

WORLD FOOTWEAR

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THE MAGAZINE FOR THE GLOBAL SHOE INDUSTRY



From tyres to soling technology
Consumer power means a new industry
Seventy years of innovation at Desma
End of the road for EVA?



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Image: Salewa

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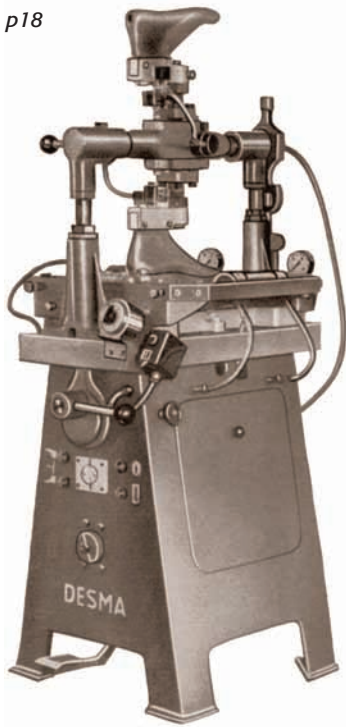


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News

EUROPE Tourists visiting Europe spent 16.8% less in June compared to the same period in 2015, according to a study by Global Blue and Barclays. Global tourist spending was down 13% year-on-year. In recent months, several European luxury goods brands, including Salvatore Ferragamo, have blamed a drop in tourism in Europe for disappointing financial results.

UK UK footwear retailer Anatomic & Co. has created a shoe designed to encourage face-to-face social interaction by blocking smartphone notifications. The company describes it as the "world's first social shoe". The 'In Good Company' shoe was created in conjunction with scientists at University College London and allows the wearer to avoid the unwanted distraction of notifications.

FRANCE Luxury group Hermès has acquired a stake in footwear and accessory company Maison Pierre Hardy. Pierre Hardy said he was very pleased by the development, calling Hermès "a house that champions the exceptional".

● Italian luxury leather shoe manufacturer Santoni has celebrated the opening of its first stand-alone boutique in Paris. The store follows the concept design by architect Patricia Urquiola for the brand's flagship boutiques in Milan and New York.

SPAIN The shoe industry in Valencia has identified Australia as a promising export market. Sales of Spanish shoes in Australia have a value of around €17 million per year at the moment, but industry body Avecal has said it feels sure there is considerable potential for growing this figure.

BRAZIL Brazilian footwear group Grendene is to launch its Zaxy brand in Spain, its top market in Europe. Grendene already sells shoes there under its Ipanema, Rider and Grendha brands.

Grendene achieved a volume of sales of 180 million pairs in all markets in 2015 but has the capacity to produce 250 million pairs. All of its production takes place in Brazil.

ITALY Luxury group Tod's reported a 3.4% decline in sales to \$557.3 million during the first half of 2016 with sales in the Greater China region especially poor. Chairman and CEO, Diego Della Valle, said the results "reflect an industry and market environment still characterised by instability and uncertainty".

● Tuscany-based shoe designer Andrea Verdura has unveiled a collection of boots and sandals made of recycled fishing nets. Having already been launched in boutiques in Italy and Spain during 2015, the range will now be available on a limited basis in the US via a Kickstarter campaign. No Trace sandals.

● Italian luxury brand Bruno Magli, which specialises in shoes and leathersgoods, has announced partnerships with retailers in China and Japan. The deals are part of the company's strategy to position itself as a leading luxury lifestyle brand in Asia.

CHINA The president of the Italian footwear manufacturers' association, Annarita Pilotti, has written to the European Commission in Brussels to express concern about China possibly being granted 'Market Economy Status' (MES) by the European Union. One of the consequences of this possible change would be that manufacturing industries in Europe would no longer be able to ask the EU to impose anti-dumping measures on their Chinese competitors, even if they could show that products were being imported from China at falsely cheap prices.

US Sportswear manufacturer adidas has confirmed plans to build a Speedfactory in the US at the end of 2017, two months after opening its first one in Germany. The company describes the initiative, which aims to transform customised shoe manufacturing into an automated process, as a "new era in footwear creation".

- US footwear brand Skechers reported total revenue of \$877.8 million in the second quarter of 2016, a 10% increase on the same period last year. The company's domestic sales fell 5.4% but CEO Robert Greenberg said it would continue to focus on its international business, which performed well in the quarter.

- VF Corporation, which owns brands including Vans and Timberland, reported total revenue of \$2.4 billion for the second quarter of 2016, a 1% increase on the same period last year but slightly below Wall Street's expectations. Net income was \$51 million, 70% lower than the second quarter of 2015.

INDIA The United Nations Industrial Development Organisation (UNIDO) has issued a request for proposals for qualified individuals or institutions to deliver a training programme in leather and footwear production Kanpur in India. The training programme will be part of a wider Kanpur Leather Development Project, which has funding from India's central government.

- India's Council for Leather Exports (CLE) has reported an increase in its membership. At the end of May 2016, the organisation had a total of 3,630 member companies from all parts of the country. This is 3.5% more than the figure for May 2015.

UNITED ARAB EMIRATES Dubai's Department of Economic Development and luxury goods conglomerate LVMH have signed a memorandum of understanding to raise public awareness on counterfeit goods. The two parties will work together to combat commercial fraud and protect the rights of trademark owners.

JAPAN Several luxury brands are refurbishing their flagship stores in the upmarket Ginza district in Tokyo ahead of an expected influx of tourists for the 2020 Olympic Games in the Japanese capital. Among them is Salvatore Ferragamo, which is remodelling its store in Ginza's main shopping district for the first time in 13 years.

CAMBODIA Exports of footwear and apparel from Cambodia in the first three months of 2016 rose in value by 39% year-on-year to reach around \$2 billion, the country's ministry of commerce has reported. The figure for the corresponding period in 2015 was \$1.5 billion. It offered no breakdown of footwear's contribution to the total.

BANGLADESH The footwear industry in Bangladesh earned export revenues of \$494.8 million in the financial year just ended, July 2015 to June 2016. This represents an increase of 2.3% compared with the previous financial year.

Footprints

SON OF FOUNDER TAKES CHARGE OF PIKOLINOS

Footwear group Pikolinos has confirmed that **Juan Manuel Perán** has taken over as chief executive. Son of founder **Juan Perán**, the new head of the company has been vice-president of Pikolinos for the last seven years, but he has spent time outside the group, completing technical courses and working in the footwear industry in Germany as well as in Italy earlier in his career.

His sister, **Rosana Perán**, takes over as vice-president of Pikolinos, while their father will now become honorary president of the company he founded in 1984.

Pikolinos closed its 2015-2016 accounts with revenues of €92 million. It produced more than 2 million pairs of shoes during the period. It exports to more than 60 countries around the world.

ASSOCAL PRESIDENT HOPING FOR A "RELAUNCH" OF ITALIAN FOOTWEAR

Italy's main footwear manufacturers' association, Assocalzaturifici, has said the "the long-awaited upswing" in demand for its members' shoes "has not yet arrived".

Initial figures for the first quarter of 2016 indicate growth in the value of exports of 2.2%. However, Assocal president, **Annarita Pilotti**, has confirmed that this revenue came in spite of a 2% fall in the volume of exports from Italian footwear manufacturers to buyers in overseas markets.

Ms Pilotti said she hopes the September 2016 edition of the Micam exhibition will offer the chance to "relaunch Italian footwear".

NORDSTROM NAMES NEW VP OF SHOES

Fashion retailer Nordstrom has named **Kristin Frossmo** as the new vice president of its shoe division. Ms Frossmo has been with the company for 28 years in various roles linked to shoes.

"Kristin's great diversity of experience over her past 28 years here at Nordstrom and the fact that she has



ZANOTTI TEAMS UP WITH JENNIFER LOPEZ

High-end footwear designer **Giuseppe Zanotti** has collaborated with performer and actress **Jennifer Lopez** for a range of footwear and accessories. The Giuseppe for Jennifer Lopez capsule collection will feature shoes and handbags inspired by the US star.

Described by the Italian luxury brand as its "largest range and most involved partnership to date", the collection will be released in early 2017. Giuseppe Zanotti has a history of collaborating with world-renowned performers, including **Kanye West** and **Beyoncé**.

The footwear will include embellished wedge sneakers, open-toe booties featuring crystals and snakeskin-printed leather shoes. There will also be two leather handbag styles.

worked in almost every area of our shoes division make her well-suited for this position," said Nordstrom co-President **Peter Nordstrom**. He described the shoe division as one of the company's "most important and brand-defining".

"From buying to merchandising, to store management and our private label group, her extensive knowledge of our business, product and taking care of the customer will serve Nordstrom well," he added.

KARL LAGERFELD TO RELEASE CUSTOMISABLE FOOTWEAR RANGE

Karl Lagerfeld, head designer and creative director of fashion house Chanel, is set to launch a personalised footwear line. The "Karl Kustomize" sneakers will be available online from July 7.

Customers will be able to customise

ten aspects of the sneakers, including shoelaces, uppers, linings and trims. The range will be available online and in Chanel's flagship stores in Paris, London and Munich. Each pair will take six weeks to manufacture.

Two sneaker designs customised by Mr Lagerfeld are currently on display at the flagship stores, alongside examples of pairs personalised by Chanel customers.

UNIVERSITY OF ALICANTE WANTS TO RUN FOOTWEAR COURSES AT NEW CAMPUS

A formal opening ceremony took place on July 12 to inaugurate a new Elda Campus of the University of Alicante.

In an address at the event, the university's rector, **Manuel Palomar**, paid tribute to Elda's long-standing footwear industry.

"We want to maximise the particular character of Elda," he said, "and that means we have to make use of the great footwear industry tradition that exists in this area. This means we have to set up courses that focus on the footwear sector and encourage innovation and research."

NEW CEO FOR STUART WEITZMAN

High-end footwear brand Stuart Weitzman, owned by New York-based luxury leathergoods company Coach, has named **Wendy Kahn** as its new CEO and brand president. She will take over on September 13 from current CEO **Wayne Kulkin**, who will move to a consultancy role at Coach.

Ms Kahn is leaving her current position as CEO at Valentino, having also served as vice president of sales, marketing and retail during her time at the Italian fashion brand. She has also held senior positions at LVMH, Marc Jacobs and Celine.

"Wendy's success in developing global luxury brands and extensive general management experience make her the ideal candidate to lead Stuart Weitzman, building on the brand's strong foundation," said **Victor Luis**, CEO of Coach.

NIKE NAMES NEW HEAD OF RUNNING

Sports brand Nike has announced a new vice-president and general manager for its running business; **Steve Lesnard** will take up the role, replacing **Patrick Seehafer**.

Mr Lesnard is currently general manager for running in the North American market. Patrick Seehafer will move to become the brand's vice-president for merchandising in Europe.

FORMER GDS DIRECTOR TO LAUNCH NEW SHOE EVENT

Frank Hartmann, who was director of the GDS exhibition in Düsseldorf until 2009, has announced a new event called the European Shoeshow.

Launching in March 2017, the new event will run in Cologne twice a year, in March and September.

Initial reports say Mr Hartmann will aim to sign up 150 footwear brands to take part in the inaugural event.

PUMA FOOTWEAR CHIEF JOINS ASICS AMERICA

Asics America has named **Andrew Richard** as its new vice president of regional sales. The appointment is effective immediately and Mr Richard will be in charge of the brand's sales team.

He moves from Puma, where he served as head of merchandising for footwear. This role saw him oversee the company's global product line management, which is responsible for annual footwear sales worth \$1.1 billion. Prior to that, he worked in senior sales and merchandising roles at Timberland and Reebok.

"Andy brings a wealth of sales

expertise to Asics and we are thrilled to welcome him to the team in this imperative role," said Gene McCarthy, Asica America CEO and president.

CHANGES AT THE TOP FOR INESCOP

Spanish footwear research and technology centre Inescop has appointed **Antonio Porta** of the footwear company UNISA-Europa as its new chairman. **Dr Miguel Angel Martínez**, formerly deputy director of the organisation, is taking over as director.

Former director, **Dr Cesar Orgilés**, will continue to be involved as a technical consultant to the board.



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Products & Services

PRODUCTION MOVING OUT OF CHINA FOR STELLA

Hong Kong-based footwear group Stella International achieved revenues of \$722.3 million in the first half of 2016. This represents a fall of 9.4% compared with the same period last year.

In terms of volume, the decline was 4.5%, falling to 25.4 million pairs in the first six months of 2016. The average sales price per pair over this period was \$27.10, compared to \$28.50 during the same period in 2015.

Chief executive, Lawrence Chen, said the two main aspects of Stella's strategy for restoring growth are to make its shoe factories more efficient and to improve the quality of its products.

He said his company will "further emphasise" production outside its established manufacturing base in mainland China, referring to a process that is already quite far advanced.

World Footwear has learned that one-third of Stella's annual production output of around 50 million pairs is now being manufactured outside China. The company puts its Chinese production at 66% of the total, with the other 34% being made in factories elsewhere.

COLOMBIA HOLDS BACK ON ANTI-DUMPING MEASURES

Colombian footwear industry association Acicam has described as a shock the decision by the government in Bogotá to hold back on imposing anti-dumping measures against some imported shoes.

A government communication dated July 8 said there is clear evidence of shoes imported from China and other Asian countries going on sale in Colombia at a lower price than consumers are being asked to pay in the countries of origin. However, it said it would not press ahead with plans to impose anti-dumping duties.

Acicam expressed surprise and said in a statement that the Colombian government appeared to have ignored the problem of "triangulation", through which Asian-made shoes are coming into the Colombian market from third countries, most notably Panama.



TIMBERLAND GIVES UPDATE ON CSR INITIATIVES

Outdoor brand Timberland has released details of the progress it made in its Corporate Social Responsibility (CSR) initiatives during the first quarter of 2016. Timberland splits its CSR into three categories: product, outdoor and communities.

Timberland said in its report that 99% of the leather used in its footwear is produced in tanneries that have a silver or gold rating. 44% of the cotton used in its apparel is either organic, of US origin or sourced from the Better Cotton Initiative. Of the 330 factories working with Timberland, 99% had "acceptable" social and labour compliance. Those that did not meet this standard had their orders withheld until corrective action was taken or an alternative production location could be found.

With regards to community initiatives, Timberland said its employees carried out 7,069 hours of work on over 80 community service projects. These included tree planting, volunteering at animal sanctuaries and building homes, a programme alongside Habitat for Humanity.

Acicam president, Luis Gustavo Flórez, said in response to the latest announcement that his organisation will make a new approach and ask the government to reconsider following "a truly thorough investigation" of the matter.

ASICS DEVELOPS COLOUR-CHANGING FABRIC

Japanese sportswear group Asics has joined forces with textiles maker Toray to develop a new textile for use in footwear that changes colour depending on the angle from which it is viewed.

The fabric, which is being called the Chemeloid Mesh, will feature in its new running shoe, the Gel-Quantum 360 CM, as well as in its Tiger shoes. Asics says that the material offers high performance on top of its interesting

aesthetic quality. It is the result of joint research between the Asics Institute of Sports Science and the Toray Advanced Textiles Development Centre.

According to Asics, the material is highly elastic for a comfortable fit and it allows for better flexibility in a shoe by following the foot's form as it bends and moves. It also has "excellent memory" to remember continuous changes in the form of the foot.

"We are happy to have developed a new textile with colours that change depending on the angle of viewing, and that we can offer this product to our customers," said Kenta Moriyasu, footwear function development team manager at the Institute.

"By analysing in detail the changes in running and walking foot form, we were able to construct an upper and

develop materials that follow the form of the foot," he added.

"Using Toray's high-performance fibres and textile design technology, we were able to develop a material with a special design and that offers a high degree of functionality," confirmed Satoshi Naruko from Toray's Advanced Textiles Development Centre.

PUMA ADDS LEATHER OPTION TO EVOTOUCH BOOT

Sports brand Puma has launched a new version of its evoTouch football boots. The latest version of the boots uses leather, with the sports brand saying its aim is to offer players "a lighter and faster solution combined with the benefits of classic leather material".

The boot is made from "a super-soft, ultra-thin and lightweight leather upper, bringing the foot closer to the ball and creating exceptional touch in all conditions", the company stated. It has an integrated knitted sock with anti-slip material inside to "lock down the foot" and ensure stability.

MANY BRANDS NOW USING GORE-TEX SURROUND

Sports and outdoor shoe brands are increasing their use of Gore-Tex Surround, technology introduced by WL Gore in 2014 that extends the company's traditional membrane-based breathability and moisture protection to the whole of a shoe rather than just the upper.

It works by means of incorporating a new construction into hiking shoes or boots. This new construction consists of five components: ventilation outlets in the side of the upper, a layer of Extended Comfort membrane technology underneath the upper material, a breathable, removable insole, a new form of Gore-Tex membrane technology, called Surround, underneath the insole, and finally a Surround 'spacer' component underneath that.

Ecco and Lowa, early adopters of Surround, are increasing its use in their latest collections and, for the first time, adidas is using the technology in some of its products. Overall, WL Gore says more than 350 Surround-enabled styles are available to sports and outdoor enthusiasts now from 52 different footwear brands.

Meindl, La Sportiva, Mammut, Salewa, Chiruca and Zamberlan were

also among the early adopters. Other footwear brands to have adopted the technology subsequently, starting with their spring-summer 2017 collections, include Haglöfs, Merrell, The North Face and Under Armour.

TEAM GB RIDERS TO HAVE CUSTOMISED SHOES

The cyclists competing for Great Britain at the Olympic Games in Rio de Janeiro will wear custom-moulded shoes made entirely from carbon-fibre. The shoes are manufactured by Simmons Racing, a US company that specialises in custom cycling shoes

and speed skates.

The shoes will be custom-moulded for each rider to prevent their feet from slipping around inside the shoes when they are competing. The shoe will be secured to the pedal using a Sidi buckle that is located on the sole of the shoe for better aerodynamics.

The sole will also have a small rubber grip on the heel to prevent riders from slipping whilst walking around the track centre. The shoes are available with either four-bolt or three-bolt soles making them suitable regardless of the type of pedals a rider uses. 

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Backtrack

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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 those you have missed.

28/07/16

Footwear leads Under Armour growth

27/07/16

Revenues down at Wolverine World Wide

Oboz celebrates planting one million trees

20/07/16

Pretty Ballerinas has Miami in its sights
AKU joins the Michelin sole roster

19/07/16

EU registers record trade deficit with China

14/07/16

Adidas accuses Skechers of design infringement
Eighteenth annual Shoes and Leather Vietnam show opens

13/07/16

Skechers expands distribution centre again

11/07/16

Over 900 brands feature at GDS

05/07/16

First phase of Tod's-led Colosseum restoration complete

08/07/16

INE figures show the importance of shoes to Valencia region

07/07/16

Ferragamo celebrates flagship reopening in Paris

06/07/16

Tod's hints at the end of twice-a-year collections

04/07/16

VF sells contemporary brands

30/06/16

Under Armour opens new manufacturing and design centre

29/06/16

Aquazzura suing Steve Madden for design infringement

28/06/16

Skechers opens new UK base
Cuba on course for two new footwear factories

27/06/16

Paraguay: local producers of leather shoes are losing out
GDS workshop to discuss sustainable footwear

22/06/16

Spain's footwear workers secure pay rise and shorter week

21/06/16

Growth for Portuguese shoes in Japan
Gucci stepping up customisation initiative

20/06/16

Elche footwear and leather events to co-locate

16/06/16

BASF publishes new materials selection guide

14/06/16

Gola goes for flat-knit upper

10/06/16

WTO says Colombia's footwear tariffs are too high

08/06/16

DSW searching for new CFO

Converse uses Nike Hyperfuse technology in updated offering

03/06/16

Vans launches Nintendo-inspired footwear collection

02/06/16

American & Efird celebrates 125 years in business

01/06/16

Online sales can work for smaller companies as well, Bells Shoes says
South Africa sees opportunities in exotic leather market

31/05/16

Deckers records increased sales, names new CEO

27/05/16

Genesco earnings rise
Colombian industry body prepares new antidumping request

26/05/16

Sendra senses big demand for artisan shoes

25/05/16

Vietnamese firm to launch new athletic shoe brand for domestic market

20/05/16

SATRA membership hits an eight-year high

19/05/16

Pensole and adidas team up for design master class

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footwearbiz.com

Michelin worked with outdoor brand Mizuno to develop soles for its Wave Daichi and Wave Mujin trail running shoes.

CREDIT: MIZUNO



French company Michelin has been making high-performance tyres for over 120 years. Through a partnership with Chinese textile manufacturer Jihua Group, it is now channelling its knowledge and experience into developing bespoke technical soles for footwear brands.

Tyre specialist steps into footwear

Michelin has more than a century of experience developing tyres for a variety of purposes. JV International, of which Jihua is a major shareholder, has been designing soles for technical footwear for over 20 years. Now they have teamed up to try and shape the future of high-performance footwear. Michelin says the partnership is an opportunity for its “know-how in rubber compounds, novel materials, tread patterns and innovative technology to be extended beyond the world of tyres”.

Michelin's role in the partnership is to offer the expertise it has garnered from decades researching and developing tyres for a wide range of vehicles, from off-road bikes to elite-level racing cars. The knowledge it has amassed of how to improve the “ground contact” of its products is invaluable to JV, which produces rubber and soles at its design and product development centre in Verona, Italy.

The ideal qualities of tyres and footwear soles are not that far apart. From a shared vocabulary (think tread, stability, grip) to similar performance requirements, it is clear that there is potential for a crossover of research ideas from one product to the other. Michelin's commitment to developing tyres that give its customers safety and reliability on the roads has seen it compile a vast catalogue of rubber compounds. This makes it well placed to develop soles that are adapted to the needs and demands of various types of footwear.

“The sole development process begins with a briefing presented by the footwear company and once the specific needs have been identified, we add the technology derived from Michelin tyres,” explains Trond Sonnergren, head of design and product development for the project.

Each sole is “aligned with the design and technical requirements” of partner brands, which are offered the chance to add their own technical expertise during the development phase so that Michelin knows exactly what its target should be. After these initial discussions, it can select the compound or mix of compounds best suited to the job and begin work on a prototype. Mr Sonnergren says that the design process takes at least eight months from the time a brand first approaches Michelin, with the possibility of the final product being on the market within 18 months.

Mountain walking

Last year, Italian outdoor brand Salewa became one of the first companies to turn to JV International and Michelin for technical soles. Michelin combined different blends of its rubber to create two exclusive soles that met the requirements of the brand's Lite Train and Ultra Train mountain boots.

For the Lite Train, the aim was to create a sole for use on softer ground. It has an aggressive tread pattern that digs deeper into the ground, drawing inspiration from Michelin's Wild Grip'r mountain bike and Starcross HP4 motocross tyres. This Salewa boot is targeted at hikers, so it was important for the sole to provide stability on irregular surfaces. Empty tread blocks along the edge of the sole give better traction when walking on slopes; reinforced tread on the edges of the sole act like claws to prevent slipping. Siping, a process of cutting thin slits across the surface in the tread, assists draining, helpful in wet conditions, and allows the sole to self-clean.

This siping also features on the sole developed for the Ultra Train boots, which was designed to cope with firmer ground. It



Outdoor brand Salewa wanted a sole that could cope with the rigours of fast hiking so Michelin added more tread blocks and smaller grooves. CREDIT: MICHELIN



The asymmetrical tread on Michelin's XAS car tyre was the inspiration behind the sole designed for Hi-Tec's "city hiking" boots.

CREDIT: MICHELIN

has extra tread blocks and lower tread grooves for increased stability when walking fast on difficult terrain, which is the main intended use of this Salewa model. Michelin added a compound it calls Outdoor to the rubber mix used for extra traction and to make it more resistant to the abrasion that frozen or hard ground can cause. Mr Sonnergren says the Ultra sole is "optimised for the kind of hard-pack terrain found during colder seasons in the mountains".

Dutch brand Hi-Tec recruited Michelin to provide the sole for its Ox collection of "city hiking" boots. It copies the asymmetrical design of tread in the XAS car tyre, which allows different sections of the tyre to perform different roles. The fact that the human foot is also asymmetrical meant the concept could be applied to the design for the sole. The tread arrangement varies on different areas of the sole. The toe has edges designed to "bite" into the ground to help change direction while the ridges on the heel give better grip when slowing down. Ridges on opposite sides work in tandem in a similar way to the tread patterns on the XAS tyre. Overall, the tread pattern follows the natural roll of the foot to provide more consistent contact with the ground.

Trail running

Trail runners are another group who rely heavily on the grip of their footwear for safety. Japanese brand Mizuno is a more recent addition to the JV International and Michelin roster. Mizuno says "it was a logical choice to merge the huge experience of both companies" for its Wave Daichi and Wave Mujin products, saying it was happy to find a partner that could "add another performance dimension to our trail footwear range". The brief from Mizuno was to produce a sole that adapts to irregular terrain and ensures its customers don't find themselves in potentially dangerous situations when practising their sport.

For the Wave Daichi, Michelin developed the G-Adaptive sole

based on its cyclocross bike tyres. The rubber sculpting around the edges gives strong lateral grip for sudden changes in direction, especially useful on muddy or slippery surfaces. There are also deep ridges in the heel for increased confidence during deceleration on all types of terrain and double density ridges on important parts of the sole for more stability.

The Twister sole, which features in the Wave Mujin range, is built for long-distance trail running. It is inspired by the Wild Mud bike tyre and adapts to the wide variety of surfaces that a wearer might encounter on a prolonged hike. To cope with long periods of wear the sole offers better support and to combat the dangers of uneven surfaces Michelin made sure it had added protection for the most sensitive areas of the foot. The 'Twister' name comes from the spiral pattern of tread, which Michelin says aids "multidirectional breaking".

When asked by *World Footwear* if it is considering working with JV International and Michelin again, Mizuno said it wants to "offer the best matching shoe for each trail runners type out there", suggesting that future collaborations are in the pipeline.

Winter sports

Winter sports is another outdoor sector where Michelin technical soles have had success. Snow sports specialists Ride worked with Michelin to develop a range of soles for its snowboard boots. The Peak and Summit soles have been used in several different Ride models, including the Trident, Insano and Cadence. Ride says they have featured in some of its "best selling and most requested models".

The weight-bearing zones of the sole have small, deep ridges for greater penetration of the ground. According to Ride, this gives better traction "on all types of snow from powder to ice". A special feature of the Peak and Summit soles is their ability to operate in extreme cold. Michelin says the compound can maintain its softness in temperatures as low as -40°C so that grip performance is not compromised. It also uses one of the company's lightest rubber mixes, a bonus for snowboarders trying to stay in the air for as long as possible.

"On snow, the sole is a critical point; for those who, like us,



The Michelin sole that features in a range of boots from snow sports brand Ride contains a special compound able to function in extreme temperatures.

CREDIT: MICHELIN



The Kodiak Klondike children's boot has a Michelin sole that is designed to offer extra stability on slippery surfaces.

CREDIT: MICHELIN

offer premium collections, it's necessary to have a product that ensures maximum grip and total safety," says Joerg Schramm, marketing manager for Ride Snowboards Europe. The brand hopes to incorporate the soles into more boot models, including those from its women's line.

A partnership with Canadian snow boot maker Kodiak saw

Michelin develop a sole specifically for use in a children's shoe. The Kodiak Klondike, which is designed for icy condition, features the Glacious sole, which is based on its tyres for heavy vehicles. A key requirement of these tyres is good traction and the ability to perform on slippery surfaces. The added grip that the compounds used in these tyres offer make them ideal for use in children's shoes as it gives parents some peace of mind that their children are safer in icy conditions than they might have been otherwise. It has small teeth on the tread for gripping icy surfaces and a vertical channel running down the sole for better traction.

Brand manager Karen McSorley says Kodiak turned to Michelin for "a technical model custom-made for us that tries to always imagine every scenario in which the product could be used".

Two-way street?

When they announced their partnership in November 2014, JV International and Michelin said they thought the footwear market was "hungry for technology" and set a target of supplying technical footwear brands with 500 million pairs of soles per year within five years. Although this goal is ambitious, capturing business for the likes of Salewa and Mizuno, established brands within their respective sectors, is a step in the right direction.

Of the two companies, Michelin perhaps has more to gain from this venture. If the knowledge and experience from over a century making tyres can be so easily transferred to technical soles, it stands to reason that developing the soles could throw up ideas and information that could be applied back to its day-to-day work with tyres. The two industries could be closer aligned in the future if this venture proves successful. 🔄

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It's a buyer's market. If a consumer can't find the footwear desired in Berlin, he or she can go online and buy it in Buenos Aires.
CREDIT: MESSE DÜSSELDORF/CONSTANZE TILLMANN

A revamped industry

The chief executive of Spanish footwear group Hergar, Basilio García, is an important figure in the industry in his country, especially in his home region, La Rioja. His father, also Basilio, set the company up in the Arnedo footwear hub in 1968 with the aim of using to the full the area's artisanal values while finding new ways to add value with touches of modern design and technological innovation.

This vision has served Hergar well. It waited a number of years before launching brands of its own, eventually bringing out a successful boot brand called Tanke in 1978, inspired by high-quality hunting boots, with hand-sewn waterproof leather uppers, but also a rugged rubber sole. In time, Tanke inspired Basilio García senior's best known brand, Callaghan, which he launched in 1987. Nothing to do with Ireland, where the Callaghan family name comes from – the choice owed more to Hollywood (Callahan, rather than Callaghan, is the surname of Clint Eastwood's famous character in the Dirty Harry films). The boss of the business today says he believes the important aspect of choosing an "international" name was that his father "knew by intuition that the times were changing".

Open to the world

In 1987 Spain completed its first year as a member of the European Union and of defence alliance NATO. Barcelona had just been announced as the host city for the 1992 Olympic

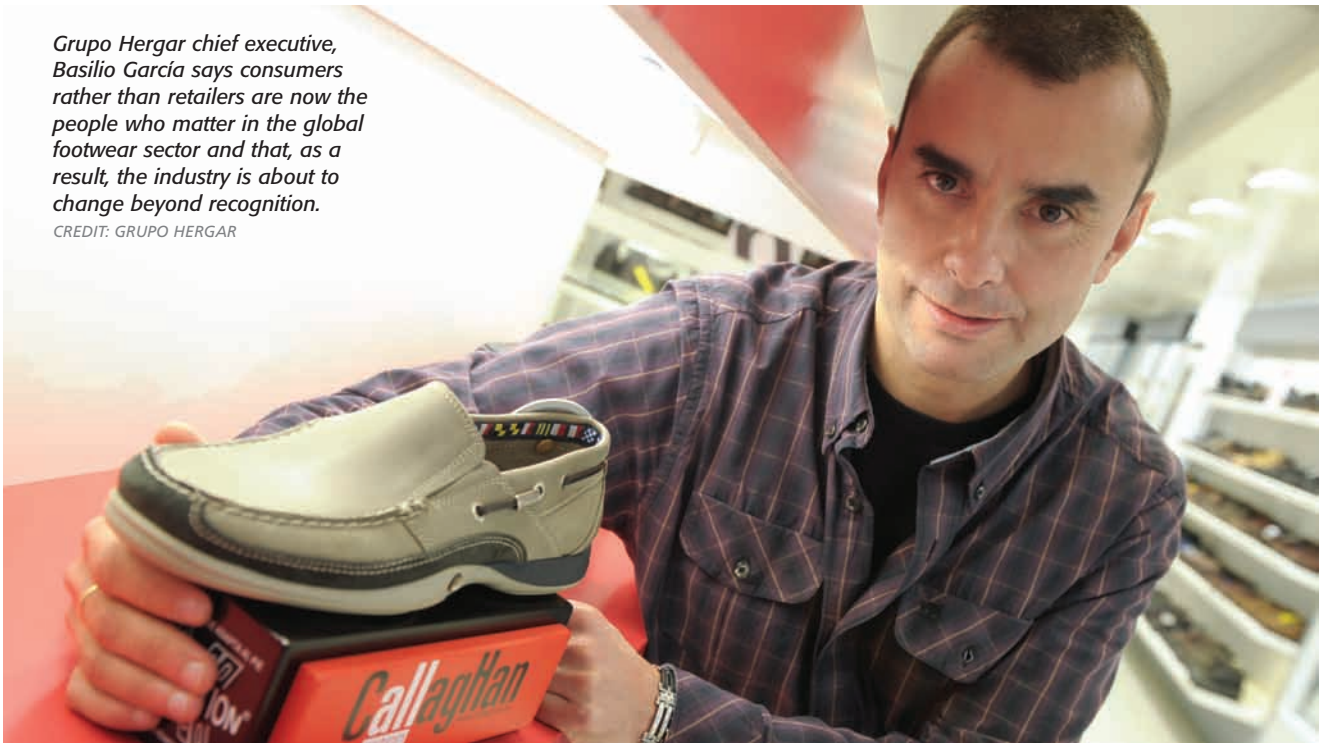
A senior figure in the industry in Spain has said changes in the footwear supply chain are revolutionising the way the industry works. Five years from now, he warns, the industry will be unrecognisable; the new ways companies make and sell shoes are set to have a big impact.

Games and preparations got under way for Seville to host the Universal Exposition of 1992. The country, ten years on from the death of dictator Francisco Franco and the restoration of democracy, was opening up to the world again. To launch a brand called Callaghan was to anticipate the impact globalisation was about to have on the footwear industry, including the industry in Arnedo.

It's because of changes that have emerged in more recent times that the founder's son is now anticipating another new set-up for shoe manufacturers. He points out that the main protagonists in the footwear supply chain used to be the retailers. Now consumers call the shots and this changes everything.

Grupo Hergar chief executive, Basilio García says consumers rather than retailers are now the people who matter in the global footwear sector and that, as a result, the industry is about to change beyond recognition.

CREDIT: GRUPO HERGAR



Distribution control

He explains that in the 1980s and 1990s, the “kings” of footwear were the owners, managers and buyers of footwear retail companies. At that time, controlling distribution of the finished product (shoes, in this case) was even more important than controlling production (a residue of this remains at the big footwear shows, for which the main target visitors are retailers, not the public). In those decades, the shopkeepers were the experts whose role it was to interpret consumer demand and select and stock the shoes that would sell best. Manufacturers manufactured.

These lines have blurred now. Shoe producers launched their own brands and then began to open their own retail outlets, shops dedicated to their collections alone. Basilio García has talked of a time when important international buyers began to “discover” Spain’s shoe-producing talent and placed big orders with outsource manufacturing partners in the region around Elda and Petrer in the province of Alicante on the east coast. It’s a world away from Arnedo and companies there, including Grupo Hergar, were left alone to develop not just brands and retail networks, but design capacity, research and development, in-house marketing and everything else needed to run a business.

Touchstones of success

With the globalisation of the industry, of course, cheaper manufacturing locations than Spain soon appeared on the map. Mr García recalls the conversations with industry “gurus”, who insisted he and his fellow manufacturers in La Rioja ought to outsource production and concentrate all their energies on brand-building. “We certainly thought about it,” he recalls, “and we even reached the conclusion that they were probably correct.” In the time it took to reach this conclusion, things had begun to change again and suddenly an ability to engage completely with design, to have the flexibility to carry out small-scale production, to make mini-collections and to add value through innovation and personalisation had become the new touchstones of success.

No resemblance

Then online sales began to grow and, in a relatively short space of time, brought about yet more changes, ones that will transform the industry again, Mr García believes. “Now the consumer is king,” he says, “and the rest of us are at the service of consumers and have to bring our offerings to them.” Increasingly, competitors all over the world are able to offer their collections (and sometimes their slightly amended versions of your collections, only at a cheaper price) to exactly the same consumers. “This is making everything different,” he says, “and in five years the footwear business will bear no resemblance to what it is today. There will be a huge range of shoes on offer, through multiple channels.”

Basilio García said he believes the way forward is to take a leaf out of fast fashion’s book and run a production set-up that allows companies to design, make and launch shoe collections, not by season, but at the time and in the quantities that the market demands. To have your own factory, your own highly skilled workforce, your own design team and your own research and development resources will be big advantages.

Levels of control

For Guy West, one of the founders of English high-end men’s shoe brand Jeffery West, some aspects (at least) of this new vision for the industry make sense. To have your own production facility will make it easier for any footwear company to shorten its lead times. “You control what goes in and what comes out,” he explains. “If it’s not your factory, you need huge volumes to be able to exercise that level of control.” But he’s less sure about online shoe shopping taking over to a great enough extent to alter the footwear supply chain. “Let’s just say that lots of companies have appeared to be successful with their online shops,” he explains, “but things are not always what they seem. You have to pay heavily to get high up on search engine lists and pay even more to stay there. That can cost so much that you won’t make a penny from your sales.”



Jeffery West co-founder Guy West says that having control over production and a smaller range of footwear are advantages in today's market. CREDIT: THE WORSHIPFUL COMPANY OF CORDWAINERS

Mr West points out that every business will have its "critical mass", a number of pairs of shoes it can make and a number that it can sell. It's important for companies to have ambition and a desire to grow, but it's also important for them to be able to live within their means and pay their bills while they are on the way up. He still likes shops. "A shop can do more than just sell shoes," he insists. "They can get your name known." That said, he concedes that rents for good retail spaces are going up, as are all costs, while sales are difficult and the market "very competitive".

Word of mouth

He explains that this is more or less what happened when he and Mark Jeffery launched their brand in Northampton in the 1980s. They did not have their own factory, but Guy West insists they were still able to keep control of production because Northampton at that time still had, as Arredo does, materials and component suppliers and manufacturers for each stage of the shoemaking process all within a small radius. "We did the design and relied on outside support for production," he explains, "but it was all on hand and we controlled it all. To have control over production is good, to have a limited range of shoes is also good because it's easier to control. And to sell online can be good provided you can fulfil demand; there's no point trying to sell shoes online unless you have them ready."

Word of mouth is what helped Jeffery West become what he calls "an established business" and he says he still thinks this is the best way, even though it takes time. "It's hard to know what the future will hold; we all have to find a way to stand out."

Lean versus agile

The impression of Professor Alan Waller, vice-president for supply chain innovation at international consultancy EFESO Consulting and a visiting professor in international supply chain



Professor Alan Waller recommends trying to find a happy balance between retailing and e-tailing.

CREDIT: VERENIGING VOOR INKOOP EN LOGISTIEK

management at the UK's Cranfield University, is that this is a debate about lean supply chains versus agile supply chains and it has been raging for at least 20 years now. Whether it would work in footwear or not remains to be seen, but he says that the model that has been successful in automotive supply chains is to try to have the best of both.

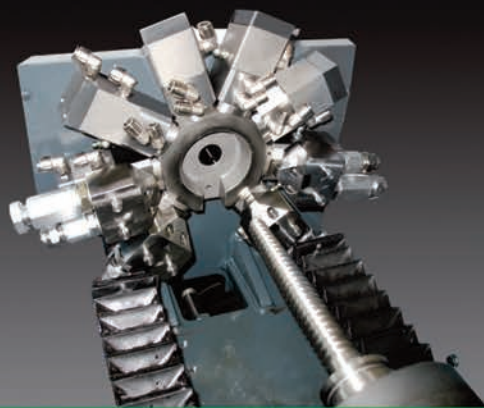
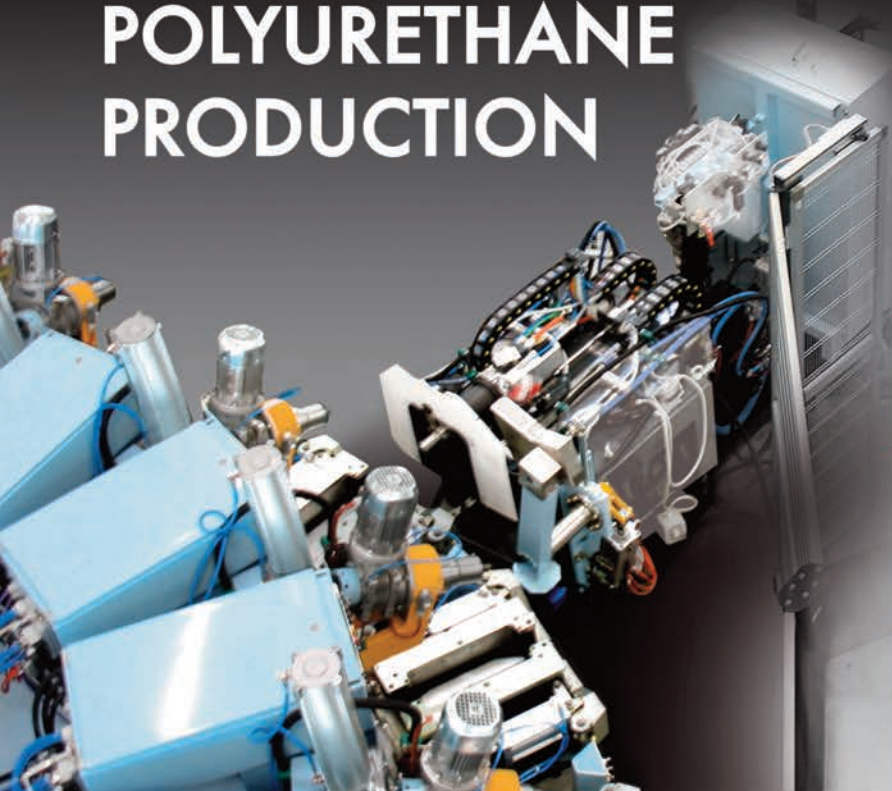
"In most industries, we went from having inefficient production to having mass production, with a smaller number of large facilities, leading to a lot of commonality among brands," he explains. "More recently there has been a move to a more flexible manufacturing model and greater responsiveness. You have volume economics at one end of the spectrum and a huge amount of choice at the other. With the best of both worlds, you can have some of the volume economics and still keep some of the choice. The combination exists."

Concept of postponement

How this works in other sectors is for companies to use lean production to make in advance and as cheaply as possible (or have made for them) as many components as they can. The key is then to assemble the finished product, responding as exactly as they are able to customer requirements, in a location closer to the target market. This uses what the professor calls "the concept of postponement", making components *en masse* for later use. He agrees that "the balance of power" in the supply chain is changing because of the amount of choice consumers have now: if a shopper cannot find what she wants in Berlin, she can go online and buy it from Buenos Aires (or vice-versa). Making it work requires a supply chain that is leaner upstream and more agile downstream, plus finding what he calls "the magic combination of e-tailing and retailing". Some fast moving consumer goods companies have become good at it. Professor Waller wonders if it can work in the footwear supply chain too. ☺

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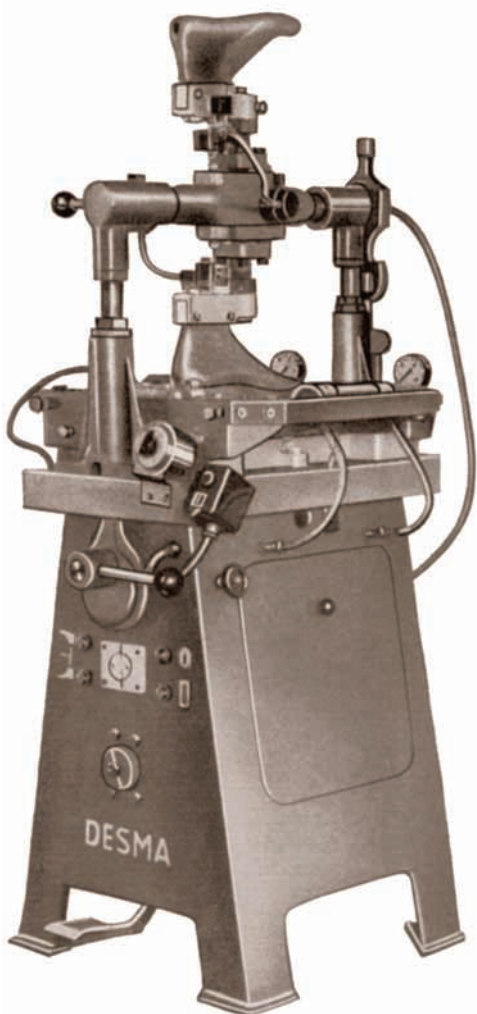
ALL CREDITS: DESMA

70 years of innovation

Desma is one of the best known machinery names in the footwear industry. From humble beginnings in the aftermath of World War II, it has become a major supplier of sophisticated moulding machines and automated systems worldwide. Founded by Herbert Ludwig as Deutsche Spezialmaschinen Co. U.E. in 1946, it initially produced a variety of products among which were simple sole presses and roughing machines for the footwear industry. In the 70 years since, it has introduced some machines and systems that have had a significant influence on footwear manufacture.

VULCANISING

The first appeared in 1955 in the form of a simple vulcanising press for direct moulded slippers, the Desma 100 (the company had been renamed by them). It was a single station machine, electrically heated to give a ten minute operating cycle. It saved a large number of separate operations and, although crude by today's standards, had a real impact on the German footwear industry. The 200, 201 and 202 machines that followed were able to produce other types of footwear including sneakers and basketball boots. Desma machines have been used by many manufacturers of sports footwear ever since.

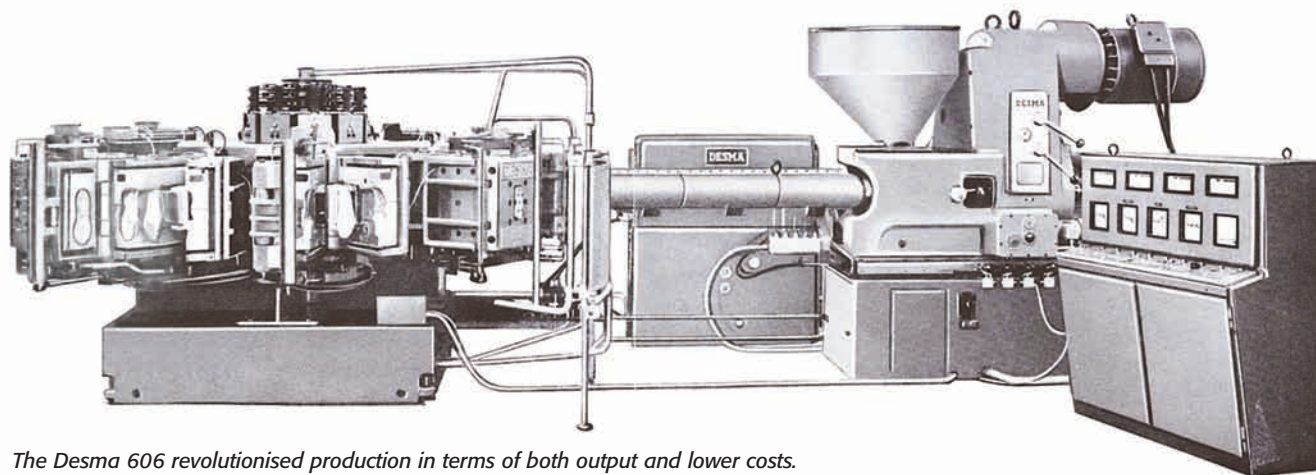
*The Desma 100 set the company on its path of innovation and development.*

PVC MOULDING

The next major step involved experiments with PVC paste (the forerunner of granules) in the vulcanising machines and again using electrical heating to cure the material. By 1961, PVC granules for footwear soling had become readily available and, that year, Desma introduced the massive 15-tonne 606 machine. It caused a sensation as only two operators could produce 1,000 pairs of boots per day compared to 25 for 700 pairs using existing methods. It was followed by a succession of PVC injection machines including the 701, with the first one delivered to adidas. It proved to be a winner and no less than 1,500 were sold. Success by German sportsmen and athletes wearing footwear produced on this machine gave Desma's technology a tremendous boost in global markets.

ROTARY TABLES

For some time, Desma had been cooperating with the Foster-Yates company in the UK. It produced rotary tables for the production of plastic sandals, using PVC granules and extruder technology. Desma became its agent and, in time, developed its own version which featured the Maltese cross system (a gear mechanism that translates continuous rotary motion into an intermittent one)



The Desma 606 revolutionised production in terms of both output and lower costs.

as used in the earlier bonding presses. The concept was originally developed by Swiss watchmakers and therefore extremely accurate. This meant that on a rotary injection moulder, the mould injection point was always precisely in line with the injection valve each time the table stopped.

There are two main types of rotary table, those for poured products and those for injected ones. In the former, pouring units—either manually or robot controlled—pass over the open mould and pour in the correct amount of material. The mould is closed and locked, and the material (usually foamed polyurethane) expands inside it until final hardness is reached. Those for use with injection moulding are characterised by the injecting of material into a closed mould, using low pressure units in front of the rotary table. Moulds on these tables, which may have 12, 18, 24 or 30 stations,

open horizontally.

The rotary table was perhaps one of the most significant developments the company ever made, and has become the central feature of the majority of Desma machines produced ever since. The varying number of stations catered for all sizes of factory output and the speed of operation resulted in greater efficiency and cost savings. It also made it possible to introduce increasing degrees of automation which, in turn, have led to the sophisticated manufacturing systems the company produces today.

POLYURETHANE

Desma's most defining decision, however, was to concentrate primarily on machines for moulding PU, a remarkable material that was totally unlike any other used for footwear soling. It offered the elasticity of conventional rubber with a higher load-

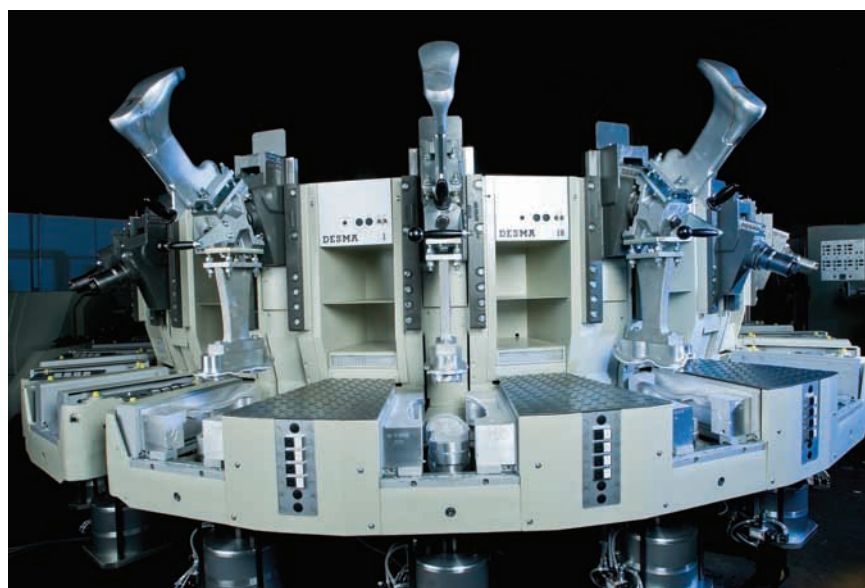
bearing capacity, was abrasion resistant and had an extremely long life. It also showed excellent insulating properties and was both heat and cold resistant.

PU is an organic polymer, either polyester or polyether. Both are two component systems consisting of a prepolymer and a polyol blend. The two components are pumped, metered and mixed, then immediately poured or injected into a mould which acts as a reaction chamber where the final thermoset polyurethane structure is formed. This is totally unlike all other soling compounds, so specialised machines are required to process it.

Desma was convinced that PU was the material of the future and, once again, its remarkable capacity for innovation came into play. The key to success with PU moulding was the accurate mixing of the liquid components and precise measuring of the mixed material into the mould cavity. Desma's answer was its 'low pressure' mixing system. This consisted of a conically shaped, high speed screw fitted to a mixing chamber with a tolerance of only 0.5mm. This provided high performance, excellent quality and was, at the same time, self-cleaning. This important development made Desma the world leader in PU moulding technology.

AUTOMATION

The company produced increasing numbers of machines for processing PU based on its mixing head and rotary head technologies. At the same time, it began to look at what else it could offer footwear manufacturers to increase output, quality and efficiency while, at the same time, providing further opportunities for itself. It realised early



The rotary table concept marked a significant milestone for both Desma and the footwear industry in general.



Sole extraction robot.

on that robots and automation could play a vital part in cost-effective production of high quality footwear. Their great advantage was that they could be programmed to perform a given task with absolute precision and at a consistent rate of output, time after time.

However, they also required serious investment in development time to enable them to do so. Rather than undertake such a complex task from scratch, Desma began to cooperate with ABB in Sweden in the early 1980s, when ABB lent it a robot for trials. This was adapted to the special needs of the footwear industry and the first production IRB 1000 robot was supplied to adidas in early 1987. It was an immediate success and other customers

soon followed. Constant improvements and updates enabled them to be used in an increasing number of footwear specific applications.

At the same time, Desma was also working on an automated work flow system that would allow robots to be integrated into a total manufacturing entity. This was AMIR, (automated machinery and material flow technology with integrated robots). The system contained an amalgamation of all known conveyor technology for bringing goods to and from all the machines and work centres on a production line using data technology and with links to production planning, operational data capture and processing. AMIR rationalised and streamlined production,

reduced variables and, once again, provided Desma with another footwear industry first.

Over time and working closely with its customers, Desma developed robotic solutions for a wide range of key shoemaking operations that included roughing, cementing, spraying mould release agents, flash trimming, last slipping and many others besides. Any or all of these could be incorporated in an AMIR system to provide fully automated production from lasted upper to finished shoe.

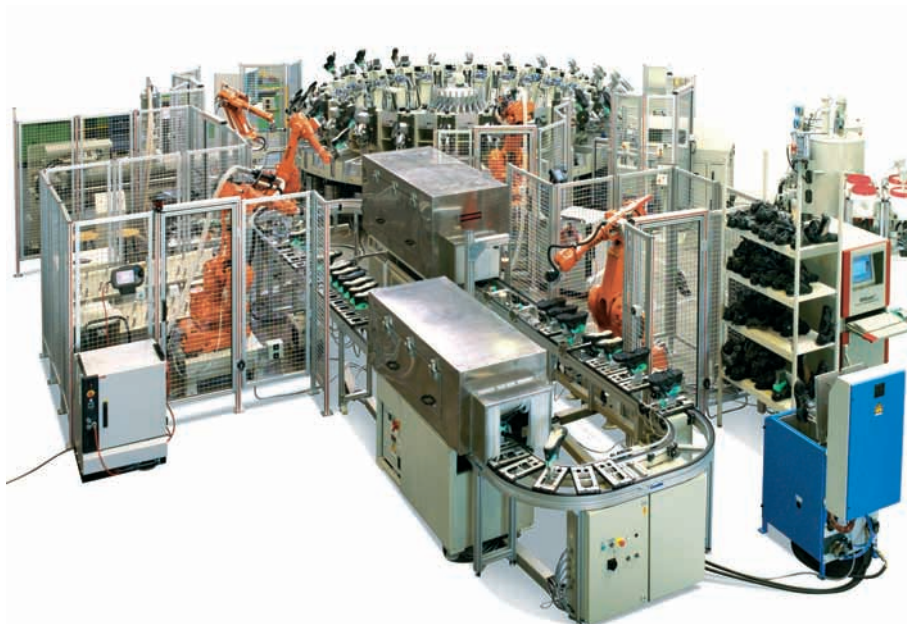
DESflow

Thermoplastic polyurethane (TPU) is created by a reaction between a diisocyanate and one or more diols. Denser and harder than PU, it has high elongation and tensile strength properties. It proved to be superior to PVC for many applications, ranging from dress shoe to studded sports shoe soles, where the actual sole was comparatively thin. However, producing small batches of TPU soles proved expensive due to the time needed to effect changes in the material itself, whether in terms of colour or some other property, between each batch. Desma's DESflow system, introduced in 2000, solved this problem and made TPU an increasingly attractive soling material.

The process was basically simple in that it involved pouring a hot liquid thermoplast on to the bottom plate and then pressing it into the mould. As the TPU was not injected through any runner channels, there was no friction to impart stresses to the material itself, so the finished sole had better properties than one produced by injection technology, with fewer flow marks and less waste. As the material was well distributed throughout the mould cavity, it did not have to be forced to flow over the total cavity in order to fill it. This offered cost savings in terms of both machine and moulds, as the latter could be aluminium rather than steel.

PROCESSING CELLS

As remarked earlier, automation had been shown to produce consistent high quality at a lower unit cost. Achieving the best possible soling bond on cemented footwear had long been a problem due to the number of variables involved. In the early 2000s, Desma developed automated solutions for



Amir automated production system.

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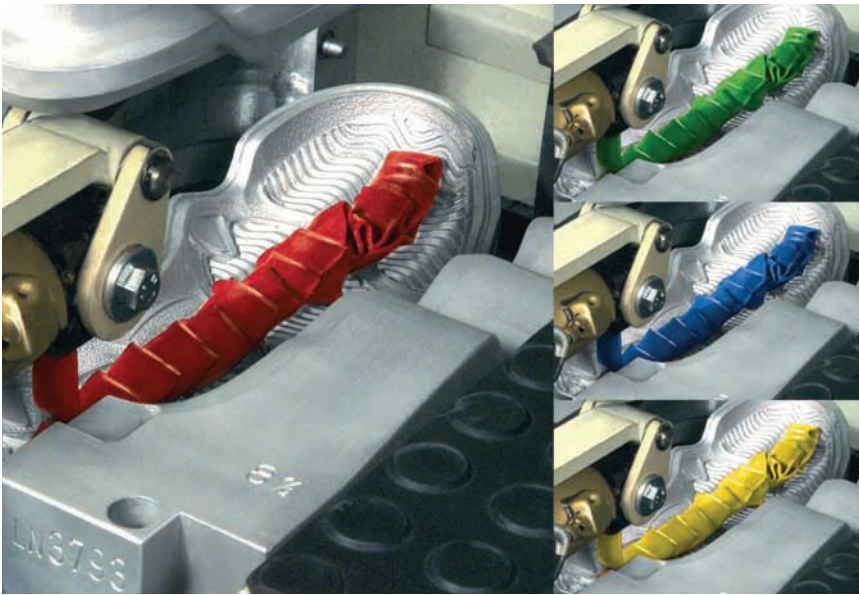
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Casting by the DESflow process.

applying sole attaching adhesives to both sole units and lasted uppers under the brand name amir C. The key elements involved were the Sole Processing Cell, Upper Processing Cell and Upper Processing Line.

Perfect sole adhesion in the stuck-on process depended on how well the upper and sole were prepared before the adhesive was applied, something that had always been difficult to achieve consistently even with automatic roughing machines. The idea of replacing the brush with a laser was tried and seemed to work well. It was fast, could rough only where wanted, cope with multiple materials in the same upper and all with no residual dust. As no pressure was put on the

upper material or seams, changes in material had no effect on the roughing action and, in addition, any contour could be followed. However, the shoe was still fixed while the laser moved and this limited its potential. Desma reversed this approach and in 2008 demonstrated a laser cell where the laser remained fixed while the shoe moved through all dimensions so that any part of the upper could be reached. This gave total flexibility and proved a great success.

Desma's Sole Processing Cell appeared two years later. A sole was fed in at one end and emerged at the other fully treated and ready for attaching. It was fast and applied only the exact amount of adhesive required, so

significant cost savings could be made. The subsequent upper processing cell operated in a similar manner whereby the operator only had to deliver the lasted upper to the cell via a delivery station. All necessary manufacturing steps were then performed by a robot operating within the cell. Most sole units have a slight side wall so that they are bonded to the upper two dimensionally for greater strength. The laser robot could be programmed to rough the lasted upper with total accuracy to any contour to match the sole, something that was extremely difficult to do by any other means.

LOW PRESSURE MIXING

One of the most important factors in the production of PU soling is the stability of the processing conditions and, also in 2010, Desma announced its RGE 4011 mixing and injection unit. This used a combination of highly accurate gear pumps, a newly structured automatic screw changer, a sophisticated cleaning device and a brand new graphic user interface to enable manufacturers to achieve even greater product accuracy and consistency than ever before.

The unit employed low pressure mixing technology, where an auger was used to mix the polyol and isocyanate. As a result, all varieties of material could be processed, whether ether- or ester-based, as well as additional solid fillers even when they comprised a large proportion of the formula. The technology was able to handle such a huge variety of different polyurethane components that it set a new standard for efficiency and versatility.

A major advantage was consistency, as its digitally controlled component valves opened simultaneously and so guaranteed exactly the same mixing ratio all the time. This enabled a footwear manufacturer to deliver products of a continuous and totally consistent quality. The technology also had the ability to change the complete mixing ratio as well as moulding parameters, such as throughput and component combinations from shot to shot, without interrupting the production cycle. The shot weight remained exactly the same due to the use of precision gear pumps regulated by a control database where data on every moulding was stored.



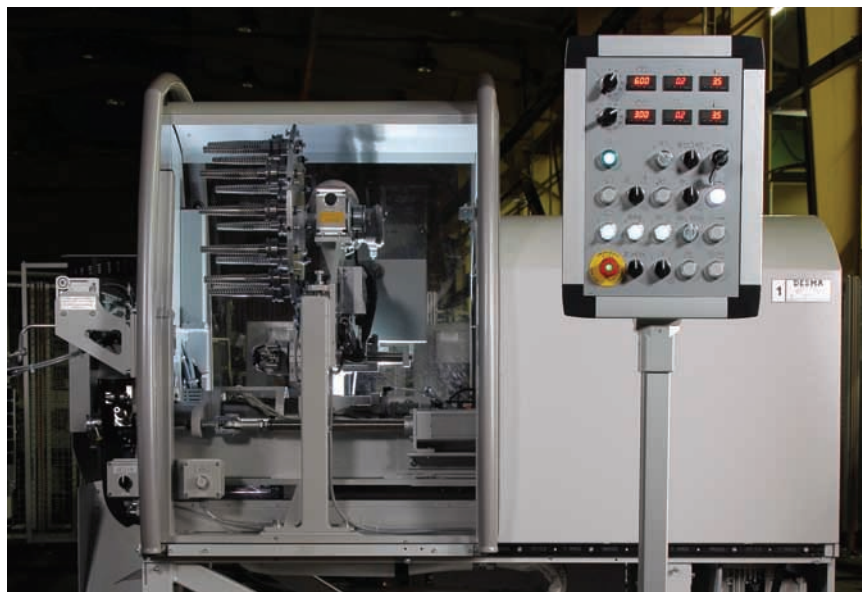
Desma sole processing cell.

QUADWRAP

Despite technical advances made since the 1990s, footwear manufacture was still a complex process in terms of both the machines needed and the number of people to operate them. Desma thought that integrated design using PU could be an answer. Analysis of existing casual footwear suggested that the required visual and technical functions could all be achieved using just four layers of different density PU. The result was Quadwrap launched in 2014, where the shoe was broken down into four parts: a load bearing inner frame to stabilise the shoe and carry the lacing, a flexible upper to provide the desired visual aspects, a lightweight midsole to provide cushioning at low weight and a slip and abrasion resistant outsole.

All it needed was one Desma D522 low pressure rotary injection machine and two mould sets per size for left and right feet. The inner frame was directly moulded onto a carrier fabric pulled over a last (*Figure 1 left*). At the same time, the outsole (or wear pads) was produced in the second mould (*Figure 1 right*) and then the mid-sole injected directly onto it in the same mould (*Figure 2 left*). The last with inner frame on its carrier fabric was then transferred into this second mould (soles remained in mould two). The upper layer was finally injected into the cavity between frame, carrier fabric and sole (*Figure 2 right*), joining all four layers together without cementing. The process was completed by de-moulding, flash trimming, inserting an insole and threading the laces.

The table could have 24 or 36 mould stations, so with two moulds per shoe and four stations per pair and size, six or nine pairs at a time could be produced on one machine. The four PU layers were produced using two low pressure injectors and one micro casting head mounted to a six-axis robot. Another one sprayed release agent into the open moulds while a third moved lasts between moulds one and two plus the manually operated lasting and last slipping station. The machine could be operated by a single employee who force lasted the carrier fabric and slipped the moulded shoe. Although it took two turns of the table to produce a shoe, parallel processing in both moulds enabled cycle times of well



Desma RGE 4011 mixing and injection unit.

Figure 1 – Inner frame on textile fabric in mould 1 (left) and out-sole pads in mould 2 (right).

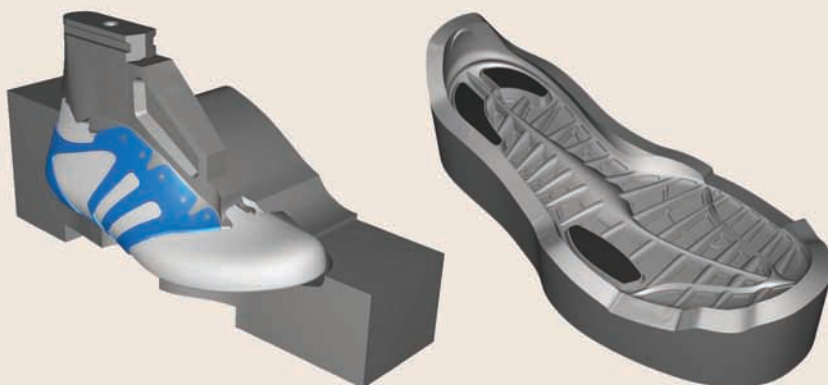
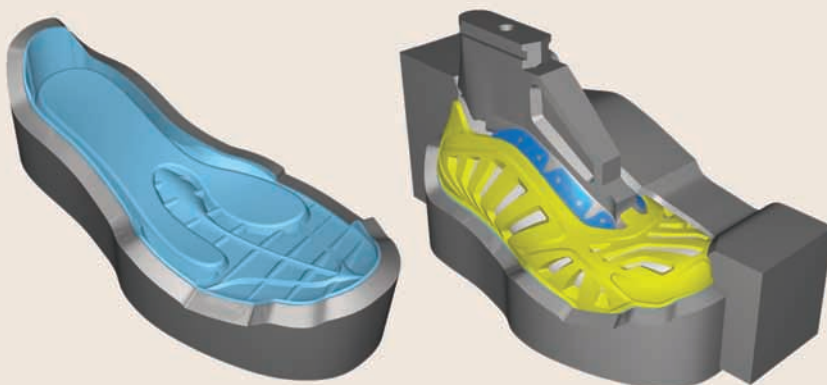


Figure 2 – Mid-sole (left) and complete shoe with upper in mould 2 (right).



** An example of a finished shoe is shown in the title image at the beginning of this article.*

below 20 seconds to be achieved.

70 years of developments in machinery and processes, many of them industry firsts and trend setters, is something the company can justly be proud of. But what about the future? Desma's young engineers think it lies in the Internet of things, Industry 4.0, smart factories and 3D printed shoes.

Clearly, the industry faces changes as profound as in the last 70 years with many exciting ones just around the corner. As we have seen, Desma has a tradition of pushing technology just that little bit further, so we can expect them to continue at the forefront of technical innovation whatever happens. 🔥



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End of the road for EVA?

EVA (ethylene-vinyl acetate) has been the material of choice for sports shoe midsoles for more than 30 years. Over the same period, sports shoe brands have constantly sought to find ways to differentiate their products in terms of performance from their competitors in a cut-throat global market. These have included metallic springs, sealed or pumped air systems and even jel bags, all of which were claimed to improve the shock resistance and 'bounce' of the sole.

As marketing ploys they worked on the basis of "look at me, I've got the latest performance technology in my shoes", until the next new gimmick appeared when the one-upmanship started all over again. Whether any of them entirely met the performance claims made is open to debate. Furthermore, the majority of shoes in what was a huge market by volume, were middle and low grade products where simple EVA remained the main source of comfort and bounce.

EVA was a known quantity; it performed adequately for the vast majority, it was lightweight, easy to process and bond, reliable and competitively priced. As a consequence, many manufacturers and brands continued to use it and in most cases still do. This is not to say that leading brands abandoned the search for better alternatives. Nor, indeed, did the chemical companies and it is from this source that two possibilities have appeared, one of which in particular could provide a real challenge.

POLYOLEFIN

Polyolefins are produced by the conversion of ethylene into polyethylene using catalyst systems based on what are called metallocenes which, in turn, are based on transitional metals such as zirconium that have several ligands (neutral molecules that

bond to a central atom), usually cyclopentadienyl compounds, attached to the metal. They have been developed and increasingly refined over the past 20 years by companies such as Dow and ExxonMobil to become practical soling materials for footwear and sports shoes in particular.

They have a natural low density, can be made in a wide range of hardness and blown to very low density without rapid loss of properties. They also blend easily with EVA, are soft and comfortable and, increasingly important, are easy to recycle. Despite all these positive features, they have not been widely taken up by the industry for several possible reasons.

One is that they are still regarded as being very novel materials and, as such, have found it hard to compete against traditional materials such as EVA. Finally, there is the question of price.

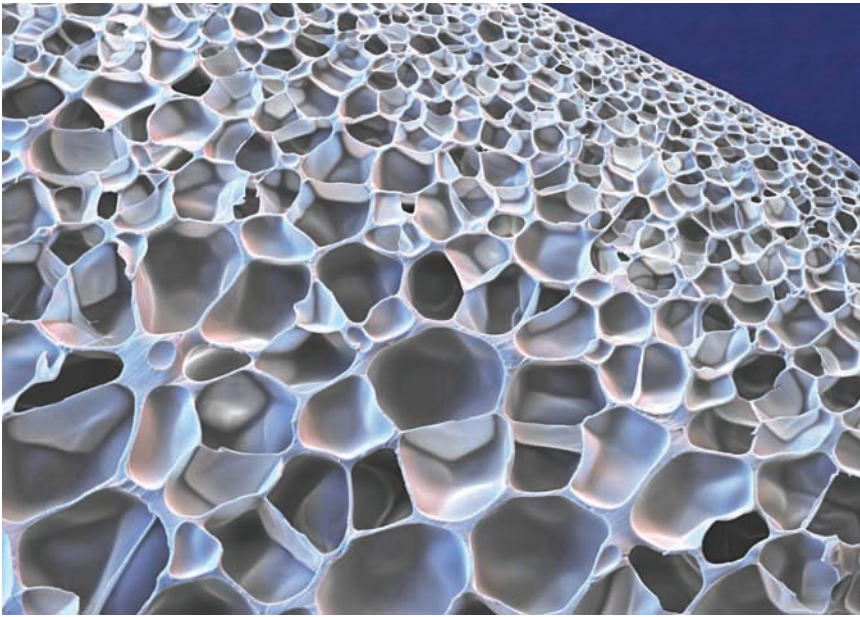
Polyolefins are considerably more expensive than EVA which, while clearly not as good in terms of performance, is, as stated, well established, reliable and, in terms of performance, still considered satisfactory by a majority of sports shoe producers.

ETPU

The second and probably most promising alternative to EVA is eTPU (expanded TPU). TPU is formed by the reaction of diisocyanates with short-chain diols (so-called chain extenders) and diisocyanates with long-chain diols. Varying the structure and/or molecular weight of these three compounds allows the reaction to be fine tuned to produce a wide variety of final properties. eTPU has been developed by BASF and is produced by foaming granules of TPU. Pressure and heat causes them to inflate rather like popcorn, increasing their



CREDIT: ADIDAS



Foam beads with closed gas bubbles give eTPU its ability to bounce back.

CREDIT: BASF SE

volume tenfold and creating foam beads that have small, closed gas bubbles inside. It is these sealed air cells that give eTPU its elastic properties and the more air they contain, the more bounce they have, making the material ideal for midsoles.

The company says the material, which it markets under the name Infinergy, has superior energy cushioning and, due to its closed-cell structure, springs back into shape immediately after impact with the ground. This cushioning triggers an energy-return every time downward force is applied, increasing efficiency and allowing the wearer to expend less energy while running. Resilience tests have shown it to have a rebound height of 55% compared to EVA at 35%.

BASF in fact describes eTPU as 'the most elastic particle foam currently available on the market'. Soles made from it are also said to be more durable as the material is able to maintain its compression set for far longer than EVA. High-frequency fatigue testing supports this having shown it continues to be resilient under continuous load and loses less than 10% of thickness, suggesting it returns nearly all of the energy exerted on it.

AHEAD OF EVA

Gerd Manz, senior innovation director for global brands at adidas, which has worked closely with BASF on the material and uses it in its Boost range of shoes, says that "during testing

the material was compressed 10,000 times to evaluate its resistance. Although the foam is softer than previous materials, the cell structure remained intact for much longer and the shoe retained its properties for hundreds of kilometres".

It also performs well across a range of temperatures. It was tested from -20°C to 40°C and the results showed that the sole underwent less hardening in cold temperatures and less softening when exposed to warmer conditions. This temperature resistance makes it ideal for an all-purpose running shoe. It also absorbs less water, allowing it to function effectively in extreme weather conditions. Over a 24-hour test period, only 2% of water by volume was absorbed, which compares favourably to the recorded performance of EVA.

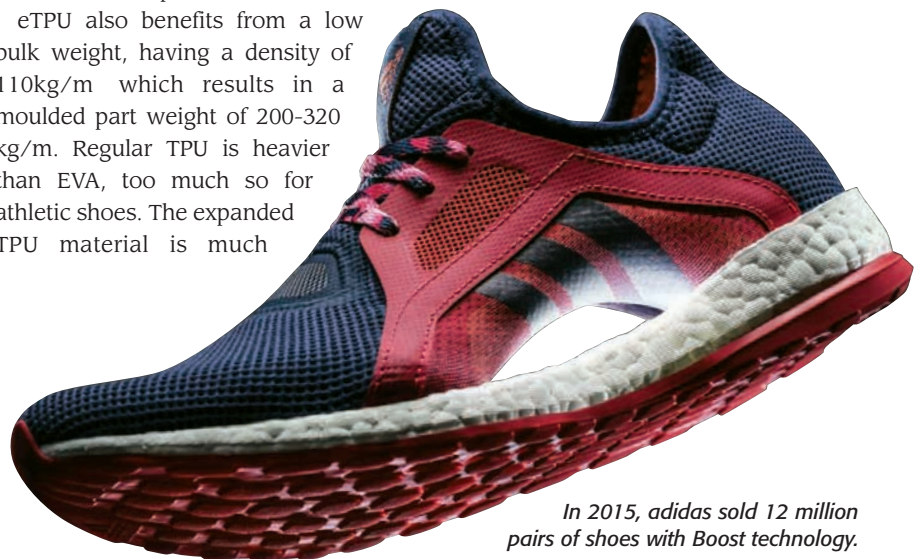
eTPU also benefits from a low bulk weight, having a density of 110kg/m³ which results in a moulded part weight of 200-320 kg/m. Regular TPU is heavier than EVA, too much so for athletic shoes. The expanded TPU material is much

lighter in weight which, when combined with its good flexibility, makes it suitable for use in all kinds of sports shoes. Important characteristics of TPU are nevertheless retained, including high breaking elongation (100%-150% depending on density), high tensile strength (approximately 600 kilopascals) and good abrasion and chemical resistance.

A REPLACEMENT FOR EVA?

We have looked at polyolefins and have seen that while they have pluses compared to EVA, they also have minuses in terms of both processing and cost. eTPU on the other hand scores considerable pluses in regard to both performance and processing. TPU in general is widely acknowledged to be a superb soling form material and in this expanded form it would appear to have great potential.

Adidas clearly considers that eTPU could be the way to go as far as midsoles are concerned as witnessed by its use in the company's Boost range. Indeed, chief executive Herbert Hainer has suggested that it can "replace EVA completely". Adidas is however a producer of sports shoes aimed at the top end of the market in terms of performance and as such can afford to be more concerned about performance than pure cost. The vast majority of sports shoe producers, on the other hand, remain price driven, so although eTPU will certainly find a market where performance is the selling point, replacing EVA completely may take a little more time. 📌



In 2015, adidas sold 12 million pairs of shoes with Boost technology.

CREDIT: ADIDAS

Measuring hardness

MIKE GEORGE, SATRA

Hardness is one of the simplest and most descriptive of polymer properties. The number of measurement scales available can however cause confusion. The hardness of a material is essentially its resistance to indentation. Most instruments designed to measure hardness do so on the basis of the depth of indentation produced by a given force on a standardised indenter, with the reading displayed either digitally or on a dial.

A high reading usually corresponds to a high hardness (small indentation) and a low reading corresponds to a low hardness (large indentation). A material of low hardness is termed a 'soft' material. It is also found that hardness relates to flexibility with soft materials being more easily flexed and to cushioning where soft materials compress substantially to act as shock absorbers. These relationships make hardness a doubly useful measurement for shoe soles.

An important point is that a hardness reading is time-dependent, tending to reduce the longer the indenter is held pressed into the surface due to visco-elastic creep effects. A choice of reading times is therefore available which needs to be agreed between supplier and customer, and be stated alongside any test result or specification.

The amount of indentation and hence the reading, is significantly influenced by the shape of the indenter and the force applied to it. A range of different instruments is available, each designed to operate over a particular scale. Hard materials require fairly sharp indentors and a high force, with soft materials requiring blunter indentors and lower forces.

Use of the wrong instrument will give readings bunched together very close to one end of the scale, with no sensible discrimination between them. We will now examine the instruments and scales in common use and identify their distinguishing features, so that users will be able to recognise the most appropriate type to employ.

SHORE HARDNESS

Shore hardness meters or 'durometers' such as SATRA's STD 226 and 227, are both easy and convenient to operate and have proved very popular across the polymer and shoe industries. They are described in a number of indentation hardness methods, including ASTM D2240, ISO 868 and SATRA TM205. They rely on spring-loaded indentors which project 2.5mm out through a hole in the flat foot of the instrument. At full projection against zero resistance, the instrument reads zero. At maximum resistance, when the indenter is pushed back the full 2.5mm to be flush with the foot resting squarely on the specimen surface, the reading is 100. In between, the reading is linearly dependent on the penetration depth. It is vital that the instrument foot seats correctly on the surface of the test specimen, which itself must be flat and smooth. Any gap will result in falsely low readings – every 0.025mm is worth one point off the hardness reading.

While shore instruments can be used in a hand-held mode, considerable expertise is needed to avoid inaccurate readings, so it is better to use instruments mounted on stands. These offer a controlled application of the instrument to the specimen. However, they do require perfect specimens with a uniform thickness of at least 6mm, having parallel, flat and smooth top and bottom surfaces. Otherwise, gaps will form between the specimen surface and the instrument foot, thus leading to measurement error. The most difficult part of the hardness test is usually that of producing a satisfactory test specimen from complex moulded shapes. This is nevertheless essential if reliable readings are to be obtained.



ALL CREDITS: SATRA



Figure 1 – Shore A indenter.

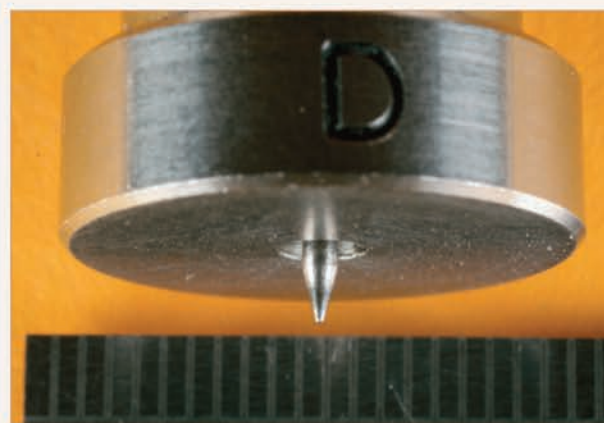


Figure 2 – Shore D indenter.

In footwear applications, the main Shore scale is 'Shore A', suited to flexible, compact polymers, including the majority of soling compounds. The Shore A instrument has a truncated conical indenter. The indenter diameter is approximately 1.3mm, which tapers down to a 0.8mm diameter flat tip with a 35° cone angle (Figure 1). The indenter spring exerts 8.05N at a reading of 100.

The 'Shore D' instrument is more suited to hard plastics such as those used in football soles and women's heel top-pieces (top lifts). The indenter diameter is also around 1.3mm, but this time there is a 30° cone running to a pointed tip with a 0.1mm tip radius (Figure 2). The spring behind this indenter exerts 44.45N (10lbf) at a reading of 100, sufficient to indent

hard plastics and impossible to overcome with a bare finger.

Shore B and C scales are also available, but neither are considered useful in footwear testing (Shore B uses the 'D' indenter with the 'A' spring, while Shore C uses the 'A' indenter with the 'D' spring). Sometimes Shore C is misquoted by customers who really mean 'Asker C', which is an entirely different scale (see below). Consideration of indenter shapes and spring forces should make it clear which instrument is, in fact, being used.

Soft foams can resist only blunt indentors with low spring forces and 'Shore OO' (Figure 3) has been found useful in many cases. This employs a hemispherically-ended 2.4mm diameter indenter and a mere 1.111N spring force at reading

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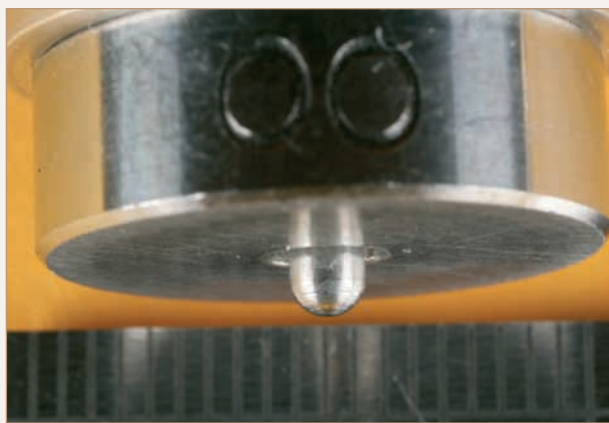


Figure 3 – Shore 00 indenter.

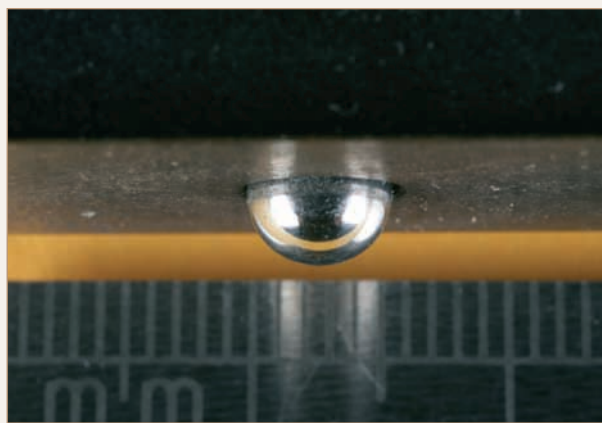


Figure 4 – Asker C and Shore E indenter.

100. An alternative, and increasingly popular scale for soft materials such as EVA midsoles, is the so-called 'Asker C', as mentioned. This is almost identical to 'Shore E', which has appeared in recent updates of ASTM D2240. Asker C and Shore E use a 5mm diameter ball on the end of a 4.5mm diameter rod (Figure 4). The Shore E spring force at reading 100 is 8.05N, which is the same as for Shore A. The Asker C spring force is 4 per cent lower, apparently the only difference from Shore E.

INTERNATIONAL RUBBER HARDNESS DEGREES

The international rubber hardness degrees system (IRHD), referred to in methods ISO 48, SATRA TM206 and ASTM

D1415, is still preferred in many types of work. It is even recognised in some Shore method documents as best suited for use in cases of arbitration or dispute. The IRHD instrument is more complicated than Shore durometers, but still gives readings on a scale up to 100 and will often give a close numerical similarity to Shore A readings (Table 1). The advantage of IRHD meters is that they effectively enable the meter to be 'zeroed' (in fact, set to 100).

This is done to reduce errors due to minor imperfections in specimen surfaces, under a very small load of only 0.3N. The hardness reading is taken after applying a further 5.4N loading. The normal IRHD instrument has a 2.5mm diameter ball indenter (Figure 5) and is distinguishable from Shore-type

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Table 1: Example comparisons between IRHD and Shore A scales		
Material	Hardness IRHD 30 seconds	Hardness Shore A 3 seconds
PVC	74	73
TR	71	64
Resin rubber	93	94
Vulcanised rubber	74	69
PU	50	56
EVA	48	52

Table 1 – Example comparisons between IRHD and Shore A scales.

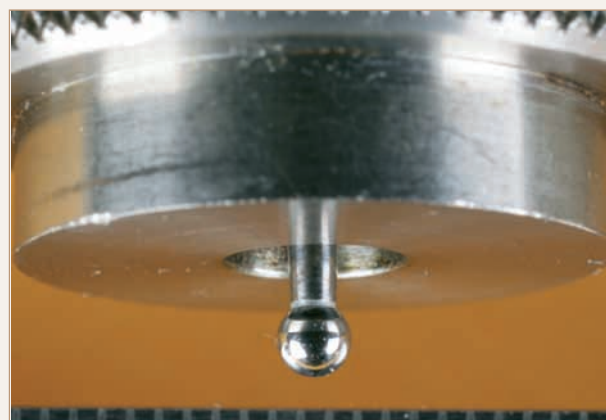


Figure 5 – IRHD normal indenter.



Figure 6 – IRHD low indenter

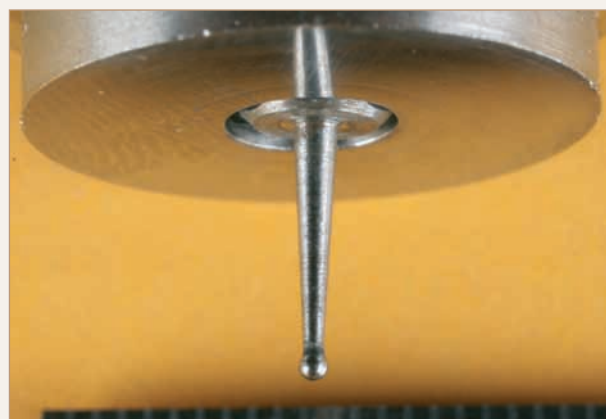


Figure 7 – IRHD high indenter.

indentors because it is retracted inside the instrument foot until the test is operated, although it can be inspected by pushing the foot upwards to expose it. A low hardness version of this test is available with a ball indenter of 5mm (Figure 6) and a high hardness test with a ball indenter of 1mm (Figure 7). These may be used at hardnesses below 35 IRHD and above 85 IRHD respectively.

INDENTATION TIMES

As well as specifying the scale used, it is crucial to record the indentation time in seconds at which the reading was

taken, as this significantly influences the result. Similarly, specifications must also give a time so that the tester knows what to do. Figure 8 shows the hardness-time relationship for an example material. Common standard times used with the Shore durometer scales include one second, three seconds and 15 seconds. The exception to this rule is the IRHD system, which always employs a 30-second indentation time (after setting the scale to zero within five seconds) and, therefore, this need not be stated. Figure 9 summarises the applicability of the different hardness scales for soft and hard materials. 🌀

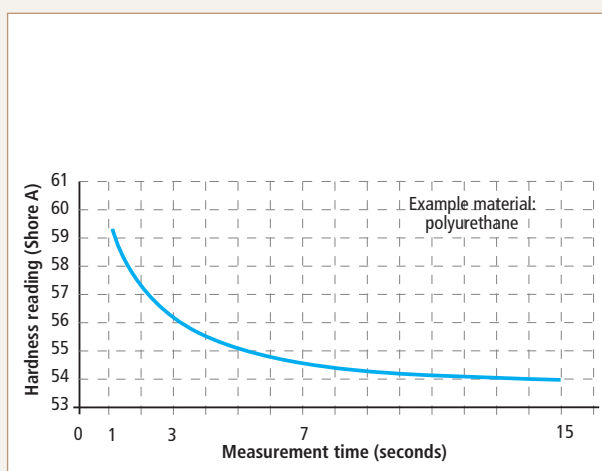


Figure 8 – Hardness reading versus measurement time.

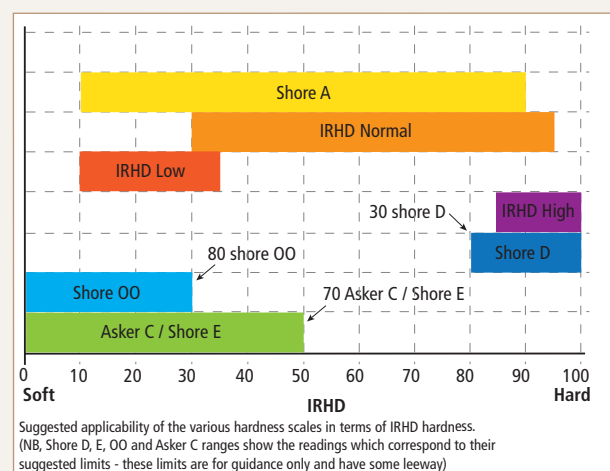


Figure 9 – Suitability of hardness scales.



A problem for leather

The internet and social media have between them revolutionised the way that most of us live or are forced to live. We are caught up in a whirlwind of change that to the younger generation is exciting and invigorating. To the older one it can be confusing and, to a certain extent, frightening as it appears to turn so many accepted norms on their heads. One of these is the constant pressure to do everything online with no actual contact with people or products.

A prime example of this is the rapidly changing face of retail and, in the case of the footwear industry, the paradigm shift in how footwear is being sold. The high streets and shopping malls, with their multiple shoe retailers, are fast giving way to internet search engines and online businesses willing to provide a broad range of products delivered to the customer's door in 24 hours or even less. The result is a generation of consumers who increasingly no longer connect with the sensory aspects of leather and what it has to offer.

Instead, they prefer to select a style based on impulse and perception. The construction or material used to produce it is secondary when considering the overall look and ability to obtain it 'just in time' for their use, without even leaving their home. This concept of purchasing is broad based and is being used by a growing number of consumers to the point that there are predictions that online retailing will soon overtake that of conventional physical shopping. Ordering shoes via an android, galaxy or iPhone is becoming second nature to a whole generation of consumers.

This is clearly not good news for leather as it is very difficult to transmit sensory perceptions in a virtual world and, more to the point, do internet retailers really care as long as they shift stock? Put simply, shoe brands have taken complete control of the materials used in producing their footwear based solely on marketing and image or, dare we suggest, profit margin. The online image and

marketing of a shoe removes the need for the consumer to touch and feel the product and so the human connection that is essential in making the case for leather uppers is by-passed. By losing the sensory aspect, it has become easier to replace leather in footwear.

In their defence, the large brands can legitimately claim that faced with rapidly increasing leather prices from 2012 through 2014, it was entirely logical to switch their leather uppers over to alternative materials. Demand for cotton, canvas and non-wovens is scalable depending on finished product sales, unlike leather which is only a by-product of the meat industry. The record-setting hide prices of 2014 have caused leather to lose a meaningful segment of the shoe industry and it is becoming increasingly doubtful that this situation is likely to change in the near future as sales of leather to the automotive industry continue to grow, effectively replacing those lost to footwear and so supporting the hide market for some time to come. 🍷

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36 station Pragma rotary machine.

ALL IMAGES CREDIT: MAIN GROUP



Proportional injection

Main Group from Italy is well known for its wide range of injection moulding machines that, between them, are able to process rubber, EVA, PU and the entire range of thermoplastics as well as combinations of different materials. The spread of technology needed to do this has been made possible by many years of experience and innovation. A good example is its Pragma rotary machine which has been around for a number of years now with either 18, 24 or 30 stations and has proved both flexible and efficient in operation. It has now become available in an extra large 36 station high output version.

All Pragma machines have been designed to process two part sole units in either single density PU, dual density PU and PU or TPU and PU at a high rate of productivity, with faster colour changing plus the ability to add inserts if

required. They can work with any type of polyurethane-based polymer and are also extremely flexible in that they can inject soles directly onto the lasted upper in one, two or even three colours if inserts are again used. They have always had excellent electronic hardware and software systems, and it is here that the latest development has taken place with the introduction of what the company calls 'proportional injection'.

One of the problems with injecting PU soles has often been surface definition which depends on the precise measuring and even distribution of the mixed components within the mould cavity. Various systems have been tried, with some more successful than others and often involving a completely new machine. Main Group claims to have found an easier solution by making major changes to the software and injection control rather than any mechanical

alterations to the actual machine itself. The company says the results are extremely positive in terms of overall visual appearance and general quality. Laboratory tests are cited that have shown polymer distribution within the mould is indeed very good as the overall material density throughout the sole is more even.

The isocyanate / polyol / colour ratio mix is said to remain constant no matter what the injection speed used and, as a result, there is a zero margin of error where with traditional systems it might be anything up to 3% in some instances. The new proportional system has been extensively trialled and refined over the past two years and is now entering bulk production with a number of major footwear producers of casual and safety footwear. Main Group says that it will now start fitting the new proportional system to all its PU machines. 



A PU sole made with a traditional injection system shows evidence of bubbles, flaws and has a less than perfect definition.



A PU sole made using the new improved system shows a distinct improvement in terms of both definition and overall surface quality.



A PU sole made with a traditional injection also reveals variations in density viz: Forepart 0.481. Waist 0.623. Heel 0.532.



A PU sole made using the new improved system shows minimal variations of density viz: Forepart 0.623. Waist 0.612. Heel 0.615.



90% of current output is casual footwear.



10% is safety boots and shoes.

Havisham wedge with winter cherry velvet.

CREDIT: SOPHIA WEBSTER

Chiara Butterfly Wing sandal in pink and neon red.

CREDIT: SOPHIA WEBSTER



Dreams can come true (with hard work)

Students in our design schools are encouraged to work hard and dream big, and most take up both suggestions with enthusiasm. Statistically, the chances are slim that these young people will ever see their creations in a superstar's outfit, their names in a glossy magazine or their logo on a prestigious shop front, but it can happen, and when it does it's something worth celebrating.

Glittering prizes

Sophia Webster thought she was busy when she studied footwear design at Cordwainers' College in London (now part of the University of the Arts). But the long hours and the hard work then hardly compare to the effort she has had to put in to make a success of her own-name brand, which she launched in 2012. "In all, I spent six years studying, as an undergraduate and then as a post-graduate," she explains. After graduation she spent two years as a design assistant at Nicholas Kirkwood before launching out on her own. She has not looked back.

Her first collection was for spring-summer 2013 and in September 2016, she will take part in London Fashion Week

London-based shoe designer Sophia Webster has enjoyed startling success in the four years since she launched her own brand, but she has a clear recollection of long years of learning as a student at Cordwainers' College and even has some advice for her younger self.

for the ninth time. That first year, 2012, she was awarded the Condé Nast Footwear Emerging Designer of the Year, and followed this up with the British Fashion Award for Emerging Accessories Designer 2013. She also won the British Fashion Council's New Generation Award for her first three consecutive seasons. In 2016, she won the BFC Vogue Fashion Fund in 2016, which brings high-level mentoring and a grant of £200,000. Also in 2016, she opened a flagship store in Mount Street in London's Mayfair.

Carrie suede sandal with embroidered feather appliqué.

CREDIT: SOPHIA WEBSTER



Selina sandal in black and rose gold.

CREDIT: SOPHIA WEBSTER

Advice lines

Drawing breath, Sophia Webster says there are five principal pieces of advice that she would give to her 22-year-old self. "Number one would be to have self-belief," she says. "Before I started my own company, I went about my day as though I had already taken that step, so I knew who it was I wanted to wear my shoes and I knew which stores I wanted to stock them." Always going above and beyond and setting herself apart, is the second piece of advice, while number three is to work hard and force herself outside her own comfort zone. Number four is to make sure of having support in place. "You need support," she says, "and for me that came from people beyond design. For example, my husband stopped what he was doing before to become my chief executive." And the final piece of advice she has for her younger self is to avoid falling into the trap of "believing your own hype", but making sure to enjoy success and celebrate it.

A woman's world

She questions the perception that footwear design is a male-dominated sector and says that she felt able as a student to focus on an industry, in the UK at least, that was "full of amazing women designers", naming Georgina Goodman, Olivia Morris, Adele Clarke and Charlotte Dellal as prominent examples. Ms Webster secured a placement at Georgina Goodman while still at college and worked on baby shoe and leathergoods projects. "But all I wanted to do was draw shoes," she recalls, "so I drew shoes in my spare time and handed the sketches to Georgina and she gave me feedback. I remember her saying there was too much going on in what I had drawn, like there were ten



Sophia Webster was the keynote speaker at the 2016 Cordwainers National Footwear Student of the Year Ceremony.

CREDIT: THE WORSHIPFUL COMPANY OF CORDWAINERS

shoes in one." The main lesson she learned from this, she says now, is that, while it's important to be "innovative" when you are a student, you have to develop a strong understanding of production, too, to learn that there are limitations to what it is possible to achieve, given the restrictions shoe manufacturers face: materials and money, factory capacity and (the most fundamental thing of all) feet. 🧠

California-based Lamo Footwear has made its name selling sheepskin boots. Now it wants to position itself as a brand that can be worn all year round.

Time for change at sheepskin footwear brand

Lamo Footwear is no longer content to stick to what it knows. Having capitalised on the growing popularity of sheepskin boots in the early 2000s, the company is now hoping a more diversified product range can drive future growth. Lamo, based in the US city of Los Angeles, was founded in 2003. Around the same time, sales of the now well-known sheepskin boots from fellow Californian brand Ugg were spiking after an appearance on a popular US chat show.

The story behind the Ugg brand is one of an Australian surfer who spotted a gap in the US footwear market while studying in the country. The background of Lamo's founder, Joseph Li, is very different. After many years sourcing wool from Australia and New Zealand, his first solo business venture was to use the wool to manufacture car seat and steering-wheel covers for the automotive industry. When car manufacturers decided that wool was no longer the material for them, he needed to rethink. Lamo Footwear, with its range of boots featuring a merino wool lining, was born.

The company now produces approximately 500,000 to 600,000 pairs per year across a range of lines, including its own Lamo brand and the creatively-named Oomphies range for children, which has proved popular in the US since its launch. All of its finished products are made in China. It describes its style as "relaxed and comfortable" with a strong Californian influence.

Lifestyle shift

Recently installed CEO Mark Etzbach has told *World Footwear* that Lamo wants to aggressively expand its customer base. He says the company needs to dispel the belief that it is a brand exclusively for autumn-winter and widen its appeal to consumers (Ugg has wrestled with the same dilemma). He talks of a shift towards being a "California lifestyle brand" - that



Lamo's designs are very influenced by its Californian surrounding, with the company based not far outside of Los Angeles.

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While making efforts to diversify, Lamo will still produce sheepskin products lined with Australian Merino wool.

is to say a brand that customers can wear during any season and as they go about their day-to-day lives. After making the most of the popularity of sheepskin boots more than a decade ago, Lamo is trying to repeat the feat by positioning itself in line with the explosion of athleisure clothing - athletic clothing worn in non-athletic settings. The Dije range of shoes is an example of this strategy in practice, but its own-branded range has also diversified into this style.

Not that Lamo is going to forget the sheepskin products that formed the foundation of its success to date. It plans to push its classic collection so that "people don't lose sight" of the company's origins, according to Mr Etzbach. The more expensive sheepskin footwear, which is offered as part of the Lamo line, uses bovine suede for the upper. Even though it is diversifying its range, he says he would like the company to sell more of its double-face products. These use high-quality Australian merino sheepskins with the wool on the inside. Lamo also offers a range of accessories made from the material, including hats, earmuffs and insoles.

The Après range, which uses synthetic uppers and has a lining made from microfibre, allows Lamo to also target the lower-end price bracket for sheepskin footwear. The CEO says demand for this brand is already strong and he is expecting revenues of more than \$1 million in the first year after release. Although Lamo doesn't want its "primary focus to be on the cost-alternative options", he concedes that the company can't ignore that it has been an important driver of growth.

Broader horizons

Despite what Mr Etzbach describes as a "challenging" retail situation in the US, Lamo has grown consistently over the past five years, led by a solid e-commerce platform and good performance from its drop-ship business (selling items held in stock and shipped by third parties). He believes that "the retailers that seem to be surviving and thriving have a very strong web-based business".

The company has just completed a relocation of its headquarters from the city of Ontario to nearby Corona, both in California. This has allowed it to more than double its office space, including its showrooms, where there will be more space to showcase its shoes. It has also partnered with AMS Fulfillment, a third-party fulfillment specialist with a good track record of working with expanding footwear brands. It hopes the added knowledge and experience (as well as storage space) that AMS brings will help Lamo continue to grow.

"This move allows Lamo to focus on the business of growing our brands and providing world class customer service," said Mr Etzbach in a press release confirming the collaboration. "Our commitment is not only to great product, but also to the best overall customer experience, which includes great customer support and the reliable delivery of our goods."

Lamo says the majority of its consumers are from the US retail and wholesale customer markets. A regret of the CEO is that the company's international distribution is "limited". He has pinpointed this as an area of improvement in the short term. He also tells *World Footwear* that the "next big priority" is to expand its market into Europe. A recent deal with TK Maxx, a company which operates retail outlets in the UK and Canada, will see Lamo-branded products sold in its stores.

The road ahead may be challenging, but Mr Etzbach is very positive. He believes the current financial position of many consumers means that Lamo is "poised to exceed expectations based on our cost-value proposition". He is confident that the quality of the product it offers will ensure further success. 



Lamo's range of shoes for children, Oomphies, have extra durability to cope with the demands of being a kid.



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