Recycled Fiber
New enzymatic technologies broaden the range of action to control stickies

Paper Coating
Understanding the critical role metering rods play in the paper coating process

Paper Machine Performance
Steam shower technology for advanced water removal on Fourdrinier machines
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Connect with us.
To learn about all the advantages of Optimyze enzymatic technologies, contact your Buckman representative or visit buckman.com.
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There have been some developments taking place in 2019 in the U.S. paper industry that I really didn’t think I would ever see — plans for new paper mills and the rebirth of others.

Let’s start with Crossroads Paper, a new company that held a PR event at Red Butte Garden in Salt Lake City on July 10. Crossroads’ CEO, John Sasine, along with his brother Ron, announced that the company intends to build a recycled paper mill in the Salt Lake Valley region of Utah at a cost of about $320 million, including infrastructure improvements, civil construction and water treatment facilities.

According to a report from Resource Recycling, financing of the mill will be managed by Credit Suisse, a multinational investment bank that is preparing a financial package for the mill to be presented to investors and lenders. The mill is being developed as a 100% recycled containerboard facility that will serve Utah, Idaho, Wyoming, Arizona, New Mexico, and parts of Colorado and California.

The Sasine brothers say the area is underserved by recovered fiber buyers, with the McKinley USA paper mill in New Mexico as the nearest outlet.

Interestingly, John Sasine is also the owner of Rocky Mountain Recycling, a paper collection and brokerage company in Salt Lake City.

In May, CorrVentures LLC (CVL), a private development firm specializing in strategic project development in the pulp and paper and corrugated packaging markets, announced its intention to build and operate a 300,000 tpy, 100% recycled lightweight containerboard mill located on a 102-acre site approximately 9 miles south of Albany, New York.

The founders of CVL include Charles P. Klass (Chairman), Stephen R. Read (President & CEO), Jan Lambert (EVP), and Eric Lawrence (EVP & Treasurer).

CVL expects to have financing in place by the fourth quarter of 2019 and the start of commercial operations in the fourth quarter of 2021.

On the mill reopening front, the West Linn paper mill in Oregon, which was about to have its assets auctioned off in June, will be brought back to life by a newly created subsidiary of Columbia Ventures Corporation named Willamette Falls Paper Company, Inc. The deal includes a five-year lease with renewal options for the related real estate and buildings.

Brian Koen, formerly the COO of West Linn Paper Co., now serves as President of Willamette Falls Paper.

The new operation owns three paper machines, capable of making coated and uncoated grades with the potential capacity of 260,000 tons. Willamette Falls Paper says it plans a near-term startup of at least one paper machine, returning it as the only coated freesheet producer on the West Coast. Initially, the mill will employ about 85 people, which will increase as they bring up one or two of the remaining paper machines.

The company said it intends to look into integrating the use of non-traditional fiber sources such as pulp from wheat straw, agricultural waste and the new farm crop of hemp into the papermaking process.

Last but not least, Phoenix Paper Wickliffe, LLC officially restarted the former Verso pulp and paper mill in Wickliffe, Kentucky. The mill produced its first roll of bleached hardwood pulp on May 29. Phoenix Paper’s parent company, China-based Shanying International, bought the idled mill from Verso for $16 million in September of 2018 and is investing $150 million to upgrade the mill and convert its production from uncoated and coated freesheet grades to the production of kraft linerboard. The mill will also produce bleached hardwood and softwood pulp, and recycled (OCC) pulp.

Here’s to hoping that demand plays in favor of these new ventures.
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NORTH AMERICA

Cascades to Acquire Orchids Paper Products Assets for $207 Million

Cascades on July 2 announced that it has entered into a definitive agreement for the acquisition of substantially all of the assets of Orchids Paper Products Company following the approval thereof by the United States Bankruptcy Court for the District of Delaware (subject to completion of definitive documentation). Cascades will pay a cash consideration of US$207 million, financed by the Company’s credit facilities.

The assets to be acquired include the Barnwell, South Carolina and Pryor, Oklahoma operations, as well as certain assets, the supply and other commercial arrangements with Fabrica de Papel San Francisco, S.A. de C.V. (“Fabrica”), based in Mexicali, Mexico, and certain of its affiliates.

Orchids Paper’s integrated plants have an estimated parent roll capacity of up to 114,000 tons and up to an estimated 114,500 tons of converting capacity. Additionally, Orchids Paper has an agreement with Fabrica providing access for up to an additional 20,000 tons of converted products for the Western U.S. market.

According to Cascades, more than $240 million has been invested in the plants’ modern production and converting equipment and strategic partnership over the last five years. This includes, at the Pryor site, the installation of a new paper machine, two new converting lines and the modernization of two others converting lines. At the Barnwell site, a new Valmet QRT paper machine was installed in 2017.

“This acquisition is very well aligned with our strategic plan and supports our efforts to position our tissue platform for long-term growth,” said Mario Plourde, President and CEO of Cascades. “The acquisition of these well-funded assets enables us to do so while simultaneously supporting market consolidation and avoiding the risks inherent in the construction or installation of new equipment.”

In the coming months, Cascades will invest approximately $5 million to add swing functionality to expand the range of products that can be manufactured from ultra-premium structured tissue to high-quality conventional, thereby maximizing its full potential. In addition, Cascades will maximize the profitability of the Barnwell and Pryor plants, which operated at approximately 30% and 70% of their total converting capacity in 2018, by transferring volumes that are currently outsourced to third parties or produced at the Company’s other U.S. plants to these facilities.

Cascades anticipates the transaction will close in August or September 2019, subject to the satisfaction of customary closing conditions.

CorrVentures to Build New Brownfield Recycled Containerboard Mill in NY

CorrVentures LLC (CVL), a private development firm specializing in strategic project development in the Pulp & Paper and Corrugated Packaging markets, announced its intention to build and operate a 300,000 tpy 100% recycled lightweight containerboard mill located on a 102-acre site approximately 9 miles south of Albany, New York.

The project is subject to approval of state and local incentives, which have been offered to projects of a similar nature in NY State, including sizable NYS Brownfield Program refundable tax credits. The mill’s geographic location is well-suited to secure primary OCC raw material supply, available to the mill by common carrier, rail, and deep-water barge, CVL noted.

The CVL development team has substantial experience and prior success in designing, building and operating business facilities similar to those planned for the Project, as well as in managing printing and packaging businesses with significant purchase requirements for recycled containerboard. The founders of CVL include Charles P. Klass (Chairman), Stephen R. Read (President & CEO), Jan Lambert (EVP), and Eric Lawrence (EVP & Treasurer).

The corporate investment and off-take partners participating in this venture will consist of major independent corrugated packaging and corrugated sheet feeder operations based in the North Central and Northeastern United States, and Canada. Each of these companies will be selected for approach based on their established history and strong reputation of success in the industry.

Operations will highlight state-of-the-art proven recycling and papermaking technologies from across North America and abroad. The paper machine will include starch surface treatment and optimized calendering to provide enhanced strength and excellent printability.

CVL anticipates a Q4 2019 financial closing with start-up of commercial operations in Q4 2021.
Merichem provides low-cost soda and sulfur make-up chemicals to the pulp and paper industry. Our products include economic caustic soda, sodium sulfide, and sodium hydrosulfide solutions used in the kraft digestion process, bleach plant scrubbers and white liquor oxidation systems.

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Phoenix Paper Wickliffe, LLC announced the official restart of its Wickliffe, Kentucky, pulp and paper mill. According to the company, the mill produced its first roll of bleached hardwood pulp on May 29.

China-based Shanying International, the parent company of Phoenix Paper, bought the idled mill from Verso for $16 million in September of 2018 and is investing $150 million to upgrade the mill and convert its production from uncoated and coated freesheet grades to the production of kraft linerboard. The mill will also produce bleached hardwood and softwood pulp, and recycled (OCC) pulp. Phoenix Paper said about 224 people are now working at the Wickliffe facility.

Phoenix Paper noted that it expects to produce about 300,000 tons of product per year once the mill is fully optimized.

Georgia-Pacific announced on June 4 that it is shutting down the equipment and processes supporting the solid bleached sulphate (SBS) operations at its Crossett, Arkansas, facility as of October 2019. This decision was based on an assessment of the mill’s ability to compete effectively in the bleached board market. As a result, the company will permanently shut down the bleached board machines, as well as the extrusion plant, woodyard, pulp mill and a significant portion of the energy complex at the Crossett mill.

The machine closures will remove 368,000 tons per year of SBS capacity or about 6.3% of the 5.87 million tons/year North American market, according to RISI.

The company also in July will shut down one of the mill’s older tissue machines that doesn’t support the long-term competitiveness of the tissue business.

Approximately 530 jobs at the facility will ultimately be impacted by these closures. About 25 business and sales jobs also will be affected by this decision.

Georgia-Pacific will continue to operate and invest in the Crossett mill to support its consumer tissue and towel business. The Crossett facility has premium product tissue and towel machines and associated converting equipment, so it remains a key contributor to the success of the Consumer Products Group’s retail business. The company will retain approximately 500 employees to manage those operations.

Until the assets are shut down in October, Georgia-Pacific employees will continue to operate the mill in its current manufacturing configuration.

"Our Crossett employees have worked hard to safely and productively manage our operations there, and in recent years we have invested significantly in our operations. However, we have decided that the required investments needed for the bleached board machines, pulp mill and woodyard to sustain the operation long-term are not economically viable," said Monty Brown, senior vice president - Consumer Products Group Operations. "We understand the impact this decision has on our employees, families and the community, and we will work cooperatively with the state and the community to minimize that impact."

Georgia-Pacific’s bleached board business, including supply to the Dixie® business, will be supported from the Naheola and Brewton, Alabama, mills and the St. Marys, Georgia, extrusion facility.
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ND Paper Receives $1.7 Million in Tax Credits for Biron Division Expansion

The Wisconsin Economic Development Corporation (WEDC) on May 22 announced an agreement to provide ND Paper with $1.7 million in tax credits over three years to support the company’s expansion at its Biron division — a project expected to create 27 new jobs.

ND Paper, a U.S.-based subsidiary of Nine Dragons Paper, is planning several major projects, including the conversion of the B25 paper machine from white papers to containerboard products, construction of a two-line greenfield recycled pulp facility and the construction of a water treatment and fiber recovery plant.

“ND Paper’s choice to invest here in Wisconsin shows the company’s continued commitment to our state and their workforce,” said Mark R. Hogan, secretary and CEO of WEDC, the state’s lead economic development organization. “These initiatives will require a significant capital investment on the part of the company and WEDC is proud to provide support to make this a viable project for ND Paper.”

“We are extremely grateful for the support of WEDC and the State of Wisconsin,” said Ken Liu, ND Paper’s group deputy chairman and CEO. “These strategic investments not only create 27 new positions, but also preserve the jobs of our existing workforce of well over 300 hardworking employees. Our vision is to transform the Biron division into a world-class facility that is sustainable for the next 100 years.”

The actual amount of state income tax credits the company receives is contingent upon the number of jobs created and retained, and the amount of capital investment the company makes through 2022. As is the case for all WEDC tax credits, ND Paper must first create the jobs and make the capital investment before receiving any credits.

In addition to the 27 jobs expected to be created by ND Paper, an economic modeling study estimates the project could indirectly generate 31 additional jobs in the region.

West Linn Paper Mill Site to Re-open as Willamette Falls Paper Company

Willamette Falls Paper Company, Inc., a subsidiary of Columbia Ventures Corporation in Vancouver, Washington, in June purchased the papermaking assets associated with the mill located in West Linn, Oregon and has entered into a five-year lease with renewal options for the related real estate and buildings.

The new operation owns three paper machines, capable of making coated and uncoated grades with the potential production capacity of 260,000 tons per year. Willamette Falls Paper Company plans a near-term startup of at least one paper machine, returning it as the only coated freesheet producer on the West Coast. Initially, the mill will employ about 85 people, which will increase as they bring up one or two of the remaining paper machines.

While the mill’s initial focus will be on traditional paper products, the long-term focus on sustainable papermaking will be its key to success. Willamette Falls Paper looks to integrate the use of non-traditional fiber sources such as pulp from wheat straw, agricultural waste and the new farm crop of hemp into the process.

In addition to making paper from sustainable fiber, the mill also plans to work with local waste management companies to help find solutions to improve the recycling rate in the region. Recent export restrictions on paper waste have made paper disposal a problem.

“We look forward to working with former customers to produce the quality products that they need,” said Brian Konen, President of Willamette Falls Paper Company. “Paper has been a part of the West Linn community for 130 years, and I am confident there are many more years of production ahead of us. Our previous employees were shocked and disappointed when the mill shut down 20 months ago, and it has been a goal of mine to find a new owner and restart the plant. Many highly skilled and experienced employees want to return to work in West Linn, and we are excited to welcome them back.”
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See you at the mill.
**EUROPE**

**Sappi Starts-up PM8 at Lanaken Mill after Extensive Rebuild**

Sappi announced that it has successfully started up paper machine 8 (PM8) at its Lanaken mill in Belgium after the machine underwent a grade conversion rebuild. According to Sappi, the rebuild took about two months, and as of June 12, PM8 now has the ability to produce high-quality woodfree coated paper grades in addition to the lightweight coated paper grades it had previously produced.

After a scheduled ramp-up and optimization, the widened product capacity will provide excellent flexibility, allowing the mill to better meet market demands.

Lanaken Mill in north-eastern Belgium is an integrated mill with the capacity to produce 530,000 tonnes of coated fine paper and 165,000 tonnes of bleached chemi-thermo mechanical pulp (CTMP) for own consumption.

**Metsä Board to Establish New Paperboard and Packaging Excellence Center**

Metsä Board announced that it will establish a Paperboard and Packaging Excellence Centre in Äänekoski, Finland. The new center will combine packaging design and R&D excellence under the same roof to be able to boost the development of new paperboard and packaging solutions of the future.

"The new Excellence Centre will enable a wide variety of collaboration, especially in the area of holistic packaging design, throughout the value chain. We will be able to organize packaging design workshops and innovation days together with our customers and partners in order to demonstrate the full potential of our lightweight, fresh fiber paperboards," said Sari Pajari, SVP Sales and Marketing, Metsä Board.

The center is perfectly situated in a bioeconomy ecosystem which is unique in the world. The site is shared with many businesses including Metsä Group’s next-generation bioproduct mill, Metsä Board’s board mill, the Pro Nemus visitor center and a demo plant for Metsä Spring and Japanese Itochu Corporation that will start the production of textile fibers at the end of 2019.

The Excellence Centre will include offices, a laboratory, R&D facilities and a packaging design studio with modern technology, as well as the customer feedback center. Construction planning starts this summer and Metsä Board expects the center to be operational in 2020.

**Stora Enso to Convert Oulu Mill to Packaging Board Production**

Stora Enso has decided to invest approximately EUR 350 million to convert the Oulu paper mill in Finland into packaging production. The investment includes converting paper machine 7 into high-quality virgin fiber based kraftliner production, and the closure of paper machine 6 and sheeting plant.

Production on the converted machine is estimated to start by the end of 2020.

“The conversion of Oulu Mill will enable Stora Enso to further improve its position in the growing packaging business and take a major step forward in its transformation. We have proven competence in running large conversion projects successfully, as we have already converted one paper machine at Varkaus Mill to produce kraftliner,” said Stora Enso’s CEO Karl-Henrik Sundström.

The investment will include a new production line for virgin fiber based kraftliner (both brown and white-top) with an annual capacity of 450,000 tonnes, the modification of the pulp mill and drying machine for unbleached brown pulp, as well as investments to enhance the mill’s environmental performance. The project will start with ground work this summer.

Oulu Mill’s current capacity is 1,080,000 tonnes of woodfree coated papers annually. Paper production is expected to continue until the end of September 2020.

**UPM Closing Paper Machine 10 at Plattling Mill**

UPM towards the end of June concluded the required employee consultation process related to the company’s decision to permanently close paper machine 10 at its paper mill in Plattling, Germany in mid-July. UPM first announced plans for the machine closure in April of this year.

The decision affects 155 employees and reduces coated mechanical paper capacity in Europe by approximately 155,000 tonnes.

Ruud van den Berg, Senior Vice President, Magazines, Merchants and Office Business, UPM Communication Papers, explained, “Among our European coated mechanical machines Plattling PM 10 has both the lowest capacity and the highest technical age. We regret this decision but remain convinced that it will support the competitiveness of both UPM Communication Papers as well as the remaining assets at the Plattling site in the long run.”

UPM noted that paper production on the remaining machines at the Plattling mill — paper machines 1 and 11 — will continue.

Prior to the closing of paper machine 10, UPM Plattling mill had the capacity to produce 785,000 tons per year of coated and uncoated magazine papers (LWC, SC) and employed 590 people.
EUROPE

Zellstoff Pöls Successfully Starts Up Second Paper Machine in Austria

Heinzel Group announced that its subsidiary Zellstoff Pöls has successfully started up a second paper machine at its pulp and paper mill in Pöls (in the state of Styria), Austria.

The new machine, PM3, was constructed over a period of 17 months at an investment of about 130 million euros. PM3 has the capacity to produce 100,000 metric tons of kraft paper per year. The new machine increases the total paper production capacity of the mill to 200,000 metric tons per year.

“The new PM3 is an important part of our strategic growth plan and was designed with a clear focus on low grammage specifically for packaging paper in the food industry and in the hygiene segment because the market for this type of paper is growing rapidly,” said Kurt Maier, CEO of Heinzel Group.

Kurt Maier, CEO of Heinzel Group. “But we also focus on expansion on a different front in Pöls — we are currently working on diversifying towards unbleached pulp, creating the basis for brown kraft paper and the construction of another paper machine.”

The Heinzel Group noted that the mill’s market pulp capacity of roughly 400,000 metric tons per year will not be affected by the increased paper production since the production of pulp will also be expanded further in Pöls.

INDIA

International Paper Announces Agreement to Sell Its India-based Paper Business

International Paper has entered into an agreement with West Coast Paper Mills Limited to sell its controlling interest in International Paper APPM Limited, an India-based paper business. International Paper currently owns approximately 30 million shares, or 75% of the outstanding shares, of International Paper APPM Limited (APPM).

The transaction is expected to be completed by the end of the year subject to satisfaction of customary closing conditions, including obtaining required governmental approvals and West Coast Paper Mills Limited’s (WCPM) launch of a tender offer.

Pursuant to Indian securities law requirements, WCPM will launch a tender offer to acquire up to all of the APPM shares owned by public shareholders, which represents 25% of APPM’s outstanding shares.

The closing of IP’s transaction with WCPM will occur following the completion of the tender offer and receipt of antitrust clearance. Depending on the results of that tender offer, WCPM will acquire from IP between 51% and 60% of the outstanding APPM shares at a price per share of 275 Indian Rupees. Once this transaction closes, WCPM will be responsible for the operations of APPM, and International Paper will be a passive investor until such time that IP has sold its remaining shares in APPM.

“As part of our strategic assessment of the IP portfolio, we have decided to exit our position in IP APPM,” said Mark Sutton, Chairman and CEO of International Paper. “This decision is a reflection of our continued focus on growing our global packaging and cellulose fibers businesses. Our paper business continues to perform well in India and we wish the team there the very best in the future.”

INDUSTRY SUPPLIERS

ANDRITZ to Supply Two Tissue Production Lines to MG TEC Industry

ANDRITZ has received an order from MG TEC Industry to supply two complete tissue production lines for their mill in Dej, Romania. The turnkey order includes two PrimeLine-COMPACTV tissue machines with steel Yankee as well as complete stock preparation systems, pumps, automation, hall ventilation, and electrification.

The new tissue machines will have a design speed of 1,900 meters/min and a width of 2.85 meters. They are equipped with a 15-foot PrimeDry Steel Yankee for energy-efficient and safe operation.

TM1 is scheduled for start-up in 2020 and TM2 in 2022.

MG TEC Industry is a newly formed company focusing on sustainable tissue production.
Domtar has named Marie Cyr as manager of the company’s mill in Dryden, Ontario, effective August 1, 2019. She succeeds Jim Blight, who will retire in August. Since December 2013, Cyr has served as the Windsor Mill’s pulp mill manager and superintendent.

Heinzl Sales announced that Tomas Jonson joins the company as Executive Vice President to its sales and trading business in North America, effective Aug. 1. He will be based out of New York. Originally from Sweden, Jonson is the current CEO of North America for Fr. Meyer’s Sohn.

Port Hawkesbury Paper (PHP) Sales Services (U.S.) LLC announced that, due to the ongoing absence of Tom Gallagher for health reasons, John Picklesimer has been named PHP Sales Services’ Interim President. Since 2017, Picklesimer has held the position of VP, Corporate Accounts and International Sales with PHP, and from 2012-2017 he held the role of Director, International Sales for the Port Hawkesbury Paper Mill.

Rayonier Advanced Materials (RYAM) announced that it is repositioning key members of its senior management team to drive the company’s Go-to-Market strategy and accelerate new product commercialization. Frank Ruperto will assume the role of Senior Vice President, High Purity and High Yield Cellulose Business; Dr. Erin Byers will assume the new role of Senior Vice President, Research and Development; and Marcus Moeltner will be promoted to Chief Financial Officer and Senior Vice President, Finance. Formerly, Ruperto served as RYAM’s CFO since November 28, 2014; Dr. Byers has lead the company’s High Purity and High Yield Cellulose Business; and Moeltner joined RYAM in November of 2017 as Vice President, Corporate Development and Planning.

UPM has appointed Jaakko Nikkilä as Executive Vice President responsible for UPM Specialty Papers business area, effective July 1. He will be based in Helsinki. Currently, Nikkilä is Senior Vice President for UPM Specialty Papers European and North American business unit. He has been in this role since 2018. Before that he was responsible for UPM Specialty Papers sales in APAC region, based in Shanghai for five years. He joined UPM in 1995.

Willamette Falls Paper Company, Inc. announced that Dr. Phil Harding will join the company as the Director of Technology and Sustainability. Dr. Harding has spent the past twelve years serving as the Linus Pauling Chair of Chemical Engineering at Oregon State University.

The American Forest & Paper Association in June announced that Heidi Brock, President and Chief Executive Officer of the Aluminum Association, will join AF&PA as its new President and CEO. Brock is succeeding Donna Harman, who announced her intention to retire earlier this year after 12 years serving as AF&PA’s President and CEO.

The Independent Packaging Association (AICC) announced that Michael M. D’Angelo started his tenure as President of AICC on July 1. D’Angelo has served as Vice President of AICC since October of 2016.

The Confederation of European Paper Industries has appointed Jori Ringman as its new Director General. Ringman succeeds Sylvain Lhôte, who passed away unexpectedly on June 6. Ringman has served as Deputy Director General of CEPI since 2016. He joined CEPI in February of 2005.
AUGUST 12-14, 2019
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Fastmarkets RISI
Renaissance Hotel Sao Paulo
Sao Paulo, Brazil
www.risinfo.com/events

SEPTEMBER 16-18, 2019
AICC Annual Meeting & Package Design Competition
Independent Packaging Association
Westin Harbour Castle Hotel
Toronto, Ontario, Canada
Contact: Laura Mihalick
Lmihalick@aiccbox.org

SEPTEMBER 16-19, 2019
PPI Transport Symposium 23
Fastmarkets RISI
Port Aventura Business & Events Convention Centre
Tarragona, Spain
www.risinfo.com/events

SEPT. 30 - OCT. 2, 2019
Specialty Papers US 2019
TAPPI and Smithers Pira
Pfister Hotel
Milwaukee, Wisconsin, USA
www.specialtypaperconference.com

OCTOBER 1-4, 2019
TissueCon 2019
TAPPI and Fastmarkets RISI
Gaylord Palms Resort and Conv. Center
Orlando, Florida, USA
tissuecon.org

OCTOBER 9-11, 2019
FEFCO Technical Seminar & Exhibition
European Federation of Corrugated Board Manufacturers (FEFCO)
Palexpo (Geneva Airport)
Grand-Saconnex, Switzerland
www.fefco.org/fefco-technical-seminar-2019

OCTOBER 9-11, 2019
MIAC 2019
Edipap
Lucca Fiere Exhibition Centre
Lucca, Italy
www.miac.info

OCTOBER 14-16, 2019
BLRBAC Fall Meeting
Black Liquor Recovery Boiler Advisory Committee
Crowne Plaza Hotel - Atlanta Airport
Atlanta, Georgia, USA
Contact: Barbara Holich: fhholich@aol.com
www.blrbac.org

OCTOBER 14-16, 2019
CorrExpo
TAPPI
Colorado Convention Center
Denver, Colorado, USA
www.correxpo.org

OCTOBER 22-24, 2019
Tissue World Sao Paulo
UBM
Transamerica Expo Center Hall F
Sao Paulo, Brazil
www.tissueworld.com/saopaulo

OCTOBER 28-30, 2019
RISI North American Conference 2019
Fastmarkets RISI
Seaport Hotel and World Trade Center
Boston, Massachusetts, USA
www.risinfo.com/events

NOVEMBER 18-20, 2019
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CEPI
Marriott Hotel, Brussels
Brussels, Belgium
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Introducing . . .
Think Paper

Confronting erroneous news coverage of paper and packaging

By Donna Harman, President and CEO, American Forest & Paper Association

For decades, our industry has been a leader in sustainability, showcasing exemplary environmental stewardship and social responsibility.

AF&PA’s sustainability initiative, Better Practices, Better Planet 2020, includes the most extensive collection of quantifiable sustainability goals for a major U.S. manufacturing industry. To date, our members have reached goals to reduce greenhouse gas emissions, improve energy efficiency and improve worker safety well in advance of the 2020 deadline.

But despite industry-led sustainability initiatives and progress, we have seen an uptick in false or misleading claims about our products — whether in the press, among our competitors, at city halls or in activist campaigns.

Think Paper is a new industry campaign to respond to erroneous news coverage that is influencing policymaker and consumer perceptions about paper-based packaging.

Mandated fees on paper bags are lumped into plastic bag bans across the country. News reports include statements that paper coffee cups cannot be recycled or that online shopping purchases shipped in cardboard boxes are contributing to deforestation. The messages received by the public and policymakers are that paper products are wasteful, problematic and should be regulated or avoided altogether.

But paper-based packaging is often the most sustainable option. Consumers should not be discouraged from supporting our industry and its nearly one million employees by misguided regulation.

Think Paper sets the record straight by communicating the facts about paper products and taking on news coverage when reporters get it wrong.

First and foremost, paper products are useful. They provide accessible, convenient and hygienic solutions to the needs of people across the country and the world.

Paper products are made with wood fiber from sustainably-managed forests, which is a renewable resource. Contrary to popular discourse, avoiding the use of paper products will not ensure there are more trees standing. Continued demand for paper products means continued demand for trees.
In the U.S., the major factors contributing to deforestation are urbanization, conversion to agriculture and natural disasters (such as forest fires). Privately-owned forests supply 91 percent of the wood harvested in the U.S. Using paper supports our nation’s forests by giving landowners a financial incentive to keep growing trees.

AF&PA members have taken voluntary steps to increase the sustainability of their manufacturing processes. This includes work toward achieving the Better Practices, Better Planet 2020 goals to increase energy efficiency, reduce greenhouse gas emissions and reduce water use.

Member efforts include implementing energy efficiency projects in their mills and self-generating the majority of electricity needed to run their operations on-site; generating carbon-neutral biomass fuel on-site; and reusing and recycling water at least ten times throughout the pulp and paper mill process before discharge.

After use, most paper products can be composted or recycled. The U.S. paper recovery for recycling rate reached a record-high 68.1 percent in 2018 — more than doubling since our industry first committed to setting and achieving paper recovery goals in 1990. The recovery rate has been at or above 63 percent each year for the past decade and, by weight, more paper and paper-based packaging is recovered for recycling from municipal solid waste streams in the U.S. than glass, metals and plastics combined.

Our industry takes responsibility for its products by investing in recycling infrastructure and educational campaigns to continue to increase paper recovery for recycling and reach our goal to exceed a 70 percent paper recovery rate by 2020.

For these reasons and more, consumers should choose paper products with confidence and policymakers should recognize that paper products can help to reduce waste and provide a renewable, bio-based alternative to fossil fuel-based materials.

To Think Paper is to think renewable, to think responsible, to think sustainable — and we want everyone to know that for sure.

To stay up-to-date on the Think Paper campaign, visit www.think-paper.com and follow @thinkpaper on Twitter.
Enzymatic Technologies Provide a New Level of Stickies Control

By Rosy Covarrubias, Innovation Director – Packaging, Buckman

Editor’s note: This article was first published in World Pulp & Paper 2019.

Stickies contribute to a significant reduction in efficiency in the practice of papermaking using recycled fiber. The presence of adhesives, binders, tapes and other stickies-creating materials in the incoming pulp leads to machine downtime, a reduction in converting efficiency, final product quality issues and increased waste.

Enzymatic technologies have proven successful in providing stickies control in mills over the past decade; however, on their own they were not able to solve the problem completely for certain types of contaminants. Greater control of stickies at paper mills is now being achieved by combining new generation enzymatic formulations with specific additives to stabilize enzymatic resistant stickies. This approach keeps the stickies small, dispersed, and non-tacky to eliminate agglomeration downstream and keep them fixed into the outgoing sheet. The latest generation of enzymatic technologies has proven to lead to a superior level of stickies control than previous generations.

BACKGROUND

Over the last 40 years the paper industry has experienced several market forces that have influenced the direction of recycled fiber utilization. Many surveys of industry experts have been conducted which indicated that stickies-related sheet quality and machine runnability problems have increased mainly due to marketplace demands for higher sheet quality performance. In order to be competitive in today’s market, papermakers must continue to respond to these ever-increasing sheet quality expectations. The papermakers rely on procedural, mechanical, and chemical methods to control stickies-related problems within their operation. The scope of this article is limited to chemical treatments. Additionally, environmental improvement efforts have limited the use of prevailing chemical technologies for stickies treatment. These main drivers that have influenced recycled fiber utilization can be categorized as technology advancements, the competitive marketplace, and environmental requirements.

Technology Advancements. Papermaking technology improvements as well as the consumer technology evolution have taken sheet quality expectations to higher levels. The main dilemma is centered on the notion that the paper industry’s quest to meet the market demands for higher sheet quality standards is one of the main contributing factors to the problems associated with stickies. The cycle starts with a consumer need to enhance the look and feel of a paper product. A marketing company may request that their paper have improved brightness, softness, strength, or printability in order to create a more distinctive and vibrant advertisement. In order to meet this demand, the competitive marketplace drives chemical innovation. It is this very innovation that leads to the creation of improved ink binders with longer water penetration hold out. As these improved ink binders become a part of the recycled fiber market, the same innovation that led to their development results in a sheet with more tenacious stickies deposits. Several paper industry technology advancements are highlighted in Diagram 1.

Competitive Marketplace. The paper industry has experienced company consolidations, paper demand reductions, and global capacity realignments that have affected the distribution and
usage of recycled fiber. Diagram 1 depicts the emerging technologies and market place drivers that continue to reshape the recycled fiber market. Many of these factors represent challenges for papermakers. Global recycled fiber demands have influenced the price and quality of recycled fiber. Papermakers no longer demand clean, consistent recycled fiber from their suppliers. Instead, papermakers accept lower quality, contaminated recycled fiber because it is affordable and available. At the same time, chemical innovation has increased the tackiness of stickies, and global recycled fiber demand has increased the potential for increased contamination in recycled furnish.

**Environmental Requirements.** Throughout the 1970s, 1980s and 1990s, the U.S. Environmental Protection Agency enforcement efforts have caused papermakers to scrutinize the chemical additives used in the papermaking process. Some of the reliable cleaning agents used in the 1970s and 1980s have been phased out due to environmental restrictions. Even some of the less aggressive detergents used in the 1990s have been banned due to clean water and clean air regulations. Currently, several paper companies have implemented a lower risk approach to chemical additives by eliminating the use of products that contain even the slightest level of hazardous pollutants. As much as the improved quality demands and the competitive global marketplace have adjusted the stickies control arena, the environmental regulations have changed the pool of potential chemical actives available for use as stickies control products.

**DISCUSSION**

These market forces have shifted the perspective of consumers into a new competitive marketplace full of increased sheet quality possibilities. In order to be competitive in today’s market, papermakers must continue to respond to these ever-increasing sheet quality expectations. The papermakers rely on several methods to control stickies-related problems within their operation. The scope of this paper is limited to chemical treatments. A survey of papermaking experts confirmed that the level of sheet quality expectations appears to be increasing at a much faster pace than the chemical stickies control technologies.

The traditional chemical control strategies have improved over the years. In some cases, the demand for increased sheet quality has outrun the capacity of chemical treatments to control stickies-related problems. Once a mechanical contaminant removal process has been optimized, papermakers rely on chemical treatments to control the remaining stickies-related issues. It seems that chemical stickies control technologies were simply falling further behind the rapid increase in stickies-related machine runnability and sheet quality.
complications caused by these increased sheet quality demands. PapERMakers were frustrated with chemical treatments that seemed to transfer the stickies from one area of the machine to another surface or end up in the sheet as a large agglomerated stickie causing converting issues.

One reason for this gap between sheet quality and chemical technology performance is that most of the chemical treatment strategies do not address the root cause of stickies-related problems. To effectively manage stickies, they must be purged from the process. Table 1 summarizes the major classifications of stickies to provide a more comprehensive appreciation for the complexity surrounding the chemical nature of stickies.

It is worth noting that the chemical nature of stickies continues to evolve as glue manufacturers continue to develop new technologies.

More than 15 years ago Buckman introduced the pulp and paper industry to enzymatic stickies control with their Optimyze technologies. These products have proven successful in controlling stickies in many mills but could not always eliminate the stickies issues completely. One of the main reasons for this result is that this line of enzyme-based stickies control products contained one enzyme that broke bonds mainly in the Poly Vinyl Acetate (PVA) type stickies. While the PVA stickies make up a large proportion of problematic stickies, there are always other stickie types that contribute to the issue. In addition, in most cases, stickie deposits contain wood pitch and other additives.

Enzymes are naturally occurring proteins that are used by living organisms to enhance the efficiency of specific chemical reactions. Enzymes are not consumed in a single reaction. In fact, enzymes can participate in millions of reactions per minute. However, system conditions such as pH, temperature, or interfering chemical residuals will break down enzymes over time. The enzymes in this product act together as a catalyst to facilitate the hydrolysis of the ester linkage of stickie materials containing acetate and acrylate components. This hydrolysis reaction alters the chemical structure of the stickie resulting in a less stable, less tacky material. The chemically altered stickie complex breaks apart into smaller particles.

**Figure 2** shows the effect of the enzymatic treatment on stickies size. **Figure 3** shows the effect of the enzymatic treatment on surface changes and reduction of tackiness.

To help close the gap created by worse quality furnish and changes in stickies chemical composition between increased sheet quality demands and chemical technology performance, Buckman has continued to develop a new generation of products that are more robust and address a broader range
of stickie contaminants: the Optimyze® Plus technologies. These new products all contain combinations of different stickies control chemistries. It can be a combination of enzymes or enzymes with other types of stickies control chemistries. The result is products with a broader range of activity in controlling problematic stickies. These products are patented technologies.

**CURRENT APPLICATIONS**

**Case History 1**

A South American Kraft/Recycled linerboard mill suffered from severe issues with stickies, causing holes, breaks and lots of costly downtime to regularly wash up. A specific enzymatic formulation was used to solve this problem for immense benefits, including:

- Cleaner system, reduction in hemocytometer (pitch/stickies) test measurements.
- Increased production, less stoppage due to breaks and forced downtime for washups.
- Significant ROI per year.

The product was applied to treat the stock that goes to the three paper machines PM#A, PM#B and PM#C, as shown in Figure 4.

The basic paper mill conditions are listed in Table 2.

**Table 2.** Paper machine information and additives.

Aside from great savings, the mill personnel were very happy to not have to clean and thread the machine so often.

**Case History 2**

A North American Fourdrinier machine was producing 650-720 tpd recycled medium from 100% OCC. This machine had difficulties in reaching budgeted production for the last year due to stickies related runnability issues. Stickies contamination is primarily poly vinyl acetate that causes dryer can and felt deposits. When deposits build, moisture variations in drying occur and even break free causing debris breaks. The cost of the problem annualized is more than $2.5 million of lost production and increased steam demand.

**Problem Description:**

- Sampled deposits from press rolls, dryer fabric, and dryer rolls tested positive for PVA stickies.
- As agglomerated stickies adhere to wire, wet felts and dryer fabrics the CD 2 sigma moisture profile starts to move upward.
• Machine tenders then spend a significant amount of time chasing the profile with slice and steam box adjustments.
• In wet spots, the slice is restricted to feed less fiber in hopes of allowing the sheet to dry evenly.
• As Concora test results drop in those areas, basis weight is then added to improve the overall sheet strength.
• Once the issue becomes unmanageable, downtime is required to batch wash the dryer felts.
• When large stickies deposits break free in the dryer sections they cause holes/breaks referred by the mill as “debris breaks”.
• In addition to the lost time from washups and breaks, the mill has to reject a significant amount of production for high CD 2 sigma moisture profiles, and decrease speed to make quality tests.

In an attempt to reduce debris related breaks, the mill added a significant amount of a detackifier to the machine chests. This attempt was unsuccessful as the #1 machine had to continue to perform unscheduled boilouts.

An extensive site survey (pH, temp, oxidants, consistency, contact time) needed to be conducted to ensure the environment is conducive for the enzyme package.

A different enzymatic product than the one used in the previous case was initially added to the short fiber surge chest pump feeding the HiD at 1#/ton. Stickies testing was performed on stock samples and repulped retains using the Buckman macrostickies dye method. Machine key performance indicators were measured in CD 2 sigma moisture profile, Uhle vacuum levels, steam demand, breaks, downtime for washing, rejects by reason (team leader report), and stickies deposits at the winder. After a few upsets with the HiD tank inventory running low, we made an application point change to the top of the short fiber surge chest which gave us an extra 30 minutes of contact time.

Although we performed daily composite macrostickies testing, the true key performance indicator was the CD 2 sigma moisture variation on the machine. This moisture profile directly correlated to stickies buildup and fabric cleaning. The Xbar–R Chart below shows moisture variation in hourly subgroups of 48 by pre-trial, trial, and post-trial (Figure 5).

The next building block in establishing efficacy is the measure of steam demand. Dryer steam demand will decrease with consistent and even drying. Less buildup on the dryer cans and fabrics allow the mill to use less steam. Note that in times of breaks, reduced production, or runnability bottlenecks, steam demand will also be low because they simply are not at optimum speed or production.

Figure 6 shows steam usage in the same Xbar-R format. Notice the reverse trial period steam usage is not significantly higher than our trial period. This is primarily due to a significant decrease in production.

Case History 3

A 100% Recycled OCC North American mill producing 1600 tpd of linerboard was having issues with downtime due to stickies debris at the drier section. Pre-trial lab work indicated Optimyze® Plus 742 reduced stickies by 45%. In addition to reducing the amount of stickies, Optimyze also detackified any remaining stickies to further reduce downtime.

Optimyze Plus 742 was applied at a rate of at 1 lb/ton and was later reduced to 0.5 lb/ton to the thickener inlet. From the thickener, a portion of the product moves forward with stock to treat stickies on the machine and the rest goes back into the OCC plant to treat stickies in the back system.

Downtime data was taken for a period of four months. Only downtime for sheet breaks and washups was included in the total downtime. From the total downtime, a subset was manually sorted out which could be attributed to stickies related debris breaks. This debris-related downtime excludes such breaks as those related to draws and wads of paper from previous sheet breaks but does include downtime for washups.

Stickies are measured using Buckman’s proprietary...
fluorescent stickies dye with a quantitative image analysis method. Image analysis provides repeatable data on the total surface area of a dyed 150 mm hand sheet. Image analysis software outputs a count of stickies particles, total area of stickies on the hand sheet, the average size of the stickie particle, and the percent area of the hand sheet covered in stickies. The most repeatable measure of stickies content is the percent area.

Data collected for one month before the trial versus data collected during the trial shows a 45% reduction in stickies at the headbox as well as similar reductions on coarse screens, fine screens and high density storage (see Figure 7).

**Results:**
- Reduced stickies on the machine and in the OCC plant.
- Reduced debris-related downtime by 64.8%.
- For the month of October (the first full month that the chemical was pumped) the following records were set for PM 1:
  - Fewest breaks/month.
  - Most tons produced in a month.
  - 24-hour average speed record for 26 lb medium was set during the trial and broken twice more during the trial.

The estimated ROI of the program for this mill due to decrease in debris-related downtime and increased revenue for uptime increase was calculated to be around $1,800,000 per year.

![Figure 7. Stickies size reduction with the addition of Optimyze.](image)

**CONCLUSIONS**

The introduction of enzymatic stickies control marked the first chemical technology that addressed the root cause of stickies-related deposition: the tacky nature of the stickie.

Buckman’s patented enzymatic technologies include actives that work together to reduce the size of stickies by breaking the key bonds that are present in the chemical structure of most acetate- and acrylate-containing stickies deposits. Due to the variability of recycled furnish, papermakers rarely have stickies-related deposits from only one type of contaminant. Most stickies deposits found on paper machines or in sheet spots contain a blend of two or more combinations of stickies.

The Optimyze® Plus products have been developed to broaden the range of action to control stickies. Combinations of enzymes and other stickies control chemistries like detackifiers and dispersants are in use or in development. Research into new products continues to help pulp and paper producers fight the stickies that come with the use of recovered fiber and address the new developments from the glue manufacturers.

Following are several of the key areas that need to be considered when calculating the potential ROI with these technologies:

- Improved Machine Efficiency = Fewer Breaks
- Improved Sheet Quality = Fewer Holes/Picking
- Reduced Washup Time = Less Downtime
- Reduction in Overall Chemical Treatment Spend = Less Cost
- Eliminated Chemical Makedown = Less Cost

**References:**


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Understanding Rod Lines and How to Eliminate Them

By Wes Buschman

Metering rods are relatively small parts in the large and complex processes of manufacturing paper, paperboard, linerboard, film, and other products. Manufacturers of these products know that to deliver the quality their customers demand, their processes must be carefully controlled to apply the highest quality coatings with precision and consistency. At the heart of the coater, the metering rod controls the application of coating, therefore playing a critical role in the coating process.

What Rod Lines are in Paper Coating

Rod lines are a series of machine direction (MD) lines sometimes seen in paper coating. The spacing of the lines usually matches the pitch of the thread as shown in Figure 1.

Rod lines are caused by a failure of the metered coating to adequately level.

According to the Coatings Technology Handbook, 3rd Edition, “leveling is the critical step to achieve a smooth and uniform coating. During the application of coatings, imperfections such as waves or furrows usually appear on the surface. For the coating to be acceptable, these imperfections must disappear before the wet coating (fluid) solidifies.”

While MD waves and furrows are a natural occurrence in metering rod coating, they will not cause a problem with your finished product as long as conditions exist to allow the coating to level after it passes the metering rod and before it reaches the dryer section.

Unfortunately, this is not always the case. If you are seeing rod lines in your finished coating, successfully addressing them will increase the quality of your finished product. If done properly, coaters can dramatically increase operational efficiency and reduce costs.

Application Changes that Can Lead to Rod Lines

Buschman provides customized metering rod solutions to paper mills, paperboard mills, linerboard manufacturing plants, and converting plants around the world. When we see rod lines in the field, it’s often the result of a misguided attempt to improve operational efficiency.

While all manufacturers have the goal of increased efficiency, common methods used to achieve this goal can have negative consequences. Here are the most common methods we see and how they can go wrong:

• Increasing Coating Solids: Boosting the percentage of solids in a coating solution means that less wet coating needs to be applied to achieve the desired dry coat weight. Since less liquid is being applied, less time is required to dry the coating and line speeds can therefore be increased. Increasing solids, however, usually means viscosity will rise as well. When viscosity rises, so does the coating’s resistance to leveling.

• Increasing Line Speed: If your coating operation is not dryer limited, you may simply be able to increase line speed. However, this reduces the amount of time the coating has to level and a product that was previously smooth and uniform may develop rod lines with this change.

• Increasing Loading Pressure (Backing / Transfer Roll Applications): As line speeds increase, the hydrodynamic force of the coating can force the substrate away from the rod. To compensate, loading pressure may be increased. But if loading pressure becomes excessive, the threads can begin to penetrate the substrate, effectively choking off the open area of the thread and diminishing coating volume.

How to Eliminate Rod Lines in Paper Coating

If high line speeds and coating viscosities are the enemy of leveling, then diluting your coating and / or reducing line speed are obvious quick fixes, but steps backward in efficiency.
A much more cost-effective way to eliminate rod lines and increase your efficiency is to use a metering rod with a thread shape engineered to aid in the leveling process. Figure 2 illustrates a comparison between two very different thread profiles.

This example shows the effect of thread shape on leveling. The rod on the left has a very wide crest that may not allow the coating to fully level after metering. The rod on the right is designed with a narrow crest, effectively reducing the amount of leveling that needs to occur after metering.

The impact a custom-designed thread shape can have on coating smoothness and uniformity is enormous. Figure 3 shows a comparison between a wire rod and two grooved rod profiles engineered to address different coating challenges.

Determining the right thread for your application can be a challenge. A close partnership with your metering rod supplier is critical to this process. The thread profile should be optimized to provide the highest possible finished coating quality.

Other Thread Selection Variables to Consider

Smooth and uniform coating, free of defects such as rod lines, is the most important factor when selecting a thread profile. However, profile selection impacts other areas that should be taken into account:

- **Rod Life**: Rod life can be increased by choosing a thread with a higher Crest/Lead ratio. Increased surface contact with the substrate being coated provides a larger wear surface. The tradeoff is that a wider crest will generally lay down coating that does not level as easily as coating applied with a narrow crest.

- **Resistance to Contamination**: Back in the dark ages when all rods were wire wound, the only shape of the root was a sharp point where the wire windings met. This narrow root area can catch debris and clog during operation, and is difficult to clean between coating runs. Choosing a grooved rod profile with a more open root will generally allow the rod to stay cleaner during operation and make it easier to clean between coating runs.

- **Backling / Transfer Roll Life**: In applications utilizing a backing or transfer roll, the friction between the rod and the roll can lead to premature failure of the roll cover causing costly downtime and expensive re-grinds. Selecting a thread that applies the right amount of coating with the minimum amount of loading pressure is crucial to keeping your roll covers in good shape for as long as possible.

Precision-crafted metering rods, customized to your application, can help you avoid rod lines and other defects and achieve your goals for coating quality and accuracy.

**About Buschman**

Buschman (buschman.com) is a metering rod technology expert and supplier for the paper and converting industries. Buschman designs and manufactures custom-engineered metering rods and rod holders for paper mills, paperboard mills, linerboard manufacturing plants, and converting plants across the globe. Buschman is headquartered in Cleveland, Ohio and has representatives around the world.

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Improving the Performance of Fourdrinier High Vacuum Sections

Patented steam shower technology for advanced water removal on Fourdrinier machines results in better drainage, lower energy use, higher CD moisture quality, and lower operating costs.

By Ken Barbour

Today, excessive steam spillage and high energy costs are detrimental to proper operation of modern paper, board or pulp machines. Recognizing this, the IBS Paper Performance Group has invested in research, development and patenting of new advanced technology that is not simply a new steam box design but is truly a significant advancement in wet end dewatering for all grades. This technology increases dewatering in both MD and CD directions to a far greater level than possible with previous steam box designs.

What is a Super Steam Vac®?
The IBS Super Steam Vac (SSV) is an engineered system solution for improving the performance of fourdrinier high vacuum sections in general, and steam boxes in particular. The SSV, a patented steam shower technology for advanced water removal on Fourdrinier machines, results in better drainage, lower energy use, higher CD moisture quality, and lower operating costs.

The IBS SSV is a system which allows application of up to 22 inches of Hg vacuum through a Super High Vac box specifically built to handle the large volume of air and water. It combines IBS cover technology for high temperature applications with the low velocity steam shower technology developed and patented by Transphase Technology.

The Evolution of the SSV
Modern steam boxes were first introduced to the fourdrinier in the late 70’s and produced good results for machine dryness, but they suffered from stock build up on the bottom surface that resulted in sheet breaks. The boxes were also not energy-efficient and produced a combination of steam spillage and sheet breaks. This led many customers to remove the fourdrinier steam boxes and install a new steam box in the press.

However, press steamboxes still have technological limitations such as low dwell time, lack of vacuum, build-up, compressed sheet stratification, and mechanical limitations of space and access for maintenance.

This all changed in 2014 when IBS — in partnership with Transphase Technology — introduced a new concept combining super-high vacuums with low velocity steam shower technology. Compared to high velocity steam applications, low velocity steam can be applied with low outlet pressures that do not disturb the sheet surface. The patented Transphase steam diffuser technology has revolutionized the application of low velocity steam onto a fourdrinier sheet, significantly reducing or eliminating fiber accumulation on the bottom of the steambox. In combination with the IBS Super High Vac technology, the SSV has proven to run without the sheet breaks and the steam spillage seen with traditional steam boxes while operating at +1.5% to 2% more solids off the fourdrinier.

Vacuum and Sheet Temperature
The high-vacuum and efficient steam penetration allows for
excellent CD moisture control. Process bump response of greater than 2.5% with a width of response as narrow as 2x actuator width.

High vacuum is attained by optimizing the open area of the cover and redistributing the existing vacuum supply. Even with higher applied vacuum, similar or lower fourdrinier drive loads have been observed due to an optimized open area, proper vacuum graduation, and lubrication of the cover.

Due to the improved steam penetration, the typical 4 to 1 ratio of couch to press solids improvement is increased due to the high temperature carried through the press. Typical sheet temperature of the sheet before the couch is up to 90 C.

While the suction couch performs effectively in terms of drainage, it produces negative effects in terms of sheet temperature. The ambient air surrounding the machine is typically much cooler than the sheet temperature. As this ambient air is passed through the sheet structure across the couch vacuum zones, the effective sheet temperature is decreased. In most cases, by increasing the drainage capacity on the Fourdrinier, the need for couch vacuum can be reduced or even eliminated. This allows the sheet to enter the pressing section at a much higher temperature while maintaining comparable sheet solids. This higher sheet temperature increases efficiency in the pressing system and dryer section.

**SSV Components**
The Super Steam Vac is a system consisting of many components that are engineered to work together producing outstanding results.

**Transphase Z-Box Steam Profiler®**. This steam box was developed to provide maximum steam heating in both MD, CD and ZD directions. The older steam boxes use of high velocity steam — up to 10x machine speed — results in billowing clouds of steam (energy) escaping from under the steam box. The high velocity steam is too high to allow the vacuum being applied under the steam box to be pulled into the sheet.

Transphase, recognizing the need for low velocity steam to be applied to the sheet, designed and patented its unique Z-Plate. This design utilizes a low velocity steam that is applied into a wedge diffuser that increases dwell time and holds the steam against the sheet while giving the vacuum under the box time to pull the steam into the sheet.

IBS then proceeded to review studies done by The Paper Institute on the effect of steam heating a moving web. They were then able to combine this advanced low velocity steam distribution system with a high vacuum system under the steam box to obtain up to twice the normal steam box performance. To achieve this performance, IBS has had to develop vacuum design expertise and drive load expertise to ensure that the whole module operates as a unit.

**Super High Vac including cover and air/water separator.** IBS developed ceramic vacuum dewatering boxes, cover designs, and vacuum factors for each paper grade. These new components exceed the current TAPPI (Technical Association of the Pulp and Paper Industry) standards, and are only available from IBS PPG.

The SHV is supplied as either a 2- or 3-chamber vacuum box reinforced to operate at vacuums up to 24 inches Hg and sized to handle the larger air and water flows associated with the SSV. The tapered bottom facilitates water flow to the separator, which is designed to match the air flow, water capacity, and vacuum capacity.

**Results and Benefits**
The results and benefits for paper producers include:

- Machine speeds increased up to 15% depending on grade
- Reduction of CD moisture profile variation up to 70%
- Reduction in steam use of older steam boxes by up to 50%
- Elimination of steam spillage through computer simulation of each application
- Elimination of water and air/water sprays from paper machines
- Reduction in dryer energy use
- Reduction in couch vacuum which increases sheet temperature into the press section, leading to a solids increase into the dryer
Evaluating and Reporting the Results

Through computer simulation, IBS can simulate the application and design steam diffusers, vacuum box covers, vacuum factors and vacuum level to ensure that all the steam used is condensed into the sheet. This eliminates spillage and minimizes energy used for maximum results. The result is an engineered system designed to deliver the maximum results in MD, CD and ZD while minimizing energy use.

**LINERBOARD**

**Machine Configuration:**
- Furnish: 100% OCC
- Freeness: 41 to 35°SR - 280 to 350CSF
- Base weight: 112 to 220gsm – 23 to 45 #/1000ft²
- Sheet width: 5300mm - 209 inches
- Speed: 762mpm - 2500fpm
- Vacuum configuration: Quadvac @ 40.6/54/67/79.5 kPa - 12/16/20/23.5 inHg

**Results:**
- Decreased couch vacuum from 74.5 to 44 kPa - 22 to 13 inHg.
- Increased pre-couch solids up to 7%
- Increased solids off couch up to 5%
- Post-couch temperature increased from 55 to 72°C - 132 to 163°F
- Up to 4% less dryer steam consumption on liner grades
- Up to 6% less dryer steam consumption on medium grades
- Significantly reduced couch drive limitation

**PULP**

**Machine Configuration:**
- Furnish: softwood
- Base weight: 938gsm - 190 #/1000ft²
- Sheet width: 4420mm - 174 inches
- Speed: 128mpm - 420fpm
- Vacuum configuration: Duovac @ 45/70 kPa – 13.2/20.6 inHg

**Results:**
- Increased solids off couch by 2.5%
- Increased solids into dryer by 2.3%
- Up to 8% reduction in dryer steam use
- 10% speed increase
- 50% less steam consumption than existing steam box
- Sheet temperature into dryer increased from 47°C to 63°C - 116°F to 145°F

**LAMINATING PAPER**

**Machine Data:**
- Furnish: softwood / hardwood mix
- Freeness: 45 to 18°SR - 250 to 650CSF
- Base weight: 41 to 160gsm - 8 to 33 #/1000ft²
- Sheet width: 3400mm - 134 inches
- Speed: 400mpm - 1300fpm
- Vacuum configuration: Duovac @ 54/74.5kPa – 16/22 inHg

**Results:**
- Vacuum configuration: Duovac @ 54/74.5 kPa - 16/22 inHg
- Over 9% speed increase across grade structure in winter (more expected in summer)
- Up to 12% increased runnability
- More than 30% 2sigma moisture improvement on manual control
- 80% reduction in couch vacuum which eliminated couch roll marking on sheet
- 28°C (50°F) temperature increase of sheet into the press
- Increased pre-couch solids by 7%
- Increased solids into the dryer by 2%
- No steam spillage
- Reduced linting in dryers due to higher press solids
- Complete absence of sheet contamination or dripping from steam box

**SACK GRADES**

**Machine Configuration:**
- Furnish: 100% Virgin SWD
- Freeness: 24°SR - 525CSF
- Base weight: 244 to 381 gsm - 50 to 78 #/1000ft²
- Sheet width: 6096mm - 240 inches
- Speed: 853mpm - 2800fpm
- Vacuum configuration: Duovac @ 47/74.5 kPa – 13.9/22 inHg

**Results:**
- Elimination of 2 couch vacuum pumps
- Increased sheet temperature into the press from 54.5 to 71°C - 130 to 160°F
- Increased sheet temperature into the dryer
- Reel moisture decreased by 1%
- Up to 5% reduction of total steam consumption
- Up to 6% speed increase

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Researchers based at Imperial College London have developed low-cost, smartphone-linked, eco-friendly spoilage sensors for meat and fish packaging. The researchers say the new sensors could help detect spoilage and reduce food waste for supermarkets and consumers.

The laboratory prototype sensors — known as ‘paper-based electrical gas sensors’ (PEGS) — cost two US cents each to make. The sensors detect spoilage gases like ammonia and trimethylamine in meat and fish products. The sensor data can then be read by smartphones, so that people can hold their smartphone up to the packaging to see whether the food is safe to eat.

Dr. Firat Güder’s team at Imperial’s Department of Bioengineering made the sensors by printing carbon electrodes onto readily available cellulose paper. The biodegradable materials are eco-friendly and nontoxic, and are safe to use in food packaging. The sensors are combined with ‘near field communication’ (NFC) tags — a series of microchips that can be read by nearby mobile devices.

The researchers say the sensors could eventually replace the ‘use-by’ date — a less reliable indicator of freshness and edibility.

“Although they’re designed to keep us safe, use-by dates can lead to edible food being thrown away. In fact, use-by dates are not completely reliable in terms of safety as people often get sick from foodborne diseases due to poor storage, even when an item is within its use-by,” Dr. Güder explained.

“Citizens want to be confident that their food is safe to eat, and to avoid throwing food away unnecessarily because they aren’t able to judge its safety. These sensors are cheap enough that we hope supermarkets could use them within three years,” he added.

During laboratory testing on packaged fish and chicken, PEGS picked up trace amounts of spoilage gases quickly and more accurately than existing sensors, at a fraction of their price.

Current Sensors

According to the research team, existing food spoilage sensors are not commonly used because they’re either too expensive (often comprising a quarter of overall packaging costs) or too difficult to interpret. Color-changing sensors could in fact increase food waste as consumers might interpret even the slightest color change as ‘bad food.’

The researchers say PEGS technology aims to address both these issues. As well as being cheaper to produce and easier to interpret with electrical readings, the researchers found that PEGS overcome many of the disadvantages of current gas sensors.

• PEGS function effectively at nearly 100% humidity, where most sensors struggle above 90 per cent.
• PEGS work at room temperature and do not need to be heated, so they consume very low amounts of energy.
• PEGS are sensitive only to the gases involved in food spoilage, whereas other sensors can be triggered by non-spoilage gases.

What’s Next?

The researchers used ballpoint pens and robotic cutters to create the sensors. “We believe our very simple technique could easily be scaled up to produce PEGS on a mass scale by using existing high-volume printing methods such as screen printing and roll-to-roll printing,” Dr. Güder said.

The authors hope that PEGS could have applications beyond food processing, like sensing chemicals in agriculture, air quality, and detecting disease markers in breath like those involved in kidney disease. However, before they can be applied beyond their current use, the researchers hope to address how sensitive PEGS are to lower humidity.
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