



The fifth industrial revolution

Footwear waste into foam

Long-lasting products are greener

Dutch shoe museum reopens



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Cover image: one of the shoes on display in the new Dutch Shoe Museum. It is from Utrecht-based design studio Skua.

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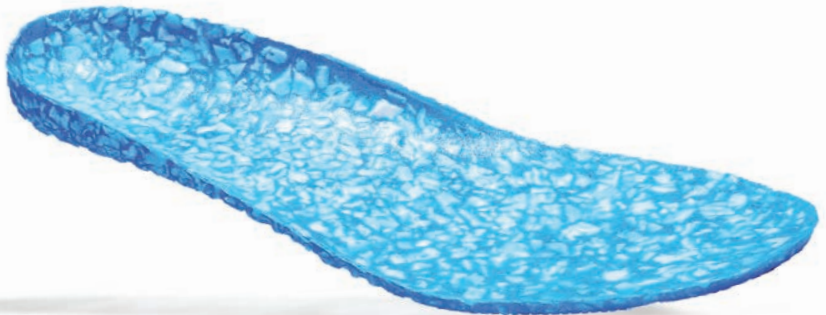
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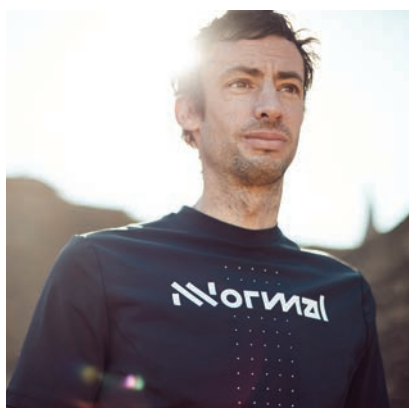
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Global news

UK As it marks its 75th anniversary, footwear components maker Texon has published its third sustainability report and revealed it is on track to meet the sustainability targets it has set for 2025. Benchmarking progress against 2015 data, Texon has reported a 27% reduction in greenhouse gas (GHG) emissions, a 9% reduction in its use of virgin materials, made 46% of its waste recyclable or reusable, and realised an 8% reduction in water use and water waste.

France French footwear industry body the Fédération Française has created three new films that explain the shoe manufacturing process. The films feature a total of six member companies: Danse Azur, Merlet Dance, Heller, Exquise, La Manufacture 49 and JM Weston. The federation will soon upload the films onto YouTube, but invited students from schools in different parts of France to a preview in mid-March. Representatives of all six footwear companies to feature were on hand to meet the students and answer questions.

Germany Footwear technology developer Desma has confirmed that its House Fair exhibition will take place as an in-person event on September 26 and 27. Desma usually runs the exhibition every two years at its headquarters in Achim, near Bremen, showcasing its own latest technology alongside innovations from select partners in the footwear manufacturing value chain. The company had to cancel the 2020 House Fair because of covid-19 and took the decision to hold it in 2021 instead. However, ongoing restrictions meant it had to cancel again.

Turkey Representatives of Turkey's leather industry have said the war in Ukraine has already had a considerable impact on its exports of footwear and finished leather products. They said they hoped there would be a ceasefire soon in the conflict, but pointed out that, even if this happens, restarting exports will take time. They have estimated that the war is likely to cause a loss of business of around \$700 million for its exporters this year.

Italy The Micam and Mipel exhibitions were held in Milan in March. Both events presented a united front under the banner 'Better Together'. Italy's national bodies for footwear and leathers goods manufacturers, Assocalzaturifici and Assopellettieri, said they viewed this joint approach as a more powerful way to present high-quality products that are made in Italy. They said 'Better Together' also gave them an opportunity to emphasise their member companies' commitment to sustainability.

Spain Spain's national association of footwear components and machinery producers, AEC, has said the edition of the Futurmoda shoe and leather exhibition in Elche in March was a success. Around 400 companies exhibited. The event will return to its pre-pandemic, twice-yearly format, with the next event taking place from October 5-6.

South Africa Logistics company DHL has teamed up with Cape Town-based shoemaker Veldskoek in the creation of 365 pairs of boots, each made by 66 pairs of hands in Durban. The collaboration marks DHL's first fashion partnership with an African brand. They jointly commissioned South African artist Reggie Khumalo to design exclusive mural-style artwork for the shoes.

Egypt High-end Italian footwear brand Giuseppe Zanotti has opened its first standalone store in Cairo. The 100 square-metre space is in a new luxury shopping area called 5A By The Waterway. The brand's founder and creative director, Giuseppe Zanotti, said: "It is an honour to open our first boutique in such a vibrant city."

China Local administrators in Hainan have revealed that offshore duty-free sales in the province amounted to \$2.3 billion during the first quarter of this year, an 8.4% rise on the year previous. In 2020, China's government began rolling out a plan to make Hainan province, the smallest and most southerly in the country, a free-trade zone. This means visitors from other parts of China and from other countries can now travel to Hainan and buy luxury products, including footwear, at duty-free prices.

US Boston-based athletic brand New Balance has opened a new sports footwear factory in Methuen, Massachusetts. It said the new factory signalled a strong commitment to manufacturing in the US and involved a significant investment in innovation and machinery, combined with the integration of lean manufacturing processes to enable what it called "a responsive US-made supply network".

Mexico The executive president of Guanajuato-based footwear industry body CICEG, Alejandro Gómez Tamez, has predicted that Mexico's footwear production this year will again exceed 200 million pairs. This would be a 20% increase compared to the figure for 2020, but would still be substantially below the pre-pandemic figure the industry achieved in 2019, which was 250 million pairs.



Kazakhstan Italy's national footwear manufacturers association, Assocalzaturifici, has said a recent event in Kazakhstan, La Moda Italiana@Almaty in Almaty, sounded "a note of cautious optimism". It said "the entire Kazakh fashion community" attended the event, along with entrepreneurs, buyers, bloggers and influencers. Figures for the first 11 months of 2021, the most recent available, show that Italian manufacturers exported 207,000 pairs of footwear to Kazakhstan over the period. These shoes and boots had an average price per pair of €83.08.

South Korea Busan-based footwear brand Azon, established in the southern port city by a local artisan with more than 35 years' shoemaking experience, has created what it is calling a "Korean-style, super non-slip outsole". The firm described the innovation as technically similar to Vibram's own high-performance soles, but made from a special rubber compound developed in-house.

Vietnam Athletic footwear manufacturing group Yue Yuen reported revenues of \$8.5 billion for 2021, an increase of 1% compared to the previous year. The volume of shoes the group shipped during the year was 238.3 million pairs, representing a decline of 2.5% year on year. It said it had been affected by pandemic-provoked lockdowns in Vietnam later in the year. This caused halts in production and material bottlenecks at Yue Yuen factories in Vietnam, but it said activity there had picked up since October.

Pakistan The Pakistan leather industry achieved export revenues of \$660 million in the first eight months of the current financial year, the period from July 2021 to February 2022. This is an increase of 16.3% year on year. Footwear manufacturers exported 12 million pairs over the eight-month period bringing in export revenues of a little over \$100 million. This showed an increase in volume of 9% and a rise in value of 17.7%.



Brazil Footwear industry body, Abicalçados, has said shoe manufacturers across Brazil created a combined total of 17,800 new jobs in the first quarter of 2022. This increase in jobs took the total number of people working in the country's footwear manufacturing industry to 284,000 at the end of the quarter, an increase of 11.5% compared to a year ago. Rio Grande do Sul, home to almost 30% of Brazil's shoe producers, was the state that created the most footwear jobs during the quarter, with 6,100 new posts, followed by Bahia, Ceara and São Paulo.



Footprints



CREDIT: SYMPATEX

Design process needs transforming, Sympatex says

Membrane materials developer Sympatex has called March 30, when the European Commission published its package of European Green Deal proposals "an unforgettable date".

These proposals aim to put in place new rules to make "almost all physical goods in the EU market" more friendly to the environment, more circular, and energy-efficient. A textile-specific package called The EU Strategy for Sustainable and Circular Textiles is part of the wider announcement.

Sympatex's reaction was to say that the textile sector will be the first industry to shift fully from a linear to a circular economy, with products

being designed to be more durable, reusable, repairable, recyclable and energy-efficient.

Chief executive, **Dr Rüdiger Fox**, said: "Until now, we have created products pretty much by ignoring our impact upstream and downstream. What we will have now is an eco-design process. The creative process of the product will need to take into account certain constraints, but the beauty is that these constraints will not limit innovation, but accelerate it."

He said the changes the European Commission is bringing in will lead companies to realise that "only certain materials are recyclable". Once they realise this, Dr Fox continued, "people can focus on developing new solutions with those materials". He estimated that the industry now has only three or four years in which to transform its design process. ■

Made In Italy champion dies

Footwear industry leader **Vito Artioli** has died. He was 85 years old and had spent a lifetime in the shoe sector, inheriting the running of his family footwear business from its founder, his father Severino, and providing high-end artisan shoes to popes, politicians and film stars.

Vito Artioli came to international prominence when he took up the presidency of the main footwear industry body in Italy, ANCI (later Assocalzaturifici) in 2007. He also served as president of the footwear industry's representative body to the European Commission, CEC.

Towards the end of the first decade of this century, the footwear industry in Europe won a hard-fought battle to have antidumping duties imposed on shoes imported from Vietnam and China. There was considerable reluctance inside the European Commission to do this, but Vito Artioli's hard work, perseverance, diplomacy and leadership played a crucial role in winning the argument for Europe's shoe manufacturers. ■

Boots investment to say thank you

Ukraine's new ambassador to Australia, **Vasyl Myroshnychenko**, has invested in a pair of RM Williams boots, saying he wanted to make a gesture of thanks to Australia for its support of Ukraine in the war against Russia.

Mr Myroshnychenko took up his post in Canberra in April and was quick to praise his host country for providing materials to help Ukraine's war effort.

At the start of May, he said he had decided to buy a pair of boots from South Australia-based RM Williams to say a personal thank you. The footwear company was established 90 years ago. In 2020, it was acquired by Perth-based investment group Tattarang. ■

Major Chinese footwear figure dies

The founder of Wenzhou-based shoe brand Kangnai, **Zheng Xiukang**, has passed away.

China Leather Industry Association (CLIA) described Mr Zheng's death as a "major loss" to the country's leather and footwear industries. He was a role model for a generation, CLIA said.

Well-respected as an early pioneer of mechanised production in Wenzhou, Mr Zheng was also a published author, a registrant of more than 70 technical patents and a contributor to national standards for leather footwear in China. ■

Senior appointment at The Athlete's Foot

Athletic footwear retail chain The Athlete's Foot has appointed **Romano Cinelli** as its general manager. His role will include brand partner management with footwear groups including Nike, adidas, New Balance and Puma.

The Athlete's Foot has 560 stores in 30 countries. It was acquired last year from Intersport by another Switzerland-based group, Arklyz.

A footwear industry veteran, Romano Cinelli previously held senior roles at Converse and Nike. ■

First female president for Red Wing Shoe Company

Red Wing Shoe Company has appointed **Allison Gettings** as its president. Ms Gettings will be the company's first female president and will oversee its operations, marketing, business technology and corporate social responsibility functions. She will report to chief executive, **Mark Urdahl**.

Allison Gettings is the daughter of Bill Sweasy, the former chief executive and chairman of the company, which runs the SB Foot tannery in Minnesota as well as footwear brands Red Wing, Vasque, Irish Setter and Worx. She represents the fourth generation of the Sweasy family to hold a leadership position there.

She has worked at the company for 13 years in nine different roles across five different departments, leading to her becoming vice president and chief services officer in 2020. She will assume the role of company president in July. ■

Shoes that have lasted 75 years so far

Footwear brand Tricker's has shared the details of news it received recently from a customer in Canada.

Peter Lake, who lives in Victoria, British Columbia, got in touch with the company to say that pair of Tricker's shoes he bought in 1947 were still in fine condition and constituted one of his best ever investments, proving that quality lasts.

Mr Lake, who is now 101 years old, bought the shoes in his native UK after serving in World War II. He went on to work in public administration jobs in Zambia and, naturally, his Tricker's brogues went to Africa with him.

He also worked as a tailor and has retained the knack of dressing elegantly in retirement. He moved to Canada in the early 1970s, naturally taking the Tricker's with him across the Atlantic.

"Almost all elements of Tricker's footwear can be repaired or replaced," the Northampton-based footwear manufacturer said. "Our Goodyear-welt construction means that it's easy for us to do. Conserving and repairing, rather than simply buying something new and replacing, is at the heart of our manufacturing process." ■

Reebok owner announces appointments

Authentic Brands Group (ABG) has appointed **Steve Robaire** as executive vice-president of Reebok.

A long-term Reebok executive, Mr Robaire will take up the new role to drive the brand's expansion internationally. He will be based in ABG's New York City headquarters.

The group has also recruited a figure from sports broadcasting, **Kiyoshi Nakamura**, to lead its business development activities in Asia. It said Mr Nakamura would generate business development opportunities for the company's brands as it seeks to expand in Japan and across Asia.

ABG completed the acquisition of Reebok at the end of February. ■

Dr Martens' new top creative is a familiar face

Footwear brand Dr Martens, headquartered in England, recently revealed that it has promoted its very own former global footwear category product director **Darren McKoy** to the role of global creative director.

Before joining the brand in 2015, Mr McKoy previously worked for companies including Asics, VF Corporation and adidas. Commenting on the news, he said: "We'll continue to innovate and tell the brand story through the way we create, the processes we adopt and the way we interact with our wearers. But we'll always pay homage and respect to the heritage and history of the brand." ■

Senior sales appointment for Texon

Performance material solutions developer Texon has appointed a new regional sales director, with **Norbert Nieleck** joining to help it grow its business with footwear manufacturers in Europe, the Middle East and Africa.

Before moving to Texon, Mr Nieleck worked at labelling solutions developer Avery Dennison, eventually becoming its sales director for Germany, Austria and Switzerland. After this, he went to work at hook-and-loop materials developer Velcro, becoming its vice-president for sales and marketing in Europe, and, from there, to become global sales director of a German hook-and-loop producer, Gottlieb Binder. He will continue to be based in Germany. ■

Children's shoe charity receives support from Caleres

Footwear group Caleres has announced assistance worth \$1 million to the Soles4Souls charity, which provides shoes for homeless children. Chief executive, **Diane Sullivan**, said the company would donate \$500,000 in cash and \$500,000 worth of shoes.

The shoes the group will donate will include athletic shoes for homeless children to receive in time for the start of the new school year in September. The first product donation will happen this summer and will benefit children in St Louis, where Caleres has its headquarters, and where there are an estimated 17,000 children experiencing homelessness. ■

Fila and Leni Klum club together on sneaker collection

A new sneaker collection on which athletic brand Fila has worked with teenage model **Leni Klum** went on sale in Deichmann stores in March.

There are 21 different designs in the Fila x Leni Klum collection and the footwear brand said the idea was to help everyone find their "perfect sneaker match". It described the styles as "young, sporty and elegant".

Ms Klum said she loved sneakers because they presented her with a wide range of options for rounding off her style or showing her mood. ■



Industry & Innovation



CREDIT: NIKE

Nike homes in on disassembly on its move to circularity

Nike's ISPA (improvise, scavenge, protect, adapt) team has released details of two designs – the Link and Link Axis – that “foretell the brand's future in circular design”.

Nike has been embracing circular design principles for several years, outlined in the Nike 2019 Circular Design Guide, an open-source workbook to share learnings and insights with the design community.

This season, the ISPA team considered the circular design principle of “disassembly”. Traditionally, designers use glue and other bonding elements to make the shoe durable, but that makes a shoe difficult to disassemble and recycle.

Recycling shoes usually requires shredding, an energy-intensive process that limits how the recycled materials can be used. Creating a shoe that can be taken apart would reduce the carbon footprint of the product and open up new possibilities for its lifecycle.

Darryl Matthews, vice-president of catalyst footwear product design, said: “Designed in partnership with engineering, digital product creation and development, these shoes are completely informed by method of make – it really is a case of form following function.”

“Our hope is that these ideas and aesthetics become normalised, accelerating our ability to imagine how shoes will continue to evolve in the future.”

Nike is also participating in “Plastic: Remaking Our World,” an exhibition at Germany's Vitra Design Museum, one of the world's leading design institutions, from March 26 to September 4, this year. The exhibit highlights the exploration of design and evolutionary journey behind the ISPA Link Axis.

Nike is building partnerships to grow its recycling capabilities, and is investing in product take-back consumer programmes across the world that will help grow its ability to repurpose end-of-life products. ■

Trail running shoe with carbon plates from Hoka

Performance footwear brand Hoka made its Tecton X trail shoe available at authorised retailers across Europe from May 1. The product is the first trail shoe Hoka has made with carbon plating.

It has a two parallel carbon fibre plates in the midsole, running lengthwise toe to heel. Hoka has said this design allows for “significant ground feel underfoot” to help runners sense uneven terrain.

The brand's vice-president for product, Gretchen Weimer, said Hoka was “generating unexpected ways of incorporating performance technology throughout our product line, with the end goal always being to help make running easier”. ■

TPU upcycling technology breakthrough

Upcycling start-up Novolooop has raised \$11 million from several investors in a Series A financing and partnered with bonding specialist Bemis Associates to grow its plastic recycling technology.

Novolooop's technology, ATOD (accelerated thermal oxidative decomposition), breaks down polyethylene into chemical building blocks that can be synthesised into other products. Only 9% of polyethylene is recycled, according to the company. ■

Adidas increases ocean plastic use again

Adidas Originals, working with Parley for the Oceans, which facilitates the upcycling of ocean plastic, has updated several of its shoe styles with the recycled yarn.

Each sneaker style in the spring-summer 2022 collection has been made with a yarn that contains at least 50% Parley Ocean Plastic, made with plastic either found in the sea or near the coast. The other 50% of the yarn is recycled polyester. ■

Funding for NFW to build plastic-free vision

Material innovation company Natural Fiber Welding (NFW) has closed a funding round, raising \$85 million to help it scale up production of materials it describes as "high-performance, petrochemical-free, circular and beautiful".

It said these materials are now coming to market in products developed by a wide array of footwear and fashion brand partners.

The materials NFW has developed so far are Mirum, a material from renewable, natural raw materials that will work in shoe uppers and accessories, and Clarus, a range of fabrics developed from natural fibres imbued with high-performance attributes through closed-loop green chemistry.

Founder and chief executive of the Illinois-based company, Dr Luke Haverhals, said: "We envision a world that doesn't rely on plastic, where abundant natural materials enable people and the planet to thrive together. We're here to leave the world better than we found it and we look forward to working with our brand partners to build a comprehensively circular coalition for the planet." ■

'First' 3D printer for luxury leathergoods

Additive manufacturing specialist Stratasy's has unveiled what it has described as the first 3D printer designed specifically for direct-to-textile printing in the fashion industry, purposefully made with high-end footwear, accessories and clothing in mind.

The innovation, named the J850 TechStyle 3D printer, offers "unlimited possibilities" for the personalisation and customisation of 3D-printed articles, Stratasy's claims. It has been created to print directly onto leather, linen, cotton, denim and polyester, among other materials, at volumes as wide-ranging as "tens of thousands" to a single piece.

Already available for purchase, the new printing technology and its associated materials will be exhibited alongside samples of footwear and other products during Milan Design Week in June.

International trend forecaster Lidewij Edelkoort described the printer as "an answer to a million prayers" from the broader creative community. ■

Pinless spikes will save time

Athletic footwear brand Asics has launched a new development in long-distance track spikes. Its Metaspeed LD system combines midsole cushioning and outsole grip with a full-length carbon plate.

It will help long-distance track runners to experience "a more responsive rebound at toe-off", increase traction, save energy and take longer strides, Asics said.

The company has given the name Hexa-Claw to the outsole. The spikes are carbon and use no pins so that, rather than piercing the track's surface, traction comes from claws in different shapes and sizes and positioned at different angles.

This also reduces contact time because it is said that runners "glide across the track" instead of having spike pins penetrate the track and come back out again. This, in turn, will help them conserve energy between steps.

"We studied the movement of mainly 5,000 and 10,000 metre competitors and athletes," explained Metaspeed LD project leader, Shuhei Takemura. "These competitions require athletes to keep up a high pace for a long period of time, and then show a burst of energy towards the end of the race. We focused on energy saving, so the athletes' strength can be showcased throughout the race, but also having the energy to showcase their speed at the end of the race." ■

Polyamide investment in China

Belgium-based polymers producer Domo Chemicals has announced a long-term investment in its polyamide production capacity in China. Domo acquired Solvay's polyamide business in 2020 and has sold high-performance polyamides under the Technyl brand name since February this year.

To meet increasing demand, it has expanded production capacity at its site in Jiaying, Zhejiang Province, to 14,000 tonnes per annum from this April. In addition, it aims to complete the production of a new facility at nearby Haiyan by the third quarter of next year. It will have a capacity of 35,000-tonnes per year. ■

Vietnam development for Milspeed

Shoe components manufacturer Milspeed has now taken full ownership of its Milspeed Victory subsidiary in Vietnam.

The facility, based in Binh Duong province in the south of the Asian country, has been audited and approved by shoe brands and Milspeed will use it to deliver customised and customer-designed products such as toe puffs and counter materials to footwear manufacturers.

Milspeed explained that all manufacturing waste will be collected in the facility and returned to the company's own recycling and manufacturing hub to support closed-loop manufacturing processes. ■

Boots from Baffin to go to the needy

Outdoor footwear brand Baffin is to donate 1,300 pairs of cold-weather boots to needy people across North America. The boots are inspired by the brand's Hunter and Little Hunter styles.

Baffin's success in recycling material from imperfect samples at its factory in Stoney Creek, Ontario, has allowed it to have between 5% and 10% recycled materials in its products. It decided that it could create a product with even more recycled content that it could give away to those in need and the new initiative, the Citizenship Boot Project, was born. ■



Backtrack

05.05.22

Successful quarter for Lenzing despite "sharply rising costs"

04.05.22

Indigenous-led projects are the focus of Vivobarefoot campaign

Skechers continues ascent with record quarter

03.05.22

Brands are resonating with consumers, Columbia says

29.04.22

Puma sales jump 20% in first quarter

28.04.22

Report reveals yoga shoes' new posture in China

27.04.22

New carbon placing pushes Asics runners on

Ugg launches first boot from 'regenerative' sheepskin

eBay offers shoe seconds at 60% off

26.04.22

Thirty Indian leather companies will travel to Spoga Horse

25.04.22

Roh Seoul broadens footwear offer

22.04.22

A good quarter for Stella International

21.04.22

Zanotti applies a neon touch to Harmony sandal

Growth for Pakistan footwear industry

20.04.22

Fuzhou shoe firms take advantage of RCEP

14.04.22

Strong growth for French footwear exports

New trademark for Putian- made footwear

13.04.22

Brand Finance reveals footwear's most valuable brands for 2022

World Footwear's publishing cycle and limitations on space make it impossible for us to run more than a carefully selected sample of news from across the industry. However, we publish hundreds more stories on **www.footwearbiz.com**. The site is updated every day with news from every continent and every part of the industry, making footwearbiz.com one of the most comprehensive archives of news anywhere on the web for the global footwear industry.

We list below just a few of the headlines that have appeared on the site in recent weeks — **www.footwearbiz.com** allows you to read the news items you may have missed.

LVMH hails "excellent start" to 2022

Toray apologises for resin certification mislabelling

12.04.22

Two more judges for Real Leather Stay Different

TNF: recycled leather, merino and rPET intrigue 'MZ+eco' generation

11.04.22

Weitzman owner donates \$3m to leather sourcing initiative

08.04.22

Footwear brands choose plant-based midsoles

07.04.22

Bangladesh leather footwear exports up by 28%

06.04.22

Merrell begins multi-year sustainability drive

New research project aims for more precision on carbon footprints

Lenzing publishes first online sustainability report

Nike hits 50% recycled materials for latest shoe

05.04.22

Assocalzaturifici announces that Almaty event will go ahead

CLIA partners China Consumers Association on leather education

01.04.22

Indian leather sector breaks \$1bn in exports to US

Lululemon leaps into footwear

31.03.22

Nike continues Kobe Bryant's legacy with fresh partnership

30.03.22

Micam surpasses Brazilian shoemakers' expectations

Mushroom material does not work, shoe designer says

29.03.22

Double-digit growth for all Anta brands

25.03.22

Vivobarefoot to test mycelium foam for footwear

24.03.22

Brazilian footwear industry heralds year of recovery

23.03.22

Nike's digital playbook pays off, but China losses weaken growth

Red Dragonfly's IoT leather project 'key' for city

China and North America push On forward

22.03.22

Strong bounce back for Stella International

18.03.22

Li-Ning responds to North Korean allegations

Mipel-Micam visitors close to 30,000

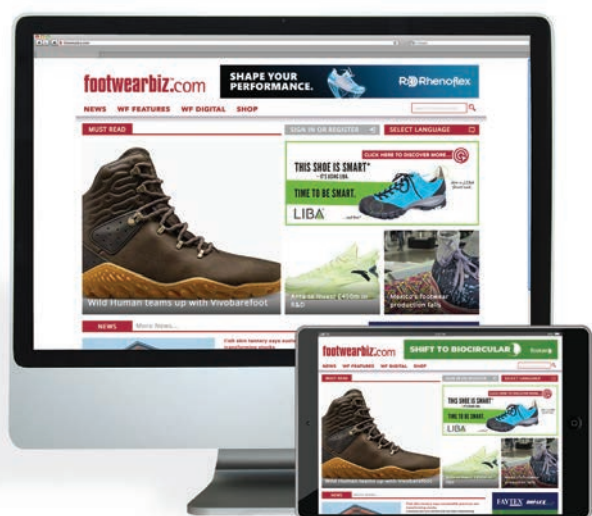
16.03.22

Large Portuguese presence at Micam is 'a sign of hope'

Adidas among first to adopt TrusTrace's new system



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Sustainable footwear, the 2030 Agenda and the Green Deal

CREDIT: INESCOP

Sustainability issues affect all industries — and the footwear sector is no exception. As part of a broad EU initiative, the two principal footwear research and technology organisations in the Iberian Peninsula, Portugal's CTCP, that led the project, and INESCOP in Spain, have been deploying the Product Environmental Footprint EU methodology and developing the Ecodesign Guide for the sector in cooperation with a number of footwear manufacturers and suppliers*.

In anticipation of a consumer future when eco-labels will become commonplace, the LIFE Greenshoes4All project provides a clear path for footwear manufacturers and component companies towards sustainability, the European green product market and economic circularity. To this end, the 2030 Agenda for Sustainable Development prioritises a set of sustainable actions.

While greenhouse gas (GHG) emissions continue to rise, there is the likelihood that temperatures will temporarily exceed the threshold of 1.5°C above pre-industrial levels in the next five years. Rising temperatures are fuelling a variety of social, environmental and economic impacts, from heatwaves and fires to flooding. United Nations Secretary-General

“ Unless there are immediate, rapid, and large-scale reductions in greenhouse gas emissions, limiting warming to 1.5°C will be impossible, with catastrophic consequences for people and the planet on which we depend. ”

ANTONIO GUTERRES, UN SECRETARY-GENERAL

Antonio Guterres said during COP26, “Unless there are immediate, rapid, and large-scale reductions in greenhouse gas emissions, limiting warming to 1.5°C will be impossible, with catastrophic consequences for people and the planet on which we depend.”

To stay on pace with the 1.5°C pathway, the footwear sector must speed up its efforts to contribute to reducing GHG emissions to deliver a 50% absolute reduction by 2030 in line with the Paris Agreement goals on climate change (or equivalent science-based

targets) and achieving Net Zero by 2050. It needs to move away from a linear pattern with growing consumption of planet resources towards a sustainable and circular economy, using fewer resources, and reducing climate-altering emissions. To do so, the industry, as well as the whole value chain and consumers, will need to take action.

How to reach these targets

Based on product environmental footprint studies done in the Life GreenShoes4All EU project and experience of working with footwear and allied trade companies in Portugal and Europe, CTCP identified a set of sustainable actions with the potential to contribute towards a 50% to 60% reduction in the overall carbon footprint of footwear products and services.

- **Design** – ecodesign for longer life, repairability and circular use/recyclability.
- **Materials** – upper, lining, soling materials and components that have low environmental, carbon and water footprint are lighter and recycled.
- **Efficiency** – using materials more efficiently and reducing waste.
- **Go Circular** – increasing use of production waste and products at end-of-life for circularity and recycling.
- **Research** – developing materials, components and processes with lower environmental, carbon and water footprint.
- **Green Energy** – increasing efficiency and adopting lower carbon and renewable energy.
- **Business Models** – increasing collaboration in the value chain from supply to retail creating circular digital enabled or traceable business models.
- **Processes** – deploying lower impact production processes.
- **Chemicals** – eliminating or reducing chemically critical substances according REACH and other regulations.
- **Packaging** – rethink packaging to promote reuse/recycling and reduce weight.

Figure 1 illustrates the estimated relative contribution of these actions to reducing the footwear industry's carbon footprint. Acting on the design phase, material and components selection and circularity will generate a relevant contribution. The quantified reductions will depend on company and product baselines, the specific objectives established and the concrete measures undertaken.

Sustainable materials

These include materials with lower GHG emissions, water footprint and energy requirements on a per unit basis compared with conventional alternatives such as recycled materials. For uppers and linings: recycled hides/leather, recycled or organic cotton, recycled wool, viscose made with fibres from sustainable sources, mechanically or chemically recycled polyester (rPoly), recycled nylon or recycled coated fabric (woven, knitted, non-woven or microfibre substrate coated with PU). For the bottom parts, these will include recycled cellulose

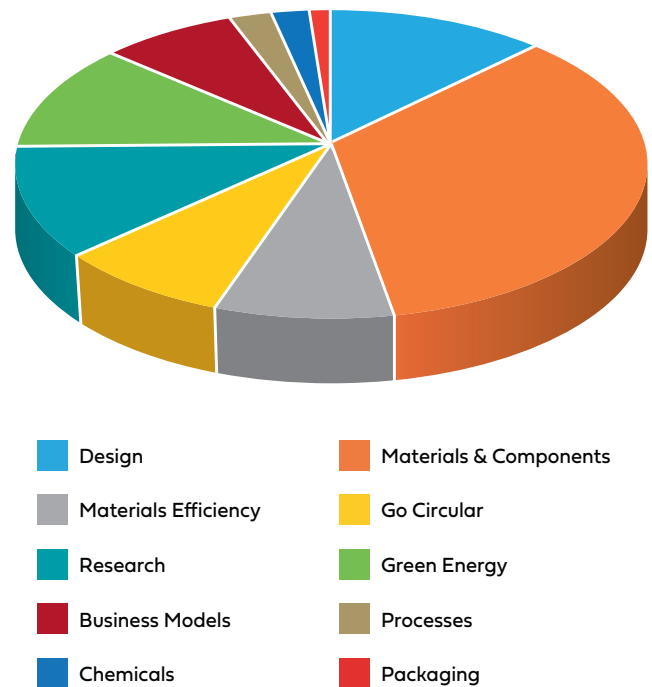


Figure 1 – The potential of sustainable actions in contributing towards a 50% reduction in footwear's carbon footprint.

CREDIT: CTCP

board, recycled thermoplastic rubber (rTP), recycled vulcanised rubber (rVR), recycled polyurethane (rTPU), recycle poly vinyl chloride (rPVC) or recycled ethyl vinyl acetate (rEVA)

The cost of these alternatives may currently be higher than conventional virgin materials and the supply constrained, but the industry supply chain is working to narrow the difference in price and putting in place the technologies needed to scale their production. These materials' quality is also a fundamental asset to ensure product functionality and durability.

To decarbonise the footwear sector, it is also important to shift to green energy, moving away from coal and high carbon fuels to lower carbon alternatives. When possible, renewable solar-based electricity is a good option. Biogas and biomass could be alternative fuels. There are also opportunities to reduce energy consumption through efficiency even though this often includes interventions that have a positive return on investment, but lower return and longer payback compared with other investments. New possibilities and major challenges are expected soon, due to the relevant investments being made in hydrogen, biofuels and batteries.

New accredited certification system

The new preferences of today's consumers in terms of sustainability have led INESCOP to work towards enabling footwear companies to anticipate what future eco-labels for footwear will look like, something similar to what is already seen in other products, such as energy efficiency labels on household appliances.

This eco-label is based on the life cycle assessment of

footwear based on the Product Environmental Footprint methodology. Currently, over 30 different footwear styles have had their PEF determined for validation. Many of them are iconic styles where manufacturers are discovering new ways of redesigning them, without sacrificing aesthetics, in line with European decarbonisation targets for 2050.

The results obtained so far are promising and show reductions of over 60% in the total carbon footprint of the styles analysed. In this sense, the implementation of eco-design principles, based on the knowledge of the environmental performance of each of the components used, allows the application of modifications to achieve positive environmental impacts.

In addition, the implementation of circular economy models, both at the raw materials stage with the selection of materials with a low environmental footprint (recycled, recyclable, bio-based, compostable, etc.) and in the minimisation and management of waste during the manufacture and end of life of the product and its recycling/recovery, allow a significant reduction in the environmental footprint of footwear.

Towards a sustainable future

As mentioned, this research has been carried out within the framework of the European project LIFE GreenShoes4All, (LIFE17 ENV/PT/000337), the main objective of which is to implement, demonstrate and disseminate a methodology through which efficient eco-design, recycling and manufacturing solutions can be developed. As a result, footwear is leading the way towards sustainability in the European industry, in line with the requirements of the 2030 Agenda and the European Green Deal.

Leading Portuguese and Spanish footwear manufacturers, such as AMF Safety Shoes, Pikolinos and Ecoalf, have collaborated with CTCP and INESCOP to learn about and improve their environmental performance by applying sustainability from the design stage.



Greenshoes4All website with Ecodesign Guide for the footwear industry.

CREDIT: CTCP-INESCOP

To this end, the project developed an essential tool for understanding this term: the Ecodesign Guide.

Sustainability by design is the cornerstone for conceiving new products based on innovation, aiming to identify technological solutions that will drive the transformation of the footwear industry. Besides CTCP and INESCOP, others in the LIFE GreenShoes4All consortium included AMF, APICCAPS, Atlanta, CEC, Evathink, FICE, INCDTP-ICPI and Il Passo.

BioShoes4All

In footwear, the materials, components and waste are the highest contributors to the total GHG emissions and research and innovation are core to pursuing footwear 2030 targets. The sector needs to develop and deploy the 'next generation' of sustainable materials and processes, including, for example, biological and plant-based materials, man-made bio-based materials, material-to-material recycling and innovative production technologies. The integrated BioShoes4All Portuguese project included 70 partners from industry to retail and academia. The

project is organised into five pillars – Biomaterials, Ecological Footwear, Circular Economy, Advanced Production Technologies and Training and Promotion and intends to support the transition to a sustainable circular bio-economy.

Commenting on this, Maria José Ferreira from CTCP, the project technical coordinator says, "There is also the need to create new concepts of eco-products for footwear and leather goods, with lower carbon footprint, high durability, functionality and circularity, fundamental assets in the strategy of differentiation and creation of value in the long term, aimed at the consumer, who appreciates design and fashion, is informed, socially and environmentally demanding and responsible, and often digital." Equally relevant will be the design and application of new approaches and technologies aimed at minimising and valuing production and post-consumption waste, in the context of a circular green economy, contributing to extend the life cycle of materials, carbon neutrality and the fight against climate change.



Ecodesign embraces the next generation of sustainable materials and processes.

CREDIT: INESCOP

The scope of the BioShoes4All project includes tools for the traceability of the value chain, robotics, value from data or artificial intelligence, that will contribute to the increase of flexibility, productivity, competitiveness and resilience of the cluster.

The project is set to run until end of 2025.

Environmental auditing

INESCOP recently undertook a study based on carrying out environmental audits throughout the entire footwear value chain in the industrial cluster of the Valencian Region in Spain. According to the study, the environmental situation of the footwear and components companies is quite promising at an organisational and product level. The development of materials with a low environmental impact, which do not reduce the quality and comfort of the product, means that the environmental results are improving as a result of their progressive introduction in the production processes.

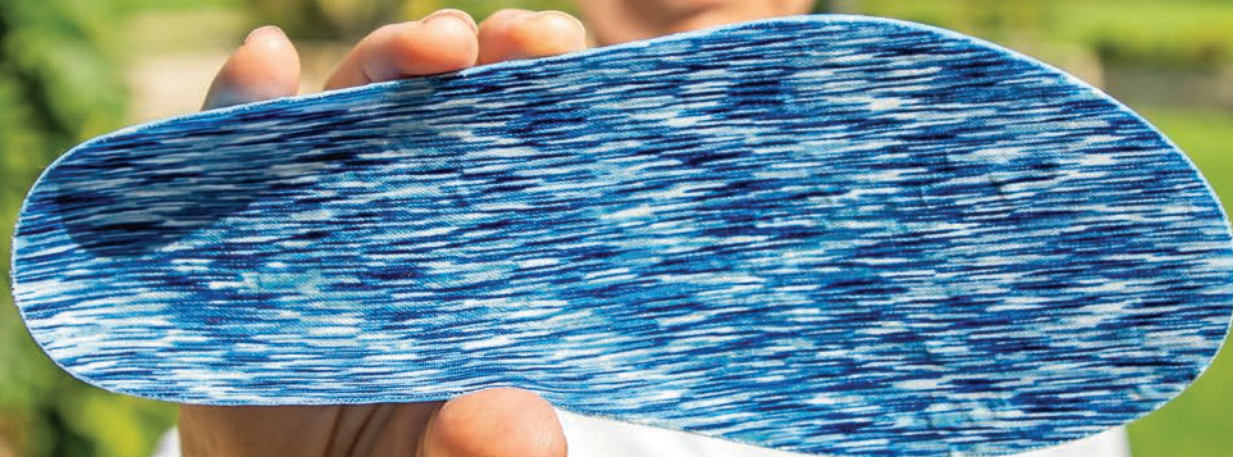
Another factor to consider in this paradigm shift is the proliferation of intra- and inter-sectoral industrial symbiosis models at a local level for the management of waste and its subsequent use as a raw material, contributing to the implementation of a circular economy in the area. From this perspective, one of the great challenges faced by the sector is its adaptation to the future law on waste, which includes extended producer responsibility. For this reason, the end-of-life stage of footwear is currently of special interest, as well as the search for technological solutions that contribute to reducing its impact. Efforts are focused on the recycling of products that are not suitable for a second life.

To this end, INESCOP has worked on setting up a pilot plant for the recycling of multi-composition waste in collaboration with the textile and toy sectors. The plant, which is located in its facilities in Elda (Alicante), is aimed at contributing to testing and validating future technologies related to the recyclability of footwear. Different models of mechanical and/or chemical recycling are currently being investigated for the recovery of raw materials and their subsequent utilisation. All these measures help reduce the Product and Organisation Carbon Footprint, which is now a powerful tool for communicating and improving the sustainability of the industry, thus contributing to European policies to achieve climate neutrality and product circularity, as well as the Sustainable Development Goals.

The work done in Portugal and Spain should be seen as a template for the international footwear industry and not be considered as only of interest to those working in the European Union. The subject is clearly part of the pressing need to reduce greenhouse gas emissions in the drive to limit global warming to 1.5°C above pre-industrial levels. This was reinforced again at last November's COP26 conference in Glasgow.

2030 is an urgent eight years away, 2050 to achieve net zero is just around the corner. Time is running out. ■

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Blumaka's Comfort athletic insole is made using high-performance PU and ETPU foam to provide enhanced comfort to any shoe.

ALL CREDITS: BLUMAKA

Upcycling waste foam

The US footwear market is huge. It also creates a huge amount of waste, with an estimated 300 million pairs of shoes thrown into landfills annually. In China and South East Asia, where most of the shoes are made, millions of tons of leftover scrap materials are thrown away by factories that produce these shoes. For the sake of the environment, something clearly needs to change and Blumaka, founded in 2019, a US fabricator of foam products, is making a start. An ecologically minded company, it takes leftover foam scraps from footwear factories and upcycles them into high performance products. The company's goal is to manufacture performance midsoles and insoles and, in the process, help clean up the planet. Currently, the company sells athletic and comfort insoles on its website, while also partnering with brands and businesses in the manufacture of their own footwear midsoles, insoles and other foam-based products.

Konnect insole

One of the company's most innovative products is the Konnect insole, which uses polyurethane (PU) and a high-performance expanded thermoplastic polyurethane (ETPU) foam made from recycled materials. This has a patent-pending, grip technology that provides a more secure connection to the ground by preventing the foot from slipping inside the shoe. The company says the Konnect insole has been proven to enhance athletic performance from baseball to golf, by providing this secure connection.

Company founder Stuart Jenkins adds, "Our Konnect insoles are built for any sport application where athletes need to keep their feet connected to their shoes. For example, when hiking or trail running, your toes won't jam to the end of your shoes when you're going downhill. In sports like baseball or tennis, you can plant or pivot your feet without slipping in your shoes. If

you skateboard, you will have more connection to your shoes, giving you better board feel when landing tricks. In golf, your feet stay grounded in your cleats, allowing you to drive more power into your swing."

Upcycling and manufacturing

Blumaka claims to offer the highest volume of recycled foam in the industry that it knows of as its insoles contain up to 85% recycled material by volume. In addition, it says its manufacturing process is significantly cleaner than traditional footwear. "Our Independent Life Cycle Assessment shows that our manufacturing process creates a 65% reduction in greenhouse gasses compared to traditional PU and a 26% reduction compared to traditional EVA." It also says its process has four times less environmental impact than the traditional one. "We create comfort and improve performance while decreasing waste," Jenkins says. Along with his co-founders, Joe Skaja and Chantal Herry they have over 120 years of experience in footwear innovation and manufacturing.

How has it managed to do this? Blumaka says that current manufacturing practices use solvents, steel moulds, silicone release agents, formamide (amide derived from formic acid) blowing agents, 400 degree heat and up to a gallon of water per pair to create midsoles and insoles. Blumaka's process uses no formamide, no heat, no silicone mould releases, no steel moulds and uses only four grams of water per pair. It is therefore a much cleaner process. Furthermore, it says that its process occupies only 6,000 square feet.

Blumaka partners with brands to create insoles and midsoles with high volume recycled content. It currently has a facility in China and is building a further one in El Salvador in order to create local-to-local manufacturing opportunities. Eventually, it hopes to work with brands to build product lines focused on circularity, where there is an end-of-life plan for the shoes they produce.

Material content

The primary ingredient in Blumaka's products is recycled granulated foam, which comprises up to 85% by volume of the final component and, as mentioned, is claimed to be the highest volume of recycled content in any midsole or insole in the industry at present. The recycled foam can be made from a variety of recycled materials including EVA, PU, biofoam, Bloom, ETPU,



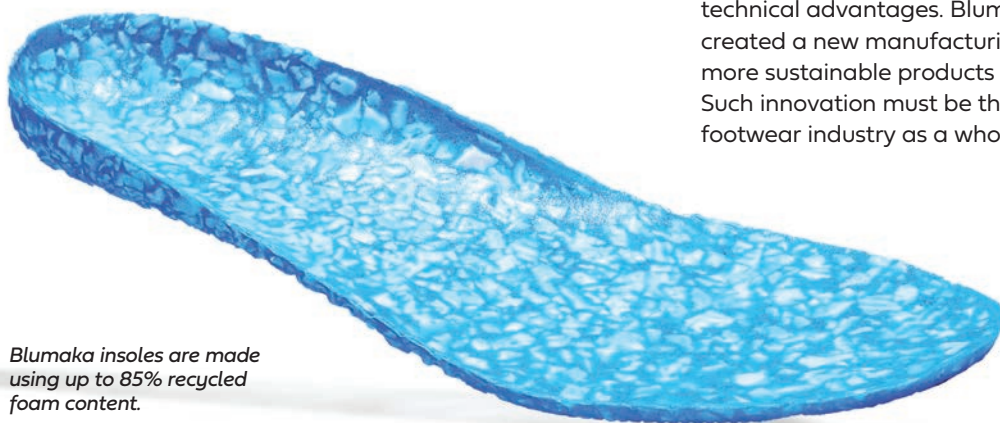
The Konnect insole on the right shows superior grip compared to that of the conventional insole on the left.

Poron, TPE-E, TPU, Styrofoam, silicone, neoprene or, indeed, any foam that can be chopped up. Stuart Jenkins says, "We are always looking for ways to turn waste into performance products. Currently, we are looking at upcycling old flip flops, old wetsuits, old sofas and couches."

The company uses PU as its base material for every midsole or insole it produces. PU provides outstanding cushioning and is extremely durable, which adds to the lifetime effectiveness of the foam. A TPU micro skin is added to the outer surface of the component. This skin is elastic so that when the foam is in compression the skin is in tension. This acts both as a moderator to reduce deflection and as a support to help the foam recover.

The way forward

There is far too much waste in the world and although we are all increasingly aware of the problems it has created, they will not be solved overnight. Nevertheless, Blumaka is beginning to chip away at it and more companies are finding ways to reduce waste and consumption of resources. Some have simultaneously come up with new processes that offer additional technical advantages. Blumaka has done just that and created a new manufacturing process while also creating more sustainable products that come out of that process. Such innovation must be the way forward for the footwear industry as a whole. ■



Blumaka insoles are made using up to 85% recycled foam content.



Ground bark from oak, valonia and spruce are used to replicate the Rendenbach production.

ALL CREDITS: KILGER

Rendenbach by Kilger

In a footwear industry increasingly dominated by synthetic materials and automated production systems, some very traditional manufacturers still exist. Among them are those producing high end Goodyear welted shoes. They survive because there is still a steady though limited demand for men's shoes made to the very highest quality standards for consumers who are prepared to pay the price. However, the numbers involved are small in footwear industry terms and this is what underlies an ever present worry for the factories concerned; the continued availability of materials and components of sufficient quality to meet the exacting standards required for such footwear.

One such material is oak bark tanned soling leather of which there were two principal producers, J & F J Baker in the UK and J R Rendenbach in Germany, up until October of last year when the latter announced that it was ceasing production. This caused an immediate panic as there were no other suppliers able to cover the shortfall. In the UK alone, companies such as Church, Cheaney, Edward Green and Crockett & Jones all rely on oak bark soles for some of the shoes in their collections. Fortunately, it appears that production under licence for the same products with the same recipes will now continue under the auspices of another German tannery, Kilger, which although having produced oak bark soling leather in the past, has not done so for a number of years.

Oak bark leather

What is so special about oak bark leather? Firstly, it is extremely durable and oak bark tanned soles will outwear all other vegetable tanned soles by a considerable margin. It also produces a flexible, lightweight and water resistant sole due to the slow and gentle nature of a tanning process that ensures the fibres in the leather retain their original weave. Furthermore, due to the fact that the tannins contained within oak bark protects the tree against fungi and bacteria, they will do the same in finished footwear so that shoes with oak bark tanned soles and insoles provide a healthy environment for the foot.

The actual oak bark tanning process itself is carried out in a series of oak lined pits with no drum work involved at any stage. The concentrations of tannin used are quite low so it is also a lengthy process in order for the leather fibres to be thoroughly tanned. It is this combination that gives bark tanned leather its special properties. It is also a time consuming and costly process due to the sheer number of hides in progress during the twelve months or so it takes to complete it, so shoes with oak bark soles are inevitably expensive. They are, however, looked upon by those who buy them as a long term investment and, properly looked after and repaired, they can have a very long life indeed.

Oak bark tanned leather is also easy to work once wetted back and allowed to mellow. It then becomes easy to mould to shape, channel and stitch in the Goodyear welted process. When allowed to dry out naturally, it will also hold its shape permanently. Lighter weight shoulders and bellies are used to produce insoles, toe puffs and counters in handmade and the very best machine welted shoes for this very reason. The fact that the hides used are also selected to be free of blemish means that oak bark soles need very little scouring at the finishing stage which again helps to prolong wear.

The way in which oak bark leather is produced has barely changed for hundreds of years. It uses natural raw materials and is fully sustainable. It also calls for great skill, experience and patience to produce the required result. Furthermore, the number of people with the necessary knowledge and practical experience to produce oak bark leather is now extremely limited which is why Rendenbach's announcement that it was ceasing manufacture caused such alarm among its customers.

Solving the problem

A solution to the problem has emerged in the form of Lederfabrik Kilger, based in Viechtach close to the border with the Czech Republic, which has undertaken to make leather soles using Rendenbach's recipes. Established in 1858, Kilger is another renowned pit tanner in its own right and is in fact 23 years older than Rendenbach. With a lineage going back six generations, Kilger is no stranger to sole leather tanning having originally supplied leather to local shoemakers and saddlers. By 1970 production had changed direction and the focus turned to the equestrian and orthopaedic sectors, with a small line in shoe manufacture and repair.

Further change came about when the tannery relocated to its current site in 2002. Having seen the direction the domestic leather industry was taking, and with great foresight it would seem, as the 300 tanneries that flourished then have dwindled to less than 30 today, Kilger saw that modernisation and diversification were essential to the company's survival, let alone future success. A key feature of the new tannery which made it very different to the traditional system used by Rendenbach was the introduction of pits above ground rather than sunk into it. While this made it easier to empty leather and tanning liquor, could it produce the same results as Rendenbach?

Easier said than done

Anyone connected with the leather industry will tell you that it is not just the recipe that counts. There are many examples of tanneries that have passed their formulations on to others only for these to fail. So how does Kilger hope to maintain both the Rendenbach name and association with quality? Michael Kilger, the sixth generation to run the tannery and the driving force behind the decision to take on the Rendenbach sole leather business, had apparently been working alongside Hanns Rendenbach for almost a year in order to gain an understanding of not just the formula but also the other operations involved. In the process, a strong partnership was formed.



Michael Kilger (left) with Hanns Rendenbach at the Rendenbach tannery.

He is well aware of what he has taken on and is under no illusions as to what is needed. "Our competitors say that we can't do it like Rendenbach because we don't have the same pits", referring to the deep layering pits as opposed to the hanging pits Kilger currently uses. Quick to dispel this, Michael Kilger reveals that, through a close family contact who owns an old sole tannery, the right sort of pits are at the company's disposal. So that is a major problem resolved. The company has also bought much of Rendenbach's raw material stock. "We have so many things from the Rendenbach production. We have the tanning liquors, the same raw material, the same bark and even the same method."

Time will tell what physical changes might need to be made at the Viechtach tannery but for the time being would appear that current capacities seem well able to cope. The pits in the alternate location will account for the bulk of production but the building of more pits on site has not been ruled out. With regards to raw materials, there is reportedly tens of tonnes of oak bark in the Rendenbach stores, enough for a good few years' production and, with a domestic supply available in the form of a by-product from the furniture industry, Michael Kilger is very optimistic about the message this puts out to further enhance sustainability.

New production will go out under the name 'Rendenbach by Kilger' and it is believed that customers will see little disruption to supply and notice little or no difference to the products supplied. Nevertheless, it has been a lucky escape for those self same customers. They have been fortunate that there was someone to hand who was prepared to take on the challenge and preserve a small but vital link in the footwear supply chain. Not only is oak bark soling part of our shoemaking heritage but the knowledge and skill to produce it, if once lost, would be lost for ever. Thanks to Michael Kilger in this instance that is not the case. However, it does show just how fragile the sourcing of such materials has become. ■



The fifth industrial revolution is here

Sergio Dulio

Companies have become familiar with the concept of Industry 4.0, the fourth stage in the evolutionary path that, starting at the dawn of industrialisation, transformed manufacturing into the digital process that it is today. It has been a path with important milestones spread over more than two centuries, with huge transformations made possible by specific technologies and new sources of energy. In 1784 the invention of the mechanical loom fostered the mechanisation of manufacturing. In this first revolution, technology manufacturing no longer needed to rely on physical force whether human or animal, but on new energy sources in the form of water and steam.

Ninety years later, the second industrial revolution opened the door to mass production. Technology multiplied the scale of operations, electricity expanded market dimensions and made available a form of energy that could be easily transported and delivered. The appearance in 1870 of the first assembly lines, which later inspired Henry Ford in the realisation of his

highly efficient automobile factories, allowed for new forms of work organisation suited to sustaining large scale production. Fast forward to the 20th century and the manufacturing paradigm changes for the third time. 1969 is the year of the conquest of the moon together with the advent of electronics, computers and automation. With this third revolution, technology multiplied data processing speed, allowing the first substitution of human workers with 'automata', machines capable of executing their tasks automatically and unattended.

We are now in the 21st century with Industry 4.0, cyber physical systems, Internet of things and smart technologies. With this fourth revolution, technology multiplied the amount of data that machines and systems can generate and the extent of their use. There is as yet no official acknowledgement of when the term Industry 4.0 was coined but it is widely accepted that the first mentions were made in Germany in 2011. So, it looks as if time was accelerating with less than 50

years passing between the third and the fourth of these crucial milestones.

Now, after ten years, a new evolution is approaching, a new phase that someone started calling Industry 5.0. Are we perhaps approaching what the American inventor, futurist and author Ray Kurzweil calls a 'technological singularity', an era where the technical progress advances at an unprecedented pace that is beyond our imagination? No answer yet exists, but things are certainly changing fast and often unpredictably.

Like the other steps in this journey, Industry 5.0 is enabled by specific technologies. If on the one hand the new paradigm is built on many of the elements we find in the portfolio of 4.0, such as robotics, cloud computing, additive manufacturing and augmented reality, it is as if three in particular are giving a new boost to all of them: collaborative robotics, fifth generation (5G) communication networks and Artificial Intelligence (AI). These are concepts that are becoming ever more common in our regular conversations. It is nevertheless worth examining them in some detail to understand how powerful their effect could potentially be on the next transformation of how we think and produce all our manufactures. So, let's learn more about them and see how their combination with the newest generations of collaborative robots will again transform matters.

A new kind of collaborative robots

Advanced robotics is one of the underlying technologies in Industry 4.0 and a main element of the advanced manufacturing solutions that are intrinsic in the 4.0 paradigm. These are based on the widespread use of advanced, interconnected and easy to program robotic systems. The most important difference with respect to the more conventional concepts of robotics, is the man-machine collaboration that allows human operators and robots to share the same space and to contribute to the main task. In a typical scenario, tasks of high manual and cognitive complexity are typically assigned to the operator, whilst the robot servant would take care of the simpler and more repetitive ones. This is what led to the development of collaborative robots that are taught exactly how to work in these situations.

Cobots, as they are known, have a mechanical structure that is very similar to that of their conventional brothers but may also have an additional rotational axis to achieve a higher level of dexterity. Cobots are lighter and intrinsically safer to allow the close proximity of operators. So far nothing new. This breed of robots appeared almost ten years ago and it became a fundamental element in the transition towards digital manufacturing and Industry 4.0. At the beginning of this path, these machines were very much like the conventional industrial ones. They were senseless and blind, so they had no means of assessing the environment around them and to let their actions be guided by their perception of it.

What we have seen in the last generations of these machines is exactly this. Robots are developing 'senses' through which they are aware of what they are doing and which they can use to drive their actions. They are



Cobots allow the close proximity of human operators.

CREDIT: SHUTTERSTOCK / LUKASSEK

being covered with sensory skins that can tell them even before a contact occurs that they are getting too close to an obstacle or to a human worker. More recently, they are being equipped with 'eyes' in the form of digital cameras that allow them to see and react to the external situation. This is the kind of transition that is shifting us from 4.0 to 5.0. If you can feel and see, you need 'intelligence' to read these stimuli and decide how to act. Welcome to the world of intelligent robotics.

AI and machine learning

AI refers to the simulation of human intelligence in machines that are programmed to think like humans and mimic their actions. The term may also be applied to any machine that exhibits traits associated with a human mind such as learning and problem-solving. The ideal characteristic of AI is its ability to rationalise and take actions that have the best chance of achieving a specific goal. A subset of artificial intelligence is machine learning, which refers to the concept that computer programs can automatically learn from and adapt to new data without being assisted by humans. Deep learning techniques enable this automatic learning through the absorption of huge amounts of unstructured data such as text, images or videos.

Machine learning (ML) is therefore one of the areas in which the broad domain of AI is structured. ML algorithms are designed to analyse large amounts of data and to identify repetitive patterns in these data from which to infer choices or decisions. The software can then 'learn' from these data without the need to be specifically programmed for each individual task. Think of a robot that, instead of being programmed for a task, can learn spontaneously how to execute it by watching its human 'trainer' performing it for the first time or that decides by itself the best route to take to pick an object from point A and deposit it in point B, avoiding obstacles and choosing the fastest possible path. A clear leap forward with respect to the complex and tedious programming that is required with conventional robots.

We must not think that this is too far-fetched or futuristic. AI and ML are already here in the search engines we use in our computers, in the speech recognition systems of our smart phones, in facial identification systems and in self-driving vehicles. We are again on the verge of another major paradigm shift, a singularity in the course of technological evolution. In this respect, Sundar Pichai (CEO of Google) described some time ago the implications of the development of AI and ML as being deeper than the discovery of fire or electricity. Sufficient to say, we are ready for Industry 5.0 where artificial intelligence and robotics marry to give robots the ability to see, understand and decide.

5G telecommunication networks

It is interesting to see how the development of the cellular networks that we all know and use in our everyday lives went through five evolutionary phases just like the five industrial paradigms described earlier. The difference is that for manufacturing the evolution spanned more than two centuries. In the case of mobile telecommunication technologies it unfolded in roughly 40 years. The first-generation 1G mobile networks appeared in 1981 and they were for voice calls only.

Ten years later (1991) 2G came along and with it the possibility of sending short text messages (SMS). 3G in 1998 allowed the full fruition and sharing of multimedia contents and access to the Internet. In a quest for more speed and more data to transfer, 4G in 2008 allowed for the first time a true possibility of mobile data consumption and now 5G, first introduced in 2019, is the core technology for the Internet of things and robotics. What this story illustrates is a progressive move from voice to data. Today, cellular networks carry more information (images, videos, files) than voice communications. Bandwidth, speed and low latency are the key elements to enable this change.

Speed measures how many data the network can transmit in a unit of time (typically in megabits per second). Bandwidth indicates how many channels the network can manage at the same time. The higher the number, the lower the risk of overcrowding and lack of response from the network. And, finally, latency, the time interval between an input signal and the arrival of the relative output. The lower the latency the more responsive the network. Future 5G networks (higher bandwidth, higher speed and lower latency) will enable us to use a number of previously unthinkable services: 5G factories of tomorrow will use the mobile network to exchange low-level signals and control data thus allowing great deployment flexibility.

Transition of 5.0

How are advanced robots, AI and 5G networks acting together to foster the transition of Industry 5.0? Robots play a more and more important role in innovating and optimising processes not only in manufacturing, but also in agriculture, healthcare and many other industries. For example, mobile robots such as quadrupeds, rovers and drones which can autonomously move around, can support or even substitute human tasks and increase operational efficiency and safety. Today their huge



Mobile robots such as drones can support or even substitute human tasks. CREDIT: SHUTTERSTOCK / MINI STOCKER

potential is limited, in most applications, by the need for local control or at least local supervision by a human operator. Enabling human supervision or control from a remote centre, where a qualified operator can supervise up to one hundred robots, will exploit their full potential and move us into the cloud robotic era.

While cloud robotics platforms are coming from different players, we still lack the kind of connectivity needed for a professional remote control of a robotic fleet. That is where 5G will fill the gap. Its imminent release will implement key features that will provide the connectivity needed for cloud robotics. The latter also needs to be executed from the edge of the network, both to reduce latency to the lowest level and to avoid any possible disconnection or bottlenecks. Furthermore, robots working remotely will send potentially huge amounts of data from the field, videos or thermal cameras, from laser scans and so forth. All these data must be analysed automatically from AI algorithms, sometimes to react in real-time. The more these algorithms are hosted on the edge of the network, the more they will be efficient and effective in promptly solving dangerous situations and will decongest the rest of the network.

One of the most important challenges of the constant monitoring of the health of the endpoints of these networks will be solved by the low latency of 5G networks. Furthermore, their ultra-broadband allows a robot to be controlled remotely, where it is essential to have a clear vision of the surroundings from high definition, possibly 360° cameras. 5G-controlled robots will be increasingly pervasive and the growth of 5G combined with 5G Mobile Edge Computing (MEC) and AI-based, real-time applications, will enable the creation of a true 'robot ecosystem', comprising fixed as well as mobile robots. Smart Robot-based businesses will expand 5G-based hyper-connected services and secure leading technology in edge cloud over the next few years. If you think this scenario is not mind boggling enough, just consider that 6G is already in the pipeline. So the future, as usual, will surprise us. ■

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*Reels of Synergex fibre and
moulded Lattice Lite torsion plates.*

ALL CREDITS: COATS GROUP



Eco-friendly torsion plates

In the same way that Formula 1 racing cars serve as test beds for new automotive materials and technologies, so the sports shoe sector of the footwear industry has been instrumental in formulating new concepts in footwear design and construction. Foremost among these has been the way outsoles and mid soles are constructed in order to cushion the foot on impact when running, which has led to a greater emphasis on the general aspects of comfort in everyday footwear. The popularity of athleisure footwear with its close links to sports shoes is plain to see everywhere and this must be to a large degree due to the comfort factor.

A more recent sports shoe development has been the introduction of carbon fibre torsion plates and bars into mid soles in order to increase lift off of the foot from the ground. This has proved to be so effective in improving an athlete's running action that it is now widely used by all the major sports shoe brands. Doubtless it will eventually find its way into

other types of footwear in the same way that cushion mid soles have done. Needless to say, it has also led to manufacturers trying out new ways to make these plates and bars in order to stay one jump ahead of the competition. The latest innovation has come from Coats Group in the form of Lattice Lite Eco.

Coats is a well known name in the footwear industry as a major supplier of sewing threads for shoe uppers. It is in fact the world's largest producer of industrial sewing threads, with a history stretching back to the early 1760s. Over the years, its range of footwear products and materials has diversified to also include zippers, hook and loop fastenings and trims. It also supplies advanced materials to other industries and it is from this source that Lattice Lite Eco has emerged. This is a revolutionary fibre-laying technology that uses sustainable materials to create composite materials for high performance torsion plates that can be produced to individual manufacturers' requirements.

The company says the technology employed enables yarns to be precisely positioned in the required place and in any direction so that the thickness, torsion, flexibility or rigidity of each section of a footplate can be specifically created to ensure they support every part of the foot. It also says that this helps address the constant challenge for developers of footwear to combine high performance with comfort. The lattice that is formed by this process is then pressed and moulded into the final footplate. This would appear to be a positive development as torsion plates cannot normally be individually tailored in this sort of way. How this all comes together is illustrated in *Figure 1*.

Furthermore, the company says that this also eliminates the need for additional resin steps such as prepeg (composite material made from 'pre-impregnated' fibres and a partially cured polymer matrix) or resin transfer moulding (closed-mould process for manufacturing high performance composite components in medium volumes), which speeds up the manufacturing process to around 120 seconds and reduces material waste down to 5% from over 30% for more traditional composite operations. It can use a range of eco-friendly materials including recycled carbon, recycled nylon or materials from natural resources such as basalt and flax.

The technology has been developed in the Coats EMEA Innovation Hub based in Bursa, Turkey, where Coats collaborates with business partners, brands, suppliers, universities and start-ups to develop pioneering new products. As well as footplates, the process can also be used in toe caps, torsion bars and heel counters to create



Figure 1: The five stages in creating a Lattice Lite Eco torsion plate.

components that are both lightweight and robust. Adrian Elliot, President, Apparel and Footwear Coats, says: "Coats Lattice Lite Eco technology is revolutionary and eco-friendly. It enhances performance on multiple levels: the consumer wearing the end product and our customer who is able to create components faster, optimise manufacturing and reduce waste."

It never ceases to amaze what natural and/or recycled materials can now be used to produce high-

tech and high performance products. As *Figure 1* reveals, Lattice Lite Eco incorporates no less than five such materials: flax fibre, recycled carbon or basalt and recycled nylon or PA11 (high-performance plastic polyamide made from 100% renewable castor beans). Innovations such as this can only encourage us to hope that ever more footwear applications that are renewable and use recycled materials as the cost of using fossil fuels becomes ever more expensive and controversial. ■



Lattice Lite preform before moulding into a final torsion plate.



“It has allowed me to have an immersive experience in the way we create products.”

ARNAU SANJUAN, ADIDAS

Out of this world

Creative people have a strong spatial intelligence, but the tools that are used to create digital 3D content are heavily based on logic, maths and linguistics, according to Howard Gardner's theory of multiple intelligences. This mismatch was something industrial designers Daniela Paredes and Oluwaseyi Sosanya wanted to tackle as part of their joint Master's project at Imperial College London in 2013 – surely it would make sense to make the design part more intuitive if your brain worked in a different way.

Their research coincided with being introduced to the then-nascent virtual reality (VR) programs that were beginning to emerge in gaming but were not prevalent in industrial design at the time. It seemed it could offer a way to create a 3D image that could better represent an object's final form. From this initial project, Gravity Sketch was launched. “The goal we set ourselves was to empower people to communicate and materialise their ideas in a quick and intuitive way, just as if you were pulling the thoughts from your head,” Ms Paredes tells us. “It's about helping people bring their ideas out and being able to communicate them.”

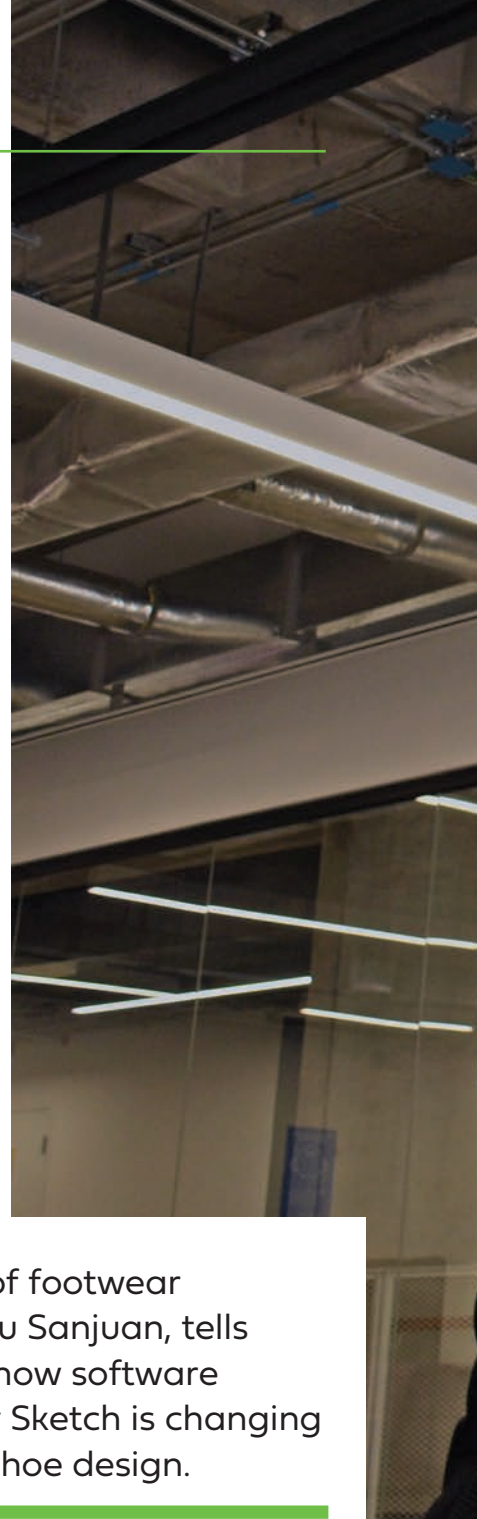
Following the course, she took a job in the innovations team at automotive group Jaguar, which cemented the realisation that there was a need for an easier way to create in 3D. Using a headset and

Adidas' director of footwear innovation, Arnau Sanjuan, tells *World Footwear* how software program Gravity Sketch is changing his approach to shoe design.

moving from 2D sketch to 3D interpretation programs could save time and money. “The way that designers are working now is definitely changing,” she says. “This change is bringing more voices into the beginning of the design process.”

Globally connected

The onset of the global pandemic, which pushed many office-based jobs into people's homes, created the need for better communication with colleagues around the world. It was at this point, at the start of 2020, that sportswear brand adidas began to work with Gravity Sketch software. “There has been a change from the previous process, from before the pandemic, with the use of the new tools, such as virtual reality and Gravity Sketch,” adidas' director of footwear innovation, Arnau Sanjuan, tells *World*





Co-founder Daniela Paredes demonstrates VR headsets using Gravity Sketch.

CREDIT: ADIDAS

Footwear. "It has allowed me and other people to have an immersive experience, something I had never experienced before, in the way we create products."

While there were similar programs in the market, many designers felt they were not intuitive enough and did not really integrate into their way of doing things, he adds. "Gravity Sketch has the depth required to generate an object from the idea you have in your mind, making it flow easily. As soon as you try it, it's a no-brainer to integrate it into your workflow, especially when we focus on the ideation phase of product design."

Crucially, the program offers the ability for more than one designer to contribute to the design at once. By wearing headsets, adidas designers across the US and Europe added their vision as the shoes were drawn and took shape.

Gravity Sketch has created a metaverse that is not consumer-facing but is an internal space for employees to collaborate on ideas. "Only a few people have the skills required to design in the metaverse and that's not good," says Ms Paredes. "Our goal is to democratise that. Ultimately, we're all creative and we know there are creative minds out there who are not able to sketch in perspective."

Simple to use

Using headsets and hand controls, Gravity Sketch software enables users to draw in 3D, and can interact with CAD and rendering software. It allows free-form sketching while creating CAD-ready data, and it is accessible through any device. It also enables users to import 2D sketches and images to trace over and to create a 3D wireframe. The companies say it only takes

a couple of hours to learn most of the tools, and full sketches are possible in only a few days. This simplicity means members of the team who are used to drawing only in 2D can quickly learn to design in 3D. It also means a design can be assessed by team members in a matter of hours, rather than waiting for a 3D model that could take up to three weeks.

"We need to build a bridge to allow people to go from an idea to a physical sample," adds Mr Sanjuan. "How to integrate that into our pipeline is something that I am focused on. You can iterate more in the 3D space so the outcome is well thought-through and you are able to discuss everything before cutting any material or creating anything physical."

Being able to work collaboratively from the start could also help reduce problems later on, when it could be too late to make changes, adds Ms Paredes. "You end up with a process that involves a lot of compromises and with products that do not necessarily reflect completely the intent of that first sketch. The software enables people to speak the same language at the beginning of the process and to make the process richer."

Time and cost savings

While it is not a tool that will affect the manufacturing side, at least not in the near term, and not an engineering tool to make moulds, developers are looking at ways that samples and prototypes can be worked on across the supply chain. For instance, a factory in China



Adidas prototypes were designed around the 3D shape of the foot. The global design team collaborated on every detail of the shoe, virtually.

CREDIT: ADIDAS/GRAVITY SKETCH

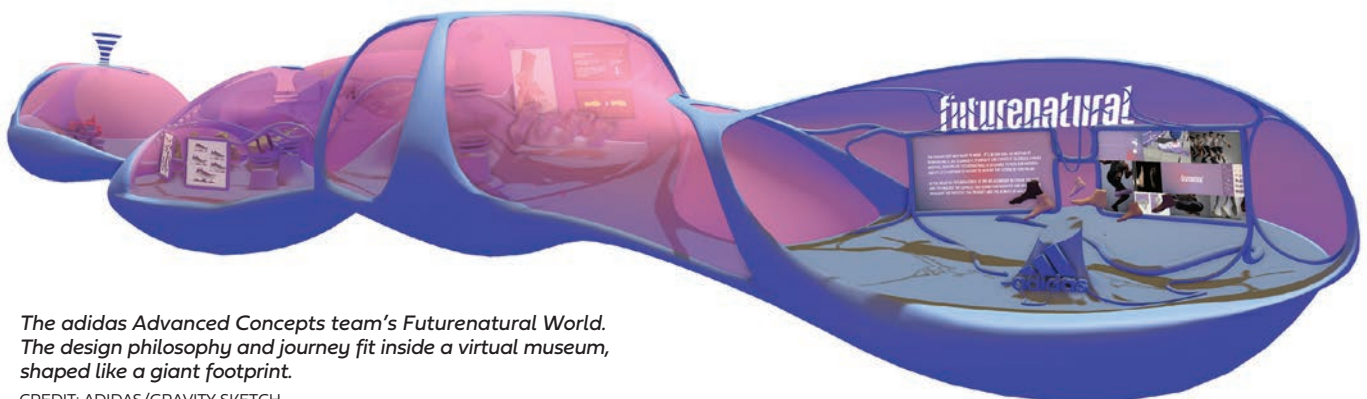
could upload a 3D file of a prototype shoe into Gravity Sketch and this can then be refined by designers. They could all also be in the same virtual space having a real-time conversation around the 3D digital object. This reduces waste and would dramatically cut down on time as well as the CO₂ and cost associated with shipping samples.

Technology and software is constantly evolving, and Gravity Sketch asks for feedback from users to help with the development process, helping to add functionality or refine its tools. It suggests users share their experiences on social platforms and help generate wider professional adoption, which will lead to a more inclusive experience.

Adidas' first range of shoes

designed inside a virtual museum shaped like a giant footprint, is the Futurenaturals family. These shoes mimic the shape of the foot and use a Primeknit upper. The program has also been embraced by footwear designers at Reebok and Anta, showing its potential in the athletic shoe sector, as well as at carmakers Ford and Nissan.

Both Mr Sanjuan and Ms Paredes see the demand for the technology growing in every sector that uses sketches. "You can generate things you were not able to generate before because you did not have that fully immersive experience," says Mr Sanjaun. "Designers will see a new way of working and will want to embrace it. I think it will soon be standard." ■



The adidas Advanced Concepts team's Futurenatural World. The design philosophy and journey fit inside a virtual museum, shaped like a giant footprint.

CREDIT: ADIDAS/GRAVITY SKETCH



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Out in the open

Few people have the strength, fitness, determination and toughness to compete at the top level of competitive mountain running. Even fewer are able to combine winning medals in ultra-trail events all over the world with other demanding activities such as ski mountaineering and record-breaking fast times for the ascent and descent of major peaks, including Mont Blanc and the Matterhorn. Kilian Jornet, however, seems able to achieve all of this and still to have carved out time while preparing for the 2022 season of the global trail running World Series to launch a new sports footwear, clothing and accessories brand, NNormal.

This is a partnership the Catalan athlete has established with footwear brand Camper. This is more than a marketing initiative; Kilian Jornet will wear NNormal shoes and clothing to compete in this season's competitions, which means they will have to be able to withstand, and help him perform at, events involving distances of, sometimes, more than 100 kilometres and climbs of thousands of metres.

Country roots

It is not unusual for athletes and brands to describe their partnerships as something more than a commercial arrangement, and this certainly applies in the statements that have accompanied the announcement of the Camper-Kilian combo. In fairness, though, a number of elements support the

Running and ski mountaineering star Kilian Jornet has launched a new footwear, clothing and accessories brand with Mallorca-based footwear group Camper.

'meeting-of-minds' narrative here.

Camper is fiercely proud of its heritage, its links to the artisan footwear industry in Mallorca and its country roots. Its name does not derive from 'camping' as we understand it today; it simply means 'from the country', as opposed to 'from the town'. Its headquarters are in the town of Inca, in the north of the island, 35 kilometres from the nearest beach and the same distance in the other direction from the city of Palma.

It launched in 1975, but founder, Lorenzo Fluxà, had impeccable Mallorcan shoemaking credentials as the grandson of Antonio Fluxà, a footwear craftsman who, in 1877, became the first person to bring stitching machines to the shoe workshops of the island. Since 2012, a representative of the fourth generation of the family, Miguel Fluxà, has been running the company. It now employs more than 1,000 people and has shops in major cities all over the world, as well as a bit of a cult following among shoe fans.

“ We need a new way of thinking and of acting in relation to the environment. ”

KÍLIAN JORNET, NNORMAL



Kilian Jornet will wear NNormal shoes and apparel to compete in the 2022 international trail running World Series.

ALL CREDITS: JAIME DE DIEGO

On the subject of setting up a new brand now, Miguel Fluxà says it is always “an exciting adventure”, but that having the chance to set up NNormal with Kilian Jornet was a one-off opportunity. He talks of a “perfect complementarity” between the two partners. “A union between performance and responsibility is totally written into our philosophy,” he continues. “Kilian also has a unique vision of outdoor activity, as well as some solid expertise in product development, while we at Camper have been able to bring our entrepreneurship, our footwear-manufacturing expertise and our creative know-how to the table.”

On top of the world

Kilian Jornet grew up in the Pyrenees, a dozen kilometres from the border between Spain and Andorra, at a large, popular mountain refuge called Cap del Rec, where his parents worked as mountain guides and winter sports instructors. Since 2016, his home has been in Rauma in the fjords of western Norway. The point is that he is no city boy either.

By his early 20s, he was winning world championships in trail-running and ski mountaineering. He entered the famous Ultra-Trail du Mont-Blanc mountain marathon for the first time in 2008, at the age of 20 and won, completing the 166-kilometre course in a record time of just under 20 hours and 57 minutes, almost an hour faster than the athlete who took second place, Sherpa Dachhiri-Dawa. He has since won the event on two other occasions.

He has won the Skyrunner World Series mountain-running championship six times and made films of his solo, unassisted ascents of the highest mountains in the world.

Saying and doing

“To talk and talk and talk and not to act adds up to nothing,” NNormal’s launch announcement states. “We know that it’s what we do and not what we say that will define us.” Nevertheless, as with the introduction of any new brand, what the partners have said about NNormal is all we have to go on for now.

The NNormal name came about, partly, through a combination of Norway and Mallorca. The products for its first collection, which will launch in Europe and North America this autumn, were designed at Camper’s home in Mallorca and tested on its new partner’s snow-covered home turf in Norway. The extra N is because what the brand partners seek to achieve in terms of product quality, sustainability and social responsibility is, they say, “not normal” today, but will be in the near future.

They describe their mission as being to inspire people to enjoy and respect nature. They commit to being “authentic”, which is to say true to their passion for the outdoors, and at the same time “functional”. This means they are determined to make products that outdoor enthusiasts will be able to wear while carrying out a series of different activities and still get lengthy service from them. These products will be repairable, reusable and recyclable, the partners insist.

They launched with a five-point manifesto, declaring that NNormal will blaze its own creative trail, which will push it “to contribute, for the good of people and the



Made to last. Kilian Jornet in a Camper workshop in Mallorca. Both of NNormal’s founding partners want to make long-lasting products and to discourage over-consumption.

planet”. The open air is the brand’s home, the manifesto continues, because of its passion for outdoor sports and because, “on reaching the summit, we take with us our memories of the people who have accompanied us on our journey”.

It also aims to “empower simplicity”, it says. Simplicity for NNormal means being able to do more with less, and a conviction that, sometimes, the simplest solution can be the most effective, “even if it’s the most difficult solution to imagine”. The fourth manifesto point extols teamwork and taking personal responsibility for our actions, and the fifth states that actions speak more loudly than words.

Transparency promise

Rounding off, for now, the words that have accompanied the introduction of NNormal, Kilian Jornet goes into more detail about what some of these manifesto pledges mean.

“We need a new way of thinking and of acting in relation to the environment and to outdoor activities,” he says. He explains that this will of necessity mean being “very honest” about how NNormal products are made and the impact the brand has on society and the environment. “This has to translate into total transparency,” he continues, “and into working to avoid excess consumption by creating products that are long-lasting.”

With the aim of making sure NNormal shoes, garments and accessories have the lowest possible environmental footprint, the mountain athlete explains, the brand will work with “different materials and different designs”. He concludes: “It’s going to be a long and difficult process, but that’s what motivates us, the whole team and me, as we launch this project”. ■



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A worker wearing Fly Litebase Matryx shoes prepares some of the material required to turn Saint John Lateran Square in Rome into a major concert venue on May 1.

CREDIT: VIBRAM/DIADORA UTILITY

Shoes on song

Since 1990, Rome's celebrations for the International Workers' Day holiday on May 1 have culminated in a spectacular, free concert in the square surrounding the Lateran Basilica, jointly organised by three of Italy's trade union organisations.

People travel from all regions of the country and beyond to see popular singers and bands, which over the years have included Vasco Rossi, Luciano Ligabue, Biagio Antonacci and Sfera Ebbasta from the host nation, and international stars ranging from Sting and Noel Gallagher to B.B. King and Lou Reed.

The crowd returns

The organisers claim crowds of up to a million people have congregated for past editions of the event, but like most other social gatherings, covid-19 put paid to live audiences at the First of May Concerts of 2020 and 2021. These took place instead in theatre and auditorium settings, with the audience following on television, radio and live streaming. For 2022, however, the concert returned to the square and the live audience was back, with 'Working For Peace' as this year's theme. Media estimates put the returning crowd at 300,000.

Technical staff and stage-crew stayed safe at Rome's 2022 First of May Concert thanks to a successful shoe duet between Diadora and Vibram.

With more than 40 acts making up the bill, each with their own sound, lighting and costume requirements, the stages and back-stage areas were also very busy, making the concert a challenging work space for technicians and production crews, who had to set up the concert area, make sure everything was in place to let the show progress as planned, and then dismantle the rigs and stages safely and quickly to allow this busy part of Rome to return to normal the following day.

Work footwear foundations

This year, to help the workers carry out their tasks in safety and comfort, the organisers kitted them out in

Fly Litebase Matryx low safety shoes, the result of a joint project between workwear brand Diadora Utility and soling technology developer Vibram.

It is true that Diadora Utility, which has operated as a brand in its own right since 1998, has its foundations in the Diadora sports brand. Diadora Utility's specialism is in providing professionals with "technologically advanced safety shoes and work clothing". But it is equally true that Diadora, which has been part of the Geox group since 2009, owes its own foundations to work footwear.

Diadora first saw the light of day in Caerano di San Marco, close to Montebelluna, a traditional footwear hub that is now most famous for being the point of origin of 60% of global supply of ski boots; it is only 50 kilometres or so from the Dolomites. In the late 1940s, however, the local footwear artisans were great specialists in work boots as well as hiking footwear. It took until the 1960s for Diadora, after acquiring "a few significant patents" in the US, to begin its focus on running shoes, tennis shoes, cycling footwear and rugby and football boots instead.

Light and flexible

Each Fly Litebase Matryx shoe weighs just over 300 grammes, a weight that Diadora Utility describes as "previously unthinkable". In addition to lightness, the properties the brand highlights are flexibility, breathability, good cushioning for comfort and a non-marking sole. Much of the weight reduction it has been able to achieve is the result of its use in these shoes of Litebase, a soling option from Vibram that reduces thickness while maintaining performance in terms of grip, stability and durability. The thickness of the rubber sole is 50% less than that of earlier soles, giving a weight reduction of up to 30%.

Matryx is also in the shoe's name because Matryx is the technical fabric that the upper is made from. French materials science developer Chamatex launched Matryx in 2016. It makes the material from aramid fibre and polyamide. This shoe uses



The First of May Concert has taken place in Rome each year since 1990, but this year's was the first with a live audience since before the pandemic.

CREDIT: SOCIETÀ ITALIANA DEGLI AUTORI ED EDITORI

version 2.0 of the fabric, designed in partnership with Diadora to provide high levels of abrasion resistance, lateral support and flexibility.

This shoe also has an anti-perforation insole made from high-density recycled polyethylene, offering high levels of resistance, but without any metallic content and weighing around 45% less than a traditional insole. The insole, the K Sole Eco, has the added benefit of covering the entire underfoot area,

ensuring protection for the whole foot. A carbon-fibre toe-piece gives protection to that part of the foot, too, while an abrasion-resistant TPU toe-cover adds to the shoe's durability.

As the workers at the 2022 First of May Concert in Rome must have found, the overall effect is of materials and ideas that are in harmony with one another; the Fly Litebase Matryx is a shoe that appears to be on song. ■

The Fly Litebase Matryx is a low water-repellent SIP safety shoe made of breathable and abrasion-resistant Matryx multifibre technical fabric.

CREDIT: DIADORA UTILITY





Long-lasting and repairable

The European Commission presented a much-anticipated package of European Green Deal proposals at the end of March. Its aim is to “make sustainable products the norm” in the European Union, to boost circular business models and “empower consumers for the green transition”.

These proposals aim to put in place new rules to insist that “almost all physical goods in the EU market” have a low impact on the environment, and are more circular and energy-efficient throughout their entire lifecycle. This means the rules will apply from the design phase to daily use, then repurposing and end-of-life. They insist that consumers need to be better informed about the environmental sustainability of products and better protected against greenwashing.

For example, new EU rules will come into force to ensure that consumers receive information at the point of sale outlining “a commercial guarantee of durability”, as well as information relevant to repair.

The European Union wants new rules that will give consumers the right to know how durable and easy-to-repair products are before they buy them.

The package suggests manufacturers, brands and retailers will be encouraged to publish “a reparability score” for the products they sell.

How long is a long time?

There is well founded concern that fast fashion champions and the developers of fossil-fuel-based fibres that make their business model possible may insist that “durable” means a product that lasts a

year or so. This is potentially a problem, but the thinking at the root of the proposals is positive. Brands can argue about what longevity and repairability mean in practice, but they cannot deny that these qualities are, suddenly, of importance and value.

These, as we have been saying and showing for years, are two of the characteristics that make leather an ideal fit with any circular economy idea. The leather industry has the ability to talk about them all day long and show countless examples of shoes that have lasted decades and bags that have grown only more beautiful with age as they pass, hand to hand, from grandmothers to mothers, and from mothers to daughters.

Greenwashers of the world beware

Environmental claims, such as 'green', 'eco-friendly', 'good for the environment', will be allowed "only if underpinned by recognised excellence in environmental performance", the document states. Voluntary sustainability labels covering environmental or social aspects will have to have third-party verification or be established by public authorities. It is greenwashers who ought to fear these changes. Makers of leather and of finished products that use leather need to stay on a path of continuous improvement and make their processes increasingly environmentally efficient, but fundamentally they only need to continue telling the truth.

Rage against the machine

Advocacy group Eco-Age has worked with the Geneva Center for Business and Human Rights to publish a report called The Great Green Washing Machine. Eco-Age founder, cinema producer Livia Firth, who has a high profile in sustainable fashion, instigated the report. The director of the Geneva Center for Business and Human Rights, Professor Dorothee Baumann-Pauly, joined forces with London-based sustainability consultant and former World Bank economist Veronica Bates Kassatly to write it.

It has taken the form of two white



Products that last a long time and are easy to repair have strong circular-economy credentials.

CREDIT: LINEAPELLE

papers; the first appeared last September, the second in mid-March this year. Together, these white papers raise seven specific concerns about the way companies in the textile and apparel sector measure their environmental performance and share information about sustainability. They draw the conclusion that current sustainability assessments in the industry are "broadly incorrect".

The Great Green Washing Machine says there are two reasons for reaching this conclusion, both of which are familiar to readers of sister publication *World Leather*. One is that the most frequent way of measuring the impact of fashion products is cradle-to-gate, rather than cradle-to-grave, and so ignores the products' use and disposal at end of life. The second is that the current measurement methods assess impact by kilo of material. What really matters, the authors say, is impact per wear.

Material questions

It needs pointing out, although it ought not to, that there is a link between consumers being able and willing to wear or use a product lots of times and the material the product is made from.

The example The Great Green Washing Machine authors give is of a dress. A cheap dress might cost 12

'environmental impact points' and if a consumer wears it once before throwing it away, the cost is 12 per wear. Another dress may cost 1,200 'environmental impact points', but if its owner keeps it for years and wears it 100 times, its cost is also 12 per wear. The main difference, the authors point out, is that at the end of the 100-wear lifespan of the second dress, there would be one dress to repurpose or dispose of. Wearing cheap dresses of the first kind each time over the same timeframe would leave you with 100 dresses to dispose of. The two scenarios, therefore, are not equal at all.

Leather's struggle

Both of the white papers that comprise the full report are easily accessible through an online search. They are worth reading because they explain in considerable detail what the seven concerns about sustainability claims are, and make recommendations for making sustainability metrics more meaningful. Specifically, the second white paper devotes an entire appendix to the leather industry's ongoing struggles with the most influential scoring system for fashion sustainability, the Higg Materials Sustainability Index (MSI), set up by non-profit organisation the Sustainable Apparel Coalition.

In the autumn of 2020, the global

leather industry formally asked the Sustainable Apparel Coalition (SAC) to suspend the score it applies to leather in the Higg MSI. Industry bodies said that what the index presented had led to a negative perception of leather among some fashion brands and consumers, one that does not reflect that material's sustainable, circular nature. Applying the economic allocation method, the Higg MSI uses the high hide prices of 2013-2014 to arrive at the conclusion that a cattle hide should have a 3.6% share of the impact of the animal on global warming, eutrophication, water use, chemical use and resource depletion.

The Great Green Washing Machine acknowledges the leather industry's long-held argument that the economic driver of production needs to be taken into account. Hides would not be produced if there were no dairy and meat industries. And if the leather industry ceased to exist, the annual hide volume would continue unchanged. The authors also accept that, if you have to apply economic allocation, outdated figures from 2013 and 2014 are unlikely to provide the best basis for your calculation. They quote the president of the Leather and Hide Council of America (LHCA), Stephen Sothmann, as saying that, by historical standards, the period 2013-2015 witnessed record high global hide prices. Hides may never again be as expensive as they were at that time, so the allocation standard itself is based on an anomaly in the market. They also take LHCA's point that millions of unwanted hides in the US are going to waste each year.

Updated data

Based on this anomaly, two leather manufacturers, JBS Couros and PrimeAsia, have submitted more up-to-date information from the extensive lifecycle assessments (LCA) studies they have carried out on their own supply chains and the Higg MSI included separate scores for their leather in its 2021 updates. The authors of The Great Green Washing Machine make a number of comments about this. They conclude that the Higg MSI will take into account new information only if

“Environmental claims, such as ‘green’, ‘eco-friendly’, ‘good for the environment’, will be allowed only if underpinned by recognised excellence in environmental performance”

companies pay to have the Higg team assess the data, and that, even after seeing and verifying new data, it seems reluctant to alter its earlier, inaccurate assessment of hides and leather.

On the first of these points, we can say, without knowing how much it is necessary to pay the Higg MSI to have it assess new data, that it will be far less expensive than the cost of amassing all the new data in the first place: “a drop in the ocean” is one description we have heard. It would cost money to have a local accountancy firm check the figures and, therefore, it is only realistic to expect the team at the Higg MSI to charge something as well. On the second point, while it is certainly true that there is no change yet to the baseline score for leather on the Higg

MSI, some in the leather industry believe there could be grounds for “cautious optimism” that attitudes are softening and that such a change could come in future.

The index works on aggregate data and the more up-to-date information the leather sector presents to it, the easier it will become to convince it to make that change. In this way, PrimeAsia and JBS Couros have made initial contributions towards building that aggregate up and there are moves afoot for further additions of data from other leather industry LCAs. All of these will help move the needle in leather's favour.

These, too, are ways of lending weight to the industry's efforts to tell its story, which, it's worth repeating, is simply a case of telling the truth. ■

The material a product is made from is an important factor in determining how long it will last and how repairable it will be.

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A glimpse inside the vast new museum, which has had funding from various bodies including Rabobank, Gravin van Bylandt Foundation and the Municipality of Waalwijk.

CREDIT: SCHOENENKWARTIER

Footwear's history safe for the future

Following a turbulent few years and period of uncertainty, the Dutch Leather and Shoe Museum is set to reopen in June, with a new name and new concept. The Schoenenkwartier in the leather and footwear-producing city of Waalwijk will be housed in the nationally listed Kropholler complex, over three floors and in a space of more than 3,000 square-metres, signalling a renewed desire to keep the area's shoe and leather history alive for future generations.

Schoenenkwartier director Anouk van Heesch tells *World Footwear* she is "thrilled" with the outcome. "We hope for a large international audience, that will be taught about both historical and social demographics, relations and developments that local shoe design and production has provided for ages, alongside the large impact The Netherlands has made and still makes within the scope of shoe design and material innovation."

The Dutch Leather and Shoe Museum was founded in 1954 but closed its doors to the public in 2017, ostensibly for a refurbishment programme to take place. While the

The Netherlands' important shoemaking and leatherworking heritage will be preserved in a spectacularly revamped museum after a turnaround by Waalwijk's officials.

renovation project was progressing, though, a disagreement with the authorities over financing led to question marks over the museum's future. The city wanted to concentrate future funding on local initiatives to help boost the local economy and local cultural life, while a partnership between the museum and footwear research and education institution SLEM had an international scope too. The resulting uncertainty cast a shadow over the project and the museum as a whole

and, eventually, the funding for reopening the museum after refurbishment was pulled.

"Luckily, the city council decided the collection was way too important for national heritage to be closed off for the public forever," says Ms van Heesch. "By the end of 2020, the city of Waalwijk finally voted for an intensive renovation of the beautiful national monument that was designed by renowned architect Kropholler."

Architects, construction workers, museum staff and stakeholders, including shoe manufacturers and brands, have worked together on the overhaul. "We have been working hard to take the former Leather and Shoe Museum to the next level. We have combined local, national and international heritage with innovation and education in different ways," says Ms van Heesch. "The museum and the city council have been working side by side to make this dream come true."

Preserving the skills

Waalwijk and De Langstraat played an important international role in the footwear industry prior to mass production abroad. Before the industrialisation, Waalwijk was of national importance and is still home to many footwear companies – at least 250 are based there, according to reports.

The strength of the Schoenenkwartier will rest on three pillars: Schoenenlab (Shoe&Lab), Schoenenkennis (Shoe&Knowledge) and Schoenenmuseum (Shoe&Museum). On the ground floor is the museum, the cafe and the labs. Professional designers, shoemakers, leather workers, artists and craft students will work there and host workshops for the public. A packed schedule of workshops and classes has been arranged, and young people, schoolchildren and older students will be invited to learn the basics of shoe design and the history of the area.

The museum space is set out like a factory, with working machines and artefacts representing the production process, from the leather processing to boxing the shoes. The first floor houses the heritage of the Langstraat, which was the centre of the Dutch leather and shoe industry from 1750. Period rooms will show social history, tell the associated folktales and highlight developments in leather and shoe designs. "There are lots of family histories to be told of generations working in shoe and leather production," says Ms van Heesch. "This is a heritage that needs to be kept alive, as it has formed the backbone of the community and The Netherlands so far."

A full wing has been reserved for the Knowledge Centre. In addition to an auditorium, this includes a library, an archive, database, material cabinets and spaces for educational purposes.

On the second floor, the emphasis is on 'identity', with all types of shoe represented: stiletto heels to platform soles, Nike Air Max to Balenciaga sneaker. Twice a year there will be a temporary exhibition with themes including fashion, design, sustainability, craft and innovation. Events, workshops and other activities in the manufacturing labs, the atrium and the auditorium will be linked to these exhibitions.



Schoenenkwartier director Anouk van Heesch trained as an art historian and has been working in the field of visual arts and design for more than 25 years.

CREDIT: SCHOENENKWARTIER

"We show our collection within a range of social issues such as localisation, gender, male-female ratio and subcultures," says Ms van Heesch. "Our scope is to be an institute for making and collection, providing different layers of interest for the whole family and different kinds of target audiences."

Next exhibit

When the doors open on June 28, the programme starts with a look at the influence of music on footwear. The exhibition Put On Your Red Shoes, will include iconic footwear via music movements such as hip-hop and rave.

The exhibition begins with footwear of artists such as David Bowie, Elvis Presley, Madonna, Freddy Mercury and Lady Gaga, whose extravagant clothing and striking lifestyle are widely imitated. The second part focuses on everyday footwear from brands including Dr Martens, Timberland and Clarks, which have grown into iconic brands in part due to their association with music scenes. Finally, visitors will learn about how singers such as Jennifer Lopez, Katy Perry and Kanye West profile themselves as influencers. By launching their own footwear labels, they have responded to the needs of their fans to dress the same way.

Put On Your Red Shoes will be at the museum until 5 February 2023, when it will be followed by The Magic of Cuir Bouilli (spring 2023); Future Proof: The Future of the Sneaker (autumn 2023); René van den Berg (spring 2024); Leather Jackets (autumn 2024); and Fly Me To The Moon: Moon boots and Leatherette (spring 2025).

"We hope our visitors will be overwhelmed by the sheer beauty and wonderful ambiance of the monumental architecture by CIVIC Public Architecture," says Ms van Heesch. "We are a small country with a large impact, always have had and will continue to have." ■

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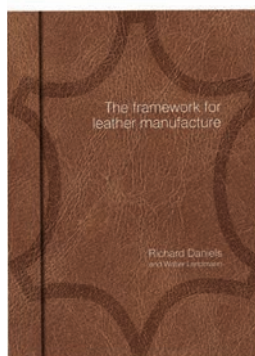
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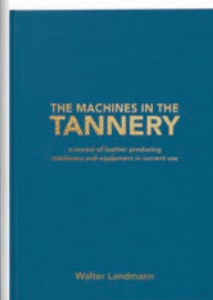
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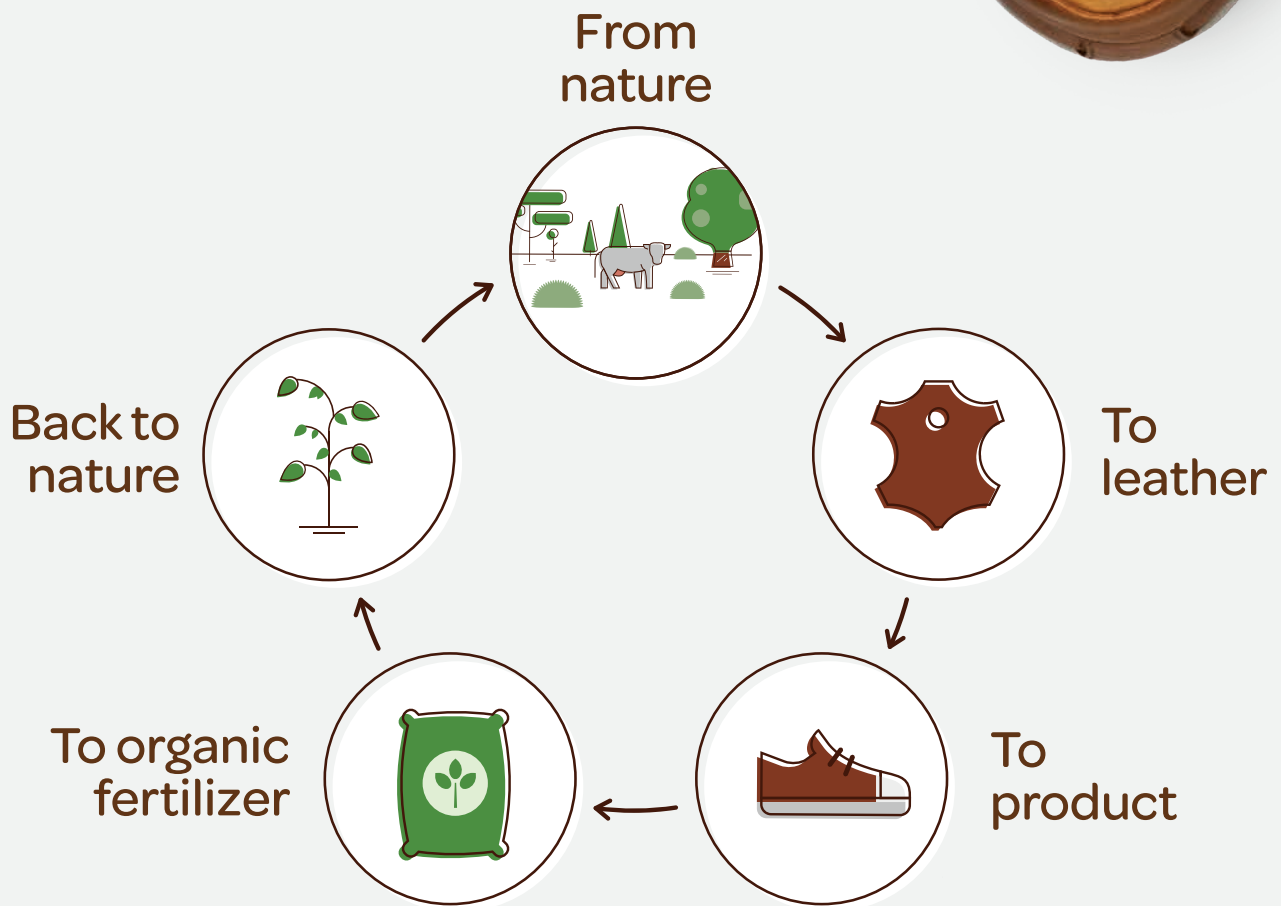
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