

FachPack 2018

Featured packaging and paper solutions from Mondri

Driven to Succeed: Mondri's Portfolio of Automotive Solutions Lighten the Load & Streamline Logistics

Mondi Automotive Packaging article

By Robert Grace

To many, Mondri is synonymous with paper and plastic packaging for food and consumer products – and for good reason, given the company's long history and strong position in those sectors worldwide. What is less well known is Mondri's key role in automotive solutions, in their various forms, and how it is leveraging that expertise to help enhance the efficiency of the automotive supply chain during a time of transition in that industry.

Industry observers expect four primary automotive megatrends – e-mobility, autonomous driving, digitization and electrification – to continue to change the automotive industry, and cause disturbance in all supplier domains. E-mobility is reshaping the sector globally, with the increasing adoption of all-electric and hybrid vehicles, and with advances in sensor and smart-computing technologies helping to bring autonomous vehicles to our roadways sooner than later. Lightweighting vehicles, reducing general manufacturing waste and streamlining logistics also remain a priority, which are areas where Mondri is lending a hand.



Thermoforming skins

The German Bundesregierung, for example, has stepped up its development efforts related to e-mobility. And momentum for electrification generally is building among OEMs due to increasing regulatory pressures and greater technology advancements, according to a December 2017 study by Lazard and Roland Berger. As a result, the study states, scenarios for the share of EV cars in 2025 range from 8-20% in the U.S., to 20-32% in Europe, and 29-47% in China.¹ These changes are impacting traditional vehicle production practices, and already are revolutionising how humans interact with the vehicles in which they ride.

“As automakers and OEMs strive to streamline their factories as well as their supply chain and shipping practices to maximise efficiencies, we are ‘on call’ and stand ready to partner with them,” states **Armand Schoonbrood, COO of Mondri Corrugated Packaging**. At the same time, these companies face continuing challenges related to such issues as vehicle lightweighting and overall waste reduction. *“The automotive industry is one of the most efficient industries worldwide,”* notes Schoonbrood, *“and yet we are pleased to be helping it to become even more efficient.”*

¹ Global Automotive Supplier Study 2018 (<https://www.rolandberger.com/de/press/Wandel-der-Mobilit%C3%A4t-hat-deutliche-Folgen-f%C3%BCr-die-Automobilzulieferer.html>)

Tailored solutions for optimised supply chains

As automakers strive to strip out every gram of unneeded weight from their vehicles, they also are being confronted with a slew of other challenges — some old, some new — from speeding part deliveries, maximising automation and optimising storage space to improving shipping efficiencies and becoming nimble enough to create increasingly personalized vehicles, more or less on demand. Mondri is well placed to drive advancements in all these areas with a wide selection of highly customisable products that are tailored to individual automakers' needs. Its products are used every day to pack such items as engines, metal body parts like hoods and doors, headlamps, bumpers and vehicle headliners, to name but a few.

Let's look more closely at how Mondri's innovations and expertise are helping the cause.

Highly protective and flexible packaging

"Our experts are most effective when they can get involved at an early stage in the product development process to create the right packaging to maximise efficiencies with the entire supply chain in mind," notes Schoonbrood.

Generally speaking, the auto industry is seeing much greater individualisation, as consumers seek to personalise vehicles to suit their tastes. Greater part variety translates into demand for flexible, suitable packaging for each of those differing parts. Take headlights, for example — with a proliferation of models and versions, automakers are looking for a single package that can be adapted to protect and safely handle each variation of these products.

Importantly, notes **Corrugated Packaging Marketing Manager Andrea Richardson**, Mondri designs and customises each primary package to fit the dimensions of an automaker's specific component, allowing first and foremost for the best possible product protection. Mondri also can fit these packages to the customer's required lot size, to best serve their specific distribution needs.

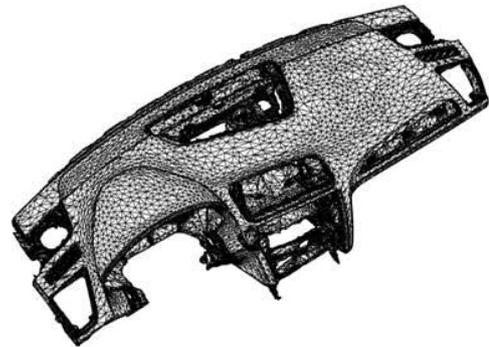
One of its recent products for a major German carmaker offers an excellent example. The customer said its existing packaging for headlights failed to adequately protect the packed products, which were breaking too often when they were dropped. Mondri Wellpappe Ansbach (Germany) responded by creating a corrugated solution with a "swing cushion" that protects the headlight by holding it very firmly in place. This single intelligent solution is adaptable to fit four different models of headlight, and has already been nominated for the VDW Innovationspreis 2018 that will be awarded during this year's FachPack (Forum Wellpappe).



Custom engine packaging with barrier coatings on the inside

3D scanning for custom packaging

“We’ve also introduced 3D scanning,” Richardson says, “meaning that we can bring a scanning device to a car maker’s facility and scan their parts, some of which may be too bulky or heavy



A physical dashboard (left) and a highly accurate 3D scan of it (right)

to easily transport. The 3D scan creates an exact image of the product and allows us to directly import all shapes and dimensions into the design systems, yielding the highest accuracy and fastest processing possible when it comes to developing custom packaging. Not only does this save time, but it’s a huge convenience factor for the customer.”

Making the most of secondary packaging

In addition to using standardised secondary packaging, Mondi also builds larger shipping containers to size to tightly contain smaller, custom-packed parts. These bulk shipments then can easily be broken down and the contents redistributed, as needed, to separate locations such as automotive repair shops and garages. *“These containers, when stacked,” Richardson notes, “can safely stack 900 kg or more when using wooden reinforcement bars.”*



stac-pac®

Mondi’s triple-wall corrugated board is very strong, she says, and as primary packaging can handle heavy items such as engines, which can weigh more than 120 kg. In such applications, corrugated solutions with an inside barrier coating have proven beneficial for overseas export, in that any grease that may leak from the engine is contained and does not leak out, which allows for a smoother customs process.

The company’s corrugated containers can be large (e.g., 1,200 x 800 mm) but they ship flat packed, simplifying handling and storage, and are easy to construct, saving valuable employee time on the shop floor, Richardson says.

But the true proof of any product or process is in its real-life application. Mondi is pleased to report that it has developed and implemented more than **20 innovative new packaging improvements** for a major car maker over the past two to three years. These changes dramatically increase efficiency, and compared to the previous wooden-crates system, require only a fraction of the time to pack products such as vehicle hoods, saving the customer hundreds of thousands of euros per year. Further validation for this project came in the form of prestigious WorldStar and ScanStar packaging awards.



This customized solution for packing a vehicle hood emphasizes space saving and product protection

Meantime, Mondi also offers various options for these heavy-duty containers, bearing the brand names of **easy-pak** (with an “automatic bottom” that, with a single pull, instantly forms a sturdy bottom with no need for tape closure); **stac-pac**[®] (with a sturdy supporting wooden frame for carrying extremely heavy loads); **pak-(k)it** (a large shipping and storage container that is delivered as a single flat kit containing the pallet, box and lid, which is compact and can be erected easily by a single person); and **pal-box**[®] (a heavy-duty shipping container with its own 100% recyclable pallet feet formed from corrugated material). Mondi plans to introduce the latest generation of its pak-(k)it line at the upcoming FachPack trade show in Germany.



pak-(k)it new generation

Getting greener, too

At the same time, while optimising shipping space for cost considerations, Mondi’s one-way packages also have been proven to be lighter-weight, recyclable, and use less material compared with traditional metal and wood solutions — all of which can help OEMs to lower their overall carbon footprint. This continues to be a major goal of all vehicle makers worldwide.

When it comes to bulky items, just bag it

Not everything is corrugated or rigid. Some products can be better served by more flexible packaging. Automakers often struggle to efficiently pack large, bulky components. They should welcome, therefore, the flexibility of Mondi’s multilayer **Protector Bags**, which are made of sack kraft brown paper. Mondi customises these flexible paper bags to specifically fit each customer’s part – from very small bags for shipping, for example, a car emblem, to very large bags that can measure 3.5 meters long by 1.25 meters wide. The latter are ideal for packaging items such as bumpers, says **Inga Boehlke, Mondi’s Sales Manager – Germany for Industrial Bags**.



Protector Bags

Due to a construction featuring several layers of paper (sometimes including an embossed middle layer), the bags are well cushioned and highly impact resistant. Different plies of paper can be combined depending on the packed products – for example, a soft layer of fleece tissue laminated to the inside of the bag can be used to protect varnished or chromed objects. Glazed paper usually is suitable for shipping unpainted parts, she notes.

Secondary packaging, such as boxes and large crates, is used to pack several products into one transport unit. It keeps the goods safe from major impacts that could cause severe damage, while the **Protector Bag** secures the goods during handling at the warehouse and helps to prevent contamination, scratches or friction with other goods during transport.

Benefit from quick and easy assembly

The automotive industry faces specific packaging challenges, given that it needs to safely handle and transport a diverse range of parts – from large and often very heavy engine parts, to relatively light, surface-sensitive and oddly shaped items such as bumpers.

“Ten years ago,” Boehlke recalls, “bumpers were more solid in design and were made of much thicker material. Now, they are more pliable and can dent or twist during transport.” That makes proper protective packaging all the more important. Mondi’s advances – from the development of new packaging systems to the enhancement of existing concepts – are helping the auto industry cope with that sector’s ever-changing requirements. They offer alternatives that address different challenges – from speeding up the packing process, to stepping up the protective performance, or creating a solution that takes into account a product’s journey along a multi-stop supply chain.

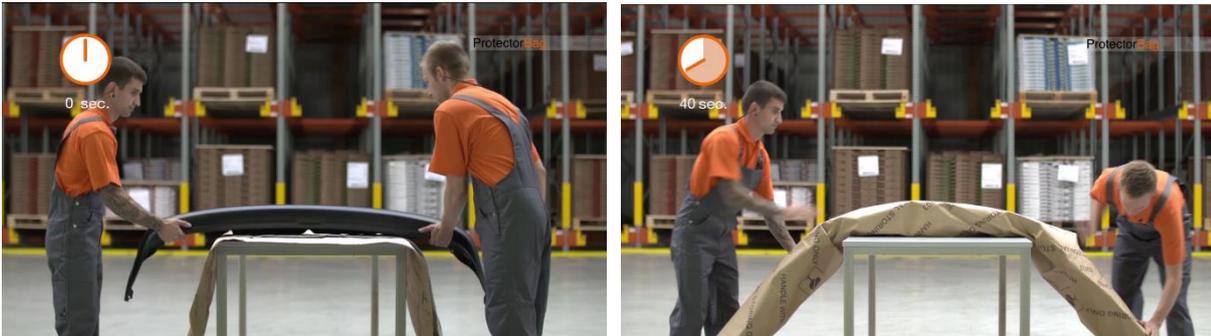
For bumpers, for example, Mondi customers have a choice between flexible Protector Bags, the slimmest way to pack bumpers, or **form-pak**, Mondi’s product-shaped, corrugated bumper solution with custom pallets.



Soft tissue as inner ply



Tobias Abrahamsson (middle): Winner of the Mondi Diamond Award 2018 in the category ‘Cutting-edge Solutions’ with “Sparks for success – packaging innovation”. Congratulations from Fred Phaswana (left), Joint Chairman of Mondi Group, and Peter Oswald, CEO of Mondi Group



Packing a bumper in a Protector Bag is a quick and easy exercise for two workers

“There is no need to ‘build’ our bags,” she explains. “Just open the bag, slide in the bumper and crumple the bag around the part.” There is a slightly overlapping glue line the length of the package. The workers filling the bag need only to peel off the release liner and press the two sides together to seal the bag (see this video: <http://bit.ly/MondiProtectorBag>).



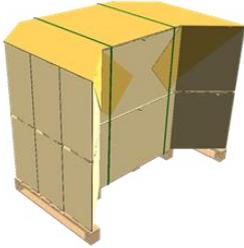
Tight packaging reduces the volume by up to 67%. Storage and transport space can be reduced, which has a positive impact on cost and CO₂ emissions.

Examples of current **Protector Bags** customers have shown that tight packaging reduces their transported volumes by up to 67%, leading to significant logistics cost savings and finally to lower CO₂ emissions.

Protector Bags also offer ecological advantages compared to traditional packaging, as they reduce packaging volume and weight, cut

down on waste and disposal costs, optimise transport and storage space (again resulting in lower CO₂ emissions), and can be made partly from recycled materials.

Just like Protector Bags, the corrugated solution **form-pak** uses the concept of odd-shaped bumpers to nest one in the other to save space during storage and to allow for more parts to be transported on a pallet. That enables more units to be packed in the same amount of space in trucks, rail cars, or sea-freight containers.

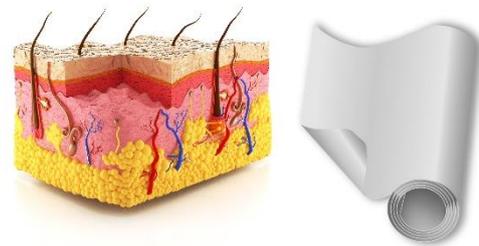


CAD drawing of form-pak

Form-pak even comes with a product-shaped pallet to follow the nesting concept all the way to the destination. Compared with standard bumper boxes, customers achieve often more than 80% additional utilisation of truck or sea-freight container space. Single bumper units can be shipped for further distribution as separate items and still are well protected. Mondi's **form-pak** can be set up very quickly, keeps the product in shape, can be stacked and is very ecological, owing to the resulting transport-related savings, reduced raw material usage, and the ability to recycle or reuse the packages.

Your partner for tailor-made skins

“OEMs are always looking to reduce complexity in their production processes,” notes **Silvia Hanzelova, Industry Group Manager – Automotive Applications for the company’s Extrusion Coatings business segment.** *“With that in mind, Mondi leverages its expertise in extrusion layering of a broad range of polymers and various substrates such as glass fibre, nonwovens or paper. Our composites can best be compared to human skin – with its complex structure, it also offers a very broad range of functionalities in a relatively thin product, with the different elements often providing useful synergies.”*



Mondi's multilayer skins perform multiple functions -- just like human skin

“Our thermoformable automotive skins are usually not the end product,” Hanzelova continues, *“but instead are a part of our customer’s larger components like headliners or carpets. This allows them to think outside the box when developing parts that meet or even exceed the OEMs’ high expectations. We always tailor-make our automotive skins and co-develop them with our customers.”*

Compared with laminates, these multifunctional skins allow for faster and more effective production, easy handling, lower stock levels, and simpler warehousing, and combinations of different functionalities (light weight, acoustics, fire retardancy, etc.).

Based at Mondi Belcoat N.V. in Duffel, Belgium, Hanzelova notes that such co-development efforts with automakers are long-term partnerships, with projects sometimes lasting up to five years before the actual car part goes into production. Customised solutions are vital, since each client has its own technical challenges and build of material preferences. When produced at different Tier 1 supplier locations, sometimes even the same skin used in exactly the same car part needs major adjustments.

Automotive skins by Mondi find use in such automotive applications as headliners, hood liners, roof liners, carpets, interior trim parts and underbody shields. By carefully engineering the skin construction, Mondi brings to these car parts an improved structural strength and stiffness, fire retardancy, chemical resistance, and a variety of finishes (for tuning optics, scratch resistance, anti-squeak properties, and more).

Solutions for future mobility

Acoustics also are increasingly important, according to Hanzelova: “*The rise of autonomous vehicles is going to turn automobile interiors more into a space akin to a mobile living room. Occupants want to talk, play games, read, sleep or work. The shift toward quieter electric and hybrid engines means that most of the unwanted noise will be coming from the street. This makes good acoustical insulation paramount for everything from underbody shields and wheel arch liners to damping reinforcement panels and carpet backing.*”

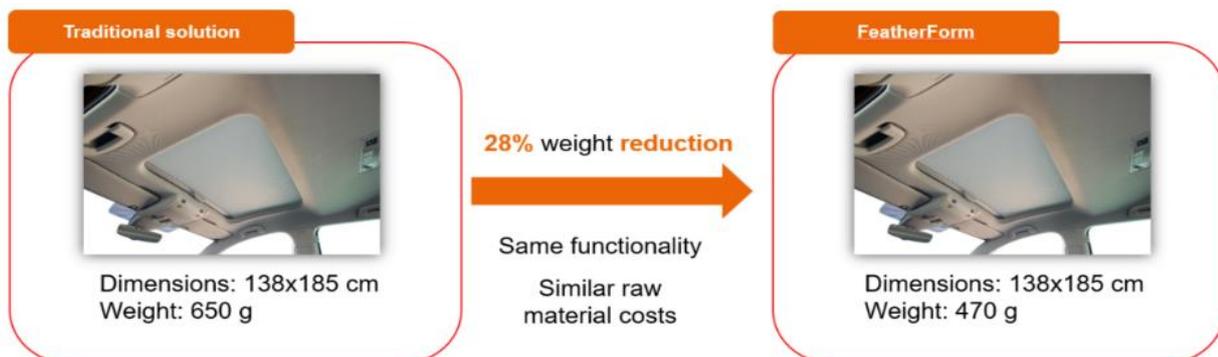


Mobile living room: self-driving e-vehicle cockpit e-vehicle cockpit



Mondi offers a family of thermoformable skin products under the brand **FeatherForm**, which is a thin polymer composite reinforced with a glass veil (a sheet of nonwoven glass fibre that Mond runs through its extrusion coating line) to yield a car part that processes easier while having a lower final weight than the same part made with chopped glass. For vehicle headliners, for example, FeatherForm can be used with either wet (open face) or dry (closed) systems.

A wet-system customer case study yielded a 28% weight reduction for FeatherForm on an identically sized headliner with the same functionality and similar material costs.



Wet-system headliner case study

As you can see, Mond demonstrates expertise and competence in fine-tuning sophisticated solutions to the dedicated needs of customers to contribute to their cost effective, high-value interior components. It offers a full portfolio of automotive solutions – rigid and flexible, large and small, custom and standard – that improve supply-chain efficiency, boost sustainability and save customers money.

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About Mondi

Mondi is a global leader in packaging and paper, delighting its customers and consumers with innovative and sustainable packaging and paper solutions. Mondi is fully integrated across the packaging and paper value chain - from managing forests and producing pulp, paper and plastic films, to developing and manufacturing effective industrial and consumer packaging solutions. Sustainability is embedded in everything Mondi does. In 2017, Mondi had revenues of €7.10 billion and underlying EBITDA of €1.48 billion.

Mondi has a dual listed company structure, with a primary listing on the JSE Limited for Mondi Limited under the ticker MND, and a premium listing on the London Stock Exchange for Mondi plc, under the ticker MNDI. Mondi is a FTSE 100 constituent, and has been included in the FTSE4Good Index Series since 2008 and the FTSE/JSE Responsible Investment Index Series since 2007.

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