

METSÄ BOARD

Case Study



Photo © Metsä Board

Challenge

Leading European paperboard producer Metsä Board required a platform that could help it accelerate its rate of innovation to better meet its customers' needs for sustainable packaging solutions that achieve the optimal balance between strength, size and performance. It needed advanced 3D simulation capabilities in order to expedite time to market.

Solution

Metsä Board adopted Dassault Systèmes' **3DEXPERIENCE** platform and its industry solution *Perfect Package*, which is one element in Metsä Board's new service offering for its customers called Metsä Board 360 Services. Using the

advanced simulation technologies that are delivered through the **3DEXPERIENCE** platform, this service sees Metsä Board create virtual twins of its packaging solutions, and compare their performance against customers' existing solutions in a variety of simulated conditions.

Benefits

Using the **3DEXPERIENCE** platform, Metsä Board can improve the functionality, recyclability and brand impact of its customers' packaging solutions, maximizing product performance while minimizing both carbon footprint and costs. Compared to physical prototyping, the company is able to propose new packaging solutions 85% faster.



“Compared to physical prototyping, we can recommend optimum paperboard 85% quicker.”

– Markku Leskelä, Vice President of Research and Product Development, Metsä Board

PAPER DREAMS

Over the past decades, Finland-based paperboard company Metsä Board has experienced extensive growth, evolving from a fine paper producer into Europe’s leading paperboard company. Millions of packages made of Metsä Board’s paperboards are consumed each and every day worldwide.

Having invested heavily in its operations, Metsä Board has strong pulp self-sufficiency and has earned a reputation as a forerunner in sustainability. All of the wood fiber it uses comes from sustainably managed, certified or controlled northern forests, and is 100% traceable.

The company recently was named to the Financial Times Europe’s Climate Leaders 2021 list, primarily due to reductions in its greenhouse gas emissions by more than 40% between 2014-2019.

“Sustainability is part of the DNA of our business,” said Markku Leskelä, Metsä Board’s Vice President of Research and Product Development. “Everything we do needs to be done efficiently, and with minimal impact on the environment. Mitigating climate change is at the core of our sustainability efforts: We want to achieve fossil free mills by 2030, with zero fossil CO2 emissions. Our targets meet the strictest requirements of the Paris Agreement, aiming to limit global warming to 1.5 degrees Celsius. All of the wood we use comes from sustainably managed forests and is 100 % traceable, and all of our mills have certified environmental management systems (ISO 14001) and quality management systems (ISO 9001), as well as PEFC and FSC Chain of Custody.”

However, this laser focus on developing new sustainable packaging solutions, along with an almost insatiable demand for fast fulfilment from customers across both the Consumer Packaged Goods (CPG) & Retail and pharmaceutical industries, has led to new, innovative ways of working at Metsä Board.

“We quickly came to realize that we needed to accelerate our rate of innovation to stay ahead of the competition,” Leskelä said. “We felt the traditional way of optimizing material and design solutions for packaging took too much time. We had to physically make a prototype design, which then had to be transported to be tested. Based on the test results, we would then recommend the paperboard and maybe also adapt the design and the process would start again.”

The company also felt that there were opportunities in improving internal collaboration. Having a real-time view of the most up-to-date designs, enabled Metsä Board to deliver the superior customer experience it wanted to achieve. “Although customers were not really demanding anything more, we saw that we can do better,” Leskelä said.

A SPRINGBOARD TO SUCCESS

Leskelä was very aware that modeling and simulation technologies could bring a new way of working to his team, but it took some time to find a good solution. “The capabilities we needed just didn’t seem to be out there,” he said. “The technologies hadn’t advanced enough. But then I discovered Dassault Systèmes’ **3DEXPERIENCE**® platform. After seeing the **3DEXPERIENCE** platform, my opinion changed. It was just what we had been looking for.”

The **3DEXPERIENCE** platform offered Metsä Board innovative 3D simulation capabilities from a central platform. Advanced packaging designs could be simulated easily, and validated in the click of a button. Designs could be shared securely in the cloud, and then accessed from any device, allowing ad-hoc collaboration to occur, even when teams are geographically dispersed. With concurrent engineering, delivered by a single platform, Metsä Board could reduce decision times and ensure much faster recommendations and solutions to its customers.

Leskelä knew he needed to take a slow and steady approach if he was going to change years-old ways of working. “We wanted to take baby steps,” he said. “We expected there was going to be a learning curve and that getting the training right was going to be key.”

Leskelä’s cautious approach paid off. “After specialized training and support from Dassault Systèmes, we implemented the **3DEXPERIENCE** platform relatively quickly, and we actually saw results faster than we anticipated,” he said.

Thanks to the **3DEXPERIENCE** platform, Leskelä and his team were able to build an entirely new offering for customers. The 3D simulations are now an important part of the Metsä Board service offering, called Metsä Board 360 Services.

“The Metsä Board 360 services are designed to help our customers create the best solution for their needs,” Leskelä said. “Using the advanced simulation technologies that are delivered



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Pekka Suokas, R&D Manager, Metsä Board

through the **3DEXPERIENCE** platform, we can create virtual twins of our customers’ existing packaging solutions, and work out how they perform against our new solutions in a variety of simulated environments.”

Metsä Board sees this as a big step towards lowering the environmental impact of customers’ packaging. “Our advanced testing capabilities enable us to recommend lighter board grades with a smaller carbon footprint,” Leskelä said. “By analyzing the properties of packaging samples, we can recommend lighter

weight that will perform equally well while minimizing both carbon footprint and costs. We can also improve functionality, recyclability and brand impact, ensuring that we maximize the performance of the packaging.”

What’s most impressive, however, is the speed at which this can be done. “Compared to physical prototyping, we can deliver data-based recommendations 85% quicker,” Leskelä said. “Our customers now benefit from a much faster and far easier experience.”

MEETING COMPLEX PACKAGING REQUIREMENTS

This accelerated speed to market is especially beneficial for Metsä Board’s CPG customers who have specific needs, particularly when it comes to selling online.

“The growth of e-commerce activity, especially as a result of the pandemic, has significantly increased the demand for new, innovative packaging solutions,” Leskelä said. “This market has quite different needs to bricks-and-mortar retail. There are far more touchpoints as packages are unloaded and reloaded multiple times before they reach the recipient. This means packaging needs to be designed to withstand this heavy handling, while ensuring they are lightweight and have as small a carbon footprint as possible.”

Metsä Board now benefits from finite element (FEM) simulation using Abaqus technology on the 3DEXPERIENCE platform. Using these simulation capabilities, the company can 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.

The company also can test an almost infinite number of applications of its products very quickly. In addition, it can simulate more complicated use cases and situations, such as behavior under compression loading, transport vibration tests, drop test simulations, secondary packaging in the context of primary packaging and more. “We can also see what’s happening inside the packaging during the simulations – this is something we have never been able to achieve before,” said Pekka Suokas, R&D Manager at Metsä Board.

A FEAT FOR PHARMA

Metsä Board’s pharma customers also are benefiting from the new simulation capabilities. “The pharma industry has different demands,” explained Leskelä. “It requires packaging that not only meets stringent regulations, but that can also withstand extreme temperatures.”

One example is the packaging for drug vials such as those used to carry doses of the various COVID-19 vaccines. Distributed across the world, the journey from manufacturing facility to dosing point is complex and carefully controlled at every step. High-quality, fit-for-purpose packaging was critical to ensure that medicines remained safe, sterile and fully traceable throughout the supply chain.

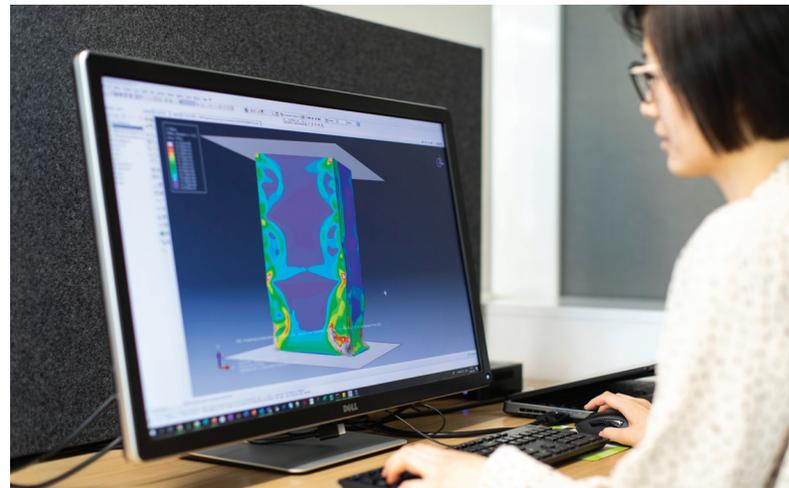
“We were on the frontline, testing the paperboards used by pharma manufacturers to package and protect vaccine doses,” said Leskelä. “The packaging needed to retain its specified thickness, mechanical strength and water absorption properties – even at temperatures as low as -70 degrees Celsius. Any changes in dimensions could cause curling or bulging, which

More about the solution:

The *Perfect Package* Industry Solution Experience powered by Dassault Systèmes’ 3DEXPERIENCE platform enables all players in the CPG and retail packaging supply chain to collaborate together to create innovative packaging designs that meet increasing demands from customers. *Perfect Package* can significantly shorten package design cycles, cut materials costs and virtually eliminate the chance for recalls. Companies can rapidly reuse and adapt designs for line extensions, new sizes and local preferences to accelerate speed to market and expansion into new geographies.

Benefits:

- Significantly reduce packaging design time
- Improve collaboration across the supply chain
- Reduce packaging and materials and design costs
- Virtually eliminate packaging recalls



Top image: MetsäBoard Pro FBB OBAfree is a fully coated OBA-free folding boxboard. It has naturally high brightness without optical brighteners and it is approved for direct food contact globally. (OBA= optical brightening agent)

Bottom image: Metsä Board’s engineer is simulating the paperboard to calculate the optimal balance between strength, size and performance.

Focus on Metsä Board

Metsä Board is a leading European producer of premium fresh fiber paperboards, supplying customers across Europe, the Americas and Asia with lightweight and high-quality folding boxboards, food service boards and white kraftliners. The pure fresh fibers used in Metsä Board products are a renewable resource, traceable to origin in sustainably managed northern forests. As a forerunner in sustainability, the firm aims for completely fossil free mills and raw materials by 2030.

For more information: www.metsaboard.com

could pose a risk to the integrity of the packaging and therefore the safety of the product inside.”

With the **3DEXPERIENCE** platform, Metsä Board can now run virtual simulations of how its paperboards perform in various conditions – from extremely cold to extremely humid – and develop packaging strength simulations such as transportation and board conditioning tests to demonstrate how a package will perform in the real world. “We can simulate various use cases and conditions in as little as a day, instead of the weeks it would have taken using physical prototyping and testing,” Suokas said.

Ultimately, Metsä Board can now achieve the optimal balance between strength, size and performance for its pharma customers – and save both materials and costs in the process by minimizing package weight using modeling and simulation during early design. “By analyzing the properties of pharmaceutical packaging samples we can recommend lighter-board weight that will perform equally well while helping to cut the carbon footprint of the packaging,” Leskelä explained. “We produce 1.3 million tons of paperboard every year, and if all of that were used to produce pharmaceutical packages weighing seven grams each, it would be enough to make 430 million packages a day. Cutting the paperboard weight by just 1% would save the amount of natural resources needed to produce 4.3 million packages a day.”

CO-WORKER COLLABORATION

Metsä Board employees also are experiencing significant benefits, especially when it comes to collaboration. With ENOVIA on the **3DEXPERIENCE** platform, its teams can innovate with a higher degree of confidence, knowing that all key stakeholders have access to a single view of the most current designs and key data.

What’s more, since modifications can be shared at the object level, teams can work concurrently on the same product. “We are able to solve problems far more effectively,” Suokas said. “Decisions can be made much faster, ensuring greater efficiency and productivity, and reducing the possibility of design and manufacturing errors.”

OPENING THE DOOR TO A BRIGHTER, GREENER FUTURE

Metsä Board executives believe they are much better prepared for the future thanks to the **3DEXPERIENCE** platform.

“We hope to expand our use of the solution in the future, so that we can realize even more benefits,” Suokas said. “The industry in which we operate is quite conservative, so it is great to be one of the first to adopt this type of solution. I believe there’s huge potential to not only reinvent the service process, but the value chain in general.”

“Ultimately, our success will be defined by the speed at which we can develop new solutions and deliver them to our customers,” concludes Leskelä. “I have no doubt that simulation will be helpful in doing this; using this kind of advanced technology, we will be able to achieve more than the conventional suppliers, and faster too. I’m excited about the new possibilities and interesting applications that simulation will facilitate in the future.”

Our **3DEXPERIENCE**® platform powers our brand applications, serving 11 industries, and provides a rich portfolio of industry solution experiences.

Dassault Systèmes, the **3DEXPERIENCE** Company, is a catalyst for human progress. We provide business and people with collaborative virtual environments to imagine sustainable innovations. By creating ‘virtual experience twins’ of the real world with our **3DEXPERIENCE** platform and applications, our customers push the boundaries of innovation, learning and production.

Dassault Systèmes’ 20,000 employees are bringing value to more than 290,000 customers of all sizes, in all industries, in more than 140 countries. For more information, visit www.3ds.com.

