa than most people would believe. According to the South African Depression and Anxiety Group (SADAG), one in three South Africans will suffer from mental illness in their lifetime. Only a quarter will either seek or receive treatment.

Image: istockphoto.com

"The problem facing South Africa, and countless other countries, is that many people suffering from mental illness are not even aware of it. This is particularly true for women in rural areas," says Graham Anderson, CEO of Profmed, a medical aid exclusively for graduate professionals.

One of the most common forms of mental illness is depression. The WHO estimates that more than 300 million people suffer from depression worldwide and that it is one of the leading causes of disability. As many as one in six South Africans suffer from depression.

Chemical condition that must be correctly treated

"The most important thing to understand is that mental illness is a medical condition. Mental issues need to be treated properly with the correct medication. The proper diagnoses and treatment can successfully control many mental issues that are common throughout the world," says Anderson.

Anderson explains that, if left untreated, mental illness can lead to a number of other serious issues. "Because people live with a mental issue that is not being properly treated, they could, for example, seek refuge in alcohol and drugs to cope. Mental illness is like getting a cold or high blood pressure. It is a recognised disease that can't be prevented. Once you have it, or you think you have it, you must seek medical advice," he says.

No shame in seeking help

There have been many innovations in the treatment of mental illness. Medication is still the most common, but consulting a psychologist could also help. "If you find that you're not coping mentally, there's no shame in seeking help. We know far more about the brain today than ever before and continue to make new discoveries," concludes Anderson.

If you are experiencing an issue you think could be the start of a mental illness, see your family doctor who can recommend the correct course of action. ■

Depression signs

- Feeling sad, anxious or "empty" most of the time
- Loss of interest or pleasure in hobbies and activities that were once enjoyed
- Feeling hopeless about life
- Feeling helpless or guilty
- Changes in sleeping habits
- Weight loss or weight gain
- Loss of energy, feeling "slow" or fatigued
- Thoughts of death or suicide, suicide attempts
- Restlessness, irritability, anger
- Difficulty concentrating, remembering things or making decisions
- Physical symptoms that don't respond to treatment, such as headaches, stomach pain, back pain, chest pain, even if it was checked by a doctor

Not everyone experiences all of these symptoms. Some people only have a few symptoms, others may have many.

Source: www.sadag.org

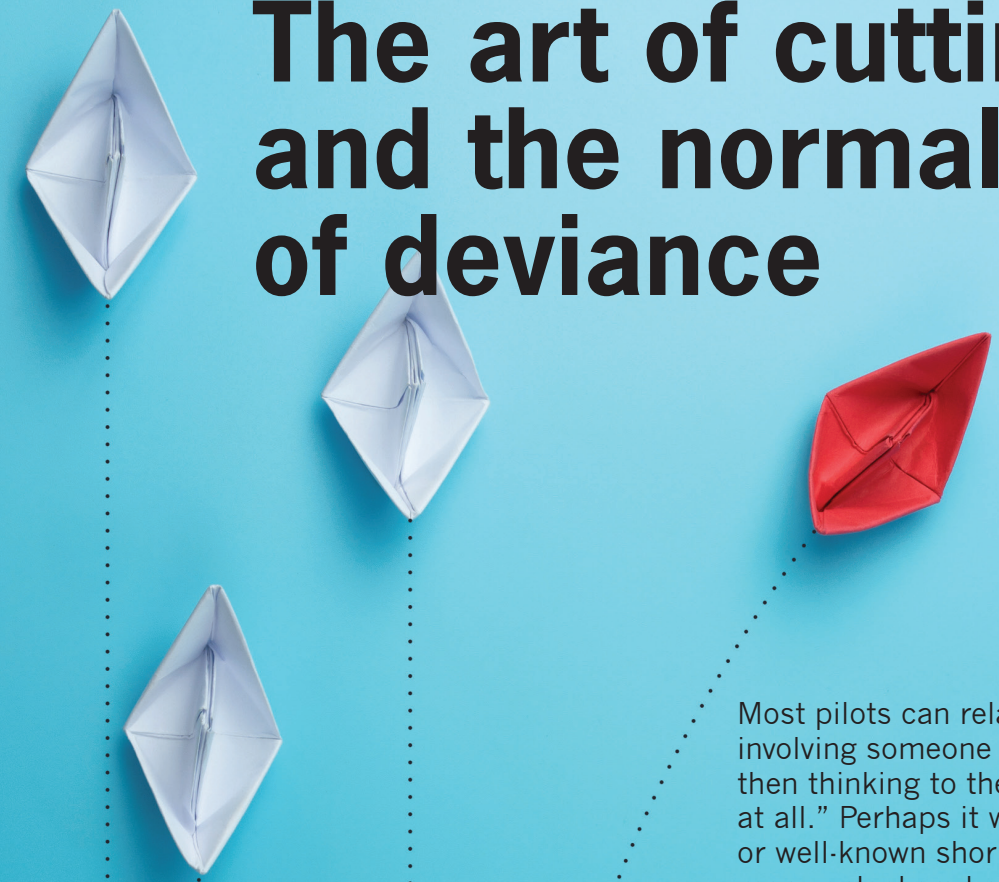
The World Health Organisation (WHO) defines mental illness as a combination of abnormal thoughts, perceptions, emotions, behaviour and relationships with others. Mental disorders include depression, bipolar affective disorder, schizophrenia and other psychoses, dementia, intellectual disabilities and developmental disorders including autism.

There is always someone to speak to.

- SADAG counselling line (between 8am-8pm Monday to Sunday): **011 234 4837**
- Suicidal emergency line: **0800 567 567**
- 24-hour helpline: **0800 12 13 14**

SAFETY CULTURE

The art of cutting corners and the normalisation of deviance



SARAH ROVNER
Master CFI, CFII, MEI, ATP,
Owner of FullThrottle Aviation LLC

Most pilots can relate to hearing of a mishap involving someone or a business they know and then thinking to themselves, "that's not surprising at all." Perhaps it was a pattern of behaviour or well-known shortcutting of procedures that many onlookers knew was an accident waiting to happen. Perhaps it was that hangar neighbour that never pre-flights their airplane. Perhaps it was the local mechanic who was known to sign off on annuals without doing a full inspection.

As we know from our training, the chain of events leading to an accident or incident started long before the mishap. It started when the deviant behaviour became normal.

The term "normalisation of deviance" was coined by sociologist Diane Vaughan[1] in the wake of the Challenger Disaster. In 1986, the Challenger blew up a mere 73 seconds after lift-off due to faulty O-rings that caused the solid rocket fuel to ignite. In the resulting investigation, it was discovered that NASA engineers were aware of the flaws as early as 1981, but a culture of loosening standards and accepting such risks had fostered an environment that eventually led to disaster. The engineers knew that the launch parameters were outside of what was tested but deemed it an "acceptable risk" because they had gotten away with it so many times before[2].

Another well-known example of the normalisation of deviance is that of the Concordia[3] cruise ship disaster. In 2012, the Costa Concordia cruise ship crashed into rocks off Giglio Island, killing 32 people. Although the ship was prohibited from going that close to shore, it was reported that directors at Concordia would allow, and even encourage, the deviant behaviour of the "ship salutes" because they were considered to "enrich the cruise product".[4] Each captain would get closer and closer to shore with no consequence; until one day a ship hit rocks and caused a disaster. Had the ship's captain followed procedures, this wouldn't have happened.

Over time, behaviours will continue to drift further and further away from the standard.

Image: istockphoto.com

The concept behind the normalisation of deviance is that when people within an organisation become accustomed to the deviant behaviour, they no longer consider it as deviant. An example of this can be found on almost any road. Although turn signals and stopping fully to a rollback at a stop sign are part of the state-mandated rules of the road, people have become so accustomed to not stopping or signaling that it has become socially acceptable. By Vaughn's theory, a driver that continues to get away with it will continue negative behaviour until it becomes normal. Over time, behaviours will continue to drift further and further away from the standard.

Although the consequences can be high on the road as well, aviation has a way of being unforgiving of recklessness. Many pilots' lives could have been saved by a proper pre-flight or checklist usage. There have been several engine failures related to fuel contamination that was not discovered on a pre-flight. Taking extra time to preflight the fuel to check for water and contaminants could have possibly saved someone's life.

Many inadvertent gear up landings could be prevented by using a checklist. We all learned to pre-flight and use a checklist during our training, so why is it that a lack of these elementary safety tools allows mishaps to reoccur? How many pilots are caught off guard by NOTAMs* and weather? Perhaps a proper briefing could have also prevented an unanticipated and dangerous situation.

Many pilots try to rationalise shortcuts under pressure. As the pilots get away with it over and over again, the behaviour becomes normal. Not checking weather and NOTAMS, skipping items on a pre-flight, or not using a checklist are just a few examples of shortcuts that pilots often find themselves rationalizing. Reinforcing negative behaviour with no consequences only fuels the tendency to continue cutting corners. Following procedures in the interest of safety is the only way to overcome these phenomena. As an instructor or just a fellow pilot, encourage your students and peers to follow the correct procedures and not cut any corners. Although we've gotten away with it many times before, the behaviour will ultimately lead to a preventable disaster. "I've gotten away with this before" is not the way to rationalise a behaviour, because today may be the day the bill comes due. ■

Republished courtesy of Avemco Insurance Company

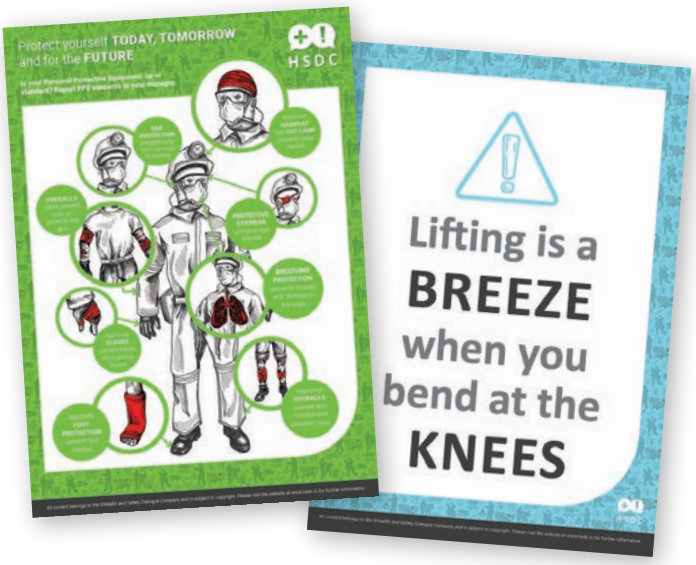
[1] https://en.wikibooks.org/wiki/Professionalism/Diane_Vaughan_and_the_normalization_of_deviance

[2] https://en.wikipedia.org/wiki/Space_Shuttle_Challenger_disaster

[3] https://en.wikipedia.org/wiki/Costa_Concordia_disaster

[4] https://enwikipedia.org/wiki/Sail-by salute

* A Notice to Airmen (NOTAM) is a notice filed with an aviation authority to alert aircraft pilots of potential hazards along a flight route or at a location that could affect the safety of the flight.



Keep it simple.

According to the Health and Safety Dialogue Company (HSDC), a strong health and safety culture improves productivity and assists in the creation of a safe, great place to work. It ensures labour force, management, community and other stakeholders are aligned in building a safe and healthy working environment. And that culture goes beyond ticking training boxes.

Legislation can only go so far to protect human life and enforce safety standards. In addition, occupational health and safety acts are complex and difficult to understand. Simple, short and visual safety information is essential in ensuring that employees truly understand the hazards and risks in their working environment.

With the new ISO 45001 : 2018 standard having been introduced, there will be an increase in the need for creative tactics to help workers understanding the full scope of their environment.

HSDC predicts that there will be a growing need for the use of storytelling or design thinking methodologies, and investment in visual communication to help drive safety culture. The new standards focus on co-creation, consultation and participation from workers as well as leadership engagement.

Lindy Scott, communication professional at HSDC, explains: "We use high quality visual content, combined with kinetic and tactical learning, as this creates a platform to facilitate discussion, debate, participation and consultation."

"Make safety fun and creative. Follow legislation, safety standards and internal policies but also encourage attitude change by adding fun elements to the process," says Scott. ■

MAINTENANCE

Collision-tolerant drone

makes for safe inspection of inaccessible spaces

Skyriders Access Specialists recently applied technology from refractory experts CHB Third Party Inspectorate to inspect a high-vacuum furnace at the SAPREF refinery in KwaZulu-Natal. Dubbed Elios, the collision-tolerant drone was put to the test for the inspection and exploration of inaccessible places.

TOP: The Elios collision-tolerant drone is the latest hi-tech inspection technology from Skyriders. **BELOW:** Flying from chamber to chamber, the drone picks up any irregularities on the screen.

What appears to be a regular maintenance inspection can quickly turn dangerous for the most experienced teams, particularly where chemicals or gas are involved. “This has always been a huge consideration for us,” says Skyriders marketing manager Mike Zinn.

The scope of the project was to inspect the hard-to-reach places that are extremely difficult or dangerous for humans to enter. The drone enters the tight or even inaccessible space from the outside of the unit while the pilot, the CHB expert Visual Observer (VO) and engineers monitor the inspection via a live feed on a monitor.

Flying from chamber to chamber, the drone picks up any irregularities on the screen. The VO can report immediately if a chamber is safe to enter. “It’s his job to focus on the safety of the drone pilot, while the pilot’s focus is on flying the drone,” Zinn points out.

The March 2018 inspection took just a day to complete, equating to a massive time-saving over previous methods. This is the first time Skyriders has worked with CHB, and a first for SAPREF, too. “All parties were so impressed with the results produced by the drone that we are in the process of putting together a memorandum of understanding with CHB for future inspections,” Zinn reveals.

With the drone technology, Skyriders is now able to carry out difficult or high-risk inspections such as those at chemical plants and power generation plants. “The timing, efficiency, and safety initiatives required with chemical plants, in particular, means that sending a machine into potentially harmful environments, rather than humans, gives us peace of mind, and a huge reduction in potential injuries. Being able to enter difficult places means drones can ensure the areas are safe before general work continues. It’s definitely the way forward,” Zinn comments.

Skyriders continues to offer the drone option to its South African clients, and pitching the solution to the rest of the continent.

“I believe this exercise proved our worth to SAPREF, and maintained our industry reputation of being able to successfully take on difficult tasks where height or confined space make the risk greater for humans to enter before checks have been carried out,” Zinn concludes. ■

Voith's Virtual Reality Solutions
bring transparency, efficiency and safety to the paper mill

During ZELLCHEMING-Expo 2018 in June, Voith Paper introduced its new smart service package, Virtual Reality Solutions, which offers paper manufacturers the opportunity to have their new machine modeled in virtual reality. Voith believes that this gives customers more transparency, efficiency and safety in paper production over the entire life cycle of the machine.

With this innovation, paper manufacturers can get a digital representation of their very own new machine within a matter of days. The system allows the machine to be brought to life before it is even built, either on a monitor or using virtual reality goggles, presenting an even more realistic experience. This makes it much easier to configure the machine and develop infrastructure, for example stock preparation, buildings and access routes in the planning phase.

More effective use can also be made of the time available prior to commissioning of the machine. Operators, maintenance crews and managers can acquire proficiency and familiarise themselves with the machine and those inner workings that are not directly accessible in real life.

Virtual training programmes allow personnel to acquire experience with the operation even though their paper machine is not yet running. Training in a virtual reality environment is about more than just visual perception; there is also a realistic noise backdrop and controls allow the user to move along the entire machine and execute certain hand actions. Much better learning outcomes can be achieved by addressing several sensory perceptions at once.

Another stated benefit is more efficiency during operation itself. Staff can practise maintenance activities in advance in interactive training scenarios. The training not only includes all work processes, which are simulated step by step with the necessary tools, it also focuses on occupational safety. For example, the replacement of a press sleeve or screen basket can be simulated and practised in a safe virtual environment before the task is due to be performed at the machine. The routine acquired in this way then leads to shorter downtimes in real-life maintenance, a lower error rate and a reduced risk of workplace incidents.

Commenting on this being the next step en route to Papermaking 4.0, Thomas Holzer, president: business line projects for Voith Paper, explains, "Our aim is to combine the potential offered by digitalisation with the physical manufacturing process and in this way optimise paper production." ■

BELOW LEFT: Paper manufacturers can become familiar with their paper machine in the planning phase. **BELOW RIGHT:** Virtual reality can address several senses at once in the training scenarios and achieve better learning outcomes than conventional programmes.

Shaping the industrial world virtually

VESA PUOSKARI

Virtual technology and applications familiar to computer gamers are beginning to make their mark in the industrial world. Mika Karaila from Valmet highlights the benefits of integrating virtual tools in mill planning and maintenance processes.

"Virtual reality is an excellent tool for visualizing complex industrial environments and machines in production plants. It can help to streamline maintenance and decrease costs through the use of intelligent products, tools and services at mills," explains Mika Karaila, Research Director in Automation R&D at Valmet.

Valmet has been developing and testing intelligent maintenance applications and augmented reality equipment for visualizing and facilitating repairs at mills since 2016. Virtual Reality (VR) is an artificial 3D environment that users can immersively interact with.

For the first-timer, navigating in virtual surroundings might feel a bit awkward, but after getting used to the headset and control stick, the journey starts to feel fun and fascinating. "We have demonstrated our VR tools at several exhibitions. People queue up at our demos, and they always give enthusiastic feedback. We have managed to overcome the major technological challenges and we are currently developing tools together with our customers. Now we are able to truly focus on issues that are relevant to them."

Saving maintenance costs with augmented reality

Valmet is using the most modern technology available to protect production lines from costly downtime – and even to decrease the environmental impacts of production. Karaila emphases that augmented reality (AR) is a valuable maintenance tool.

Maintenance can be very costly and challenging in a complex mill environment. Virtual technology can optimise and enhance operational work processes, security and asset performance to enable productivity enhancements.

The control room is the nerve center of the mill or plant, where screens display thousands of measurements from different parts of the process stages drawn in piping and instrumentation diagrams. With the help of AR, this process information can be displayed virtually in a headset, and mechanics can take the information they need with them when they are working on a machine.

Unlike VR, which creates a totally artificial environment, AR uses the real-world environment and overlays new digital information and images on top of it in real time.

"For example, we have created virtual solutions to visualise process measurements at pulp and paper mills. With the help of mobile devices and modern wearables, technicians can easily access the maintenance instructions and process measurements for mechanical components, valves and other equipment. This makes the whole operation more safe and manageable," Karaila explains.

Technicians can also shoot 360-degree videos when tackling a task for the first time together with a more experienced worker. "When executing the task alone, they can verify the different stages of the work through AR devices. This is one way to ensure consistently good results in maintenance work, while also taking safety issues into account," he says.

Valmet has developed a Valmet DNA ecosystem that serves as an automation and information platform for process control. It combines all controls in a single platform: process, machine, quality, supervision, drive, as well as optimisations and mechanical condition monitoring.

"If the Valmet DNA tag is connected to the 3D world, then we can configure all the information in 3D surroundings. We have several applications for our energy, pulp and paper customers. The same programs can be configured to fit any of our customers."

Design platform for mill construction

Virtual tools can be integrated into the design process for power plants or paper mills and their machinery. "We can collaborate with our customers by creating and sharing virtual surroundings with several users, demonstrating and solving problems even if they are located in another part of the world," Karaila says.

"For example, we can manage VR mill planning processes to discuss with our customers and architects about whether certain pipelines are in the correct place, if there is enough space for maintenance operations, or whether some doors and windows need to be installed somewhere else," he adds.

Mika Karaila, Research Director in Automation R&D at Valmet. (photo: Tomi Aho)

Virtual reality can help to visualise complex industrial environments, streamline maintenance, and decrease costs at mills.

"This is a quick way to proceed and solve issues already in the design phase. During the planning and construction phase, we don't always have to travel to the site, which is often in a remote location. This saves time and costs."

Future industrial standard

With the key technological challenges now solved, Karaila believes that virtual tools will soon make a breakthrough in real-world applications.

"The technical properties of software and equipment are becoming more accessible in terms of price. In industrial environments, we can use equipment that is already familiar from consumer markets. Younger generations familiar with computer gaming seem to be especially enthusiastic about experimenting with and applying VR and AR in their work."

One example of a useful VR application is a gamified training tool for factory environments. Virtual training can prepare workers to react correctly in hazardous situations, for instance. Also, the gesture and speech controls familiar from video game consoles are perfectly suited for industrial control rooms when the next-generation software for virtual control systems is ready.

"We are aiming to develop Valmet's virtual expertise through assistive artificial intelligence at the predictive level in surroundings where extended reality can suggest the service routines that should be performed for executing simple tasks like changing a filter."

Extended reality (XR) encompasses a wide spectrum of hardware and software, including sensory interfaces, applications, and infrastructure that enables content creation for VR and AR. Karaila adds that AR and VR equipment also work offline.

"On industrial premises, network connections are not always reliable, so maintenance workers can get to know the problem by taking photos of the issue first, and then going online in a different office environment to solve the problem."

He predicts that VR will gradually become an industrial standard. "We are entering a stage where we can sit down with our customers and discuss what kind of applications they are interested in and what kind of problems they have had using devices. The more concrete the feedback we get from our partners, the better we can improve our tools." ■

Maintaining and enhancing the paper and pulp industry's contribution to the Circular Economy by improving resource efficiency and resilience at recycled fibre paper mills

EMMANUEL KASESE* Facilitator: Western Cape Industrial Symbiosis Programme (WISP)**

LAUREN BASSON Manager: Technical and Knowledge**

The paper and pulp industry and the circular economy

The pulp and paper sector is a resource intensive sector with a value-chain that spans the renewable resource sector (plantation forestry), primary processing (pulp milling), secondary processing (paper and paper products), use and disposal, collection, and recycling/secondary beneficiation (recycled paper and paper products). The secondary beneficiation stage which recycles paper fibre is an important cog in making the industry more circular as it provides the avenue for reintegration of used paper back into the economy. Indeed, as an industry that is based on a renewable resource with a high recycling rate, it can be argued that the paper industry is a good example of an industry that is contributing to a more circular economy.[1]

This article focuses on the secondary beneficiation stage, and specifically on recycled fibre (RCF) mills, as it is a critical stage in the value chain that needs to function to close the loop, and to a large extent has to deal with the consequences of decisions made in other parts of the value chain. It is also the stage that has both challenges and opportunities: challenges to be sustainable under resource pressures and constraints, and opportunities to contribute to a wider circular economy at a industry or regional level.

*Corresponding author - emmanuel@green-cape.co.za

** The GreenCape Sector Development Agency, 18 Roeland Street, Cape Town, 8001

[1] A wide variety of definitions exist for the term "circular economy". Most call for a systemic shift away from a linear 'take, make and dispose' economy. Geissdorfer et al. (2017) provide a practical definition of how to effect this: "A circular economy is a regenerative system in which resource input and waste, emission, and energy leakage are minimised by slowing, closing, and narrowing energy and material loops. This can be achieved through long-lasting design, maintenance, repair, reuse, remanufacturing, refurbishing, and recycling." A good source for information on the circular economy is the Ellen McArthur Foundation (https://www.ellenmacarthurfoundation.org/).

Resource challenges faced by recycled fibre mills

From a waste generation point of view, the two largest problematic waste streams from an RCF mill are paper sludge, which has a very low heating value and a high moisture content that affects its ability to burn efficiently, and effluent water. RCF mills produce two to four times as much sludge as virgin mills (Scott, Smith, & Abubakr, 1995). Staples, soils and various plastics also form part of the waste streams.

On the energy front, whilst most virgin fibre (VF) mills can partially substitute their energy sources (typically coal) with biomass from de-barking and other processes, this option is not available to most RCF mills where conventional fuels and electricity are used for boilers and most heating requirements. Although RCF mills use less energy and water per tonne of paper made (Bajpai, 2014), these mills cannot risk becoming complacent in an environment where energy and water supplies can be unreliable. The energy crisis in 2013/2014 and the current drought situation that is affecting the Western Cape and other parts of South Africa are a reminder that businesses need to have strategic foresight in order to protect themselves from future shocks that could pose business risks. In both the energy crisis and recent droughts, most businesses were caught unawares, but those that were prepared were less exposed.

RCF mills are still overly reliant on conventional fuels and electricity and need to build resilience against an uncertain energy and water future. The finite resources (fossil fuels, water, material) available coupled with the ever growing population will continue to put pressure on what can increasingly be considered a resource constrained economy.

Increasing competition for resources will make resource intensive industries like pulp and paper particularly vulnerable unless early action is taken to be prepared. Below, we present some interventions at RCF mills that can improve resource efficiency and build resilience. We introduce the concept of industrial symbiosis that is of particular relevance for finding solutions to problematic waste streams in the industry, but can also be extended to improve resource efficiency and build resilience in terms of energy and water.

Recovered paper at a material recovery facility in Cape Town where the material is sorted, compacted and baled.

Industrial Symbiosis

Industrial Symbiosis (IS) is a key tool that can be used to build material, energy and water resilience. Facilitated IS programmes like the Western Cape, Gauteng and KZN Industrial Symbiosis Programmes[2] can assist businesses by identifying under-utilised resources that companies have ("wastes") and finding other companies that can make use of these resources.

For example, materials that can be used by businesses as substitute raw material and or as fuels are often discarded and are sitting in landfills. There exists real opportunities to reintegrate these "secondary materials" back into the economy. The challenge is that most industries still work in silos and there is lack of inter-industrial communication pertaining to secondary material availability. It needs to be understood that recycling can extend beyond the boundaries of individual industrial sectors.

Companies sometimes struggle to find alternative solutions to landfill for their waste streams because they are looking for solutions in the wrong places. Through IS, businesses can achieve their sustainability goals and the economy can transition into a more circular economy. IS contributes to a circular economy by unlocking the value of under-utilised materials like waste streams and making sure their economic value is retained through sustained use in the economy via reuse and recycling. It is worth noting that the concept of IS can also be applied to other under-utliised resources such as energy, logistics and land.

Waste

Perhaps we can start by dispelling some misconceptions around the concept of "zero waste," which is often erroneously considered synonymous with a circular economy. Waste generation is something that is unavoidable for many manufacturing companies. The unwanted component in a material is only a waste to a specific industry. One industry's waste can be a resource to another industry. However, as long as companies and industries continue to work in isolation, there will always be waste and this typifies a linear economic model where materials are consumed and the residues discarded. A shift to a circular economy does not imply that businesses will stop generating waste.

It is highly improbable for a company to create circularity by itself, hence the importance of working with other companies especially those in sectors far removed from one's sector as chances are that is where the solutions will be found. An interesting example is given below where a symbiotic relationship has developed between paper and brick manufacturers.

In the Western Cape (and elsewhere), paper sludge from secondary fibre operations is being utilised by brick manufacturers. Incorporation of paper sludge in clay bricks produces a lighter brick with better thermal properties due to the air pockets formed inside the brick structure during firing. Brick manufacturers are not concerned about the moisture content as water is needed when making bricks.

Brickmaking is not the only industrial symbiosis option available to paper mills. There is also interest in paper sludge for bio-digesters (specifically those with microbes that can digest the cellulosic material), and for companies that want to enter into gasification and pyrolysis processes

Energy

Process optimisation should always be the first option before other interventions are investigated so that engineers can determine where they should be focussing their efforts to improve system efficiency. This can lead to process integration and with that comes the scope for energy integration i.e. matching processes/streams that need heating with those that require cooling (which can be done most effectively through pinch analysis). This allows the capturing of low grade thermal energy which may otherwise have been lost to the environment. Cogeneration should also be considered as this can increase thermal efficiency to 80% (Sinnott, 2005).

(Continued on the following page)

[2] The Western Cape Industrial Symbiosis Programme (WISP) is delivered by GreenCape (see https://www.greencape.co.za/content/sector/wisp) and the programmes in Gauteng and KZN are delivered by the National Cleaner Production Centre (see http://ncpc.co.za/waste/how-to-participate)

The energy need for RCF mills in terms of hot water and low pressure steam are well within the range that solar thermal systems are ideally suited to provide, hence the paper and pulp industry has been identified as a key industry for the application of solar thermal systems.

The next step is looking at alternative fuel and power sources. Depending on location and needs, solar energy (photovoltaic and solar thermal) and biomass could be viable options. Most mills have large roof spaces making them good candidates for PV installation. There are a number of factors that need to be considered to determine whether rooftop PV is suitable (e.g. type of roof, orientation etc) and financially viable. However, PV could be used to partially off-set grid power for utilities like lighting and other equipment. In a modelling exercise based on actual industry costs, a payback period of approximately five years was calculated for typical 100kWp system (GreenCape, 2018a).

Most mills are still using old equipment and some boilers are due for replacement. When the old boilers are decommissioned, they could be replaced with new boilers that can take alternative fuels or energy sources, or the old ones can be retrofitted to accept alternative fuels. This presents opportunities to look at solar thermal technology and waste to energy options like refuse derived fuels as substitute fuels. The energy need for RCF mills in terms of hot water and low pressure steam are well within the range that solar thermal systems are ideally suited to provide, hence the paper and pulp industry has been identified as a key industry for the application of solar thermal systems (IEA-ETSAP and IRENA, 2015). In terms of alternative energy sources, businesses can also take advantage of initiatives like alien vegetation clearing or recycling of waste wood to potentially source biomass that can be used as a fuel.

Water

When considering water security, it is worth noting that there are many simpler and less expensive interventions that can be done before considering alternative water sources (e.g. rainwater, groudwater, desalination). These options are outlined in what has become known as the Sustainable Water Journey (GreenCape, 2018b). A simple water audit can be used as a tool to understand water use and risks on a site. Meters can be installed so that water usage is monitored and the relative water use of different processes and activities better understood. Businesses can start with low risk interventions like fixing leaks, installing low flow aerators in taps, waterless urinals etc. (Savings would differ by industry and company, but some companies have reported reducing potable water usage by almost a third just from these low cost interventions). The next step is looking at reuse and recycling options on site. This can be achieved through a “fit for purpose” exercise which matches water quality to application.

For example, why use high quality potable water for a process that can use grey water or water from another process? In addition to water cascading between processes and on-site reuse, there exist opportunities for companies to share water resources with neighbours if the neighbour can use the effluent water (assuming that all process, health and safety risk have been duly assessed).

Similarly, for a RCF mill this could be an opportunity to access alternative water and reduce costs. An RCF paper mill can also talk to neighbours to determine whether the businesses would be willing to co-fund a waste water treatment plant to allow water reuse by one or both parties, should there not be a business case or space for setting up a treatment plant on its own. Businesses can start to close the water loop and maybe even become zero liquid effluent discharge sites. An alternative source of water which is low risk with high returns (depending on the type of industry) could be the use of treated effluent water from (municipal) waste water treatment plants.

There are companies in the RCF industry that are using treated effluent for dilution purposes, cooling of rolls and presses, wash ups and cleaning. Treated effluent is typically much cheaper. (For example, in Cape Town, the price of treated effluent is less than R7/kl, compared to R57/kl which is the price for industry under level 6b restrictions).

The last option, which usually requires capital outlay, is looking at other alternative sources of water like rain water harvesting or ground water abstraction and treatment.

Conclusion

Recycled fibre mills can benefit from working cross-sectorially with other businesses to avoid limitations to resource efficiency imposed by focussing only on the pulp and paper value chain. The spectrum of possibilities opens substantially when using the idea of industrial symbiosis. This enables businesses to become more resilient to shocks in resource availability and long term resource scarcity. In so doing, recycled fibre mills can continue to play a vital role in maintaining and enhancing the paper and pulp industry’s contribution to global efforts to enable a transition from an unsustainable linear to a more sustainable circular economy. ■

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Causing a stir

Combining wood fibre and bioplastic into durable consumer products

Stora Enso and Orthex have collaborated to bring a new range of kitchen utensils to market. By combining best of wood and plastic, the bio-based material can be used to replace fossil-based plastic, reducing their carbon footprint by up to 80%.

Stora Enso's DuraSense™ biocomposite uses sustainably produced spruce and pine. "The wood used in the biocomposite is obtained from side streams of wood products and pulp production, which means that the wood material is utilised optimally," says Patricia Oddshammar, head of Biocomposites at Stora Enso.

"The properties of the new products made from wood-based materials correspond to those of similar plastic utensils: the products are hard, durable, hygienic and dishwasher-safe. The wood contained in the biocomposite makes the material stronger and harder. We are now launching nine GastroMax BIO products made of bio-based materials for the home kitchens. In their product group, products that contain 98% bio-materials are uniquely innovative," Orthex CEO Alexander Rosenlew says.

"The DuraSense™ biocomposite is the perfect material for furniture, pallets, tools and car furnishing as well as for various consumer products from toys, tooth brushes, beauty and lifestyle products to kitchen utensils, garden furniture and disposable cutlery," Oddshammar says. ■

Radar and radiometry measurement

Pushing the pulper towards maximum efficiency

JENS LAMBRECHT Project manager and CEO, ermaengineering GmbH & Co. KG, D-Bad Schussenried
CHRISTIAN LANGENSIEPEN Branch management: pulp and paper industry, VEGA Grieshaber KG, D-Schiltach

Non-contact measuring methods have become well established in the paper industry as in many other industries. Beside quality measurement systems on paper machines, they also include level instrumentation with radar and mass flow measurement with radiometry.

Adequate measurement technology for the paper industry would need to comprise level, limit level, pressure, density, interface and flow rate gauging, both in the form of contact methods and non-contact sensors. Technologies are also available for converting and transmitting measurement signals (interface systems), for visualising measurement data and for managing inventories (asset management systems).

These technologies apply to almost all areas of the paper industry, from pulp production to water/wastewater. In addition, there are a large number of other measurements required for monitoring process variables such as temperature, flow rate and consistency, as well as quality variables such as whiteness, grammage, gloss, opacity, etc. Typical applications are storage towers, chests, sorters, refiners, headbox, tanks with paper chemicals, and the vacuum system.

However many of the measuring methods described above operate in contact with the media, i.e. they are directly exposed to the process conditions. This means they can be abraded by substances such as titanium dioxide and also by undesireable substances in the waste paper stream like staples, iron, engines etc.

For these reasons, non-contact measuring methods are becoming more and more important for users, especially for level and throughput measurement. These are mostly based on electromagnetic waves.

Radar for level measurement

In this article, we use the term "radar sensor" when the transmission frequencies are in the microwave range and "radiometric sensor" when the transmission frequencies are in the range of gamma radiation.

A radar sensor for non-contact level measurement is installed on top of a vessel and, once in operation, sends microwaves down to the product surface. The microwaves are reflected there and then received by the sensor, in this way measuring the distance to the surface. After zero and span adjustment, the sensor calculates the level from the signal data. Such a radar sensor works nearly independently of the product properties and process conditions – from vacuum to the highest pressures, from the lowest to the highest temperatures.

Using radar, the goal is to transmit with a very small beam angle and receive with the highest possible signal gain. For this reason, the larger the antenna and the higher the frequency, the smaller is the beam angle. For example, VEGA's 80 GHz-Sensor presents a beam angle of only 3°, and with this smaller beam angle, a better focus is attained. With this small beam angle and its measuring range of 30m, this sensor can be used universally for a wide variety of applications: from large storage tanks to reactors and IBC containers to small dosing or bottling vessels.

With this technology, the dream of planners and maintenance engineers can become reality: one sensor for all applications. With its large dynamic range, the 80-GHz sensor ensures a high degree of measurement certainty. It also measures very reliably in applications with foam, extremely turbulent product surfaces, condensate or buildup on the antenna as well as high temperatures.

RIGHT: Antenna size, frequency, beam angle of radar sensors
FAR RIGHT: Radar level measurement in the pulper

The solution for level measurement in the pulper

Level measurement in the pulper is needed for the automated process of stock dissolution. It regulates the mixing ratio between supplied fibres and process water, thus ensuring the stock consistency required for the discharge process.

Level measurement in the pulper was not possible using sensors until recently. This was due to limitations from disturbing installations, turbulent product surfaces and buildup on the antenna. But thanks to good focusing, 80-GHz technology now makes this possible. Its use results in considerable simplifications in the design of the vessel. The sensor is easily accessible even when the pulper is full. Water flushing is no longer necessary. Due to its simple mounting, retrofitting or rebuild is easily possible.

Radiometry – the universal measurement technology

In the industrial application of gamma rays, a radiation source (transmitter) and an opposing detector (receiver) together constitute a measuring unit. A low radioactive substance emits focused gamma rays. This radiation is attenuated depending on the density of the material that is penetrated. From the intensity of the incoming radiation, the detector calculates the measured variable, whether level, point level, density or flow rate.

It also works in pipelines, for example in alkali regeneration. In this instance, the processes run at high temperatures and pressures; the media are aggressive and sometimes abrasive.

In the case of solids, the radiation source would be mounted above the conveyor belt. The radiation penetrates the wood chips and the conveyor belt. The detector below the conveyor belt would detect the radiation. With the measuring signal dependent on the current loading height, a higher load results in a smaller measuring signal, and conversely a lower load gives a greater measuring signal.

1. Non-contact, wear-free measurement
2. Measuring point independent of vessel design
3. Sensor can be accessed without emptying the pulper
4. No water rinsing required
5. Easy retrofitting and rebuild possible

Solution for the pulper feed

In a customer´s revamping project, a decommissioned stock preparation line was to be put back into operation. This was done to enable a separate grinding of long and short fibre and to increase capacity and production volume. The pulper, instead of its usual batchwise operation, was now to be operated continuously in order to increase output. The smallest unit of one pulp bale weighing approximately 250 kg had to be detected by a suitable measuring system. Conventional measuring systems did not however meet process requirements. Since an absolutely reliable, maintenance-free and long-term reproducible measurement was required, the decision was made to install a radiometric measuring system.

As this was a rebuild of an existing system, the measurement had to be selected and adapted to the customer's circumstances. The small space between the building wall and the pulper opening was a particular challenge.

Due to the limited distance between the radiation source and the pulper belt, two radiation sources were required for complete detection of the individual cellulose bales. With this arrangement, it was possible to ensure that each detected bale actually landed in the pulper.

The bales are loaded onto the conveyor belt and unwired. The DCS fills 50% of the amount of water into the pulper, demands a bale via the mass flow measurement, and finally fills the remaining 50% of the water needed for the bale. This ensures that no bale is fed in without the necessary quantity of water. To get this right requires a reliable measurement that also detects "phantom bales" (pulp bale wrapping) and, if necessary, bales placed close to each other on the pulper. The VEGA system allows for accurate and fully automatic accounting of the pulp inventories.

Summary

Radiometric sensors allow non-contact measurement and ensure reliable operation independent of the process conditions, as well as being wear- and maintenance-free. For this reason, they are often used for continuous mass flow measurement.

The newest generation of radar sensors for liquids operates with 80-GHz technology. These high transmission frequencies allow exact focusing on the measuring point with interference from the environment virtually eliminated. Therefore even the most challenging tasks, such as level measurement of fibre/water mixtures in the pulping process, can be realised.

The successful combination of radar and radiometry measurement makes a great future for the paper industry, and gets maximum efficiency out of your pulpers. ■

Heimbach adds to its portfolio

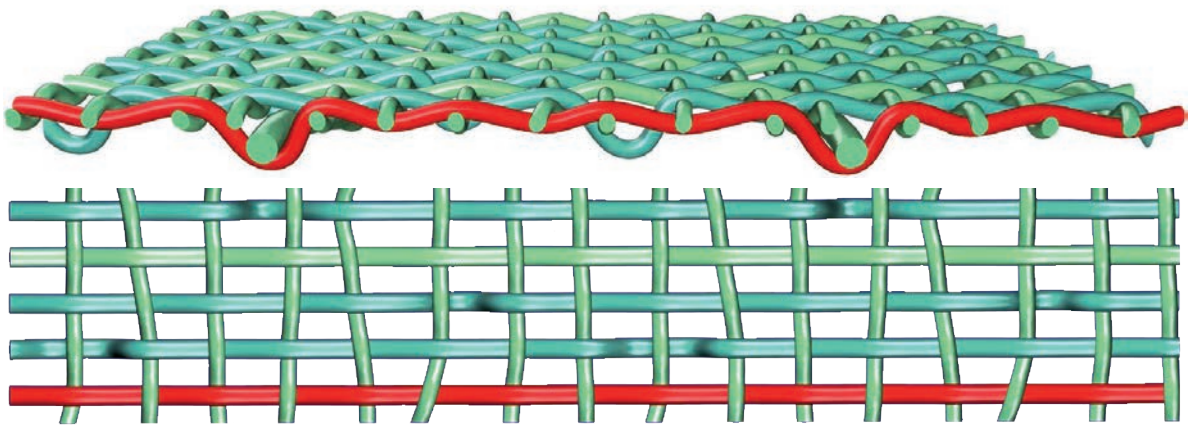
a new forming fabric

With Heimbach's new addition to its Primoselect forming portfolio, papermakers can expect even more in terms of longevity, formation and energy savings. Primoselect Plus (+) is set to expand the benefits offered by the patented product line.

Product	Suffix	Design	Pulp	Board	Fluting	Kraft	Fine	News	Magazine	Magazine coated	Extra Fine	Tissue
primoplan	HD	Double Layer		✔	✔	✔						
primoplan	F	Double Layer		✔			✔					✔
primobond	HD	SSB		✔	✔	✔						
primobond	F	SSB		✔		✔	✔	✔	✔	✔	✔	
primobond	SF	SSB					✔	✔	✔	✔	✔	✔
primocross	SF	SSB					✔	✔	✔	✔	✔	
primoselect	P	SSB (new)	✔									
primoselect	HD+	SSB (new)		✔	✔	✔						
primoselect	F	SSB (new)		✔	✔	✔						
primoselect	F+	SSB (new)		✔	✔	✔	✔	✔	✔	✔		
primoselect	SF+	SSB (new)					✔	✔	✔	✔		✔

TABLE 1: Forming fabric portfolio at a glance.

FIGURE 1: Primoselect with just one binder yarn – all unnecessary yarns removed allowing a more open structure, optimum drainage capability and lower energy consumption.



Olli Kääpä, vice president for Products, confirms that over the past few years Heimbach has strategically extended its forming fabric product portfolio.

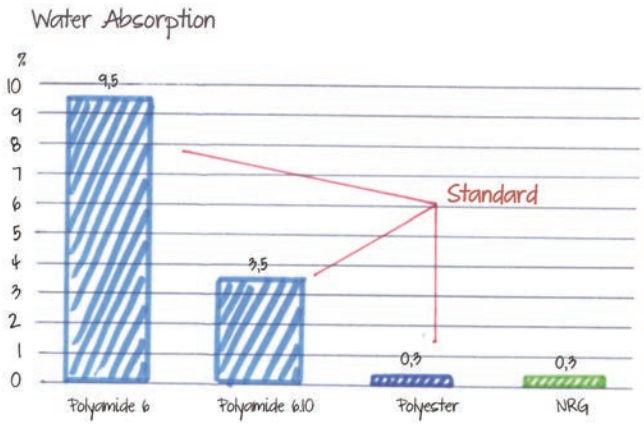
Long experience with multi-layer forming fabrics

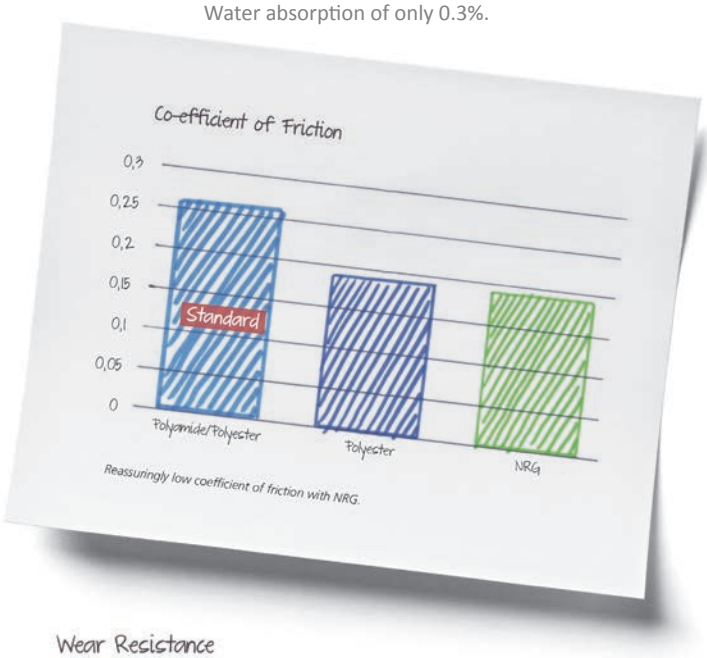
Anyone that attaches great importance to runnability and cost reduction "will always find the right solution with Heimbach", states Kääpä, referring to savings potential in terms of energy, raw materials and additives, as well as paper quality.

"As with every product innovation, it was critical in this case to show increased benefits for our customers," he explains. Now a new chapter has begun, adds Kääpä, looking back to the late nineties, when the first sheet support binding (SSB) fabrics came on the market. These forming fabrics brought a change to the business of papermaking, due to the fine paper-side surface and robust machine-side that were made possible by integrated binder yarns. "We were part of this from the beginning, when these designs became universally popular, and in the meantime, we have become established among the leading suppliers." Kääpä notes that their classical Primobond and Primocross brands have been well proven for many years in the most diverse applications.

Responding to every need

Kääpa, who has worked at Heimbach for over 25 years, points to the widened product range in the forming section (see Table 1). "Heimbach continues to offer tailor-made solutions for all types of paper - from pulp to tissue. With





(CLOCKWISE FROM TOP LEFT) FIGURE 2: Premium solution: 8-shaft weave pattern on the machine side. **FIGURE 3:** Reassuringly low coefficient of friction. **FIGURE 4:** Superior wear resistance: NRG – the high performance monofilament. **FIGURE 5:** Water absorption of only 0.3%.

Primoselect, which we unveiled in 2013, papermakers are able to take advantage of previously unprecedented possibilities thanks to the patented weaving design which comprises only one integrated binding yarn," says Kääpä (Figure 1).

The papermaker himself helps to determine the exact specification to be applied by prioritising his needs regarding formation, lifetime, former hygiene or energy savings. Primoselect scores highly on the last point in particular, with energy savings pushed to the fore by the new Plus (+) varieties.

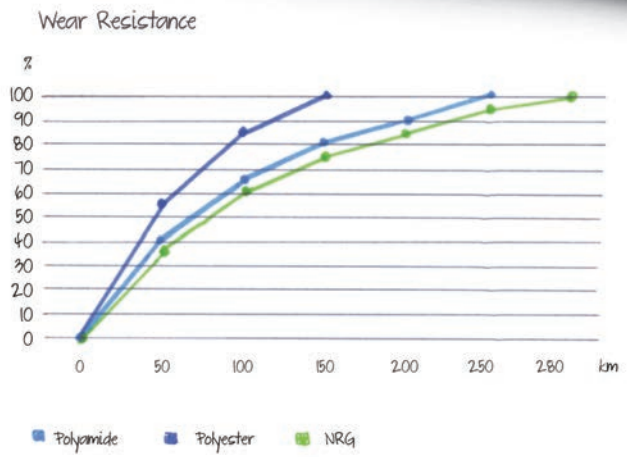
A double plus

"The Plus+ designs effectively constitute a stand-alone product line," explains Hamish Parsons, Strategic Product Manager Forming. In addition to Primoselect SF+ (Super Fine) for graphical applications now, Heimbach also offers Primoselect HD+ (Heavy Duty), a design developed specifically for packaging applications.

Of course, these fabrics also meet the challenge of being able to combine several benefits. "The HD+ design combines two core aspects which until now have not been available in combination in any other forming fabric," states Parsons, who goes on to explain why. Firstly, the Plus alternatives are characterised by an 8-shaft weave pattern on the machine side (Figure 2). Secondly, the machine-side cross direction yarns, designated with the name NRG, benefit from an especially low Coefficient of Friction (CoF, Figures 3 and 4). This special design and material combination also meets demands for maximum abrasion resistance. The machine-side construction, in keeping with the general Primoselect concept, offers different options depending upon requirements and objectives. Therefore, the proportion of the NRG high-performance monofilaments can vary between 50% and 100%.

One design – many benefits

Improved wear resistance and, in particular, a lower CoF are assured with the Plus varieties: "Papermakers will make noticeable energy savings," remarks Parsons. In itself,



the 8-shaft construction is nothing new, as this has been standard in the industry for some time, but Heimbach believes the combination of weave pattern and materials to be revolutionary. Add to this, improved cleanliness, reduced fibre carry and less energy consumption, with the latter attributable to the new material combination, as well as a more open structure and reduced caliper of the Primoselect weave. With the elimination of the redundant second binder yarn, fabrics are thinner and water can flow through the structure more quickly. There are fewer yarns in the fabric, and more water throughput.

"The water removal is excellent," explains Parsons, clarifying that apart from the fact that each Primoselect fabric has a lower void volume, new material only absorbs small amounts of fluid (water absorption 0,3 %, Figure 5). This means a very high drainage capacity with first-class retention. This reduces costs for chemical additives. Parsons concludes, "We are now discussing the Plus variant with even more customers, and all installations up to press are highly promising." ■

Enhanced services for Andritz DD-Washers

With installations in 24 countries, the DD-Washer is clearly preferred for fibreline washing applications. To support this installed base, Andritz has developed a full range of monitoring, diagnostic, and support services to reduce lifecycle costs and keep availability high.

Virtually all the DD-Washer systems ever delivered are still in operation. Many of the advances made over the five generations of washers are available as retrofits or upgrades to these installed systems.

Retrofits and upgrades to increase performance and extend shutdown intervals

An almost universal trend in mills today is to extend the period between planned shutdowns for maintenance. There is always a trade-off: intervals too short may subtract from maximum production; intervals too long may lead to degraded performance or even a catastrophic component failure.

Improvements in materials of construction in the DD-Washer have been steadily adopted over the years. Intensive R&D for sealing and other critical components is done in three pilot machines running 24/7. Chances are that any component in an older DD-Washer will benefit from these improvements in wear when replaced. For parts of the machine that are not designed for replacement, there are services for on-site coating and cladding with replaceable wear surfaces.

Washing efficiency is a key parameter for cost-effective pulp production. If a mill has continually increased production over the years without upgrading or reevaluating operational setpoints for the washer, it is possible that the operation is no longer optimised. However, there are rather simple retrofits, such as upgrading the wash water distribution system, to keep washing efficiency high or even improve it by as much as 20%, even at the higher loadings.

Efficiency can also be improved by readjusting wash water and filtrate flows between washing stages. In addition, adding a high-pressure oscillating shower to the screen plate will often eliminate losses in throughput or efficiency if plugging is an issue. A retrofit to optimise the cake height is also possible for older generation drums.

IIoT service tools

In addition to equipment upgrades, the Andritz Service division has developed modern tools to monitor, enhance, and extend the life of DD-Washers. These services are available on a contract basis.

These service tools take advantage of recent advances in the Industrial Internet of Things (IIoT), including smart sensors and data analytics. Sensors can be installed in the washer system to continually measure sealing water pressure and flow, sealing air pressure and flow, the rotation speed of the drum, drum positioning, the running life of the end seal, etc. This gives insight into the condition of the end seal, which is one of the critical consumable parts of the washer. The user interface to this information is a simple DD-Washer Dashboard using traffic light indicators (red, yellow, green). The information is displayed on a handheld tablet for maintenance teams and optionally a DCS screen for operators and is available via a Metris app at any time and anywhere.

> "Our service concept, combining mill audits, shutdown services, and effective IIoT service tools, is a powerful way to let the mills focus on production while we ensure the runnability of the DD-Washer."
>
> PASI HÄRKÖNEN, PRODUCT MANAGER, ANDRITZ

In addition, there are new monitoring tools for early detection of drum leaks, for detecting scaling on the perforated screen plate, and for monitoring the thickness of the end seal to predict when it should be replaced. By interfacing these tools with the Andritz Metris platform – our brand for digital IIoT solutions – mills are able to benefit from mobile functionality, remote maintenance solutions, real-time data, and mill optimisation using OPP (Optimisation of Process Performance) software.

Decision support capabilities from the Metris platform could include creating indexes for each DD-Washer with regards to scaling, washing consistency, washing efficiency, and rotational torque to predict the behavior of the equipment and the washing process. Andritz's combination of operational, shutdown, and lifecycle services ensures safe and optimal performance of the DD-Washer – no matter when or where installed. ■

OPTICAL BRIGHTENING

Archroma celebrates opening of **Global Competence Centre for Whiteness**

Archroma has officially inaugurated its new Global Competence Centre for Whiteness in Prat, near Barcelona, Spain. Together with the Global Competence Centres for Colourants (Reinach, Switzerland) and for Surface & Coating Technology (Bradford, UK), the new centre in Prat forms a network of experts fully dedicated to developing innovative product packages to support its customer production process with integrated system solutions.

Whiteness and brightness solutions for paper can be achieved with optical brightening agents complemented with shading dyes and pigments. The new installation is therefore ideally located in Prat, where Archroma has major OBA (Optical Brightening Agent) and colourant manufacturing plants, recently extended with additional tetrasulfonated OBA production.

During the last few years, Archroma has launched several eco-advanced innovations in the area of whiteness, such as Leucophor® MT liquid, a REACH-registered, urea-free, modified tetrasulfonated OBA that offers papermakers a new, cost-effective option to achieve high whiteness levels in a surface application, especially at the size press, and more recently on the North American market, Leucophor® ACK liquid, a patented ultra-concentrated, urea-free disulfonated OBA for brilliant whiteness in stock and coating applications.

Andrew Jackson, product manager OBAs, Archroma Packaging & Paper Specialties, commented: “At Archroma, we continuously challenge the status quo in the deep belief that we can make our industry sustainable. As the paper market has been re-morphing and transforming in the past years, we see a growing demand for chemical solutions that support sustainability. And as consumers are increasingly looking for safer and eco-friendlier options, Archroma is committed to help its customers answer the call, and that clearly includes making sure whiteness solutions are designed accordingly.” ■

TOP: Archroma’s CEO Alexander Wessels (third from left) inaugurates the new Global Competence Centre for Whiteness in Prat, near Barcelona, Spain, with OBA specialist team (left to right) David Atkinson, Gabriel Martinez, Edna Trullas, Fabienne Schneider and Andrew Jackson. (Photo: Archroma)

ABOVE: Lab demonstration by OBA Application Technician Fabienne Schneider at the inauguration ceremony of the new Global Competence Centre for Whiteness in Prat, near Barcelona, Spain on July 5, 2018. (Photo: Archroma)

WINCHES

Demag's high capacity winch cranes provide a fast, safe and reliable lift

With their outstanding combination of size and lifting capacity, Demag's compact High Capacity Winches can handle loads of up to 500T.

The winches offer a full range of solutions for heavy mechanical engineering applications, and by using them as tandem units, their lifting capacity can be increased to 1000T. The open winch units can also be configured to meet the customers' needs by way of their modular system design, without the need for any additional design or development work.

The load on the crane superstructure can be significantly reduced due to the low hoist unit dead weight. The hoist units are equipped with wear-resistant components, ideal for harsh environments and offer good accessibility for service and maintenance. They can also be used to modernise existing crane installations where little space is available.

Demag's open winch units are considered ultra-reliable and offer optimum approach dimensions to utilise the existing floor area. Depending on their design, the 4 or 6-wheel crabs ensure uniform distribution of the load on the crane girders.

Many additional options are available according to customer needs, such as single or double hooks, a motor-driven design and a hook position that can be locked at increments of 90°. ■

The future for forming fabrics

Primoselect is a unique concept in forming fabric design: Within this product group **Primoselect.HD** is the perfect solution for **packaging paper** production.

- **Optimised production** in terms of runnability, dryness, energy consumption and efficiency
- More open structure and low caliper leading to **improved drainage**
- **Good sheet formation**
- Robust machine side providing **better stability and longer life**
- **Easy to clean**, increased retention, less sheet breaks
- **Less fibre and water carry**

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BEARINGS

A winder upgrade by Voith delivers 15% capacity improvement

Voith's new SmoothRun hydropneumatic damping bearing system for winders effectively reduces vibrations occurring during the winding process. Hydropneumatic damping allows for higher operating speeds and better winding results. Overall, capacity increases of up to 15% are possible, states Voith, with the compact upgrade solution suitable for Voith and Jagenberg two-drum winders.

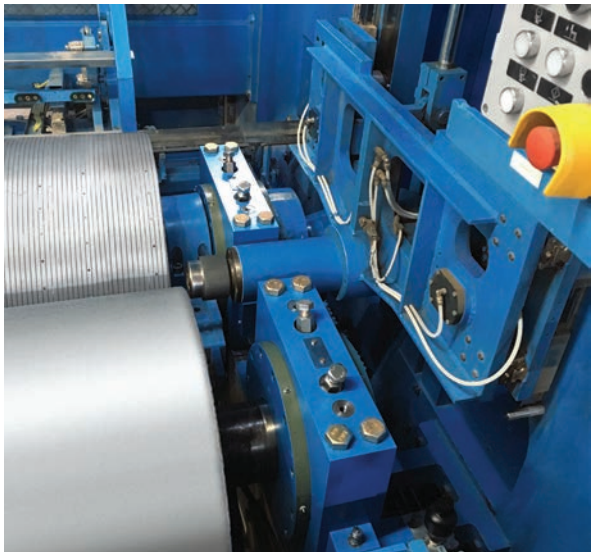
Without special damping, vibration can occur in conventional winders at high production speeds for certain paper grades; these vibrations can impair winding quality. However, to minimise the disruption during the winding process, the production speed and accelerations rates need to be reduced below the maximum capability of the winder.

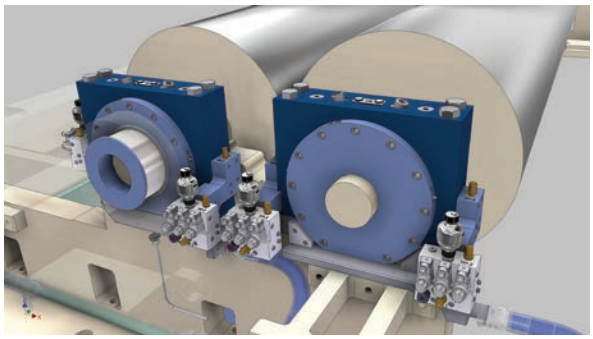
With Voith's SmoothRun hydropneumatic damping bearings, the vibrations can be effectively reduced while allowing equipment to continue operating at consistently high speeds. At the same time, SmoothRun improves the winding results and reduces the overall mechanical stress on the machine.

Case example: Eliminating bottlenecks through capacity upgrades

Papier- und Kartonfabrik Varel (PKV) based in Lower Saxony, produces high-quality corrugating medium and testliner on its PM 5. Until now, the existing VariFlex M had to be run at a lower speed when producing paper grades sensitive to vibrations. The result is the winder could barely keep up with the production of the paper machine.

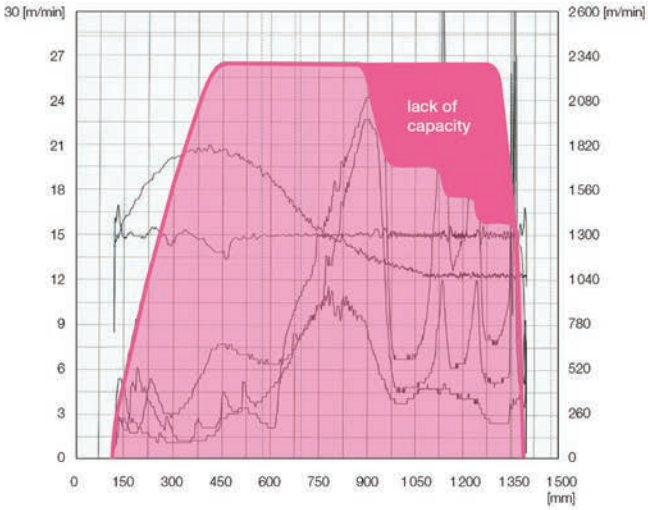
The purpose of the hydropneumatic damping bearings was to allow the winder to be operated at the maximum speed. "Following commissioning of the new bearing system we were able to reduce vibrations for all paper grades and increase speeds. We are currently optimising the settings of the bearing system with intensive support from Voith," explains Michael Wolff, line manager: equipment at PK Varel. ■



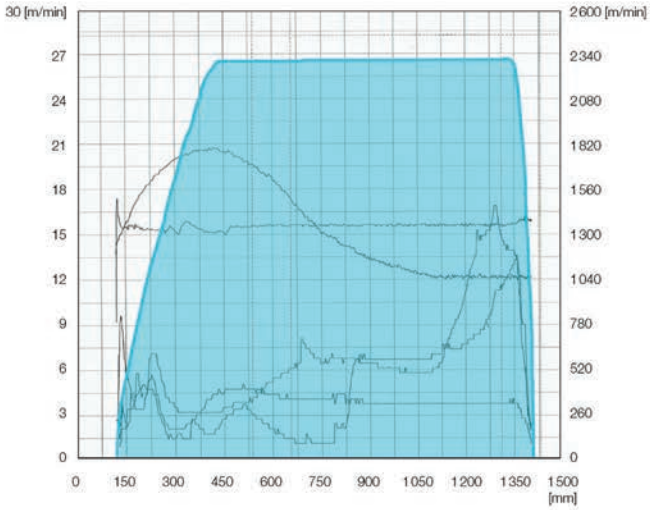


TOP: Voith's SmoothRun hydropneumatic damping bearing system reduces vibrations occurring on the winder drums. **ABOVE:** SmoothRun helps achieve higher operating speeds and improved winding results. **BELOW:** A consistently high operating speed can be maintained without vibrations. The coloured area underneath the speed curves corresponds to capacity at 2,300 m/min. (Left without damping, right with SmoothRun damping)

2 300 m/min, without damping



2 300 m/min, SmoothRun: hydropneumatic damping



VF Dura 35


VA 50A

PUMPS

Verder appoints The Pumpsmith as sole distributor for KZN

Verder – a global supplier in advanced industrial pump solutions – has signed an exclusive distribution partnership with The Pumpsmith, as part of the company's long-term strategy to expand its footprint within the greater KwaZulu-Natal (KZN) region.

"This was an important move for our business. Verder has a long-standing presence in KZN and - as the region is a key hub for investment, development and growth of industrial sectors – we recognised an opportunity to increase our own investment, and extend our pump offering to customers in the area," says Darryl Macdougall, managing director, Verder Pumps South Africa.

Verder has an installed base within sugar mills, paper mills, steel manufacturing and chrome processing plants, as well as chemical tank farms. This demonstrates the depth of the company's product portfolio for diverse applications. "Having previously worked through distributor relationships to supply products and pump solutions to the region, we understand the value of local knowledge and presence. The Pumpsmith was, as such, appointed due to their in-depth market knowledge, technical ability, service capability and high coverage of the KZN province," adds Macdougall.

As the exclusive distribution partner to Verder in the KZN region, The Pumpsmith will hold stock of – though not limited to - Peristaltic Hose pumps, Verderflex VF and Dura, Tube pumps, Vantage 5000 and VerderAir air operated double diaphragm pumps. The Pumpsmith will also continue to offer after-sales service support to their clients on all Verder pumps, including servicing and maintenance.

Verder has also appointed Flo-Tek as its exclusive distribution partner in Nelspruit and surrounding areas, as the pumps company continues to expand its footprint.

Macdougall adds, "We are very pleased to bring Flo-Tek onboard as a distribution partner. Nelspruit and the Mpumalanga province present significant growth opportunities for our business – and Flo-Tek holds valuable market knowledge on the local context conditions and needs of their customers that will support our ambitions. And, this appointment also opens incredible opportunities for Flo-Tek to expand their solution offerings to their customers too." ■

AND IN OTHER NEWS...

Imerys Performance Additives Division launches new website

Imerys Performance Additives, a division of Imerys, a supplier of mineral-based specialty solutions, launched its new website www.imerys-performance-additives.com which replaces the existing www.imerystalc.com website.

Imerys minerals are used in the pulp, paper and paperboard industries to improve productivity, surface and print quality, while its bentonites and talcs make excellent pitch and stickies control agents, wet-end process aids and water loop treatment aids.

The new website presents the Performance Additives Division's full portfolio of mineral solutions and their attributes across a wide range of industrial applications.

Created with the user experience in mind, it features a streamlined responsive design, simple navigation, richer content and improved functionalities, such as a new easy-to-use download centre and product finder.

Valmet launches digital collaboration space

Valmet is launching a unique digital space for continuous collaboration and real-time sharing of information with customers. The Valmet Customer Portal is a collaboration space that brings Valmet's expertise and online services into one platform to make working together with customers easier and more transparent than ever before.

The portal allows customers and Valmet experts to collaborate, share information and innovate together in real time. The online services, functionalities and usability of the portal have been developed together with customers to provide useful, personalised content.

The content is personalised according to each user's profile and interests. Valmet is developing a total of nine services modules for the portal to support cooperation with customers - starting from the sales phase, through project deliveries, and all the way to daily reliability and performance services.

The launch starts with the first four modules:

1. **Expert Fastlane** helps customers to easily find answers to their issues and questions. Valmet's experts are always close to customers and also easily accessible through the portal.
2. **Opportunities** lets customers see the status of their development plan - the Shared Roadmap - with defined actions. The results of the actions can be monitored, and lessons learned and related new ideas can be shared.
3. **Learning** gives customers the opportunity to build their teams' capabilities and competences.
4. **The Operations Panel** is the customer's view to Valmet's Industrial Internet applications and services. Through dashboard views, customers can easily get the right information to monitor their operational KPIs and the progress of their business targets. ■

image: SUMITOMO FORESTRY & NIKKEN SEKKEI

Breeding trees for big buildings

Tall timber buildings was just one of the topics deliberated at the recent annual meeting of the International Council of Forest & Paper Associations (ICFPA) in Tokyo, Japan. Country representatives discussed global priorities around climate change, tree breeding research and the role of the sector in the bio-economy.

With Tokyo as the host city, it would be remiss not to have examined plans by Sumitomo Forestry to build a 350-metre high hybrid timber skyscraper to mark the company's 350th anniversary in 2041.

Named W350, the ambitious 70-storey tower will be almost four times higher than the 18-storey Brock Commons Student Residence in Vancouver, Canada, which currently holds the record for the tallest timber building in the world. The skyscraper has been designed by Sumitomo's Tsukuba Research Laboratory in collaboration with Tokyo practice Nikken Sekkei. It will be Japan's tallest building.

The company says it will be a 'wood and steel hybrid structure of the right materials in the right places' with a timber to steel ratio of 9:1. It is expected that 185,000 cubic metres of wood will be used in its construction. But where will it come from?

"They will grow the trees," remarks ICFPA president and executive director of the Paper Manufacturers Association of South Africa Jane Molony. "Tree breeding forms an integral part of the W350 project, and Sumitomo envisages a convergence of materials, biorefinery and tissue culture technologies."

Green shoots of innovation

"On the one hand, the sector has seen printing and writing grade production and consumption continue its downward trend with machines either closing or converting to more profitable grades," explains Molony. "We have seen the death of some grades but now we witness the emergence of so much that is new, that is hopeful; green shoots are everywhere."

Like the phoenix rising, Molony says we see investment in biofuel in Finland, xylitol being produced from waste streams in South Africa and we have gene editing potentially making the world a safer place by curing disease and providing a valuable tool to produce more from less. "All this made possible from the humble tree."

Biotech boon

"The forest product sector is entering a remarkably exciting era, especially in tree breeding and wood science research and exploring the use of wood as a renewable, low carbon material in the bioeconomy," she says.

The forest and paper sectors face increasing pressure to meet demand. Issues such as vulnerability to pests and disease, along with competing uses for natural resources, require accelerated adaptation to climate change effects. There is also a need to improve the quality and quantity of products.

Planted trees find their place

While timber plantations represent only 7% of the planet's forest area, they provide half of the wood for industrial purposes[1]. There is the global transition towards a bio-based industry that uses renewable materials to replace finite, petroleum-derived products. "The forestry sector is well-placed to serve this transition, not only at research level but also on the ground," says Molony.

With the formal timber sector employing about 13.7 million workers globally and generating a gross value add of more than USD600 billion each year, it is a key contributor to the economy of many countries. It is also an important component in terms of giving effect to the Climate Change Paris Agreement through carbon sequestration while the goods and services provided by forests make significant contributions towards the achievement of the UN Sustainable Development Goals.

The ICFPA meeting heard presentations on health and safety and a chain-of-custody standard for wood and wood products being finalised by the International Organisation for Standardisation (ISO).

[1] Food and Agricultural Organisation of the United Nations

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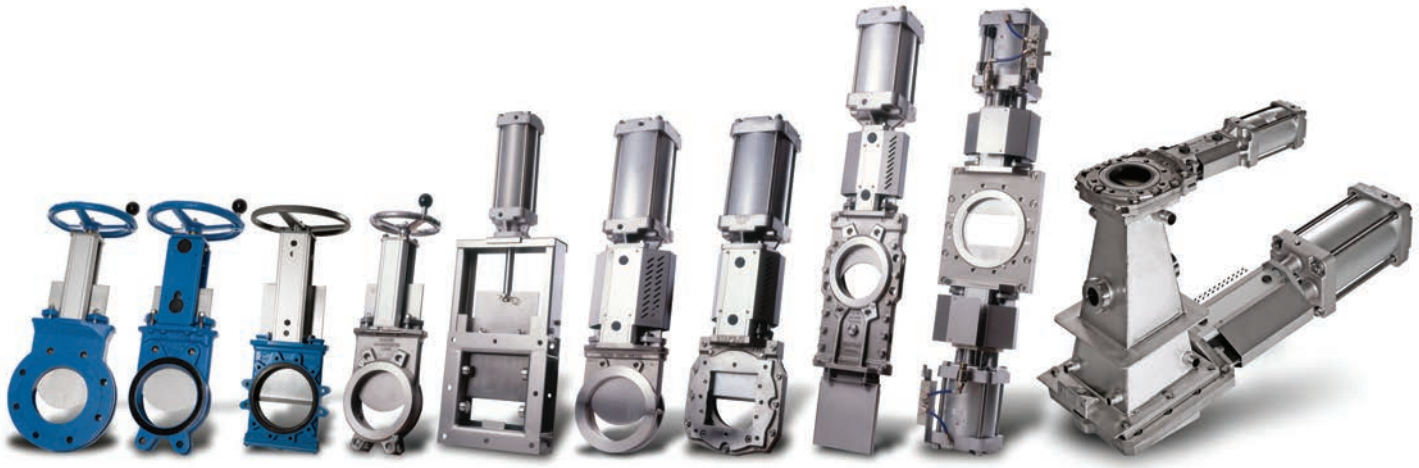
Valmet FORWARD

NAF
STAFSJÖ

PULP, PAPER & CHEMICAL CELLULOSE

NAF - PROCESS CONTROL VALVES

NAF



STAFSJÖ - KNIFE GATE VALVES

STAFSJO

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