# 

# WORK SAFELY IN CONFINED SPACES

Guidelines for developing a plan for confined space work permit program

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# ENABLE PAPERMAKING FOR LIFE

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SEPTEMBER / OCTOBER 2023, VOLUME 139, NUMBER 4



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### editors note \_



# **Containerboard Mega-Deal**

By John O'Brien, Managing Editor jobrien@paperage.com

I have to say that the joint announcement on September 12 by Smurfit Kappa and WestRock about their agreement to combine the companies came as somewhat of a surprise, even though a number of news outlets a week earlier reported the two packaging paper products producers being in talks about a potential combination.

"This incredibly exciting coming together of our two great companies is a defining moment within the global packaging industry," says Tony Smurfit, CEO of Smurfit Kappa. "We will have the leading assets, a unique global footprint in both paper and corrugated, a superb consumer and specialty packaging business, significant synergies, and enhanced scale to deliver value in the short, medium and long term."

The proposed "Smurfit WestRock" will be incorporated and domiciled in Ireland with global headquarters in Dublin, Ireland and its North and South American operations will be headquartered in Atlanta, Georgia.

Smurfit Kappa CEO Tony Smurfit, CFO Ken Bowles and chair Irial Finan will all assume the same roles in the new company. The Board of Directors will be composed of eight Smurfit Kappa Directors and six WestRock Directors.

According to a presentation issue by Smurfit Kappa and WestRock, the proposed Smurfit WestRock would be geographically balanced with limited overlap. A breakdown of the global manufacturing operations of the two companies is as follows:

#### North America

Smurfit Kappa: 1 mill and 7 converting operations. WestRock: 25 mills and 166 converting operations.

#### Europe and other

Smurfit Kappa: 23 mills and 209 converting operations.

WestRock: 2 mills and 44 converting operations.

#### Latin America

Smurfit Kappa: 11 mills and 57 converting operations. WestRock: 5 mills and 14 converting operations.

To sum it up, Smurfit WestRock, globally, would have 67 mills and around 500 converting operations.

According to commodity intelligence agency *Fastmarkets*, WestRock's containerboard capacity is 8.98 million tons, following the upcoming closures of its North Charleston and Tacoma mills. The company's consumer packaging capacity is 4 million tons and its unbleached kraft paper bag capacity is just less than 1 million tons. Total board and packaging paper capacity for WestRock is about 14 million tons. Smurfit Kappa's global capacity is 9.1 million tons.

Together financially, Smurfit Kappa and WestRock generated combined last twelve months' adjusted annual revenue of approximately \$34 billion as of June 30, 2023, which would make Smurfit WestRock the largest listed global packaging partner by revenue.

David Sewell, CEO of WestRock, said, "We look forward to working with Smurfit Kappa to build a leading global platform that harnesses the strength of WestRock's consumer portfolio, presents a truly comprehensive offering of packaging solutions for customers and delivers meaningful value to our shareholders today and into the future. Smurfit Kappa shares our deep commitment to innovation across the packaging lifecycle, and we are confident that Smurfit WestRock will continue to lead the industry forward."

Smurfit Kappa and WestRock expect to finalize this mega-deal in the second quarter of 2024.



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Copyright @2023 by O'Brien Publications, Inc. All rights reserved. PaperAge (ISSN:0031-1081) is published five times per year with those issues being January/April, May/June, July/August, September/October, November/December by O'Brien Publications, Inc., **PO Box 904, Cohasset, MA 02025.** Periodicals postage paid at North Reading, MA.

Canadian Mail distribution information: Publication Mail Agreement #40112731 Ontrac International P.O. Box 25058, London BRC. Ontario, Canada N6C 6A8

#### POSTMASTER: Please send change of addresses to: PaperAge, PO Box 904, Cohasset, MA 02025

Subscriptions: PaperAge is mailed without charge in the U.S. and Canada (upon written request) to qualified individuals in the pulp, paper, paperboard, and paper converting industries. To all others there is a subscription charge of \$45.00 in the U.S., \$50.00 in Canada, and \$75.00 in all other countries. Single copies may be purchased for \$10.00 each. All payments must be made in U.S. funds and checks must be drawn from a U.S. bank. Credit cards are accepted.

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### industry news

#### NORTH AMERICA

#### WestRock and Smurfit Kappa Sign Definitive Agreement to Combine Companies

The Boards of Smurfit Kappa and WestRock in mid-September announced the signing of a definitive transaction agreement to create Smurfit WestRock.

The Boards of Smurfit Kappa and WestRock see compelling strategic, commercial and financial rationale for combining Smurfit Kappa and WestRock's highly complementary paper-based packaging companies to create a global leader in sustainable packaging. The combination will enhance Smurfit Kappa and WestRock's existing offerings, bringing together:

- Smurfit Kappa's operational execution and innovation as a European leader in corrugated and containerboard as well as its large-scale pan-regional Americas presence; and
- WestRock's strengths in the United States as well as its strong footprint in Brazil and Mexico, across corrugated and consumer packaging delivering a broad portfolio of packaging solutions serving diverse, growing end-markets.

Together, Smurfit Kappa and WestRock



generated combined last twelve months' adjusted annual revenue of approximately \$34 billion as of June 30, 2023, which would make Smurfit WestRock the largest listed global packaging partner by revenue.

The transaction will involve the creation of a new holding company for the combined Smurfit WestRock. Smurfit WestRock will be incorporated and domiciled in Ireland with global headquarters in Dublin, Ireland and its North and South American operations will be headquartered in Atlanta, Georgia.

The combination of the two companies

offers improved operating efficiency and increased returns across approximately 500 converting operations and 67 mills.

"We look forward to working with Smurfit Kappa to build a leading global platform that harnesses the strength of WestRock's consumer portfolio, presents a truly comprehensive offering of packaging solutions for customers and delivers meaningful value to our shareholders today and into the future," said David Sewell, CEO of WestRock.

"Smurfit Kappa shares our deep commitment to innovation across the packaging lifecycle, and we are confident that Smurfit WestRock will continue to lead the industry forward. I'm grateful to WestRock's team members, whose hard work has made this combination possible, and excited for the many opportunities that will arise from becoming part of the partner of choice in our industry," Sewell added.

Subject to shareholder approvals, regulatory approvals and other customary closing conditions, the combination is expected to close in the second quarter of calendar year 2024.

#### Georgia-Pacific to Close Its Foley Cellulose Facility in Perry, Florida

Georgia-Pacific on Sept. 18 informed employees at its Foley Cellulose mill in Perry, Florida, that the company plans to permanently close the facility.

All the approximately 525 jobs at the mill will be impacted by this closure.

The Foley mill produces specialty and fluff pulp.

According to Georgia-Pacific, various factors influenced this difficult decision. Ultimately, GP does not believe that the mill can competitively serve its customers in the long term despite the significant investments and commitment by GP Cellulose since the site was acquired in 2013.

GP noted that this is a strategic decision that was made prior to Hurricane Idalia and is not a reflection of the hard work and effort of the Foley team.

Production will continue for a limited time as the site works to fulfill as many customer commitments as possible.

The mill plans a safe and orderly shutdown, GP said.

GP's focus in the coming weeks and months is to continue to safely operate while

supporting its employees during the transition.

The Foley Cellulose mill, near Perry, Florida, is a major producer of specialty fibers from predominantly slash pine. Constructed by Procter & Gamble in 1954, the facility was acquired by a private business partnership in 1993 when P&G sold its Cellulose and Specialties Division. The partnership evolved into a publicly traded company, Buckeye Technologies, Inc., in November 1995, before finally being acquired by Georgia-Pacific in the summer of 2013.

#### NORTH AMERICA

#### West Fraser to Sell Two Pulp Mills to Atlas Holdings for \$120 Million

West Fraser Timber Co. and Atlas Holdings in September signed a definitive agreement for the sale of West Fraser's Quesnel River Pulp mill in Quesnel, British Columbia and its Slave Lake Pulp mill in Slave Lake, Alberta to Atlas. Atlas owns and operates several pulp, paper and wood products businesses in Canada and the United States.

The agreement includes related woodlands operations and timber holdings in Alberta and a long-term fiber supply agreement for the Quesnel River Pulp facility.

Upon closing of the transaction, the Quesnel River and Slave Lake pulp mills will be operated by Millar Western Forest Products, which joined the global Atlas family of manufacturing and distribution businesses in 2017. Millar Western is a more than 100-year-old Canadian forest products company headquartered in Edmonton with existing pulp mill operations in Alberta.

Combined total cash proceeds from the sale are US\$120 million.

"We believe this transaction provides these two great assets and teams a strong strategic future while allowing West Fraser to focus our resources on our objective to be the premier wood building products company in North America," said Ray Ferris, West Fraser's President & CEO. "Atlas Holdings and Millar Western bring deep experience in the pulp sector, and we look forward to continuing to work together as a key fiber supplier to Quesnel River Pulp."



The transaction is anticipated to close following successful completion of customary regulatory reviews and satisfaction of customary closing conditions.



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### industry news

#### NORTH AMERICA

#### International Paper Opens Corrugated Packaging Facility in Pennsylvania

International Paper on Sept. 15 celebrated the opening of its newest state-of-the-art corrugated packaging facility in Atglen, Pennsylvania. The new \$100 million facility is providing more than 100 manufacturing jobs to Atglen and the surrounding communities. The new facility will produce corrugated packaging for produce, processed food, beverage, shipping, distribution and e-commerce customers.

"Our corrugated packaging business is an important part of International Paper. This strategic investment will add local jobs and help us better serve our customers," said Tom Hamic, Senior Vice President and Chief Commercial Officer, International Paper.

"After months of hard work, it is exciting to see construction complete with machines running. At Atlgen, we are helping to create what's next by making fiber-based sustainable products our customers value," added Darrin Hinds, Regional General Manager, International Paper.



The completion of this project was a collaborative effort between International Paper and local, county and state community partners. Atglen was selected based on its access to a skilled workforce, multi-mode transportation capabilities and easy distribution access to strategic markets.

Cameron Rushing, Plant Manager, added, "Today, we celebrate the hard work and dedication of so many people. This was really a team effort and we're grateful for everyone that contributed to its success including our team at Atglen, colleagues from across International Paper and partners within the community."

#### Paper Excellence Canada Restarts Pulp Operations at Catalyst Crofton Mill

Paper Excellence Canada on Sept. 27 announced the resumption of kraft pulp operations at its Catalyst Crofton mill, bringing more than 300 workers back to their jobs.

"While market conditions allow for the restart of our pulp operations, the curtailment of paper operations at Crofton is being extended to the end of October," the company said in a press release.

Krista Cuddy, Catalyst Crofton, Interim Director — Operations & Integration, explained, "In spite of challenges posed by exceptionally low pulp and paper prices driven by global market fluctuations, we are pleased to announce that we are resuming pulp production and reinstating a portion of our workforce at our Crofton mill. While this is a positive development, we will continue to assess the ongoing viability of maintaining Kraft pulp operations at Crofton to ensure it is cost effective to operate and consistent with our overall business strategies."

Located on Vancouver Island, Crofton, British Columbia, the Crofton Mill has two paper machines and two pulp lines. The mill has the capacity to produce 320,000 tonnes per year of printing / packaging papers and 380,000 tpy of NBSK pulp.



#### NORTH AMERICA

#### Pratt Industries to Build Corrugated Box Plant in Georgia

Georgia Governor Brian Kemp announced that Pratt Industries will build a new corrugated box plant in Warner Robins, which is located in central Georgia. The new plant will create more than 125 jobs and over \$120 million in investment.

"We're proud of great Georgia-based companies like Pratt Industries and grateful for their continued growth here in the No. 1 state for business," said Governor Kemp. "Expansions like this account for more than 70 percent of last year's economic development projects and are a testament to our business-friendly and partnership approach as we bring more opportunity for hardworking Georgians."

Anthony Pratt, Global Executive Chair



man for Pratt Industries, said, "We're very honored to be coming to Warner Robins and we're committed to the great State of Georgia — in fact, Georgia is where our company began."

The new manufacturing plant will be the company's 13th site in Georgia.

"Georgia has substantially grown its role

as a regional hub for supporting businesses and manufacturing needs across the Southeast," Pratt said. "We are excited to expand our operations in the region, allowing us to continue to strategically service our customers and grow the business."

The new Pratt facility will be located at Robins Industrial Park, a Georgia Ready for Accelerated Development (GRAD) certified site, in the portion of Warner Robins within Peach County. The planned 496,000-square-foot facility will produce corrugated boxes using 100 percent recycled containerboard, largely sourced from the company's mill in Conyers, Georgia.

Operations are expected to begin in late 2024.



### industry news

#### NORTH AMERICA

#### Sonoco Completes \$330 Million Acquisition of RTS Packaging

Sonoco Products Company on Sept. 8 announced the completion of its acquisition of the remaining equity interest in RTS Packaging, LLC from joint venture partner WestRock and one WestRock paper mill in Chattanooga, Tennessee.

RTS Packaging is one of the world's largest partition manufacturing companies. As a fully integrated packaging company, RTS offers a continuous supply of solid fiber and specialty paperboard products for partition and pad inner packaging applications.

The Chattanooga mill supplies RTS with URB (uncoated recycled paperboard).

Sonoco said the acquisition, which was originally announced on November 9, 2022, will further strengthen and expand Sonoco's 100% recycled fiber-based packaging solutions to serve growing consumer wine, spirits, food, beauty and healthcare markets.

Prior to closing the transaction, Sonoco was a 35% owner in the joint venture with WestRock.



With this acquisition, Sonoco adds a network of 15 operations and 1,100 employees in the U.S., Mexico, and South America.

The purchase price for this acquisition was \$330 million, subject to customary price adjustments.

Sonoco funded the acquisition with borrowings under its existing credit facilities and cash on hand.

#### Glatfelter and Ekman Initiate Partnership to Sell Abaca Pulp Globally

Glatfelter has entered into an agreement with Ekman & Co. to market Glatfelter's high quality, specialty Abaca pulp exclusively through Ekman's global sales agency platform.

Abaca is a unique, durable, strong fiber with a variety of applications, including filtration (tea, coffee), currency paper, textile, rope & twine, and several other applications where strength, porosity, and natural fibers are required.

Glatfelter has increased its market capacity of Abaca pulp and is partnering with Ekman's global sales organization to reach new markets for this fiber. Ekman has 40 offices worldwide and handles nearly 4 million tons of forest products every year.

"We are excited about this new relationship with Ekman," said Thomas Fahnemann, President & CEO of Glatfelter. "As we continue to grow our position as a producer of Abaca for the market, we have a natural fit with Ekman, whose logistical platform and expertise in specialty pulp will help us both win in this growing market."

#### Corrugated Partners Group to Build \$52.7 Million Sheet Feeder Plant in Pennsylvania

Pennsylvania Governor Josh Shapiro announced that Corrugated Partners Group plans to invest \$52.7 million to build a new corrugated sheet feeder plant in Chambersburg, Pennsylvania.

The Corrugated Partners Group's manufacturing operation will be known as Keystone Sheets, and its first location in Pennsylvania will be a 420,000-square-foot facility at 1465 Nitterhouse Drive in Chambersburg. From this facility, the company will be able to serve customers in the mid-Atlantic region and primarily produce single, double, and triple wall corrugated sheets used to produce boxes. "I'm thrilled that the Commonwealth won this advanced manufacturing project over other states and am pleased to welcome Corrugated Partners Group to Franklin County," said Governor Shapiro.

Corrugated Partners Group received a funding proposal from the Department of Community and Economic Development (DCED) for a \$400,000 Pennsylvania First grant and a \$160,000 workforce development grant to train workers. The company was also encouraged to apply for tax credits through the Manufacturing Tax Credit Program.

Corrugated Partners Group is a colla-



borative network of sheet feeders, producing more than 20% of the country's corrugated sheet requirements. The network employs over 1,200 individuals across 15 plants in the U.S.

#### NORTH AMERICA

# Domtar to Indefinitely Idle Espanola Mill in Ontario

Domtar in early-September announced that it will indefinitely idle the pulp and paper operations at its Espanola, Ontario, facility for an expected period greater than one year.

The decision will result in a curtailment of Domtar's annual pulp production by approximately 280,000 air-dried metric tons of northern bleached softwood kraft pulp and approximately 69,000 tons of specialty paper.

The announcement will affect approximately 450 employees.



"The Espanola mill has been challenged for some time now," said Steve Henry, Domtar paper and packaging president. "We have worked diligently to find a viable path forward for the operation including offering it for sale. Employees affected by this change have earned our appreciation and we thank them for their contributions. We also want to thank federal and provincial officials for their efforts."

The mill will be idled after years of ongoing operating losses and high costs associated with maintaining and operating the facility. The pulp mill will shut down in early October and the paper machines will shut down by early November.

Domtar will take appropriate measures to assist employees affected by this decision in accordance with the collective agreement, Domtar policy and legislation. The mill will be idled in a safe and environmentally sound manner that will facilitate a possible sale or future restart.



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#### SOUTH AMERICA

#### Klabin Inaugurates Puma II in Paraná, Brazil

Klabin on Sept. 21 held an inauguration ceremony for its Puma II — a project that marked the expansion of the Puma Unit in Ortigueira, Paraná, Brazil.

According to Klabin, the Puma II project is the largest investment in the company's history and the largest private investment ever made in the State of Paraná. With an investment of R\$12.9 billion, Klabin installed two new paper machines — MP27 and MP28 — which are both in operation and have a combined production capacity of 910,000 tons per year of packaging paper grades. Announced in 2019, the Puma II Project is part of Klabin's biggest growth cycle in its 124-year history. The first phase, completed in August 2021, included the construction and start-up of Paper Machine 27 (MP27), which manufactures Klabin's Eukaliner<sup>®</sup> kraftliner made with 100% eucalyptus fiber.

In June 2023, there was the startup of the second paper machine, MP28, which focuses on the production of paperboard. The machine also represents Klabin's debut in the white paperboard market.

Together, the two machines increase



Klabin's annual production capacity to 4.7 million tons of paper and pulp.

Between 2013 and 2023, the Puma Unit received the largest investments in Klabin's history, adding 2.5 million tons per year to the company's total production volume.

#### UNITED KINGDOM

#### Metsä Tissue Chooses Goole, East Riding of Yorkshire for Planned Tissue Mill

Metsä Tissue has chosen Goole, East Riding of Yorkshire as the site for its planned new state-of-the-art tissue paper mill in the UK. This landmark investment of several hundreds of millions of pounds will deliver the largest tissue mill in the UK and significantly reduce the quantity of tissue products that are currently imported into the UK and Ireland each year.

Subject to planning and environmental permits and a final investment decision, the site will occupy an area of around 200 acres and will have the capacity to produce 240,000 tons of tissue paper per year, built in several phases over the next decade, serving



both the professional and consumer markets.

According to Metsä Tissue, up to 45% of tissue products are currently imported into the UK and Ireland. Metsä Tissue aims to replace almost half of the imported products with local British production, using fresh fiber pulp as the main raw material from sustainably-managed forests in the Nordics. "Goole is the perfect location for this proposed investment," said Esa Kaikkonen, CEO of Metsä Tissue. "The Humber region provides a crucial gateway to the whole of the United Kingdom and the region's ambitions to bring cutting-edge green technology and jobs to the UK matches our ambitions in clean, sustainable manufacturing."

The Goole facility will use cutting-edge sustainable production technologies to deliver an efficient and modern facility with world class environmental performance.

Metsä Group noted that it aims for all its mills, including the new Goole facility, to operate without the use of fossil fuels by 2030.

#### Fourstones Paper Mill Prepares for Q2 2024 Launch of New Tissue Paper Machine

Fourstones Paper Mill is installing a new tissue paper machine at their Sapphire Paper Mill site in Leslie, Scotland.

According to the company, the paper machine was delivered to the mill in September and is equipped with a Crescent Former, a Fabricated Steel Yankee Cylinder and a High Temperature Drying Hood. The machine has a trimmed width of 2.75m and an operating speed of 1700m/min. "This marks the largest single investment in the company's history, demonstrating our firm commitment to expanding the business and establishing a strong foundation for its future growth," said Peter Duxbury, Managing Director of Fourstones Paper Mill.

The civil and infrastructure works have now been completed, and the paper machine installation is set to begin in October, with commissioning scheduled for Q2 2024. The company anticipates that the new machine will increase paper production capacity on the site to 60,000 tonnes annually. The machine will primarily produce virgin toilet tissue and towel grades for the consumer and away from home markets.

In line with their sustainability goals, Fourstones is actively working to secure a reliable and ethical source of pulp for their operations, ensuring responsible production.

#### EUROPE

#### Metsä Group Starts-up Kemi Bioproduct Mill and Paperboard Mill

Metsä Group's new Kemi bioproduct mill and expanded paperboard mill came into operation as planned on September 20. Pulp deliveries from the new bioproduct mill to customers are beginning in October.

The Kemi bioproduct mill produces 1.5 million tonnes of softwood and hardwood pulp annually. It uses zero fossil fuels and will be completely waste-free by 2030. The mill operates a fully-fledged circular economy, as all the wood raw material and production side streams are efficiently used for various bioproducts and bioenergy. For example, the mill produces tall oil and turpentine, as well as two terawatt hours of renewable electricity per year, which is equivalent to the annual consumption of 100,000 electrically heated single-family homes. This accounts for approximately 2.5 per cent of Finland's total electricity production.

The modernization and bottleneck investments made in the Kemi paperboard mill will increase the annual production capacity of white top kraftliner by around 40,000 tonnes to 465,000 tonnes.

The integration of the bioproduct mill and the paperboard mill, as well as the modernization of the paperboard mill's production line, will considerably improve the paperboard mill's water and energy efficiency.



The investments will reduce the mill's water consumption by 40 percent and energy use by 5 percent per tonne of paperboard produced.

#### Sappi's Kirkniemi Paper Mill in Finland Switches to Bioenergy

Sappi Europe's Kirkniemi Mill in Lohja, Finland, has successfully made the switch from using fossil fuels to renewable energy. An EUR 16.5 million investment into stateof-the-art facilities and machinery for the reception, storage and handling of biofuels is the latest in a string of efforts by Sappi in meeting its Science-Based Targets Initiative (SBTi)-approved emissions reduction goal across all its regions.

Kirkniemi Mill has three paper machines that, combined, produce 750,000 tons per year of high-quality Galerie papers (coated mechanical paper) which are tailored to



high-quality publishing and advertising end uses as well as 300,000 tons per year

of bleached mechanical pulp for its own consumption. Over 90% of the Kirkniemi Mill production is exported.

Biomass residues such as bark, sawdust and wood chips, largely locally sourced, now fuel the Kirkniemi Mill Galerie paper operations, setting the stage for a 90% reduction in direct fossil greenhouse gas emissions. This upgrade now works alongside the multi-fuel boiler built in 2015, enabling the mill to reduce nearly 230,000 tons of carbon dioxide annually. This means that Kirkniemi Mill is now able to reduce the carbon footprint of the Galerie paper range by 40%.

#### Arctic Paper to Invest SEK 285 Million in Bioenergy at Grycksbo Mill

Arctic Paper has decided to invest SEK 285 million in the expansion and upgrade of the biofuel installation at its mill in Grycksbo, Sweden.

According to the company, the investment provides annual energy cost savings of SEK 50 million. In addition to electricity and steam, the installation will annually produce 50 kton of wood pellets at an estimated value of approximately SEK 100 million to be sold on the market.

"Thanks to the biofuel boiler, Arctic Paper Grycksbo has a low climate footprint and a competitive energy mix," said Michal Jarczynski, CEO of Arctic Paper. "Now we are taking the next step as part of our long-term strategic plan to diversify into green energy."

The main biofuels used will be sawdust and wood chips, but the modernized boiler is flexible and other biofuels can be used.

Arctic Paper said the investment will be financed by bank loans and equity and is expected to be completed during the first half of 2025.

Arctic Paper Grycksbo has the capacity to produce 220,000 tonnes per year of highquality coated graphic paper on two machines. About 92% of the mill's production is exported.

### industry news

#### RUSSIA

#### International Paper Completes Sale of Ownership Interest in Ilim JV

International Paper in September announced the completion of the sale of its 50% interest in Ilim SA, the holding company for its Ilim joint venture, to its JV partners for US\$484 million in cash.

In addition, International Paper completed the sale of its outstanding shares in JSC Ilim Group to its JV partners for US\$24 million in cash and is divesting other non-material residual interests associated with Ilim.

International Paper first announced the agreement to sell its stake in Ilim in January



of this year.

With the completion of these transactions, International Paper has divested all of its ownership interests in Ilim.

#### INDUSTRY SUPPLIERS

# Voith to Supply Pulping and Wastewater Pre-Treatment System to Graphic Packaging's New CRB Mill

Voith will supply multiple stock preparation lines, integrated reject handling and the wastewater pre-treatment system for Graphic Packaging's greenfield CRB (coated recycled board) mill being built in Waco, Texas.

According to Voith, the system will ultimately allow the mill to save energy, water and fibers.

"We are happy to be partnering with GPI again and are eager to support them with our leading technology in stock preparation for efficient recycling of fibers and separation of contaminants," said Michael Hmielewski, Director of Project Sales at Voith. "Our stateof-the-art wastewater pre-treatment system enables GPI to minimize freshwater consumption which is one main focus of the project."

Rusty Miller, Senior Vice President Engineering and Technology at Graphic Packaging, noted, "Voith's proven and innovative pulping technology and wastewater pre-treatment solutions are key to reaching our high product quality targets and improving efficiency and sustainability. Our close partnership is based on trust and the very reliable cooperation we have enjoyed in the past."

The installation of the new system and components is targeted for completion in 2025.

#### Mondi Agrees to Sell Mondi Syktyvkar in Russia for EUR 775 Million

Mondi in September entered into an agreement to sell its last remaining facility in Russia, Joint Stock Company Mondi Syktyvkar, together with two affiliated entities to Sezar Invest LLC for a total cash consideration of RUB 80 billion (approximately EUR 775 million) to be paid in a series of installments.

Sezar Invest is a subsidiary of Moscow-based real estate development company Sezar Group.

Mondi confirmed that both the Russian Federation's Federal Anti-Monopoly Service and Government Sub-Commission for the Control of Foreign Investments have approved the sale on the terms agreed between Mondi and Sezar Invest.

The total cash consideration of RUB 80 billion will be paid to Mondi in RUB and in six monthly installments. Once the first four monthly installments have been paid to Mondi, expected to be by the end of December 2023, the sale will be complete and ownership of Mondi Syktyvkar will transfer to Sezar Invest and, accordingly, Mondi will have completed its exit from Russia.

Mondi Syktyvkar is an integrated pulp, packaging paper and uncoated fine paper mill located in Syktyvkar (Komi Republic). The Business employs approximately 4,500 people and is a leading provider of uncoated fine paper and containerboard to the domestic Russian market.

#### Valmet to Supply New Tissue Machine to Sofidel America in Ohio

Valmet will supply an Advantage DCT tissue line including an extensive automation package, flow control valves and Industrial Internet solutions to Sofidel America's Circleville mill in Ohio.

The new tissue line, which will have a design speed of 2,000 m/min and a width of 5,6 meters, will have an annual production capacity of 70,000 tons.

The new Advantage DCT 200 (TM 3) line follows the two Valmet Advantage NTT lines installed at the Circleville mill in 2017.

"Sofidel has a strong focus on sustainable

and high performing technologies that can fulfill our targets to increase capacity with as low environmental footprint as possible," said Simone Capuano, Executive VP, Operations and Supply chain, Sofidel America.

Valmet's scope of supply comprises a complete tissue production line including Advantage DCT 200 tissue machine with OptiFlo headbox and Yankee cylinder. It will also be featured with the Advantage tissue technology including ViscoNip press, AirCap hood with Air system, WetDust systems and a SoftReel reel. Valmet has also delivered detailed mill engineering, stock preparation equipment as well as automation, including Valmet DNA Distributed Control System (DCS) with built-in machine condition monitoring, Valmet IQ Quality Control System (QCS) and Web Monitoring System (WMS).

The delivery also includes Valmet's flow control and Industrial Internet solutions including Valmet Performance Center services, and Valmet Quality Predictor and Centerline Advisor applications.

# The Lowdown on Low Angle

By Frank Mathews, Motion

A common misunderstanding, especially in the paper industry, is that a universal joint driveline (or Cardan shaft) must operate at three degrees minimum misalignment. This concept causes mills and plants to spend unnecessary resources to create this minimum misalignment value. Additionally, this three-degree-or-greater value causes decreased reliability in the application.

The concept of three degrees of misalignment or greater originated from applications involving a prime mover (e.g., a motor) with vibratory power input, such as a diesel or gasoline engine. In these applications, the driveshaft must operate at three degrees to effectively transmit this vibrational power.

The driveshaft does not need to operate at three degrees or greater in applications with smooth power input (e.g., an electric motor). In these applications, low angle will increase the total operational lifetime of the driveshaft. A bearing lifetime equation is below.

$$Lh = \frac{Lc * 10^{10}}{n * \beta * T^{\frac{10}{3}} * K1}$$

- Where:
- Lc = Bearing Capacity Factor
- n = Operating Speed (rpm)
- $\beta$  = Operating Deflection (angle)
- T = Operating Torque
- K1 = Shock Factor

The operating deflection angle ( $\beta$ ) is in the denominator of this calculation. If zero degrees were inputted, the value would become infinite. As the angle approaches zero, the bearing life equation becomes unstable. For this reason and general selection purposes, lifetime calculation is done using three degrees or true operating

angle if above this value. At low angle with an electric motor driving, the rolling elements will have very little oscillation on the journal trunnion on whichit rides. This will decrease overall internal friction and reduce wear over its lifetime. In some cases of extreme low angle, the rolling elements will become static, which would theoretically provide an infinite bearing lifetime. Image 2 shows a cutaway view of a Cardan shaft bearing assembly's general configuration and operation.

A Cardan shaft can be used in many locations; most will accept up to 15 to 20 degrees of total misalignment. If space permits, they can offer a very long operational lifetime with decreased maintenance costs and greater flexibility in operational constraints. This can be an excellent alternative to replacing gear coupling floating shafts, disc coupling assemblies and many other rotating coupling types.



Image 2. Cardan shaft assembly cutaway.



**Image 1.** Installed in a paper mill, this driveshaft features new universal shaft joints that fixed a misalignment issue. The gear couplings were also replaced.

Another benefit to implementing Cardan shaft assemblies would be advance warning of impending failure. Unlike other rotating couplings, driveshaft issues can typically be caught before complete failure using temperature measurements, deflection checks, and detecting vibration during operation.

Though this article has concentrated on minimum operating angles, focus is needed to confirm that parallelism of the mating flanges is within specification. In any existing or new application where a Cardan shaft can be implemented, please contact the experienced engineering team at Motion's Mill Services. They can help determine the proper fit and series for the application.



A certified mechanical engineer, Frank Mathews is the Division Manager – East Shops and has more than ten years of experience with driveshafts and their applications. For more information, visit https://motionind.biz/3rX7V8k.

### people

#### PAPER

Clearwater Paper announced the appointment of Sherri Baker as senior vice president and chief financial officer, effec-



tive August 14, 2023. Sherri Baker Baker joins Clearwater Paper with extensive finance and executive leadership experience. In her last two roles she served as CFO, first at PGT Innovations and then at HyliionHoldings both NYSE listed companies.

International Paper announced that Chairman and CEO Mark Sutton has requested that the Board of Directors



Mark Sutton

move forward with the

next phase of the company's CEO succession plan. This phase in the process will include a comprehensive evaluation of internal and external candidates for Sutton's successor. Sutton will continue in his role as chairman and CEO until his successor is in place.

Mativ announced two appointments to its executive leadership team. Mark W. Johnson has succeeded Ricardo Nuñez as Chief Legal Officer, General Counsel and Secretary, effective Sept. 1. Prior to joining Mativ, Johnson served as Executive Vice President, Chief Legal Officer, and Corporate Secretary



Mark W. Johnson



for Kimball International. Additionally, Rajeev Kapur has been named Mativ's new Chief Information Officer. Kapur served as the company's vice president of digital transformation and business intelligence since July 2022.

Metsä Fibre has appointed Mikko Antsalo as Senior Vice President, Sales and Customership, and a member of Metsä Fibre's Management



Mikko Antsalo Team, effective March 1, 2024. Antsalo joins Metsä Fibre from Stora Enso, where he is currently working as SVP. Head of Paper Segment, Division Packaging Materials.

Norske Skog has appointed Geir Drangsland as its new CEO, effective Sept. 1. Drangsland succeeds Tore Hansesaetre, who has decided to leave

Norske Skog after more than 14 years to pursue career opportunities outside the company. Drangsland has served as the Chair of the Board since March 2023, and steps out of that position.

Stora Enso has appointed Hans Sohlström as the new President and CEO of the company. He replaces Annica Bresky, who has left



Geir Drangsland

Hans Sohlstrom the company "to pursue new challenges outside of Stora Enso." Since March 2021, Sohlström served

as a member of Stora Enso's Board of Directors, a position from which he has stepped down. Most recently, Sohlström served as President and CEO of Ahlstrom from April 2018 -December 2022.

Stora Enso announced that Minna Björkman will assume a business leadership role in Stora Enso's Packaging Materials division during the fourth quarter of 2023.



Minna Bjrkman

Until Björkman starts in her new role, she will remain a member of the Group Leadership Team. Currently, Björkman serves as Executive Vice President Sourcing and Logistics.

■ UPM announced the appointment of Aki Temmes as Executive Vice President responsible for UPM Fibres Business Area, effective Dec. 1, 2023. Temmes



is currently Senior Vice President, Business Control and Finance Operations. Prior to that he was responsible for UPM's Timber business and UPM Fibres Business Area Business Control.

#### **INDUSTRY SUPPLIERS**

BTG Group, a Voith company, announced the appointment of Xin Shun Cui as its new President and CEO. Since 2018, Cui served as CFO for

Xin Shun Cui

Voith Paper P+S based in Heidenheim Germany. Cui replaces Robert Crossman, who took on a new role as President Products and Service North America within Voith Paper.

■ Valmet announced that its President and CEO. Pasi Laine. has informed the Board of Directors of his intention to resign at the end of September 2024. The Board of Directors has



Pasi Laine

initiated a search for a successor. Laine, who has been with Valmet for some 33 years, has served as Valmet's President and CEO since 2014.



#### 2023

#### NOVEMBER 6-8, 2023 Fastmarkets Forest Products International Containerboard Conference

Fastmarkets The Westin Chicago River North Chicago, Illinois, USA www.fastmarkets.com/ forest-products/ international-containerboard

#### DECEMBER 8-10, 2023 ICPF Holiday Weekend in New York

International Corrugated Packaging Foundation Refinery Hotel New York City, New York, USA www.icpfbox.org

2024

#### JANUARY 12-15, 2024 Student Summit 2024 TAPPI

Hyatt Regency Greenville Greenville, South Carolina, USA tappistudentsummit.org

#### JANUARY 16-18, 2024 2024 Paper Distribution Conference

NPTA (National Paper Trade Association) Ritz Carlton Golf Resort Naples, Florida, USA www.gonpta.com/page/PDC

#### JAN. 31-FEB. 2, 2024

Tissue World Miami Informa Markets Miami Beach Convention Center Miami, Florida, USA www.tissueworld.com

#### FEBRUARY 5-8, 2024

Paper Week Canada 2024 Online (Feb. 5-8). In-person (Feb. 6-7) PAPTAC Montreal, Canada www.paperweek.ca

#### FEBRUARY 20, 2024

**Converters Expo South** BNP Media Packaging Group Greenville Convention Center Greenville, South Carolina, USA www.packagingstrategies.com/ converters-expo-south

#### FEBRUARY 21-23, 2024 ASPI 2024 Spring Meeting

Association of the Suppliers to the Paper Industry (ASPI) Hilton Clearwater Beach Resort & Spa Clearwater Beach, Florida, USA www.aspinet.org

#### APRIL 10-12, 2024 PPC Spring Outlook &

Strategies Conference Paperboard Packaging Council (PPC) Omni Frisco Dallas, Texas, USA paperbox.org/event/2024-spring-meeting

#### APRIL 28-MAY 1, 2024

TAPPICon 2024 TAPPI Huntington Convention Center Cleveland Cleveland, Ohio, USA tappicon.org

#### SEPTEMBER 17-19, 2024

Paper Meets Live! 2024 AF&PA and NPTA

Opal Sands Resort Clearwater Beach, Florida, USA www.afandpa.org/event

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### recycling matters



# America's Paper Recycling System Remains Strong

Effective recycling policy requires understanding issues with EPR.

By Heidi Brock, President and CEO, AF&PA

t should be clear to policymakers and policy stakeholders around the country that America's paper recycling system is strong and delivers results. Yet, this recycling success story is at risk. In recent years, interest in developing new recycling policy has grown.

Attempts to make sweeping changes to recycling policy and improve recycling infrastructure have risen to the top of agendas in several state legislatures around the country. These proposals typically show up in the form of extended producer responsibility (EPR) proposals.

What is EPR? It is an environmental policy concept that requires brand owners, producers, and material manufacturers to manage end-of-life costs of recyclable products. In theory, EPR is designed to improve recycling for products that are difficult to recycle, or without strong end markets.

EPR programs are not a new concept. In many instances, there are programs to recycle materials like batteries, paint, electronics and mattresses. EPR programs can be effective when products are difficult to process or have low recycling rates.

However, this doesn't apply to paper and paper-based packaging in the U.S. Yet many recent EPR proposals are trying to take a 'one-size-fits-all' solution to recycling challenges. This approach fails to differentiate between materials



with strong recycling rates and healthy end markets – like paper.

Lawmakers must use data for a more targeted approach. This helps to ensure recycling policies improve hard-to-handle materials, and do not set back paper recycling's success.

Recently released data from American Forest & Paper Association indicates the paper recycling rate remains strong – nearly 68% in 2022. Furthermore, America's recycling rate for old corrugated containers (OCC), or cardboard, was 93.6%, reinforcing the status of paper and paper products as one of the most-recycled materials in the U.S. A key contributor to this success is widespread and convenient access to community paper and paperboard recycling programs. 94% of Americans have access to these programs through either curbside or drop-off collection.

These recycled fibers go on to become new and sustainable paper products in the circular economy. Last year, roughly 50 million tons of paper and paper-based packaging were recovered for recycling. That amount could fill rail cars stretching from New York to Los Angeles nearly 3 times.

Our industry understands what it means to be a responsible producer. AF&PA members operate more than 100 materials recovery facilities, where recyclable materials are sorted and baled for delivery to end markets. The paper industry is also investing nearly \$7 billion in manufacturing infrastructure, from 2019 to 2025, to continue the best use of recycled paper in our products.

roposals would imperil these voluntary investments. It is why we must continue to advocate for data-driven policies that discern between materials with strong recycling and end markets from those with lower rates. We need policy makers to ensure that proposals contribute to the long-term strength of our paper recycling systems and advance the circular economy.

Your voice is needed to help convey this message to policymakers and policy stakeholders across the country. Get started by accessing the latest paper EPR programs can be effective when products are difficult to process or have low recycling rates. However, this doesn't apply to paper and paper-based packaging in the U.S.

recycling statistics and data from AF&PA: www.afandpa.org/priorities/recycling

The evidence is clear. Paper is highly recycled. And our industry, as well as millions of Americans, are deeply invested in paper recycling's success.

#### About AF&PA

The American Forest & Paper Association serves to advance U.S. paper and wood products manufacturers through fact-based public policy and marketplace advocacy. The forest products industry is circular by nature. AF&PA member companies make essential products from renewable and recycle resources, generate renewable bioenergy and are committed to continuous improvement through the industry's sustainability initiative — *Better Practices, Better Planet 2030: Sustainable Products* for a Sustainable Future.

The forest products industry accounts for approximately 5% of the total U.S. manufacturing GDP, manufactures about \$350 billion in products annually and employs about 925,000 people. The industry meets a payroll of about \$65 billion annually and is among the top 10 manufacturing sector employers in 43 states.



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It is essential for pulp and paper mill safety team members to understand, teach and enforce a confined space work permit program.

By Barry Taylor, Motion

In confined spaces, an employee's chances of injury or death are heightened due to less freedom of movement. Keeping workers safe in such limited spaces is critical. Planning along with following certain guidelines and tips will help keep them safe.

#### What is Confined Space?

A confined space is a constricted area with limited entry and exit openings. Such spaces include tunnels, silos, vats, access shafts, rail tank cars, and maintenance and utility holes. Confined spaces should be occupied for only short periods, and always with taking necessary safety precautions, which this article will cover.

#### Developing a Plan

No matter the space size, a written rescue plan must be posted and available for everyone to reference. The plan should be tailored for each confined space within a mill or plant. Authorized workers, entrants, attendants (lookouts)

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OSHA's 29 CFR 1910.252(a) covers general industry requirements, which touch on basic precautions from fire hazards, space guards and restrictions on certain activities like welding and cutting.

#### But 1910.146 is complex. Ask:

- Is the entry and exit point in a work area large enough to accommodate a human being?
- **2)** Are you limited at the entry and exit opening of the confined space?
- **3)** Is the space designed for continuous occupancy?

#### Your plan must certainly include hazardous atmospheric conditions. Ask:

- 1) Are flammable gases, vapors or a mist present?
- 2) Are airborne combustibles present?
- **3)** Are atmospheric oxygen limits present, and are oxygen levels too low or too high?
- 4) What is the atmosphere concentration level for other hazards?
- 5) Is there any other condition immediately dangerous to life and health?



and supervisors (who sign off on the plan) should know how to perform an employee rescue within the space and an employee non-entry rescue (for someone who got hurt outside a confined space).

A mill's safety manager and their directors typically write and organize the plan that goes into a confined space permit. No work will start without a permit that the safety manager or director signs off on. Specifically designed for your mill, a confined space work permit should be available for your employees to study; a plan with documentation leaves no doubt about what is expected of employees to do the job and do it safely. A permit plan helps to ensure that everyone involved knows their roles and tasks for all entry and exit procedures of the confined space. Remember, anyone with one foot inside the confined space is considered to have entered that space.

What should be in the plan itself? First, the company's emergency service numbers should be readily available and posted for everyone to see. A great next step is to create a list of common hazards, necessary equipment and items, and safety procedures.

#### **Common Hazards**

When putting together a confined space program for your mill, an assessment to identify and eliminate all hazards is necessary. From my many visits to paper and paperboard mills, I have compiled below the most common dangers possible in a mill's confined space. (See sidebar left, OSHA's 29 CFR 1910). Each confined space should be assessed and measured, if appropriate, for the following:

- Oxygen deficiency
- Toxic gases or vapors
- Entrapments
- Electrical hazards
- Flammable hazards
- Heat or cold hazards
- Rotating, moving or unguarded equipment
- Chemical hazards
- "The unexpected"

In confined spaces, an employee's chances of encountering various hazards increase with "unexpected" occurrences, so those are necessary to include on the permit plan. The unexpected is an event that has never occurred or been considered. For example, a

### safety in confined spaces \_\_\_\_\_

confined space such as a silo may be opened, and asbestos is found. Asbestos should never be present, but it is unexpected and could happen.

Another unexpected example involves the human factor — not having a personal awareness of the mill's surroundings or a technical understanding of the available equipment and tools when working in confined spaces. It is as if a truck driver is unaware of and exceeds your mill's speed limit, endangering many in the area.

Rescue and self-rescue are more difficult in confined spaces than in normal spaces. Some confined spaces can contain curved walls or uneven floors, causing workers to become tangled, in a bind, or trapped. Other hazards, like high temperatures, may require a time exposure limit in the space because of the heat alone.

The space entry type should be considered. Is the employee going up into a confined space, or is the employee going down into a space, or just walking straight into a confined space? "Straight-into" entry happens often in paper mills and paperboard mills due to many necessary chemical storage facilities.

#### Safety Equipment and Supplies

A permit plan should also include necessary items that keep entrant employees safe.

Several of these items are used in tandem with the lookout or another employee. Atmospheric conditions identified in the hazard assessment would indicate what PPE (personal protective equipment) to include and other safeguards that must be in place.

The following should be on hand:

- Required entry equipment (e.g., a tripod if the entrant needs to descend, or a mechanical hoist system)
- Signage
- Respirators (including escape respirators and self-contained breathing apparatuses [SCBAs])
- Coveralls
- Hearing protection
- Safety glasses
- Explosion-proof lighting
- Fire extinguishers
- Harnesses
- Identified anchor points
- Escape equipment
- Radios (means of communication; check if line of sight is a problem for radios)
- Inhalators

Almost all confined spaces require PPE, and mill employees should know and understand how to use it, including respirators and other breathing equipment,





gloves and harnesses. Hands-on training with winches, tripods, davit systems and portable lifelines is critical to ingrain understanding and knowledge.

Plan for the unexpected and look critically at your rescue plans. Do you have the right equipment for all rescues? For example, fall protection has weight limits — 310 pounds on harnesses and winches are standard. However, can you safely rescue any employees who might be over 310 pounds? Accidents can and do happen on mill grounds, so get with your safety team or call your local safety specialist to ensure you have the right equipment to move and rescue these valuable workers.

#### Safety Procedures

The following safety procedures should also be listed, carried out and documented to keep everyone safe:

- Review hazards and work procedures (whole safety team).
- Notify the available emergency team and guards that a mill section will be shut down for confined space/safety purposes.
- Ensure any necessary signage is in place.
- Redirect any employees whose regular jobs will be affected by the activity.
- Make entry preparations.
- Ensure that the required PPE is worn.
- Isolate hazardous energy (shut the energy source down before entering the confined space).



- Apply lockout/tagout procedures (LOTO is an additional permit).
- Verify that the entrant has a lookout in place.
- Verify the entrant's isolation.
- Secure the area with posts and flags.
- Clean, drain and purge the space.
- Establish required ventilation.
- Perform an atmospheric test and ensure it is satisfactory.

Atmospheric testing for chemicals should be done before entry. Will there be continuous monitoring? Document the test frequency, tester name, tester ID number and the testing equipment's manufacturer and model number.

Your testing columns for atmospheric testing should include minimum and maximum exposure limits, along with the actual air temperature. Heat is a big concern that we all have witnessed. In the years of being in and out of paper mills, the top three chemicals you should be protected from are caustic sodas, chlorine and hydrogen sulfide (H2S). All employees should be trained on these chemicals and their dangers, what PPE to wear, and how to operate and use gas monitors. Smaller personal gas monitors work well if you know you will only be exposed to that one gas or vapor in your confined space.

Other important information to include on the permit would be outside rescue contact numbers (such as the local fire department, ambulance, etc.), along with authorization boxes for the date/time that the permit was approved, signature lines, verification of the date/time work completed, and a checkbox for marking that the permit is closed and no longer active. The permit should be filed for records, including for OSHA if needed.

#### Training

Training your employees on entry is one of the top priorities of your confined space procedure, so all involved know how to react when the unexpected happens. Instead of panicking or engaging

### safety in confined spaces

in an incorrect procedure, they should know exactly what to do. For example, say the worker in a confined space is incoherent and unresponsive — will the lookout person do what is right and get help? Or will the lookout panic and enter the confined space, possibly endanger themself, and turn what could be a single emergency into one for multiple people? This could and should always be avoidable thanks to your upto-date confined space entry plan and the frequent training your company received on rescue procedures.

The lookout attendant monitors the situation from the outside and must know how to operate the rescue equipment and understand the importance of using it properly (Figure 1.) If they do not, they can jeopardize the whole team.

Lookouts and other competent persons are an asset to your confined space program. Ensure they are trained and certified in CPR and other first aid procedures. These drills should be practiced at least once a quarter or in an otherwise timely manner.

Regardless of your confined space work permit program, it is only as effective as your employees and competent people trained to perform the work. It is essential for pulp and paper mill safety team members to understand, teach and enforce the program. Frequent training for everyone (especially new employees), in conjunction with carefully considered permits, is critical to help ensure everyone's safety and confidence working in the pulp and paper industry's confined spaces.

Barry Taylor has worked with Motion since 2000. He was a Branch Manager from 2004 to 2010 before moving to the company's safety division as a Safety Specialist in 2010. Taylor earned QSSP and OSHA 30 certification. For more information, visit: Motion.com.

# **Pioneering Sustainable Solutions with Nanofibrillated Cellulose**

Mercer International and Resolute Forest Products, through Performance BioFilaments, are set to capitalize on NFC's burgeoning demand.

ercer International and Resolute Forest Products are leading the charge in biomaterial innovation in an era demanding sustainable solutions. Their collaborative enterprise, Performance BioFilaments, is a pivotal initiative in the development and market introduction

of nanofibrillated cellulose (NFC). Performance BioFilaments Inc., a partnership between Mercer International and Resolute Forest Products, is committed to harnessing the commercial potential of nanofibrillated cellulose, one of the most promising biomaterials emerging on the global stage.

#### NFC: A Technological Breakthrough

NFC isn't merely another material; it represents a paradigm shift. Its unique nanostructure, derived from sustainably sourced wood pulp, undergoes a chemical-free, proprietary refining process that yields fibers with extraordinary characteristics. These include a high aspect ratio for unparalleled strength and a dense surface area rich in hydroxyl groups, which augments its rheological properties.

Cellulose filaments are a subset of nanofibrillated cellulose derived from conventional kraft pulp, consisting of 95% cellulose and 5% hemicellulose. In a wet state, the pulp resembles white polyester pillow filling. Yet, through the application of mechanical energy, the cellulose fibers undergo delamination, transforming into singular nano-sized filaments or fibrils. Delamination refers to the process in which layers of a material, typically in a composite structure, separate or split from each other due to various factors such as mechanical forces, heat, or chemical reactions. This separation leads to forming distinct layers or thin sheets within the material, often resulting in a loss of structural integrity and performance. In the context of cellulose fibers. delamination is the mechanism through which individual nano-sized filaments or fibrils are created by breaking down the original cellulose fibers under the influence of mechanical energy.

#### NFC: Properties, Production, and Environmental Advantages

The cellulose filaments that Performance BioFilaments develop differ slightly.



NFC isn't merely another material; it represents a paradigm shift. Its unique nanostructure, derived from sustainably sourced wood pulp, undergoes a chemical-free, proprietary refining process that yields fibers with extraordinary characteristics.

Nanocrystalline cellulose (NCC) particles are typically five to 10 nanometres wide and a few hundred nanometres long. Fibrils, on the other hand, can range up to several micrometres in length. This gives them different properties, especially from a rheological perspective. Rheology refers to studying the flow and deformation of materials, especially liquids and soft solids, under the influence of applied forces. In the context of cellulose filaments and materials, rheology examines how they respond to mechanical stress and how their flow properties change based on external forces.

Performance BioFilaments' reason for selecting a mechanical refining process over chemical treatment was improved economics. With mechanical refining, kraft pulp is put between two spinning plates, breaking down the fiber and peeling filaments off, similar to unravelling rope licorice candy.

The material possesses remarkable thinness and significant length, enabling Performance BioFilaments to excel in specific applications, such as fortifying other materials. When substances like sulphuric acid are employed, some

## nanofibrillated cellulose

wood cellulose undergoes hydrolysis, transforming into sugar and decreasing the yield.

The term "hydrolyzed" refers to a chemical process where a substance, like wood cellulose in this case, is broken down into smaller molecules by adding chemicals and water. This implies that when wood cellulose interacts with certain chemicals, such as sulphuric acid, it triggers a hydrolysis reaction, breaking the cellulose into simpler components, including sugars.

Not only does the mechanical process allow for a higher yield, but the process is relatively low cost, making scale-up more economical. As an added bonus, the fact that mechanical refining doesn't require acids reduces the environmental impact.

#### Performance BioFilaments and Potential Applications

In addition to their ongoing efforts to improve the manufacturing process, Performance BioFilaments researches potential applications, including reinforcing plastics and concrete and rheology additives for industrial paints and coatings.

Performance BioFilaments focuses on injection-moulded plastics geared towards the automotive sector and driven by environmental regulations. For example, in the United States, the National Highway Traffic Safety Administration (NHTSA) in 2022 finalized rules for 2024-2026 requiring a fleet average of 49 mpg by 2026. In addition, the Biden administration in July 2023 proposed to hike fuel economy standards by 2032 to a fleet-wide average of 58 miles per gallon as it seeks to cut greenhouse gas emissions and reduce fuel use. And, European fuel economy standards are on a stricter track going forward.

The regulations have prompted automotive manufacturers in both North America and Europe to seek

# nanofibrillated cellulose.

lighter plastic options. This initiative aims to decrease vehicle weight and meet fuel efficiency requirements. To ensure safety benchmarks are upheld, these plastics require reinforcement from lightweight materials. Cellulose biofilaments emerge as a potential solution perfectly suited for this purpose.

Regarding paints and coatings, the distinctive rheological characteristics take center stage. Cellulose fibrils showcase a unique trait called thixotropy, rendering them viscous and resistant to flow during regular circumstances. However, under agitation or stress, their viscosity experiences a notable decrease. By blending cellulose nanofibers with paints or coatings, producers have the potential to precisely adjust the flow attributes of their goods, thereby enhancing overall performance.

The focus is on advancing three specific application domains, including (1) reinforcement of thermoset and thermoplastic materials, (2) enhancing concrete durability and strength, and (3) adjusting solution viscosity through rheology modification. Thermoset and thermoplastic refer to two polymer categories consisting of large molecules composed of repeating units. These polymers exhibit distinct traits and behaviors due to variations in their



Performance BioFilaments focuses on injection-moulded plastics geared towards the automotive sector and driven by environmental regulations. These regulations have prompted automotive manufacturers in both North America and Europe to seek lighter plastic options. Cellulose biofilaments emerge as a potential solution perfectly suited for this purpose.

molecular structures and responses to heat and pressure.

Each of these domains presents unique challenges that are being addressed either by customizing the production process — often by adjusting refining energy levels — or by implementing supplementary procedures subsequent to cellulose filament production.

Performance BioFilaments will offer their products in various formats tailored to their specific applications. For instance, in the context of concrete, the cellulose filament can be incorporated directly to improve internal curing as the concrete dries. This virtually eliminates the micro and nano cracks that

#### A Look into the Expanding Horizons of NFC

On April 24, 2023, Resolute Forest Products inaugurated its new C\$27 million cellulose filament plant located at the company's Kénogami paper mill in Saguenay, Quebec. The facility has a daily production capacity of 21 tonnes and an annual output of 7,000 tonnes of NFC. But capacity is just one part of the equation; the true value lies in the ever-widening applications for NFC, backed by robust research and economic feasibility. occur as the concrete dries. By eliminating this undesired phenomenon, cellulose filaments improve the durability of the concrete, resulting in potentially longer service life of structures such as bridge decks. Research by Performance BioFilaments continues to delve into this phenomenon.

A pivotal concern revolves around achieving optimal dispersion of filaments throughout the material. Ensuring uniform distribution of cellulose filaments within plastics, particularly thermoplastics, presents a greater challenge. The anticipated approach for achieving effective filament dispersion within plastics involves selling batches of plastic pellets containing a higher filament concentration than desired in the end product. When these specialized pellets are combined in the appropriate ratio with conventional plastic pellets, the resultant melted plastic will exhibit the intended cellulose fiber concentration.

Another significant hurdle involves ensuring the compatibility of the filaments with the matrix polymer. Performance BioFilaments has undertaken several approaches to address this challenge. These efforts encompass refining processes to improve dispersion within both thermoset and thermoplastic materials. Additionally, they are focused on altering the surface characteristics of the filaments to bolster the bonding between matrix polymers and the cellulose surface.

In the realm of plastics, the primary objective is to substitute the existing glass fibers used for reinforcement. The inherently lower density of cellulose compared to glass results in composite materials featuring cellulose fibers thatare lighter than prevailing market options. This attribute holds particular appeal for applications in sectors such as automotive, aerospace, and sporting equipment. In these industries, component weight carries significant importance.

Plastics constitute just a single facet within cars or airplanes, and numerous gradual enhancements are necessary to lower the overall vehicle weight. These include advancements in metal alloys and more efficient motors, aligning with the fresh emission standards mandated by European and US governments. The significance of lighter vehicles extends to bolstering electric vehicle performance, as reduced car weight correlates with extended battery life. This emphasis on lightweighting remains pertinent for trains and buses, airplanes, rockets, and satellites.

The overarching aspiration is to create biodegradable vehicles. Notably, Performance BioFilaments is actively engaged in initiatives geared towards crafting completely renewable or bioderived composites tailored for the automotive industry. Yet, the immediate reality dictates collaboration with non-biodegradable plastics, which presently dominate industrial usage. Consequently, while the exploration of cellulose filament reinforcement in biodegradable plastics stands as a "longer-term" endeavor, it unquestionably represents an area of profound interest for the company.



"NFC technology is not just a sustainability play; it's a catalyst for transformation across industries. With the potential to revolutionize everything from construction materials to the transportation sector, NFC is a key driver for innovations from the lab to the marketplace. Our focus is not merely on scaling production, but in creating a suite of applications that bring tangible economic and environmental benefits."

 Gurminder Minhas, Managing Director at
Performance BioFilaments.

#### **Expert Insight**

Gurminder Minhas, Managing Director at Performance BioFilaments, lends his perspective. "NFC technology is not just a sustainability play; it's a catalyst for transformation across industries. With the potential to revolutionize everything from construction materials to the transportation sector, NFC is

# nanofibrillated cellulose

a key driver for innovations from the lab to the marketplace. Our focus is not merely on scaling production, but in creating a suite of applications that bring tangible economic and environmental benefits."

#### Economic Advantages and Risk Mitigation thru NFC Integration

In addition to sustainability, economic factors hold a pivotal sway over industrial adoption. NFC has demonstrated the potential to curb operational expenses by elevating product longevity, thereby reducing replacement frequency.

Furthermore, governmental encouragement of eco-conscious practices is poised to yield supplementary financial advantages for enterprises incorporating NFC into their endeavors.

In light of the fluctuating costs of petroleum-derived goods and the escalating stringency of environmental directives, NFC emerges as a robust risk mitigation approach. Embracing NFC empowers businesses to establish stability in raw material expenditures and proactively navigate regulatory requisites. In effect, this ensures both business continuity and competitive standing.

#### Conclusion

It's not just about current capabilities; it's about the roadmap ahead. Mercer International and Resolute, through Performance BioFilaments, are set to capitalize on NFC's burgeoning demand, owing to their advanced R&D and a strong economic rationale. They aren't merely contributing to the industry, but setting the course for its future, backed by substantive data and a compelling business case.

For more information regarding Performance BioFilaments, please visit: www.performancebiofilaments.com.

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Publication Title: PaperAge

Publication Number: 0031-1081

Frequency of Issue: Bi-monthly (except January/April) for a total of 5 issues published annually. Mailed free of charge to qualified recipients. To all others: \$45.00 in the U.S., \$50.00 in Canada and Mexico, and \$75 in other countries.

Complete Mailing Address of Known Office of Publication: PO Box 904, Cohasset, MA 02025. Complete Mailing Address of Headquarters, or General Business Office of Publisher: PO Box 904, Cohasset, MA 02025.

Full Names and Complete Mailing Address of Publisher, Editor, and Managing Editor: Publisher, Michael C. O'Brien, PO Box 904, Cohasset, MA 02025. Managing Editor, John F. O'Brien, Jr., PO Box 904, Cohasset, MA 02025.

Owner: O'Brien Publications, Incorporated. Michael C. O'Brien, PO Box 904, Cohasset, MA 02025; John F. O'Brien, Jr., PO Box 904, Cohasset, MA 02025.

Known Bondholders, Mortgagees, and Other Security Holders Owning or Holding 1 Percent or More of Total Amount of Bonds, Mortgages, or Other Securities: None

Tax Status: Has not changed during preceding 12 months.

Issue Date for Circulation Data Below: Sept/Oct. 2023.

Extent and Nature of Circulation: a. Total Number of Copies; Average No. Copies Each Issue During Preceding 12 Months – 8, 186; b. (1) Outside County Paid/Requested Mail Subscriptions – 6, 452; b. (2) In County Paid/Requested Mail Subscriptions – 6, 463; Sates Through Dealers and Carriers, Street Vendors, Counter Sales, and Other Non-USPS Paid Distribution – 439; b. (4) Requested copies distributed by other mail classes through the USPS – 0. c. Total Paid and/or Requested Circulation – 6, 981. d. (1) Outside County Nonrequested copies – 1, 267; d. (2) In County Nonrequested Copies – 0; d. (3). Nonrequested copies distributed through the USPS by other classes of mail – 0, d. (4) Nonrequested copies distributed Dutside the mail – 0, e. Total nonrequested distribution – 8, 186. i. Percent Paid and/or Requested Circulation – 6, 267. 1, ford distribution – 8, 186.

Extent and Nature of Circulation: a. No. Copies of Single Issue published Nearest to Filing Date – 7,860; h.(1) Outside County Paid/Requested Mail Subscriptions – 6,211; b. (2) In County Paid/Requested Mail Subscriptions – 0; h. (3) Sales Through Dealers and Carriers, Street Vendors, Counter Sales, and Other Non-USPS Paid Distribution – 443; b. (4) Requested Corelation – 6,654. d. (1) Outside County Nonrequested copies – 10; T.2; d. (2) In County Nonrequested copies – 0; d. (3). Nonrequested copies distributed through the USPS by other classes of mail – 0. d. (4) Nonrequested copies distributed through the USPS by other classes of mail – 0, d. (4). Nonrequested copies distributed Unside the mail – 0. e. Total nonrequested distribution – 1,722. Total distribution – 7,860. i. Percent Paid and/or Requested Crucilation – 6,869.

I certify that all information furnished is true and complete.

John F. O'Brien, Jr., Managing Editor

# of interest

# **Pixelle Invests \$1.4 Million in Safety at Spring Grove Mill with Robotics**

Pixelle Specialty Solutions has improved safety and productivity at its specialty paper mill in Spring Grove, Pennsylvania, by installing a smelt spout robot manufactured by Valmet. The smelt robot is essential for keeping recovery boiler spouts open and improving efficiencies in the liquor recovery cycle.

The first smelt robot installation of its kind in North America, the robot regularly cleans the recovery boiler smelt spouts ensuring stable smelt flow, optimum cleaning and safer boiler operation, without manual intervention.

In addition, the robot allows the mill to clean multiple ports without having to modify its existing boiler.

"We're proud to introduce the industry-first smelt robot installation in North America, supporting our ongoing commitment to operational excellence and innovation in specialty papers," said Ross Bushnell, President and CEO of Pixelle. "By leveraging the latest automation technology, we are positioned to drive greater mill safety, productivity and quality."

Removing smelt deposits from recovery boiler spouts is a critical task in maintaining boiler reliability, but manual processes can put operators in close proximity to molten smelt, black liquor, hot gases and ash. Instead of an operator manually removing smelt deposits, the robot cleans all spouts safely and efficiently in a carefully programmed sequence. Operators retain control and visibility remotely, programming cleaning sequences and using the robot's camera for trouble-



The robot regularly cleans the recovery boiler smelt spouts ensuring stable smelt flow, optimum cleaning and safer boiler operation, without manual intervention.

shooting and evaluation.

"The heart of an integrated pulp and paper facility is a recovery boiler, and removing smelt deposits from its spouts is a challenging and time-consuming maintenance task," said Jeff Forry, Director Pulp and Utilities, Pixelle. "Our new smelt spout cleaning robot will keep spouts clean, protecting our people and allowing operators to focus on other critical tasks."

The six-servo motor, FANUC M-900 series robot was designed, manufactured and installed by Valmet.

"It's incredibly exciting for Valmet and the paper industry at large, to install the first smelt spout cleaning robot system in North America at Pixelle's Spring Grove, PA mill," said Drew Humphries, Vice President, Pulp & Energy, North America, Valmet. "By helping Pixelle reach new levels of safety and boiler performance, this industry first project will help change perceptions about what is possible in pulp and paper."

#### About the Spring Grove Mill

Pixelle's integrated Spring Grove mill has four specialty paper machines with a combined capacity of 330,000 tons per year. The mill also is equipped with one specialty coater and one blade coater. In addition, the mill has the capacity to produce 240,000 tons per year of pulp. ■

Headquartered in Spring Grove, Pennsylvania, Pixelle Specialty Solutions is a leading manufacturer of specialty papers in North America with operations in Ohio, Pennsylvania and Wisconsin.

# Moving forward towards more autonomous operations



More and more companies aim to increase the autonomy of their mill or plant operations. In an autonomous mill or plant, an autonomous system can monitor its own performance, which brings several benefits, like improved safety and efficiency, lower costs and reduced environmental impact. Digitalization and more autonomous operations also mean that there is less need for human intervention. The role of people will continue to be important, evolving towards supervising and ensuring that different process areas perform well together, and towards managing exceptions. Operations and maintenance work will become more collaborative in the future as well.

Whether you are just beginning your digital transformation journey or you're further along in the process, Valmet's framework helps you recognize the necessary steps and building blocks. Our experts are there to support you as you move towards more autonomous and optimized operations.

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