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Aerial shot of VPK's modern greenfield plant in Halden, Norway, which makes high-quality, customized corrugated packaging from recycled materials. Photo courtesy of VPK.

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We explore one of the industry's most dynamic sectors. Read about the growth of a leading corrugated manufacturer (page 12); a new barrier technology with vast potential for corrugated (page 15); and how digitalization can help optimize your mill or plant (page 18). We also introduce Corr*Focus* (page 17), a new content section coming to *Paper360°*.



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setpoint



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Pros at Cons

I have recently returned from TAPPICon 2022 in Charlotte, NC. If you were one of the more than 1,300 folks who were there, I hope we got to meet! Hey, remember that great presentation that blew everyone's mind? Oh, and remember that cool thing we saw on the exhibit floor? Of *course* you do. It was terrific.

If you were not there... frankly, you missed out. Live events are becoming a "thing" again, reminding us all why we loved them in the first place. TAPPICon 2022 had a great energy, as if the industry is beginning to hit its stride again after the long COVID lockdown. Is everything back to "normal"? Not quite yet, but that's okay. At TAPPICon 2022 there was a lot of talk about the "new normal" and how, as an industry, we can use the lessons learned during a challenging time to come back stronger, brighter, and full of ideas. What makes TAPPICon so special is that the programming is designed "by the industry, for the industry." I was impressed with the level of engagement, both from the working professionals who planned the program and served as speakers, panelists, and subject matter experts; and from the attendees themselves, who flooded the exhibit floor and packed the session rooms. There really is nothing like that spark in the air when peers meet to share knowledge.

I was particularly impressed with the way some of TAPPI's newer divisions are keeping up with our changing industry. The Student, Young Professional, Women in Industry, and PIMA Management divisions were crushing it at TAPPICon 2022. As always, we here at *Paper360°* will do our best to share conference take-aways in new technology and innovative thinking throughout the next several issues. You can check out the highlight reel at tappicon.org to spot your colleagues, friends, and favorite vendors (and me at my podcast booth!)

In the meantime, we've got a great May/June issue here to take your mind off what you missed. Starting on page 22, we spotlight some of TAPPICon's biggest celebrities: our 2022 award winners. In Trendspotting, we look at some "core" issues in corrugated (terrible pun intended) to set the stage for our new Corr*Focus* section starting in the July/August issue. We also touch on Safety, Reliability & Maintenance, recent news, and more — because, just like the folks who put together TAPPICon, we care about sharing information you can really use.

If you missed the fun this year, mark your calendars for TAPPICon 2023 in Atlanta, GA, April 22-26. If you were at TAPPICon, what did you think? I'd love to hear your feedback.

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MANUFACTURERS

Finnpulp is abandoning plans to build a bioproduct mill in Kuopio in Eastern Finland.

Georgia-Pacific plans to close its tissue mill on Day Street in Green Bay, WI, over the next 18 months. This decision does not affect G-P's other operations in Green Bay.

Metsä Fibre and Veolia have signed a long-term partnership agreement on the refining of crude methanol generated during pulp production at the Äänekoski bioproduct mill (Finland) into commercial biomethanol. Veolia will build a crude methanol refinery in connection with the mill; the refinery will be owned and operated by Veolia and closely integrated into the bioproduct mill's processes.

Mondi will invest EUR280 million (about US\$302 million) in its corrugated packaging operations across four countries to boost production and to serve customers more efficiently. The investment includes around EUR185 million (US\$200 million) across its central and eastern European Corrugated Solutions plant network and EUR95 million (US\$102 million) at Mondi Swiecie's containerboard mill in Poland.

ND Paper will convert the B26 paper machine at its Biron, WI, mill from production of coated mechanical papers to lightweight, high-strength recycled packaging grades.

Peak Renewables Ltd. has acquired the Chetwynd pulp mill previously owned and operated by Paper Excellence. The Chetwynd facility, located in British Columbia, has not operated since 2015. Peak Renewables will remediate the mill site and repurpose the land and buildings to other industrial uses.

Sappi will invest close to EUR6 million (US\$6.47 million) to modernize the current steam generation boiler at its Maastricht Mill in the Netherlands.

SCA will invest SEK 150 million (about US\$15.6 million) in new equipment for treating black liquor at its Munksun paper mill in Pileå, Sweden. This will help the company reduce energy consumption and produce pine oil for biofuels.

Schweitzer-Mauduit International, Inc. and Neenah, Inc. have entered into a definitive agreement to combine in an all-stock merger of equals with combined revenues of approximately US\$3 billion, expanded scale and capabilities, and accelerated growth opportunities. The combined company will have strong positions in large, growing categories including filtration, health care and wellness, protective and adhesive solutions, industrial solutions, and packaging and specialty paper.

Stora Enso has initiated a sales process for a possible divestment of four paper

Cepi, the European paper industry association, and its members across Europe have responded decisively in the face of the unjustified military aggression against Ukraine and in a spirit of solidarity with the people in Ukraine at this difficult time.

"We support EU leaders in their defense of international law, human rights and democratic values," Cepi wrote in a March, 2022 statement. "Europeans see our products as essential goods. But to provide them and maintain business as usual has proven difficult. Our sector is particularly hit by the spike in energy prices. At the time of writing, many paper mills across Europe were forced to stop production or to introduce temporary downtimes. This situation puts at risk the jobs of over 4 million people who are employed in the European forest-based value chain." Read the full statement at www.cepi.org.

As of press time, *Paper360°* has received news of the following industry actions in response to the situation in Ukraine:

- Elopak, a producer of carton packaging headquartered in Norway, has suspended all activities in Russia with immediate effect. Elopak's plant in Fastiv, Ukraine has already been temporarily closed. The company will continue to pay the salaries of its employees directly affected until further notice.
- International Paper is contributing US\$275,000 to both the Red Cross and Global Foodbanking Network to support the growing humanitarian needs prompted by the conflict in Ukraine.
- Lucart, the Italian producer of tissue brands including Tenderly, Tucco, and Grazie, is donating hygiene products (toilet paper, medical sheets, and other paper products) to Ukrainian hospitals.
- Metsä Group has suspended operations at its only production unit in Russia, the Svir sawmill. Wood procurement in Russia for the Svir sawmill and imports to Metsä Group's Finnish and Swedish mills has also been discontinued.
- Mondi has suspended production at its paper bag plant in Lviv, Ukraine. The company has also pledged EUR1 million (more than US\$1 million) to support the United Nations World Food Programme's emergency operation for people impacted by the Ukraine conflict.
- **Pro-Gest** packaging group has announced a temporary production stop at all of its six paper mills in Italy. This is seen as a consequence of the war in Ukraine and exorbitant energy prices.
- Stora Enso stopped all production and sales in Russia due to the ongoing invasion in Ukraine. The company has three corrugated packaging plants and two wood products sawmills in Russia, and sales there make up about 3 percent of total group revenues. Stora Enso will also stop all export and import to and from Russia.
- **Sylvamo** has stopped the production of A4 office paper at its plant in the Russian St. Petersburg region due to interruptions in the supply of chemical reagents.

In supplier news, **Kemira** announced price increases for all product lines in the Europe, Middle East, and Africa (EMEA) region with immediate effect. "Costs for all main raw materials, energy and freight have massively increased during recent months and continue to rise. The surge in costs has been further intensified by the ongoing war in Ukraine," stated a recent press release.

production sites: Anjala in Finland, Hylte and Nymölla in Sweden, and Maxau in Germany. In line with Stora Enso's strategy, paper is not a strategic growth area for the group.

Verso Corporation stockholders have voted to approve the previously announced merger with BillerudKorsnäs.

WestRock:

- broke ground on a 285,000 sq. ft. expansion at its consumer packaging facility in Claremont, NC. The US\$47 million investment was bolstered by a performance-based grant from the One North Carolina Fund.
- will permanently cease operations at its mill in Panama City, FL. The mill produces containerboard, primarily heavyweight kraft, and fluff pulp, with a combined annual capacity of 645,000 tons. Select grades of containerboard currently produced at the mill will be manufactured at other WestRock facilities.

SUPPLIERS

A.Celli will provide two new E-WIND[®] P100 paper rewinders for Henan Xinya's Xianxing plant.

AFT is supplying two POMix stock processors to Pratt Industries for its new PM18 board machine in Henderson, KY. **Andritz:**

- has started up a complete OCC line delivered on EPS (Engineering, Procurement, Supervision) basis to SCGP's subsidiary, United Pulp and Paper Co., Inc., for its mill in Bulacan, the Philippines.
- has set a new production record. The PM10 at Laakirchen Papier AG, part of the Heinzel Group, Austria, which was rebuilt by Andritz, has become the world's fastest converted containerboard production machine with speeds of up to 1,420 m/min at a basis weight ranging from 80 to 140 g/m².
- has started up the rebuilt PM2 kraftliner paper machine for Cartiera Giacosa S.p.A. at its mill in Front Canavese, Italy, and has received a follow-up order to further improve its performance.
- received an order from Jiangxi Five Star Paper Co., Ltd., China, to supply a highcapacity, chemi-thermomechanical pulping system. Start-up is planned for 2023.

Runtech Systems will supply a RunEco vacuum system to Ankutsan A.S. PM2, Turkey.

Toscotec:

- will supply to linerboard manufacturer ETAP a technological rebuild of PM2's press section at the Borg Elarab paper mill, near Alexandria in Egypt.
- Will supply a TT SYD Steel Yankee Dryer for Shawano Specialty Papers, a division of Little Rapids Corporation.
- continues the expansion of its covered production area with a new building at its Lucca, Italy HQ: Workshop 9, primarily dedicated to equipment loading and logistic operations.

Valmet:

- acquired North American-based Coldwater Seals, Inc., a global provider of consumables and services to the pulp and paper industry. Coldwater operates manufacturing facilities in the United States and Sweden.
- will supply the modernization of fiberline no. 1 plant to Cenibra's pulp mill in Belo Oriente, Brazil. The fiberline will be prepared for a capacity increase of 100,000 metric tpy of pulp. The start-up is scheduled for September, 2023.



GREGG REED ELECTED AS TAPPI FELLOW

Imerys congratulates Gregg Reed, Technical support leader at our Imerys Technology Center in Sandersville, GA on his appointment as a fellow to the Technical Association of Pulp and Paper Industry (TAPPI) in 2022.

With this recognition, he represents a global network of inspirational professionals across the industry. This award honors his longstanding involvement with the TAPPI organization and his contribution for technical service to the paper and board industry.



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Sharing Safety Practices with Remote Workers

As the safety director for Universal Blastco in Sumter, SC, Reggie Epps is dedicated to the wellbeing of his employees. Long before the worldwide pandemic made remote work ubiquitous, Epps managed the distribution of safety information to employees throughout the US and its territories.

"While we have offices in four states — South Carolina, North Carolina, West Virginia, and Michigan — our crews are even more spread out than that," Epps says. "When we're gearing up for outages, we can have people flying in from Puerto Rico, so when we say remote, we mean remote."

In addition to the pulp and paper industry, Universal Blastco, which focuses on industrial coatings and linings, also serves the chemical and petrochemical, mining and minerals, and power generation industries. Safety is not just a passing thought; the corporate website calls safety the "most important part of every single employee's job." Each employee is given the company president's cell phone number and is encouraged to call with any safety concerns. "We are absolutely committed to a culture that helps employees integrate safe practices in all areas of their lives," Epps explains.

That extends to their training as well. In the past, Epps had to determine ways for his geographically dispersed teams to become oriented to not only his company's safety policies, but also the policies for each mill they would be working at. "It was a huge undertaking to make sure that we got them everything they needed — from applications, to drug testing, to the correct safety orientations before they showed up on the job," he says. "Even if you had a system onsite, or a supervisor, that was already too late. The optimum way to engage employees is to prepare them *before* they get to the jobsite."

With more than 200 people passing through the company's system each year, Epps said one consistent challenge was the possibility of not connecting at all with some individuals until the next outage. This prolonged absence of communication often meant gaps in their safety orientations and other onsite facility requirements. Trying to assemble that information into a cohesive record for every individual scheduled to work an outage became a real challenge. Epps decided there had to be a better way to facilitate Universal Blastco's employee safety record-keeping and orientation program.

Epps says he stumbled onto his solution quite accidently about five or six years ago while attending a safety meeting at an Arkansas mill. He discovered that this mill, among quite a few others in the company's portfolio, used an online platform called TAPPISAFE for both its own employees' onsite orientation and for the many different contractors that visited the site. "What really caught my attention is that the program was built by the pulp and paper industry *for* the industry," Epps says. "It had already been vetted by the big-name paper and tissue companies and, for a smaller company like us, that served as quite an endorsement."

One of the benefits that Epps appreciates is that his dispersed employees are getting the same safety message. With the online platform, everyone receives and answers the same questions so it's easier to see just how much and how well that information is being retained. Epps feels that type of consistency is important when you can't be in front of each student all the time. Plus, the electronic recordkeeping makes checking orientation histories instantly accessible. In addition, TAPPISAFE also took Universal Blastco's own employee orientation and made it specific to the pulp and paper industry. "That helped cement that going with this program was the best decision we could have made," he notes

Epps has integrated the TAPPISAFE information into Universal Blastco's proprietary platform, which produces a daily report that he uses to review not only for employee safety information, but also to track what sites employees have worked at and the correlated



training that must accompany any site visit. With an automatic alert at the 12-month expiration, he is able to coordinate with project supervisors to ensure everyone arrives onsite properly prepped and ready to work.

"We have taken the data and done so much more with it internally than just noting whether an individual has had required orientations," Epps says. "It doesn't matter if you are working at a mill or a power plant: understanding the hazards of confined spaces or scaffolding work, or learning fall protection, is important no matter what industry you're working in. Being able to ensure that our employees can go in and take what they need, with or without prompting, is all part of the culture at Universal Blastco that says safe practices are important everywhere and all the time."

TAPPISAFE is a web-based orientation program that allows the workforce to take industry-specific training online so they arrive at the mill ready for gate entry. Learn more at tappisafe.com. trendspotting | CORRUGATED

Agility for Turbulent Times in Corrugated Packaging

The corrugated packaging industry has gone through some turmoil during the past couple of years. We checked in with VPK Packaging UK and Ireland to learn how this European leader responded.

PAPER360° SPECIAL REPORT



Aerial shot of the modern greenfield plant in Halden, Norway. The site recently achieved BRCGS (British Retail Consortium Global Standards) certification, which includes food safety related to packaging — much of the packaging produced at Halden is delivered to the food industry.

The huge growth in ecommerce, food purchasing, and the closure of "Main Street" shops has fuelled a rapid rise in the use of corrugated packaging. Reacting to the change in market conditions requires agility, speed to market, and flexibility to react to customers' changing demand patterns during periods of turbulence. To support this, VPK Packaging UK and Ireland has maintained its strategy based on a centralized service that is agile and flexible.

The past 20 years have been quite a revolutionary change for VPK Packaging UK and Ireland. Rivalling the bigger players in the market, its growth has meant it is now one of the most prominent corrugated packaging companies in the UK and Ireland, with seven sites.

With the 2021 UK Packaging Company of the Year award (presented by *Packaging News*) firmly under its belt, the corrugated company is beginning to stand out as one of the top suppliers of corrugated packaging across the UK and Ireland.

DRAMATIC GROWTH

Looking back, and despite the global unpredictability the pandemic brought with it, 2020 was a year of activity for the company. First, VPK's corrugated operations in UK and Ireland (formerly known as Rigid Containers) were rebranded as VPK Packaging, along with the company's other European corrugated divisions.

As background, under its ownership over the past 22 years, VPK Group has invested more than GBP120 million (about US\$157 million) into the division. The Desborough location was transformed into the UK flagship site, whereas greenfield sites in Wellington and Selby gradually increased capacity to fully mirror operations on all three sites. In 2015, the acquisition of ICS Europaks in Limerick, Ireland, further strengthened the geographical spread. With a strong focus on high quality printing capacities, the UK and Ireland



Julian Freeman, sales and marketing director for VPL Packaging UK & Ireland.

divisions enjoy a solid reputation with high service requirement customers.

Also in 2020, VPK acquired a majority stake in CorrBoard UK Ltd., a leading supplier of corrugated cardboard sheets located in Scunthorpe. The site includes a 320,000 sq ft modern factory equipped with a new fast order-change Fosber 2.80m corrugator, using a CO_2 neutral production process.

Following fast in October, 2020, was the acquisition of corrugated packaging producer Encase. VPK has now fully merged Encase's three UK sites (Banbury, Leeds, and East Kilbride) with the existing VPK UK corrugated operations. The acquisition has also enabled VPK to gain its first site in a new geographical location: Scotland.

VPK has a proven track record of successful investments and acquisitions in corrugated manufacturing assets. These include an ultra-modern greenfield investment project in Halden (Norway) and the acquisition of Viallon Emballages in France. VPK Group has also set clear plans to convert the Alizay (France) paper mill into a recycled paper-based production site with long-term sustainable development in the circular economy. As a significant step in this project, VPK Group has ordered the conversion of the existing paper machine with Valmet, the Finnish leading developer and supplier of paper industry technologies.

Significant machinery investments across the plants over the past years have included a BP Agnati Corrugator, Mitsubishi EVOL printing systems, and Bobst systems, among many other large ancillary investments. These have all positioned the company as one of the most well-invested integrated converting sites in the UK and Ireland.



Cutting and stacking at VPK's Selby, UK, plant (formerly known as Rigid Containers).



Bahmuller TURBOX folder gluer at VPK's Wellington, UK, plant (formerly known as Rigid Containers).

A NUMBER OF CHALLENGES

Last year did deliver a number of challenges regarding capacity; this was felt across the whole corrugated industry. However, since the pandemic hit, the corrugated industry overall has played an essential part in keeping the supply chain functioning — an effort that VPK UK & Ireland is proud to have joined.

The sales and marketing director for UK & Ireland, Julian Freeman, comments on the pattern of change that the company experienced: "Overall, we reacted with agility and flexibility to our customer's changing demand patterns for packaging during this period, which is something we are very proud of."

The demand for e-commerce has obviously increased significantly. As an example, corrugated packaging is proving to be the ideal format to meet the exponential growth of the e-commerce sector, with eye-catching printed boxes being an increasing part of brand awareness. Corrugated e-commerce packaging is able to interact with the customer at the point of use through its design. If the box is decoratively printed inside, for example using an inside print, it can even "talk" to consumers when opened, supporting brand positioning through relevant messages and graphics.

Freeman adds, "As COVID restrictions came off, we saw an increase in brick-andmortar shopping. Realistically, the pandemic situation has pushed the transition from 'high street shopping' to e-commerce at a higher speed than what would have happened normally."

Recruiting people is still an issue across the industry, and attracting people to the industry has been a huge focus, Freeman says. "We've been an essential industry throughout the pandemic and we've played an important role in keeping supply chains operating, and because of this high-profile role it will hopefully attract new talent to work in the industry."

SUSTAINABILITY

The demand for sustainable packaging is key to future strategy too. The environmental credentials of corrugated packaging continue to make it a popular choice for retailers looking to swap the single-use plastic option with an alternative.

Customers are looking at how corrugated packaging can play an integral part in their overall packaging targets. This falls in line with investment too, and it's an essential synergy of state-of-the art equipment to produce packaging in a lean, low-waste manufacturing environment.

Freeman comments: "Our strategy will focus on delivering reliable, high-impact, and sustainable packaging solutions for a wide variety of goods, and we need to ensure we have the latest machinery to deliver this, so continued investment is essential.

"Sustainability is at the core of our business and reducing our environmental footprint and contributing to a circular economy are important parts of our business." During the early part of 2020, the company started the implementation of a new IT system. "This kind of implementation is never without teething troubles, but it has now been successfully installed at all of our sites and puts us in perfect synergy with VPK systems across Europe," Freeman says. "We believe that we are now one of the most technically advanced corrugated packaging manufacturers in the UK, with an IT system that ensures maximum productivity."

He recognizes too that the packaging sector is often criticized for "over-packaging" products, which raises the question: Is the industry doing enough as far as right-sizing is concerned?

Freeman comments, "It is a big focus area within our industry. Our in-house design and technical teams both work with customers to ensure they have a product fit for purpose but without it being excessive."

He feels that the industry has a great story to tell regarding sustainability. "As an industry we need to be aligned. By stressing the positive role that corrugated packaging plays overall in protecting and enhancing the goods we buy, we can counter this. A balanced approach will also ensure that consumers continue to see the benefits of corrugated materials, however as an industry we must not rest on our laurels in delivering this message."

THE FUTURE

An exciting two years of acquisition and continued investment will continue, especially as the previous Encase business is continually integrated into the VPK business strategy. For the company, the future means growth, more acquisition, the development of strong values, being a great place to work for employees, and offering a great service to customers.

"In addition, our understanding of the environment and increasing concern for sustainability will drive the business forward," Freeman adds. "Now that we are one brand it means that our strategy is ever more strengthened. Delivering the sustainable corrugated packaging solutions customers and consumers demand means VPK is continually investing in its sites."

This year there will also be a firm focus on enhancing the service offering to customers and pushing the HQPP capabilities across the company's flagship sites: "We will continue to push forward in the market and ensure that we offer the best service in the industry to our existing and future customers."



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ROMAIN METIVET AND DANIEL SAMAIN

All packaging companies and

brands want to drastically reduce their use of plastics and harmful chemicals and increase paper use. Indeed, many of them have committed to do so within the next five to 10 years. Yet, until now, there was no real viable, competitive, scalable, and truly sustainable solution available.

A new patented process answers many of these requirements and opens a new world of sustainable possibilities not only for the paper and packaging industries, but for others such as construction and health care. Overall, the serviceable market may be worth hundreds of billions of dollars. The technology has been developed by Cellulotech, based in Vancouver, BC.

WHAT IS CHROMATOGENY?

Simply stated, the world has a material problem. Of the 100 billion tons of material we use every year, 76 percent is not considered "renewable." Half of our plastic materials are used only once, and 91 percent of plastics are never recycled (Fig. 1). We need to drastically reduce our reliance on such materials, and cellulose has a crucial role to play since it is the most abundant and renewable organic compound on Earth. Hence, Cellulotec seeks to decouple its value.

Chromatogeny is a green chemistry reaction (meaning no solvent is required) that grafts long-chain fatty acids onto a cellulosic substrate's OH (hydroxide) groups. It is considered a nanotechnology, since it grafts a molecule as small as one nanometer over the whole



specific surface. However, even if you can't see or feel it, the performances are impressive. Treated paper becomes superhydrophobic without affecting breathability. Contact angles of almost 180 degrees can be reached, which makes paper behave like lotus leaves.





An overview of the technology. Solid Solid Partition Chromatogeny (SSPC) is a patent-pending process based on an innovative chemical engineering approach. It treats the reagent as a nanometer-thick monolayer film, which allows coverage of up to 50,000 m² with only one kilogram. It also improves the grafting efficiency and considerably speeds up the reaction.

History and Development

In the 1920s, scientists discovered that fatty acid chlorides could react with paper to make it superhydrophobic. However, the reaction was extremely slow and required a solvent, so it was not really of interest to the industry — it was more of a chemical curiosity. Then, on Christmas Eve in 1996, French chemist Daniel Samain made a chance discovery: this reaction could actually be made solvent-free and very fast. He named it chromatogeny.

Samain first worked in France within his own company and an industrial and public research institution to further study this process and its properties. They found that it could also be applied on PVOH coated paper, offering performances close to PE coated paper while remaining repulpable and compostable.

A pilot was developed more than 12 years ago. While it demonstrated the potential of the technology, the paper engineering approach used was unfortunately suboptimal and prevented scalability. Moreover, there was little interest at that time from the industry to find alternatives to its well-established processes.

In early 2019, investment professional Roman Metivet was working as the CIO of a family office on sustainability issues, notably packaging. While researching monomaterials he came across chromatogeny and was surprised it had not gained more traction. "When it was discovered more than 25 years earlier, there was limited interest simply because our knowledge of environmental issues was limited and there was no real reason to look for alternatives," says Metivet. "Today, chemicals that we know to be harmful for humans and the environment are clearly being pushed toward the exit. The increasing demand for renewable and recyclable cellulose-based materials clearly provides a strong tailwind for chromatogeny."

Eventually, Metivet traveled to France to meet Samain. After discussing the chemistry and other technical aspects, Metivet proposed that they create a new company to fund more research. This new company is Cellulotech.

"In some ways, the pandemic was a huge boost in our productivity, since we found a new application: producing 100 percent paper-based face masks," Metivet says. "Lab trials also fueled creativity around the process, which has been considerably improved. We believe it is now scalable for the paper and packaging industries."

Cellulotech is now developing its own industrial pilot and is working on joint research projects with different companies and universities.

Researchers also discovered that, when grafting paper coated with polyvinyl alcohol (PVOH), they could get the excellent oxygen and grease barrier qualities of PVOH while offering a strong water barrier and a good vapor barrier as well. This can be achieved while preserving all the repulpability and compostability properties of paper and PVOH.

Grafted monocomponents are nothing new, but they were typically complicated and costly to manufacture. Cellulotech brings to the field an entirely new chemical engineering approach that allows extremely high speed and low cost. The process can apply as little as 20mg per square meter of an already widely available reagent. Overall, it can treat up to 50,000 square meters for just a few dollars. Moreover, Cellulotech's process is not limited by a roll-to-roll approach since it can treat some 3D shapes or even corrugated cardboard. When we saw that by applying reagent on only one side we were also treating the flute and the other side, we were astonished.

Chromatogeny allows manufacturers to adjust the barriers to optimize the performance/cost ratio by playing with different parameters such as the substrate, the reagent, or the process itself. Regarding the substrate, there are infinite types of paper and a whole family of PVOH that offer very different performances once grafted. Cellulotech is also working on very promising bio-based substrates. Regarding the reagent, the change in performances can be exponential when the fatty acid chain length is increased.

One enemy of sustainability in packaging is overengineering. Overall, barriers need to

match the actual needs and shelf lives or use time as closely as possible. Without sacrificing functionality, manufacturers need to optimize resources and minimize their environmental impact. This leads to two initial questions: What barriers are really needed, and for how long? What is the lowest cost possible that can be achieved adjusting the two parameters mentioned here?

Let's take a paper cup, for example. There is no need for a thick layer of high-performing PVOH or the fatty acid with the longest chain available to get the performance needed for a few minutes of use. In contrast, flexible packaging is much different, as the barrier requirements are much more demanding. There are also products when only a strong water barrier is needed, but manufacturers end up using plastic, waxes, and other harmful chemicals because of the lack of satisfactory solutions. With the same process, chromatogeny allows them to be both selective and flexible regarding the barriers they provide.

A RANGE OF APPLICATIONS

The applications are numerous. At Cellulotech, we are confident that the more people learn about chromatogeny, the more ideas emerge. We do not doubt that our process allows this green chemistry to now be scalable, competitive, and even cheaper for several industries.

The most obvious application is in packaging — whether it is to replace PE coatings, get rid of PFAS or waxes, or to simply reduce pulp use while making corrugated board. Because the reaction is extremely fast, we believe it is possible to implement this at the papermaking stage to replace sizing agents like AKD with a potentially cheaper solution. We discover new applications regularly and see a new world of possibilities opening up.

The critical point to understand when developing applications and bioproducts is that chromatogeny is a covalent linkage grafting process using reagents derived from naturally occurring long chain fatty acids. Because of the covalent linkage, the end products from chromatogeny are "monomaterials" or monocomponent products. Multicomponent products — which associate, for example, layers of naturally occurring cellulose-based material such as paper sheets together with layers of synthetic polymeric material — are easy to prepare and efficient from a barrier point of view, but they are extremely difficult to process after use. To make a comparison, it is quite easy to dissolve salt into water, but it is extremely difficult to remove salt from water.

The big pluses of chromatogeny are first, that the end products are harmless biomaterials; second, because the long chain fatty acids are covalently grafted, the amounts needed to provide barrier properties are considerably lower than what would have been necessary through a conventional coating approach. In a nutshell, multicomponent materials may be viewed as "dumb and clumsy" while grafted monocomponents may be viewed as "smart and nimble."

LOOKING TO THE FUTURE

In the opinion of the authors, the packaging industry (as well as pulp and paper) is going to see a paradigm shift. Packaging used to be considered a "low-tech" industry mostly concerned about mixing existing products without any considerations about their afteruse compatibility. The packaging of tomorrow will be much more sophisticated and will make use of the creativity of organic synthetic chemistry to design products that respond to specific packaging challenges and, notably, their life cycles.

A new concept needs to be implemented. Instead of the old "one process fits all" approach, we will see the development of the "fair" package concept, where different technologies will cohabit with design innovations. What is most exciting is that packaging will stop being an industry that mostly made use of results obtained in other disciplines — and will move to the forefront of research in sustainability. Other industries will very likely turn to the achievements of the packaging industry to provide solutions to their own sustainability challenges.

At this stage, Cellulotech is developing its industrial pilot and working with several companies on different projects. The company has a collaborative approach (see sidebar on page 16 about the development's history) and we recognize we can't do everything on our own with such a promising technology.

While the process won't be commercially available in the very short term, Cellulotech invites any company interested to get in touch to better understand this technology and potentially work together on a specific challenge or application. The idea is that, once it is commercially ready (ideally, within the next two years), adoption can be smooth and quick. Romain Metivet is founder and CEO, and Daniel Samain, Ph.D., is scientific director, of Cellulotech. Metivet is an investment professional with expertise in natural resources, energy, and materials. Samain is an awardwinning organic synthesis chemist specialized in green chemistry; he discovered chromatogeny in 1996. Visit cellulotech.com to learn more.

New Corr*Focus* Section Coming to *Paper360°*

This month, we're using our "Trendspotting" feature to take a "360" look at issues in corrugating — one of the most dynamic sectors of the pulp and paper industry. Yet this important content won't end with this issue.

Beginning with the July/August issue, *Paper360*° will include a new section: **CorrFocus**, an every-issue compendium of corrugated-related content. Corr*Focus* will gather information on corrugating best practices, industry leaders, new research, market trends, upcoming events — any information pertinent to the careers of corrugated industry profession-



als — and offer it in this dedicated section within

Paper360°. Corr*Focus* will be easy to find, easy to read (*Paper360*° is already offered in both print and downloadable, device-friendly digital formats), and easy to pass along to colleagues and peers.

As a publication of TAPPI, *Paper360*° is in a unique position to leverage close access to TAPPI's Corrugated Division, a talented group of technical professionals who focus on the manufacture and use of corrugated containers and associated packaging materials and products; and the Corrugated Packaging Council, the advisory board whose members work together to provide guidance and support for TAPPI's efforts to serve the corrugated industry. TAPPI (in conjunction with AICC) can also provide editorial access to two premier events for the corrugated industry: Corrugated Week and SuperCorrExpo (in fact, see page 19 for a look ahead at Corrugated Week 2022.) No other publication now serving the corrugated industry can offer all of that.

Of course, Corr*Focus* will not be exclusively for professionals in the corrugated industry. Corrugated is one of the forest products industry's fast-growing sectors, opening new markets and fostering more new research than ever before. That is why we believe that all *Paper360*° readers will benefit from the inclusion of content related to corrugated — just as corrugated professionals have a lot to gain from the other sections of *Paper360*°. It's a content win-win.

We'd love to hear from you as we get ready to launch Corr*Focus*. What are the topics in corrugated that most interest you? What would you most like to learn about this growing sector? What companies or leaders would you like to see profiled in these pages?

If you're a corrugated producer or supplier, Corr*Focus* offers a great opportunity to share your successes with readers throughout the industry. Tell us about problems solved, goals achieved, and new ground covered — we'd love to consider your story for the pages of Corr*Focus*.

For editorial opportunities, contact *Paper360*° Editorial Director Jan Bottiglieri at jbottiglieri@tappi.org. For advertising opportunities, reach out to Media Director Shane Holt at sholt@naylor.com. And remember to look for Corr*Focus*, beginning in the July/August issue of *Paper360*°!

Transparency Enables Flexibility and Resilience

Producers of corrugated board face many pressures. Smart digitalization might ease some of them.

BRADLEY ROBB

It is a challenging time to work in the corrugated business. The containerboard sector reached record production in 2021, according to the American Forest & Paper Association (AF&PA). Total containerboard production increased 5.6 percent compared to 2020. Yet at the same time, the Association of European Coreboard producers (ECBA) issued a warning: Despite the positive market development, the revenue situation of many ECBA members has reached proportions that could threaten the industry's existence.

Germany's Verband der Wellpappen-Industrie e. V. (the Association of the Corrugated Board Industry, or VDW) paints a similar picture. Even during the months before the outbreak of the Ukraine war, the market situation had been tense and the cost pressure had been higher than ever. The corrugated board industry, as well as the supplying manufacturers of corrugated base paper, are significantly dependent on natural gas as an energy source. Already, some paper mills are closing temporarily due to gas prices getting out of hand. Electricity prices are exploding as well. The price for a megawatt hour on the Dutch TTF exchange on March 7, 2022, temporarily moved toward EUR350 (US\$381). In March, 2021, the end-of-day value had remained below EUR20 per megawatt hour.

Skyrocketing raw material prices are also putting massive pressure on the corrugated board industry. The overall price level for corrugated base paper rose by 66.1 percent from September 2020 to December 2021, according to the VDW. Consulting company Fisher International reports that over the course of 2021 raw material prices to produce corrugated packaging rose steadily, reaching US\$910 per ton for linerboard and US\$791 per ton for corrugated medium. This amounts to a 26 percent and 32 percent increase, respectively, compared to the fourth quarter of 2020. The current COVID-19 omicron wave poses additional challenges for the corrugated board industry: the logistics sector is facing a significant shortage of truck drivers. Freight space is becoming scarcer. Corrugated board manufacturers themselves are also affected by a decimated workforce due to quarantine and sick leave. Additionally, they are expected to produce in a more sustainable manner to meet customers' expectations.

The question currently keeping manufacturers of corrugated board awake at night is not whether orders will continue to come in; it's whether they can continue to deliver — and whether production is financially sustainable. Many enterprises are discovering that their organization is no longer equipped to achieve their targeted results while becoming more sustainable at the same time.

Most producers of corrugated goods have started to increase their prices accordingly. But customers' willingness — and ability — to pay more is limited. So how can companies cope?

DOUBLING DOWN ON DIGITAL

Alfred Becker, global lead, product management for forest products, paper, and packaging industries at SAP SE, suggests an increase of digitalization activities to tackle today's volatile market situations. "Increasing transparency with suitable data-driven technology enables organizations to become more agile, more flexible, and more resilient," Becker says.

One promising approach to building resilience in corrugated industry enterprises is to develop fully integrated IT systems. Areas where data is hidden in manual processes or isolated digital solutions are particularly vulnerable to volatility and crises, since much of the knowledge associated with those processes is not documented for general access. This often includes unstructured files stored on an individual machine, or even only in the heads of a few specialists.

Examples might include the addresses of suppliers with a poor response rate, special conditions known only by one procurer, recipes for certain products, or the number of essential materials in stock. Any organization that only has isolated IT solutions, or even purely paper-based processes, will find it impossible to enact efficient, secure information assembly and exchange; to effectively monitor workflows; or to address cost, quality or sustainability issues in a timely fashion.

It's not enough merely to digitize some parts of the enterprise like the administration and billing/payment departments. Production also needs to become transparent. A key building block is a Manufacturing Execution System (MES), which can provide information about the status of production orders. The MES is the data hub linking platform data from the shop floor with data from the enterprise resource planning (ERP) system, ideally fully integrated into the other components of the company's IT. This enables a centralized view of all data relating to the manufacturing process and detailed analyses of the data. Now it becomes clear which production step consumes a lot of energy and which processes or procedures are "greener" than others. Companies then can optimize their processes accordingly.

Another use of a modern MES is the recording data associated with maintenance tasks. This is helpful in times like these as well. A spare parts inventory can be maintained in parallel with consumption posting for maintenance orders. Doing so yields high potential for cost savings and reduces working capital. It also provides an ability to quantify and evaluate the risk that production will halt due to a lack of basic wear parts. It is then possible to counter the risk appropriately by proactively

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User screen of a digital trim optimization tool (Trim Suite) being used for corrugated production planning.

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Sample Trim Suite user screen of a high-complexity scenario for optimizing reel trim.

purchasing additional stocks of important parts to keep on hand locally, as a safeguard against changing circumstances (during which rapid delivery cannot be guaranteed).

Plants can reap more benefits by the digitalization of the processes in the areas of quality assurance and quality control. This is especially true since the corrugated industry is moving toward more sustainable production, and cardboard is set to replace other raw materials in packaging production. According to Industrial Physics, a global testing and inspection company for packaging, products, and materials, nearly threequarters of the 225 packaging companies surveyed (71 percent) reported that they experience the quality control processes for environmentally sustainable packaging materials as "significantly more difficult" or "somewhat more difficult." Nearly half of these companies (49 percent) state that "meeting testing standards" is one of the

Corrugated Week is Coming!

Corrugated Week 2022 is your opportunity to further grow your business, explore cutting-edge products, and take your corrugated vision to the next level. This exciting event will be at the Henry B. González Convention Center in San Antonio, TX, with the Grand Hyatt serving as the official host hotel. TAPPI and AICC are co-hosting, just as they did for the highly successful SuperCorrExpo event in August, 2021.

Corrugated Week 2022 brings together one of the largest groups of industry decision-makers, giving you direct access through exclusive networking events and one of the largest gatherings of industry vendors under one roof. The conference program and topics will be unveiled soon, so now is the time to lock in the best hotel block rate. The next Corrugated Week is four years away — don't miss your chance now to get the latest on innovative trends and technology advances!

Mark your calendar: Corrugated Week 2022, September 19-21 in San Antonio. Exclusive show days are September 20-21, with special rates to attend just the exhibit. Early bird pricing and box plant rates coming soon. Visit corrugatedweek. org for hotel and travel information, and to sign up for convenient program updates.

If you are interested in being a Corrugated Week 2022 Sponsor or Exhibitor, please contact Linda Cohen at lcohen@tappi.org, or directly at (914) 944-0135.



biggest challenges they face in the wider adoption of environmentally sustainable packaging materials.

By integrating digital tools like an MES into production processes, quality inspections can be triggered on an event basis and production data can be linked to quality data. Deviations in quality can be analyzed and traced back to changed production parameters. This ensures the traceability of every batch produced and it decreases the amount of goods that must be reproduced because of quality issues. This increases the efficiency and sustainability of a companies' production.

PRODUCTION PLANNING

Digital integration can also help address issues such as efficiency and sustainability on another level: production planning. How can data optimize scheduling or trim processes?

Planning and optimization tools calculate in advance which boards are to be produced where and when and specify how the board will be trimmed to generate the required end products. A trim optimization tool, such as Trim Suite (from T.CON GmbH & Co. KG) even considers the stocks of the respective layers of corrugated board during planning. The software also helps to reduce machine set-up times, and the need to reconfigure machines — nowadays, mostly in paper and film production. Trim Suite's functionality has been enhanced to even tackle the production of cardboard — especially challenging, considering that corrugated material will typically contain three layers of paper, each of different grade, thickness, length, and grammage.

Integrating software components like Trim Suite into an integrated IT landscape is vital, because the number of business-critical tools and applications is growing. A patchwork of applications can make it impossible to leverage process improvements. A lack of integration boosts maintenance costs and reduces the budget available for digital innovations that drive value creation. If a company plans to grow fast — as many corrugated companies and other packaging companies must do the "patchwork" legacy IT systems often slow things down since they are hard to roll out to new plants or business units.

Producers are not the only ones that need to evolve and increase their level of digitalization. Software and consulting companies must adapt to new demands as well if they want to support corrugated companies efficiently. Their business demands highly specialized solutions for their business functions, but all parts of the IT landscape must form a fully integrated, seamless puzzle, not a patchwork. This is, on a technical level, not an easy task. That's why some IT players pool their expertise so they can offer wholistic solutions that support specialized business processes.

For example, T.CON, which has a focus on integrated end-to-end processes in manufacturing companies, and aicomp Group, a leading provider of ERP solutions in the packaging industry, are now advancing their successful collaboration through a sales and implementation partnership. Their goal is to offer a solution that is already integrated in the SAP product configuration. This will offer customers a fast turnaround time for quotation requests, improved efficiencies, and optimized production for waste reduction. It sounds like a perfect match for the digitalization of the corrugated and the packaging business in challenging times.

Bradley Robb is international business manager, T.CON GmbH & Co. KG, an owneroperated business and SAP Gold Partner. Visit www.tcon-international.com to learn more.

MINIFIBERS, INC.

would like to congratulate our Technical Sales Representative Scott Frasca on being selected as a TAPPI Fellow.



According to TAPPI, "Fellow is an honorary title bestowed upon a small percentage of TAPPI's membership and is given to individuals who have made extraordinary technical or service contributions to the industry and/or the Association." Scott has been active at both the local and national levels of TAPPI since 1986. On the national level, Scott has chaired the former Microbiology and Microbial Technology committee, and currently chairs both the Local Section Office Team and the Runnability Planning committee. At the local level, he has chaired sections in both Pennsylvania and New York, and is currently serving on the executive committees of Empire State TAPPI/PIMA and Northeast PIMA/TAPPI. Scott was the recipient of the Paul W. Magnabosco Outstanding Local Section Member Award in 2010.

We are proud to have Scott as a member of the MiniFIBERS team, where he can share his expertise and continue to positively impact the industry. Congratulations, Scott!



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2022 TAPPI/PIMA Awards: Celebrating Excellence

JAN BOTTIGLIERI



"Excellence is doing ordinary things extraordinarily well." This quote (attributed to John W. Gardner, former US Secretary of Health, Education and Welfare) may well apply to the pulp and paper industry professionals profiled here. Not content with merely ordinary work, they have each found a way to contribute that is truly extraordinary.

Each year, *Paper360*° spotlights the recipients of TAPPI's association-level awards, as well as those receiving awards from several TAPPI Divisions. We've placed this feature in the "Millwise" section to illustrate that these outstanding pulp and paper professionals demonstrate excellence in their mills and at their companies every day.

Most of these awards were presented at TAPPICon 2022 in Charlotte, NC. In the words of TAPPI Board Chair Jim Haeffele, who helped present the awards, "These individuals have led by example — in their service to others, their exemplary leadership, and their remarkable contributions to the industry."

For many TAPPI Awards, **nominations are open until August 1**. Several association-level awards include generous honorariums funded by private donation. Visit tappi.org and choose the "Get Involved" tab for more information on TAPPI Awards & Honors.

In the following pages, we are pleased to introduce this year's winners.

For Scientific Achievement:

Gunnar Nicholson Gold Medal Award



PETER HART, Ph.D. WESTROCK

Dr. Peter Hart is one of TAPPI's most prolific authors, having published more than 100 peer-reviewed technical articles and edited and co-authored three textbooks for TAPPI PRESS. He is director-research and innovation at WestRock, where he has worked for 29 years.

A TAPPI Fellow and a member since 1981, Hart has been in the leadership ranks of both the Southeastern and Gulf Coast Local Sections. He has served in every leadership position on the Alkaline Pulping and Bleaching Committee and on the Pulp Manufacture Division. Hart has been a *TAPPI Journal* (TJ) Editorial Board member for 20 years, served one term as TJ assistant editor, and recently completed his second term as the journal's editor-in-chief. Hart also served on TAPPI's Board of Directors.

He earned his Bachelor of Science from the University of Maine (UMaine) majoring in both chemical engineering and pulp and paper technology. After obtaining an MS in chemical engineering from UMaine, Hart worked for the university and assisted with the relocation of a pilot paper machine, among other projects. Hart then earned his Ph.D. in chemical engineering from Georgia Institute of Technology. His dissertation was on the formation and release of AOX during kraft pulp bleaching.

First presented in 1985, the prestigious Gunnar Nicholson Gold Medal Award is TAPPI's highest technical honor in recognition of an individual's exceptional industry contributions. It recognizes preeminent scientific and engineering achievements of proven commercial benefit to the world's pulp, paper, board, and forest products industries.

For Business Leadership:

TAPPI/PIMA Executive of the Year



WILLIAM KRESS GREEN BAY PACKAGING INC.

Building on his family company's firm foundation, William "Will" Kress has kept his eyes on the future as chairman and CEO, earning him recognition as a visionary leader. The Executive of the Year Award is traditionally presented to senior-level executives in the pulp, paper, or converting industries for excellence in management and outstanding contributions to the industry. It is one of TAPPI's highest honors.

TAPPI President and CEO Larry N. Montague says, "Under Will's guidance, Green Bay Packaging continues to uphold its longstanding commitment to the community and the environment. Its new Green Bay mill recently achieved Net-Zero Water in its production of 100 percent recycled containerboard with the first-of-its-kind, circular reclaimed water system, significantly reducing the environmental footprint of the operation."

GBP is a family-owned, vertically integrated manufacturing company consisting of corrugated container plants, a folding carton facility, recycled and virgin linerboard mills, pressure-sensitive label roll stock plants, specialty converting operations, timberlands, and a sawmill facility. GBP's footprint expands across 37 locations in 16 states.

Kress holds a BS in finance from University of Colorado-Boulder and joined the company as a sales trainee in 1979. He worked through several leadership roles before becoming president in 1995. He was named CEO in 2001 and was elected chairman in 2019. Kress has spent his entire career at GBP, furthering the vision of innovation, environmental sustainability, and quality set forth by his grandfather, George, and father, James. Kress currently serves on the boards of Green Bay Packaging and the Green Bay Packers and Advisory Boards for the Associated Bank and Junior Achievement.

"Being selected as the TAPPI/PIMA Executive of the Year is a great honor," says Kress. "GBP has been involved in this industry for 90 years and I take great pride in our employees who are focusing on providing customers with superior quality and unparalleled service, while also being good stewards of the environment."

For Local Section Service:

Paul Magnabosco Outstanding Local Section Member Award



MICKI MEGGISON SAPPI NORTH AMERICA



MICHAEL VON GRUMBKOW BTG GROUP

The Magnabosco award recognizes remarkable leadership and service at the Local Section level; recipients are those whose exceptional service has resulted in significant and measurable benefits to their section. Both of this year's winners have exhibited this high level of service.

Meggison is a process improvement Black Belt with Sappi North America in Westbrook, ME, the mill she has worked at her entire career. She served on Sappi's Sustainability Council from 2010 to 2022, collaborating with colleagues to develop and execute strategic goals and objectives.

Meggison became involved with the TAPPI/PIMA Student Chapter as a freshman at University of Maine and served as chapter VP her senior year. Meggison joined TAPPI as a professional member in 1990 and served on the Maine-New Hampshire TAPPI (ME/NH TAPPI) executive committee for several years.

She was recruited to the executive committee of the Northeast PIMA Local Section in 1999, and has held a variety of offices within the section. Meggison joined the PIMA Executive Council in 2008, serving until 2012. She received the PIMA Del Boutin Division Service Award in 2011. Meggison has co-organized the Northeast PIMA/TAPPI Scholarship Fund Golf Tournament each year since 2012.

Von Grumbkow is part of BTG Instrument's Global Solutions Team — Paper and Board. He has been in the paper industry for 28 years, and joined Lake States TAPPI/North Central PIMA in 2007. Von Grumbkow served as chair of the section's Executive Board from 2017 to 2021. He has also served on several committees for both PIMA and TAPPI.

His passion in local section work has been helping and mentoring students entering the industry; he has shown "incredible dedication to make Lakes States TAPPI better each year," notes his nomination. A graduate of University of Braunschweig, Germany, Von Grumbkow and his family recently relocated from Neenah, WI, to the city of Linz, Austria.

For Service Leadership:

Herman L. Joachim **Distinguished Service** Award



JOHN NEUN JOHN NEUN LLC

John Neun, TAPPI Fellow, has served the paper industry since 1979 and is now a consulting engineer. He holds bachelor's and master's degrees in mechanical engineering from Rensselaer Polytechnic Institute in Troy, NY.

A summary of his service activity makes it clear why Neun has received this prestigious award. He began his career as a research engineer with Albany Felt Company, followed by a long tenure at Kadant-AES. His first boss at Albany Felt, Ed DeCrosta, was an officer of the TAPPI Engineering Division and introduced Neun to TAPPI in 1980. Neun served as an officer and ultimately chairman of the Water Removal Committee, the Papermaking Technical Program Committee, and the Paper and Board Division. He has written and presented many conference papers and has lectured in TAPPI courses for decades. He has played some role in every annual conference since 1990.

Currently, Neun serves on the TAPPI Journal Editorial Board. He has received the Leadership and Service Awards from both the TAPPI Engineering Division and Paper and Board Division, as well as the TAPPI Engineering Division's Technical Award. He holds six U.S. patents.

The Herman L. Joachim Distinguished Service Award was established to recognize individuals for voluntary leadership and support. Recipients have significantly and demonstrably advanced the mission and vision of TAPPI and made specific improvements in the association's internal or external endeavors.

Welcoming the TAPPI Fellows Class of 2022:

For more than 50 years, TAPPI Fellows have continued to enrich the industry with their contributions. Only a small percentage of TAPPI members ever achieve this distinction. TAPPI Fellows represent every area of the industry and hail from all over the world, creating a global fellowship of men and women whose professionalism and high personal standards serve as inspiration. "TAPPI Fellows truly represent our best and brightest, and their service forms the foundation of TAPPI," says TAPPI President and CEO Larry Montague.

Considerations for selection include longstanding TAPPI membership, exemplary volunteer leadership, and outstanding contributions to the industry's knowledge base. The TAPPI Fellow designation is also conferred upon those who have served on TAPPI's Board of Directors upon completion of their term. Innovators — leaders — mentors — TAPPI welcomes the following individuals as new Fellows for 2022:







LUCIAN LUCIA, PH.D. North Carolina State University **TAPPI Member since 2017**





GARNET BREMNER

TAPPI Member since 1993

Nalco

TIM PATTERSON, PH.D. Solenis

TAPPI Member since 1994



DOUG SWEET, P.E. Doug Sweet & Associates, Inc. TAPPI Member since 1984

TAPPI Member since 1984



SESHADRI RAMKUMAR. PH.D. Texas Tech University

TAPPI Member since 2005

GREGG REED, PH.D. Imervs TAPPI Member since 1983

GUENTER SCHUBERT Speira TAPPI Member since 1997

DOUGLAS SINGBEIL

FPInnovations



For Meritorious Research:

TJ Honors Best Research Papers for 2021



Each year, the *TAPPI Journal* (TJ) Editorial Board honors the best of *TJ* content by nominating and voting for the *TAPPI Journal* Best Research Paper, which is ultimately selected based on scientific merit, innovation, creativity, and clarity.

The winning paper, "Application of foamed additives to the surface of wet handsheets," was authored by Terry Bliss with co-authors Mingxiang Lou and Matthew Nicholas. "Concentrated at the intersection of sustainability and next generation technological advancement, this study is an impactful demonstration," says *TJ* Editorial Board Member Scott Rosencrance. "The work combines foam form concepts with optimization of chemical additive application."

This is the type of work that can lead to what Rosencrance calls "acceleration of commercial implementation of emerging production processes and grades." Lead Author Bliss is a research fellow at Solenis, LLC in Wilmington, DE, while Luo is a global market development manager and Nicholas is a process research engineer, also with Solenis. The foam additives research appeared in the January, 2021, issue and is available through the TAPPI website.

Bliss will also be awarded the Honghi Tran *TAPPI Journal* Best Research Paper Prize. The US\$2,000 cash prize is endowed by Professor Emeritus Honghi Tran, Ph.D., of the University of Toronto and author or co-author of more than 80 papers published in *TJ*. Bliss and his co-authors are donating the cash prize to the Paper and Board Division scholarship.

Division Awards

Coating and Graphic Arts Division:

Division Technical Award & The Charles W. Englehard Prize

RICHARD E. GAGNON RETIRED



RETIRED Gagnon began his career in 1989 in research for Potlatch Corp. and in 1999 joined

DuPont Soy Polymers, where he served until retirement. He has published extensively on a wide range of industry topics. Gagnon joined TAPPI in 1993, and in 1995 joined the C&GA's Technical Program Committee, serving for several years. He has been a presenter at TAPPI's Coating Conference and an instructor at TAPPI sponsored courses.

Division Leadership and Service Award & DuPont Soy Polymers Prize



MARTTI TUOMISTO EPIQ AD

After starting his career at Stora Enso's Varkaus paper mill, Tuomisto had a 35-year

career with Valmet. He is now with EPIQ AD (Advanced Dynamics) and is recognized as a leading technical expert in papermaking process technology, paper machinery, and paper coating and finishing. Tuomisto has chaired both TAPPI's Calendering Committee and Coating Operations Committee.

CGA Division and WestRock Outstanding Educator Award



DR. PATRICK GANE AALTO UNIVERSITY (Retired) A TAPPI Fellow, Dr. Gane

A TAPPI Fellow, Dr. Gane is credited with more than

400 scientific publications and named inventor on over 300 corporate patents. Focus areas include interaction of liquids and heat with complex porous network media, including nanoscale phenomena applied to printing, environmental sciences, and composite biomaterials. He is a two-time winner of the Swedish Kempe Prize for research.

International Flexible Packaging & Extrusion Division:

Division Leadership and Service Award & Andreas Ahbrandt Prize



JIM LUSH CELPLAST METALLIZED PRODUCTS

Lush joined Celplast in 1989 and is now sales man-

ager. He got involved with IFPED at the committee level by joining the Flexible Packaging Committee and has also served on the Technical Program Committee. During his time as an IFPED officer, he was instrumental in the reorganization of the division's structure into Teams and also in introducing the Mentor Match program to the division.

Division Technical Award & Samuel Zweig Prize

SCOTT MARKS DOW INC.



support of heritage DuPont materials. He began TAPPI committee work in the late 1980s and has held all the Division Council positions in IFPED; currently he is a chair emeritus of the division and a council member-at-large. He has been a core instructor in IFPED Short Courses from the 1990s

Paper and Board Division:

Division Technical Award & Harris O. Ware Prize



through today.

MARTIN HUBBE NORTH CAROLINA STATE UNIVERSITY

Hubbe teaches and conducts research related to

chemical additives for the paper manufacturing process. He earned an M.S. in paper technology from the Institute of Paper Chemistry and a Ph.D. in colloidal chemistry from Clarkson University. His industrial work has focused on alkaline sizing and paper product development. At NCSU his research involves papermaking chemistry and colloidal science.

Division Leadership and Service Award & Oscar May Prize



GARY WAYNE NYMAN INTERNATIONAL PAPER Nyman is an SME-Innovative Solutions and

has spent 34 years with International Paper. His experience in the industry includes both technical support and production management roles at multiple locations around the world. Nyman has also been involved in several new or rebuilt paper machine capital projects. He is a TAPPI Fellow and a member of Couch Pit University.

Jasper Mardon Memorial Prize for Best Papermaking Technology Paper



JAKE ZWART SPECTRUM TECHNOLOGIES

As the owner of Spectrum Technologies, Zwart specializes

in advanced vibration test techniques. He holds an MASc in mechanical engineering and is a Professional Engineer and spent the first 10 years of his career in R&D for a large newsprint company. Since then, Zwart has been with Spectrum Technologies developing specialized tools and advanced algorithms to aid in consulting.



CONGRATULATIONS TO PETER HART, PH.D.

TAPPI 2022 GUNNAR NICHOLSON GOLD MEDAL AWARD RECIPIENT!

Dr. Hart has been a TAPPI member since 1981 and is currently director of Research and Innovation at WestRock, where he has worked for 29 years. We applaud his leadership in innovation and commitment to the pulp and paper industry. Congrats, Peter!

😂 WestRock

PIMA Management Division:

Technologist of the Year



DOMTAR Smith is a senior process control engineer at Domtar's Kingsport mill and an inte-

RHONDA SMITH

gral part of the mill's production and continuous improvement team. She has been instrumental in the mill's transition to Domtar's first 100 percent recycled packaging facility. Smith holds a BS in chemistry from Georgetown College as well as a BS in chemical engineering from University of Kentucky.

Process Control Division:

Division Technical Award



KEVIN VANPEMBROOK VALMET

VanPembrook's career in the pulp and paper industry has spanned 34 years; he has

been with Valmet since 1996. He excels in wet-end chemistry and alkaline conversions of fine paper machines and now works with advanced wet-end and stock prep measurements and controls. VanPembrook is considered a subject matter expert and has published numerous papers with TAPPI and PAPTAC.

Division Leadership and Service Award

DAVE MADDUX VALMET



Maddux joined the pulp and paper industry in 1990 and today is a regional sales manager with Valmet

Automation. He is past chair for the Process Control Division, current vice-chair for the TAPPICON Steering Committee, and will serve as chair for TAPPICON 2023. A TAPPI member since 2001, Maddux is passionate about getting students and young professionals interested in the engineering and automation aspect of the industry.

Professional of the Year



PHIL HINCHCLIFFE DOMTAR Hinchcliffe is a senior oper-

ations engineer for Domtar Paper's Hawesville, KY, mill.

He has 31 years of engineering experience

in industrial automation — remarkably, all at the same facility. Hinchcliffe notes, "Our greatest challenge is to develop reliable systems that present the right information to the right person at the right time — enabling our operators to transform data into insight."

Division Best Paper Award



DAVE BURTON ASTEN-JOHNSON With over 25 years in

With over 25 years in technical and production management positions, Burton

has spent the last 15 years of his career with Asten-Johnson, where he is a member of the Papermaking Specialist team. Burton has served as Water Removal Committee past chair and is a member of Couch Pit Fraternity. His winning paper, "Using Process Information Survey Techniques to Support Gap Closure," was presented at TAPPICon 2021.

Process and Product Quality Division:

Division Technical Award & Richard S. Hunter Prize



DENNIS CRAWSHAW INTERNATIONAL PAPER At IP's corporate technology center, Crawshaw leads

a team of scientists and technicians providing chemical analysis, microscopy analysis, and physical measurements for IP's manufacturing plants and business groups. He is a member of TAPPI's P&PQ Division Council, Quality and Standards Management Committee, and Standards Advisory Review Group. He chairs the Physical Properties Committee and the Optical Properties Committee and has served as Working Group Chair for 28 TAPPI standard methods.

Division Leadership and Service Award



DAVID LOEBKER PROCTER & GAMBLE

Loebker has worked in the pulp and paper industry for more than 32 years and

is named as inventor on 28 US patents in the areas of tissue paper product, process, and analytical analysis technologies. He has been a leader within the TAPPI Tissue Properties Subcommittee for over 10 years and has presented at many TAPPI conferences on tissue topics and the benefits that TAPPI standards provide.

Women in Industry Division:

Woman of the Year Award



TRINITY CONSULTANTS Duram is a managing consultant and, since joining Trinity more than 20

ΠΕΔΝΝΔ ΠΙΙΒΔΜ

years ago, she has served clients in a variety of industries, with a particular focus on forest product manufacturing. Deanna helped develop and now directs Trinity Consultant's Women in Leadership (WIL) initiative and is a member of Trinity's Diversity and Inclusion (D&I) committee. Duram is a graduate of the University of Michigan and a registered Professional Engineer in Georgia and South Carolina.

Division Leadership and Service Award



PAULA HAJAKIAN USG CORPORATION Hajakian is a paper indus-

try professional with 35 years of experience and a Six Sigma

Black Belt. She has authored or coauthored six patents and presented at numerous conferences. A 30-year member of TAPPI, Hajakian is a TAPPI Fellow, an active member of the WIN Division, outgoing chair of the Paper and Board Division, and was the WIN Division's 2021 Woman of the Year.

Young Professionals Division:

Division Leadership and Service Award



LENA SHARESKY PACKAGING CORP. OF AMERICA

Sharesky is a sales representative who launched her

career with PCA following graduation from Monmouth University, where she earned a BS in business administration in 2017 and an MBA in 2018. She began her TAPPI journey as director of events for the YP Division and she is now YP liaison for the Corrugated Packaging Division Council and the incoming vice chair of the YP Division.

For Service and Emerging Leadership: Young Professionals

of the Year Award

TAPPI's Young Professionals Division is the gateway to all that TAPPI has to offer as an industry association. This dynamic division has been growing to meet our industry's needs and is a true launchpad for young professionals across the industry.

The Young Professionals of the Year is an annual award that identifies aspiring young leaders in the global forest products, pulp, paper, tissue, packaging, and associated industries. For 2022, TAPPI has chosen two recipients based on their outstanding leadership, community service, and problem-solving contributions to scientific or engineering projects.



KIRK CARLSON Capital Project Engineer CLEARWATER PAPER COMPANY

During his time at Clearwater's Lewiston, ID, mill, Carlson delivered solutions to improve energy efficiency, increase production, and reduce chemical usage costs. He's been a TAPPI member since 2019 and holds a Six-Sigma Green Belt and a Bachelor of Science in civil engineering from the University of Minnesota.



JESSICA SPADACCINO Communications Manager

MICA CORPORATION

Spadaccino became the YP Division's Director of Communications in 2018 and in 2020 she took a leadership role in TAPPI's International Flexible Packaging and Extrusion Division's (IFPED) Digital Team. In these capacities she has been integral in developing new online hubs for division members to gain access to valuable resources and increase involvement.





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Coping Mechanisms for the Carbon Clampdown

These five focus areas can help paper and pulp companies turn regulatory readiness into a competitive edge.

KAI ALDINGER

A war in Ukraine may have diverted focus from the war on climate change for the moment. But the global regulatory push to curb carbon emissions continues unabated. The US Security and Exchange Commission's newly proposed rules to require corporations to disclose a range of information about climate-related risks and greenhouse gas emissions are a case in point.

Besides requiring companies to disclose how they manage climate-related risks and how those risks could impact their business, the SEC proposal unveiled in March also would require them to provide information about greenhouse gas (GHG) emissions — those produced directly from their own operations, as well as indirect emissions from the energy they purchase and from upstream and downstream activities along their value chains. The rules would phase in over the 2023 to 2027 fiscal years.

Similar standards are set to take hold in Europe as part of the EU Taxonomy, a policy designed to establish uniform sustainability and GHG reporting standards across the European Union. The EU also is moving to implement a plan to tax imports of certain materials and goods based on the greenhouse gases emitted to manufacture them. Though the Carbon Border Adjustment Mechanism (CBAM) policy approved in March initially will apply to goods deemed at highest risk of carbon leakage, including steel, cement, and aluminum (but not pulp or paper), policies like these put all carbon-intensive industries on alert that their regulatory responsibilities are likely to mount in coming years.

In the US, various states have enacted or are actively exploring extended producer responsibility (EPR) policies that would shift responsibility for end-of-life management of products to producers/manufacturers. EPR policies already are in place in five Canadian provinces and throughout Europe, according to the National Caucus of Environmental Legislators. While



organizations like the American Forest & Paper Association (AF&PA) aren't big supporters of EPR mandates, some of the world's largest corporations and brands are: an EPR policy statement from the Ellen MacArthur Foundation garnered support from more than 100 firms, including Coca-Cola Company, Unilever, DS Smith, and Mondi.

FIVE KEY AREAS FOR P&P

As customer preferences align with regulatory policy in pushing for a more sustainable, producer-centric approach to managing paper and packaging waste, the opportunity for paper and pulp companies to gain a competitive edge by taking a leadership position with respect to sustainability and carbon-reduction grows stronger. To capitalize on that opportunity, they'll need to focus on five key areas:

1. Factoring sustainability considerations, including greenhouse gas emission reduction, into decisions made across the business. Manufacturers have begun to make sustainability part of their organizational DNA, factoring carbon footprint and other sustainability-related KPIs into their end-to-end The ability to centrally monitor, manage, and optimize business/ operational processes is critical, and will give organizations a clear line of sight into the relationship between sustainability investments and business success.

processes and decision-making, from sourcing to product design to manufacturing operations to transportation/logistics.

The ability to centrally monitor, manage, and optimize business/operational processes is critical, and will give organizations a clear line of sight into the relationship between sustainability investments and business success. How does a simple adjustment in the type of ink used for a paper product impact that product's recyclability? How will switching from virgin material to recycled material impact the performance and profitability of a product? Answering questions like these begins with responsible design of products.

2. Strengthening supply chain visibility and control. To comply with the next wave of carbon-reduction policies, companies need integrated tools to collect, track, and analyze the make-up (and prove the origin) of the materials and equipment they use and the products they make. With the ability to periodically calculate product footprints at scale across the entire product lifecycle, they can optimize products and processes via a continuous feedback loop. Externally, meanwhile, this track-and-trace capability enables a company to evaluate its supply chain partners based on their sustainability performance. How does one wood or fiber supplier or pulp mill stack up versus another in terms of emissions, in addition to their price and quality? In a world where the poor sustainability performance of one link in the value chain can undermine a company's own sustainability goals and initiatives, organizations must be capable of evaluating suppliers on factors beyond price and reliability.

3. Beefing up reporting/disclosure capabilities. Visibility and track-and-trace

are just part of the compliance equation. With new reporting requirements like those from the SEC and the EU taking hold, companies also must have the ability to collect and standardize data from disparate — sometimes unstructured — sources, both internally and from other entities in the value chain. They must then be able to package that data in various formats to meet reporting requirements that may differ substantially from jurisdiction to jurisdiction.

What they need, essentially, is a single reservoir from which to draw trusted data, with the ability to standardize and tailor that data to meet varying reporting requirements. With



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MWN Niefern Maschinenfabrik GmbH Bahnhofstr. 51 - 53, D - 75223 Niefern-Öschelbronn Germany Telefon: +49(0) 7233 / 75 - 0 Telefax: +49(0) 7233 / 75 - 11 Internet: www.mwn-niefern.de Email: info@mwn-niefern.de the help of a standard cloud platform supported by machine learning- and artificial intelligencedriven tools to detect patterns across locations and units, doing so becomes significantly less daunting. It also makes measuring progress toward internal sustainability goals that much simpler.

4. Building and actively participating in business networks. Complying with EPR policies and evaluating current or potential procurement and supply chain partners based on their sustainability performance requires close communication, cooperation, and alignment with other companies. Digitally-connected business networks give companies the framework within which to share data to fulfill reporting responsibilities, work together to deliver more value to customers, and even collaboratively explore new business models, services, and revenue streams with waste- and emission-reduction in mind. As part of a network, they're aligned and sharing risk in working toward their sustainability goals.

5. Keeping a close eye on regulatory/ policy developments in all the countries and markets in which they are active. Staying abreast of new government policies, statutory requirements and rules isn't getting any easier. This is particularly true for companies that do business in multiple countries, regions, and markets.

This is another area where machine learningand artificial intelligence-driven tools can help. These tools can scan a huge array of documents, websites, and other relevant sources to identify — and alert organizations to — any legal, regulatory, or policy developments that could impact the business. If a new tariff requirement emerges in Asia, or a new EPR law is passed in New York, they'll know about it.

In a pulp and paper business that, according to the European Commission, already "has an excellent track record in resource efficiency and innovation," companies that excel in these five areas will be well-positioned to build on that legacy by delivering the sustainable products and lower-carbon performance that both customers and regulators are coming to expect. 30

Kai Aldinger is global solution management lead, paper and packaging industry, at SAP. He has more than 20 years with SAP in advisory and solution roles across multiple manufacturing industries. He focuses on new and emerging technologies and finding new ways for customers to apply them to improve operational efficiency, innovation, and growth.

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- Mud Slurry Pumps
- Chip Chute Pumps
- Mixers and Agitators
- Vat Dilution Pumps
- Top Circulating Pumps
- Upper and Lower
 Circulating Pumps
- Wash Circulating Pumps
- Fan Pumps
- Thick Stock Pumps

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How China Came to Dominate Market for Lithium Batteries

...and why the US cannot copy its model.

ALLEN BERNARD



Worker on a copper foil production line for electronic lithium batteries in Jiangxi Province.

Even though China does not have anywhere close to the world's largest lithium reserves, the country has come to dominate the global lithium battery supply chain over the last two decades. At a FastMarkets conference in September, 2021, Prabhakar Patil, the former CEO of LG Chem Power, a maker of lithium-ion cells, stated that the Chinese share of the battery market — from raw materials extraction to production of battery packs has increased dramatically, from 60 percent in 2018 to 72 percent in 2020.

By comparison, the US owns only about 8.5 percent of this pipeline. The US maintains little presence in producing unrefined lithium (there is only one working brine pool in the US), refining mined lithium into battery grade material, or making cells.

BloombergNEF estimates the numbers are even higher. "China's success [in battery manufacturing] results from its large domestic battery demand (72 gigawatt hours, or GWh); plus control of 80 percent of the world's raw material refining, 77 percent of the world's cell capacity, and 60 percent of the world's component manufacturing."

CHINA'S INVESTMENT

China's domination of the lithium battery market for electric vehicles (EVs) was no accident. According to the Institute for Defense Analysis (IDA) report, "Lithium-Ion Battery Industrial Base in the US and Abroad," Chinese battery-maker BYD kicked off the EV market by purchasing a Chinese EV automaker in 2003. BYD then built the EVs with batteries from its vertically-integrated, domestic supply chain.

More recently, over the past decade, the Chinese government has spent between US\$60B and US\$100B increasing the domestic market for lithium batteries by subsidizing the production of inexpensive (as little as US\$4,500) EVs and helping companies build out the lithium mining and refining infrastructure to support them, says David Deckelbaum, managing director for Sustainability & Energy Transition at the investment banking firm Cowen.

According to the IDA report, the Chinese government has put in place policies to encourage consumer adoption of EVs. And, since 2015, they have been subsidizing domestic battery makers such as CATL, giving them a cost advantage over foreign-owned rivals that operate in the country. Even though IDA said these subsidies are being phased out, it has given Chinese battery makers the head start they needed to compete globally.

The Chinese government "just cut checks," says Deckelbaum. "The rest of the world simply didn't devote capital toward it. A lot of other countries were moving away from laborintensive and environmental-intensive mining and moving operations to China because it was cheaper there. The rest of the world is about a decade behind."

WHY THE US CAN'T COPY THIS MODEL

The Biden administration has recognized the strategic threat a Chinese-dominated lithium battery supply chain poses to US competitiveness and is asking Congress to direct federal resources toward building out a domestic supply chain similar to that of China's. Still, the possibility of the US catching up to China any time in the next decade using China's vertically-integrated approach is remote. Though there are numerous reasons why this is the case, a few stand out.

According to the US Geological Survey, US reserves of lithium are sufficient to meet its growing demand, but getting it out of the ground is costly, time-consuming, and difficult. It is estimated that by 2034, the US will need 500,000 tons of unrefined lithium just to meet battery demand from EVs. Today, all of North America (not just the US) is only producing a tiny fraction of this amount and it will take many years for that to change, says Chris Doornbos, president and CEO of E3 Metals Corp., a lithium extraction firm in Calgary, Canada.

A big issue in meeting domestic demand with domestically-sourced supply is the NIMBY attitude, according to Doornbos. Better known as "not in my backyard," NIMBY represents the pushback environmentally destructive activities such as mining and refining get from US consumers. Lithium mining and refining can be dirty businesses, requiring large amounts of land in the form of open-pit mines or brine pools, and can involve the use of toxic chemicals to produce battery-grade lithium. "In terms of the US being competitive in the raw material sense, [the US is] going to struggle," Doornbos says.

Even though auto companies like Tesla, GM, and Ford have all announced plans to build new battery plants, it will be many years before those factories can produce enough batteries to supply the industry. "Between now and 2030, we calculate that as much as US\$100 billion would need to be invested in battery gigafactories alone for the US to have sufficient [domestic battery] capacity," writes Alan Wilkinson and Srinath Rengarajan of Oliver Wyman in an article for *Industry*



Today. "Current levels of investment would not even get us halfway there. On top of that, billions more are needed to develop a domestic supply chain to support those battery gigafactories."

Because of this, US battery makers would need to secure lithium feedstocks from other parts of North America, if not other parts of the world, to ensure an adequate supply. With most unrefined lithium headed to China today, this leads us to the other major issue facing the US: time.

If estimates are accurate, the demand for batteries over the next decade will exceed all efforts to meet that demand using a domesticonly supply chain. It will take years to open mines and build refining facilities; workers must be trained, gigafactories built, contracts negotiated, and, given that batteries make up about 50 percent of an EV's overall cost, the final product will need to be affordable and high-quality enough to compete with existing Chinese products.

There simply isn't enough time to make all of this happen in time to become a serious player in electric batteries as energy storage capabilities transition from fossil to electricity.

There is some good news. As we explain in our white paper, US Role in Global Lithium Battery Manufacturing, there are many other, very effective ways the US can compete without needing to own the entire supply chain from end to end. Some things we can do (and are doing) are: build more gigafactories to assemble batteries on US soil, invest more in battery R&D (an area where we already lead the world), and develop cuttingedge manufacturing capacity around specific components like anodes.

Even though we cannot use the same methods as the Chinese, the US does have the capital, brainpower, and the know-how to become a major player in the global lithium-ion battery supply chain. We can and should build more domestic capacity to reduce the reliance on a global supply chain that the COVID-19 pandemic has exposed as unreliable and dangerous to future US prosperity.

Allen Bernard is a technology journalist focusing on the intersection of technology and business. The whitepaper US Role in Global Lithium Battery Manufacturing is available free from OneCharge, a US manufacturer of lithium-ion batteries. View at the website: https://www.onecharge.biz.



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FEBRUARY

ENVIRONMENTAL

Utilization of kraft pulp mill residuals *Torsten Meyer*

Kraft pulp mills produce on average about 100 kg of solid residuals per metric ton of pulp produced. The main types of mill waste are sludge from wastewater treatment plants, ash from hog fuel boilers, dregs, grits, lime mud from causticizing plants, and lime dust from lime kilns. Of these, about half is disposed of in landfills, which highlights the need and potential for waste recycling and utilization.

Sludge is either incinerated in hog fuel boilers to generate steam and power or used in various forms of land application, including land spreading, composting, or as an additive for landfill or mine waste covers. The majority of hog fuel boiler ash and causticizing plant residues is landfilled. Alkaline residuals can be conditioned for use in land application, manufacture of construction materials, and production of aggregates for road work.

This technical review summarizes residuals utilization methods that have been applied in pulp and paper mills at demonstration- or full-scale, and therefore may act as a guide for mill managers and operators whose goal is to diminish the costs and the environmental impact of waste management.

RECOVERY CYCLE

Experiments and visualization of sprays from beer can and turbo liquor nozzles *Ari Kankkunen, Santeri Koivisto, Kari Saari, Mika Järvinen, James Biggs, and Andrew Jones* Industrial scale swirl-type black liquor nozzles were studied using water as the test fluid. Simple water spraying experiments were found to be very beneficial for studying and comparing nozzles for black liquor spraying. These kinds of experiments are important for finding better nozzle designs.

Researchers investigated three nozzle designs to understand the functional differences between these nozzles. The pressure loss of nozzle 1 ("tangential swirl") and nozzle 3 ("turbo") were 97 percent and 38 percent higher compared to nozzle 2 ("tangential swirl"). Spray opening angles were 75°, 60°, and 35° for nozzles 1, 2, and 3, respectively. Video imaging showed that the nozzles produced sprays that were inclined a few degrees from the nozzle centerline. Spray patternation showed all the sprays to be asymmetric, while nozzle 2 was the most symmetric.

Laser-Doppler measurements showed large differences in spray velocities between nozzles. Tangential flow (swirl) directed the spray $6^{\circ} - 12^{\circ}$ away from the vertical plane. Liquid sheet breakup mechanisms and lengths were estimated by analyzing highspeed video images. Nozzle geometry was found to greatly affect spray characteristics.

In this study, spray properties were experimentally characterized. Knowledge of spray opening angle, velocity, and mass distribution can be used to compare different nozzles for better char bed, fouling, and emissions control. Spray characteristics can be adapted for computational fluid dynamics (CFD) modeling.



Splash plate nozzle operation schematic shows how increased liquor temperature, which causes increased spray velocity, contributes to wall drying — a particular problem in smaller recovery boilers.



Major sulfide transitions in the wastewater treatment plant.

MARCH

WASTEWATER TREATMENT

Considerations in managing wastewater odor at pulp and paper operations *Amanda Johansen Mattingly, Paul Wiegand, and Robert Sackellares*

Many pulp and paper mills are, at least periodically, faced with the release of odors that can migrate offsite and be considered a nuisance by nearby residents. At chemical pulp mills, perceptible odors associated with reduced sulfur compounds (RSCs) are common, many of which are highly perceptible owing to their low odor thresholds. As releases of RSCs and other odorous substances from production processes are progressively controlled, the proportional contribution from wastewater treatment systems to areal odors can increase.

This review paper summarizes important fundamentals of odor generation, source identification, and control. The paper identifies common odorous substances and summarizes mechanisms for their generation. Approaches for measuring odorous substances are detailed to enable more effective management, and various odor control strategies are discussed.

PAPERMAKING

Numerical investigation of the effect of ultrasound on paper drying

Munevver Elif Asar, Zahra Noori, and Jamal Yagoobi The paper drying process is very energy inefficient. More than two-thirds of the total energy used in a paper machine is for drying paper. Novel drying technologies, such as ultrasound (US) drying, can be assessed numerically for developing next-generation drying technologies for the paper industry.

This study numerically illustrates the impact on drying process energy efficiency of US transducers installed on a two-tiered dryer section of a paper machine. Piezoelectric transducers generate ultrasound waves, and liquid water mist can be ejected from the porous media. The drying rate of handsheet paper in the presence of direct-contact US is measured experimentally, and the resultant correlation is included in the theoretical model.

OTHER RESEARCH IN *TJ'*S FEBRUARY 2022 ISSUE:

PAPERMAKING

Furnishing autohydrolyzed poplar weakly alkaline P-RC APMP to make lightweight coated base paper. Bo Zhang, Kaili Wu, Qingxi Hou, Tongbao Jiang, Wenwen Zhang, Kaisheng Luo, and Wei Liu

TECHNICAL BRIEF: RECOVERY CYCLE

A model black liquor formulation for use in development and evaluation of membranes for concentrating weak black liquor. *Scott A. Sinquefield*

The drying section of a paper machine is simulated by a theoretical drying model that considers three scenarios. For all cases, the research analyzes the average moisture content and temperature during drying, enhancement of total mass flux leaving the paper by the US mechanism, total energy consumption, and thermal effect of heated US transducers.

Results show that the application of the US can decrease the total number of dryer drums



Schematic of the paper machine studied in the theoretical drying model. Press and dryer section are shown with addition of prior and retrofitted US dryer modules (in red), along with nomenclature for the four drying phases.

for drying paper. This numerical study is based on the US correlation obtained with the US transducer in direct contact with the paper sample. Thus, future work should include US correlation based on a non-contact US transducer.

PAPERMAKING

Predicting strength characteristics of paper in real time using process parameters

Shivamurthy Modgi and Kamala Rajan

Online paper strength testing methods are currently unavailable, and papermakers must wait for manufacture of a complete reel to assess quality. The current methodology is to test a very small sample of data (less than 0.005 percent) of the reel to confirm that the paper meets the specifications. This study attempts to predict paper properties on a running paper machine so that papermakers can see the test values predicted in real time while changing various process parameters.

This study was conducted at a recycled containerboard mill in Chicago using the multivariate analysis method. The program provided by Braincube was used to identify all parameters that affect strength characteristics. Nearly 1,600 parameters were analyzed using a regression model to identify the major parameters that can help to predict sheet strength characteristics. The coefficients from the regression model were used with real-time data to predict sheet strength characteristics.

Comparing the prediction with test results showed good correlation (95 percent in some cases). The process parameters identified related well to the papermaking process, thereby validating the model. If this method is used, it may be possible to predict various elastic moduli (E11, E12, E22, etc.) in the future as the next step, rather than the traditional single number "strength" tests used in the containerboard industry, such as ring crush test (RCT), corrugating medium test (CMT), and short-span compression strength test.

The information in this study is useful for operators to track sheet properties as the paper is being made. It also helps them to understand the effect of each parameter change they make in their day-to-day operation and how it impacts sheet quality.

PAPERMAKING

The Shendye-Fleming OBA Index for paper and paperboard

Awadhoot Shendye, Paul D. Fleming Iii, Alexandra Pekarovicova, Veronika Husovska, and Kiran Deshpande The researchers propose a new one-dimensional scale to calculate the effects of optical brightening agents (OBA) on the bluish appearance of paper. This index is separate from brightness and whiteness indices.

In the paper industry, one-dimensional scales are widely used for determining optical properties of paper and paperboard. Whiteness, tint, brightness, yellowness, and opacity are the most common optical properties of paper and paperboard. Most of the papers have a blue cast generated by addition of OBA or blue dyes. This blue cast is given because of the human perception that bluer is whiter, up to a certain limit. To quantify this effect, it is necessary to determine how much blue cast paper and paperboard have.

As the printing industry follows the ISO 3664 Standard for viewing, which has a D50 light source, this also plays a very important role in showing a blue cast. Color perception is based on light source and light reflected from an object. The ultraviolet (UV) component in D50 interacts with OBA to provide a reflection in the blue region of the visible spectrum.

Use of a UV blocking filter results in measurements without the effect of emission in the blue region. This difference is used in determining the OBA effect in the visible range of the paper. This equation is known as the Shendye-Fleming OBA Index.

TAPPI Journal Adopts Open Access Model

TJ's new 100 percent Open Access publishing model offers many advantages

With a new, fully Open Access (OA) publishing model, *TAPPI Journal (TJ)* will now be able to more rapidly disseminate the latest scientific and engineering knowledge to advance the forest products and related industries. The TAPPI Board of Directors voted to adopt the new model beginning with the March 2022, issue. *TJ* will maintain its stringent peer-review process and distinguished editorial board of academic and industry experts.

The new *TJ* OA model gives everyone in the industry immediate, free access to the articles as soon as the issue is published. Articles that were previously embargoed will also be available as free downloads. *TJ*'s previous publishing model provided members free access to the current year's articles while nonmembers were required to pay for downloads.

Many research studies have indicated OA articles receive significantly more citations. This improves the visibility of the science, as well as the reputation of the journal. The OA format will also be able to better help researchers meet their funding and grant application requirements. As in the past, the copyright remains with the author, and unlike other technical journals, *TJ* does not require a publication fee.

"The Editorial Board is very excited about this change," said Doug Coffin, *TJ*'s editor-in-chief. "Our authors are eager to get their research out there. We are confident this move will not only help improve exposure to their research, but also use and application of the important research contained in each issue, as well as increasing submissions."

Prospective authors from academic and research institutions, as well as speakers who present scientific papers at TAPPI conferences, are encouraged to submit their research for peer review and consideration for publication in *TJ*. As an added incentive, your paper could be awarded the US\$2,000 Honghi Tran *TAPPI Journal* Best Research Paper Prize presented at TAPPICon. Submit your abstract today at tappi.org/tjsubmit. 78th Annual Pulp & Paper Safety Association Safety & Health Conference

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Reliability and Safety

Part 1: The Link Between Personnel Safety and Equipment Reliability

TORBJÖRN IDHAMMAR



It would appear obvious that reliable operation of our production equipment and the safety of our plant personnel go hand in hand. When the plant is operating efficiently, we assume that the risk of hazard exposure should be reduced.

This two-part article addresses these assumptions and the important role reliability can play in safety. This month, I will spotlight the link between the safety risks of our personnel and risks associated with equipment reliability. In Part 2, I will explore how we can leverage reliability improvements to reduce overall risk, and perhaps provide some new considerations for how to apply risk reduction techniques from the world of personnel safety to enhance equipment reliability and vice versa.

WHAT'S YOUR EMERGENCY?

I think we can all agree that most severe injuries to maintenance personnel occur when "emergency" maintenance work (which is typically unplanned and unscheduled) is being conducted, as opposed to more routine work such as preventive maintenance. Can we also agree that the interaction between human and machine, and the resulting risk of injury, increases as equipment performance declines? Also consider this statement: "People are invariably fallible, i.e., they are going to make mistakes, and we need to ensure that when

	Top 25%	Middle 50%	Bottom 25%
Reactive Maintenance	9%	30%	64%
OSHA Recordable Incident Rate (per 200,000 hrs)	0.11	1.16	4.36

Fig. 1 Reference: 2015 study of over 100 companies (UT-RMC)

these mistakes occur, the severity of the resulting incident is mitigated as much as possible."

According to a 2015 study conducted by the University of Tennessee Reliability and Maintenance Center (UT-RMC), workers at the companies that are performing the highest percentage of reactive (unplanned and unscheduled) work suffer recordable injuries at rates four times higher than companies in the middle of the pack and **40 times higher** than companies that minimize reactive maintenance work (Fig. 1). These "Top 25" companies reduce reactive maintenance work through both effective planning and scheduling and effective Preventive Maintenance/Essential Care and Condition Monitoring.

Why is the risk of injury so much higher under reactive maintenance circumstances? Stress, uncertainty, fatigue, time pressures, trying to do the work with the wrong tools, failure to identify the job risks before commencing work — these are all possible contributing factors to the increased number of recordable injuries being experienced.

Managers are often guilty of assuming that work execution will be error-free if we properly prepare our workers to execute their work safely and efficiently through proper planning and scheduling of the work and proper safety training and instruction. By this logic, if an employee then gets hurt, it is their fault for getting injured. But the reality is that, as long as human beings are involved, errors are inevitable. Workers don't go into a job thinking that whatever injury is about to occur would ever happen to them. The companies that have the most success in this area embrace human error, learn from incidents that occur, and look to build a safer workplace where people can *fail safely* (when they inevitably fail).

There is an entire field of study in the personnel safety arena dedicated to these types of issues. It is called *Human and Organizational Performance (HOP)*. It is based on the overriding belief that systems drive behavior. The primary tenets of HOP are:

- 1. *Error is normal.* People make mistakes. Expecting perfection is illogical and unrealistic.
- 2. *Blame fixes nothing.* If you don't correct the underlying causes, the failure is doomed to recur because...
- 3. *Systems drive behavior.* Workers don't cause failure; workers trigger failure latent in their work system. Prior to this interaction, this failure (exposure) is undiscovered and just lying in wait.
- 4. *Learning from incidents is vital.* While human failure is normal, the risk of system failures can be reduced significantly through effective Root Cause Analysis and Problem Elimination.
- 5. *Response matters.* The way management responds to an incident is key to establishing an effective work culture. Does your response promote *learning* by focusing first on the condition of the injured parties and/or equipment condition, then on the



Fig. 2

circumstances surrounding the incident and the potential for this incident to recur? Or does your response cause vital information to be ignored, instead focusing on who to *blame* and who should be disciplined?

There is significant overlap in industry's focus on reliability and safety. Consider the automobile industry. Think about the improvements that have been made in reliability and safety in the last 50 years. Have we been able to eliminate all vehicular accidents given all of the technological improvements made in that industry over that time? No, vehicular accidents still occur. There were roughly 39,000 crashes in the US in 1975 resulting in 44,000 fatalities. while in 2019, there were 33,000 crashes that resulted in 36,000 casualties.

Granted, the numbers of vehicles on the roads and the number of miles driven have increased significantly in that time frame, so the fatality rates per mile driven have dropped. But the point is, accidents are going to occur. So, the automobile industry has adopted the motto "We can't change the driver, but we can change everything else..." Think about all the technological improvements designed around permitting the driver to fail safely:

- Airbags
- Seatbelts
- · Anti-lock braking systems
- · Lane departure warning systems
- Crumple zones
- Shatter-proof safety glass
- Rumble strips

These are only a few. These systems are designed to acknowledge that drivers will inevitably fail, then allow them to correct their behavior before an accident happens (or increase the likelihood of survival if an accident should occur). By focusing on the inevitability of human failure by our plant personnel, we can implement systems that will alert them that their performance is operating outside of desired parameters, which should give them an opportunity to correct that behavior before incidents occur - just as we should implement systems that will alert them that the production equipment is operating outside of acceptable parameters and that action should be taken before an incident (breakdown) occurs.

We should also look to implement systems that will allow the equipment or personnel to reach a safe state before catastrophic failure occurs when their performance is falling outside of acceptable parameters. Think of a pressure relief valve on a tank that vents pressure to the atmosphere before the tank overpressurizes and potentially explodes. Or consider a portable grinder that has a mechanical clutch and an automatic brake to reduce the risk of serious injury, not if, but when, your employee accidentally exposes a part of their body to a grinding wheel rotating at 4,000 to 16,000 rpms.

On the equipment side of things, we talk about the Failure Developing Period (Fig. 2). An event occurs that will result in a component's performance to leave acceptable operating parameters. We will call this the Root Cause. Once that event occurs, as performance has begun to degrade outside of acceptable parameters, failure is deemed to have occurred.

Eventually, the condition of the component will continue to degrade until it reaches the point where it cannot continue to operate. We call this the breakdown. The period between the occurrence of the triggering event and the breakdown is called the Failure Developing Period.

Good maintenance practices should include inspection of the condition of this failing component at a high enough frequency (for instance, twice during the Failure Developing Period) to allow for a planned and scheduled corrective action to be taken to repair or replace this failing component before breakdown occurs.

SAFETY FOLLOWS THE PATTERN

Safety events follow a similar type of evolution (Fig. 3). Work that is executed without the benefit of planning and scheduling tends to have a lot of variability in it, as demonstrated by the blue line. Now, if you ask the managers, the expectations often look like the orange line. Why wouldn't we expect zero variability on our work if it has been properly planned and scheduled?

In reality, if the unplanned/unscheduled job was executed according to the orange plan, it might look more like the purple line. Notice that there is still some variability, though the work is executed closer to expectations than before. Why does the work not follow the plan exactly? Because the plan is based on a certain set of ideal, 100 percent repeatable conditions.

Realistically, the worker executing the job faces a requirement to adapt to circumstances that don't always exactly match that perfect plan. We always seek to make sure our plans are as accurate as possible. However, acknowledging that our workers must safely adapt execution of our processes and procedures to the circumstances presented to them is where the most value is gained. This concept is referred to in HOP circles as "employees working the blue line."

In Figure 3, the red line represents the risk that is inherent in every job that is being performed. Where the red line and the blue line intersect is where injuries occur. Our workers deal with ensuring that the blue line and red line never meet, every day. Identification of, and paying particular attention to, critical steps in the job plan is a great way to focus on keeping the blue and red lines apart.

We will circle back to this situation in Part 2 of this article in the July/August issue of Paper360°.

References:

Pre-Accident Investigations - An Introduction to Organizational Safety, 2012, written by Todd Conklin excellent reference on Human and Organizational Performance by one of the OGs of HOP.

Tor Idhammar is president, IDCON, Inc. and section editor, Reliability & Maintenance, for Paper360° magazine. You can reach him at t.idhammar@idcon.com.

IDCON²

R&M TIP: MOTORS IR Inspections of Electric Motors

Despite the important role they play in a commercial facility, electric motors tend to be both out-of-sight and out-of-mind until they fail. Infrared thermography can be used as a cost-effective diagnostic tool for detecting problems within electric motor systems.

Many infrared inspection programs include motor control circuits but overlook the motor itself. Evidence of several conditions that can lead to premature motor failure can be detected with a thermal imager. The following are suggestions for thermographically inspecting motors.

- With cover removed and the motor under load, inspect electrical connections at the motor junction box. This should be done in conjunction with the regularly scheduled inspection of the facility's electrical system.
- Inspect motor casing for localized hotspots, which may be indicative of short circuits within motor windings.
- Qualitatively compare individual motors to similar motors under similar load.
- When possible, qualitatively compare inboard and outboard bearings for each motor. If a large Delta T is present, it may indicate misalignment or a rotor balance problem. If both bearings are hot, the bearings may be worn or improperly lubricated.

Because no complicated analysis is required, infrared inspections typically can be performed rapidly and at a fraction of the cost of other types of motor testing. Additionally, infrared imaging can detect evidence of misalignment at lower thresholds than those detectable by vibration analysis and motor current signature analysis.

Lastly, infrared inspections of motor bearings and stator should be performed monthly by experienced, certified infrared thermographers who thoroughly understand the theory and operation of electric motors.

Infrared inspection of electric motors is one of the many topics covered in an available training course. For information on thermographer training, including our Distance Learning courses, visit us online at www.infraspection.com or call us at 609-239-4788.

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What's Going to Happen When All This Announced Containerboard Capacity Hits the Market?

LAURA BEACHAM

Earlier this year, the American Forest & Paper Association (AF&PA) released its preliminary 2021 data from US paper and paperboard mills. According to this report, total containerboard production in 2021 increased 5.6 percent compared to 2020 — the ninth increase in the past 10 years. Containerboard has demonstrated the highest rate of growth for any major paper grade over the last six years, and paper producers are making large investments to keep up with growing demand.

WHAT'S DRIVING NEW GROWTH?

Containerboard, which is made up of corrugated medium and linerboard (the papers used in producing boxes), experienced a major spike in demand as a result of increased e-commerce rates at the onset of the coronavirus pandemic. Online shopping surged in the first quarter of 2021 and, while that shift was largely compelled by government mandates, we have now seen a structural change take shape as consumers have become more accustomed to, and now even prefer, online shopping.

As a result, containerboard producers have responded to this market shift by ramping up capacity at an unprecedented rate, as these papers will subsequently be converted into corrugated board that will be used for shipping boxes. Of the three main drivers behind the demand of corrugated boxes in the US (nondurable goods, durable goods, and e-commerce), e-commerce was the primary driver of corrugated and containerboard demand in 2020.

As illustrated in Fig. 1, durable and nondurable goods (about 85 percent of demand) behaved as expected during the first economic shockwave in early 2020; however, e-commerce then accelerated and offset declines in other sectors.

Along with the increase in e-commerce rates, sustainability-related initiatives have gained momentum as importance is being placed on environmental, social, and corporate governance (ESG) issues at the corporate and global





policy levels. Many companies are looking for ways they can reduce packaging waste throughout the supply chain to address the surge in e-commerce while still adhering to sustainability goals and initiatives.

"Paper products and materials like containerboard help to meet the needs of consumers seeking sustainable choices. These are some of the most recycled materials in the US — in fact, more paper by weight is recycled from municipal waste streams than plastic, glass, steel, and aluminum combined," AF&PA President and CEO Heidi Brock stated. "Consumer demand is growing for sustainable paper products, and our industry is investing to meet evolving customer and consumer needs."

According to AF&PA, paper recycling rates have consistently increased with each year: 2021, for example, exceeded 2009 rates by nearly 63 percent. As a result, and in alignment with the paper industry's commitment to sustainability, the industry has completed or announced around US\$5 billion in manufacturing infrastructure investments from 2019-2023 with the goal of maximizing recycled fiber usage in pulp and paper products. These investments will help increase the amount of recovered paper used by US paper and paperboard mills by approximately 8 million tons — a 25 percent increase over 2020 levels.

The evolving dynamic between the push for sustainability-related initiatives and the growth in demand for packaging and corrugated has created a huge opportunity for the containerboard sector. Figure 2 illustrates current and announced US containerboard capacity, which shows that capacity skyrocketed in early 2021 as producers tried to keep up with the surge in demand, adding more than 2,200,000 tpy of containerboard into the market.

For the remainder of 2021, capacity ebbed and flowed. However, US production is expected to reach even higher numbers in 2022 with more than 1,200,000 tpy of added capacity by the end of 2022 compared to the end of 2021 — reaching a total of nearly 43,000,000 tpy.

WHERE IS ALL OF THIS ADDITIONAL CAPACITY COMING FROM?

With production already at record levels, what will happen when all of this announced containerboard hits the market? Will there be an oversupply?

Since the pandemic created an immediate upswing in demand for more packaging, and as companies look to develop sustainable packaging solutions, we are beginning to see investments expand in the domestic corrugated sector as an attempt to keep up with containerboard production. So far, new box plant investments that have been announced include:

- WestRock in Longview, WA
- International Paper in Atglen, PA
- Kruger in Elizabethtown, KY
- Green Bay Packaging in Fort Worth, TX
- Georgia Pacific in Centralia, WA
- Pratt in Henderson, KY

These investments are just a few examples of the numerous companies responding to the booming demand the containerboard sector has experienced, and is expected to continue experiencing, for the foreseeable future.

WHAT ADDITIONAL IMPACTS HAS NEW DEMAND CREATED?

While the increase in demand for containerboard has created new opportunities for containerboard producers, it has also contributed to price increases. The industry has seen an





increase in prices for raw material fiber, particularly recovered fiber sources. Figure 3 illustrates the different types of raw material fiber used to produce containerboard and the price change each has experienced since the fourth quarter of 2020.

The increased price of raw material fiber, in combination with high containerboard demand, has driven containerboard prices even higher. In Fig. 4, we can see the trend of trade-derived domestic prices for corrugated medium and linerboard. Over the course of 2021, prices for both products rose steadily, reaching US\$910/ton for linerboard and US\$791/ton for corrugated medium — a 26 percent and 32 percent increase, respectively, compared to fourth quarter of 2020.

After analyzing these trends and thinking forward, participants in the containerboard and corrugated sector need to remain mindful of a few important questions:

- Is this a sector worth investing in right now?
- How will the price of OCC change going forward?
- Will the continued rise in recycled fiber cause producers to use more virgin fiber and what impact would that scenario have on all fiber prices?
- Will the price of containerboard continue to rise?
- What impact will the heightened awareness around sustainability have on recycling?

Laura Beacham is with Fisher International and has more than 10 years of papermaking and coating experience. For more data and insight into the present and future state of the pulp and paper industry, contact Fisher International at fisheri.com.

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Girl Scouts Offer New Paper Scientist Patch Program

The patch reflects the importance of the forest products industry as a totally renewable and recyclable producer.

TAPPI, in partnership with the Girl Scouts of Maine, has created a new paper scientist patch program. The new program is open to Girl Scout Juniors, Cadettes, Seniors, and Ambassadors.

"Paper science is a fascinating and rewarding field," noted Beth Cormier, vice president, R&D and Sustainability for Sappi North America and a member of TAPPI's Women in Industry (WIN) Division, which spearheaded efforts to develop the new patch. "Because paperbased products are such a huge part of our everyday life — from the books we read, to the packaging of products, to the tissues we use — it's important for people to understand what an amazing renewable material it is and the exciting career paths it offers women and men."

Girl Scouts interested in pursuing the paper scientist patch must complete a series of activities that will take them on a journey from the forest to many areas around their hometowns that use paper and wood products. They must complete at least two activities at each stop and at least two activities in which they are tasked with taking action. Details on the paper



Girl Scout Juniors (at left, in green vest and sash) and Cadettes (at right, in tan vests) work together on a task to earn the Paper Scientist Patch.

scientist patch program can be found on the TAPPI website at tappi.org/gspatch.

"It is our hope this introduction to the paper industry will help young women and girls recognize the kind of successful and important impacts they can make in the US and around the world as paper industry professionals," said Carrie Enos, president, University of Maine Pulp and Paper Foundation; former TAPPI Board of Directors member; and current member of WIN. "We are proud to have assisted in the creation of this unique patch program."



Samantha Lott Hale, program director and regional office supervisor, Girl Scouts of Maine, also praised the new patch program. "With the positive experiences that girls had at the in-person paper scientist EXPOs in 2018 and 2019, we are excited to add a virtual option for completing the paper scientist patch program," she says. "The virtual scavenger

hunt includes all the links and instructions so Girl Scouts anywhere can learn about, reflect upon, and take action on paper, the environment, and sustainability. The virtual assets developed and curated by Sappi and TAPPI highlight the interesting science behind paper making and the environment, promote action, and give Girl Scouts the chance to explore STEM career options."

To learn more about the Girl Scouts of Maine paper scientist patch program, visit tappi.org/gspatch.



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ASPI Welcomes Members Back to In-Person Meetings

The 2022 Spring Meeting was not only remarkable for its excellent program — it also marked the first in-person event for ASPI members since the 2020 Spring Meeting two years earlier. The group enjoyed a full program of speakers discussing some of the most critical issues facing the pulp and paper industry. The meeting took place March 2-4 at Baker's Cay Resort in Key Largo, FL.

Following a Wednesday evening welcome reception and dinner, the program kicked off early Thursday morning with the first speaker: 2022 ASPI Customer Executive of the Year Matt Szymanski of Green Bay Packaging (see sidebar.) Szymanski offered his perspective on leadership, as well as highlights from GBP's new "Project Wolfpack" mill in Green Bay, WI. Of particular interest to ASPI members was his insight into the project's "procurement journey." The mill's new circular reclaimed water system was another presentation highlight.

Next, AF&PA Executive Director Mark Pitts presented an industry overview that touched on new challenges from the pandemic, the effect of the digital economy, and statistics on the pulp and paper industry's economic footprint. "It amazes me that we need to constantly educate policymakers about our industry," Pitts said. "We contribute greatly to the US economy — especially to rural communities."



The Spring Meeting welcomed eager attendants back to in-person events.

Later that morning, Domtar's Charlie Floyd, vice president, packaging business capital, introduced attendees to "the VUCA world." The acronym stands for "Volatile, Uncertain, Complex, and Ambiguous" — and, now more than ever, it describes our industry, said Floyd. He was able to bring Domtar's experience with



AF&PA's Mark Pitts discusses the state of the industry.



Matt Szymanski, Green Bay Packaging, accepts his award as 2022 Customer Executive of the Year from ASPI President Steve Grandchamp, Buckman.

business transformation to bear when advising attendees on finding opportunity in a VUCA world.

The final speaker for Thursday was Todd Zielinski, vice president, strategic sourcing for Georgia-Pacific. He began by thanking attendees for their support of the industry throughout recent years' challenges; G-P has more than 30,000 suppliers, Zielinski revealed. He also spoke about the "Human Action Model" that helps G-P navigate sourcing complexities. "We don't only use (this model) to drive change we also use it as 'post-mortem.' When something goes wrong, we review the three stages and we usually find the problem."

We will visit the second day of the Spring Meeting in the next issue — until then, remember that all ASPI members have access to meeting materials from past ASPI meetings. Keep checking the website, https://www.aspi. org, for updates.

The next ASPI meeting will be the **2022** Fall Customer Alignment Meeting in Memphis, TN, hosted by International Paper, September 7-9. See you there!

ASPI Awards Honor Szymanski, Semanak

In our previous issue, we mis-reported the awards received by ASPI's 2022 honorees. The correct information appears. here. Congratulations to these two worthy recipients.

ASPI's Customer Executive of the Year Award



This year's Customer Executive of the Year is **Matt Szymanski**, Green Bay Packaging. The highest honor that ASPI can bestow on an individual, this award is presented annually to a customer execu-

Matt Szymanski, Green Bay Packaging

tive who has worked diligently within his or her company and with the company's suppliers to dramatically increase the benefits the company derives from its supplied goods and services.

Szymanski is Green Bay Packaging's vice president of mill operations. In this role, he is responsible for the company's Green Bay Mill Division, Arkansas Kraft Division, and Pinecrest Paper Slitting Division. Previously, Szymanski spent much of his career at Green Bay Packaging's mill in Green Bay, WI, where he was general manager. Szymanski is an active TAPPI member and the proud recipient of PIMA's 2016 Glen T. Renegar Award.

ASPI Excellence in Leadership Award



George Semenak, Georgia-Pacific

For this special recognition, ASPI members may nominate individuals who have demonstrated leadership in capital projects, mill transformation, grade changes, mill restructuring, and/or human resource management. For 2022, ASPI chose **George Semenak** of Georgia-Pacific.

Semenak began his career as a contracted electrical engineer in 1984 after graduating from Michigan Technological University. Semenak eventually accepted a permanent role with Georgia-Pacific (Fort Howard) in 1990, where he has held a number of engineering and manufacturing leadership positions. Today, Semenak is vice-president of projects and engineering.

Both Szymanski and Semanak received their awards at the ASPI Spring Meeting in Key Largo, FL.



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