



WINTER

2021—2022

Board

METSÄ BOARD PROFESSIONAL MAGAZINE

Finding the optimal
packaging with
3D simulation

Online grocery
boosts innovation

Bio-based
design is here



CHERISHING THE SWEETEST THINGS

Virtual simulation

3D simulation enables 85% faster packaging development than the traditional way of testing with physical prototypes.



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SHORTS

100% recyclable paperboard lid. Smart glasses technology. Sustainability Unfolded. At the core of future work. Bioactive products from birch bark. Packaging that reduces food waste. 35 million trees. **page 4**

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The capacity of the folding boxboard machine in Husum grows. **page 8**

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Theme:

SWEET AND SAFE

Chocolate is the master class of demanding paperboard end-uses. We know how to success. **page 14**

Together on the road to a fossil free future

The world is looking for more sustainable packaging – and rightly so. Climate change requires rapid action and fossil free solutions. But the thing is, nobody knows exactly what the future has in store: growing consumer expectations and evolving legislation drive rapid and sometimes unpredictable change.

The challenges across the packaging life-cycle are such that no one has the means to tackle them on their own. Building strong collaboration networks is the answer.

So we are inviting you to work with us to jointly create packaging solutions that change the world for the better. By working together, we can address and optimise the entire product life-cycle – from material development to production and design for recyclability.

In this magazine, we have gathered articles from across the packaging value chain: from the megatrends affecting our business to future packaging design trends and innovation with partners, supported by our 360 Services. I hope the stories about the variety of solutions paperboard packaging can provide will be an inspiration, and look forward to co-creating new solutions with you.

Finally, I would like to extend my sincere thanks to all our customers and partners for your continued cooperation in these exceptional times. Together, we can discover what the future holds.

Mika Joukio



SHORTS

100% recyclable paperboard lid for takeaway cups

Collaboration between Finnish start-up The Paper Lid Company and Metsä Board has led to the development of a 100% recyclable paperboard lid for use with takeaway beverage cups. It uses a novel technology developed by The Paper Lid Company that makes it possible to form the paperboard into the desired shape. The result is a one-piece lid that clicks firmly in place and offers a great user experience.

“Paperboard made from renewable fresh fibre is by its nature a sustainable raw material, and by pooling our expertise with Metsä Board’s we have been able to innovate a new solution that we believe has tremendous potential to change the takeaway cup market,” says **Matti Salonoja**, founder of the The Paper Lid Company.

The carbon footprint of a paperboard lid is more than 50 per cent lower than that of a plastic lid, and the paperboard lid is fully recyclable.

The new one-piece lid made of dispersion barrier paperboard clicks firmly in place and provides a positive user experience.

1 —

1 — TECHNICAL ASSISTANCE FROM A DISTANCE WITH SMART GLASSES TECHNOLOGY

To help customers with training, quality optimisation, trials and more, as part of Metsä Board’s 360 Services the company is now employing the latest in cutting-edge smart glasses technology from Iristick.

The glasses can be dispatched to a customer within days and allow experts to provide support remotely, acting as the customers “eyes and ears”. They support audio, zooming, video recording and screen capture capabilities, as well as text communication in 30 languages.

“While the glasses cannot replace face-to-face visits, they are a valuable tool that allows us to provide timely assistance. We see and hear what the customer does, so we can ask questions and provide recommendations based on facts instead of guesswork,” says **Koen Verplancke**, Technical Development Director at Metsä Board.



2 — ‘SUSTAINABILITY UNFOLDED’: STRAIGHT TALK ABOUT HOT TOPICS

The need for easily understandable information regarding sustainability issues is constantly increasing. By creating the “Sustainability Unfolded” editorial platform, Metsä Board aims to provide a consumer-oriented and fresh way to open up and address sustainability topics, especially in the context of packaging sustainability.

“The way ‘Sustainability Unfolded’ talks about these complex issues is somewhat unconventional for the industrial B2B-sector. The goal is to stimulate and engage the reader, and encourage everyone to look at the topics from a wider viewpoint,” states **Marjo Halonen**, VP Communications at Metsä Board.

How do you think “Sustainability Unfolded” succeeds in addressing themes like deforestation, climate change, recycling, and greenwashing?

Go and check it out: www.sustainabilityunfolded.com



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Texts: Metsä Group, Silja Eisto
Photos: Hannu Rainamo,
Elisa Karhula

SHORTS

At the core of future work

In early 2022, a demo plant will be launched at Metsä Group's mill site in Äänekoski, Central Finland, to make wood-based 3D fibre products. The technology applied in the plant converts wet wood pulp into final 3D fibre products without any intermediate steps.

The short-term goal of the 3D fibre project is to develop a novel, durable, environmentally friendly and easy-to-use food package. If the demo plant phase validates the concept as sound, the next step will be the construction of a commercial factory in Finland in the years to come.

"There is a lot of buzz around the bioeconomy. It's great that Metsä also has the opportunity to be involved in higher risk projects through Metsä Spring," says **Jarkko Tuominen**, VP, Projects at Metsä Spring.

The plant is being built in cooperation between Metsä Group's innovation company Metsä Spring and Valmet.



The 3D fibre product core team photographed in Äänekoski.

1 — BIOACTIVE PRODUCTS FROM BIRCH BARK?

Metsä Group's innovation company Metsä Spring has made an equity investment in Innomost Ltd, a start-up producing valuable bioactive products from birch bark.

Innomost intends to produce valuable ingredients for the cosmetics and personal care industry, as well as for other industrial applications. Metsä Group has several mills which may provide birch bark for the production.

The present product portfolio of Innmost includes betulin, suberin, birch charcoal powder, and birch bark powder. These ingredients can be used in different cosmetic product categories, including skincare, haircare, body care, decorative cosmetics, and oral care.

Innomost currently operates in Central Ostrobothnia on the west coast of Finland with **Maria Svinhufvud** and **Sami Selkälä** as founding members.



2 — PACKAGING THAT REDUCES FOOD WASTE

Kari Kastari, Managing director of Tuorekartano, a company specialising in packing and selling Finnish potatoes, says that more and more consumers – especially younger ones – expect packaging to also be sustainable.

Tuorekartano seeks to actively reduce the amount of plastic in its packaging and boost the use of recyclable packaging material.

"We want to offer alternatives to consumers and be true to our word. We have chosen the road of eco-friendly acts," says Kastari.

In the summer of 2021, the company launched a new recyclable paperboard package that holds 650 grams of new potato. The size of the package is one way to reduce food waste.

The package is made from MetsäBoard Prime FBB EB folding boxboard, featuring dispersion barrier coating. The delicate nature of new potatoes was taken into account in the packaging design. The package has pinholes for oxygen and is slightly slanted. This leaves enough space between the packages, enables the potatoes to breathe, and prevents the accumulation of moisture.

The paperboard package has been popular among consumers, with more than 60,000 sold during the test marketing last summer. The package is being further developed, and an upgraded version will return to the market in the summer of 2022.

35 million

Metsä Group and forest owners planted 35 million trees in Finnish forests last summer. Well done!



Answering the market's call

Metsä Board will answer the growing demand for sustainably produced packaging material by investing in the folding boxboard machine at the Husum mill in Sweden.

Silja Eisto, photo: Metsä Group

Nearly all paperboard produced at the Husum mill is shipped to Americas and EMEA regions.

FIGURES

50%

The investment increases the annual production capacity of the Husum folding boxboard machine by 50%. The additional capacity will enter the market in 2024–2025.

0%

The share of fossil-based energy will be 0% at Metsä Board's mills by 2030.

EUR 210 million

The amount Metsä Board is investing in sustainable packaging materials by increasing production of folding boxboard.

Metsä Board is strengthening its position as Europe's leading producer of folding boxboard with a EUR 210 million investment in the production capacity of the folding boxboard machine BM1 at the Husum mill.

The demand for folding boxboard is increasing steadily in our main market areas, Europe and the United States.

"As a market leader, it is natural for us to answer the demand and enable our clients to grow in their businesses," says **Jussi Noponen**, SVP Sales and Supply Chain.

After the investment, the annual production capacity of BM1 will increase by 200,000 tonnes to 600,000 tonnes.

Supporting the circular economy

Several trends are increasing the demand for folding boxboard. The world's population is growing and becoming wealthier, which increases consumption. At the same time, mitigating global warming has become a significant goal all around the world. Consumers are looking for more sustainable packaging solutions.

"We believe that easily recyclable fresh fibre paperboard made from renewable wood raw material will replace other

packaging materials in certain end-uses," explains Noponen.

Metsä Board's three-layer folding boxboard is one way to reduce the carbon footprint of packaging. Its light weight and excellent strength properties help customers reduce the amount of packaging material needed.

Towards 100 per cent fossil free production

All investments in the Husum mill site support Metsä Board's sustainable growth strategy. The ongoing modernisation of Husum pulp mill plays an integral role in achieving fossil free production by 2030. The mill's new recovery boiler and turbine are expected to be ready for use in the first half of 2022.

The pulp mill investment will increase the integrated mill's self-sufficiency in electricity from the current 40 per cent to over 80 per cent. Also, the use of fossil oil in the mill site will be reduced by approximately 5,000 tonnes per year. •



Jussi Noponen
SVP Sales and Supply Chain
at Metsä Board

In search of the optimal packaging: 3D simulation for faster innovation

The sophisticated virtualisation tools of Dassault Systèmes have long been used in the automotive and aerospace industries, but the paperboard industry has been waiting for a frontrunner. Metsä Board is now excited to break new ground.

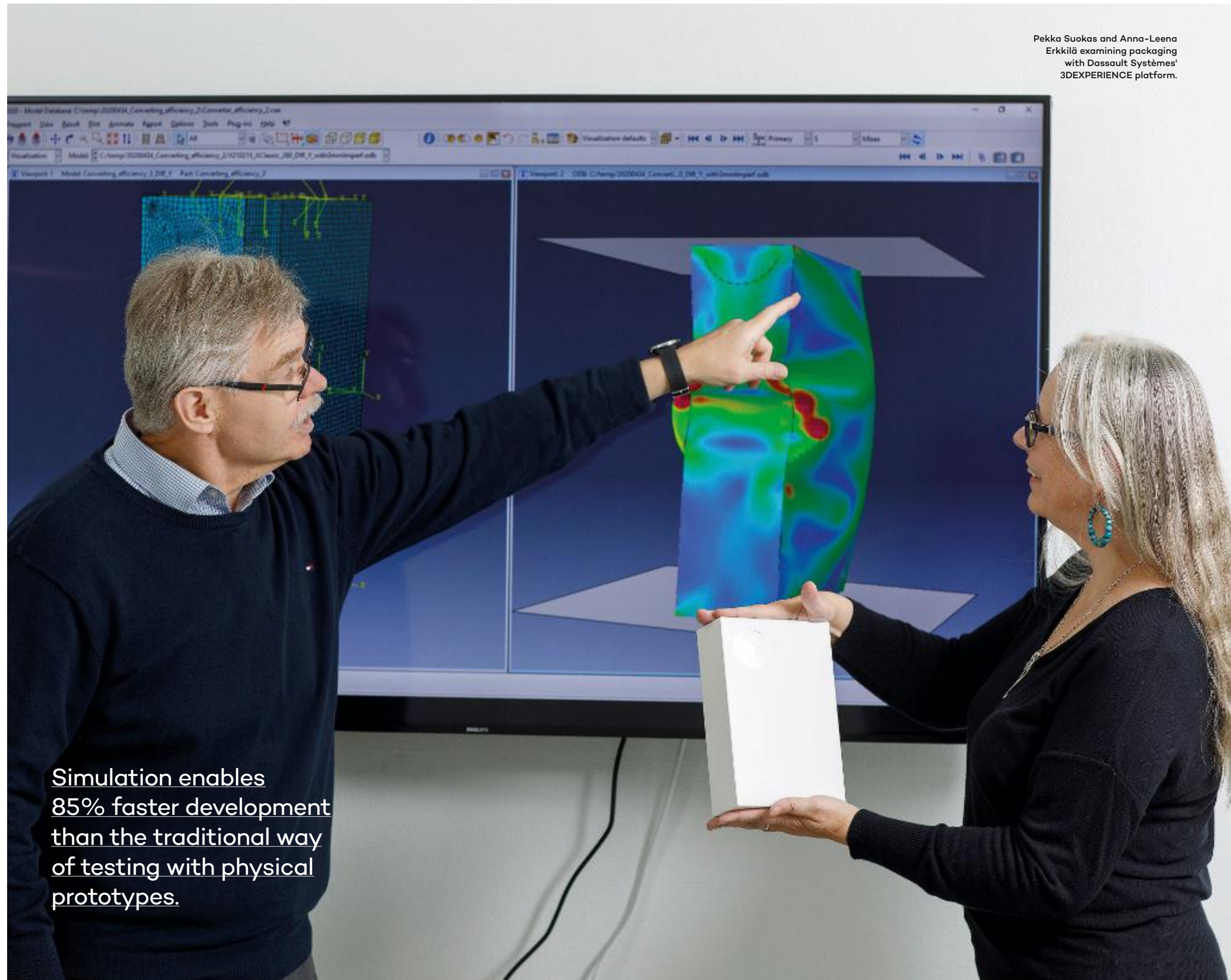
Michael Hunt, photos: Hanna-Kaisa Hämäläinen, Dassault Systèmes

Metsä Board is using Dassault Systèmes' 3DEXPERIENCE platform as part of its new and innovative 360 Services to provide more efficient and sustainable packaging solutions for its customers. The focal point is in Äänekoski, at Metsä Board's Excellence Centre, where Metsä Board develops and tests packaging solutions with its customers.

The state-of-the-art technology helps simulate material and packaging performance in a variety of conditions so that customers can save time and materials. The optimal packaging solution in terms of material choice and structural design also has a lower carbon footprint.

Simulation enables 85% faster development than the traditional way of testing with physical prototypes.

Pekka Suokas and Anna-Leena Erkkilä examining packaging with Dassault Systèmes' 3DEXPERIENCE platform.





Physics simulation tools of Dassault Systèmes enable faster innovation. The same technology is now used by the automotive, aerospace, and paperboard industries.

“Metsä Board has created an industry buzz by demonstrating new possibilities to its customers,” says R&D Manager **Pekka Suokas** from Metsä Board. “It is something most have not seen in our field of business,” he says, adding that speed is one of the greatest customer benefits that simulation provides.

HUGE POTENTIAL IN THE WHOLE VALUE CHAIN

Compared to physical prototyping, 3D simulation allows Metsä Board to deliver data-based material and design recommendations 85 per cent more quickly.

“We felt the traditional way of optimising material and design solutions for packaging took too much time,” Suokas says. “With this new technology, decisions can be made much faster, ensuring greater efficiency and productivity, and reducing the possibility of design and manufacturing errors,” says Suokas.

For example, a box compression test can now be done in hours, compared to several days or even weeks with traditional physical testing methods.

One example of a current trend that places its own demands on the physical durability of packaging is the growth of e-commerce, where reducing overpacking while ensuring product safety is particularly crucial. With boxes being unloaded and reloaded multiple times before reaching their destination, packaging must be designed with the sturdiness to withstand strenuous handling.

With the simulation tool, it is possible for Metsä Board to take 3D design drawings and calculate the strength of a complete packaging design. That allows testing multiple uses for the products efficiently, while simulating real-world packaging conditions.

“We can also see what’s happening inside the packaging during the simulations,” says Suokas enthusiastically. “This is something we have never been able to achieve before. We hope to expand our use of the solution in the future so that we can realise even more benefits. I believe there’s huge potential to not only reinvent the service process, but the value chain in general.” •

EXPLORING NEW FRONTIERS TOGETHER

“The aerospace and automotive industries have successfully used virtualisation tools for a number of years in their product development. Our engagement identified areas where these learnings could be deployed in the packaging industry. These industries share the need to develop ever lighter products, reduce the consumption of raw materials, and meet strict strength and performance requirements. The 3DEXPERIENCE platform makes this possible,” says **John Kitchingman**, Managing Director, EuroNorth, Dassault Systèmes.

FIGHT AGAINST COVID-19: TESTING PAPERBOARD TO ITS LIMITS

With the help of its partner network, Metsä Board is on the frontline in testing paperboards used by pharmaceutical manufacturers to ensure their COVID-19 vaccine vials remain safe, sterile, and identifiable throughout the supply chain. Because the journey from manufacturing facilities to dosing sites must be carefully controlled, high-quality and purpose-built packaging is required.

“As well as protecting against physical damage during transport, paperboard packaging contains vital information and safety features,” says **Markku Leskelä**, Metsä Board’s SVP for Development.

ENSURING THE INTEGRITY OF THE COLD CHAIN

Secondary paperboard packaging must also be able to withstand -70 Celsius, the temperature at which vaccines are stored and transported. “This is where our in-depth testing and simulations capabilities are extremely valuable for the pharma industry,” says **Pekka Suokas**, R&D Manager at Metsä Board.

INSTILLING CONFIDENCE WITH CUSTOMERS

To help manufacturers quickly distribute vaccines, Metsä Board tests pharmaceutical packaging samples across an extreme range of conditions at its Excellence Centre in Äänekoski. Such simulations instil confidence with customers, Markku Leskelä says.

LIGHTENING THE LOAD ON THE PLANET

Advanced testing capabilities and simulation enable lighter board grades to be recommended with confidence. Metsä Board produces 1.3 million tonnes of folding box-board each year. If it were all used to produce pharmaceutical packages weighing seven grams each, it would be enough to make 430 million packages a day. Cutting paperboard weight by just 1 per cent would save resources equivalent to 4.3 million packages a day.



Sweet Credibility

Packaging preserves taste, elevates brand and pioneers sustainability – and always with a “safety first” mindset.

Sami Anteroinen, photos: Jussi Hellsten

Memories can be persistent things – and memories related to our tastebuds may be the most persistent of all. For all intents and purposes, a chocolate bar you had when you were six may leave an enduring impression, something that stays with you for ever. But what happens when you try to revisit that magical feeling when you’re all grown up, and you notice that the taste is not quite the same? Immediately, the spell is broken. But is it far-fetched to think that the culprit may be... *packaging*?

Marjatta Punkka, Product Safety Manager at Metsä Board, is well aware of the issues related to protecting the taste qualities of food and how possible challenges can be tackled. When discussing food, there is obviously a vast range of products to consider – each with their own characteristics and requirements. Still, within the packaging industry, chocolate is widely recognised as the “master class” for demanding food products.

“This is due to the fact that chocolate absorbs volatile compounds easily,” explains Punkka.

Since chocolate contains fat, it is particularly sensitive, as many odorous substances are fat-soluble.

“Because chocolate is such a sensitive product, chocolate is often used as a simulant when testing the sensory properties of food packaging,” Punkka says.

Chocolate serves as a whistle-blower for trouble

Metsä Board’s paperboard is recognised as having market-leading sensory properties. In the case of chocolate, this means that the delicate taste aromas can emerge



“Elements of premium packaging can elevate brand perception and lead consumers to pay more.”

Andres Chehtman, Euromonitor

unchanged. Marjatta Punkka remarks that even if a person cannot recognise any odours in materials, it does not mean there is nothing that can be transferred; it is essential that any transfer of odours and flavours from the packaging into the packaged product is kept to an absolute minimum:

“This means that no influence on the odour and taste of the packaged foodstuff can be detected at all.”

Probably the most common detection procedure in the industry is the Robinson test, which means sensory evaluation. Other methods such as the gas chromatography test and European standard EN 1230-2 test are also used.

The usual suspects

The two “bad guys” you’re looking for through these tests are odour and taint. Odour involves any smell in packaging materials, explains Punkka.

“When dealing with an odour issue in a finished package, you have to find out first whether the smell is caused by paperboard or printed cartons, or other components of the packaging,” she says.

The smell may be caused by e.g. paperboard, ink, varnish, side seam gluing adhesive, or a laminate used with the cartons.

Taint, on the other hand, can cause even more problems than odour:

“Taint is an unwanted taste in a food that can be caused by a disturbance in the food chain, and it can also be related to low quality or insufficient packaging. Unwanted taste in the food can be minor or sometimes even detectable by the consumer.”

Metsä Board uses 120 kg of chocolate every year to test the taint neutrality of its paperboards.

Trust the senses!

But isn’t sensory evaluation a kind of “old school” method when we have tools like nanobots and AI now? Punkka explains that sensory evaluation has not been totally replaced by instrumental methods, because taint can be caused by extremely low concentrations of substances.

“These concentrations may appear insignificant using an instrumental method, but sensory evaluation can still pick up on them.”

Eye on brand

In addition to being a champion for taste, packaging does a lot more, too. **Andres Chehtman**, Consultant and Central Project Lead for Snacks at Euromonitor, points out that packaging, in fact, tells a brand’s story on the shelf.

“For example, elements of premium packaging can elevate brand perception and lead consumers to pay more.”

Premiumisation, then, is the use of tangible traits or features that lift consumers’ perception of a product, thus creating the willingness to dig deeper into their wallets.

Packaging design can convey a premium image through both material type – such as metal or glass – and use of colours, imagery and font. Functional packaging can also drive premiumisation, notes Chehtman.



Marjatta Punkka
Product Safety Manager
at Metsä Board



Andres Chehtman
Consultant and Central Project
Lead for Snacks
at Euromonitor



SMARTIES BECOMES THE FIRST GLOBAL CONFECTIONERY BRAND TO SWITCH TO RECYCLABLE PAPER PACKAGING

At the beginning of 2021 Nestlé announced that its popular Smarties brand is now using recyclable paper packaging for its confectionery products worldwide. Smarties is the first global confectionery brand to switch to recyclable paper packaging, removing approximately 250 million plastic packs sold globally every year.

Alexander von Maillot, Global Head of Confectionery at Nestlé, said: “Shifting Smarties packaging to recyclable paper is one of our key sustainable packaging initiatives in the confectionery category. It is a further step in realising Nestlé’s ambition to make all of its packaging recyclable or reusable by 2025 and to reduce its use of virgin plastics by one third in the same period.”

The new Smarties paper packaging is sourced sustainably and is made of a coated paper, paper labels or carton board. Information about how to properly dispose of Smarties paper packaging is also included on its labels to raise consumer awareness.

Louise Barrett, Head of the Nestlé Confectionery Product Technology Centre in York, said: “Developing safe and convenient paper-based solutions for Smarties has required the pioneering of new materials and testing by Nestlé packaging experts. We adapted our existing manufacturing lines to allow for the careful handling that is required for paper, while also ensuring recyclability across all new formats.”

Source: Nestlé.com/Media/News



“Smarties Giant Hexatube” is a plastic-free pack, comprised of a one-piece construction made entirely from recyclable paperboard with an integrated cartonboard lid. The carton was produced by WestRock on MetsäBoard Pro FBB Bright lightweight paperboard. It won the Public Award at the 2021 European Carton Excellence Awards in September 2021.



MARS WRIGLEY UK'S MALTESERS BOXES NOW FULLY RECYCLABLE

Maltesers boxes have been a familiar sight on store shelves since 1930. In August 2021, Mars Wrigley UK announced that it has replaced the old multi-layer box design, where the PE plastic liner covered the box, with a dispersion coated barrier paperboard. According to Mars Wrigley UK, the new design will reduce its annual plastic usage by 82 tonnes.

The new Maltesers box uses Metsä Board's dispersion coated barrier board, which is fully recyclable, biodegradable and compostable and made of fresh fibres 100% traceable to their origin in sustainably managed Northern European forests.

"Our iconic Maltesers box is now fully recyclable, marking another important step in our journey toward packaging that is 100% reusable, recyclable or compostable," says **Adam Grant**, General Manager, Mars Wrigley UK.

"We are firmly committed to helping brands develop solutions that address the increasingly pressing need to take food packaging in a more sustainable direction," says **Matthew Terry**, Technical Service Director, South and West Europe, Metsä Board.

In this project, Metsä Board deployed its Excellence Centre and R&D laboratory to demonstrate the functional equivalence of the materials to be utilised prior to real world testing.

"This ensured a both time-efficient and cost-effective development phase," Terry says.



"We use fresh fibres sourced from sustainably managed Northern European forests which offer purity and durability for the whole value chain."

Marjatta Punkka, Metsä Board

"Consumers are often willing to pay more for products that offer convenience, in the form of portability or resealability, or novelty, like chocolate eggs with toys. Consumers also increasingly value sustainable packaging, as concerns about plastic waste and environmental degradation have become more widespread."

Hearts and minds

Andres Chehtman believes that packaged snacks, for example, can build brand equity and customer loyalty.

"For example, in France, nuts are growing in popularity as a healthy snack. Packaged brands are innovating with value added features to capture share from bulk offerings, a trend that may accelerate."

Addressing other key trends, Chehtman believes e-commerce is here to stay – and it's only getting started.

"As shoppers experience the convenience of online groceries for the first time, the channel will see permanent gains. This creates significant challenges for impulse-based snacking."

Fresh fibre anchors safety

Beyond the considerations of taste and brand, there looms an even bigger issue: safety.

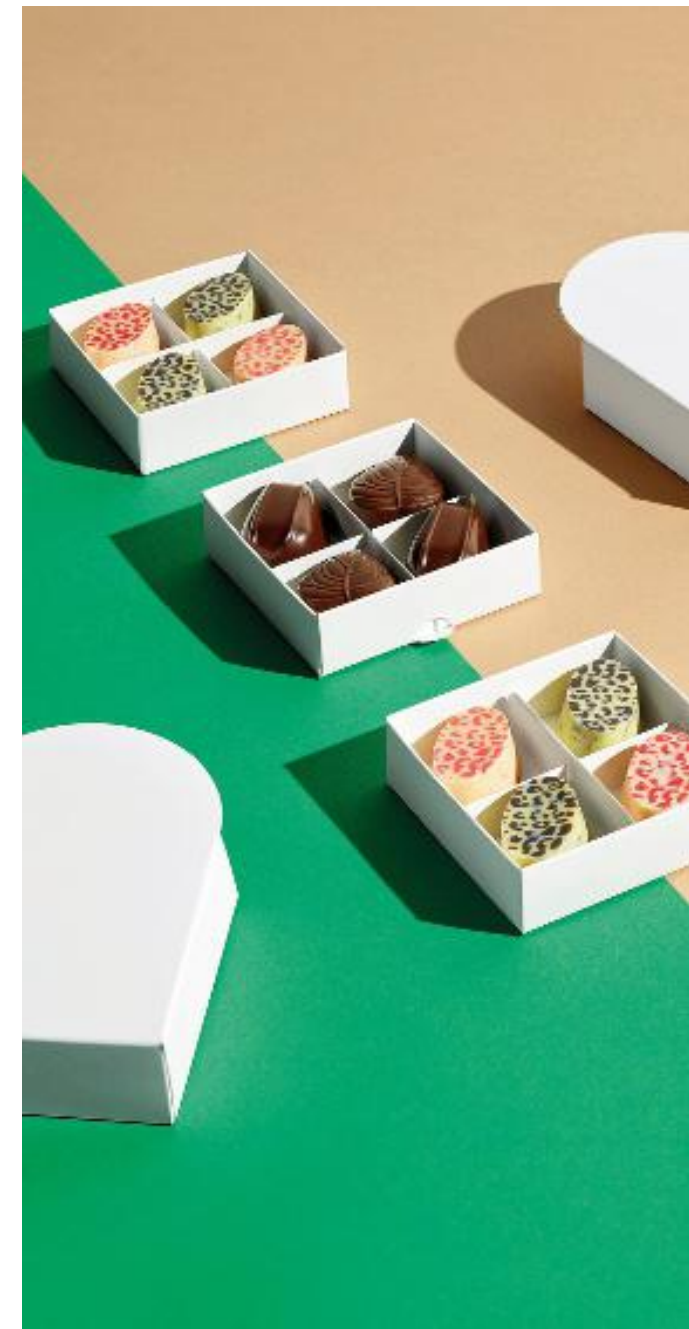
Marjatta Punkka says that product safety is a number one priority for Metsä Board and the company's customers – both in the board manufacturing process and the finished products themselves.

"We use fresh fibres sourced from sustainably managed Northern European forests which offer purity and durability for the whole value chain," she says.

Metsä Board deploys tailor-made pulps, made by Metsä Fibre and Metsä Board, to ensure the highest quality and runnability at Metsä Board's paperboard production. The manufacturing process meets the highest environmental and safety standards, explains Punkka.

"We know the origin of all raw materials used in production. The traceability and reliability of our supply chain is in a class of its own, even in Nordic comparison."

Metsä Board paperboards comply with EU and several national regulations for food packaging, and all the board mills producing food contact paperboards are ISO/FSSC 22000-certified.



“We produce paperboards that have excellent sensory properties.”

Marjatta Punkka, Metsä Board

“Similarly, all our subcontractors follow the same strict hygiene requirements,” adds Punkka.

Recycled fibre raises questions

Several factors come into play when you’re talking about excellent product safety and the sensory properties in packaging. Punkka points out that recycled board, for instance, while being good for the environment, cannot be fully recommended for packages involving food.

“Recycled fibre comes from so many sources that quality control is a real challenge. In the food industry, you need even quality at all times.”

By contrast, in fresh fibres, the composition is known through-and-through.

“In our process, all chemicals go through a very thorough evaluation process, which covers the regulatory, functionality and safety aspects,” says Punkka.

Furthermore, microbiological activity is controlled regularly.

“We produce paperboards that have excellent sensory properties. To create a premium package, the converter must follow the same standards. This means, for example, food-safe low-migration inks and varnishes which are water-based, nontoxic, and completely free of UV-reactive chemistries,” she says.

No mineral oils or fluorinated chemicals

The problems related to mineral oils, resulting from use of recycled fibre, have been talked about in the food industry for several years. The fresh fibres used by Metsä Board, however, do not pose a risk of mineral oil traces in the products, Punkka reports.

“Questions have also been raised regarding the safety of fluorinated chemicals for the environment and humans – and we don’t use those chemicals, either.”

And what’s the final take-away from all this...? Next time you reach out for a chocolate bar, you may remember that taste is king – but every king needs his knights! •



SPANISH CHOCOLATE KINGS

Ibercacao, a truly classic Spanish chocolate manufacturer, aims to simplify the types of packaging materials used and to increase the use of certified material.

Ibercacao has more than 70 years of experience in the manufacture of chocolates and cocoa derivatives. Ibercacao is part of Chocولاتes Lacasa Group, which is the largest manufacturer of chocolates in Spain.

Ibercacao’s Dulcinea chocolate tablets, Dulcinea chocolate pralines and cocoa truffles all utilise Metsä Board paperboards in their packaging solutions.

With regards to packaging solutions, Ibercacao seeks continuous improvement. Typically, any chocolate manufacturer starts off with a situation where it uses materials with different characteristics of grammage, thickness, and origin (fresh or recycled fibres), both for different products and in the different formats or case sizes.

“Our objectives are to simplify the types of materials used and to increase the use of certified material. With these objectives we aim to do our bit for the circular economy,” says **Teodoro Toledo Gomez**, Packaging Category Buyer from Ibercacao.

“Ibercacao and Metsä Board share similar, ambitious sustainability goals. With our collaboration, we can realise these goals in the whole supply chain,” says **Andres Lopez**, Sales Director from Metsä Board.

The use of fresh fibre materials gives Ibercacao products sufficient strength, stiffness and high performance for the packaging process. Most importantly, food safety stays on a high level consistently.

Using fresh fibre for packaging, one can reduce the weight of the product cases and reduce the board consumption by tonnes. By using materials from sustainably managed forests, Ibercacao ensures the renewal of resources and the protection of the biodiversity of forests and endangered species.

Online grocery shopping spurs packaging innovations

E-commerce deliveries are placing new requirements on packaging.

Elina Hovinen, illustrations: Jukka Pylväs

In 2020, online grocery shopping went up by over 55 per cent in both the US and Europe.

“2020 was an exceptional year for food e-commerce, as teleworking and restaurants’ limited opening hours have made people cook more at home,” says **Anna Keinänen**, Market Intelligence Manager at Metsä Board.

Consequently, the rapidly growing popularity of online grocery shopping has prompted grocery retailers to develop their online business around the world. According to Keinänen, South Korea, China and the United Kingdom are pioneers of food e-commerce. Countries with high e-commerce penetration in other product categories as well as a tech-savvy and dense population with a relatively high disposable income offer the best basis for food e-commerce. In the top-five European countries, e-commerce penetration varies between 3 and 11 per cent, with the UK being the clear leader.

The popularity of e-commerce has spurred packaging innovations and will continue to accelerate its development. When transporting food orders, cold and frozen products and the weight of purchases must be taken into account. The seller must ensure that the cold chain is maintained throughout the journey, and good hygiene is also a priority.

"It is important that the packaging is sufficiently durable and safe, because the worst thing would be if the customer received a damaged or spoiled product due to poor packaging," says Keinänen.

In addition, it should be fit-for-purpose – no overpacking – both in order to take up less space during transport and to maximise sustainability by reducing waste.

Coronavirus fuelled explosive growth in food e-commerce

“Food e-commerce also grew exponentially in Finland when the coronavirus landed in the northern part of Europe,” says **Antti Rajala**, Director, eCom & Digital Services at Kesko.

Kesko is one of Finland's three largest grocery retailers, and it is the central organisation of a business based on a network of independent retailers. A similar operating model is used, for example, by ICA in Sweden and REWE in Germany.

Directly after the coronavirus outbreak in April 2020, the number of grocery purchases made in K-food online stores increased tenfold compared to a year earlier. Before the pandemic, 200 K-food stores also retailed online. By autumn 2021, the number had increased to 500.

“Even before the coronavirus, e-commerce purchases in Finland were on the rise, but with the lockdown more and more people started to do their grocery shopping online,” says Rajala.

Kesko closely monitors the development in Sweden in particular, which is ahead of Finland in food e-commerce. In Sweden, e-commerce accounts for approximately 5 per cent of grocery purchases, while the corresponding figure for Finland is about 2 per cent.

“In the grocery trade, the share of e-commerce in Finland and around the world is still small in absolute terms. In 2020, e-commerce accounted for 3 per cent of all our grocery sales, and in early autumn 2021 it accounted for less than 4 per cent of all grocery sales.”

During the pandemic, online stores have attracted many new customers.

“Consumption habits have changed, and many people will still be using these services even after the coronavirus,” Rajala says.

Anna Keinänen estimates that the growth of e-commerce will continue, but the growth rate will slow down as coronavirus restrictions are lifted. Several surveys show that consumers intend to continue spending more money on groceries post-pandemic than they did pre-pandemic. In addition, the number of new online buyers will continue to rise.

In the next few years, to strengthen the company's e-commerce business in the face of intensifying competition, Kesko will invest tens of millions in the automation of order picking.



E-commerce



New packaging solutions for e-commerce needs

As cardboard boxes are durable and can hold more products at a time than a plastic bag, K-food stores use these to pack food orders. In addition, they are an environmentally friendly option. Responsibility is an important value for Kesko and K Group.

“With the Package-Heroes project*, we outlined our preference for wood-based solutions of sustainable origin, FSC or PEFC-certified or recyclable material. In addition, we aim to provide low-emission transportation in the future, which we are currently testing,” Rajala says and continues,

“Sales of cardboard boxes have increased in line with order volumes, and correspondingly fewer plastic bags have been sold.”

According to Rajala, the needs and special features of e-commerce should be better taken into account in packaging. Requirements for the appearance of packaging are different in brick-and-mortar stores and online stores.

“In the future, we will have to think more about how packaging sells online when only a small image of the product is shown.”

Rajala also expects new solutions for transporting refrigerated products.

“I would like to see new packaging innovations for refrigerated products, so that there will be no need for separate refrigerated trucks to transport them in the future.”

SOURCES: THE ARTICLE ALSO DRAWS ON STUDIES FROM FORRESTER, MCKINSEY, SAVILLS RESEARCH, EUROCOMMERCE AND SMITHERS.

**The Package-Heroes project examines and develops environmentally friendly food packaging solutions. Its goal is to reduce the waste load. The project will end by the end of 2023. Metsä Board is also participating in the Package-Heroes project.*

Towards 12.6%

Forrester predicts that the Western European online share of the Food and Beverage sector will rise from 5.3% in 2020 to 12.6% in 2025.

Over 60%

of US online grocery shoppers plan to buy groceries online more frequently or at the same frequency as during the COVID-19.

SOURCE: CORESIGHT RESEARCH, APRIL 2021

75%

of Food & Drink sector e-commerce packaging value is corrugated. It may lose some shares to flexible packaging over the coming years.

SOURCE: SMITHERS

KESKO

Kesko is a central organisation that offers its self-employed retailers a logistics chain, centralised marketing, store locations, systems and a store concept. The retail entrepreneurs operate according to a jointly defined concept.



Antti Rajala

Director, eCom & Digital Services
at Kesko



Anna Keinänen

Market Intelligence Manager
at Metsä Board

Strong, lightweight and luxurious

Going lighter, reducing the carbon footprint and facilitating recycling are important steps towards increasingly ecological packaging. A prime example of this is the strong yet lightweight corrugated packaging made of fresh fibre, designed for a Polish premium product.

Jaana Kalliokoski, photos: Metsä Board, Hanna-Kaisa Hämäläinen

High-end product packaging has traditionally consumed huge amounts of plastic and paperboard. It has resulted in a large carbon footprint and made recycling challenging.

“This type of packaging, along with overpackaging, will be history before long. Sustainable development is an increasingly important aspect of packaging design, which takes the entire value chain of products into consideration,” says **Iiro Numminen**, Structural Packaging Designer at Metsä Board Excellence Centre.

The Polish producer of Chopin Organic Rye Vodka was looking for packaging that complied with the principles of sustainable development and the circular economy. Numminen explains how the circular economy-compliant packaging for an organic luxury product came into being.

The Excellence Centre team got down to business. The packaging also had to support the premium brand and meet three key requirements:

“First, the design of the bottle and its light green hues and label had to show through the packaging. Second, the packaging of the organic product also had to be ecological. Third, the packaging was expected to be of a high quality and to stand out from other premium products on the shop shelf,” Numminen explains.



The design was guided by the notions of organicity, purity, lightness and a minimum amount of material.

According to Iiro Numminen, Structural Packaging Designer at Metsä Board, traditional high-end packaging, which uses up enormous amounts of material, will be history before long.



The CO₂ emissions from the production of fresh fibre-based corrugated board are 80% lower than those of solid board.

Cradle-like model allowed for a window

The request that the bottle show through the packaging presented a challenge to Numminen and his team. Traditional packaging with a window is not stiff enough and can easily be squashed. The structure had to be designed so that despite the window, the package was sufficiently strong for a product weighing over one kilogram.

The answer was a cradle-like structure and innovative bidirectionally curved edges. To add more rigidity, the edge was made thickest in the middle of the packaging.

“We used simulation tools to test both curved and straight edged models and found that the one with curved edges was 30 per cent stiffer. The curved design also creates a premium feel and protects the product,” says Numminen.

Metsä Board’s simulation capabilities include finite element (FEM) simulation, where it is possible to take a 3D design drawing or measure the dimensions of an existing package sample, and use this structural data together with the strength data of the paperboard to calculate the strength of a complete packaging design.

Another challenge that the team had to solve came from the anti-theft security ring, an alarm device attached to the neck of the bottle with a metal string, commonly used in shops in many countries. The device had to remain inside the packaging.

“We designed a multifunctional flap that covers the neck of the bottle and hides the alarm device. The flap is easy to open and close repeatedly without the packaging suffering. It also locks the bottle in place.”

Light yet stiff corrugated flute made of fresh fibre

Corrugated F-flute made of fresh fibre, which is lightweight yet stiff, was chosen as the packaging material. The clean white material also serves as a crisp background for the green bottle.

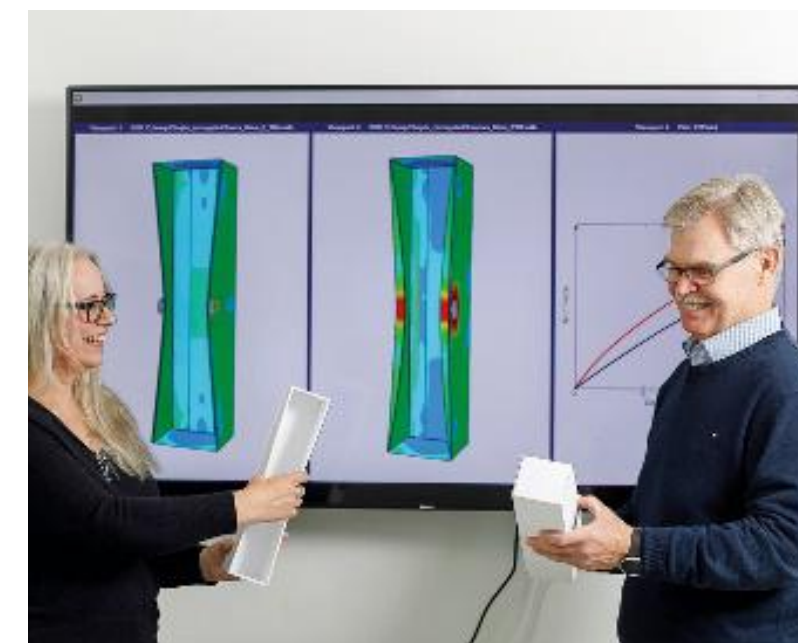
“We compared the carbon footprint of corrugated board and solid board and found that corrugated board had 80 per cent lower CO₂ emissions. We use renewable energy in the production of our white kraftliners, which results in a really low carbon footprint for the material.”

The packaging has a fully glue-free structure, and it can be transported flat and assembled at the product packaging line.

“If the packaging is flat, 50,000 units can be transported in a single truck instead of five trucks,” Numminen estimates.

The minimal use of colours supports clean and easy recycling. The printing is made using two food colours: green and black. In contrast to many other similar premium product packaging solutions, the one designed for Chopin Organic Rye Vodka does not use hot foil stamping, which contains plastic. Instead, the letters on the side of the packaging are slightly embossed, giving an added feel of organicity and luxury.

“Many premium beverages come in dark packaging that features hot foil stamping. A white, fresh and natural look really stands out on the shelf.” •



This project also used the 3D simulation technology provided by Dassault Systèmes.

Quickly replanted, the forest keeps on sequestering carbon.



Forests gain strength from diversity

By establishing mixed forests of pine and spruce, Metsä Group and Finnish forest owners are helping to retain the vitality of forests.

Anna-Kaisa Kontinaho, photo: Petteri Kivimäki

Forest growth is affected by changing natural conditions, but this does not mean we are powerless. Metsä Group, responsible for Metsä Board's wood supply, continues to develop forest management methods and bases its practices on solid research results.

A harvested forest is always replaced by a new one, the work being done by the owners or by a planting service. One option is to plant two coniferous species, which boosts the health and diversity of the forest. This is a prime example of the new methods already in use at Metsä Group.

"Mixed forests of spruce and pine are more sustainable and diverse than single-species forests," says **Tiina Laine**, Forest Management Specialist at Metsä Group.

"On an appropriate site, spruce is planted as seedlings, while pine is planted or sown as seeds. The ratio of the tree species is half and half."

It makes good sense to establish mixed forests in areas that suffer from elk browsing. Elk like pine seedlings, but spruce is not

to their taste. Avoided by elk, spruce adds density to the forest, which is required for high-quality pine wood.

Climate change has exposed spruce to European spruce bark beetles.

"They have already caused considerable damage in Central Europe. As the climate warms, they will also begin to attack the northern spruce trees that already suffer from drought," says Laine.

Pine and spruce grow at largely the same pace in the forest.

"Active young stand management can help control the ratio of tree species before thinning. Naturally occurring deciduous trees are also left in suitable places, to create the best possible growth conditions and to increase biodiversity."

Metsä Group aims to quickly renew forests after harvesting. The sooner a vigorous new seedling stand is in place, the faster and better the new growing stock can sequester carbon from the atmosphere. •

TIINA LAINE

Forest Management Specialist at Metsä Group, lives in Suonenjoki, a small town in North Savonia. She previously worked as a researcher and has completed a doctoral thesis on mechanised tree planting. • In her leisure time, Laine enjoys spending time in the forest with her family, orienteering and being active in the Scouts – also in the forest.

Case Paper and Metsä Board form winning partnership

The Finnish-American collaboration has won awards while meeting customer needs with high-quality products in a competitive marketplace.

Michael Hunt, photo: Case Paper

For almost a decade, Metsä Board and Case Paper Company, based in New York with six manufacturing facilities in the United States, have teamed up to create high-quality products and competitive solutions to meet growing customer needs.

The partnership has also left a trail of distinction in the marketplace.

“It seems as though every time we end up successfully collaborating on a project, it wins awards,” says **Mark Beamesderfer**, Metsä Board’s Packaging Services Director.

Distinctive design

To commemorate Case Paper’s 75th anniversary in 2019, Metsä Board and Case Paper created a package resembling a vinyl-album box that held giveaway items and company information. The Record Box won seven Print Industry and Marketing awards.

The most recent collaboration is a swatch kit that promises to resonate as strongly with customers. Case went to Metsä seeking a swatch book with a unique look that had the flexibility to grow for the future, and Metsä responded with a product that Case loved.

“This piece will allow our customers to really think creatively on what can be done with the products they’re selling,” tells Case Paper President **Simon Schaffer**.

“There are so many different films you can put on paper, so this is just a sampling to get people thinking about how their design can be distinctive. It gives our customers inspiration. There’s an emotional connection, a ‘wow moment.’ Combined with our business model, it gives us an edge.”

Hands-on approach to customer service

Schaffer, the 36-year-old grandson of the company founder, leads the privately held firm with an in-house supply chain philosophy that gives Case Paper a competitive advantage in the U.S. market with its hands-on approach to customer service.

Metsä Board has helped Case Paper to build a responsive supply model to the market.

“I think our commitment to having inventory on the floor is a huge aspect of that,” Schaffer says.

“We can custom-convert and respond quickly to customer

needs, instead of waiting for a mill or an outside converter to turn it around. That’s certainly a key component to our model.”

The shared passion of doing “wow” work

Beamesderfer says Metsä Board’s partnership with Case Paper works “because they’re partnering with people for the long haul and not just for the short term.”

Quality products, innovative design and commitment to excellence have given Metsä Board and Case Paper a collaborative marketplace advantage.

“We share the passion of not just doing good work, but ‘wow’ work,” Schaffer says.

“We call it being ‘On the Case,’ or going above and beyond. When you put that level of thought and detail into things, people notice.” •



Mark Beamesderfer
Packaging Services Director
at Metsä Board



Simon Schaffer
President
at Case Paper



The new package designed for Arctic Blue Oat was made without printing ink. This sustainable solution maximises the aesthetics and brand impact of the design.



Ilkka Harju
Packaging Services Director
EMEA and APAC
at Metsä Board

Bio-based design ideas

The shift towards bio-based packaging has started, and a whole new field of possibilities is opening up for designers.

Paperboard is a solid basis for fresh ideas.

Markku Rimpiläinen, photos: Metsä Group, Vesa Tyni

The European Green Deal, the new growth strategy announced by the European Commission in 2019, sets a new tone for the packaging industry for the decades to come.

The EU strategy focuses on achieving 100% recyclability or reusability of packaging materials in an economically viable manner by 2030.

Many key players of the packaging industry have already begun transforming their products and supply chain structures to support increased recyclability. The inevitable consequence of this shift is that the use of bio-based materials will increase rapidly.

Northern wood is one of the world's most versatile biomaterials. The most impressive examples of current wood-based products are paperboard packages that can be recycled numerous times and wooden constructions, where carbon is sequestered for hundreds of years. The new types of application – already underway – include wood-based textile fibres and 3D fibre solutions.

New possibilities for paperboard

Among current biomaterials, paperboard is a vibrant choice. It is based on renewable raw materials, recyclable, and decomposes if it ends up in nature.

“Although paperboard has a long tradition, it still has a lot of untapped potential,” says **Ilkka Harju**, Packaging Services Director, EMEA and APAC at Metsä Board.

“We can develop new packaging technologies to make paperboard suitable for new shapes and requirements. Right now, we are facing the need to replace plastic-based single-use cups and containers with recyclable alternatives. We also need recyclable food packages that guarantee 100% food safety and quality.”

Harju is convinced that the properties of paperboard, and even the fibres, will develop.

“The development of fibre-based bio-barriers is well underway. Developing elastic properties for the fibres can bring new adaptability to packaging.”

Material-driven design process

The shift towards biomaterials is also changing the work of packaging designers.

“Designers must adopt new skills, but they also have a unique opportunity to develop new solutions that don't exist yet,” Harju says.

First, the designers must learn to master the properties of bio-based materials.



Could future mobile phone packaging look like this? In this concept, 3D fibre packaging and paperboard were utilised.

The art of packaging

The Paper Lid Company has brought a new recyclable paper-board lid to the market. Its carbon footprint is more than 50% lower than that of a plastic lid.



Metsä Board and Esbottle have been testing and developing a possible future concept for bottles based on paperboard. They could contain anything from shampoo to water.

THINGS TO CONSIDER IN BIO-BASED PACKAGING DESIGN

1. Maximum performance with minimum material
2. User-friendliness
3. Strong visuals
4. Personalisation
5. Utilisation of existing materials using new technologies
6. Utilisation of new materials with new and current technologies
7. Special effects of packaging by ecological means
8. Intelligent packaging
9. Preventing counterfeiting
10. Fit for purpose

“The design process is very material-driven. The designer must understand what can be made of the particular material, and how the package should be shaped. We must also learn to combine traditional and new materials like paperboard and 3D products.”

Mastering new materials

Harju underlines that the designer must also be familiar with packaging technology and the various manufacturing methods.

“Designers must work hand in hand with design engineers. Cooperation and discussion are needed, because one understands machine technology, the other the form of a new package. In addition, a business-oriented view is already needed at the planning stage.”

The expected rapid development will require a lot from all the actors in the packaging industry.

“Communication through the whole value chain is important. The more we understand each other, the better the whole chain will function and generate new insights. It is also important to understand and learn about consumer behaviour.”

Harju says he can hardly wait to see how the new bio-based era will change packaging design.

“The boundaries of different professionals are disintegrating. And when designers learn to release the potential of bio-based materials, a whole new field of possibilities opens up.” •



This foldable origami cup is a versatile future solution designed by Metsä Board for the on-the-go market. It will be suitable for both food and drinks.



METSÄ BOARD FACTS AND FIGURES

OUR PRODUCT PORTFOLIO

	NATURAL	CLASSIC	PRO	PRIME
FOLDING BOXBOARDS FBB	MetsäBoard Natural FBB	MetsäBoard Classic FBB MetsäBoard Classic FBB CX	MetsäBoard Pro FBB OBAfree MetsäBoard Pro FBB Bright MetsäBoard Pro FBB CX	MetsäBoard Prime FBB Bright MetsäBoard Prime FBB EB MetsäBoard Prime FBB CX MetsäBoard Prime FBB CXB
FOOD SERVICE BOARDS FSB	MetsäBoard Natural FSB Cup		MetsäBoard Pro FSB Cup	
WHITE KRAFTLINERS WKL	MetsäBoard Natural WKL MetsäBoard Natural WKL Bright	MetsäBoard Classic WKL	MetsäBoard Pro WKL	MetsäBoard Prime WKL

METSÄ BOARD IN NUMBERS

No 1

in folding boxboard and
white kraftliners in Europe

in coated white kraftliners
globally



Our customers are
brand owners, retailers,
converters, corrugated box
manufacturers and mer-
chants

2,400

personnel

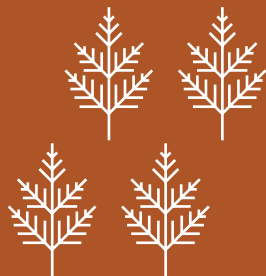


1.9

Billion EUR sales

100

We deliver to 100 countries



In Finland, for every tree
harvested, four seedlings
are planted

OUR VALUE CHAIN IS SPECIAL



High access to Nordic fibre

100,000

Finnish forest owners as our owner base



Sustainable and renewable raw materials

100%

traceability and self-sufficiency in high-quality
Nordic fibres and tailormade pulps



Ambitious climate targets

The Science Based Targets initiative has
approved our emission reduction targets as
consistent with actions required to meet
the Paris Agreement goal to limit global
warming to

1.5 °C



Metsä Board
professional
magazine



metsaboard.com

IT'S TIME TO CELEBRATE!

With chocolate, life is always a bit better.

On the covers of this magazine, you can see delicious handmade chocolate made by the Finnish company Kultasuklaa. Chocolate is often part of special days: it belongs to birthdays, Christmas, and Valentine's Day. But the taste of chocolate is comforting on any day.

Next time you are indulging yourself, take a moment and have a look at the packaging. It can be a masterpiece in itself.

Well-designed packaging guarantees that the chocolate stays undamaged and is safe, and it preserves its taste. Our aim is to ensure that you will have safe and sweet moments.

Enjoy!



The cover of this magazine is made with MetsäBoard Prime FBB Bright 210 g/m² (12.0 pt). It is printed with five colors (CMYK + PMS 8025 C), and coated with gloss varnish.