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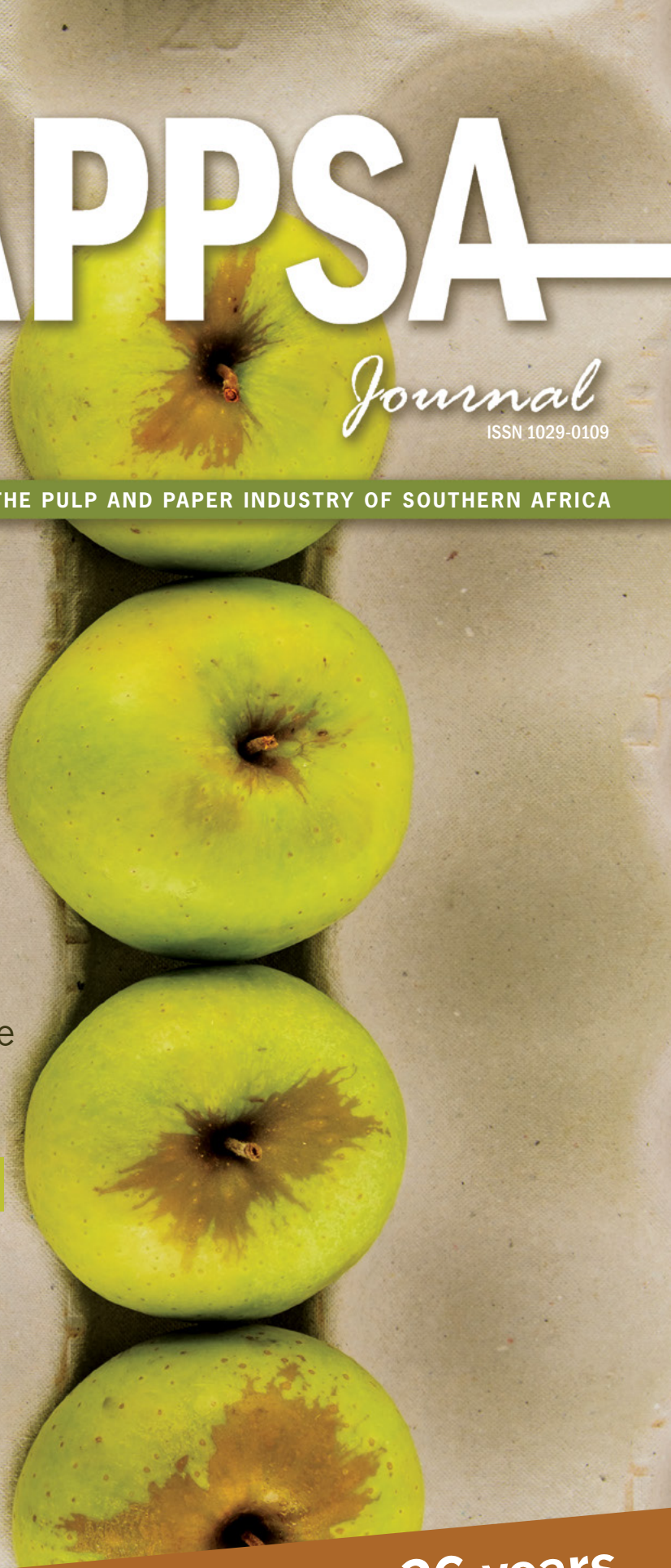

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Cover pic: Pulp-based fruit tray by Huhtamaki

Quarter 4 2018


TAPPSA EXECUTIVE COMMITTEE IN 1999


TAPPSA SOUTHERN REGION COMMITTEE IN 2005

O tempora! O mores!

Heralding the end of an era

BY SAM CHOLES
Editor

As TAPPSA prepares to close its doors and we close out 2018 with the final edition of the TAPPSA Journal, the team has – with the help (and memory) of many who have worked with the association – pieced together TAPPSA's 36-year journey.

As far back as 1976, Ron Day, the then-managing director of Sappi, proposed the formation of an association for the paper industry. The US pulp and paper association TAPPI was approached with the idea of forming a branch in South Africa. They declined but offered to help set up what was to become TAPPSA.

According to editorial in the May/June 1982 issue of *Paper Southern Africa* (published by Primedia), a tentative start was made by the South African Institution of Chemical Engineers (SAIChE) with pulp and paper centric meetings held in the apt surroundings of the Science Lecture Theatre Complex at the then-University of Natal (now UKZN).

"During this preliminary period," wrote *Paper Southern Africa* technical editor William Hastie, "it became clear that, apart from those directly engaged in the manufacture [of paper], there would be active support from the supporting industries... plant and equipment suppliers, chemical and dye manufacturers, felt and wires and all those in activities indirectly essential to a healthy and growing paper and pulp industry."

TAPPSA is born

On 25 April 1982, TAPPSA hosted its inaugural meeting at the Maharani hotel in Durban at which its first chairman Charl Gonin was elected.

Over the years, a number of well-known 'paper people' took the chair including Graeme Lloyd, Tjaart van der Walt, Jim Casey, John Hunt, Roger Sobotker, Chris Macdonald and current chair Iain Kerr. Roland Streatfield originally ran the association as national organiser from 1996 to 2004, after which Jane Molony took over as executive director. Jane moved on to head up the Paper Manufacturers Association of South Africa (PAMSA) at which time Lynne Askew, who was handling advertising sales for the journal, took up the mantle.

At the outset, TAPPSA comprised three regions largely based on the locality of the paper manufacturers: Northern (Gauteng and Mpumalanga), Southern (Western and Eastern Cape) and the Eastern (KwaZulu-Natal) regions.

The association has been supported by paper mills and associated industries in the form of company membership by paper manufacturers, and sustaining membership by suppliers to the industry. Staff of the respective mills were encouraged to become individual members of the association.

At its height during the late 1990s and early 2000s, TAPPSA enjoyed the support of over 700 members but sadly these numbers dwindled to a mere 300, largely attributable to the rise of digital media and availability of online training, the closure of paper machines and mills, and the subsequent cost pressures.

Enter: the *TAPPSA Journal*

In 1999, the first edition of the *TAPPSA Journal* was published with Jane as the inaugural editor working alongside Roland. Jane continued to edit the journal, and brought Jodie Watt on board to assist her. Jodie took over editorship in 2008 until 2014, after which she continued to handle the design and layout when I took the reins. At first, it was a daunting task but as my networks and knowledge grew, I managed to figure out what the big words actually meant. For Jane, Jodie and myself, the role as editor has taken us to interesting places and allowed us to meet many people.


TAPPSA NORTHERN REGION COMMITTEE IN 2007


LINKS TO SISTER ASSOCIATIONS OVERSEAS

The *TAPPSA Journal* has always been a sought-after publication highlighting events and advancements made in the production of pulp and paper. The journal and the association could not have done without the stalwart support of Melanie Smith who organised the membership and mailing lists and ensured that the journal was posted on time. The journal had many overseas subscribers keen to keep abreast of the progress within the South African pulp and paper industry.

Over the years, it has been hard work to publish original research papers in the Journal, as it is not accredited by the Department of Higher Education and Training. Authors would rather have their work published in recognised journals so as to attract remuneration.

Despite several attempts to have the Journal accredited by the Department of Higher Education, and thus attract sufficient technical papers, these applications were all met with rejection. I recall the mysterious disappearance of one of my painstakingly-compiled submissions comprising years' worth of journals. Some of them were the only copies we had, and nobody in the DHET could tell me where they landed up. Needless to say, we had to wait another year to make a submission. All I hope for is that the missing magazines have since been recycled.

Fun and games, and lots of learning

Over the years TAPPSA ran a number of successful conferences, workshops and training courses, with the international OMNI courses very well received and supported. Unfortunately, the cost of bringing these courses to South Africa became prohibitively expensive.

Its flagship event was the biennial TAPPSA Pulp & Paper Week, Conference and Exhibition which was always well supported and showcased supporting products as well as the various mills. In recent years, the event was changed to be held every three years, to cater for the shrinking industry along with shrinking budgets.

In addition to the national TAPPSA committee, each region had their own committee that arranged events (new speakers evenings, workshops, etc.) for their area. Somewhat of a double-edged sword, the Competition Act made it difficult for industry role players to meet and socialise these gatherings. As a result, various companies implemented protocols that prevented employees attending; added to this were leaner workforces and greater workloads.

For many years, the Eastern Region ran the much-anticipated Berg Conference to which members from all regions were invited to attend. The format was a family weekend away which included various speakers on Friday evenings and Saturday mornings, the AGM and the highly successful TAPPSA golf event.

Thank you and goodnight

The TAPPSA national committee is extremely grateful to each and every one of its steadfast supporters over the years. We appreciate your kind words of gratitude and encouragement. Closing TAPPSA has not been a decision that was taken lightly.

Thank you to Melanie, Jane and Lynne for their assistance in piecing this issue together. To Iain, our chairman, thanks always for the technical back-up! To Bob Heimann, many thanks for inspiring the title of this piece. My sincere gratitude to Jodie Watt who has done a sterling job with the design of this issue. In particular, I am astounded at how she has managed to capture 36 years in just a few pages. On behalf of the team, thank you to our advertisers, especially for this issue. Your support has enabled us to go out with a bang!

It has been exciting to see the innovation in the fibre sector, and how an industry that has been disrupted by technology and the electronic age has the potential and foresight to do some disrupting itself. As plastic and non-renewable materials become taboo, and paper and wood become the products of choice, this final issue pays tribute to such innovation, from the processes to the products.

Long live paper (and all the innovative stuff we can make from sustainably produced wood and recycled fibre!).

ABOVE PHOTOGRAPHS FROM LEFT TO RIGHT

Donovan Barton-Hobbs (inset), Jim Casey (National Chairman), Chris Macdonald (National Secretary/Treasurer), Soger Sobotker, Peter Miller (National Vice-chairman), Bob Heimann, Roland Streatfield (National Organiser), Gunter Gerischer (inset), and Leigh Mann (absent).

Jonathan Hermanus (Treasurer), Mike Johnston (Vice Chairperson); Roger Sobotker (Chairperson), Jason Naidoo (Secretary), Jacques Haarhof (Member), Lavendran Reddy (Member).

Bob Heimann, Ntokozo Sithole, Nkuli Khanyeza, Shaun Powell (Vice Chair), Brindha Roberts (Chairperson), Angelo Spada, Mike Birkett. Susann Pienaar (Secretary) and Karin Krüger were not present.

Jane Molony (then editor of the *TAPPSA Journal* and Executive Director of TAPPSA) at the Zellcheming centenary celebrations held in 2005 in Wiesbaden, Germany, with Pirkko Molkentin-Matilainen (PI) and Wilhelm Busse (Zellcheming).

Upon announcing the news of TAPPSA's closure, TAPPSA received a number of messages:

What very sad news. Whilst we all become immersed in the advancement of technology, one must always remember, technology will never replace the friendships, business relationships or those face to face encounters that Tappsa brought to our industry. To this end I would like to thank Iain and his team, as well as Lynne and Melanie for your tremendous efforts, to keep the Tappsa's flag flying as high as it has over so many years. This truly is, the end of an era, and a very sad day for the paper industry in South Africa.

Hugh Heine, Valmet South Africa

This is indeed very sad news. Having personally been associated with the pulp and paper industry for the past 22 years, it is really disappointing to hear that the association will shortly cease to exist. The market factors are understandable, and have had a marked impact on not only the pulp and paper industry but many other associated industries too. We would like to thank yourself, Iain and all of the executive committee, past and present, for your unwavering dedication to producing and reviewing quality technical literature and publications for the industry, and allowing us the opportunity as a company to gain valuable recognition in the industry for our products and services. We are proud to have been associated with Tappsa over this period. Thank you.

Steve Clark, Metso

It must be a sad day for you because we could see how you tried to keep the journal interesting and relevant.

Roger Philps, Rogortec

Dear Lynne, This is sad news indeed but I suppose a sign of the times. The industry has changed enormously in these 21 years that coincide with my tenure in the industry. I think the contraction of budgets and restrictions of the competitions act are major causes. I wish you well for the future as you no doubt need to adapt to this also. Thank you for doing such a sterling job in your role in TAPPSA.

Neil Hunt, Mpact

Dear Iain and Lynne,
As a faithful supporter of TAPPSA for many years I want to express my great regret that the Association has finally had to call it a day. It is surely a reflection of the economic hard times we face now. I will always feel proud of having belonged to TAPPSA, and am truly sad to see it go.

Bob Heimann, retired environmental-coordinator, Kimberly-Clark

Thank you for your valued support over the last 12 years. I started printing for Jane Molony in 2006. TAPPSA Journal went to print on 19 June 2006. It's been interesting to note the paper stock changes over the years as paper was discontinued and new sustainable stocks were made and FSC-certified. We did well together and it is sad how the sign of the times and the digital age is moving away from a good old printed magazine.

Daryl Scott, Fishwicks Printers

Then and now...

1982

The Technical Association for the Pulp and Paper industry of South Africa (TAPPSA) is established.

What else happened in this year...
On 11 January 1982, the United Nations Special Committee against Apartheid launched the International Year of Mobilisation for Sanctions against South Africa, hastening the divestment of South Africa's economy by major academic, social and industrial bodies. At this time, South Africa's State President was Marais Viljoen, and our Prime Minister was P.W. Botha.

2010

In this year...
While South Africa took centre stage in the world's sporting calendar as host to the 2010 FIFA World Cup, our pulp and paper industry was occupied with quieter celebrations as tonnages of most grades recovered from their 2008/2009 lows during the 2008 economic recession, with the exception of fluting and kraft papers. The industry's steady recovery was driven mostly by packaging and tissue grades, despite a strong Rand and a lack of trade tarrifs making South Africa an easy target for dumping, with imports of paper and packaging grades rising strongly to a 28% increase since 2006. Total paper and board production was at 2,467,000 tonnes, while total pulp production was at 2,307,000 tonnes.

1999
Our first issue

The first issue of the *TAPPSA Journal* (pictured left) is published under the editorship of Jane Molony.

What else happened in this year...
South Africa was enjoying a growing economy, five years into democracy. On 2 June, the country's second democratic elections took place and were won by the African National Congress. It was in this year that Nelson Mandela stepped down after one term as South Africa's first democratically elected president.

The pulp and paper industry at this time...
While our industry archives regrettably do not go back to 1999, we did find the industry statistics for 2001, and include them below as an indicator of what kind of industry the *TAPPSA Journal* was born into.

PRODUCTION	(1000 tonnes)
Printing and writing papers	863
Packaging papers	1245
Tissue paper	150
Total paper	**2257**
Total pulp (excluding dissolving pulp and recycled fibre)	**1740**
EXPORTS	**(1000 tonnes)**
Paper	640
Pulp (excluding dissolving pulp and recycled fibre)	183
IMPORTS	**(1000 tonnes)**
Paper	254
Pulp (excluding dissolving pulp and recycled fibre)	50
CONSUMPTION	**(1000 tonnes)**
Paper	1871
Pulp (excluding dissolving pulp and recycled fibre)	1607
VALUE	**(million Rand)**
Value of production	10428
Value of pulp exports	2320
Value of paper exports	2704

2001

TAPPSA membership has gone up and down since our inception. In 2001, TAPPSA had 679 members. Our membership peaked in 2004 with 807 members on the books. Tellingly, this membership has dwindled considerably to just 272 members in 2018.

2018

The pulp and paper industry 36 years later...
While the forestry-to-paper contribution to South Africa's GDP was 0.48% in 2017, pulp production was down from 2016 levels, with local demand declining the most, according to PAMSA. Pulp continues to add positively and substantially to the country's trade balance. There is also a longer running trend of rising packaging and tissue grades, both becoming increasingly positive. Total paper, tissue and board production for 2017 was at 2,180,061 tonnes, with total paper, tissue and board consumption at 2,255,075 tonnes.

Going forward...
In 2001, the then-editor of the *TAPPSA Journal*, Jane Molony, voiced her concerns at the threat of HIV/Aids to our workforce in the pulp and paper industry. While this threat has not materialised to the extent that the industry feared it would, there is no doubt that South Africa's workforce remains challenged - but now, it is by high unemployment rates. According to latest stats from the World Bank, South Africa's unemployment rate stood at 26.7% in the last quarter of 2017, with a horrifying 50% unemployment rate among youths. According to Statistics South Africa, the Quarterly Labour Force Survey, Q3: 2018 states that 6.2 million South Africans are now unemployed - 4.3 million of which have been unemployed for a year or longer. In the last ten years, the number of people in long-term unemployment (defined as 12 months or more) has increased by 1.7 million, from 2.6 million in 2008.

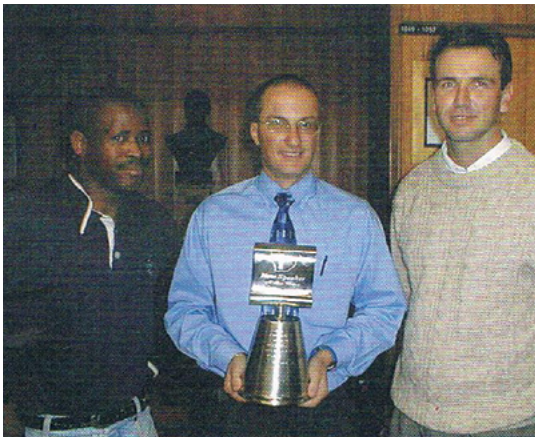
Spotted in the TAPPSA Journal through the years

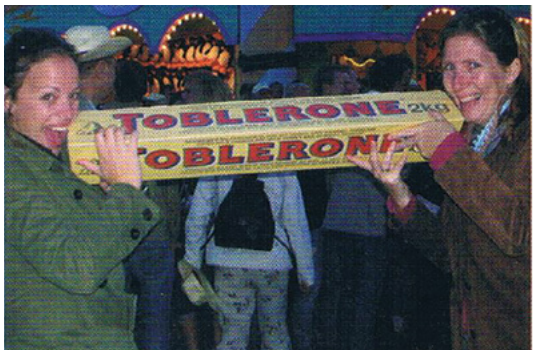
ABOVE LEFT. Amid the festivities of his 80th birthday celebration, Joe Jack was presented with an Honorary Tappsa Membership by TAPPSA founder member, Professor Günter Gerischer. **RIGHT.** Sappi Stanger hosted the FP&M Seta and Umfolozi TVET College for a brief tour of the mill in August 2017.

ABOVE. In 2013, TAPPSA successfully held an OMNI Machine Operations Course, with attendees from Lothlorien, Mpact, Voith and Mondi.
BELOW. Jane Molony with Tafadzwa Nyanzunda, director of resource-based industries at the dti at the 2016 TAPPSA Conference.

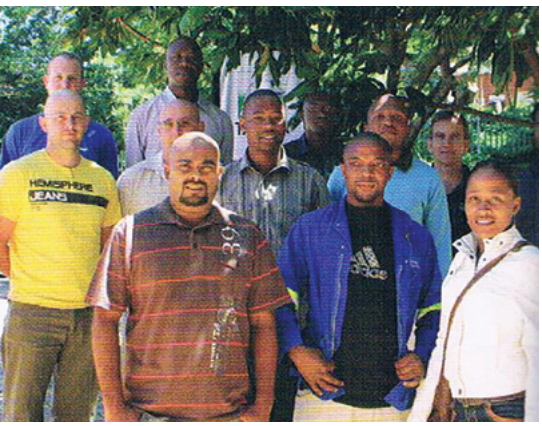
ABOVE. Students at the 2004 B.Tech Coastal presentations.
RIGHT. *TAPPSA Journal* editor Samantha Choles took the opportunity for a selfie with the now late Minister of Environmental Affairs Edna Molewa at the opening of Mpact's Liquid Packaging recycling plant in July 2017. Ms Molewa passed away after a sudden illness in September this year.

BELOW. Seen at the official opening of the CSIR Forestry Research Centre back in 2000 were (LEFT) Peter Lynch and (RIGHT) Chris Davies and Prof. Manfred Hellberg. **RIGHT, FAR RIGHT.** Over a decade later, TAPPSA continued their involvement with CSIR with the launch in 2012 of their Hands-On Pulp and Papermaking Course, in collaboration with PAMSA and the CSIR. Seen here are the course presenters and some of the course attendees.





(ABOVE) TOP. TAPPSA launched a Speakers trophy in 2000, with the winner Alex Greenway from T&C Chemicals speaking on "The measurement and control of entrained air in the pulp plant". Pictured with Alex are fellow speakers Gerhardus Scheepes and Anthony Hoto. **MIDDLE.** Srini Naidoo and Susann Pienaar at the 2006 Northern Region Conference. **BOTTOM.** Jodie Watt (previous *TAPPSA Journal* editor) and Lynne Askew (TAPPSA executive director) at the SPCI Conference and Exhibition in Stockholm, in 2008.



True blues

John Read, TAPPSA executive member and former head of projects at Mondi Merebank, casts a retrospective look.

My introduction to TAPPSA was as a student in the early 80's, attending what might have been one of the association's first international conferences. This was a grand affair held over a few days in a large hall in the Maharani Hotel in Durban. Support was terrific, speakers included prominent industry leaders from around the country, as well as those representing supplier groups.

TAPPSA gained much momentum over the next few decades becoming a well-respected organisation delivering latest technology trends to many mill engineers and process people alike. The variety and popularity of the various regional conferences as well as the Durban-based biennial conference and exhibition organised by the Eastern region continued to grow. The attendance at the conference put TAPPSA in search of a larger venue and the move from the popular Elangeni Hotel to the International Convention Centre was appropriate.

The industry continued to face many new challenges on the operational front; demands for more reliable, faster and bigger machines, less wastage, higher time efficiencies, increased clothing life, better quality, shorter maintenance/breakdown stoppage times, and lower production costs, were typical. Some suppliers were well ahead, and with it saw the demise of some well-known equipment, chemical and clothing companies, which either closed down for good, or were merged through take-overs and buy-outs. There was also growing pressure from other factors such as the increased use of digital media, and environmental/conservation considerations. These challenges often provided the themes for the various conference events, and for a while this momentum carried, but one sensed a withdrawal of support in later years. This was manifested through a definite change in the balance of supplier to mill representation, the latter often dropping below 50%.

Certainly, in the last decade this has been more noticeable, resulting in the biennial conference changing to every three years, and cancellation of the Berg Conference altogether. The final straw was cancelling the conference planned for 2019 and indeed, to cease the publication of the TAPPSA Journal at the end of 2018.

It is with sadness that I too realise the continued viability of TAPPSA is not sustainable. Suffice to say that throughout my years in the industry I look back with very fond memories of the amazing people with whom I came into contact through the association's interests, the true-blues associated with the South African pulp and paper industry.

Reflections on 35 years in the pulp and paper industry

Donovan Barton-Hobbs, retired TAPPSA executive member

The year 1979 seems a long time ago. Having started off as a young and inexperienced Asso Pulp (Association of the Pulp and Paper Industry) student, and now having recently retired, I find myself looking back over my career with a sense of pride and a lot of nostalgia.

After graduating in 1981 with a National Diploma in Pulp and Paper Technology from the Natal Technikon, I started my career in the industry at the South African Board Mills in Umgeni, Durban, which at the time was the second oldest mill in the country, something which Jim Casey light heartedly referred to as the 'University of Paper Making'.

After two years of learning how to make board without the benefit of computerised and automated process control, I was fortunate to have been transferred to Mondi Richards Bay mill (a green fields, state-of-the-art pulp and paper mill) as part of the commissioning team, working my way up to technical manager for the Mondi Richards Bay mill. It was here that I had the privilege of interacting and working with some of the luminaries of the industry at the time, who were instrumental in ensuring that Mondi Richards Bay became a world class operation.

Whilst I am saddened to hear of the demise of TAPPSA, an organisation that I was personally involved with as treasurer for 22 years, I trust and believe that the industry will continue to go from strength to strength in the coming years.

Through the years at the **Berg Conference**

John Hunt and Colin Callaghan with partners

2001 Winning Golf Team: Blaise Atkinson, Leo Davies, Danny and Chris Macdonald

ABOVE, LEFT TO RIGHT. Brindha Roberts and Lynne Askew join Devlyn Fraser and his wife at the conference dinner. **LEFT.** Delegates from the Sappi Enstra mill, Louis Stroebel seen here with his wife Linda (left) and Sanjay Raghubir.

APPW and TAPPSA **National Conference & Exhibition**

Speakers at APPW in 2000 included Swaroop Iyengar, Ted McMinn, Peter Hunter, and Jimmy Pauck, with Pam Allison as Session Chair. In the Exhibition, Chris Macdonald chats to Lazare Etiegni of Kenya's Moi University.

ABOVE. Attending the 2004 were Jim Casey, Jonathan Leslie, Reinhard Gather, and Roland Streatfield. **LEFT.** Bruce Sithole and Charlie Clarke share a laugh in the Exhibition Hall.

ABOVE, LEFT TO RIGHT. Iris Streatfield and Melanie Smith (TAPPSA) at the 2002 APPW Conference; Ian Kerr at the 2010 TAPPSA National Conference & Exhibition.

ABOVE. Peter Clews, John Read, Rupert Haslinger, Mike Nash, Jane Molony, and Jimmy Pauck catch up over lunch at the 2013 TAPPSA National Conference & Exhibition.

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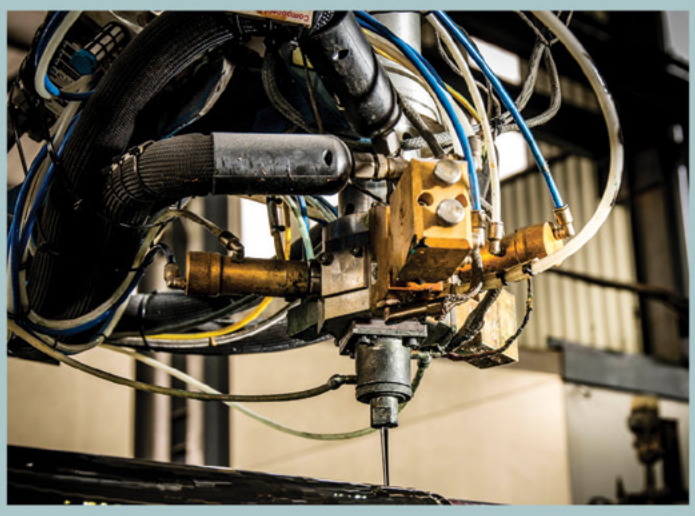
Farewell, and thank you.

As we bid farewell to the TAPPSA Journal, let us take a minute to acknowledge the impact they have made. We honour them by looking to the future and continuing their good work. H&M will be forever grateful for the insights and expertise shared that assisted our development of sustainable roller solutions.

Get in touch with H&M today and let us continue the collaboration for milling and printing excellence. Let our diverse product ranges and specialist engineering solutions give your business the edge it needs for tomorrow's success.



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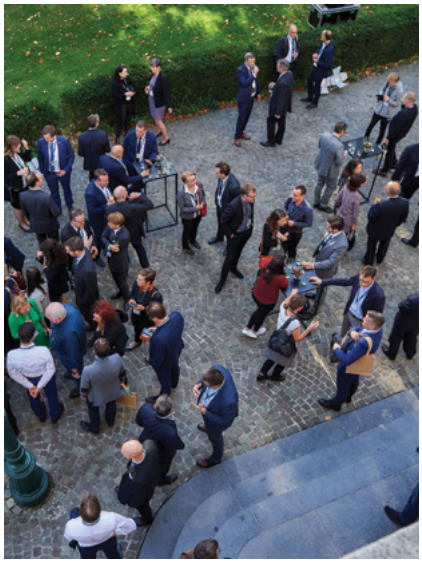


Appita Fibre Value Chain Conference
4-7 DECEMBER 2018 | NEW ZEALAND

The Packaging Conference
4-6 FEBRUARY 2019 | LAS VEGAS, NEVADA

RISI European Conference 2019
11-13 MARCH 2019 | VIENNA, AUSTRIA

Propak Africa 2019
12-15 MARCH 2019 | EXPO CENTRE, NASREC

2019 International Conference on Nanotechnology for Renewable Materials (Co-located with the Nanocellulose Forum)
3-7 JUNE 2019 | CHIBA, JAPAN

Pumps, Valves and Pipes Africa 2019
11-13 JUNE 2019 | GALLAGHER CONVENTION CENTRE

TissueCon 2019
1-4 OCTOBER 2019 | ORLANDO, FLORIDA, USA

International Conference on the Application of Superabsorbent Polymers & Other New Admixtures Towards Smart Concrete
25-27 NOVEMBER 2019 | SKUKUZA, SOUTH AFRICA

INTERNATIONAL SAP CONFERENCE

Efficiency and productivity in focus at International SAP Conference for Forest Products, Paper and Packaging

The International SAP Conference for Forest Products, Paper and Packaging 2018 took place in Prague from 16-18 October. German Solution and SAP consulting company T.CON – platinum sponsor of the conference – played an integral role in the event.

Said to be the largest and only customer-centric paper and packaging industry event of its kind globally, SAP, its partners and international industry experts presented their latest SAP-based solutions. “The vibrant atmosphere all these innovative, creatively thinking minds brought to the event was certainly nothing but mind-blowing,” said Esther Robb of T.CON. “With our different contributions, visitors were able to learn how to set new standards in terms of productivity and efficiency in production.”

The company demonstrated the various integrations and functions of their solutions at a live demo during the presentation 'Top Floor to Shop Floor – Smart Manufacturing in the Mill Industry'. With one single point of entry, their MES (Manufacturing Execution System), TRIM solution and Enterprise Logbook are all seamlessly integrated.

Along with SAP, T.CON also co-hosted the 'Manufacturing Operational Excellence with SAP® Software’ Workshop. Attendants were able to find out how SAP® and MES CAT software supports the manufacturing environment for both discrete and process industries. T.CON’s MES was built specifically for the mill process sector with all the strengths and benefits of SAP.

ABOVE AND RIGHT.
T.CON’s team invited delegates to the T.CON booth to find out how to set new standards in terms of productivity and efficiency in production

JOBS SUMMIT

Jobs, localisation and investments highlighted in October

October was an interesting month for the South African economy heralded by the inaugural Jobs Summit, which President Cyril Ramaphosa called for in the early days of his presidency.

Closing out the two-day event, the President highlighted localisation as one of "key planks" to putting South Africa on a road to economic recovery, and a real win of the summit.

In a statement leading up to the job summit Philippa Rodseth, executive director of the Manufacturing Circle, said, "The Jobs Summit is particularly relevant as the manufacturing sector is among the top three multiplier sectors in terms of value addition, job creation, export earnings and revenue generation." She pointed out that manufacturing has lost around 400,000 jobs since the 2008 financial crisis and that it is vital for South Africa that job creation takes top priority. "We have to limit further de-industrialisation, arrest job losses and stabilise our industrial base," she noted.

The localisation of procurement spend is one of the strategies required to achieve this. To this end, the Manufacturing Circle is committed to advancing the reputation of South African manufactured products and is working closely with the Proudly South African campaign. This includes promoting preferential procurement of locally manufactured and beneficiated products that are of competitive quality and price; partnering with Proudly South African and other relevant institutions in multi-faceted "buy local" campaigns; and encouraging companies to increase expenditure from local producers.

Two of PAMSA's members are also members of the Manufacturing Circle and as a result PAMSA partnered with the Manufacturing Circle to offer opportunities for all their members to make company commitments at the event. Mpact and Sappi's commitments – along Corruseal's - were read out by the head of Proudly SA.

PAMSA member-related projects have made it into the Jobs Summit's list of projects: the Ekurhuleni recycling project and Sappi's Fuel Rod project which involves production of fuel rods from biomass and coal fines.

Manufacturers put money on the table at subsequent Investment Conference

Less than 20 days after the Jobs Summit, local and international businesses came "bearing gifts" in the form of investment commitments to the tune of R134 billion at the inaugural South African Investment Conference.

President Ramaphosa said the investments were a culmination of a six-month investment drive by the four envoys tasked with globetrotting in search of over R1 trillion worth of investments over the next five years.

Two of the sector's leading players responded to the call to support goverment efforts at reigniting economic growth by committing a collective R15.7 billion in local investment.

Viv McMenamin, CEO Mondi South Africa, said, "Over the next five years we will be investing a total of around R8 billion in our South African operations, which includes ongoing investment in our forestry assets and the modernisation of our pulp, containerboard, and paper assets." This is subject to approval by the Mondi boards.

McMenamin added "I'm very proud. We are very proudly South African. We are passionate about performance. We are global competitors. We are investors of people. We want to be part of building South Africa and we want to reach across the table. We have been reaching across the table for years."

Mondi, which earns R4 billion annually from exports, believes that investing in its cost-advantaged asset base to maintain and enhance competitiveness is of particular importance for its pulp and paper operations where cost competitiveness is a key value driver. It also prides itself on a disciplined approach to investigating, approving and executing capital projects as one of its key strengths, and plays an important role in successfully delivering strong returns.

Through Mondi Zimele, Mondi's small business development initiative, the business continues to invest in enterprise development as part of an integrated supply chain, supported by local contractors and growers.

Sappi's Steve Binnie reiterated its July investment announcement that R7.7 billion will be ploughed into the local economy to draw capacity for dissolving pulp at its Saiccor Mill. The investments include a R2,7 billion capacity expansion project and a planned R5 billion over five years in various continuous improvement initiatives and upgrade projects. Sappi has in fact invested close to R5 billion in its SA operations since 2012 to boost local production including significant upgrades at Ngodwana mill.

Sustainable employment growth needs better education

At the end of October, South Africans were greeted with the news that our unemployment rate rose to 27.5% in the third quarter of 2018 from 27.2% in the previous period.

Many economists and industrial commentators have argued that this unemployment rate is not for lack of job opportunities but rather a lack of skills brought by poor education. High unemployment breeds income inequality and slows economic growth, limiting access to and/or funding for education. It's a vicious circle. But it's the private sector that is making education and people development its business with various training and skills programmes.

Bruce Strong, Mpact CEO and former Manufacturing Circle chair, agrees that education is the key to employment and the company has made this a priority. "Our commitment to job creation is evident in our apprentice and learnership programmes which improve the industry-relevant skills pool. We also provide 22 fully funded bursaries for tertiary studies to dependents of previously disadvantaged employees."

Mpact has invested over R3.4 billion in various strategic projects over the past four years, including upgrades to its Felixton and Springs mills. In addition to employing close to 5,000 people, the company supports more than 50 small businesses through its enterprise development programme.

Manufacturers commit to local procurement

According to Sappi SA CEO Alex Thiel, "Sappi's direct value-add to KZN is R11.7 billion per annum and R5.8 billion to Mpumalanga. In addition to the direct employment of 5,000 people, Sappi's use of contractors provides employment to more than 10,000 people, mostly in rural areas. We are committed to driving local procurement in terms of sourcing more raw materials domestically and we believe that it is important to achieve a holistic, aligned and coordinated approach to local procurement and job creation."

Corruseal Group, a black owned paper and corrugated packaging business which employs around 1,400 people, has invested R840 million to remain competitive in its markets. Joint CEO Mehul Mehta notes, "This includes the acquisition of the Enstra paper mill and a greenfield corrugator site in the Western Cape. We support the contributions of PAMSA and the Manufacturing Circle."

André de Ruyter, Nampak CEO and chairman of the Manufacturing Circle, agrees that procuring locally manufactured goods that are competitive on cost and quality will drive increased local demand, job creation and ultimately investment. "We employ some 4,000 people in South Africa, and are continuously investing in skills and training to ensure that we run world-class manufacturing facilities". Local procurement has strategic supply chain benefits for Nampak, and imports are only pursued as a business necessity.

Eustace Mashimbye, CEO of Proudly South African, reflected: "The South African buy local movement was born out of the first Presidential Jobs Summit in 1998. In the intervening years, the country and the world have gone through periods of growth and contraction, but sustained economic growth is what we now need.

"With economic growth comes job creation, and one proven strategy to increase employment levels is the uptake by business and consumers of local goods and services. Proudly South African's partnerships with organisations such as The Manufacturing Circle are important platforms for the promotion of our message of localisation."

Rodseth concluded that the Manufacturing Circle welcomes the opportunity for continued engagement and collaboration to achieve its objectives of job-rich growth by driving the manufacturing sector. This includes recommendations to address current blockages, and interaction on progress made to date. "This is fundamentally important to effectively implement increased aggregate local demand, an urgent demand-side intervention required to grow our economy and create the jobs that our country desperately needs."

16TH INTERNATIONAL WOODFIBRE RESOURCE AND TRADE CONFERENCE

The RISI International Woodfibre Resource and Trade Conference was held in Durban in September. This was the first time that the event has been held on African soil. It was extremely well attended by both local and international players and proved a valuable networking opportunity for those either already involved in or interested in the woodchip and biomass market.

NATIONAL RECYCLING DAY MEDIA TOUR

Mpact hosts media tour

in celebration of National Recycling Day 2018

On Tuesday 4 September, the Paper Manufacturers Association of South Africa (PAMSA) and Mpact Recycling hosted a group of journalists at the Mpact Paper Springs mill for a tour of the recycling yard and mill. "We gave them an opportunity to literally see the ins and outs of the paper recycling process," explains Donna-Mari Noble, communications manager for Mpact Recycling.

Before they donned their reflective vests and safety shoes, Jane Molony, executive director of PAMSA, and John Hunt, managing director of Mpact Recycling, set the scene by sharing the importance of the pulp and paper sector, as well as debunking some of the myths about paper recycling.

Molony said: "Paper recycling is a vital part of our country's fibre story. South Africa has been using waste paper to make new paper since 1920. With limited land suitable for the commercial growing of trees, South Africa has built up a strong paper recovery sector. Given that paper fibres can only be recycled six to seven times, virgin fibre is often added to the mix. That said, some mills might use 100% recovered fibre in their pulp recipes."

Hunt added, "Today, recycling is recognised by government and many South Africans as a job-creating beneficiation activity and integral to the pursuit of a green economy. Long-term sustainable recycling in South Africa requires long-term sustainable investment in the country's recycling capacity. This means investing in recycling facilities such as paper mills and plastic operations that create a market for recyclable materials.

"This will also allow the approximately 100,000 people who rely on constant volumes of recycled material to earn a sustainable living, from the factory employees to the entrepreneurs and small business owners, and the collectors."

The event sought to be a call to action to media to help share the good news story on paper recycling and encourage readers, viewers and listeners to understand the importance of separating at source and give paper and packaging a second, even sixth or seventh, life.

LEFT: John Hunt, managing director of Mpact Recycling, talks through some of the myths about paper recycling; **ABOVE:** Godfrey Zwane, Pulp Mill Manager at Mpact Springs mill, explains part of the process to Heidi Goikos from eNCA. **TOP RIGHT:** Bhavna Singh, process engineer at Mpact Springs mill, being interviewed by eNCA.

TOP. Jane Molony, president of the International Council of Forest and Paper Associations, shares her views during the Blue Sky Awards session.

ABOVE. World-renowned sustainability expert on China, Peggy Lui, was the keynote speaker.

RIGHT. The conference was held in the beautiful Solvay Library in Brussels.

PAPER & BEYOND

The circular bioeconomy
takes centre stage at Paper & Beyond

Paper & Beyond, an event hosted by CEPI in Brussels, took place in October following the release of the EU's new Bioeconomy Strategy which had set out a clear path for better linking the bioeconomy and circularity.

"The new European strategy comes at a defining moment for the bioeconomy," said Karl-Henrik Sundström, CEO of Stora Enso and chairman of CEPI. "Industry's transformation is gaining pace across the entire forest fibre and paper value chain. As the mainstream renewable and recyclable material industry, we are ready to take the lead on Europe's circular bioeconomy."

The first of its kind, the conference got off to an innovative start with the CEPI 2018/2019 edition of the Blue Sky Awards, gathering some of Europe's most promising young researchers. From the engineering of spider-silk strong nanocellulose filaments to paper-based electrodes for fuel cells, researchers illustrated the innovativeness and European lead in forest fibre research.

Building on the 2018 theme, the "Europe & Beyond – Getting the best from the bioeconomy" session welcomed keynote speaker Peggy Liu, a world-renowned sustainability expert on China who brought a global perspective on the circular bioeconomy. Lui touched upon recent developments in China, including the country's waste restrictions, its policy on single-use plastics, and its recent investments in Europe under the Belt and Road initiative.

Following the positive trends in production (up 1.5%), exports (up 5.4%) and investment (up 7.5%) seen in the latest market data for 2017, RISI returned to provide market insights with, for the first time, a business intelligence session on European nanocellulose markets.

Paper & Beyond also hosted the final conference of the EU-funded PROVIDES project which has confirmed its work in Deep Eutectic Solvents (DES) technology. You can read more about this on page 35.

From the engineering of spider-silk strong nanocellulose filaments to paper-based electrodes for fuel cells, researchers illustrated the innovativeness and European lead in forest fibre research.

The opening session of WasteCon 2018 with, from left, Jan Palm (IWMSA past president), Prof Linda Godfrey, Cllr Ndosi Shongwe of City of Ekurhuleni, Leon Grobbelaar, incoming IWMSA president Ad Landsink, and Gys Louw.

WASTECON 2018

Focus on the heirarchy of waste

"Standing in front of you today, I realise that my first professional presentation was on the WasteCon podium 20 years ago. This led me to ponder whether the waste management industry has changed, or whether we are still stuck in old ways of thinking and implementation when it comes to waste management practices in southern Africa and the rest of our continent," said Professor Linda Godfrey at WasteCon 2018, billed as the flagship conference of the Institute of Waste Management of Southern Africa (IWMSA).

The three-day October event centred around the theme 'Implementing to Waste Hierarchy' and its practical application towards a set of priorities in managing waste streams and the efficient use of resources. Leon Grobbelaar, president of IWMSA, explained, "Presentations and workshops sparked numerous discussions on how we can find solutions for the waste management problems we collectively face by focusing on waste avoidance and reduction, re-use, recycling, recovery and ideally, as the last port of call, the treatment and disposal of waste."

Professor Linda Godfrey, manager of the Waste Research, Development and Innovation (RDI) Roadmap's Implementation Unit of the Department of Science and Technology, shared on the findings of Africa Waste Management Outlook (AWMO). She was part of the research and development of the AWMO project conducted under the auspices of the United Nations Environment Programme (UNEP), the International Environmental Technology Centre (IETC), and the Council for Scientific and Industrial Research (CSIR).

The initial need for such a report arose from the lack of waste management data that can be scaled down to a regional level. "Some of our findings point to challenges such as the existence of inadequate measures to manage new and changing waste streams, and inadequate transport infrastructure which has a huge impact on the quality of food by the time it reaches the end consumer," she explained. "In response to these challenges we often see a "knee-jerk" reaction to ban products due to these and other challenges, rather than implementing measures to address the challenges.

As an example, we see Polyethylene terephthalate (PET) bottles and containers being banned which, in the context of freshwater security across the African continent, can have detrimental impacts on communities," she continued.

Prof Godfrey further suggested that the sad reality is that "many African dumpsites are filled with reusable materials and no plan for diversion because of a lack of the will to do so."

> Professor Godfrey reiterated that by no means is the African picture all "doom and gloom", as she highlighted many wonderful examples from Africa and southern Africa that showcase the inherent entrepreneurial and innovative spirit of our continent's people.

Among these examples are the We Cycles project which originated in Nigeria; and the Rethaka Foundations' Repurpose Schoolbag Initiative, Bio2Watt, and Agri Protein, which are three South African based projects. Ultimately, waste management solutions that are relevant and sustainable within the African context will be key to realising the vision of a Circular Economy on our continent.

Professor Suzan Oelofse, the research group leader for Waste for Development, Natural Resources and Environment at the CSIR, talked about the economic opportunities of waste, and that the industry is currently experiencing a paradigm shift towards the circular economy.

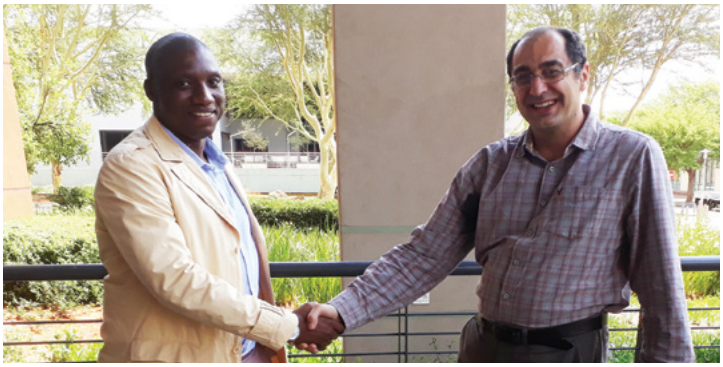
"There are increasing waste management practices and initiatives that indicate the transition to a circular economy, in South Africa and the rest of Africa. Not only does it deal with waste products, it is also a way to overcome resource limitations by decoupling global economic development from consumption of finite resources," continues Oelofse.

The circular economy and waste hierarchy are complementary. 'Resource and energy recovery' is a level of the hierarchy which looks at extracting materials and energy from waste streams. "Proper implementation of the hierarchy and putting more focus on developing the circular economy can have major benefits for both our economy and natural environment," said Oelofse. "While we protect natural landscapes from the burden of ineffective waste management, the circular economy optimises the use of natural resources by limiting the need for further extraction and will offer job opportunities and stimulate entrepreneurship."

B.TECH PROJECTS

DUT BTech presentation winners

The Durban University of Technology hosted two sessions – one for inland and the other for coastal regions – where 16 of its Bachelor of Technology students were given the opportunity to present their projects.



Pictured right (top) at Sappi Tech Centre on 2 November 2018, Theo de Koker congratulating the best inland presenter Sakhile Zungu. Zungu, currently employed at Sappi Ngodwana, has focused his work on the optimisation of sand removal at the waste plant.

Ruan Nell (bottom right) from Mondi Richards Bay took the prize for top coastal presenter with his report on reducing total reduced sulphur emissions from a landfill leachate pond. Here he is with de Koker at the Riverside hotel Durban on 5 November.

RECYCLING INDUSTRY

New name for 15-year-old Paper Recycling Association

The Paper Recycling Association of South Africa (PRASA), the paper recycling arm of the Paper Manufacturers Association of South Africa (PAMSA), has a new name and identity: RecyclePaperZA.

recyclepaperza
Paper recycled. Paper renewed.

"For the past few years, members of the public have increasingly confused us with the state-owned enterprise, PRASA," explains PAMSA executive director Jane Molony. "We have often been asked about train services, or questioned on why a rail agency would be involved in recycling."

PAMSA invited submissions from its member companies. "Thank you to everyone who took the time to submit suggestions," remarked Anele Sololo, manager for training, promotion and operations for RecyclePaperZA. "The new name - inspired by Sappi's Debbie Williams, internal sales co-ordinator: containerboard - was selected as it reflects a call to action. Incidentally, it also mirrors our website address www.recyclepaper.co.za, so it's a perfect fit."

Backed by the pay-off line "Paper recycled. Paper renewed", the association will continue to promote the recovery and recycling of paper fibre as a vital link in the renewability chain.

The message is that paper is a renewable product made from farmed trees and that, by recycling, we not only keep carbon out of the atmosphere for longer but provide an alternative fibre for paper manufacturers.

Formed in 2003, RecyclePaperZA represents companies that process recovered paper for the manufacture of new products. It also represents manufacturers of liquid board packaging in the form of milk and juice cartons, paper cups and bowls.

Through our various programmes, we advocate improved paper recycling and efficient waste separation at businesses, homes and schools," says Sololo.

In 2017, South Africa's paper recycling rate tipped the scales at 1.3 million tonnes. This represents 70% of the 1.8 million tonnes of paper available for recovery. It excludes books, archived records, and unrecyclable paper like toilet tissue.

Follow PAMSA and RecyclePaperZA on Twitter and Instagram (@paperrocksza).

COMPANY MILESTONE

Tetra Pak celebrates 60 years in South Africa

(Above, from top to bottom) Stefan Fagerang, managing director of Tetra Pak Southern Africa, and Amar Zahid, Tetra Pak cluster vice president GMEA; Plaque unveiling by Bruce Burrow, senior VP finance and business transformation at Tetra Pak, H.E. Ms Cecilia Julin, Ambassador of Sweden, and Stefan Fagerang; Guest speaker Bryan Habana, former Springbok rugby player.

Since the establishment of its manufacturing plant in Pinetown in 1979, Tetra Pak South Africa has increased to almost two billion packages to meet the needs of a growing population.

"Tetra Pak was established in Lund, Sweden, in 1952," says Dennis Jönsson, president and CEO. "South Africa was an early expansion destination and the growth and success we see today is proof that the country and Africa will deliver on our vision to make food safe and available everywhere. We continue to innovate new technologies and strategies to drive growth in the industry while providing our customers with sustainable solutions to grow their businesses," he says.

Industry 4.0 is all about smart manufacturing. With smarter production systems, Tetra Pak provides customers with more connectivity, smarter ways of doing business and making the production of food and drinks more efficient and cost effective.

"We want to ensure faster delivery, more uptime and lower costs for our customers; and give them the quality and innovation they need to address their changing needs," says Stefan Fageräng, managing director of Tetra Pak Southern Africa.

"Africa is a continent of opportunities and South Africa is one of the largest economies in Africa," says Fageräng. "Our state-of-the-art factory in Pinetown continues to provide quality and innovation in a fast-changing world."

He adds that the local facility delivers efficiencies in plant management, environmental management, and overall productivity while supporting the export market.

"Africa is a global growth region and depends on innovative solutions and adaptations to market changes," says Fageräng. "Our close cooperation with our customers and partners in the region will see us continue to provide safe, secure, and sustainable products."

SUSTAINABILITY AWARD

Mpact wins Sustainability Award at 16th National Business Awards

Well done to Mpact on winning the Sustainability Award category of the National Business Awards. Over the last 16 years, these awards have become the definitive showcase for South Africa's most successful companies across various sectors.

Through rigorous benchmarking and tracking of industry behaviour, Topco Media researches, identifies and celebrates sustainable growth and impact. Innovators and the new economic champions are honoured so that they can showcase their achievements, and share best practices, policies and strategies with other ambitious companies to create an inspirational ripple effect across the economy.

Pictured above are Noriah Sepuru, Neil Hunt and Donna-Mari Noble accepting the award at Emperors Palace on 15 November.

RECYCLING INDUSTRY

Mpact Recycling goes social

On 29 August, Mpact Recycling officially launched its social media presence on both Facebook and Twitter.

Like MpactRecycling on Facebook

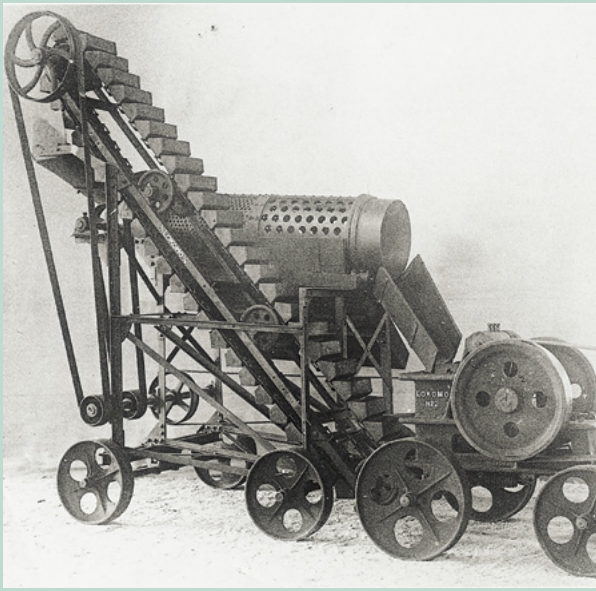
Follow @MpactRecycling on Twitter

INNOVATION AWARDS

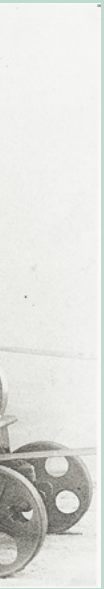
Sappi places second in Top 100 Companies Award

Sappi took second place in the Sunday Times Top 100 Companies Award, beaten by Capitec Bank Holdings Ltd. The accolades are calculated on share-price performance on a R10,000 investment from 1 September 2013 to the end of August 2018, after taking into account normal and special dividends and bonus shares reinvested. As of this year, the winning company was required to have held a market capitalisation of R5 billion as of 1 September 2013. Capitec Bank Holdings Ltd opened at R185.00 in 2013, and closed at R1,002.75 at the end of August 2018, with an annual compound growth of 42.65%. This means that R10,000 invested in 2013 would have delivered R59,064 in 2018. Clicks Group Ltd came in third.

COMPANY MILESTONE



THEN AND NOW...
The first mobile crushers manufactured at Lokomo (TOP) were introduced in 1920s. Metso has since developed one of the industry's most advanced range of solutions for handling virtually any type of waste and scrap metal (MIDDLE). Now, approximately 60% the world's liquid gas and 75% of pulp flows through Metso's valves (BOTTOM).



Metso celebrates its 150th anniversary

In 2018, Metso celebrates its 150th anniversary. The story of Metso started in 1868 as a local ironworks, and is linked to the development of urban environments and the modern way of life.

Metso has evolved through a series of mergers, acquisitions and divestments. With operations in more than 50 countries and over 12,000 dedicated professionals working for the group, Metso prides itself as a global industrial company providing the world's mining, aggregates, recycling and process industries with innovative solutions for the sustainable processing and flow of natural resources.

During its 150 years, Metso has been in many businesses, ranging from steam engines, locomotives, car manufacturing, forest machines, and pulp and paper machines, to valves, metal and waste recycling equipment, and solutions for rock and mineral crushing and screening, to name but a few.

One of its core areas of expertise today is aggregates and minerals processing: key ingredients for the construction and manufacture of the infrastructure, housing and consumables needed for growing populations and urban areas.

The first innovations that kicked off mechanical crushing and screening processes in the mines and quarries were introduced in the 1800s. Bruno Nordberg, a Finnish migrant who settled in Michigan in the US, produced some of the first crushing equipment for mines. In 1928, Nordberg acquired the Symons cone crusher technology, an innovation that revolutionized crushing practices in the mines and quarries. Bergeaud & Bruno was established in France in 1895 to manufacture crushing equipment, and in Tampere, Finland, Lokomo produced its first jaw crushers at the beginning of the 1920s. These industry pioneers are all key components of our DNA.

The amalgamation of Svedala Industri Ab into Metso in 2001, and the introduction of solutions like primary gyratory crushers, grinding mills and vertical shaft impactors was elemental in the creation of a full-scope offering for crushing and screening. Thanks to its strong installed base and close cooperation with its customers, the company has been able to continuously develop its services, equipment and systems to best meet the needs of its customers. More recent innovations - like Life Cycle Services, energy-efficient HRC® high-pressure grinding technology, MegalinerTM mill linings, the MXTM Multi-Action cone crusher and Lokotrack® Urban(TM) jaw crushing plants - have quickly become household names among its customers around the world. Digitalization, sustainability and energy-efficiency are some of the focus areas in its current R&D projects. The Metso Metrics concept, which comprises a cloud-based, remote monitoring and data visualization service for mobile crushing plants, will soon be introduced to mining and recycling processes, too.

Metso is probably the only company in the world that can say that it has been providing equipment and services for the recycling business already for 100 years. With the importance of the circular economy increasing, recycling is more important than ever. Metso is in a good position to provide the necessary equipment and services to handle virtually any type of waste or scrap metal. The metal recycling offering rests on a strong platform built on the LindemannTM, Texas ShredderTM and N-SeriesTM technology, covering a wide range of efficient solutions for the fragmentation, compaction and separation of different types of metal scrap.

In flow control, its solutions are built on innovative Neles® and Jamesbury® valve solutions. Neles Oy was established by Antti Nelimarkka and Eino Santasalo in 1956. The first Neles valves were originally designed for the needs of the pulp and paper industry. Soft-sealed Jamesbury valves, Mapag® valves (now part of the Neles product portfolio), valve controllers and globe valves were later added to the portfolio to complement the offering.

Today, various process industries - often located close to urban areas and including pulp and paper, chemicals, energy, gas processing and LNG, industrial gas, and refining - rely on its flow control products and services to run their processes safely and reliably.

To celebrate 150th anniversary, Metso hosted a photo exhibition in September illustrating how Metso has taken part in shaping and building the modern world. The exhibition featured photos, stories and insights into how the world and the industry it works with have changed over the time. The focus was on three main themes: Building urban environments, Enabling the modern way of living, and Reaching for the future.

The evolution of Neopak

Despite its name, Neopak is by no means a new player in the packaging sector. The *TAPPSA Journal* met up with Marc Snyders, recycling director, and Johan Marais, recycling operations manager, to unpack what makes Neopak the success that it is.

Neopak's intricate history can be traced back to July 1920 with the registration of Herzberg Limited, erect box makers of Cape Town. Some 14 years later, Transvaal Box started selling corrugated cartons while another decade on, in October 1944, Amalgamated Packaging Industries (API) was formed.

August 1963 saw the foundation of National Packaging Ltd (Natpak) as the holding company for Transvaal Box and Herzberg companies and in 1968, Natpak and API merged as National Amalgamated Packaging or as we came to know it, Nampak, with it listing on the Johannesburg Stock Exchange. In 1970, Reed Group took a stake in Rosslyn-based Paper and Packaging Industries (PPI), which Nampak acquired as a wholly owned subsidiary a decade later, with some mergers and acquisitions in-between.

It was in 2007 when the Rosslyn corrugated paper mill commenced a multi-million Rand expansion and the construction of PM3. The first reel of saleable paper was produced on PM3 in 2009. The expansion was officially unveiled in September 2011 in the presence of government dignitaries.

Over the decades, the group has been involved in the production of glass, paper, tissue, metals, and plastic packaging. In 2015, Nampak did some strategic unbundling of the Corrugated and Tissue divisions and Nampak Recycling, an important provider of raw material, and sold the assets to Ethos Private Equity for R1.53 billion and for R76.3 million respectively.

This created Neopak (corrugated and recycling assets) while the tissue assets formed the Twin Saver Group (TSG). Both groups have operated successfully in their respective markets over the past few years.

Effective 1 June this year, Neopak and TSG agreed to split what was previously known as Neopak Recycling into two separate recycling companies, namely Neopak (a recycling unit wholly owned by Neopak) and Econamic Recycling (a recycling unit wholly owned by TSG).

Neopak's footprint today

Apart from the two paper mills at the Rosslyn operation, Neopak operates corrugated packaging facilities in Northdene, Durban, and Wadeville, Germiston as well as a speciality plant in Cape Town known as Western Province Box.

Neopak also owns two recycling branches - Amalgam, south of Johannesburg city centre, and Pinetown – which receive, separate and bale recovered paper according to paper grades required by its own mill as well as other paper packaging manufacturers and converters.

ABOVE, FROM LEFT TO RIGHT. Neopak's transfer station in Amalgam, south of Johannesburg; April Mokonyane, factory supervisor at Amalgam, with Johan Marais, recycling operations manager; Joseph Mpanza has been working for Neopak for 42 years - today, he is the operations controller at Neopak Amalgam.

Investment and vertical integration

Rosslyn's PM3 was built on a green field site adjacent to the existing paper mill and at the time was viewed as one of the group's largest capital projects to date. The expansion aimed to make the corrugated business self-sufficient in terms of its supply of waste-based packaging grades of paper. At full capacity, the Rosslyn mill processes over 150,000 tonnes of recovered paper fibre per year, producing more than 140,000 tonnes of Kraft packaging paper, largely for local use.

Local use

Speaking to the challenges that face the paper recycling sector, Snyders says that price is always the sticky issue. "Waste paper is not a tap that one can simply switch on and off in line with the ebbs and flows of markets," remarks Snyders. "It is a commodity and is affected by the local supply and demand as well as export parities."

Waste paper is also directly linked to the product that will be made from it. Some companies import expensive, wet-strength Kraft paper from overseas for converting and then expect to relay the price they paid for raw material to the price they want to get for the offcuts and trimmings. "Unfortunately it doesn't work like that," smiles Marias.

Where collectors and traders bring in pre-sorted grades, they will get a higher price for it as they have invested the labour and time, eliminating the need for Neopak to expend that cost. "The collectors get the advantage of the higher price, because they added the value," explains Marais.

Another big issue is contamination, whether it be moisture or plastic. "We pride ourselves on high quality clean paper, thanks to our sorting processes at Amalgam and Pinetown," says Marais. It is for this reason that Neopak Amalgam keeps a tight ship at its weighbridge. "We make it very clear that wet paper will be penalised although some grace is given on the days of high humidity or rain."

Amalgam also operates a lean sorting team, another reason why it rewards collectors for cleaner material. It does however perform a negative sort, removing the contraries and contaminants that may have slipped under the radar.

Its principal sources of recovered paper are shopping centres, banks, office blocks and the converting, printing and manufacturing sectors, for pre-consumer recoverables. Apart from its own fleet, the company is also reliant on its network of traded dealers and agents. Neopak does not service the household market.

BELOW. Rosslyn recycling yard. **RIGHT.** Rosslyn's paper machine

ABOVE. Neopak operates a tight ship at its weigh bridge.

Shredded paper is a nuisance but unfortunately an accepted "commercial hazard" of the industry. With the Protection of Personal Information (POPI) Act, many businesses are required to shred documents. Notwithstanding the added issues of paper dust and fly-aways, shredding shortens the fibre in white paper and reduces the fibre yield during the pulping process. To mitigate this, Neopak mixes shredded paper with complete sheets.

There is clearly room for innovation in this space to enable the requisite destruction and ensure recyclability.

Under the microscope

Ask anyone in the packaging sector and they will tell you that packaging is not as simple as taking corrugated board and folding it into a box. There is a distinct science behind strength, performance, moisture transmission, water resistance and barrier properties.

Through its Paper Laboratory, Neopak provides technical support to the different divisions and keeps abreast of packaging science and technology. With a team of scientists and technologists, Neopak can perform analysis, optimization and performance prediction of new corrugated products as well as raw materials and evaluation of suitability for use. It is also invested in trouble shooting and root cause analysis, both internally for the paper mill and converting plants and externally for customers in the commercial and agricultural segments. Its commercial markets cover beverages, perishable foods, non-perishable foods, household chemicals and general trade, while on the agricultural side, its packaging protects citrus fruits, deciduous fruits, tropical fruits and local produce from farms.

Changing shape

As we go to print, Neopak is still evolving. Whatever its final form and shape, it will continue to make a valuable contribution to the local pulp and paper sector and to the country's economy.

PAPER PEOPLE

Going the distance

Tshepo "April" Mokonyane is a factory supervisor at Neopak Amalgam where he manages 20 staff members at the paper recycling operation and oversees the day-to-day operations. His career journey started in 2001 at Clover SA as a team leader in the secondary distribution centre where he looked after 38 employees. In 2008, he joined Capital Outsourcing Group as a sites manager. He joined Neopak in 2014.

April cites perseverance as one of his strengths. "I'm a person who wants to finish everything I have started." This explains why he is a long distance runner with 12 Comrades Marathon finishes under his belt and twice completed the 56km Two Oceans Marathon.

He shares that one of his career goals is to be part of the upper hierarchy of the business in the next five years after completing his degree in Disaster and Safety Management. April lives by the words of the late Nelson Mandela: "Real leaders must be ready to sacrifice all for the freedom of their people."

PROFESSIONALLY SPEAKING:

What is your advice to people in a similar position?
This is a high stress environment and one should manage himself before trying to manage others; to always maintain calmness even when things aren't too favourable.

What stands out as your most significant professional accomplishment so far? My Road Transport Management Certificate from the University of Johannesburg.

Rewind to the early years of your career – what would you have never anticipated? To be challenged by subordinates.

What has been the hardest part of your job over the years? To see someone losing his/her job.

Who has been your mentor through the years? Ephraim Madaba, operations manager at our former branch in Pretoria West.

LIGHTER SIDE

What is the best advice you ever received? Respect people, more especially the weak.

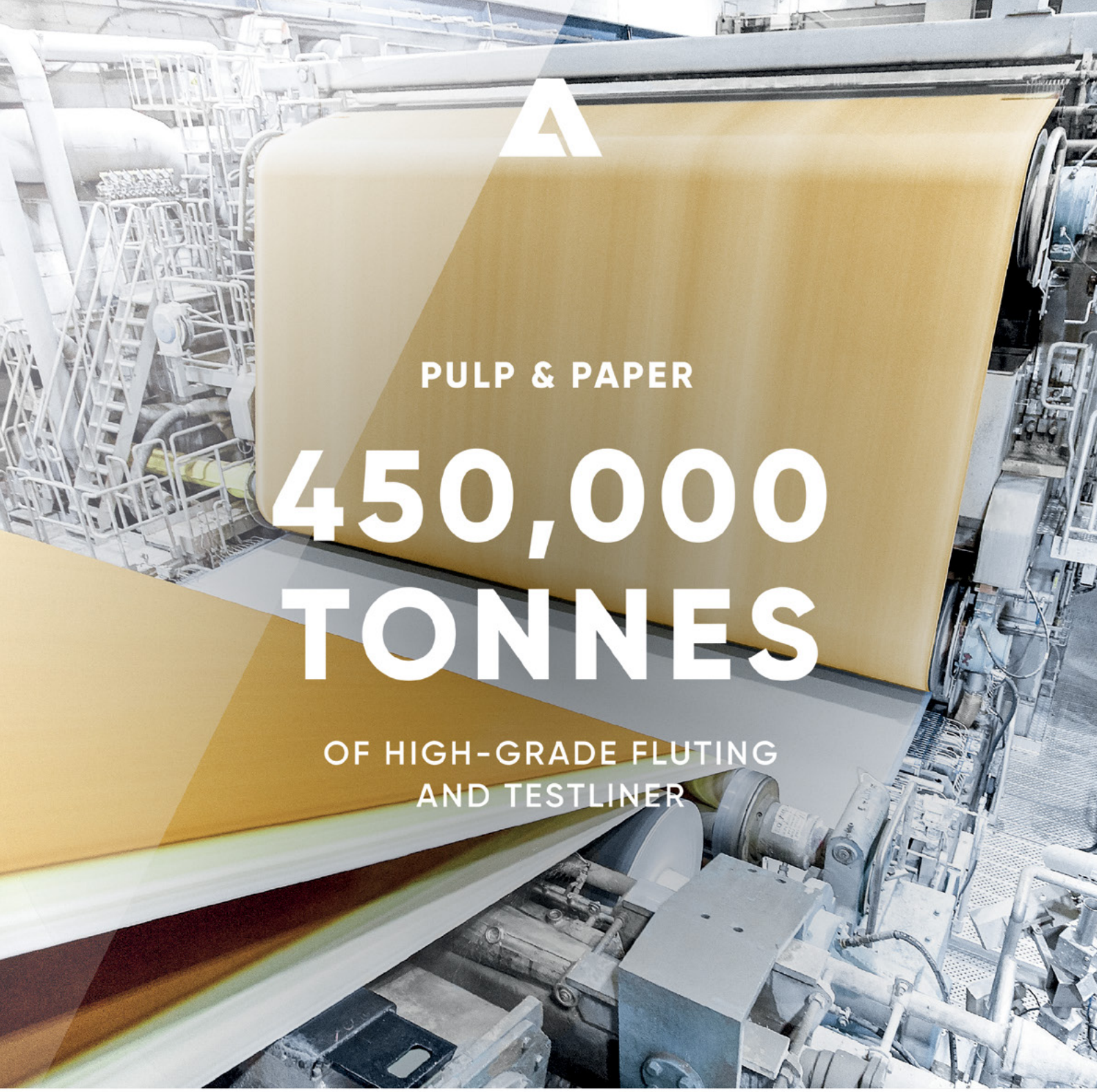
eBook or paper book? And why? Paper, with the Bible as my "go-to book". As a Christian, this is where I find my purpose to be alive.

Last book you read? *The President's Keepers* by Jacques Pauw.

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

What do you do to unwind and relax? I'm an outdoor person who loves sport with cricket, soccer and athletics as my favourites.

If I were to ask a group of people who know you well to give me three adjectives that best describe you, what answers would I get? Kind, glamorous and brave.



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ANDRITZ

6 things you need to know to be a future-fit leader

BY KEITH COATES
TomorrowToday

1 The importance of **unlearning**

Smart leaders understand the need to remain 'learner leaders'. Too many leaders that I have engaged with have to all intents and purposes stopped learning. The signs of this are easy to discern with one obvious indication being their unwillingness to change and with that, their stubborn intransigence towards their own personal and business assumptions.

Influential philosopher Bertrand Russell said that, "In all affairs, it's a healthy thing now and then to hang a question mark on the things you have long taken for granted." But when it comes to linking the importance of challenging assumptions to learning, American social philosopher Eric Hoffer said it best when he wrote, "In times of change, learners inherit the earth, while the learned find themselves beautifully equipped to deal with a world that no longer exists".

The need to learn sits at the heart of adaptability. To be a learner is to build the capacity of adaptability. Inherent in learning is the need to 'unlearn'. This is to recognise that not everything one has learnt is useful for meeting current and future challenges. It is the ability to 'let go' of past formulas that although may have brought about success and recognition, will prove a liability to moving forward.

It can be summarised by the phrase, 'what got us here won't get us there' – something easier said than embraced and put into practice! This point is something management guru Peter Drucker acknowledged when he said that it is not turbulence that is the problem but rather it is the use of 'yesterday's logic' (in the face of that turbulence) that poses the biggest danger. Drucker, as ever, was correct!

2 The importance of **culture**

Far too many leaders believe that being ready for the future is a strategic matter. It is not. Having a good, agile and effective strategy is of course very important but being 'future-fit' is primarily not a strategic concern but rather it is a cultural issue. The need to be agile, adaptive, nimble and responsive to a changing context, with both the opportunities and threats that come with that change, is best understood as a cultural need rather than a strategic need.

Smart leaders understand that the organisational culture starts (but doesn't end) with them and they go about intentionally building a cultural readiness for adaptability. The presence of an organisational culture of adaptability makes it easy to implement a strategic plan for the future. Research shows (especially when it comes to mergers and acquisitions) that when organisations fail, the biggest cause is culture and not strategy.

Culture can be understood in the decision rights inherent within the organisation (how and who makes decisions); in how information is transmitted within the organisation (who has it and who doesn't); in both the formal and informal motivators within the organisation and finally, as to be expected, in the structures. If asked to look at an organisation's culture perhaps as part of some sort of cultural audit, these four areas – 1) decision rights, 2) information, 3) motivators and 4) structure would be a good place to start.

Traditionally in most leadership development programmes there has been an overbearing emphasis on 'strategy'. Going forward such programmes would be better served by focusing on organisational culture and the importance for leaders to understand their role and responsibility in the development of a suitable and appropriate culture within the business. At the heart of any successful business story you will find a leader who has understood the importance of this link.

Smart leaders go about intentionally building a cultural readiness for adaptability. Research shows that when organisations fail, the biggest cause is culture, not strategy.

3 The importance of **the balcony**

The distinction between the 'dance floor' and the 'balcony' is a powerful analogy embedded within Ronald Heifetz's adaptive leadership model. The thought is that when 'on the dance floor' leaders have a limited vision or big picture but from the balcony, the entire dance floor can be surveyed. Too many leaders are spending too much time on the dance floor rather than on the balcony.

An easy way to gauge this would be to look at your most recent leadership agendas: how many of the agenda items were focused on operational aspects of your business and how many had to do with 'looking out the window'; exploring the bigger picture both within and outside of your particular industry and sector? My bet would be that your leadership agenda has been dominated by internal or operational concerns. I say this only because that has been my overwhelming experience as I get to sit in on such meetings. Of course, paying attention to operational concerns is imperative but not at the expense of developing the capacity and habit of seeing the bigger picture – of getting on the balcony.

Accessing such a vantage point (especially if not used to such) is not as easy as it may seem but it is critical if you are to see, understand and respond to changes impacting your dance floor. 'Getting on the balcony' is a powerful phrase and one that should be part of your daily leadership thinking and practice. They are words you should hear often from your leadership team and they should have a particular meaning within your leadership team dynamic.

4 The importance of **how you see**

I recently started a keynote address to 750 global leaders (at the Women's International Network conference in Rome) with "Hi, my name is Keith and I am racist; I am also sexist". It certainly got their attention – especially the second confession! My point was that as a white South African having grown up in a country framed by the Apartheid policy, how could I assume that I wasn't racist? I was brought up to 'see race', to see a person's colour. Of course, my story doesn't stop there, nor must it get stuck in such a framing but it is a story that certainly started with this contextual influence and my statement was to acknowledge this reality. Similarly, with my sexist confession: how can I think that growing up in a male-dominated business world, I can be free from such a bias?

My point (and I recognise that this is a 'thin line' to tread in today's overriding emphasis on political correctness) is that we all have filters or lenses that impact on how we 'see' (and interpret) the world around us. This, in fact, is the starting point of being emotionally intelligent. To see how we see is important leadership work. It frames our attitude and response to a changing world brought ever closer by globalisation, technology and easy access (for many but not everyone).

Every day our sense of 'normal' is challenged and it is how we engage and interact at this intersection that determines much of our readiness to grow into the future and all that invites and demands. When considered through a generational lens, a clever paragraph from *Hitchhikers Guide to the Galaxy* author, Douglas Adams, captures this prevailing sense of normal as set by our personal bias or lens best when he wrote, "When you're born, anything in the world is normal. Anything invented before you're 35 is revolutionary. Anything invented after you're 35 is unnatural and wrong".

I have many lenses that impact on 'how I see' but here are four that I cannot change; that are both fundamental and significant: I am a white, male, South African Baby Boomer.

Doing the work necessary to understand 'how I see' is hard but entirely necessary in order to be a future-fit leader. Of that I am convinced. You need to be as convinced.

5 The importance of **questions**

For many leaders, asking questions is seen as a sign of uncertainty or weakness. But smart leaders know that questions are the answers. Smart leaders ask a lot of questions and I would go as far as to say that the quality of the questions you (as a leader) are asking will determine the quality of the solutions and strategy going forward. The willingness to pose questions that go to the very heart of purpose, motivation and objectives; questions that are given permission to venture into territories that previously have had large 'no entry' signs posted; questions that go both 'inwards' and 'outwards' – these will be the means by which we find our way forward through the turbulence, complexity and ambiguity that obscures our way.

Questions serve to open the conversation and thinking. They invite others into the conversation and as we get more used to asking them – and more comfortable, so too will we get better at 'holding' them, engaging with them and strengthening the process towards new learning and solutions. I would suggest that you consider doing a 'questions audit' at your next meeting. In other words, at your next leadership meeting pay attention to the number (and quality) of questions being asked. What does this reveal about your team and company's readiness to be 'future-fit'?

I keep an ever-growing list of 'great questions' and it might just be the most important list that one could keep! Here would be one such question to get you and your team started: 'What are the questions you should be asking, but aren't?'

6 The importance of **adaptive intelligence**

Adaptive intelligence can be understood as the, 'capability to use information to manage (challenging) situations, communicate and connect with other people, and educate yourself on the surrounding context or climate'.

Given this, there are some important specifics that you can cultivate at both a personal and organisation level in order to build the capacity for adaptive intelligence. What I am about to share might also just be the best parental advice I could give you!

Adaptive intelligence, according to research done by marine biologists Gunderson and Holling, can be fostered by: learning to live with change and uncertainty; combining different types of knowledge in order to learn; nurturing of diversity in order to develop greater resilience, and creating opportunity for self-organisation.

Pause a moment and think about that list – those four points. That is how you can actively develop adaptive intelligence! The offshoot of this would be to explore what this might mean, look like and how it could be measured within your company. It would be to wrap each of these points with practical behaviours and actions that give them meaning and expression within your day-to-day leadership practice. This is a great example of allowing theory to shape practice given that these points emerge from research done by Gunderson and Holling on the adaptability of coral reefs in the Pacific. The fact that it is as far removed from business theory as it could possibly be is part of why I loved it the moment I came across it – it also might explain why it also offers such profound insight and applicability!

Take each of these four points and make them the subject of your leadership agenda without necessarily revealing where you are heading or what they relate to (adaptive intelligence). See how you and your team can embrace, think, action and measure them and then, once all four have been subject to such scrutiny, share that these are the fundamentals of building an adaptable organisation – of ensuring that you are future-fit.

Closing thought

Of course, there are many valuable points that could be added to the six provided. However, this is a start, a good start.

The closing thought is to talk about leaders as 'brokers of hope'. In a world and context where it is all too easy to be gripped by fear and despair, the notion of the leader as a broker of hope is important. Vaclav Havel, the Czech poet, philosopher and President (you don't often get to lump those descriptive labels together!) gave a helpful insight to hope when he wrote, 'Hope is not the conviction that something will turn out well, but the certainty that something makes sense regardless of how it turns out'. In his book, The Audacity of Hope, Barack Obama suggests that hope is something within (despite all evidence to the contrary) that can be realised through courage, hard work and the willingness to reach for it and fight for it.

Be a leader then who is a broker of hope. Be a leader who intentionally and continually works at being future fit.

Be a leader then who is a broker of hope. Be a leader who intentionally and continually works at being future fit.

Enzymatic smart refining management offering new solutions to tissue and packaging producers

PAULO H. ARNEIRO[a]*, SILVIA HELD-BELLER[b], ALEXANDER RIEFERT[b]

SUMMARY

Independently of the fibre source or pulping process, it is the refining procedure which essentially determines the fibre's structure and consequently also the paper performance and properties.

The objective of this work was to exploit further potential of biorefining treatments and how to create a wide range of effects on tissue and packaging paper. The choice of an appropriate enzyme in combination with the right machine settings are the key factors.

This paper is based on experimental investigations and case studies performed on industrial tissue and packaging paper machines using enzyme treatment as a biorefining agent.

The conclusion is that a proper choice of the enzyme together with a smart application management can provide additional benefits besides the known energy savings. This investigation concluded that the biorefining increases the productivity and gives the paper maker a new world of possibilities such as improving paper strength, Corrugating Medium Test (CMT), Ring Crush Test (RCT), Edge Crush Test (ECT), Tensile Energy Absorption (TEA), Scuff, Cobb and Softness.

Keywords: Biorefining, Enzymes, Paper properties, Packaging paper, Tissue paper.

INTRODUCTION

Packaging and tissue papers are growth markets worldwide because of the growing demand, the high functionality, relatively low prices, the biodegradability and many other attractive properties. Furthermore, paper is produced from renewable biomass raw material and the waste paper may be either recycled or combusted to generate energy. The global average annual growth from 2010 to 2015 of packaging paper was 2.5% and of tissue 3.5% for the same period.

Refining is a key step in paper making and used to be performed exclusively by mechanical treatment which increases the fibrillation and outer surface area of cellulose. It enhances fibre swelling and flexibility as well as bonding interactions between the fibres. The process name “refining” was coined several centuries ago and does not precisely reflect its character since it suggests reduction of the cellulose fibre length. Mechanical refining is conducted using either conical or disc refiners in order to loosen the structure of cellulose fibres and in this way to produce paper with target properties, meeting end product quality demands.

The principal drawback of currently applied refining technologies is the high unit energy consumption, usually ranging from 150 to 500 kWh/tonne paper and accounting for 30 to 50% of the total energy used for paper making [1, 2]. For the mean unit energy consumption of 300kWh per tonne and paper production of 400M tonnes/year, the global refining energy reaches 120TWh, which is equivalent to incineration of around 24M tonnes of black coal per year. In 2017 CHT enzyme technology application saved approximately 5 500MWh of energy in the paper industry. This energy would be enough to supply around 25 thousand homes per month in Brazil.

Despite numerous efforts to improve the energy efficiency of conventional disc and conical refiners, this parameter has not been reduced enough yet. The energy efficiency of these refiners range from a few to over 15% and the majority of refining energy is dissipated as heat, resulting in pulp warming [3, 4].

Enzymes are widely used in many industries including pulp and paper. They proved themselves as effective aids with a strong positive effect for papermaking. As biological products from renewable sources, they provide sustainable and green technologies for production of different grades of paper.

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One of the most intriguing applications of enzymes in papermaking fields is the modification of virgin or recycled fibres. Through the enzymatic pre-treatment of the fibre prior to refining, the specific surface area of the fibres can be expanded, the inter-fibre bonding improved and the freeness level developed with less energy. Enzymatic pulp treatment started many years ago having the reduction of refining energy as the main target. This makes the process not only less expensive, but also more environmentally friendly[1][5].

In this study, we investigated the interaction of cellulase based CHT product QUIMIZIME B and virgin hardwood and softwood fibres in existing industrial production processes. We discuss how smart application management of the bio refining system goes much beyond the energy saving. How it offers the paper maker options to increase productivity, improve paper quality, save other chemicals and even opens up the possibility to change the fibre furnish to be more competitive.

EXPERIMENTAL

Enzyme

The experimental studies were performed with the CHT Group commercial product QUIMIZIME B, which is a special cellulase enzyme blend. The product complies with Recommendation XXXVI of the German Federal Institute for Risk Evaluation (BfR) concerning the use of auxiliaries for manufacturing food packaging papers "papers, paperboard and cardboard for contact with food" according to today's standard.

The applied dosage was in a range of 100g/t to 200g/t depending on the fibres, grade of paper and production process. The pH range was between 4.0 and 8.0 and, to achieve an optimum result, the treatment temperature was between 35 and 65°C. The retention time of the enzyme in contact with the fibres was from 20 - 60 minutes.

Paper production

In this work we discuss three different enzyme applications:

a.Kraft liner:
The experimental study (investigation) was done on a machine consisting of a Valmet – OptiFlo Fourdrinier double headbox with a double Nipcoflex shoe press. The machine speed was 640m/min, with an average production of 720 tonnes per day. The furnish was a mix of 80% pine softwood and 20% eucalyptus hardwood. The basis weight of the board was 170g/m² and all data presented is the average data for the first five days of the enzyme application.

The enzyme dosage started at 150g/tonne and was optimized to 120g/tonne of paper produced. The key performance indicator (KPI) to adjust the enzyme and other chemical dosage was the air resistance (Gurley). The Gurley was measured online on the paper machine and allowed the adjustment of the mechanical refiners and chemical dosages in order to achieve the desired target.

b. Cement Sack Paper:
This investigation was carried out on a machine consisting out of a Voith-MasterJet Pro Headbox. The main innovations of this machine are its completely reworked ModuleJet dilution technology as well as the integrated and coordinated OnQ Profilmatic cross profile control. The machine speed was 800m/min, with an average production of 240 tonnes per day. The furnish was unbleached 100% pine softwood. The basis weight of the paper was 75g/m² and all data presented are the average data from the first five days of the enzyme application.

The enzyme dosage was 80g/tonne during the entire trial period. The KPI to adjust the enzyme and other chemical dosage was the air resistance (Gurley). The porosity is an important quality property of sack paper. The Gurley parameter was available online on the paper machine and allowed the adjustment of the mechanical refiners and other chemical dosages in order to achieve the desired target.

c. Towel Tissue Paper:
The investigation was carried out on a machine consisting of a Voith Crescent Former paper machine. The machine speed was 1,300m/min, with an average production of 85 tonnes per day. The furnish was a mix of 30% pine softwood and 70% eucalyptus hardwood. The basis weight of the paper was 32g/m² and all data presented is the average data from the first five days of the enzyme application.

The enzyme dosage was 150g/tonne split between the pulper and the secondary fibre pulp line. The KPI to adjust the enzyme dosage, the mechanical refiners and other chemical dosages was the first vacuum box data (available online) and confirmed by the Schopper Riegler freeness test measured hourly.

Paper properties

Paper properties were collected from the paper machine online measurement systems and confirmed by hourly handsheet analyses during the trial period. The handsheets were produced using a standard laboratory Rapid-Köthen class sheet former, according to the standard ISO 5269–2:2007 standard.

The following paper properties were measured in standard conditions, in compliance with ISO 187:1990 (at a relative air humidity of 50% and temperature of 23°C):

- Grammage (g/m²) - according to TAPPI T 410 om-98, only paper sheets of grammage between 78 and 80g/m² were accepted for further investigation,
- Freeness (Canadian standard method) - according to TAPPI T 227 om-94, twenty measurements were made,
- Air Resistance (Gurley) (s/100ml) – according to TAPPI 460 om-96, twenty measurements were made,
- Ring Crush Test (RCT) (Kgf) – according to TAPPI 822 om-96, twenty measurements were made,
- Short Compressive Test (SCT) (KN/m) – according to TAPPI 826 pm-92, twenty measurements were made,
- Tensile Energy Absorption (TEA) (J/m²) – according to TAPPI 494 om-93, twenty measurements were made,
- Tensile Strength (kN/m) – according to TAPPI 494 om-96, twenty measurements were made,
- Burst (kPa) – according to TAPPI 403 om-97, twenty measurements were made,
- Scuff – according to TAPPI 830 pm-92.

TABLE 1. Kraft liner enzyme study

VARIABLE	REFERENCE	WITH ENZYME	% Δ
Freeness tank 1	697	697[5]	-
Freeness[4] tank 2	750	750[5]	-
Production (tonne/h)	28.56	28.65	0.32%
Gurley (s/100ml)	48.90	51.00	4.29%
RCT (Kgf)	2.00	2.10	5.00%
SCT (KN/m)	3.40	3.50	2.94%
Scuff (Passes)	70.35	95.65	35.96%
Refining Energy (KWh/ tonne)	422.70	365.40	-13.56%
COBB	45.30	49.05	8.28%
Sizing (kg/tonne)	0.43	0.34	-20.93%

TABLE 2. Sack paper enzyme study

VARIABLE	REFERENCE	WITH ENZYME	% Δ
Freeness	650	650	-
Production (tonne/h)	10.60	10.60	-
Grammage (gsm)	85.60	85.01	-0.69%
Gurley (s/100ml)	8.90	9.72	9.21%
Tensile Strength (kN/m)	4.75	4.96	4.42%
Elongation (%)	7.80	8.07	3.46%
TEA	229.00	258.92	13.49%
Burst (kPa)	516.00	521.09	0.99%
Refining Energy (KWh/ tonne)	166.00	138.00	-16.87%
Retention polymer (kg/ tonne)	0.60	0.20	-66.67%

TABLE 3. Tissue paper enzyme application

VARIABLE	REFERENCE	WITH ENZYME	% Δ
Freeness	650	650	-
Production (tonne/h)	10.60	10.60	-
Grammage (gsm)	85.60	85.01	-0.69%
Gurley (s/100ml)	8.90	9.72	9.21%
Tensile Strength (kN/m)	4.75	4.96	4.42%
Elongation (%)	7.80	8.07	3.46%
TEA	229.00	258.92	13.49%
Burst (kPa)	516.00	521.09	0.99%
Refining Energy (KWh/ tonne)	166.00	138.00	-16.87%
Retention polymer (kg/ tonne)	0.60	0.20	-66.67%

RESULTS AND DISCUSSION

The challenge in the kraft liner application was to increase strength in the Z-direction, more specifically in the superficial strength measured by the scuff test method.

This specific issue regarding the paper quality generated on average 460 tonnes of broke per month. The initial plan was to increase the sizing agent, however no positive result was achieved.

The enzyme acted by fibrillating the external surface of the fibres and increased the number of hydrogen bonds formed at a crossing points to improve the strength of the linkage and, thus, the strength of the paper in the Z-direction[2].

The results of applying the enzyme to kraft liner are presented in Table 1. The main aim of improving scuff test (delamination) was successfully achieved and the air resistance was kept under control. Significant side benefits of energy saving[3] and reduction of sizing chemical were achieved.

Cement sack paper requires very specific properties. It is a must to have a high tensile strength, a good tensile energy absorption (TEA) and it is also important to control the paper porosity to avoid bursting when filling the sack with cement. The refining system is the key to achieving all of these properties. In this case, the production process was fitted with two mechanical refining systems (high and low consistency refiners), but was not possible to improve performance mechanically.

The data shown in Table 2 demonstrate how the treatment with the Quimizime B resulted in a significant change to the refining system, compared to the purely mechanical procedure. It shows that biorefining can save energy, retention chemicals and improve the TEA by more than 10%.

High performance tissue towelling requires some important physical properties such as tensile strength, scrub strength, absorbency, bulk, weight, softness, absorption, water filtering capacity and thickness. The strength of paper towels depends mainly on fibre quality, fibre-fibre interaction and degree of wet strength. It is common in the industry to use a mix of short fibre, which is more cost competitive, and long fibre, which gives the paper better properties, in combination with a chemical wet strength resin.

The impact of Quimizime B applied as a biorefining agent in tissue towelling paper making is presented in Table 3. The effect of the enzyme on the process was a selective defibrillation[6] improving the interaction between the fibres, which enabled a decrease in the wet strength resin dosage, a decrease in starch dosage and savings in mechanical energy refining, while retaining the same paper properties.

Additionally, this study opened up the potential of considering replacement of long fibre with short fibre in the furnish,while retaining the same quality of the final paper.

CONCLUSIONS

Enzymes have been found to reduce the pulp refining energy and improve paper strength properties over many years. Most researchers focus on enzymatic pulp treatment to reduce refining energy and make paper manufacturing more environmentally friendly [6]. In this work, an enzyme blend in combination with smart process management showed that a biorefining system can go beyond energy saving or paper strength improvement.

The art of paper making is the art of joining fibres in the best way to achieve the best properties. This study investigated industrial applications for three different kinds of paper, for the solution of three different challenges, using the bio refining concept.

Thus, the biorefining not only saves refining energy, it is also sustainable and provides the necessary tools for the paper maker to make improvements to a wide range of paper properties using the right product and smart process management. This entails not only monitoring the process but also adapting the process to the enzyme usage. During the application, the smart management would involve opening or closing the refiners, adjusting the dosage of other chemicals, and evaluating how the enzyme refining is impacting the paper properties and the fibres specifically.

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FOOTNOTES

1. The enzyme production cost process is not energy driven. It comes from a controlled action of a fungus and the volumes of enzymes applied are significant lower compared with the fibre that needs mechanical refining without the enzymatic action.
2. Assumed, based on strength results.
3. We used the net specific energy consumption of a refiner or refining system applied to a pulp:

   (The common metric units are kWh/tonne)

   Example calculations:

   a) With a flow rate of 500 gpm and a consistency of 4.5%, the throughput is: t/d = 500 x 6.0 x 0.045 = 135 st/d

   b) With a flow rate of 1200 lpm and a consistency of 5.3%: t/h = 1200 x 0.06 x 0.053 = 3.8 mt/h

   c) If the motor load is 575 hp and the no-load power is 115 hp, then the net applied power is: 575 – 115 = 460 hp and the specific energy input is: 460 hp / 135 t/d = 3.4 hpd/t
   To convert from hp to kW, multiply hp by a factor of 0.746. The equivalent specific energy calculation for the flow rate of 1200 lpm would then be: (575 hp x 0.746) – (115 hp x 0.746) = 342 net kW 342 kW / (1200 * 0.06 * 0.053) = 90 kWh/t

   This is the method to calculate it, but the data used in the table came from on line measurement from the paper machine which was calculating it automatically.
4. Freeness is measured in points or “level” and there is a table to correlate it depending on the pulp consistency. Please refer to TAPPI T 227 om-94.
5. This was a target and it is a simple average. The numbers were received from the paper maker database.
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ETHANOL PRODUCTION

Up for the challenges of **cellulosic ethanol production**

BY KERSTIN ERIKSSON

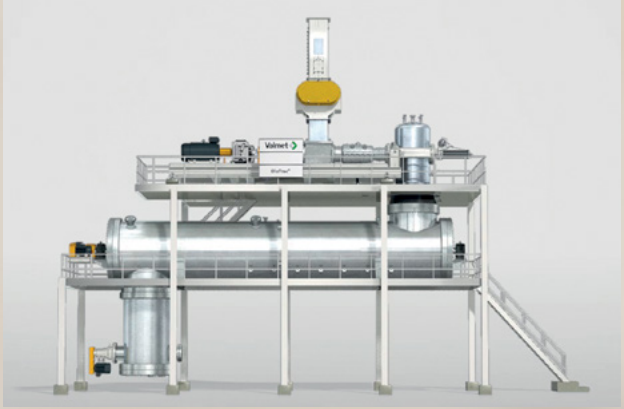
Cellulose pretreatment is one of the most critical and challenging areas in the cellulosic ethanol production process. Pretreatment makes the cellulose accessible in the subsequent biotechnological stages by transforming the material, both physically and chemically.

When a process solution is designed for a specific raw material, the pretreatment stage can be very efficient, increase yield and maximise the amount of ethanol produced. Equipment plays a critical part in the pretreatment area and is vital in achieving a fully implemented process solution. To this end, Valmet's BioTrac system, which is part of the front end in a biorefinery and used for prehydrolysis, contributes to both the quality and quantity of the ethanol produced.

Achieving balance in pretreatment

There are several challenges in the pretreatment area, which have been experienced by most plants. They start with the feeding of bulky, heterogeneous material into the system, together with contaminants such as silica and sand – this can lead to wear problems.

Bulky materials are challenging to feed, but the BioTrac system can handle it.



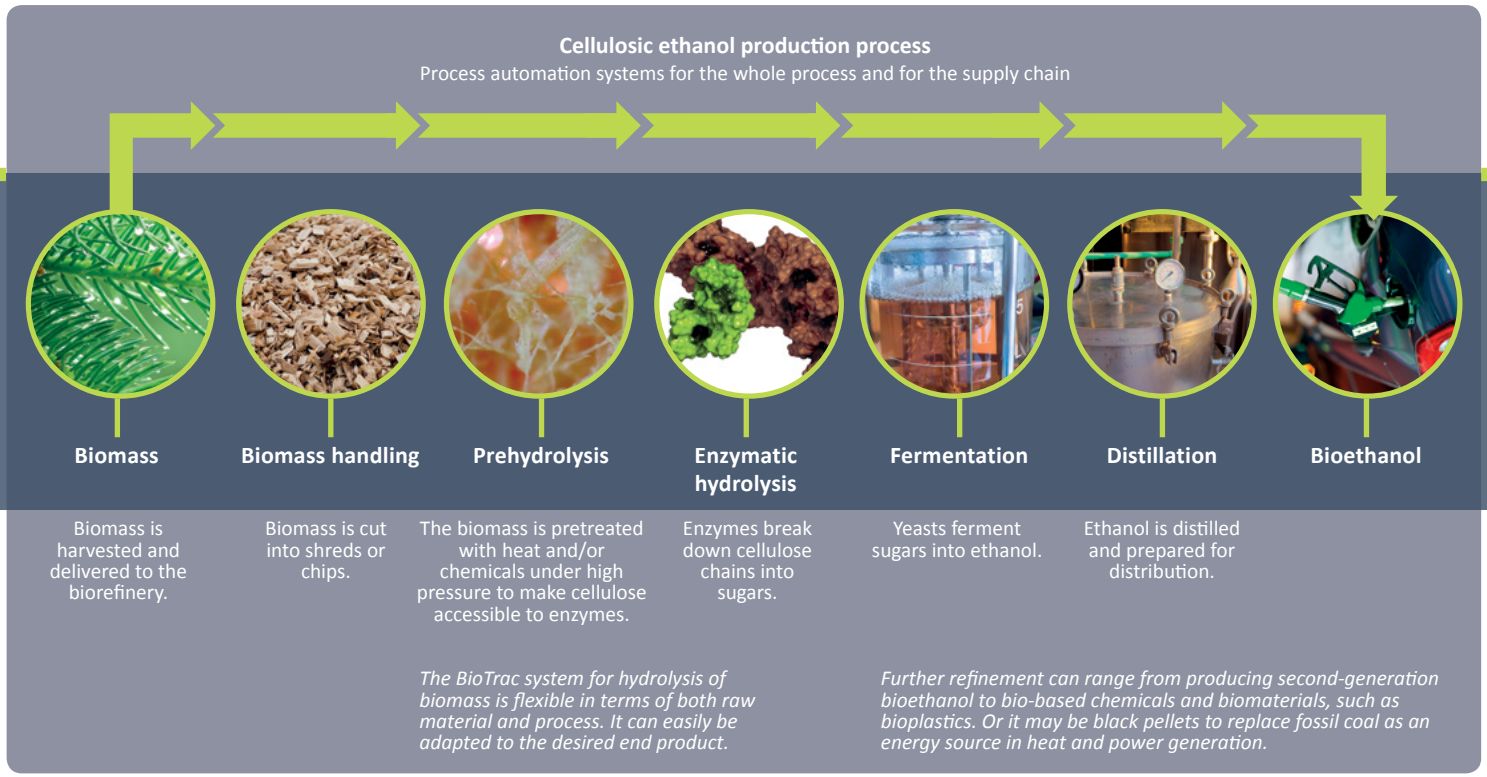
Bulky material is difficult to handle when feeding into a high-pressure reactor: the material must act as a steam-tight plug – to minimise blowback – but at the same time the energy input must be minimised to reduce wear on the feeding system. To achieve this balance, Valmet believes it has a very flexible system to optimise the feeding of bulky material.

Other challenges include the physical behavior of the material as it passes through the system, and onto discharge.

"You need to manage all these challenges, otherwise you will get unnecessary sugar losses and the formation of inhibitors, which will affect the subsequent process steps. It will also be a problem to obtain consistent production. Raw material in the cellulosic ethanol process is more challenging than in traditional biomass-based industries, with feeding and wear being the two main challenges," says Francois Lambert, manager of Biofuels Technology at Valmet.

High availability with BioTrac

Backed by knowledge gained in the non-wood pulping and panelboard industry, Valmet has managed to minimise wear on the discharge line and has successfully developed a solution to feed non-wood materials under high pressure in a safe way. When dealing with high temperatures and high pressure, it is extremely important to reduce safety and operational risks. In the BioTrac system, the biomass is pre-compressed to attain a steady feed into the reactor while improving safety and providing high availability.



The BioTrac system for prehydrolysis of biomass is flexible in terms of both raw material and process. It can easily be adapted to downstream process steps. The layout of the system varies according to the application, but it often consists of either one or two reactors, although more may be used if required. The patented feeding system combines a force-feed screw and a plug screw feeder. Valmet's impregnation system has been developed to achieve even impregnation in a very short time and to prevent chemicals from remaining on the surface of the material.

"Basic research has been going on for many years, creating a knowledge bank that covers different raw materials and their behaviour. We have been building pilot and demonstration plants since the 1990s, which we have used to further develop our knowledge about non-wood together with our customers and partners. Continuously serving and supporting our customers, we have followed them in their successes and transferred knowledge acquired from those plants into our full-scope offering," says Patrik Pettersson, process engineer at Valmet.

Patrik Pettersson, Process Engineer, and Francois Lambert, Manager of Biofuels Technology, from Valmet.

Proven, safe equipment

Valmet's technology originates from the traditional pulp, paper and fibreboard industries – where the company has extensive experience – and has been further developed to meet the new challenges of biorefining. Its extensive experience in non-wood pulping and feeding of non-wood materials has been highly valuable when applying this technology in the pretreatment stage. Non-wood materials are not a homogeneous category, and each material needs to be assessed separately to get the right feeding solution.

In the bioethanol industry, the main focus has been on the downstream stages of the cellulosic ethanol production process, so the design of the equipment has not received as much attention. To better utilise the valuable raw material and prepare the material for further processing, the pretreatment stage needs to be reviewed. Proven, safe equipment is vital to meet the challenges and increase production of cellulosic ethanol. Valmet is a reliable partner and up for the challenges of cellulosic ethanol production, from pilot plants to full-scale production.

What is cellulosic ethanol? Cellulosic ethanol is ethanol produced from cellulose, the stringy fibre of a plant. It is a biofuel produced from renewable raw materials, such as grass, wood or other plant material, or algae.

RESIDUE EXTRACTION

A new process for full utilisation of softwood bark

In the Finnish mechanical and chemical forest industry, three million tonnes of softwood bark are produced annually which are mainly used for energy production.

Using a method developed by VTT, a high yield of pure tannins can be extracted from the bark for use as a raw material for resins used in wood products. The residual fibre fraction can then be used to produce sugar as a raw material for fermentation products while also being suitable for material applications.

Traditionally, tannins are extracted from the bark by hot water extraction. In addition to tree species, the extraction yield is influenced by the origin and processing history of the raw material. From Scandinavian spruce and pine, the yield remains at most 10% of bark weight. The utilisation of bark residues as a source of sugar has been studied through enzymatic hydrolysis. Even in this process, the yields have not been very high, and consequently much of the bark tannin and carbohydrates have remained unused.

The new process uses much higher alkaline conditions and a higher temperature, more closely resembling the wood cooking process. About one third of the bark weight can be dissolved and isolated as a tannin fraction with significantly less impurities – carbohydrates and ashes – than in a fraction obtained by hot water extraction. This tannin extract is a much more reactive resin raw material than normal kraft lignin. The same technology as used for lignin recovery is suitable for the recovery of the tannin. In addition to tannin, there is some lignin in the fraction.

The fibre fraction can be hydrolysed considerably more easily than after hot water extraction. The hydrolysate is well-suited for fermentation. The purpose is to further test the suitability of a fibre fraction for material applications.

The method for the total utilisation of the bark has been developed by VTT as part of the EU's SPIRE programme project, "Systemic Approach to Reduce Energy Demand and CO_2 Emissions of Processes that Transform Agroforestry Waste into High-Added-Value Products".

Other partners include BBEPP from Belgium (upscaling), FORESA from Spain (tannin fraction for resin) and BIOSYNCAUCHO from Spain (hydrolyzate fermentation). They have participated in the further development and validation of the process and the resulting fractions while the project has been co-ordinated by Spanish TECNALIA.

In order to bring the method into production, a company consortium is being created, which is expected to include an interested supplier of raw material, equipment supplier and application testers to utilise the tannin and fibre fractions.

Source: www.vttresearch.com

FIBRE ENHANCEMENT

Towards a more sustainable pulp and paper industry with Deep Eutectic Solvents

At a special conference organised as part of the Paper and Beyond 2018 event in Brussels during October, the first phase of the PROVIDES project was officially completed. PROVIDES is a research and innovation project within the Biobased Industries Initiative with the goal of significantly reducing CO_2 emissions in pulp and papermaking. Sappi, an active participant in the project, is supporting the pulp and paper industry's technological transition towards meeting its climate objectives.

The completion of the first phase was celebrated with the publication of a booklet describing the potential of Deep Eutectic Solvents (DESs) for creating breakthrough innovations in the pulp and paper industry. The publication 'Deep Eutectic Solvents in the paper industry' can be downloaded at www.providespaper.eu.

Revolutionising the industry

In November 2011, the Confederation of European Paper Industries (CEPI) launched its 35-year vision for the sector, concluding that breakthrough technologies would be needed to make the industry more sustainable. Specifically, it aims to achieve an 80% reduction of CO_2 emissions and at the same time create 50% more value. New, mild pulping technologies based on natural DESs lead to a significantly more sustainable process that is energy, cost and resource effective, while producing much lower CO_2 emissions.

The total DES concept

Nature-based, renewable, biodegradable, low-volatile and cost-effective, the DES concept could help to achieve a 40% reduction of energy use and an 80% reduction of CO_2 emissions in pulp and papermaking. It will also enable the industry to obtain a radically new, sustainable and techno-economically feasible pulping technology, while also enabling the selective recovery of dissolved components. In addition, DESs can be regenerated and recycled for economical use of resources. This technological innovation produces high-quality cellulose fibres for papermaking, while simultaneously producing high-quality lignin and hemicellulose fractions for a variety of high-volume applications.

Did you know...

PROVIDES stands for 'PROcesses for Value added fibres by Innovative Deep Eutectic Solvents'.

A eutectic system is a mixture of components of which the freezing point is lower than that of each of the components. The most commonly known eutectic system is salt in water: when salt is added to water, the freezing point lowers by a few degrees. The single chemical composition that solidifies at a lower temperature than any other composition made up of the same ingredients is known as the eutectic point. A deep eutectic system is a system with an unusually strong decrease in freezing temperature, which can be more than 100°C.

Results and achievements

The first phase of the project yielded more than 100 new DESs and of these, two have been further developed as successful delignifying agents. The project proved that the entire DES pulping process can be run at operational costs similar to those kraft pulping, and that the resulting cellulose fibres have good tensile strength and extreme internal bond strength. In addition, it was proven that DES delignification results in 95% lignin removal, and that the lignin can be successfully recovered and the DES regenerated.

Next steps

In the coming years, the pulping part of the DES research cluster, coordinated by the Institute for Sustainable Process Technology (ISPT), will continue to conduct further applied research towards the realisation of a DES pulping pilot and demo, ultimately leading to commercial implementation in 2030.

Having it all

- top quality screening and high level runnability

The main goal in the screening process is to efficiently remove debris, including stickies, shives and other contaminants from the stock. However, there are other factors to consider such as targeted capacity, reject rate, energy efficiency, and runnability. ANDRITZ UTwist adaptable screening profile wire allows a mill to have it all.

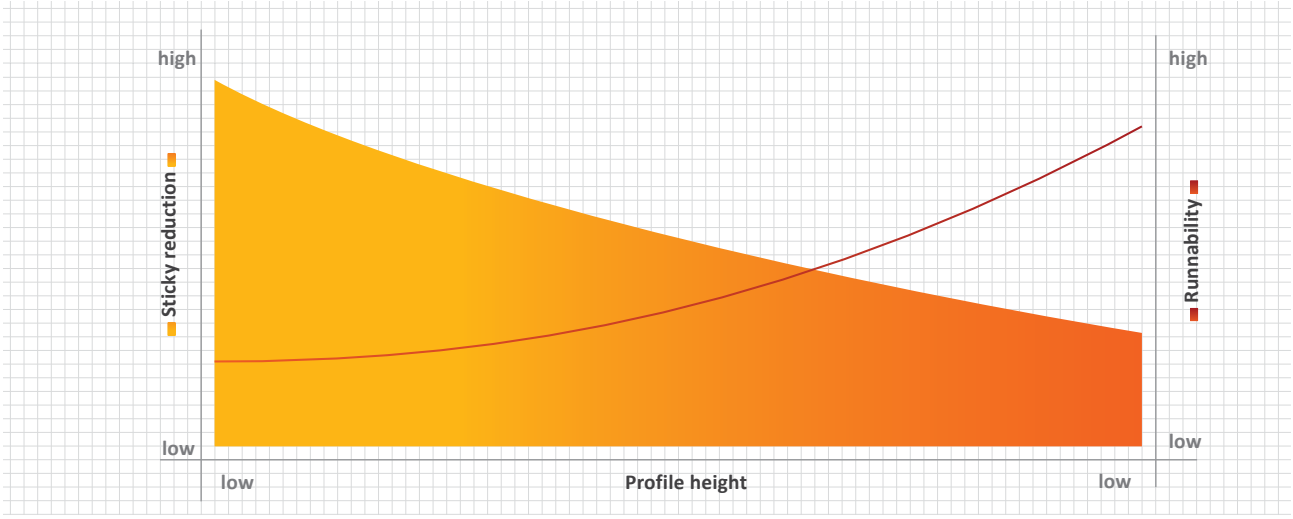
A standard screen basket has a fixed wire profile from top to bottom. This is the norm even though the stock thickens as it flows from the feed end to the reject end – increasing the risk for plugging in the reject end where the thickening reaches its peak. What is becoming more of a challenge is to operate the screen under changing process conditions – inconsistencies in incoming raw materials, excessive amounts of contaminants, shutdowns, and other process disturbances.

Since screening efficiency and runnability are contradictory objectives, this points to the inherent compromise in basket specification; setting the wire profile height low enough to ensure good efficiency (high accept quality with minimal contaminants), yet high enough to produce enough turbulence on the basket surface to maintain throughput and high runnability.

The design of the wire in a slotted screen basket has a major effect on both screening capacity and accept quality. The profile height is determined by adjusting the angle of the wires and it affects the turbulence on the basket surface.

Turbulence has a crucial effect on the behaviour of the fibre suspension. Increasing the profile height increases turbulence on the basket surface, which is beneficial for stock fluidization and increased throughput. Higher turbulence also prevents fibre mat to build up too strongly on the basket surface, which might lead to plugging. However, if the turbulence is too strong, more contaminants will pass through the basket, reducing the accept quality.

A low profile height, on the contrary, improves screening efficiency, but lowers the throughput of the screen. It also contributes to higher rejects thickening, especially in the reject end of the screen, which again may jeopardize runnability.



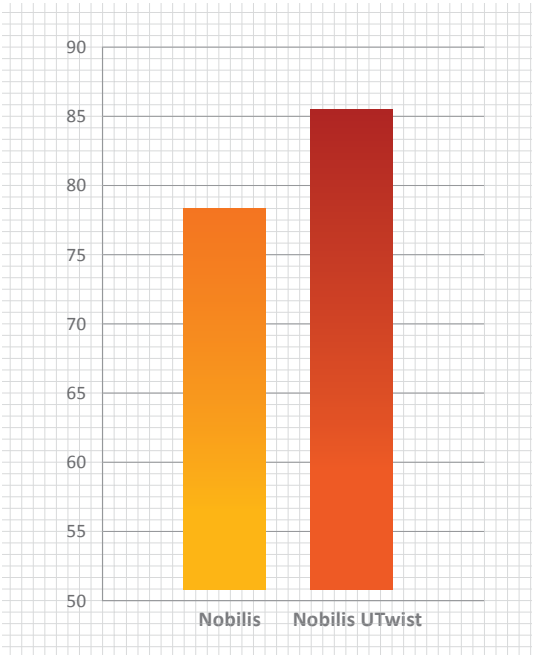
(ABOVE) FIGURE 1: Effect of the profile height on sticky reduction and on runnability. **(RIGHT) FIGURE 2:** Pilot Plant Results

PILOT PLANT TRIALS

Pilot plant trials of the UTwist were conducted on a small screen (A12) in the ANDRITZ laboratory. For the trial, two screen baskets were compared under identical process conditions and with the same rotor (tip speed 15.3 m/s):

- **ANDRITZ Bar-Tec Nobilis:** slot width 0.16 mm; profile height of 0.6 mm
- **ANDRITZ Bar-Tec Nobilis UTwist:** slot width 0.16 mm; profile height of 0.4 mm on the top and 0.7 mm on the bottom

The results of the pilot plant tests confirmed the design (Figure 2). The UTwist version of the Nobilis basket showed an approximate 10% higher reduction in stickies at the same throughput and energy consumption.



WHY NOT HAVE AN ADAPTABLE WIRE?

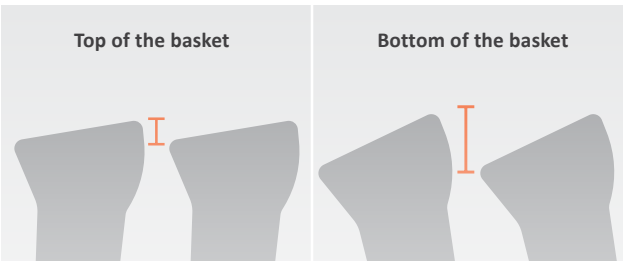
In a traditional basket design, with a given slot width, the manufacturer must accommodate the compromise between screening efficiency and capacity with a profile height that is uniform from the top to the bottom of the basket. Prioritizing runnability when selecting the profile (i.e. no critical thickening, no plugging and no unexpected shutdowns) ensures that optimum screening efficiency is never achieved. This is why the ability to tailor the profile height along the length of the wire – from feed to rejects – is so desirable.

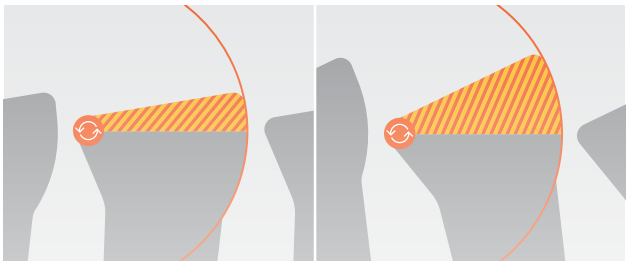
Basket suppliers often need to specify a higher profile to create enough turbulence to avoid critical thickening, which can reduce screening efficiency. Therefore, the chosen profile height is not optimum for every position of the basket – meaning that the full potential of the basket is not achieved.

ANDRITZ has solved this problem by developing UTwist, an adaptable-profile wire which ensures the lowest possible profile height at any vertical position of the basket. The ability to adjust the profile height across the basket is unique, enabling low profiles close to the feeding zone to increase screening efficiency, and a higher profile in the following zone to avoid critical thickening.

The patented profile geometry enables tilting the wire without impacting slot width. This is not possible with any other profile wire.

(BELOW LEFT) FIGURE 3: Different profile heights in different sections of the basket. **(BELOW) FIGURE 4:** Tilting of UTwist wire





RESULTS FROM THE MILL

Based upon the successful pilot plant trial, the UTwist concept was introduced to the first customers.

OCC FINE SCREENING

A mill in Central Europe using OCC furnish for the production of packaging paper wished to improve the accept quality. A side-by-side comparison test was done in the first stage fine screens (ANDRITZ F60) in line 1 and line 2. The rotors in both screens were identical (RO-TEC LRsR with a tip speed of 20.6 m/s):

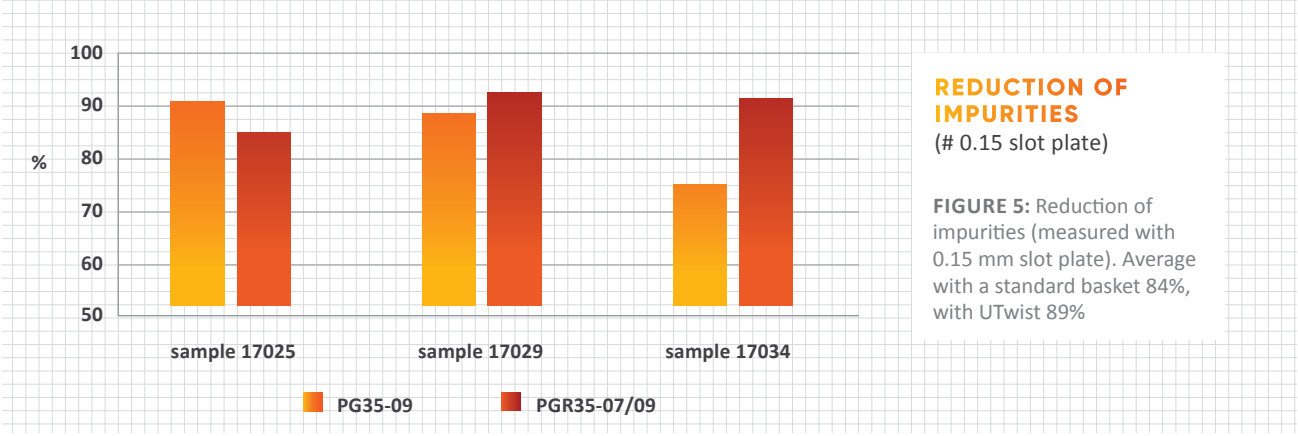
- **Line 1:** Bar-Tec Valeo, slot width 0.15 mm; PG wire with 0.9 mm profile height
- **Line 2:** Bar-Tec Valeo UTwist, slot width 0.15 mm; PGR wire with a profile height of 0.7 mm (top) to 0.9 mm (bottom)

Figures 5, 6, and 7 show the results.

IMPROVEMENTS ACROSS THE PROCESS

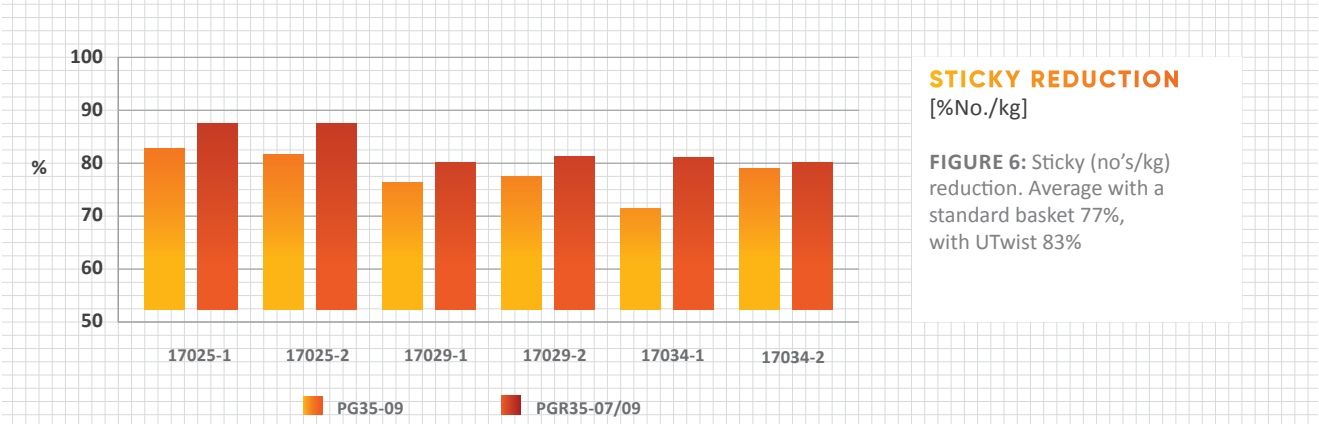
The efficiency and effectiveness of the screening process relies to a great extent on the performance of the screen basket. The development of the UTwist basket, a key and patented technology from ANDRITZ, allows improving the operation of virtually any screening system, regardless of the original manufacturer. With this basket design, the wire profile can be adjusted to account for variations in stock thickening as it flows from the feed end of the screen to the reject end.

The design allows setting the wire profile height low enough to ensure good accept quality by capturing rejects, and yet high enough to maintain throughput without plugging, ensuring high runnability. This feature has been tested and verified at ANDRITZ's pilot plant and is now installed in approximately 60 mill applications.



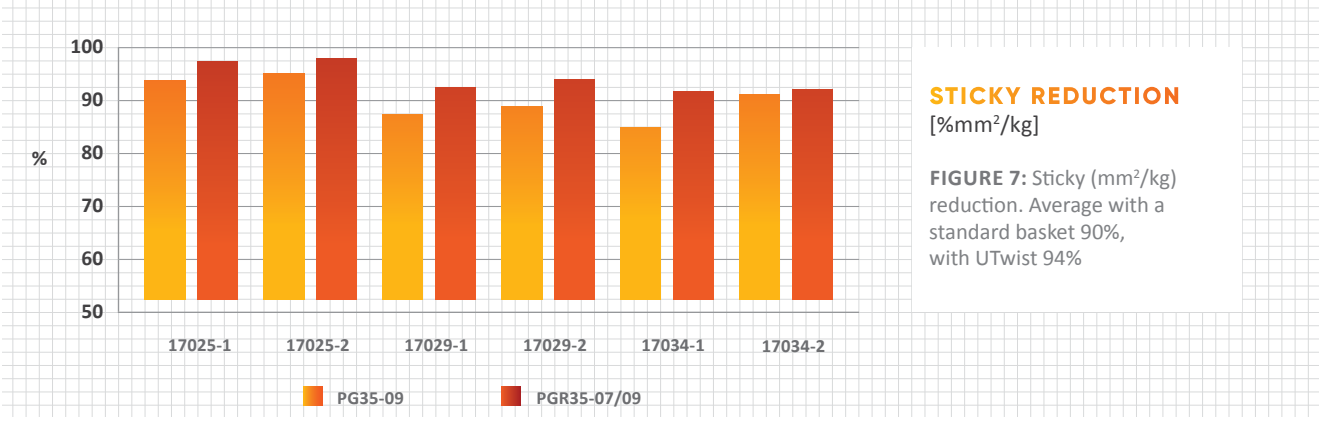
REDUCTION OF IMPURITIES
(# 0.15 slot plate)

FIGURE 5: Reduction of impurities (measured with 0.15 mm slot plate). Average with a standard basket 84%, with UTwist 89%



STICKY REDUCTION
[%No./kg]

FIGURE 6: Sticky (no's/kg) reduction. Average with a standard basket 77%, with UTwist 83%



STICKY REDUCTION
[%mm²/kg]

FIGURE 7: Sticky (mm²/kg) reduction. Average with a standard basket 90%, with UTwist 94%

RECYCLABLE PACKAGING

UK trial of fibre-based ready meal packaging extended

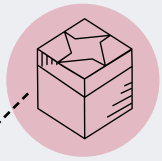
UK-retailer Waitrose & Partners, in collaboration with its packaging supplier Huhtamaki, will be extending a trial version of renewable fibre-based ready meal packaging. Huhtamaki is part of a three-party consortium developing an alternative to existing black plastic ready meal trays which will be piloted with customers in the UK.

Currently, much of the black plastic packaging used by supermarkets for food such as ready meals and puddings is not recycled, as lasers used by waste processors cannot recognise the colour effectively. This means it is not identified for recycling. The packaging concept will be tested with three ready meals by consumers at Waitrose stores for two months. More meal variations will be tested for a longer duration to understand whether the consumers still appreciate the concept.

New print with QR code makes cup recycling easier in UK

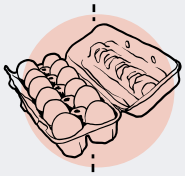
Huhtamaki has also launched an initiative aiming to increase cup recycling within the UK. Its Specialty Cup range of single wall hot cups and paper vending cups now have a brand new, modern design with a QR code and a message to 'please recycle this cup'. The QR code can be scanned by a mobile phone which will lead the consumer to a web page which contains details of the growing numbers of cup recycling sites and schemes across the UK.

The cups are recyclable via a fast growing and accessible recycling infrastructure including outlets and in-store collection schemes, ACE UK Bring Banks, waste contractors, specialist cup collection and recycling operatives as well as regional recycling schemes.



Taking the fiction out of pulp packaging

BY JOHN CORRALL
Managing Director of Industrial Inkjet Limited



The world of packaging is changing. The hedonistic throw away culture of years gone by, where plastic was king, is already a fading memory. The future sees a rejection of the practices that litter oceans and contaminate land for generations, instead favouring the recyclable and the sustainable. John Corrall, managing director of Industrial Inkjet Limited, discusses how pulp is leading the way in this revolution.

Pulp is made from recycled cellulose, sugar cane or even grass. It has a multitude of potential uses, from internal packaging for electronics to egg boxes, disposable plates to fruit punnets; it can be used for salad boxes or even detergent packs. It can be light but strong and can even be made grease-proof.

The next question is how to decorate these new packages. Nothing looks more drab on a shelf than endless grey or brown packages, so they need to look brightly-coloured and appealing. However, any decoration has to de-ink easily for recycling. For long production runs, flexo is currently used, but for short runs or runs with a lot of variation (for example different types of fruit in the same size punnet) this can mean that more pulp cartons are used for setup than in production (hardly a green solution).

Using labels is then the logical alternative, but these can cost more than the pulp carton itself, potentially ruining the commercial viability.

So what if an alternative was possible? Print direct to the pulp carton using economic and safe water-based inks in vivid colours? Surely that would be the perfect solution. And in order to achieve this goal, what are the technical challenges to be overcome?

The right ink

As with most inkjet projects, while the printing hardware has to be right, the ink is the king. Without the right ink, no project will ever succeed. In the case of pulp packaging, the demands on the ink are widespread:

Bright colours: it's obvious that bright or strong colours will be needed – but they need to remain bright on what is often a very absorbent material. The water content of the ink may be absorbed quickly, but the pigment needs to stay on or near the pulp surface. Also the carton material itself may be an off-white colour or may be pre-coloured (grass-based pulp packaging is – not surprisingly – green in colour).

Regulatory requirements: if the carton will be used to hold food then the relevant regulation is EC1935/2004. For the printing ink most customers expect compliance with Swiss Ordinance SR 817.023.21. This regulation defines the materials that may be used in a printing ink for 'non-direct food contact'.

There are tests to check what will migrate out of the ink and into any food contained. We need to worry not just about ink that penetrates through the carton wall from the outside to the inside, but also any cross-contamination between the ink on the outside of a carton and the inside of the carton below it when they are stacked together.

Cost: as ever, the economics will make or break the project. Inkjet ink is always going to be more expensive per-litre than flexo ink but this is compensated for by the lack of setup time (and therefore setup cost) and the lack of waste during setup. The economics will obviously change a lot depending on the extent of the decoration required. For example, the cost of printing a small picture of a strawberry or a plum, plus some text and a barcode, might be only 10% of the cost of decorating the entire top and sides of the carton.

Pulp media type: 'Normal' water-based inks usually work well on regular pulp cartons. The problem comes with grease-proof cartons that have had the pulp material treated with a hydrophobic coating. The ink simply sits on the surface of the carton and can easily be 'smudged' with a finger. With this kind of material, we can use a pre-treatment such as a primer to help fix the ink. Or we can use an alternative ink such as a water-based polymeric ink that will 'fix' to the pulp surface when heated. In either case, there is an additional cost to be considered.

Inkjet system

As with any inkjet hardware to be used in-line in a production environment, the system will need to be very reliable. After that there are several aspects to decorating pulp cartons that are a little unusual:

Orientation: high-quality colour inkjet print in an industrial environment usually uses piezo drop-on-demand technology. These inkjet print heads have open nozzle holes and the ink is prevented from falling out by careful application of a small vacuum to the ink supply system. This works fine when printing downwards (for example onto the carton lid) because all of the nozzles in the inkjet print head are at the same height and see the same pressure.

However, when printing cartons such as fruit punnets, we need to print both sides of the punnet at more or less the same time. The inkjet print heads are now in 'tower' mode, i.e. the row of nozzles is vertically upwards. The nozzles shoot sideways onto the sides of each punnet as it moves horizontally past. The ink pressure at the top of the print head is always going to be less than the ink pressure at the bottom of the print head. For this to work we need a print head with a wide 'pressure window'. A combination of the non-wet coating on the inkjet print head, and the shape of the tiny nozzle cone, allows the ink meniscus to survive a significant change in ink pressure along the length of the print head.

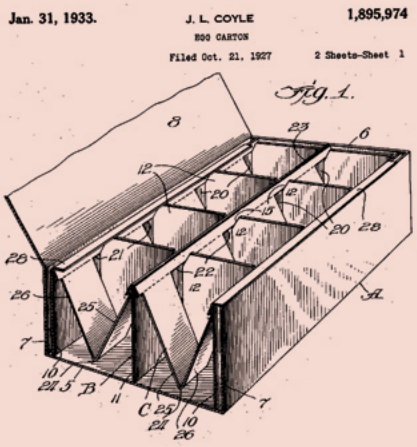
Ink throw distance: pulp cartons usually have a textured surface and are not highly accurate in their overall dimensions. There may be individual paper fibres sticking up. They also tend to have steps or lips in their design in order to add strength. All of this means that the inkjet print head cannot get close to the carton or there is likely to be a crash.

From our experience at IIJ, we are normally asking the inkjet print head to 'throw' the ink drops between 3 and 5mm to the carton surface. To an extent this conflicts with the customer's desire for the highest possible print quality. High quality print needs small ink drops, but small ink drops won't fly far before they lose momentum and blow away.

The best compromise seems to be around 14pL (picolitre) drop size. Quality is still rated as 'good' but we can print well onto cartons with curved or stepped surfaces.

Environment

Dust: a pulp carton is dusty. Dust gets onto the inkjet print head nozzle faces and interferes with jetting. This causes missing nozzles in the print and production has to pause while the print heads are cleaned. The most important thing to consider is how to prevent dust reaching the inkjet print heads in the first place.


Jan. 31, 1933. J. L. COYLE 1,895,974
EGG CARTON
Filed Oct. 21, 1927 2 Sheets-Sheet 1
Fig. 1.

Did you know?

Joseph Coyle, a newspaper publisher in the Bulkley Valley area of British Columbia, is credited as the inventor of the egg carton. The story goes that his office was next door to a hotel and one day he overheard the hotel owner arguing with a local farmer that eggs he delivered often arrived broken. Coyle knew he could solve their problem and he decided to create a box that would have each egg in its own cushioned pocket. In 1911, he invented the egg carton, after which he designed a machine that could make them in large quantities. He sold his newspaper and built egg carton factories in Vancouver, Toronto, Chicago and Los Angeles, and the egg carton he invented is still the standard way to transport eggs today.

Airflow is very important, so an air-knife may be used to remove dust from the carton well before it approaches the inkjet, and the area around the inkjet might be kept at a positive air pressure. It's also important that when cleaning of the print heads is eventually required; the process is very quick and minimises down-time.

Heat and humidity: if we are printing the cartons soon after manufacture then we have hot, wet cartons passing close to the inkjet heads. The heat could potentially cause drying of the ink in the nozzles, while the humidity could cause condensation i.e. water droppings forming on the cooler inkjet print heads. As with dust issues, the solution involves airflow. Gently blow away the warm, wet air and the problems are resolved.

Drying

Drying of the printed ink should not be forgotten. Our experience is that on dry cartons a near infra-red (NIR) lamp is an effective solution for drying the ink. However, if the decoration is to be done in-line directly after carton manufacture then the situation is different. In that case, the pulp is still wet – perhaps around 7% water by weight depending on the manufacturing process.

Since the ink is water-based, this doesn't seem to impact print quality – but it does make drying difficult since in effect the dryer is drying the carton as well as the ink. In this case we have found that hot air can work very well (although it takes up a lot of space).

Demand for pulp carton is about to explode, and the use of inkjet for decoration may well be the 'next big thing' for our industry.

Dryer section efficiency that's better for the pocket

Pocket ventilation offers great potential

Whenever energy savings are concerned, the focus often tends to shift to the dryer section. Nearly 65% of total energy demand for a paper mill comes from drying. This makes it imperative that air inflow and outflow, for example, are accurate in the hood, as this is where analysis can often highlight bottlenecks or areas for improvement. This is one measure among many that helps papermakers not only save costs, but also increases productivity. All of this relies heavily on a fine-tuned dryer section.

The Heimbach TASK-Force offers some guidance on pocket ventilation which, approached correctly, will reap considerable rewards.

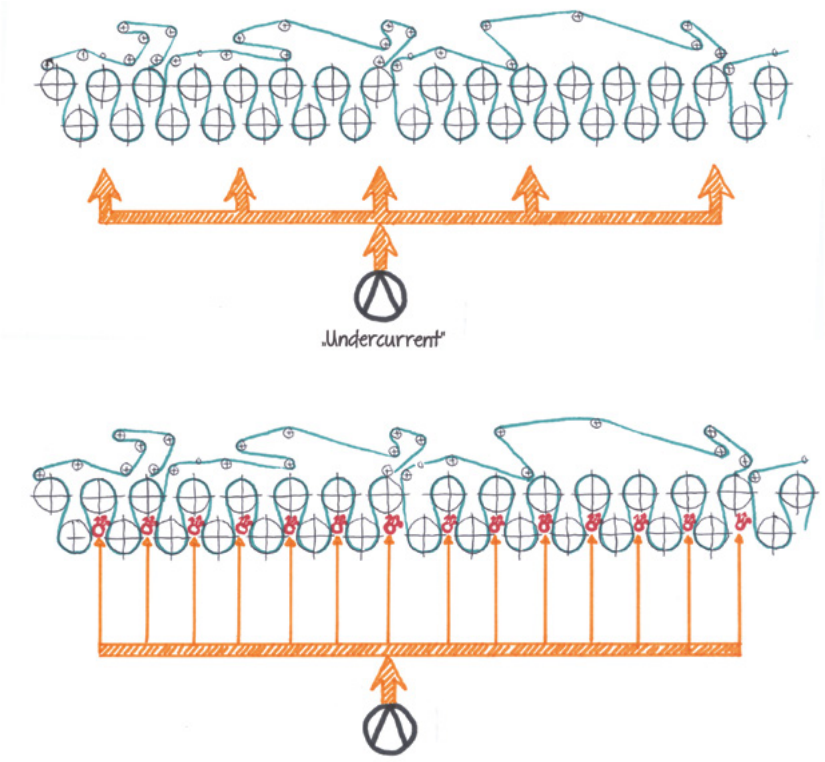
The first case study is about a customer that produces newsprint (40-60 gsm) at 1,000m per minute. The machine has been regularly measured and successively optimised by Heimbach TASK for a extensive period of time.

Lasting improvement

On the basis of measurements made, a step-by-step restructuring of the dryer section from conventional to Slalom was recommended. This was tackled over a few years: firstly the third, then the fourth dryer group (groups one and two were already running as a slalom).

The first success yielded was clearly improved runnability and visibly fewer sheet breaks at the same production speed as before. Thomas Fischer, leader of TASK, summarises aptly: "More productivity, more quality, more efficiency."

However, this was not the end of the optimisation plan as the air inflow was still directed into the basement as "undercurrent" (Fig. 1). This means it flows past the machine but does not contribute to the drying process.



(TOP) **FIGURE 1**: Unfavourable – "undercurrent". (BOTTOM) **FIGURE 2**: Very good – blow pipes distribute air in a sensible and directed way

Blow pipes showing the way

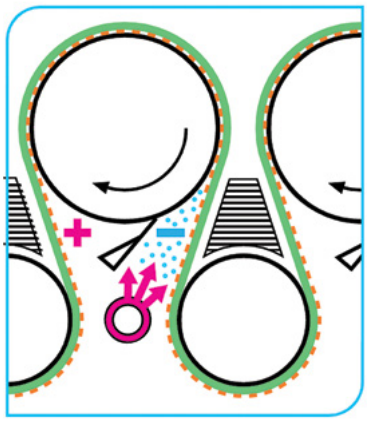
Consequently the drying performance was still not sufficient in the production of heavier grades (60 gsm) at maximum speed. In this case the path to a solution was the use of blow pipes, which significantly improved drying capacity.

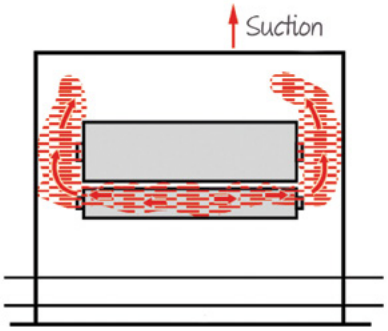
Blow pipes are built into the cylinder pockets, which in many cases means higher productivity and energy savings per tonne of paper at the same time – one measure, two benefits. This was also the outcome with customer, though of course all the optimisations should be considered as a whole in this case. In total, the Slalom conversions and blow pipe installations extended over several years.

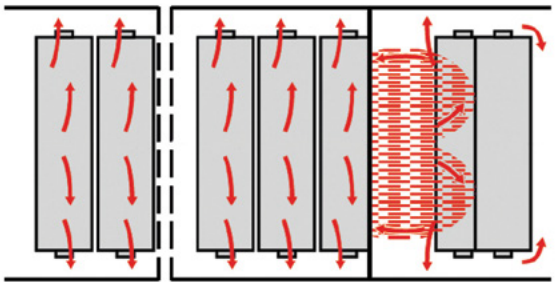
Airflow altered and improved

In the end all pockets were equipped with blow pipes (Fig. 2) which meant that the "undercurrent" no longer flows into the basement, where it is almost completely ineffective. Instead the air is directed where it is really needed in order to remove the water vapour from the paper sheet as efficiently as possible.

The optimum blowpipe position in the cylinder pockets can be seen in Figure 3. Ever since the air has been used in a more targeted way, the customer has also been able to produce heavier grades at 1,000 m/min. This results in a 17% productivity increase, bearing in mind that installation costs were quite low. This is a long-term optimisation which brought the customer millions of Euros of additional turnover.







(LEFT) **FIGURE 3.** Optimally placed blow pipe. (ABOVE) **FIGURE 4.** Recommended air flow from the pockets. (BELOW) **FIGURE 5.** Uneven pocket ventilation = uneven moisture removal.

Great effect

Looking at the details, the customer was able to use one less dryer fabric in the third dryer group while achieving improved runnability. This was owing to, among other things, the reduction in sheet breaks. The same applies to the second part of the dryer section restructuring (fourth group). If you calculate additional turnover referred to above, it is in theory possible to add some millions to the top line. However, this is not always so straightforward, which is why calculations of economic efficiency vary considerably in practice: "The best way to approach this," Fischer explains, "is to look at every machine for what it is: unique."

Naturally, if every paper machine is different, the numbers will always be relative. Nevertheless, an increase in economic efficiency of 17% can be said to be an impressive argument on its own.

Using blow boxes

Generally, slalom groups and optimal pocket ventilation are almost always beneficial. Blow pipes are not always necessarily needed, as other techniques have been effective. In the case of slalom groups, blow boxes for example are a sensible alternative. These are, like blow pipes, placed behind the doctor, so that the air in the pockets is distributed evenly – from the middle of the machine to both front and drive side (Fig. 4).

An accumulation of moisture towards the machine centre is therefore avoided; the sheet is also better pressed to the dryer fabrics while a stabilised sheet significantly and effectively reduces possible sheet fluttering. This one source delivers many practical benefits and further demonstrates why uniformity is crucial.

Moisture: a most important detail

The second case study involved a customer that asked Heimbach to measure and evaluate the status of his pocket ventilation. Figure 5 shows the TASK log including all relevant parameters.

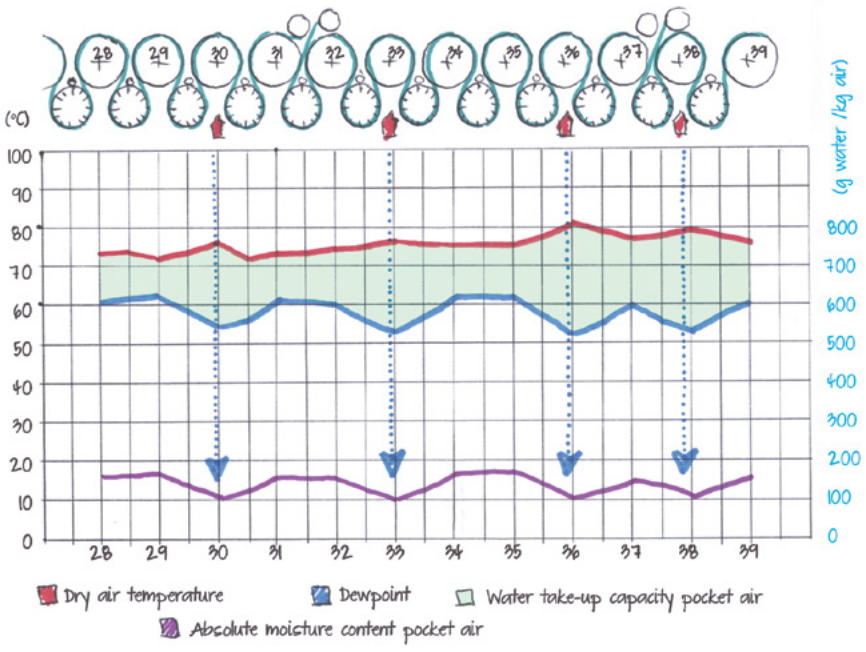
On this paper machine, blow boxes were only installed in the pockets under cylinders 30, 33, 36 and 38. This gave an uneven result in terms of ventilation: in places where the pockets are ventilated the absolute moisture is lowered by 38% - a significant reduction.

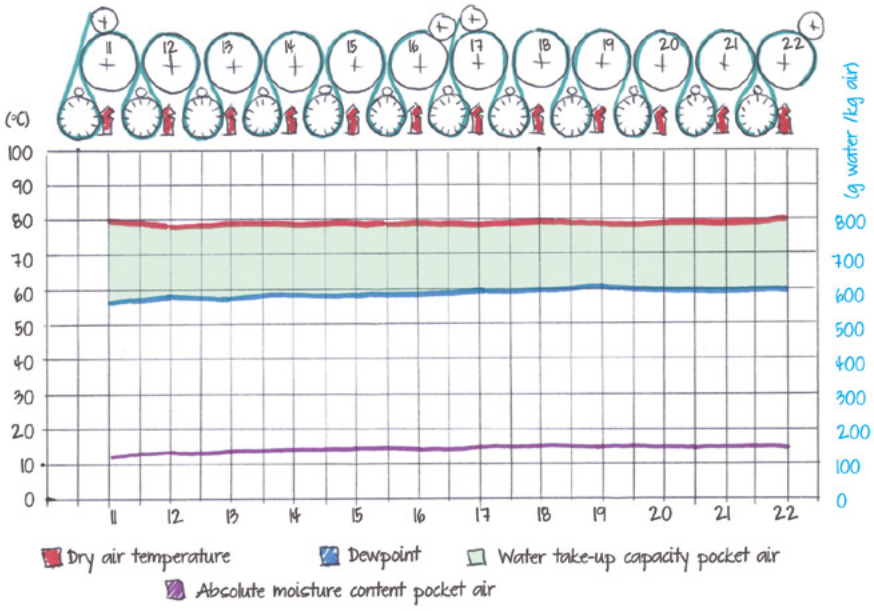
Looked at the other way round, the pockets that are not ventilated contain much more moisture. In conclusion: the blow boxes make it possible for significantly more water to be absorbed and transported away in these pockets. This is as obviously important when comparing Figure 5 with a different machine configuration.

Uniformity as a benefit

The dryer group in Figure 6 shows blow boxes in all pockets. At first glance, everything is even with both the dry air and the dew point temperatures very regular. As a result this also affects the water absorption capacity of the air in the pocket.

This means in practice that air flow is even from the middle of the machine in all pockets towards both edges. Furthermore, the lower moisture content of the air in all pockets leads to higher water take-up capacity.





(LEFT) **FIGURE 6.** Even pocket ventilation – regularity across the board. (RIGHT) **FIGURE 7.** Air doctors in cross section

"In summary, very effective removal of the evaporated water from all pockets," Fischer states. "The target was achieved in this case too, because an optimum CD moisture profile is, as everybody knows, a key quality characteristic across all paper grades."

The process is crucial

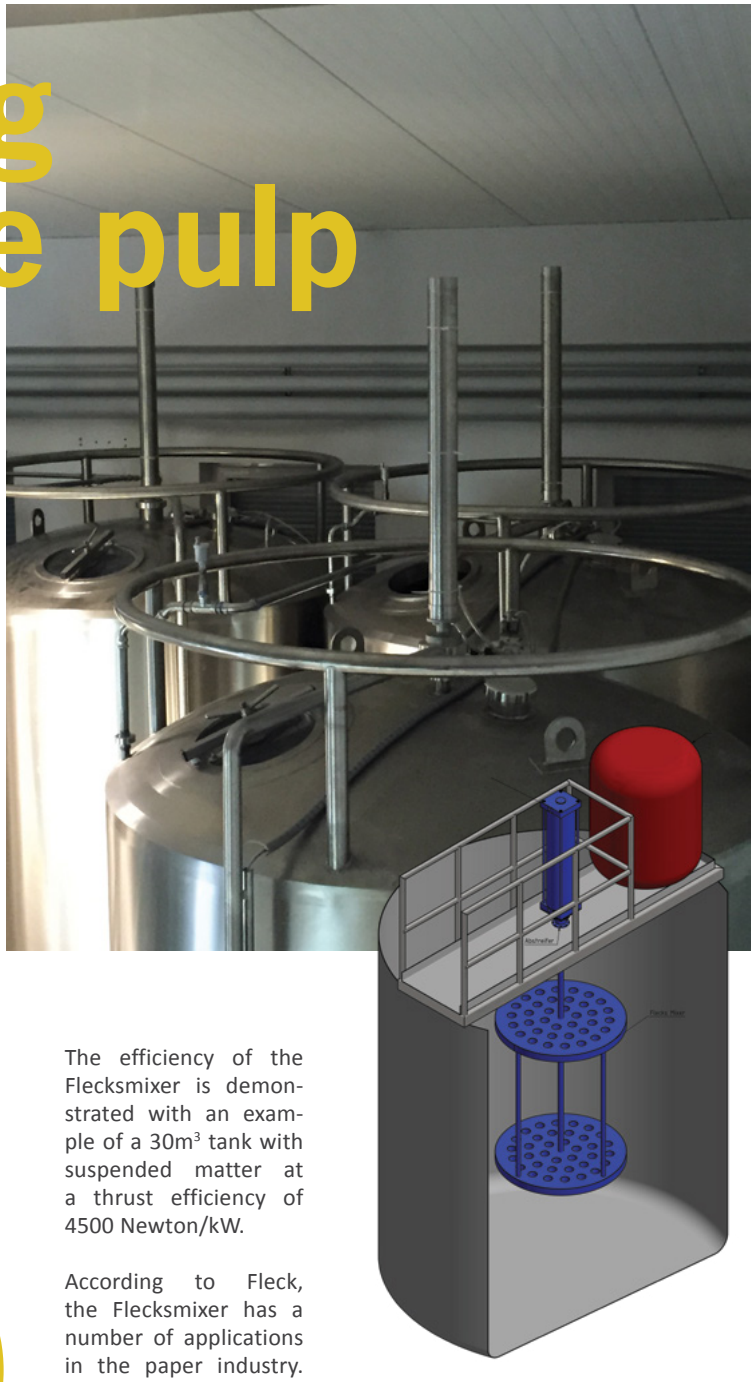
Unwelcome wet streaks can be all but eliminated with the use of the right technology and appropriate adjustment of the machine components. The examples mentioned here are certainly convincing as practical achievements, but they are all based on a process that always starts with measurements, since the appearance of moisture streaks can have more than one cause.

TASK always recommends assessing the situation by means of measurements, and only then think about optimisation and restructuring. This creates certainty, and simplifies assessment and evaluation.

Air doctors as an option

Similarly, in the third case, a customer opted for air doctor technology, a space-saving alternative that involves a combination of doctor beam and blow box (Fig. 7). Air doctors are very well suited to both conventional and slalom positions. Besides optimal use of space in the pockets, air doctors have the advantage of directing the supply air directly into the wedge between the exiting sheet and the cylinder – leading to an evening out of the vacuum created. This also applies to conventional groups.

No beating around the pulp

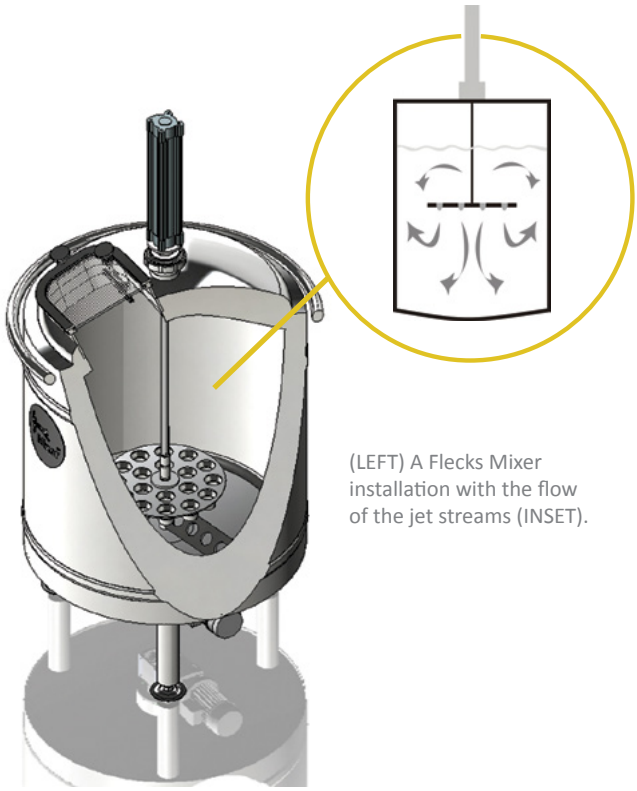


Flecks Brauhaus Technik has developed a "one-of-a-kind new, non-rotating agitator". Instead of the conventional rotating agitators, the Flecks Mixer performs a pneumatic up-down motion. Vinzenz Fleck believes that this technology has the potential "to become the new friend of many a process engineer in the pulp and paper industry".

Flecks Mixer allows an optimal stirring of liquids, suspensions and slurries, resulting in a homogenous mix. "A homogenous mix is always the aim," says Fleck, adding that it is a critical process step which is largely responsible for the quality of the final product.

Any mill will seek good mixing performance at low energy, along with the consistency of the solid contents and distribution and low shear by gentle product handling.

The efficiency of agitators and mixers is nowadays evaluated on two characteristics: thrust (N) being its output and its electric power consumption (kWh) being the main part of the life cycle cost.



(LEFT) A Flecks Mixer installation with the flow of the jet streams (INSET).

The efficiency of the Flecksmixer is demonstrated with an example of a 30m^3 tank with suspended matter at a thrust efficiency of 4500 Newton/kW.

According to Fleck, the Flecksmixer has a number of applications in the paper industry. Firstly, in the mixing chest, the technology can handle homogenization quickly but without shear forces.

"In the coating kitchen, where high quality coaters contain pigments, binding agents and auxiliary agents, the Flecksmixer can be used successfully for such types of fluids and will achieve homogenous mixing," explains Fleck.

The high efficiency of the new mixing system combined with fairly low investment cost delivers a robust design suitable for industrial applications. "It can be applied in any existing tank that is suitable for top entry," says Fleck.

Flecks admits that many engineers find it difficult to think about anything other than a rotating agitator, but with the Flecksmixer providing a reliable homogenisation and produces a high-quality suspension, it would be harder to think about anything else."

How drives help in papermaking

Drive technology is a key component in papermaking machinery, from tissue winders to suction rolls, embossers, print units and conveyors. As important is the need to meet modern paper mill production schedules and avoid costly downtime and maintenance issues.

The performance levels required of drives in papermaking machines is now way in advance of straightforward functionality. With papermaking machines spanning 150 metres in length, operating at 100 km/h and boasting efficient process control, today's paper mills are a far cry from the traditional image of yesteryear, where animals or water provided the power.

Ethernet for integration

Ethernet is another notable trend, whereby paper mills enjoy the benefits of employing a single network technology from the boardroom to the shop floor. Vertically integrating everything from sensors to accounting software presents possibilities for greater operational control. Simultaneously, Ethernet-based networks now permit more flexibility when installing and expanding control systems within the manufacturing process chain in comparison with conventional field buses.

A typical turnkey solution for papermaking machinery would comprise integrated drives, automation, safety and networking. Take a two-ply tissue winder for example. Forming part of an active front end (AFE), advanced drives are able to facilitate class leading motor performance with real-time Ethernet, while offering a fully integrated safety system in accordance with EN ISO 13849-1.

The drives work and communicate with controller technology, while Ethernet capability offers real-time drive-to-drive synchronisation. It is here where the latest drive innovations differentiate themselves with extremely fast current-control algorithms and high switching frequencies.

Co-processor modules can also be deployed to perform cascade speed control. More and more manufacturers of tissue and paper-based products are upgrading the drive systems in their production machines to leverage benefits such as on-board advanced motion control, multi-protocol encoder connectivity and savings in cabling.

When looking to upgrade, engineers should take care to not only specify the optimum drive in terms of capability, but one that is completely compatible with the drive being replaced. For instance, the new drive should offer full mechanical compatibility in terms of dimensions and weight. Also, check to see that existing mounting holes can be reused. Engineers will also benefit from ensuring the drive offers the same power and control wiring philosophy, and the same menu and parameter structure with easy transfer of parameters. Typical upgrade projects might include deploying the latest drives for the control of motors in conveyors. Embossers are a further common application, where paper veils are matched together to make final tissue products thicker and softer. Modern drives can also control print units, as well as winders and unwinders, which deliver materials to further stages of the process.

The effective and efficient driving of induction and permanent magnet servo motors in combination with real-time Ethernet delivery are clearly facilitators of maximising machine throughput. This is supported by high-speed input/output (I/O) for position capture and greater control with single and multi-axis network synchronisation. It has never been easier for machine builders to create more sophisticated and flexible papermaking machinery. All stages of the process can benefit, from suction rolls and paper guide rolls, through to integral dryers.

Supporting these drives are a multitude of additional module/software configurations that can provide a programming environment befitting of the high-performance motion and functionality necessary in papermaking machinery operations.

Among the many additional benefits of such modules is real-time access to all of the drive's parameters, plus access to data from I/O and other drives. Tasks are synchronised to the drive's own control loops to give the best possible performance for drive control and motion.

Papermaking in the industry 4.0 era

Looking to the near future, in particular the ramp-up to Industry 4.0, the papermaking industry is preparing for the transition using intelligent drive and motor solutions that can collect information and provide the first line of processing. These data can then be converted into useful information for a diverse range of applications, such as predictive diagnostics, process optimisation and machine-to-machine integration.

So, what capability currently exists in this respect? A number of modern drives and motors enable smarter energy use by measuring and optimising consumption. Furthermore, drives are frequently connected to process-critical external sensors such as flow, temperature and position.

Drives can also generate critical process information such as speed, torque and current, while digital encoders can provide data to enable automatic drive configuration and measure factors that include vibration. The boundaries to what paper mills can achieve using the latest drive technology are almost without limit.

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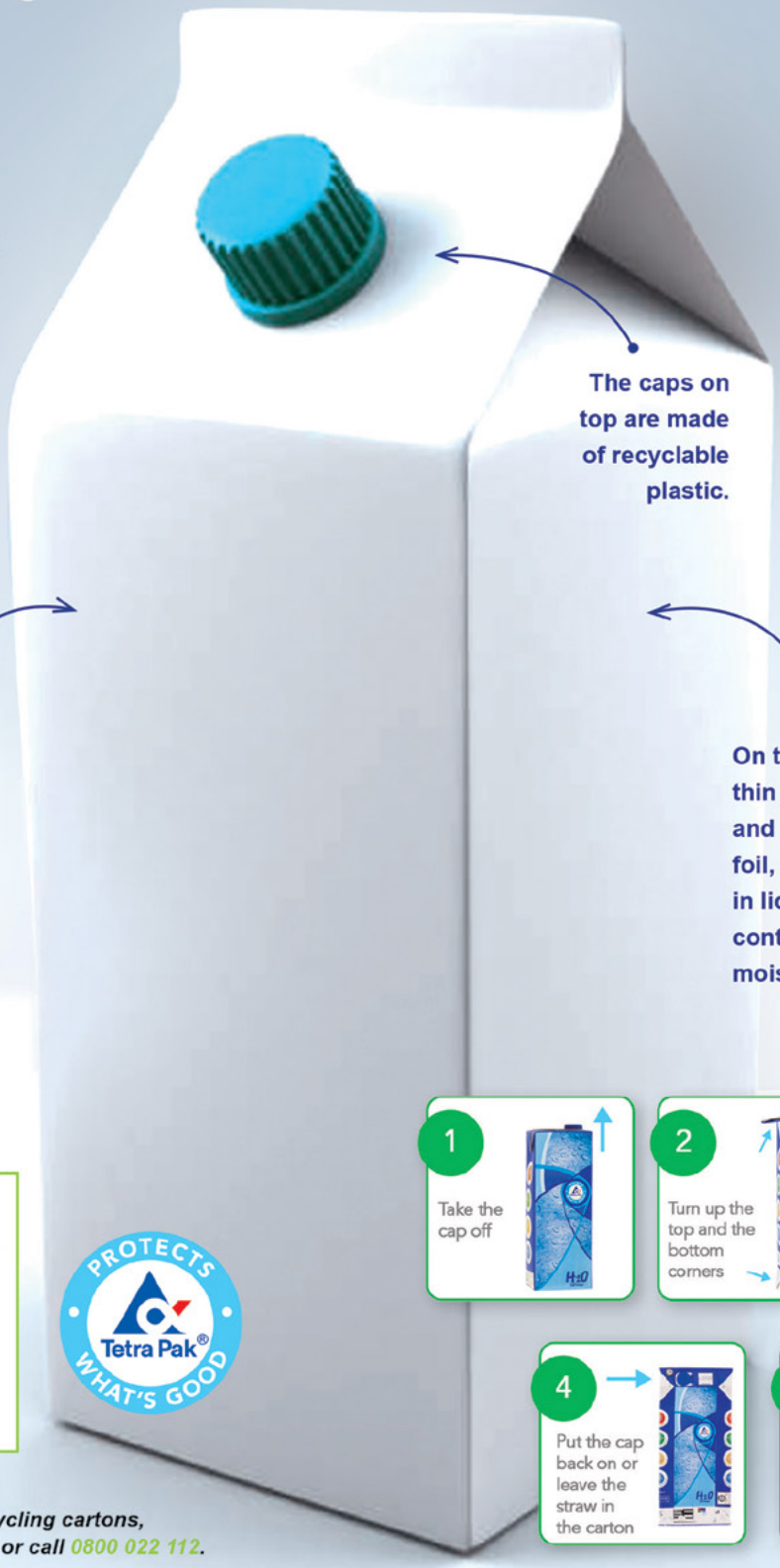
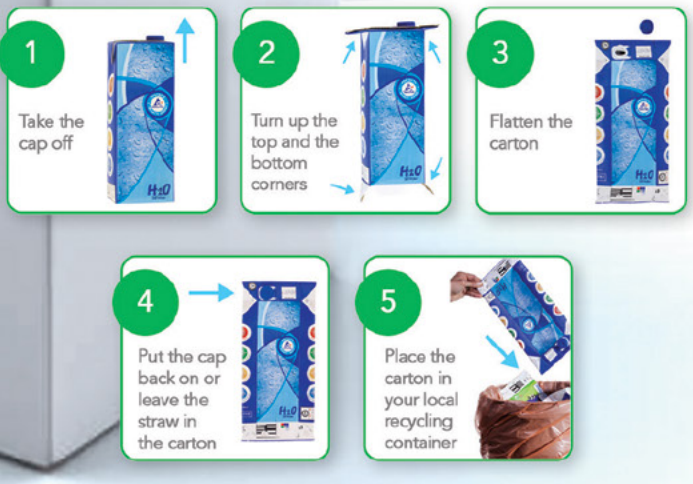


Cartons come in all shapes and sizes, and are generally filled with a variety of food and beverages.

The caps on top are made of recyclable plastic.

The cartons are made up of 75% paperboard from certified and sustainably-managed plantations, which gives them their form and strength.

On the inside, they comprise thin layers of polyethylene and aluminium (polyalu) foil, to keep food safe, seal in liquids and protect the contents from external moisture, oxygen and light.



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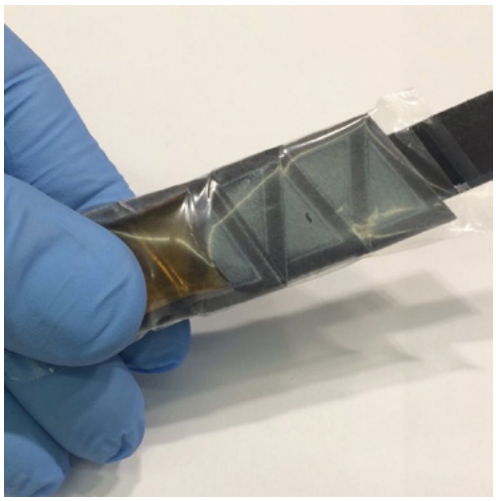
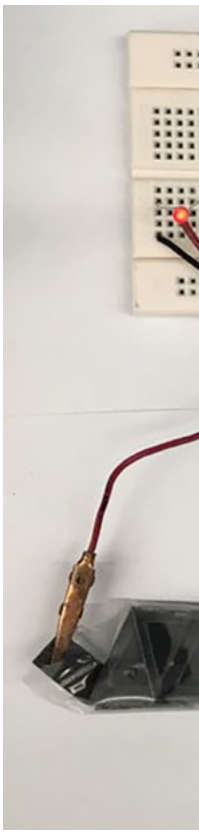
Paper-based electronics

could fold, biodegrade and be the basis for the next generation of devices





(ABOVE) A foldable, biodegradable battery based on paper and bacteria opens a new opportunity in electronics. Seokheun Choi/Binghamton University, CC BY-ND

(RIGHT) A group of folded batteries can power a paper-based electronic device. Seokheun Choi/Binghamton University, CC BY-ND

SEOKHEUN CHOI
Associate Professor of Electrical and Computer Engineering, Binghamton University, State University of New York

It seems like every few months there's a new cellphone, laptop or tablet that is so exciting people line up around the block to get their hands on it. While the perpetual introduction of new, slightly more advanced electronics has made businesses like Apple hugely successful, the short shelf life of these electronics is bad for the environment.

Modern electronics are filled with circuit boards on which various metals and plastics are soldered together. Some of these materials are toxic – or break down into toxic substances. There are efforts underway to boost recycling of e-waste, recovering materials that can be reused and properly disposing of the rest. But most devices end up added to the growing piles of e-waste in landfills.

Instead of adding more trash to these ever-growing piles, there is an opportunity to create electronics that are biodegradable. That's why other researchers and I are looking to the emerging field of paper-based electronics – known as "papertronics." They're flexible – even foldable – sustainable, friendly to the environment and low-cost.

But to be truly eco-friendly, papertronics can't use traditional batteries, which are made of metals and caustic acids, to store and discharge electricity. Recently, my chemist colleague Omowunmi Sadik and I developed a paper battery that's recyclable and biodegradable, as well as reliable enough to actually use. The key is bacteria.

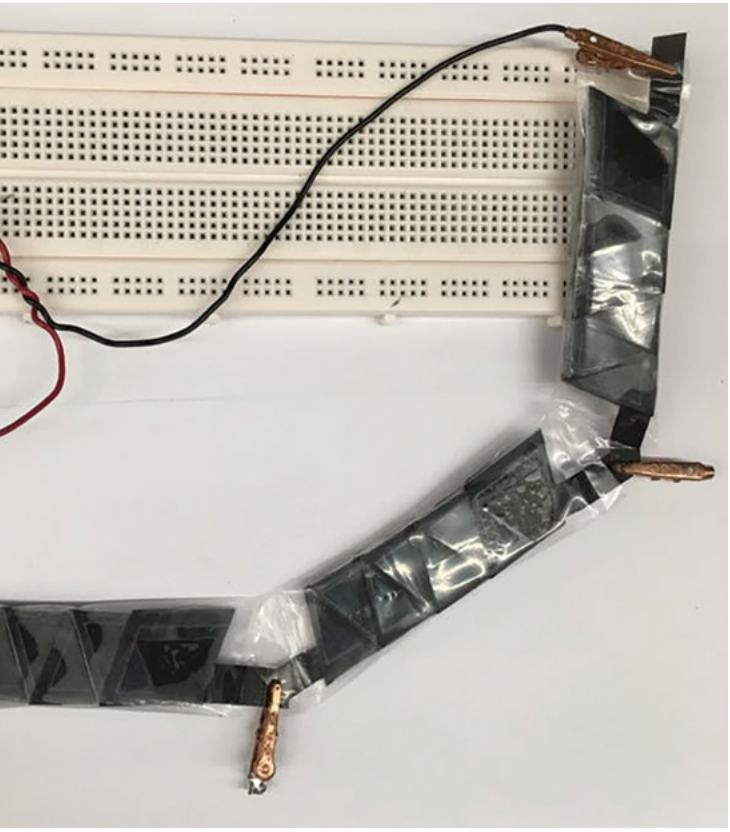
Flexible bio-batteries

I've developed flexible batteries, batteries powered by saliva and more. I figured that when seeking to power paper-based electronics, it made sense to try to make a battery out of paper. Fortunately, paper is a good potential battery material: It's flexible, a good insulator – which makes it a good platform for mounting electronic components on – and absorbs and releases fluids easily. We added polymers – poly(amic) acid and poly(pyromellitic dianhydride-p-phenylenediamine) – to improve those electrical characteristics.

Then, to store energy in the battery, in place of the metals and acids that react chemically to generate electrons, we added bacteria. When these batteries are eventually commercialized, they'll use bacteria that are safe for humans and the environment and well-contained to reduce any other contamination.

Because the paper is rough and porous, the bacteria stick to it, and generate their own energy by breaking down almost any available organic material, including plant material or wastewater. At the moment, we're prepackaging source material, but it could also come from the environment. This chemical reaction produces electrons. Normally in a bacterial reaction, those electrons would bond with oxygen, but we've built our battery to limit oxygen and substitute an electrode, meaning we can capture the electron flow and use it to power devices.

We were concerned that oxygen could get into the paper and interrupt the electron flow between the bacteria, decreasing the battery's efficiency. We found that while that does happen, it has minimal effects. That's because



so many bacterial cells are so tightly attached to the paper fibres; they form a multi-layer biofilm that shields the chemical reaction from most oxygen.

We also wanted a battery that could biodegrade. The bacteria in the battery itself, once they're done releasing energy, can break down the paper and polymers into harmless components. In water, our battery easily biodegraded, without any special equipment or other microorganisms to aid in the breakdown.

The polymer-paper structures are lightweight, low-cost and flexible. That flexibility also allows for the batteries to fold like a normal piece of paper, or be stacked on top of each other. That lets more battery power fit into smaller spaces.

Promises and opportunities

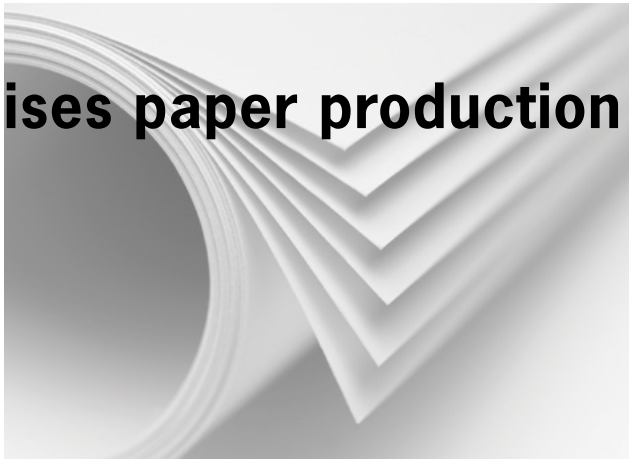
Papertronics can be particularly useful in remote areas with limited resources because they're powered by bacteria that can inhabit even the most extreme of conditions and break down nearly any material to produce electrons. They don't need a well-established power grid either. In addition, though paper batteries are designed to be disposable after they're used, their materials are recyclable – and new batteries can be created from recycled paper.

As revolutionary as paper-based bio-batteries are for future electronic devices, they're fairly straightforward to make. The polymers and bacteria can be blended with paper in traditional manufacturing processes, including roll-to-roll printing and screen printing – or even be painted or poured right onto paper.

Other materials can also be added to the paper batteries – like metals, semiconductors, insulators and nanoparticles. These and other substances can add more properties and capabilities to paper-based devices, opening new doors for the next generation of electronics.

PROCESS CONTROL

Schubert & Salzer stabilises paper production



Austrian company Grünewald Paper recently modernised its process control to improve profitability.

Thanks to a new control system and a grammage-weight control valve, the company's throughput and paper quality have been further improved. Through the introduction of a highly accurate sector ball valve with an internally-mounted angle transducer and stepper motor, significant stabilisation of the process could be achieved together with improved quality at markedly higher throughputs.

The production of papers with grammages in the range of only 18 to 60gsm demands very accurate process control. Grünewald, with an annual capacity of 50,000 tonnes, supplies largely food contact paper in rolls for the production of food bags, waxed paper or flower tissue paper, as well as paper table cloths.

The existing system was replaced by modern process control in order to stabilise paper weight and allow increased production. This necessitated the increase of control valve size from 100 to 150mm, incorporating a Schubert & Salzer DN 150 ball sector valve.

The previous valve fitted with a stepper motor operating at 5,800 steps proved to be unable to maintain accurate tolerance of the weight. "With a larger valve, every incorrect positioning step caused more trouble than would be the case with a smaller valve," said Reinhard Christes, head of electrical, measurement and control engineering at Grünewald Paper. "The change in valve size led to a completely inadequate level of accuracy and the consequences were unacceptable fluctuations in the paper grammage. For that reason the stepper motor was replaced with a newly-developed precision servo motor drive from Schubert & Salzer."

Precise volumetric flows require targeted measures

The servomotor can be configured in the factory to customer requirements for a command signal either via an analog positioning signal (4 to 20mA) or through a stepper/directional control with a signal level of 24V and 400Hz maximum input frequency. The activation of the positioning drive is performed either by CAN-Bus or with Profibus. The drive control via stepper/directional control is performed, depending on process and/or accuracy requirements, in such a way that the 90° rotational movement can be achieved within a range of 1,000 to 8,192 steps. Elimination of backlash is done by the use of compact planetary drive. In this way, the set number of steps corresponds exactly to the actual number of positioning steps transmitted to the ball sector and not to the number of steps of the motor. The vital feedback for uncompromised control accuracy is supplied through a 15-bit absolute-rotational angle transducer which is attached load-free to the bottom trunion, and records the current position of the ball sending this as a digital signal to the control system.

This control circuit, monitoring valve movement internally, ensures that the very highest level of accuracy is achieved between positioning signal and the actual valve position.

Activated through an analog positioning signal, the positioning time for this valve drive over a 90° rotation can be set in a range of one to 300 seconds. The control system is enclosed in a compact cabinet. In addition, this delivers an analog return signal which can be evaluated by the equipment controls.

"With this new precision drive system all our problems were solved at once. This 8,000 step resolution certainly supplied the basis for the solution but the valve's internal positioning signal direct to the drive is the outstanding feature of this valve drive," said Christes.

High control accuracy without hysteresis

Hysteresis is often an underestimated problem with control valves. High levels of control accuracy require a backlash-free transmission of the drive to the valve functioning unit. Only then does a positioning signal correlate with the parameterised opening angle of the valve and the corresponding volumetric flow. With the combination of a very accurate valve drive and ball sector valve, Schubert & Salzer Control Systems has succeeded in producing a precision valve unit for even the highest volumetric flows.

In addition, the resolution of more than 8,000 steps to drive the valve through 90° reduces the hysteresis under 0,02%.

In this way volumetric flows in the case of paper manufacturing can be controlled and regulated to extremely precise levels. "We can now correlate exactly the valve position of the paper grammage regulating valve to a specific material volumetric flow and the valve adopts precisely this position setting," said Christes.

"Thanks to the new servo drive of the grammage control valve from Schubert & Salzer, we can run our grammage weights much more accurately than ever before. We are producing today with significantly smaller longitudinal weight fluctuations. The more accurately we run the better this is for the whole line. This precision valve drive also has an impact on the dosage metering of additives. Since there are no more fluctuations in the system, the dosage metering also works considerably better."

Sappi Typek launches new brand campaign

Live a life of note

Typek, the A4 paper that is used by many businesses, launched a new consumer campaign. One that will make you sit up and take note. The 'Live a Life of Note' campaign, a fresh media campaign aimed at everyone who has come to trust the paper in the red box, launched on 29 October and is set to create excitement, with 'firsts' for the brand and an exciting competition for people to showcase the small inspirational things that make theirs a life less ordinary.

"As a leading brand of multi-purpose office paper, Typek believes that if anything is worth doing, then it is worth doing well, which is why Typek wants you to live a life of note… and reward you for it. Just as we do our best to make sure Typek is as good as it can be, we want people to be inspired to ensure that their life is as good as it can be, too," says Richard Wells, vice president sales and marketing Sappi Paper and Paper Packaging.

The campaign theme 'Live a Life of Note' is all about the small things and it challenges consumers to do something extraordinary in their own environment. Waking up half an hour earlier to watch the sunrise. Baking with their kids, running a half marathon (or doing a Park Run), starting to save for a dream trip. Little things that make their corner of the globe a bit better; and random acts of kindness that uplift other people.

Various out-of-home activations communicate the message. These include large format billboards which will rotate on various highways and street pole adverts that will supplement Typek's presence around key areas in Gauteng. It further includes an integrated social media campaign with always-on content – created and curated for Typek – with an exciting competition, kicking off on 05 November 2018, where one person could win R10 000 when they share how they 'Live a Life of Note'. Arresting, quirky images used in creative spaces set the visual tone for the message throughout.

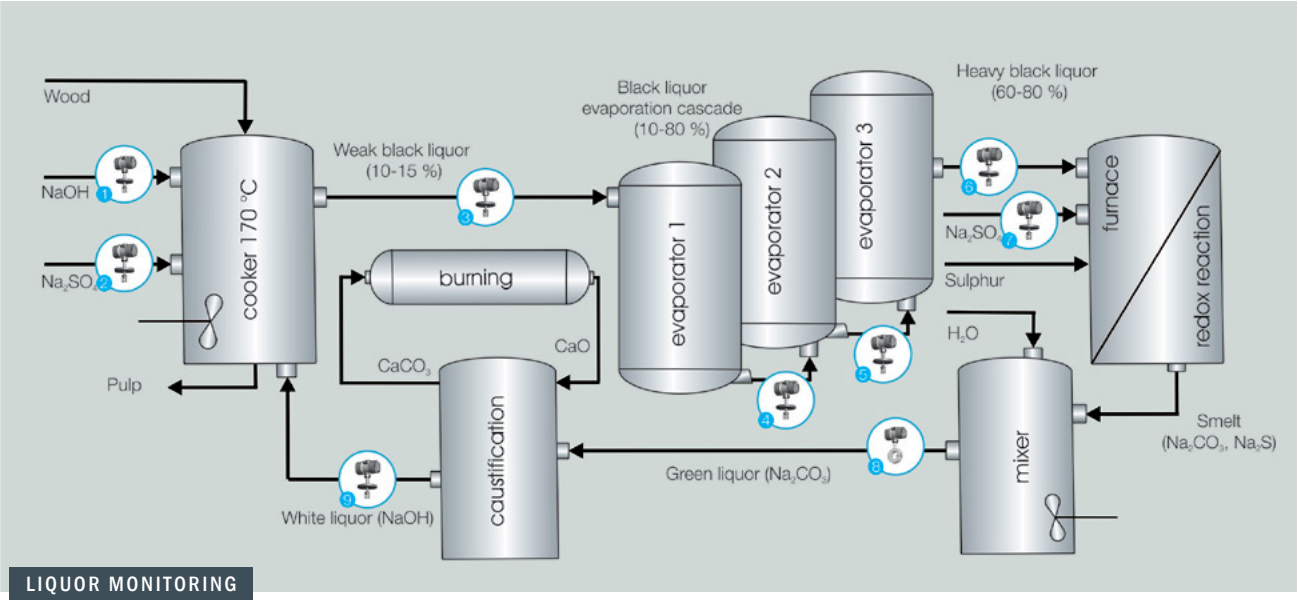
"We are very excited about the 'Live a Life of Note' campaign. It involves 'firsts' for Typek, such as our social media campaign. Typek is a trusted brand and we want more people to associate with the campaign ethos. We are also extremely proud that it asks the public to live their best lives – whatever that looks like for them – and share that with other people," says Michelle Thain, Sappi Paper and Paper Packaging's General Manager for Office, Tissue and Timber.

This campaign will create exposure for Typek and expresses a message to everyone who engages with the brand to instantly "think Typek red" and understand what the Typek brand stands for.

Follow the campaign on:

Typek South Africa @Typekpaper

Hashtags: # ThinkRed #TypekSA



LIQUOR MONITORING

Concentration monitoring for pulp and paper

An important part of papermaking is the alkaline sulphate process during which fibrous material is separated from lignin. For environmental sustainability and economic reasons, the chemicals used in this process are recovered and recycled, but this in itself requires particular technology and attention.

"Getting it wrong is expensive and time-consuming," said Ian Morton, founder and owner of Morton Controls, a local agent for SensoTech.

Lignin and similar organic materials are removed through a process that concentrates and burns the black liquor. This recovery process produces a smelt with high salt content as well as energy, providing the base material for green liquor. The sodium carbonate in green liquor, through causticising with lime, is converted to sodium hydroxide, which is reused in white liquor for the next pulping process.

"SensoTech's LiquiSonic analysers monitor each step inline, which leads to productivity increases and optimised quality control," explained Morton. The analysers can be used to monitor green liquor concentration in real-time, the black liquor evaporation and the control of recycled white liquor while also being used for different processes to detect separation.

Morton cited some of the advantages: "Firstly, there is enhanced operational safety as no dismounting or remounting is required for cleaning or maintenance. Steam washing is not necessary as it is layer- free, and offers maintenance-free processes even with high temperatures (200°C) and liquors with high coating."

Furthermore, there is an accurate inline concentration measurement for black, white and green liquor which in turn reduces laboratory costs.

SensoTech sensors (pictured below) have been built to withstand the harsh working environment of a pulp and paper mill and can be adapted to existing process conditions.

ACQUISITIONS

SCA develops new sustainable sizing additive to produce water-resistant paper

SCA has developed a sizing additive to improve the production of water-resistant or hydrophobic paper. The product comprises a blend of depolymerised lignin and cationic polysaccharide which is added to a lignocellulosic pulp suspension containing aluminum salt at the wet end of the paper manufacturing process. Experiments have shown to improve water resistance and UV-light stability.

While the development work is still ongoing between SCA R&D Centre and its Kraftliner business and no decisions have been taken regarding commercialisation, it could be possible to replace the addition of commercial sizing agents in the paper production.

DISSOLVING WOOD PULP

Sappi injects some Verve into dissolving wood pulp market

With annual production volumes of close to 1.4 million tonnes of dissolving wood pulp (DWP) and a 16% market share, Sappi is responding to the growing demand by consumers for products made from renewable, sustainably sourced and processed wood fibre. To this end, Sappi has launched Verve as the brand name for its DWP product.

In the past, DWP sold by Sappi was unbranded and industry-generic names were used as product names. This did not reflect the specific benefits that have always differentiated Sappi's DWP.

Verve can mean anything from vitality and energy to vigour and life. Sappi believes the new brand creates a very specific identity within the DWP market.

The majority of DWP is consumed in the viscose industry where pulp is converted through the value chain to yarn and ultimately textiles, providing naturally soft, breathable fabrics that are smooth to the touch, hold colour well and drape beautifully. DWP cellulosic fibre is also used for a myriad of household, industrial and pharmaceutical applications, including tablets, personal hygiene, cellophane and washing sponges.

"Our products and service offering within the dissolving pulp market are highly valued and we remain an industry leader in this space. Verve gives recognition to this enviable reputation and the value we offer this market," said Sappi Limited CEO Steve Binnie. "Brands, including industrial business-to-business brands, carry tremendous value, not just to customers but to the whole value chain. Sappi Verve represents our commitment to the entire value chain, from brand owners to cellulosic fibre producers; and to producing a natural fibre sourced from sustainably managed forests. As a responsible corporate citizen, it is a commitment to our ethos of sustainability within the context of people, planet and prosperity."

Bernhard Riegler, vice president for marketing at Sappi DWP explained: "We have always known there is something special about our DWP products. We have consistent, outstanding quality products, supported by dedicated customer service, all underpinned by a strong sustainability story.

"As a fibre produced from natural and renewable resources, Verve provides the value chain with a sustainable choice, not only within the broader textile sphere which includes cotton and polyester, but as a preferred sustainable choice within the DWP market."

TISSUE

Hygienic Tissue Mills fires up new TT WIND-P tissue rewinder

Pietermaritzburg-based Hygienic Tissue Mills started up a Toscotec-supplied TT WIND-P tissue rewinder on 27 July. The new installation serves PM2 which was commissioned in 2017 to process 100% virgin pulp and recycled paper for parent rolls.

The TT WIND-P slitter rewinder features two unwind stands and handles parent rolls of 2.75m sheet trim with a 2.5m diameter. It operates at a design speed of 1,500m per minute while the pneumatically-loaded slitting system has a minimum width of 150mm.

"It was one of the fastest commissioning processes I have seen for a rewinder. The TT WIND reached its maximum speed in record time with a final saleable product. Thanks to the great co-operation of Hygienic Tissue's team, we completed fine tuning in two days with the machine running at top speed," said Toscotec start-up and service engineer David Ponte.

"On the day of start-up, we reached the maximum speed in a few hours. On this rewinder, we expect to get the same efficiency that we have on the MODULO-PLUS machine. High efficiency and consumption reduction are our priorities, and we are happy with the results we are getting in both areas," said Hygienic Tissue CEO Ashraf Jooma.

Matteo Giorgio Marrano, Toscotec area sales manager, said that the TT WIND-P rewinder completed the scope of supply of a MODULO-PLUS tissue line that has been running efficiently for nearly a year- and-a-half.

"This is a new achievement for Toscotec in the South African market, which has been growing steadily in the last few years. Hygienic Tissue's strong focus on energy savings matches our mission to tailor the design of high-performing tissue machines to the mill's specific working conditions to optimise energy usage. The good performance of the slitter rewinder goes into this direction."

Toscotec supplied the complete electrification and control and sectional drive systems. The scope of supply included erection supervision, commissioning, start-up assistance, and on-site training.

PRESSURE TESTING

Moeketsi Mpotu of Brimis Engineering which now has the technical capability to repair, test and certify critical application safety valves in line with pressure equipment regulations.

Engineering firm acquires valve test bench

Mpumalanga-based wholly black-owned mechanical engineering company Brimis Engineering has procured a pressure relief valve test bench to test more than 90% of all installed safety valves currently in use in South Africa.

Global valve test and repair equipment supplier Ventil is the original equipment manufacturer. "This acquisition will enable Brimis Engineering to extend its current offering to the mining sector, water boards, the pulp and paper industry, mineral processing plants, the oil and gas sector, petrochemicals enterprises and a host of other specialised engineering industries," said Brimis Engineering technical director Moeketsi Mpotu.

The safety valve test bench will test pressure of up to 300 bar, and be equipped with a booster system that will increase test pressures to more than 400 bar.

Brimis will also have the technical capability to repair, test and certify critical application safety valves in line with the pressure equipment regulations stipulated in the Occupational Safety and Health Act.

The Act requires that pressure equipment and all associated accessories undergo periodic inspection to ensure reliability and prevent over pressurisation, leaks and any possible harm to people and plant equipment.

"The test bench has a compressor that can test up to 330 bar and includes technologically advanced software that allows for valves to be tested to American Society of Mechanical Engineers, American Petroleum Institute, British Standards and European Norms standards."

Mpotu noted that in addition to listed specifications, specific requirements are dictated by the client. The test bench is capable of testing valves of not only up to 16 inches, but 0.5 inches.

The safety valve test bench can manage liquid pressure capacity of up to 320 bar and conduct seat leakage testing such as the quantity of test fluid passing through an assembled valve in the closed position.

Technology and innovation

Brimis Engineering has a young team of innovative skilled engineers who continue to build in-house engineering capability by investing in world-class equipment while striving to grow and develop inventive engineers.

All test data is stored online and can be shared electronically. "The unique test software provides digital readings and verification against test standards while it stores and prints test certificates, all of which enable us to link all information to our Brimis Engineering operating platform."

He noted that safety plays an important role, as with any machine, and a number of safety features have been built in to ensure the protection of the operator and equipment.

"This is a universal test bench for gas and liquid testing; it is also capable of testing shut-off valves with its state-of-the-art bubble laser counter. All testing is done in digital format, which eliminates human error."

Mpotu adds that the test bench can test to international standards for liquids and gas, providing clients with peace of mind regarding the finest engineering tolerances.

He believes that the test bench will enable Brimis Engineering to maintain and improve its service offering to current and prospective clients in the power generation, steelmaking and cement manufacturing industries.

"We also aim to grow our market share by continuing to be technically ahead of the curve and astute while delivering cost-effective solutions to the industrial valve sector," Mpotu concludes.

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ACQUISITIONS

Valmet strengthens its automation business with Enertechnix acquisition

Valmet has acquired Enertechnix, a Washington-based combustion diagnostics and monitoring technology company that develops innovative technologies for boiler imaging and temperature measuring.

The acquisition complements Valmet's automation offering for the pulp and paper and energy industries, enabling more comprehensive solutions for the efficiency, availability and safety of recovery and power boilers.

"Enertechnix's combustion diagnostics and monitoring systems meet well the needs of today's recovery and power boiler operators. We are especially excited about its comprehensive imaging and high-temperature measurement solutions as well as the many opportunities they provide in opening a whole new window into the boiler process," said Sami Riekkola, business line president for automation at Valmet.

"I believe that our leading products, technologies and business will be further developed at Valmet, and be better and more easily accessible to customers globally. We are very excited to be part of Valmet," comments George Kychakoff, founder and CEO of Enertechnix.

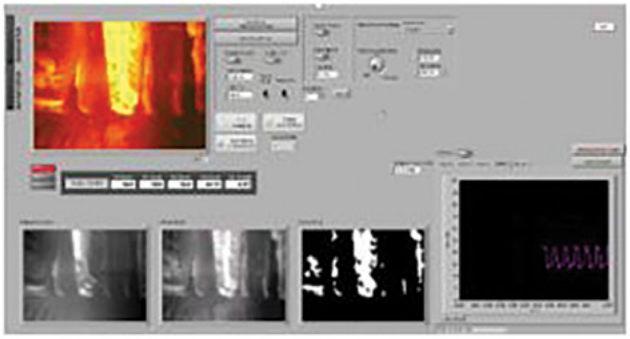
Product range

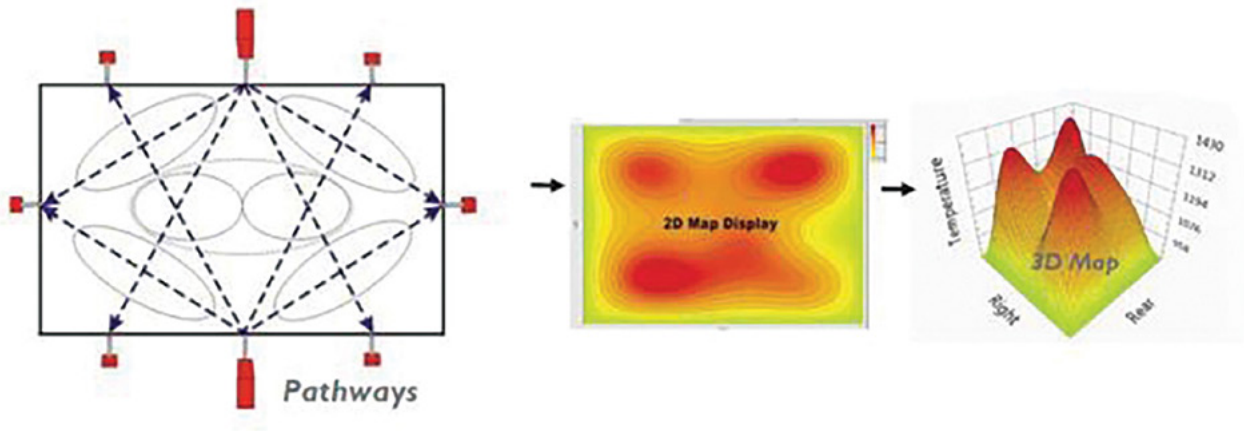
Enertechnix has developed high-resolution IR camera systems with diagnostics software to provide superior online visibility and temperature analysis. They are able to see through obscuring dust and gas to depths of 24 metres, allowing the monitoring of developments anywhere in the combustion chamber.

The company's acoustic pyrometer is a non-contact measurement device that obtains highly accurate instantaneous gas temperature profiles in any area of the boiler.

Enertechnix has also developed a visible wavelength, light-weight, fully digital imaging system that provides high-resolution HD video quality and unprecedented operational views of extreme high-temperature processes in kilns, boilers, furnaces and more. The company supplies image processing software to provide additional information from networked cameras.

BELOW. A boiler furnace camera and diagnostics user interface.
BOTTOM. An acoustic pyrometer's gas temperature profile.





BIOGAS

Renewable energy from wastewater

Stora Enso and energy company Gasum have signed a contract to build a biogas plant at Stora Enso's Nymölla paper mill in Sweden. The plant, built and operated by Gasum, will turn the mill's wastewater effluent into renewable energy.

Gasum plans to upgrade biogas into liquefied biogas (LBG) and sell it as fuel for cars, buses, trucks and ferries. The expected LBG production is 75-90GWh per year, equivalent to the amount of fuel needed annually for more than 200 average long haul lorries in Sweden. Production is expected to start during 2020.

"For Stora Enso, substituting fossil-based fuels with renewable solutions is a vital way to combat global warming," said Michael Lindemann, director at Nymölla mill.

PARTNERSHIPS

Toscotec partners with Chemitex-Egypt

Toscotec has signed an agency agreement for both its tissue and paper & board (P&B) divisions with Chemitex Egypt for Trading & Agencies, S.A.E. to increase its sales in the Egyptian market where it recently landed a number of P&B rebuilding orders.

Toscotec entrusted Sameh Habib, founder and owner of Chemitex-Egypt, with the agency. Habib has 15 years of sales experience in the tissue and paper industries in Egypt.

Following the deal with Toscotec, Habib said, "The Egyptian paper and tissue market has high growth potential. Toscotec's technology fits very well in this market with its strong focus on customisation and flexibility, paired with energy reduction. Building on our customer portfolio and relationships of mutual respect, trust and cooperation, we expect to see promising results in the coming years".

CONVEYOR BELTS

Bosch Rexroth introduces latest generation TS 5 transfer system

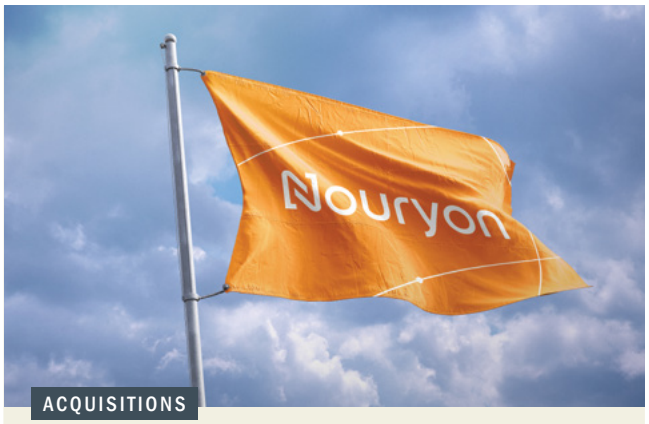
By optimising existing components and integrating new modules into its TS 5 conveyor system for heavy loads, Bosch Rexroth has enhanced its flexibility to meet the requirements of an even broader range of industry sectors.

Distributed in South Africa by Tectra Automation, the TS 5's new capabilities include tandem transport for oversized cargo, of importance to the automotive sector. The TS 5 can now connect with i4.0 tools to visualise production processes in real time and – with the MTpro design planning tool – can achieve any layout, which can handle loads of over 400kg.

With the TS 5 conveyor, Bosch Rexroth has expanded on the roller conveyor system's known strengths and novel applications by developing new modules. Customers can combine these into any configuration while also integrating a three-way diverter, a rotate unit, a front-end drive, and a compact stop gate into the final system. For larger components, the tandem transport capability allows for the transfer of excessively long products. The upgrades provide the customer with even more flexibility when designing their individual system layout and make the TS 5 the ideal solution in a broad range of industry sectors.

Compared with systems using standard chain drives, the king shaft drive and the conveyor rollers allow the customer to experience virtually maintenance-free production, with low wear and increased productivity.

The conveyor also sets the benchmark in terms of digitalisation by seamlessly connecting to other Rexroth solutions such as the ActiveCockpit. The interactive communication platform processes and displays manufacturing data in real time. Parameters such as energy efficiency, cycle time and work piece pallet tracking can be measured and visualised for greater transparency and more efficient production processes.



ACQUISITIONS

AkzoNobel Specialty Chemicals is now Nouryon

The former AkzoNobel Specialty Chemicals has been relaunched as Nouryon. The move follows the recent acquisition of the business by The Carlyle Group and marks the company's transition to becoming an independent, global speciality chemicals leader.

"Launching our new company is a significant milestone to add to our proud history and we are all looking forward to this exciting new chapter," said new CEO Charles W Shaver. "We are ready to leverage our experience, global presence, and strong company culture to unleash our full potential as an independent company," he said.

"We are starting from a great position," Shaver added. "We have a great set of businesses, leadership positions across our portfolio, long-term customer partnerships, and a dedication to continuous improvement and innovation we can leverage for further success. As an independent company we can accelerate our progress on all fronts and take our rightful place alongside other industry leaders."

Nouryon has a history that stretches back nearly 400 years and its new name and brand identity reflect that heritage. Noury & Van der Lande was one of the first companies to realise the important role chemistry could play in everyday life; today, Nouryon is a world leader in essential chemistries used to manufacture everyday products.

"When we started developing our new name and brand we asked our employees what mattered most to them," explained Vivi Hollertt, chief communications officer at Nouryon. "Our employees are especially proud of our heritage, as well as our track record of growing through partnerships, innovation, sustainability, and contributing to society. We combined all of this to create a brand identity for Nouryon which is true to who we are and helps us stand out from our competitors."

Nouryon's new company purpose – Your partner in essential chemistry for a sustainable future – reflects this pride as well as the focus going forward. The company's success has been built on strong partnerships and it believes that collaboration is key to future success.

Nouryon will be working closely with customers and other partners to innovate, make strategic investments, and develop essential, sustainable solutions that meet customer needs and fuel shared growth.

MODULAR ROPE HOIST

Demag revolutionises
modular rope hoist

Demag's rope hoist can now be built either in a C or co-axial design utilising some basic technology: smart interfaces and corresponding fittings and accessories.

Demag's modular rope hoist (DMR) offers many options, including five different sizes with load capacities of up to 50 tonnes; a choice of motors; a foot-mounted hoist, low-headroom travelling hoist, double-rail crab or standard-headroom travelling hoist as well as a smart SafeControl system.

"Flexibility and productivity, long service life and cost-effective operation are key characteristics of our DMR," said Richard Roughly, senior manager sales and marketing of Demag Cranes. "Consequently, the impressive modular rope hoist concept offers sophisticated technical details."

Sudden motor forces are absorbed by the coupling between the motor (which weighs much less than previous models) and the gearbox, allowing for a longer rope hoist service life.

The DMR gearbox also requires 30% less oil. This translates into longer maintenance intervals thanks to its efficient oil lubrication. Its enclosed design also offers protection against external factors.

VACUUMS

The electrical vacuum generator ECBP from Schmalz with intelligent interface for connection with grippers and robots.

Creating a vacuum without compressed air

The Schmalz electrical vacuum generator ECBP is ideal for handling airtight and slightly porous workpieces. It features an integrated speed control function, which regulates the power of the pump to suit the process or material.

Moving porous materials, like cardboard, requires considerable suction capacity and thus considerable energy. Airtight materials, on the other hand, require less power and the user can reduce the speed. This degree of flexibility makes the vacuum generator extremely energy efficient.

As the vacuum is generated without compressed air, the ECBP is particularly useful in mobile robotics, and its fully automated small parts handle just as well for stationary handling tasks. Different grippers from the Schmalz VEE modular system can be attached simply and easily via integrated flanges. Connection to lightweight robots from different manufacturers works in the same way.

By way of a data interface, the ECBP provides the user with energy and process data via IO-link from the machine to the cloud. The condition monitoring function can also recognise deviations in the vacuum supply, reducing faults and downtimes and increasing system reliability. Furthermore, the user has various options for adapting the pump capacity to the handling process. The ECBP can be parameterised directly on the device, using a near-field communication terminal or via IO-link in the control centre, for example.

The plastic housing sees the ECBP weighing in at just 700 grams; it is designed in such a way that there are no interfering contours. The electrical connection to the pump is established via an eight-pin M12 connector. The maximum suction capacity is 12 litres per minute at a maximum current strength of 0.7 amperes.

The ECBP is distributed by Tectra Automation, a member of the Hytec Group and a subsidiary of Bosch Rexroth.

ADDITIVES

Archroma reinforces its strength management solutions for packaging and tissue paper

Archroma has introduced its new Cartastrength® DST.03 for stronger packaging and tissue papers and improved stickies management during the production process.


Photo: Archroma

The company has been active in the field of increasing wet and dry strength of packaging and tissue paper under the tradename Cartastrength®, particularly targeting recycled fibre. Cartastrength® agents increase the stability of corrugated fibreboard and allow manufacturers to achieve higher levels of dry strength with lower amounts of fibre.

The new range can also be used in the fast growing tissue segment, allowing customers to produce stronger kitchen wipes and napkins. The product replaces starch which can make tissue less harsh and also reduce chemical oxygen demand loadings in the effluent as a consequence.

Cartastrength® DST.03 is an efficient dry strength liquid additive, suitable for all paper and board grades. It is especially beneficial where recycled fibre is the main raw material. It is ideally suited for fine paper grades, including décor, tissue with fully bleached fibre, or wastepaper and brown packaging manufactured from old corrugated containers.

Archroma reinforces its strength management solutions dedicated to packaging and tissue paper with Cartastrength® DST.03.

MILL UPGRADE

Andritz to supply major pulp production technologies and key process equipment for Arauco's Mapa project in Chile

Andritz has received an order from Celulosa Arauco y Constitución to supply energy-efficient and environmentally-friendly pulp production technologies and key process equipment for the modernisation and extension of the Arauco pulp mill in Horcones, Arauco, Chile. The order value for Andritz is in the region of 300 million euros, with start-up scheduled for the first quarter of 2021.

The scope of supply includes:

- **A complete wood processing plant** with three debarking and chipping lines, one chipping line for forest-debarked wood, chip storage with stacker-reclaimer blending bed system, chip screening, bark handling with BioCrushers, and HQ-Press bark presses that increase dryness and consequently the energy efficiency and production of the biomass boiler.
- **Eucalyptus will be debarked** at a rated capacity of 360m^3/h solid over bark per line using RotaBarker technology. This provides excellent debarking results with very low wood losses. The chipping process uses horizontally fed HHQ-Chippers, ensuring high capacity (400m^3/h solid under bark) without compromising on chip quality. The operation is supported further by SmartWoodyard products like the advanced decision support information system, ChipperEKG and CrusherEKG condition monitoring systems, and ScanChip chip analysers for chip quality measurements.
- **A complete fibreline** with a capacity of 4,700admt/d bleached pulp, including Lo-Solids continuous cooking with a TurboFeed chip feeding system, brown stock washing with multistage DD-Washers, two-stage oxygen delignification followed by deknotting, screening, and multistage DD-Washers. Bleaching is based on proven upflow reactor technology and washing is performed with DD-Washers after every stage, all contributing to low chemical consumption, high-quality pulp, and low environmental emissions.
- **An energy-efficient black liquor evaporation plant** with a capacity of 1,750 tonnes/hour. The plant will have a 7+ Effects heat economy system and concentrate black liquor to the high dry solids content of 80% for efficient combustion in the recovery boiler. The plant is equipped with the latest innovations in secondary condensate quality enhancement for 100% reuse in other departments of the mill. The scope also includes a tank area and methanol liquefaction system. Andritz's lamella technology and the unique process solution for scaling control reduces washing needs, ensuring minimum plugging of heat surfaces and good cleanability, which results in high availability and increases the overall production and efficiency of the plant.
- **Complete white liquor plant**, including efficient green liquor filtration with LimeGreen filters – producing clean green liquor and minimising waste to landfill, white liquor filtration with LimeWhite filter – maximising the white liquor quality, and efficient lime mud filtration with two LimeDry filters providing high dry solids content and low residual alkaline. The capacity of the recaustizicing plant is 15,300m^3/d. The delivery also includes two lime kilns (capacity 700t/d each) with low heat consumption and low emissions to meet Arauco's tight emission permits.

"During the sales phase, we assessed the capabilities of the company and Andritz demonstrated its competence, commitment and professionalism. Congratulations to the whole team, which has worked hard, efficiently, and with passion and professionalism for this outcome. We are just starting, but I am sure this will be a great project for all concerned," said Franco Bozzalla, senior vice president pulp and energy at Arauco. The Mapa project will increase Arauco's efficiency and pulp production, strengthening its competitiveness and leadership in global markets.

South African *Make Time for Print* campaign stirs nostalgia

BY PIET VAN NIEKERK

As convenient as they are, our screens and devices fail to adequately recreate the tactile experience of reading on paper. An evocative South African video campaign now aims to remind audiences of the value of print.

A campaign featuring three short videos crafted to trigger an emotional response and nostalgia for print as a publishing medium is being spearheaded by Associated Media Publishing (AMP) in South Africa, in collaboration with various industry players. "We felt that consumers have been bombarded about how print and paper are bad for the environment and have forgotten the important role that printed products actually play in our lives," explains Julia Raphaely, CEO of AMP. "There is still an important job to be done in changing consumer perception of the print and paper category."

The three half-minute videos show print pages turning into whimsical origami objects and creatures to evoke memories of holding print, reading print and the journeys it took the reader on.

The first video calls to mind the viewer's first experience of a book, the feeling of the paper and the characters depicted. It echoes childhood rhymes, and ends with the words: "It's easy to remember, just open the page, take a deep breath and become another age."

The second video by creative director Rotem Shachar celebrates the sense of holiday-like seclusion, quiet privacy and bliss that can be experienced while indulging in a good magazine. As origami coconuts created by artist Ross Symons grow into palm trees to support a hammock on a beach, the words remind viewers of days "spent alone without anything at all, not even your phone. Drifting off to other places through pictures and words. No technology around, just the tweeting of birds."

The third video is still in production. Ideally, the sponsor would be a paper supplier and its focus will either be 'Imagine a world without knowledge (instruction manuals, pharmaceutical pamphlets, textbooks) or 'Imagine a world without choices' (Fast-Moving Consumer Goods - rows of unnamed/unbranded food items).

AMP produces iconic titles such as Cosmopolitan, Marie Claire, Good Housekeeping, WOW and House & Leisure. Raphaely says, "We want to remind viewers how much they appreciate the printed medium for exactly what it does in addition to the many digital channels that we all use every day."

Raphaely stresses that the 'Make Time for Print' videos take nothing away from the importance of the digital medium, "Digital is equally fantastic for different reasons. But I do think at this point it is time to give recognition to the special experience people have when engaging with print."

In the absence of any industry association to represent the interests of magazine media in Southern Africa, AMP with Novus Holdings as the first sponsor, have taken on the campaign to promote print on behalf of the industry as a whole.

Raphaely explains: "I see this campaign as a beautiful, evocative body of work that will remind people all over the globe to make time for themselves as well as for print. We wanted to get consumers to fall in love with paper and print again. To feel that some things just can't be replaced. The strategy was very simply to communicate that life without printed products would be hard to imagine."

The hope is that with a simple and emotive message, the campaign will resonate with audiences and help spread the message that it would indeed be hard to imagine a world without print.

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Access the videos

Use this QR code to access the videos on Associated Media's website.

How to use the Facebook QR Code scanner:

1. Open Facebook on your smartphone.
2. Type 'QR code' in the search bar.
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Valmet FORWARD

NAF
STAFSJÖ

PULP, PAPER & CHEMICAL CELLULOSE

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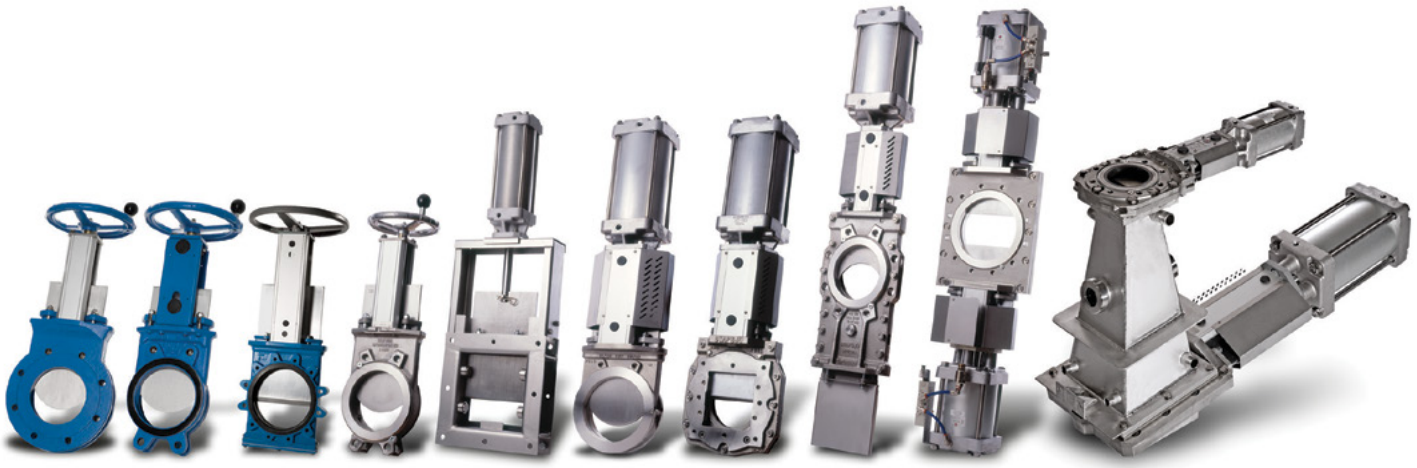

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