

WORLD FOOTWEAR

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THE MAGAZINE FOR THE GLOBAL SHOE INDUSTRY



Are shoe firms too small to have global supply chains?

A new era dawns for footwear cutting machines

Price could be holding polyolefins back

Why New York brand sees gain in Spain



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Contents

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Front cover

Footwear from a recent collection by German manufacturer Ara, a supporter of investing in technology and in continuing to produce shoes in Europe.

Image: Constanze Tillmann / Messe Düsseldorf

2. News Map

Selected highlights from around the world of footwear. For footwear matters every day, go to footwearbiz.com, the best news website in the business.

5. Footprints

People making their footprints felt in the industry: politicians, industry leaders and designers.

8. Products and services

Details of innovations and new offerings from across the industry.

12. Where the strength is

Desma managing director, Christian Decker, shares his thoughts on the future of the shoe supply chain.



11. Backtrack

Headline highlights from footwearbiz.com

16. Print the shoes people really want

Chattanooga-based Feetz regards itself as a technology company, but it has the software and the hardware to make shoes to any consumer's specifications using 3D printing.

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20. Cutting machines will multi-task

Footwear manufacturers need more from their cutting machines and Sergio Dulio argues that technology is now becoming available to make this multi-tasking possible.

24. Fluid situation

The need for speed to market could mean an end to the never-done search for the cheapest labour, says Stuart Cleaver.



p20



p30

30. Held back by price

Polyolefin elastomers could work extremely well in footwear, according to Steve Lee, but their adoption is proving slow owing to the price advantage and the already widespread use of EVA.

34. Personalised insoles

Belgian start-up RS Print believes its personalised 3D printed insoles are part of the reason 41-year-old athlete Paula Radcliffe is back racing.

36. Gain in Spain

New York-based footwear start-up has won acclaim for the stylish handmade men's shoes it is able to offer for \$200, thanks to smart sourcing from artisans in Spain.



40. Essential reading

IBC Advertiser/reader enquiry service

p36

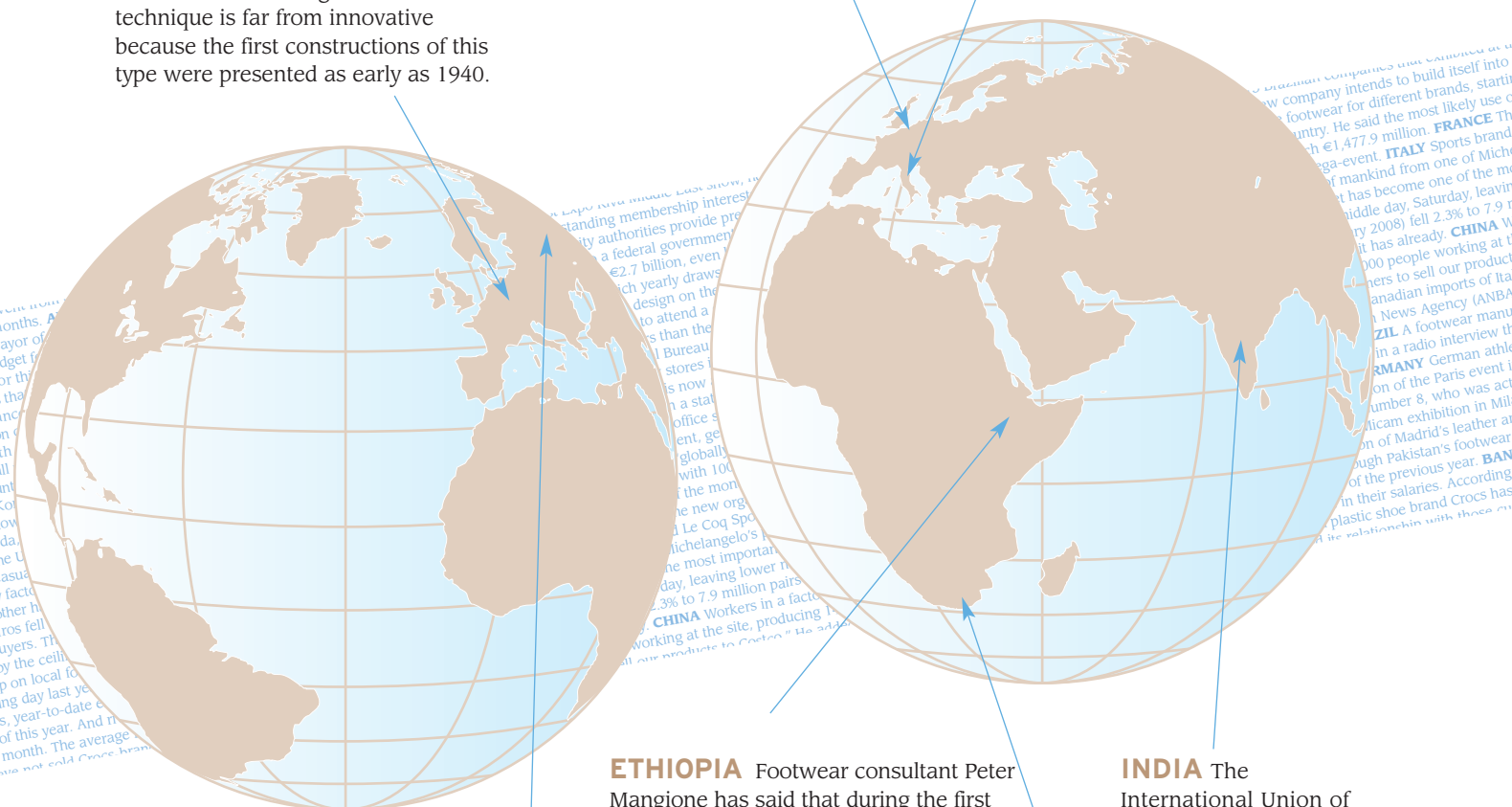


News

GERMANY Local sources say adidas has won a legal battle concerning knitting technology for footwear uppers. The Federal Patent Court in Munich has ruled that Nike's European patent on knitting technology for footwear uppers is obsolete and is to be removed from the German register of patents. Two years ago, Nike tried to prevent adidas from marketing its knitted footwear, Primeknit. Adidas argued that the technique is far from innovative because the first constructions of this type were presented as early as 1940.

BELGIUM The European Confederation of the Footwear Industry (CEC) has announced a new International Footwear Forum. CEC president Jean-Pierre Renaudin said it was necessary to bring footwear associations together to "anticipate problems, remove uncertainties and find ways to accommodate the diverse points of view in the globalised footwear economy". A date and venue will be announced during the first quarter of 2015.

ITALY The footwear manufacturers' association Assocalzaturifici (Assocal) has criticised a decline in government funding for promotion of exports of goods made in Italy. Assocal president, Cleto Sagripanti, said funding of around €130 million per year to support export promotion had been withdrawn. "There is still a lot to be done to restore complete faith in the economy, and we firmly believe that we need to start by protecting our areas of excellence."



RUSSIA Adidas Group's earnings took a €100 million hit in Russia in the first nine months, its CEO, Herbert Hainer, has admitted. "While we firmly believe in the long-term potential of the market, due to the rapid depreciation of the Russian rouble, which hit a record low, and the considerable risk of further deterioration in consumer spending, the short-term fundamentals of the business have changed materially." The group has closed 27 stores in the region since the end of July.

ETHIOPIA Footwear consultant Peter Mangione has said that during the first half of 2014 Ethiopia was the cheapest source of labour in the shoe manufacturing industry. He estimates the cost per hour of one worker was \$0.36. Bangladesh was next (\$0.71), followed by Cambodia (\$0.85), India (\$0.85), Vietnam (\$1.14), Nicaragua (\$1.27), Thailand (\$1.34), Indonesia (\$1.60), the Dominican Republic (\$1.88), China (\$2.09) and El Salvador (\$3.05). The cost per hour in Italy was \$18.68 and \$25.66 in Japan.

INDIA The International Union of Shoe Industry Technicians (UITIC) has announced that the Indian city of Chennai will play host to its 19th congress in February 2016. India's Council for Leather Exports (CLE) will act as organiser.

SOUTH AFRICA UK-based research organisation SATRA is aiming to play an important role in helping South Africa's new National Footwear and Leather Cluster (NFLC) fulfil its mission. SATRA received visits from NFLC chief executive George Newton and top industry representatives. The government is to invest more than \$25 million through its Competitive Improvement Programme, establishing a number of business clusters, of which the NFLC is one.

UAE Footwear exports from Vietnam to the United Arab Emirates have been increasing by 55% annually for the “past few years”, according to Lefaso, the Vietnam Leather and Footwear Association. A Vietnamese delegation attended the recent Dubai Footwear Expo, hosting a conference aimed at increasing exports to a region which only has seven footwear factories producing 250,000 pairs a year, mainly sandals, said Lefaso. “The most important thing is understanding the requirements of quality, taste, trends and import and export regulations of the UAE.”

PAKISTAN Footwear companies from across Pakistan attended a seminar on how to boost productivity and exports, as part of the Leather Competitiveness Improvement Program (ICIP). The European Commission contributed nearly €2 million to the three-year project – 90% of the costs. Michal Špacek, from the International Shoe Competence Centre in Pirmasens, Germany, advised attendees on how to improve the quality of shoes, consume materials more efficiently and boost productivity.

ECUADOR The country's government has helped set up a footwear design centre and has provided funding for local producers to visit exhibitions overseas to build contacts and promote Ecuadorean shoes. It has also put tariffs in place to encourage retailers to source domestically produced footwear.

BANGLADESH Figures from Bangladesh show the leather and footwear industry increased the value of its exports in the first four months of the financial year (July-October 2014) by 6.1% to \$383.6 million. Exports of leather footwear were up in value by 20.3% at \$169.5 million.

INDONESIA Indonesian outsource manufacturers made almost a quarter of all adidas shoes in 2013. Globally, the sports group's suppliers produced 257 million pairs of shoes last year, with 24% of them made in Indonesia. The figures came to light during a recent visit to Indonesia by its vice-president of sourcing, John McNamara. He said adidas wished to expand its business with “a few big, good suppliers”.

CHINA Footwear manufacturers produced almost 3.3 billion pairs of shoes and boots with leather uppers in the first nine months of 2014, according to the China Leather Industry Association. This represents a year-on-year increase of 2.8% in volume.

VIETNAM Wolverine's sourcing director has outlined plans to shift manufacturing from China to Vietnam. Driven by rising wages, coupled with expected benefits from the incoming Trans-Pacific Partnership (TPP), Scott Thomas said while 75% of the company's supplies currently come from China, the group has plans to cut it to a third by 2020 and leave the rest to Vietnam, which currently supplies 15%.

MEXICO The governor of the Mexican state of Guanajuato, Miguel Márquez, has put the number of tanners, other suppliers and finished product manufacturers there at 4,700 companies. He said 60% of all of Mexico's footwear exports were from Guanajuato and from January to September 2014, exporting companies had shipped 12 million pairs of shoes and boots overseas, earning revenues of \$315 million.



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PRESIDENT PRAISES PORTUGAL'S SHOEMAKERS

The president of Portugal, Aníbal António Cavaco Silva, devoted an entire day to the country's footwear industry. Meeting industry leaders he said: "This is a sector that stands out in our industrial landscape due to the vision of its entrepreneurs and to their capability for building a unique space in the global market."

Dr Cavaco Silva went on to pay tribute to the level of investment Portuguese footwear manufacturers have made in research and innovation in recent years and said the sector had, over the last 30 years, gone from being a traditional, labour-intensive and low-added-value industry to being "one of the most dynamic, modern and expansionist industries in the Portuguese economy, exporting approximately 95% of its production."

SPORTS SHOE INDUSTRY NEEDS A 'NEW MINDSET'

The sporting goods industry needs to establish a new mindset that inspires designers to explore new capabilities, according to speakers at the Manufacturers Forum organised by the World Federation of Sporting Goods Industries (WFSGI) in Leipzig, Germany.

"As a consumer brand, we need to reduce costs, increase speed and improve efficiency in our supply and distribution chains," said adidas Group CEO Herbert Hainer, who delivered the keynote speech.

Around 180 delegates from 22 countries discussed ways to better integrate design into manufacturing. They visited the nearby Porsche factory, where production methods are factored in at an early phase of design.

'EFFICIENT SUPPLY CHAIN' GIVES CHINA AN EDGE

China's footwear industry has increased its investment in materials, including leather, by 20% since 2008 in an attempt to increase quality.

Vice-president of the Hong Kong Footwear Association, William Wong, revealed this figure during comments at

RIHANNA JOINS PUMA AS CREATIVE DIRECTOR

Singer Rihanna has joined sportswear brand Puma as creative director of the women's business, covering footwear and apparel.

She will "directly influence collections" from the start of 2015, working in partnership with Puma's product creation team.

Puma CEO Bjørn Gulden said: "Signing Rihanna is a fantastic step. Her global profile, her charisma and individuality, her ambition – all these things make her a perfect ambassador for our brand."



CREDIT: PUMA

the Fifth World Footwear Congress in León, Mexico.

Mr Wong, who is also the founder and chief executive of a retailer called Italian Fashion Galleria, said rising labour costs mean Chinese-made shoes have increased substantially in price.

But he argued that, if leather shoes from China are cheaper than shoes made in many other countries, it's not because the manufacturers are using cheap materials. "Labour costs have gone up," he said, "but the supply chain is very well organised."

LATIN AMERICA CALLS ON WTO FOR HELP

Ysmael Lopez Garcia, president of the Guanajuato Chamber of the Footwear Industry, has requested that the World Trade Organization (WTO) establish regulations for "ethical trade in commercial practices".

"On behalf of Latin American footwear industries that produce 1,500 million pairs annually – from Argentina, Brazil, Chile, Ecuador, Mexico, Peru and Uruguay – who have asked me to be their voice, we ask the WTO to exercise strong action among member countries to comply with established agreements and for the economies of each country to behave as true market economies.

"Given this dynamic of globalisation in which we are living, it is essential to strengthen business ethics in international trade, to prevent practices

that harm local economies, and thus boost the integration of countries practising free, and fair, trade."

He said footwear companies want to know that competition between manufacturers from different countries takes place in a framework of legality: "That is our demand, our duty and our right."

NEW FOOT LOCKER CEO AS KEN HICKS RETIRES

New York-based athletic footwear retail group Foot Locker has announced that chief executive, Ken Hicks, retired at the start of December 2014. He will continue as executive chairman of the board until the company's annual general meeting in May 2015 but will then step down from the board.

Mr Hicks is being succeeded as chief executive by Dick Johnson, who has been with Foot Locker for 17 years, serving as chief operating officer since May 2012.

YOUNG TALENT HONOURED AT UK AWARDS

A young company making foldaway flat shoes inspired by sore feet after nights out was among winners at the eighth Footwear Friends Awards.

Rollasole founder Matt Horan was awarded a £5,000 bursary after taking the Worshipful Company of Cordwainers Award for Innovation at the London-based event.

The Micro-Pak award for £2,500 plus 12-months mentoring programme was presented to Ibiza-made sandal brand Solillas, while the Meltzer Travel Award went to Dear Frances, which specialises in Italian leather shoes. It will help the brand with trade show costs and also includes a mentoring programme.

CHANGES AT THE TOP AT PENTLAND GROUP

Sports and footwear group Pentland has announced changes at the top. Andy Rubin is to take up the newly created role of chairman of its brand management division, Pentland Brands. Stephen Rubin will remain chairman of the group. Andy Long, currently chief operating officer of Pentland Brands, will replace Andy Rubin as chief executive. The changes came into effect this January.

Pentland own Berghaus, Canterbury, Speedo, Brasher, Boxfresh, Ellesse, KangaROOS, Mitre, Prostar and Red or Dead and is a licensee for Lacoste Chaussures, Ted Baker and Kickers.

PROJECT CELEBRATES FERRAGAMO'S JOURNEY

Salvatore Ferragamo has launched A Man's Story, a menswear project by photographer and filmmaker Francesco Carrozzini, which celebrates the founder's vision and the risks he took to start the business.

In 1914, 16-year-old Salvatore emigrated from southern Italy to Boston, in the US where one of his brothers was working in a boot factory. He convinced his brothers to follow him to California to create a made-to-measure shoemaking service.

Creative director Massimiliano Girometti said: "Had he not have taken that risk, this brand that continues to grow and attract new generations may never have existed."

GENESCO SAYS GOODBYE TO LONGSERVING CFO

Footwear group Genesco has announced that its longstanding chief financial officer, James Gulmi, is retiring at the end of the fiscal year.

Mr Gulmi has served as Genesco's CFO since 1986, and will continue as senior adviser for a year.

He will be succeeded by Mimi Vaughn, the company's senior vice-president of strategy.

"Serving with six different chief executives, Jim has been the constant thread running through successive chapters of a long and successful transformation of the company into a market-leading specialty retailer," said Genesco's CEO, Robert Dennis.

TWO TEN RAISES \$2.7M AT NEW YORK GALA

As part of its 75th anniversary celebrations, US-based charity Two Ten Footwear Foundation raised \$2.7 million at its New York gala attended by 1,600 people.

The chairman of Foot Locker, Ken Hicks, said: "We are proud to have been an integral part of this year's event, which resulted in a record-breaking year of fundraising, furthering our continued support and contribution to the ongoing mission of shoe people helping shoe people."

Tim O'Donovan, retired CEO of Wolverine Worldwide, was presented with the Bob Campbell Lifetime Achievement Award. O'Donovan served on the Two Ten board for 23 years, including two years as its chairman, and is currently tri-chair of its honorary board.

ASSOCAL TO CEMENT ITS TIES WITH CHINA

Italian footwear manufacturers' association Assocalzaturifici (Assocal) has appointed a China-based executive as its new general manager.

Tommaso Cancellara, originally from Italy, has been based in Shanghai for three years, working as marketing director for Cesena-based gym machinery manufacturer Technogym.

He will return to Italy in January to take up his new position.

Assocal has placed increasing emphasis on its ties with China, launching the Micam Shanghai exhibition in April 2013. Exports to China have been registering double-digit increases at a time when sales in the domestic market and in other important overseas markets, such as Russia, have been stalling.

CHIRUCA FOUNDER DIES

One of the founders of the Chiruca hiking boot brand, Joan Fontfreda, has died. He was 92.

Mr Fontfreda founded Chiruca with his brother, Lluís, in the years following the Spanish Civil War and World War II.

They set out to make rubber-soled boots suitable for use in the high mountains of the Pyrenees, close to their home in Catalonia.

Chiruca footwear became popular across Spain in the 1960s and 1970s, with the name, taken from an affectionate Galician form of their mother's name, Mercedes, almost becoming synonymous with outdoor activity.

CROCS COMPLETES MANAGEMENT SHAKE-UP

Crocs has named its new CEO as Gregg Ribatt, former interim CEO of Spanx and CEO of Collective Brands Performance & Lifestyle Group, which includes the Saucony, Sperry Top-Sider, Keds and Stride Rite brands.

"Gregg brings to Crocs a two-decade record of success and leadership in guiding companies through significant growth and transformation," said Thomas Smach, Crocs chairman.

"Since Gregg joined our board in January, he has contributed to efforts to conceptualise the Crocs of the future."

Before joining Collective Brands, Mr Ribatt was CEO at Stuart Weitzman.

He will be based in new commercial centre in Boston and will take up the role in late January.

Former CEO John McCarvel stepped down in April. Since that time, the brand has revamped the management team in the face of falling profits.

VIETNAM'S INDUSTRY WILL STAGNATE, WARNS LEFASO

Officials from Lefaso, Vietnam's leather and footwear association, have warned that without investment in research and development, the industry will stagnate in five years.

"The industry lacks the technical capacity to design and build brands and product lines," said Lefaso vice-president Diep Thanh Kiet.

"Although we have low labour costs, the majority of workers have limited skills and low labour productivity. If it cannot increase investment in design, researching new products, production capacity and distribution in the next five years, the industry will not grow."

The country currently imports most of the raw materials it uses for the footwear industry. It makes low-quality canvas domestically, as well as soles and threads. Most machinery is imported, as well as 70% of its leather needs. 🇻🇳



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Products & Services

RAPID PROTOTYPING TOPS AGENDA AT DELCAM CONFERENCE

The benefits of 3D printing and rapid prototyping were top of the agenda at the first Milan-based Footwear Technology Forum organised by software developer Delcam Crispin.

Software developer Autodesk spoke about its new rendering capabilities describing how the work it has completed for car manufacturer Volkswagen could be applied to footwear design.

Danish company Ortopaedi Skomageriet discussed coupling footwear design technology with custom orthotic insoles, Lectra described how technology can help overcome manufacturing barriers, while Crocs gave an overview of its use of rapid prototyping.

Brands, including Reebok, Vans and Decathlon took part, with Pentland's 3D product designer Ed Batchelor describing the event as "well organised and enjoyable".

Delcam says it is planning a follow-up during this year.

HUNTSMAN TO INCREASE TPU CAPACITY

Inspired by growth in demand from the global footwear market and a number of other application areas, Huntsman Corporation has announced that it will expand the capacity of its plant at Osnabruck in Germany to produce thermoplastic polyurethane (TPU) in the first half of 2015.

Projections are that Huntsman will be able to expand the current TPU production capacity at Osnabruck from 70,000 tonnes to around 75,000 tonnes per year.

FDRA CREATES CUSTOMS 'RESOURCE CENTRE'

The Footwear Distributors and Retailers of America (FDRA) has created an online customs 'resource centre' for the footwear industry which will simplify customs classifications and help brands understand the rules.

The new 'centre' covers recent

footwear classification rulings by Customs Border and Protection, footwear classification forms and codes by country, key classification definitions, labelling and markings information, as well as information on issues such as foxing.

"As the footwear industry continues to innovate, footwear classification is becoming more and more complex. FDRA is constantly pushing to end duties on footwear, but until that day happens it is focused on helping brands understand and adapt to the current rules," said FDRA president Matt Priest.

Quinn O'Rourke, director of compliance and logistics for LaCrosse Footwear, added that an incorrect classification could cost a company thousands of dollars. "Now I can go to one place to get information on my footwear customs questions," he said.

NEW INSOLE MONITORS SPEED AND BALANCE

Flexpoint Sensor Systems and Bend Tech have launched an insole system that provides wireless feedback on a number of performance metrics, including balance, power and speed.

Each insert pad features sensors and can be manufactured in different sizes. The sensor is constructed as a single layer so it cannot be damaged or degraded by dust or dirt, say the companies. Moisture and immersion in mud, water, sweat or other substances do not affect the sensors' performance.

"We are glad to see the product available and well received," said Tony DeGreef, managing director of Bend Tech. "We look forward to helping transform the athletic shoe industry."

BASF MAKES ACQUISITION IN 'ATTRACTIVE' TPU MARKET

BASF has entered into a definitive agreement to acquire all of the business and assets in Taiwan and mainland China of thermoplastic polyurethanes (TPU) adhesives base material manufacturer Taiwan Sheen Soon.

On announcing the development,

BASF said it wanted "systematically" to pursue growth "in the attractive TPU market". Its president for performance materials, Raimar Jahn, commented: "It is a valuable addition to our existing TPU portfolio, strengthening our manufacturing footprint in Asia."

The company went on to say that it views Taiwan Sheen Soon's TPU business as complementary to what BASF already does in this segment, specifically in TPU extrusion as well as injection moulding grades for various segments including footwear. As an example of TPU application in the footwear segment it mentioned the Energy Boost running shoe from adidas, made with expanded TPU, which BASF markets under the name Infinergy.

Becoming an integrated solutions provider for TPU and TPU adhesives will enhance its value proposition to customers, BASF said.

The acquisition is expected to close in 2015, pending necessary internal and external approvals. The integration will take effect in the course of 2015. The parties have agreed not to disclose financial details of the agreement.

STRATÉGIES MOVES TO COPE WITH DEMAND

Specialist footwear technology provider Stratégies has announced a change of address, moving to larger offices at Rungis, near Paris.

The company, which produces footwear-specific design software Romans CAD, said the move was essential for it to be able to cope with a "continuous increase" in demand for its product among footwear manufacturers around the world, and the necessary growth in its workforce that this has brought about.

Its new offices are in the Amsterdam building at the Icade business park in Rungis.

MAKERBOT BOOSTS 3D PRINTING SUITE

3D printing machinery maker MakerBot is launching a product in Europe which it says will help

"universities, schools and enterprises to innovate, collaborate and challenge competition with the help of large-scale 3D printing".

Already established in the US, the MakerBot Innovation Center combines a number of 3D printers and scanners with a software solution. It enables simultaneous printing or access to a combined set of designs.

"Real-Time Prototyping and the creation of 3D-models are getting more important not only in the industry, but also in research and education," said Alexander Hafner, general manager of MakerBot Europe.

"Large companies and universities now get the chance to effectively manage larger numbers of MakerBot Replicator 3D printers."

FWF UPDATES 'WAGE LADDER' TO MAKE GLOBAL COMPARISONS EASIER

The Netherlands-based Fair Wear Foundation (FWF) has launched the second generation of its Wage Ladder, an online tool that allows the wages paid at factories to be compared with benchmarks.

Members can now compare wages between men and women and between departments, both on a country and region level, making negotiations between brands and factories more productive, says FWF.

A new feature enables FWF to better measure progress, such as establishing whether wages have increased between audits.

"The Wage Ladder is a first step to bridge the gap between minimum wages and living wages," said FWF director Erica van Doorn. "It's not a solution in itself. But it makes clear that the industry does not need to wait for an international standard to be developed. You can start moving wages 'up the ladder' today."

The ladder is currently being used by 500 companies.

FULL DETAILS IN PLACE FOR UTECH EUROPE 2015

Organisers of the UTECH Europe 2015 polyurethanes event have announced full details of the three-day conference. It will take place from April 14-16, 2015, at the MECC exhibition and conference centre in Maastricht, the Netherlands.

Featuring more than 90 detailed technical papers delivered in a total of 11 sessions, the conference will cover the latest developments in the global polyurethanes supply chain.

Frank Grunert, regional head of polyurethanes at Bayer MaterialScience, will deliver the welcome address ahead of keynote presentations from Tony Hankins, president of Huntsman Polyurethanes, and Soichi Inoue, chief executive of Inoac.

Two highlights from the conference's plenary session looking at key strategic and market developments are Hassan Baalbaki, vice-president of the Baalbaki Group, who will present his outlook for the PU industry in the Middle East, and

Robert Outram, associate director at IAL Consultants, who will provide a strategic business review.

Sustainability and the use of renewable resources will remain a key focus, according to the organisers, with 11 papers devoted to the subject on the conference's first day. Further sessions are devoted to applications of polyurethanes in flexible foams, energy-efficient rigid foams and elastomers.

Representatives of many major industry players will take part, including senior researchers and executives from Huntsman, Dow, Bayer MaterialScience, Wanhua BorsodChem, BASF, Du Pont, Shell Chemicals, Momenite and Evonik Industries. 



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Backtrack

World Footwear's publishing cycle and limitations on space make it impossible for us to run more than a carefully selected sample of news from across the industry.

However, we publish hundreds more stories on **www.footwearbiz.com**. The site is updated every day with news from every continent and every part of the industry, making footwearbiz.com one of the most

comprehensive archives of news anywhere on the web for the global footwear industry.

We list below just a few of the headlines that have appeared on the site in recent weeks —

www.footwearbiz.com allows you to read those you have missed.

05/01/2015

DSW awards \$110,000 to employees' choice of charities

Nicaraguan producers cannot meet school-shoe demand

24/12/2014

New Year greetings from *World Footwear*

22/12/2014

New appointment at Chatham

19/12/2014

Revamp and rebrand for Nike's ACG lines

Li Ning says 2015 will be a year of growth

18/12/2014

Shine comes off Italian footwear for Russian consumers

Shoe exports down for Peru

17/12/2014

Continuous growth for Europe's luxury goods industry

Stark figures for decline in Argentina's shoe exports

Hi-Tec launches Paddington Bear boot

16/12/2014

Bread & Butter cancelled due to lack of exhibitors

15/12/2014

First retail members join European Outdoor Group at 'critical stage'

12/12/2014

Eindhoven conference examines the footwear materials of the future

11/12/2014

Pakistan's inaugural 'Mega Leather' show to go ahead in March

09/12/2014

Church's growth continues as Prada CEO warns of a 'readjustment'

Own tannery makes all the difference to Carmen Steffens

08/12/2014

Big boost for Bangladesh leather shoe exports

05/12/2014

More growth on the cards as Italian footwear retailer changes private-equity hands

Full details in place for UTECH Europe 2015

04/12/2014

Vans fills marketing position left by North Face move

03/12/2014

Busy time for growing Brown Shoe

Assocalzaturifici expresses new fears over labels of origin

02/12/2014

Ghana: Czech footwear firm eyes tannery

Safety shoe firm takes Uruguay's tanners to task

01/12/2014

China's leather output on par with 2013 levels

28/11/2014

Timberland publishes CSR update

27/11/2014

DSW pleased with third-quarter gains

Ackerman to make shoes in the Americas for Italian luxury brand

26/11/2014

Nearly 5,000 companies in Guanajuato leather value chain

Italy: Recruitment drive promotes footwear-making sector to young people

24/11/2014

Luxottica executive to lead Deckers' European business

21/11/2014

First footwear factories awarded as part of FDRA's new code of conduct

20/11/2014

Volley and Shoe Warehouse among footwear casualties at Pacific Brands

Elche university in search of footwear professor

19/11/2014

Chinese demand behind Ferragamo's growth

Yue Yuen counts financial cost of strikes

Brazil will take six tanning groups to the World Footwear Congress in León

18/11/2014

Agra CIFA conference examines what the industry will look like in 2019

17/11/2014

Wolverine World Wide seeks out alternatives to leather

ASICS registers strong growth in first six months



The 'Desma family' of 50 co-exhibitors, including chemical companies and soling makers, offer their latest solutions to manufacturers.

ALL CREDITS: DESMA

Desma sees the footwear manufacturing landscape changing as a 'decentralisation' takes place. Managing director Christian Decker also contemplates a retail environment that has fully integrated supply chains at its core.

Strength will lie in shorter supply chains

Rising wages, population growth and increased wealth – all factors that will alter the landscape of footwear manufacturing over the next decade, as companies look for ways to reduce outgoings and bring product closer to the market. Around 20.63 billion pairs of shoes were produced in 2013 – 13 billion of which were made in China – and this is forecast to rise to almost 22 billion by 2015.

"Even if China becomes expensive for labour, there will be no other China," says Christian Decker, CEO of footwear

machinery maker Desma. He says what happens in the country over the coming years will dictate the global landscape for footwear production. Rising wages will mean new generations of spenders; it will be "no longer just the production powerhouse but an important consumer market and we have to recognise this".

He predicts a different structure of production; a kind of decentralisation, featuring huge facilities housing 50,000 to 80,000 workers, churning out 20 million pairs per year, but also smaller locations making one or two million pairs, giving

other countries the opportunity to compete.

Understanding how the landscape will change is imperative to keep up with new requirements and offer solutions before the market has moved. Mr Decker's forecasts were keenly listened to by a group of global manufacturers in a packed conference room at the company's House Fair (open day) in Achim, northern Germany. Many of these companies had come to see the latest developments, including the Quadwrap shoe, made on an Amir D522 in four injected steps (see *World Footwear* November/December 2014). Instead of a typical shift of 200 workers that can produce 1,200 athletic shoes, the same number of Quadwrap shoes could be made in 24 hours with a bare minimum of workers, reducing labour needs by up to 90%, according to the company.

This kind of increased automation supports reshoring, as illustrated by German brand Ara expanding manufacturing in Portugal, and Puma looking at locating production in Eastern Europe. Sales of Desma's automation solutions have increased 20% in the last two years, and are expected to rise by a similar amount over the next two.

"We want to show what is possible. You can produce in high-cost countries because the labour costs will be low. You don't need to ship materials to Asia and can avoid the long lead times and so on; you can be flexible," explains Mr Decker. "We are talking with US brands who are extending facilities in the Dominican Republic and Puerto Rico, because NAFTA (North American Free Trade Agreement) means it's quite easy to ship from there to the US."

High quality in China

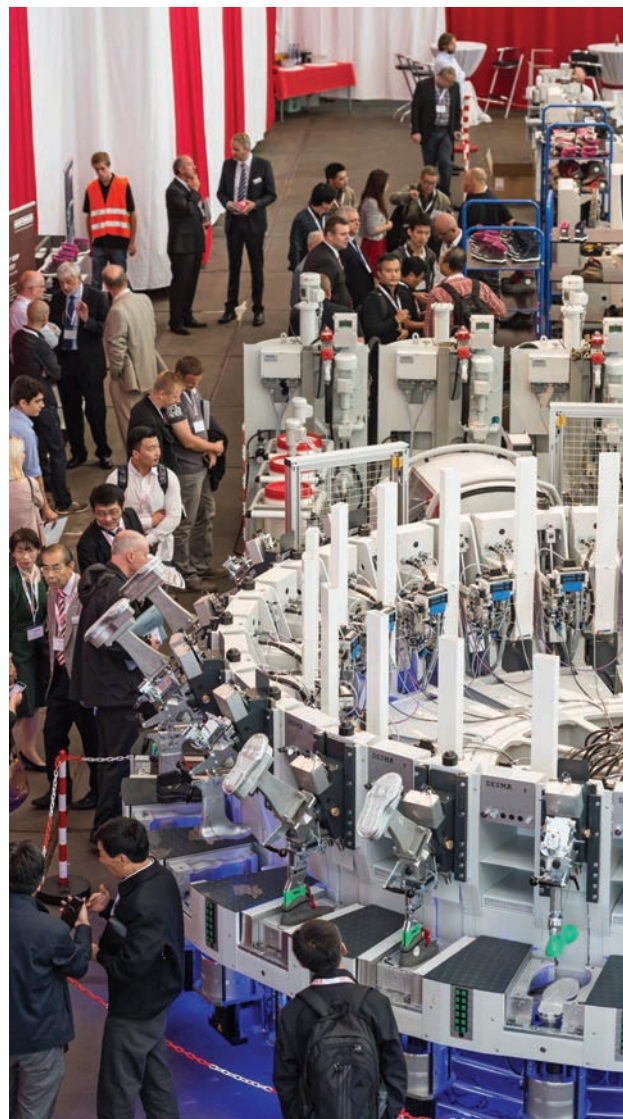
But it is not just Western companies that are keen: in 2013, China installed more automation solutions than Japan, the former leader for this kind of production. The country is looking to move away from low-complexity exports and increase its mid- and high-complexity exports, such as cars.

"Chinese are starting to invest money in equipment, some are thinking about lean production. There will come a point when there will be a total rethinking of existing processes, and we have already discussed this with some producers at the fair," says Mr Decker.

This new breed of Chinese footwear manufacturer has the resources to invest in high-tech machinery. One such company is a finalist in the Tannery of the Year programme, Henan Prosper, a sheepskin boot manufacturer that supplies to Ugg as well as making for its own brand. It is targeting five million pairs per year within two years, using Desma machinery. One crucial strength is that it controls a large part of the supply chain, from raw material through design and manufacture, starting at the skins.

"Having a short path from production to distribution and consumption of the products is something that I see coming up as a trend. There needs to be a closed chain between the design and the production – design for manufacturing – that's one key point. Some manufacturers already have this; Ecco is good example because they have the design, the marketing, the sales, a tannery, they make the lasts and moulds and so on, they have their own production and an extended shop chain."

He mentioned examples in South America where the groups own the chain from the cattle through to retail. "The



Manufacturers watch Desma's Amir machinery in action.

only exception is they don't produce the chemicals, but if they planted palm or soybeans, this could be used to create bioplastics and they would have even more control.

"The target should be that you can decentralise production and get it nearer to the customer – this is one of our drivers."

Retail adventure

The 'closed chain' also extends to the retail experience and consumers; he foresees a time when it is commonplace to customise shoes while in the store and have them made nearby, an initiative New Balance is trialling in New York. "The basic idea appeared at the beginning of 2014 and we are working on solutions. Shopping has to be an adventure, not just trying on shoes, paying and leaving. Where is the adventure in that?"

3D printing will also feed into this, another angle Desma is working on. "It is still too expensive to have mass production, but additive manufacturing is something we're focusing on and will have innovative solutions in the near future."

To counter all shoe purchases being made online, he envisages stores with walking tracks and foot scanners, 'tupperware party'-style shopping where groups come together, as well as retailing using 'virtual mirrors' that project

COMPONENTS SUPPLIERS OUT IN FORCE

Desma's House Fair focused on automation and polyurethane, welcoming around 600 visitors compared with 500 at the previous event in 2012. The 50 co-exhibitors were represented by chemical companies, soling and materials manufacturers and research institutes.

- Robotics manufacturer ABB displayed YuMi, only one of four prototypes in the world and the first robot that 'interacts' with a human. "We already have a lot of ideas for how we would use it, but I want to see what ideas shoe manufacturers have," said Desma CEO Christian Decker.
- Rhenoflex, a Germany-based toe box and counter producer, was promoting Rhenoprint, among other products – a "waste-free, fully recyclable" product. "We're looking at green and recyclable products at the moment – using a waste-free process, as well as sustainable raw materials like wood and straw compounds," explained sales manager Daniel Sommerhauser.
- Rika, a Germany-based shoe chemicals company, was promoting its release agents for moulded parts of PUR, PUR colour-pastes, environmental mould cleaner and lacquers for shoe components.
- Italy's Limonta promoted its ultra-microfibre and non-woven materials for safety shoes, a market it says is growing. "We want to bring to the sector not only our experience but also a style that we have accumulated working with fashion companies," said marketing director Massimo Sessana.
- AK Form, a Turkish insole manufacturer, presented a new washable product made from 100% organic cotton, stating that its customers are now requesting more sustainable options.
- Teco, a soles producer from Portugal, presented a new way to mix TPU, PU and rubber. Its in-house R&D team has developed a novel way to bond the materials using new machinery, for a "sole that offers the best of those properties". The group also owns last company Sifac and development and certification company Camatec.
- Chemical group Bayer, which partnered Desma for the Quadwrap development, also presented a CO₂ lightweight technology and blowing agent. It highlighted a new material for insoles that can be milled to the shape of the foot, designed to replace EVA for orthopaedic applications.
- UK-based D30 displayed its impact-protecting solution, which it has adapted for midsoles. "We use a raw dilatant material and incorporate that into the polymers, it offers flexibility but behaves like a solid when you apply force," explained material technologist Becky Donovan, who had visited Desma to run trials on its machines. "We can tailor it for cushioning or rebound, for heel inserts or insoles."
- Dow presented advancements in PU injection-moulded footwear technologies, including its Voralast solutions, and an update based on renewable resources.
- Huntsman discussed polyurethanes as a replacement for EVA, including Daltoped Lite and Daltoped Grip. Johann Van Dyke, head of footwear development in Europe and India, said: "PU is the only soling material that can do the same as all the rest, and is a good choice from a sustainability point of view."
- German chemical company Evonik, which makes additives for PU and foam soles, was promoting release agents. "Our main focus is the reduction of VOC emissions," said a spokesman. "We are looking to reduce the content of organic solvents in our products and replace them with water."

various colours and styles using augmented reality. Customers will be able to synchronise them with social media to get feedback from their friends, as adidas has begun to do in Germany. "But the brands have to be careful," he warns. "Suddenly it's switching the power. It's moving to being more controlled by Facebook, social communities and recommendations; the power is more in the hands of the consumer than the brand."

Brands will also have to stave off rising competition from

their Chinese counterparts; Mr Decker thinks a number of emerging brands will grow in importance. "You might not know them yet, because they might not be available in the Western markets, but in five years they will dominate the Western markets, all made in China."

China

China has the advantages of large harbours, good infrastructure, material availability, textile and engineering

knowledge, but weighed against those are rising labour costs, high fluctuation of labour, fewer at a working age because of an aging population, rising energy and material costs, distance to market and increasingly stringent environmental regulations. Another stumbling block could be a lack of liquidity. "They will have to be careful because liquid cash is required to invest." This gives other markets a chance to compete.

"In 2020, China will still be at the top but India is rising strongly, so is South Korea and Brazil. The potential in India is high if they improve their infrastructure. The same in Brazil, but there is also political risk, as there is in Thailand. The most interesting countries to watch are Mexico, Indonesia, Vietnam and Turkey, all have potential but some barriers to overcome."

What are the challenges for the footwear manufacturers of tomorrow? Labour costs, loyalty, overtime restrictions, workers' benefits; lead time, equipment and TCO (total cost of ownership); energy and material consumption, mould costs and waste costs; return on investment, efficiency of equipment and sustainability. "Projecting our business ideas for the next five to 10 years is really important for us; we want to design the solutions of tomorrow. Sometimes it is too visionary for some people, but our team is convinced it is the right direction.

"We need to make machines more effective to reduce cost factors," he concedes. "Material efficiency, production flexibility, service and quality are important factors, so we will focus on all these aspects in the future." 



Desma managing directors Klaus Freese and Christian Decker.



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WHEN YOU NEED TO BE SURE

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Chattanooga-based Feetz has perfected the technology, sourced the investors, hired the clever employees and is now producing 3D-printed shoes.

This time it's personal

While the footwear world talks about the potential opportunities 3D printing technology could or might bring at some undefined point in the future, Feetz, a company based in Tennessee, has quietly gone about perfecting the technology on its own and is now producing and delivering shoes to customers. Its chief technology officer, Dr Nigel Beard, believes personalisation is the key.

Speaking at the Future Footwear Materials conference in Eindhoven in December 2014, organised by Dutch footwear

innovation and education institute SLEM, Dr Beard pointed out that consumers today go to great lengths to make sure that even a cup of coffee comes exactly as they like it but that, while personalised coffee is commonplace, personalised shoes are impossible for most people to find.

Feetz has responded by developing software called SizeMe, which is patented and will soon be available as an app, Dr Beard says, that lets members of the public capture all the data required to make a pair of shoes (although perhaps not always precisely a pair, more on which later)

Feetz says its shoes are for people who want to take care of their feet, but who feel they currently have little or no choice when it comes to shoes.

CREDIT: FEETZ





Nigel Beard of Feetz presenting at the Future Footwear Materials conference in Eindhoven in December 2014, with Nicoline van Enter, founder and creative director of conference organiser, SLEM.

CREDIT: SLEM

that will fit their feet as well as the best of bespoke. As befits a chief technology officer, Nigel Beard knows what the accuracy variance of SizeMe is: it's between one and two millimetres.

Material options

With the software in place, Feetz next had to find the right soft materials to use to make the shoes. As its shoes come out of a printer, it sources thermoplastic polyurethane (TPU), ethylene vinyl acetate (EVA) and other familiar plastics, but in pellet form. It then applies additives to produce what Dr Beard refers to as "a flexible material that's good for your feet". Additives in use include nano-carbon fibre (to increase durability) and, also at nano level, gold, silver and copper for their antimicrobial properties. There are also ceramic materials, which help the plastic from which the uppers are made to manage moisture better.

"We have around 25 material options at the moment," Dr Beard says. "What we want is to create a palette for designers to use. But it's like a Willy Wonka factory; you can throw whatever you want in there to create a new property. Scented oils, for example. A polymer is essentially a gel, so you can have scented polymers to make the shoes smell good."

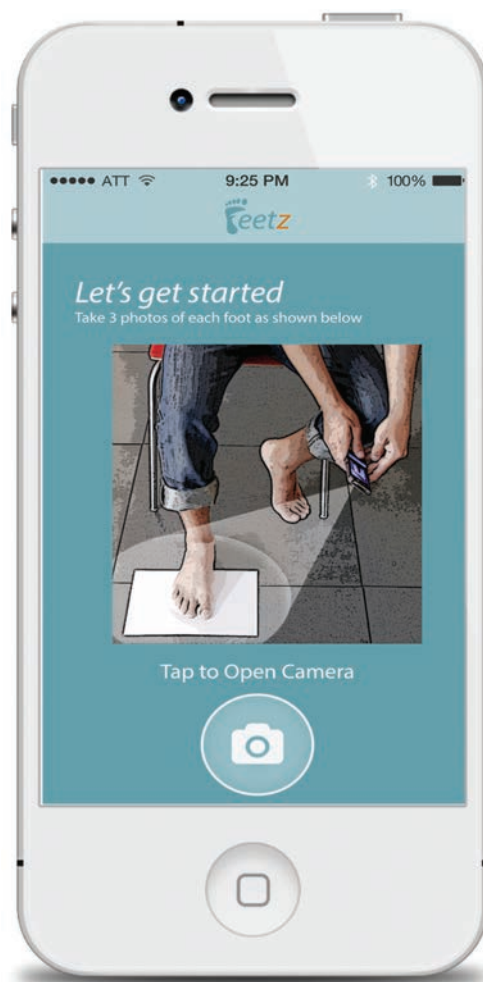
He also insists that no compromise on design is necessary. Material surfaces with 3D printing come out smooth, but the footwear company has invested in an electrostatic flocking gun that can spray fibres onto the surface to add visual appeal. Feetz has also developed a technique for incorporating any design or motif on special dissolving paper. Immerse a shoe with the paper in liquid containing "a few special chemicals" and the ink transfers to the shoe when the paper dissolves. It also uses a dissolvable support structure, produced by its printers, within which the upper and the sole are printed.

Production line

Dr Beard is originally from the UK but is at home in Chattanooga, Tennessee, which is where Feetz has its base; he describes it as "a geek city", using the term as a compliment. Chief executive, his wife, Lucy, is also from an IT background. Creativity is clearly in healthy supply at Feetz,

but the company has had to face up to the challenge of making multiple pairs of its shoes cost-effectively enough to become a successful business. It knew its technology worked, but questions remained about how to make it work on an industrial scale. After securing permission to view at close quarters production lines run by automotive company Volkswagen, with each car coming off the line different from the last, Feetz's conviction increased that it could do something similar with 3D printing and shoes. It spent much of 2014 building up seed funding and believes 2015 could be a breakthrough year, commercially, for 3D printed shoes in general and for Feetz in particular.

Nigel Beard can address already most of the questions shoe buyers are likely to want to put to the company. Those concerned about sustainability will learn from him that one of 3D printing's advantages is that it is "zero-waste". The software works out how much material is required to make shoes of the size and in the design required and uses only that amount. Feetz has spent time pondering the possible use of plastics made from polylactic acid (PLA), but has decided against it. The problem, is that, while the raw materials for PLA itself are from renewable resources, the plastics are not reusable at the moment, "and we want to re-use as much as we can", he insists.



Feetz has patented software called SizeMe, which will soon be available as an app.

CREDIT: FEETZ

But he makes it clear to the people he talks to that the biggest advantage is being able to find and buy the shoes you really want. "Fit and comfort are like style," he says, "they are subjective. And if someone says they would like a longer toe-box we can adjust accordingly. If someone else says they want a glove-fit, we can adjust in a different way."

More fundamentally, he believes the Feetz demographic will include people with 'problem' feet, such as those with bunions, those with different-sized feet and so on. "It's people who want to take care of their feet," Dr Beard says, "but who feel they currently have little or no choice when it comes to shoes or no place to go. Our information is that this can be up to 20% of the population. We are targeting people who have a burning desire to solve the problem of finding shoes they can wear." 🌀



With its software in place and a range of soft materials already available for designers to work with, Feetz believes commercial success for its 3D printed shoes is just a step away.

CREDIT: FEETZ

NOT BEFORE TIME

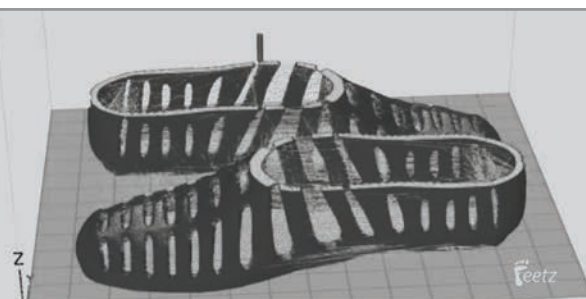
One of the founders of footwear-focused computer-aided design (CAD) software developer Stratégies, Jean-Marc Pedebay, has said he believes 3D printing has an important role to play in footwear production today, but has some doubts about mainstream consumers' readiness to buy finished shoes produced by a printer.

As someone who has been passionate in pushing the use of cutting-edge IT in the shoe industry since the mid-1980s, Mr Pedebay has kept a keen eye on 3D printing, although it is a technology that Stratégies, whose best known product is the Romans CAD application, has not itself developed. A bigger technological breakthrough for his large customers, including major global groups such as Wolverine and Clarks, is that moving data onto the Cloud means designers and range specifiers can access and work on CAD files from anywhere, making response times and the approval process for new designs and new collections much faster. Speed is the key, of course, and it's here that he has seen an important contribution from 3D printing.

"Plastic shoes produced using a 3D printer will not replace shoes with leather uppers in the mainstream market," he says, "but there is a collaborative cycle in the supply chains of most big companies in this industry and it's here 3D printing is playing a part, speeding up what happens at the sample and prototype stage. You send the file by email and your colleague or supply chain partner prints it. You can save around 30% of the time required to produce a prototype. And I can tell you that one organisation that is unhappy about this progress is FedEx. In 2014, FedEx must have earned a million dollars less than it was used to earning from one major footwear group that I can think of, precisely because of this."

He talks of technology as a means of "democratising" the shoe industry. He says he realises that small-scale, individual designers working on their own would be unlikely to find the funds to invest in an expensive software application such as Romans CAD, but with availability online, he envisages a pay-as-you-go future in which companies of all sizes will have access to the smart technology they need, and he says the biggest challenge facing all footwear industry technology providers is to make it as easy as possible for shoe companies to become more high-tech. And when they do, he believes the links between designers, pattern-makers, factories and retail will become stronger, making things better for the person who really counts, the consumer.

"It's about identifying problems and mistakes early," he explains. "This is what has happened in automotive and in the aerospace industry. Those companies spend money up front to avoid delays and mistakes. Delays and mistakes at the time of a launch can prove much more expensive, so they invest to make sure they end up with a product that is right. Footwear has its peculiarities, but it can still learn a lot from looking at other industries."



High levels of IT skills available locally have helped Feetz make Chattanooga its headquarters.

CREDIT: FEETZ

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Hyper-cutters

SERGIO DULIO

Cutting and its related technologies are among the topics that are most often cited as a demonstration of how shoe making has evolved since the dawn of the first industrial revolution; swing beam and travelling head presses were in time replaced initially by NC (numerical controls), die cutting machines and, more recently, by an all new breed of dieless cutting systems. When they first appeared, back in the early 1990s, these machines marked a clear departure from earlier and more traditional devices.

The old ones were mainly massive steel machines, with an electrically driven hydraulic pump to generate the cutting force that was necessary to press the die through the material (in single or multiple layers) to be cut. They were rather simple devices based on half a century of experience in the mechanical design of machines. The new systems were quite different. Although a robust mechanical design was still a good starting point and guarantee for a reliable and robust device, it was not the only relevant technological content as electronics played an equally important role.

The new systems were multi-axis (typically three) set-ups whose movements were controlled by so called NC-piloting servo drives capable of dashing the cutting head along very complex trajectories. And, as these trajectories were the result of an accurate calculation of where each single part of the shoe had to be placed in order to guarantee the necessary material yield and product quality, software was the third important element of their design.

Mechanics, electronics and software are the building blocks of any complex mechatronic device. NC-controlled dieless cutting tables also marked the evolution of footwear technology suppliers from essentially mechanical firms into interdisciplinary organ-



The new Atom FlashCut 2H 1685 is typical of the latest generation of cutting tables.

CREDIT: ATOM

isations with a much wider set of skills and more modern design teams. As stated, this evolution started, at the beginning of the nineties, peaked at the turn of the new millennium and is somehow continuing today. It drove the search for the fastest and most affordable cutting technology, from the early water jet systems, when this approach looked like the only one capable of delivering the high cutting speeds needed to make dieless cutting competitive in terms of output, to the soon abandoned laser, and on to the current state-of-the-art high frequency oscillating blades.

A good indication of the design ingenuity that the specialised vendors exhibited is the enormous proliferation of machine architectures that included flat or inclined bed, table or conveyor belt, single-head or multi-head. The catalogues of the most important market players in this technological segment are full of models and variants, each one with its specialisation for cutting leather or synthetic materials, single or multiple ply, small or large cutting areas, with inline or offline software for calculation of the best pattern layout to obtain the optimal combination of high

material yield and cutting throughput.

Current generation machines can handle virtually all types of materials normally used to build a shoe, from the most delicate and expensive leather to heavy duty ones such as plastic and board, that make up its more resistant parts. This is achieved through 'multi-tool heads' that feature a full range of different devices, from the universally adopted high frequency oscillating blades (with electric or pneumatic chuck), to milling tools, punches of different shapes, pens and, more recently, printing heads. This seems to indicate that versatility is what customers demand from these machines, that is being able to cover as many cutting applications as possible with the same kind of machine and least possible number of tool changes and set-ups. Size also plays an important role, both when synthetic materials in sheets or rolls are handled or when leather must be processed, with the need to accommodate hides of different size and shape that vary from less than a square metre to as much as four to five metres for the large hides used in car and furniture upholstery.

This gives a rather clear idea of the challenges machine manufacturers had and still have to face in order to keep ranges up to date and preserve their competitive edge. Last but not least, machines are also becoming more 'elegant'. The early models, properly called 'cutting tables', in fact looked just like big square tables with a very clumsy appearance and little or no attention to design finesse. Things are now changing and the latest models begin to exhibit more curved surfaces and a streamlined body that conceals all the machine's mechanisms and electronic components. It is a clear indication that technology is reaching a mature level in which function gives way to aesthetics, and a transformation that certain customers in more industrialised countries have begun to demand.

Is this the end of the evolutionary wave or what kind of other transformations can we expect to see in the future? There are indications that something is happening and there are at least three trends that deserve attention: robotisation, integration and hyper-cutting.

CUTTING SERVANTS

If we have to mention another technology that is enjoying a moment of great promotional hype, it is certainly robotics. New machines are being developed and new models are available with characteristics that are going to change our perception of them and of the way they can be integrated in a factory environment. They are becoming lighter, smarter and cheaper, easier in terms of programming their tasks and, above all, they incorporate new sensors and control features that allow them to be placed side by side with human workers. In a few words, it is ever more easy to integrate them with other machines and to be programmed to seamlessly complement tasks traditionally performed by human operators.

Let us take for instance picking and collection of the parts cut by the machine. In a typical leather-cutting job there might be several dozens of different shapes to be gathered after cutting, sorted in the proper order and stacked in their appropriate containers. This task is typically performed by one or more operators standing at the back of the machine and retrieving the parts as soon as they are cut and conveying them to the unloading area. This is a job for the new 'servants'. In a similar way, one or more of these lightweight robots could be mechanically and electronically integrated with the

cutting machine in a way that instructs the robot of where the parts are and what to do with them, leaving its intelligence to decide in which sequence and with which logic the picking mission should be executed.

Speed and dexterity are therefore the demands they should satisfy. Open communication protocols and a standard signal exchange bus are the prerequisites to enable this type of integration and there is intense work on this subject within ASSOMAC, the Italian association of shoe machinery producers, aimed at proposing an industry standard. Although there are already a few examples of this kind of application in production tests as well as much research work, it must not be forgotten that driving the robot to perform its picking mission is only a part of the solution. Choosing the right approach to pick up the cut part and cope with the diversity of shapes and materials to be handled is as important as telling the robot where to go and accounts for the same if not higher R&D efforts as the previous one.

We can therefore expect to see in the near future more and more cutting tables equipped with robot arms dealing with a number of tasks, from part collecting to material handling throughout the entire extended cutting process. New generation robots are a perfect match for these requirements, particularly as being designed to cooperate strictly with their human colleagues, they can be easily



Atom's complex printing head.

CREDIT: ATOM

installed in the proximity of the machines, straightforwardly integrated with their electronics and, if necessary, moved around and assigned to other tasks.

NO MORE 'LONELY' MACHINES

In the past we had cutting tables with one or more operators tending them and performing all necessary manual tasks such as loading hides, placing sheets of materials, locking roll holders stacked with textiles or other synthetics, using the software to generate the cutting layout and collecting the cut parts. Little attention or interest was shown as regards the upstream and downstream operations that occurred before and after the cutting task. The machines were an island that did not communicate with the other systems across the shop floor.

This is also changing. Although our earlier examples of the integration of robots with cutting tables hint at that, there is more, industrial cutting applications that show the way. Cutting being a general technology by definition, there are several applications of cutting machines originally designed for footwear processing that are used in sectors ranging from the classical converting industries to gasket manufacturing and to the automotive world. In the latter especially, the cutting step is just one of a very complex sequence of operations in which materials are taken to the machine, cut, post-processed and moved to the next operations.

Automatic devices of various kinds (including robots) take care of the mechanical integration under the supervision of SCADA (system control and data acquisition) software applications that monitor process data and perform all the necessary supervision and coordination activities. It is an important transformation from isolated, individual machines to open systems that can communicate with other modules of a complex manufacturing system.

If industrial applications are paving the way in this evolution, the trend is nevertheless also noticeable in the footwear and leather goods sectors whereby cutting machines (besides

robots) have begun to talk to and integrate with spreading tables for the preparation of multi-layer materials to be cut, with sheet stacking systems or with motorised roll holders. Some of these are simple examples of low level integration with components often designed and built by the same manufacturer as the cutting machine. In other cases, third party machines are connected and integrated, once again calling for data communication standards and system openness as already mentioned.

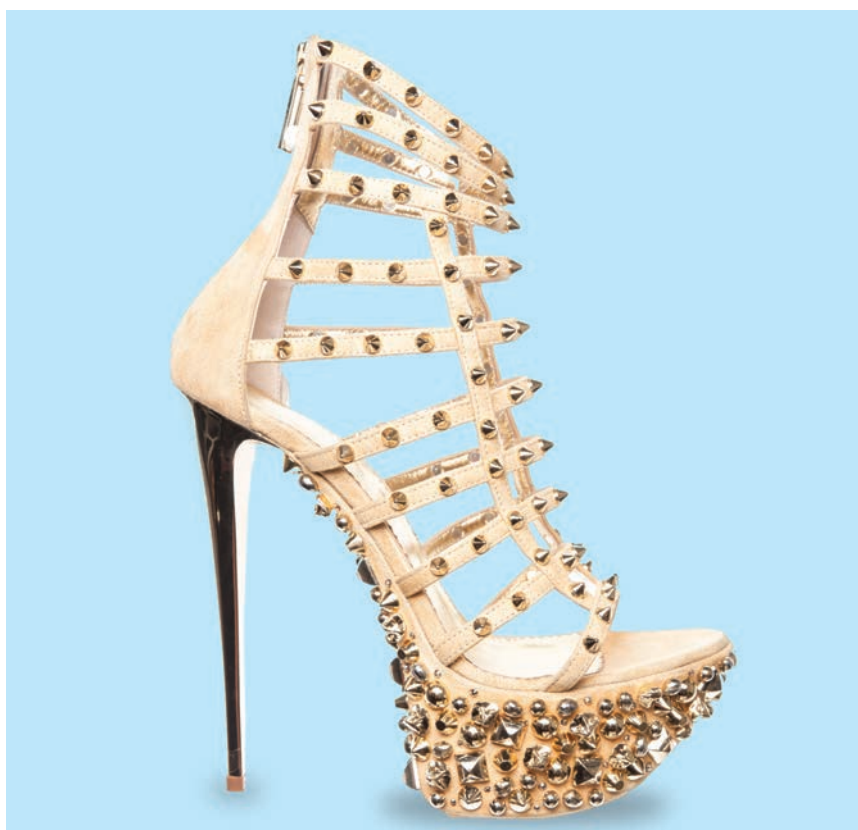
HYPER-CUTTING

We know that after having cut all the parts of a shoe, there are several other operations that must be performed on all such parts or merely some of them. Patterns are typically split, then skived along the edges, very often reinforced on the same edges; texts and letters are to be printed in certain areas or decorations executed in specific portions. While these are the most common, one can think of others, such as depositing layers of material in particular areas or according to a specific design. Until today, such operations were performed by

dedicated machines (when available) or manually at the cost of a series of manipulations of the cut parts that were collected and sorted after cutting, reprocessed one or more times, re-collected and sorted again. This involves a high number of manipulation steps, is highly time consuming and risks making mistakes, or forgetting or losing parts: in a word, inefficiency.

In any one of the modern cutting tables, parts are firmly held in place after cutting, lying flat on the machine surface so they lend themselves perfectly to receive additional processing. On the other hand, the number of different tools that their cutting heads can accommodate is growing ever greater and the double head architecture that many such machines possess allows them to dedicate one head to cutting and the other to corollary applications.

We can now think of configurations for 'hybrid' cutting machines capable of cutting and skiving, or cutting and spraying adhesive on to the entire cut part or along the edges. They could also deposit thin layers of material (low temperature melting TPU among



Further advances in cutting technology can only bring benefits to shoe making in terms of both quality and cost.

CREDIT: MICAM

others) on certain areas or follow a given design to improve either the aesthetic of the shoe or, more interestingly, to tweak the mechanical properties of that part in order to obtain a shoe with improved functionality.

Cutting machines develop new and enhanced abilities that go beyond their initial and simple original mission. As a hyper text link opens up to new content, such as pictures or video clips, so hyper-cutting expands the functions of the machines, linking their operations with other processing steps and collating in one single, multi-task system a variety of different missions. It looks like an exciting development, but should be examined more carefully. There are in fact advantages and drawbacks in adopting this approach. Having a number of operations performed on the same machine, instead of a multitude of them, certainly sounds more efficient and should also reduce overall costs as there are less handling steps and therefore a further move in the direction of a more streamlined manufacturing solution with fewer machines.

But there are drawbacks, notwithstanding the technical feasibility of some of the operations that have been mentioned. For example, if we need to skive the edges of a part, how do we cope with the fact that it lies on the cutting bed grain side up when skiving is normally performed on the flesh side.

There is one critical aspect above all others. Cutting, as any other type of processing done on single patterns, is strictly part by part, so it is perfect when you cut single layers as in the case of leather. If some of these operations are to be performed on synthetic materials, which are typically cut in several layers at the same time, we may lose important advantages in terms of overall productivity. In this case, a careful trade-off between the loss of overall throughput, related to the need of processing each part singularly, and the gain in efficiency thanks to the reduction of the total number of processing steps must be found.

CONCLUSIONS

The trends we have presented are at

a very early stage or perhaps in the domain of a futuristic vision, as in the case of hyper-cutting. Nevertheless, it is becoming more and more evident that, after a long period of galloping evolution followed by consolidation and a certain stagnation in terms of innovative ideas, cutting machines are approaching a new evolutionary phase that is somehow going to change their characteristics and their role in the shoe manufacturing process. In parallel with that, we have observed a curious phenomenon in market dynamics. Whilst the number of vendors decreased or, should we perhaps say, consolidated with a small group of market leaders and some courageous followers, the range of

machines and models on offer proliferated dramatically up to the point that there seems to be a machine for each single, minute application or manufacturing need. It is probably a good thing for the market, but certainly a nightmare for the manufacturers.

So what the future might bring is less of more: fewer models with more hyper-cutting functions, equipped with robot arms to automate all the necessary corollary applications and deeply integrated into the whole manufacturing flow. Certainly, no longer the relatively simple machines they evolved from but, instead, highly productive multi-purpose machining centres. 🐍



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Continued fluidity of global manufacturing

STUART CLEAVER

With the global economy gradually recovering over the past two years, it is an appropriate time to consider the implications for the footwear industry in terms of where it finds itself entering 2015, compared to the situation before the recession and how it may develop over the next few years.

Global production of finished footwear rose by 5.6% in 2013 to almost 20 billion pairs, an increase of 1.06 billion. This can mainly be attributed to further growth in Asia which increased by 938 million pairs, South America which achieved a rise of 61 million pairs and Africa with an additional 51 million. Asia's 938 million pairs was predominantly from China which produced an extra 743 million pairs, followed by India with 130 million and Vietnam 44 million more than in 2012.

Conversely, amongst the developed countries, Western

Europe produced just five million more pairs, Eastern Europe three million and North/Central America six million. Whilst these are in themselves commendably positive results, they do not as yet offer any particular threat to the hegemony of the South East Asia. Does this therefore indicate that it is business as usual with the unstoppable march of Chinese footwear, Vietnam mopping up any slack in the market and India servicing its own needs in pretty much glorious isolation?

In 2013 the answer was probably yes as tentative customers and retailers were still wary of the market and new sources and ways of doing things. China alone supplies 57% of global demand. China plus India supply 70%, whilst the further addition of Brazil, Vietnam and Indonesia means these five countries alone are responsible for 81% of the world's footwear production.

FIGURE 1 - COMPARATIVE LABOUR COSTS 2013

COUNTRY	COST PER HOUR (USD)	% CHANGE ON 2012
Ethiopia	0.32	+39.1
Bangladesh	0.44	
Cambodia	0.61	
Vietnam	0.80	+14.3
India	0.85	+13.3
Nicaragua	1.22	0.0
Thailand	1.32	+3.0
El Salvador	1.33	+6.4
Indonesia	1.75	+29.6
Dominican Republic	1.81	+3.4
China	1.90	+18.7
Guatemala	2.15	
Brazil	3.59	+6.5
Mexico	3.87	+28.5
Portugal	6.35	
Italy	18.26	+4.0
Japan	25.7	-21.0

SOURCE: GFP SURVEY

A CHANGE IN THINKING

Certain developments have, however, started to impinge on current thinking as to future sourcing. On the one hand, China has, we are told, entered into a phase of seeing domestic production more for domestic consumption rather than for exports. Labour costs (*Figure 1*) have almost quadrupled since 2005 to USD2 per hour. There is stricter enforcement of overtime, the government minimum wage climbs apace, there are some labour shortages and environmental demands are increasing. Added to this, the currency exchange rate is 30% above what it was in 2005.

In 2013 China produced 11.3 billion pairs of finished shoes of which 8.7 billion were exported. Production for the local market was 23.6% of total output. Domestic consumption in China is estimated at two pairs per capita. Total consumption in 2013 compared to 2009 showed a 43% rise, whilst compared to 2012 it was 15.8% higher in volume terms. Imports at 110 million pairs also grew although at a relatively low level.

So there are signs that demand in China is growing and that Chinese factories are servicing more of that demand. However, exports are also continuing to flourish both directly and

through third parties as will be discussed later. One possible warning light for the future was that exports to the leading market, the United States, actually fell by 15 million pairs in 2013. Therefore, whilst it may be true to say that there is some movement towards providing more footwear to the local Chinese market, the impetus to supply ever more exports does not yet seem to have abated, with the possible exception of the US. This gap was effectively filled by Vietnam which also saw an improved year with an extra 44 million pairs produced and 36 million exported. This surplus was virtually all attributable to the US market and effectively replaced the reduced Chinese supply.

SEEKING ALTERNATIVES

Due to the rapidly rising costs in China's traditional shoemaking areas, there is always a possibility that production will move to ever lower cost regions of the country. Even so, higher labour costs may well start impacting more on the country's exports from 2014 onwards. Organisations such as the FDRA (Footwear Distributors and Retailers of America) and AAFA (American Apparel and Footwear Association) in the United States have been considering possible alternative low cost sources of supply for the US market.

The most cited names have been Nicaragua, Cambodia, Ethiopia and Bangladesh.

The footwear industry in these countries is at different stages of development, with Bangladesh and Cambodia having production levels of more than 50 million pairs and export levels of around 40 million. *Figure 2* indicates the state of play in these other

FIGURE 2 - ALTERNATIVE PRODUCERS

COUNTRY	PRODUCTION	EXPORTS	COMMENTS	CAUTIONS
Bangladesh	100m pairs	36m pairs	Young One 30m pairs Development	Strikes, Fire in Walmart supplier
Cambodia	51m pairs	42m pairs	Kingmaker 25m pairs Development with Chinese involvement	Factory problems (Asics) 2013 pay rise
Ethiopia	25m pairs	6m pairs	Huajian 25m pairs Development	Ara withdrew
Nicaragua	4m pairs	2m pairs	Brazilian investment Exports for Clarks	Schmidt problems

SOURCE: GFP SURVEY

countries' industries and their possible developments.

Bangladesh and Cambodia are clearly further along the development road than Ethiopia and Nicaragua and also have some large scale developments coming on stream. Bangladesh is able to offer cheap labour, raw material availability and duty free exports plus the presence of the likes of Bata, Tata, Apex and Young One to provide overseas know-how. Cambodia is already exporting over 40m pairs, with the UK and Germany as important markets. Kingmaker has manufacturing plant in Cambodia. Originating in Taichung, Taiwan in 1980, the company now has its headquarters in China. With five plants (three in China) and around 15,000 employees, it is an important presence in Cambodia. The "Better factories in Cambodia" programme should help to address any safety and health issues.

Ethiopia has a large livestock population and developments by the Chinese company Huajian are quite extensive. Interest shown by Japanese and UK companies is also indicative that Ethiopia has the potential to become a leading 'Shoe Hub' in Africa.

Currently, Nicaragua is the least developed of the four. It does however offer proximity to the United States and Brazil to interest both buyers and developers in those countries. The involvement of two Brazilian shoe manufacturers, Schmidt and Aniger, seemed at one stage to presage an expansion. However there were rumours that Schmidt was closing and the future is now not so clear. Exports to the United States actually fell in 2013 from one million pairs to 600,000 but ProNicaragua claims that Clarks and Ecco will both now be buying in the future.

RELOCATION

There has been some discussion on the topic of relocation of shoe production back to developing countries instead of—or in addition to—alternative sources to China. If Chinese costs rise to a level that it is no longer as attractive to source from that country and/or it devotes itself more to domestic consumption (still a big 'if'), then there is the thought that some production which has been lost to Europe and North America could return.



Automation makes footwear manufacture possible in industrially developed countries.

CREDIT: HEINRICH KLUMPEN SONS

Why might that necessarily happen, besides costs? The possibilities include reducing time to market especially for fashion products, making use of the "made in 'our' country" tag, to service military requirements, achieve greater control over the entire process and to give more cachet to a brand. To achieve this goal requires sufficient skilled labour and an ability to reduce costs as much as possible which, in turn, may call for greater automation. The questions therefore are whether this relocation is happening, to what extent and where.

There are in fact already instances where shoe production is either being switched to European plant or extended in existing plant. Two examples are the German comfort shoe manufacturer Ara in Portugal and high end men's Goodyear producer Church in the UK.

Ara was due to move some of its production to Ethiopia but decided instead to make use of existing plant in Portugal and Romania. In Portugal it increased its production capacity from 1.4 to 2.0 million pairs, an increase of 600,000 pairs per annum. This example shows a commitment to Portugal which has been following a strategy of upgrading quality and introducing the latest technology and automation.

Church in the UK, now owned by Prada, has announced that it will

increase its output by 20-30% with an extra 150 employees. Dr Martens, a one time major UK manufacturer, had already brought back some production from abroad although only about 70,000 pairs per year.

Also in Portugal, Ecco announced in 2013 that it was bringing some bulk production back to Portugal with a USD 5.7 million investment which was to be completed by August 2014. 200 new jobs were being created and production capacity increased to a million pairs. In 2013 there were 600 employees with 200 working on R&D. Ecco had moved bulk production away from the country in 2009. Since then, Portuguese costs have fallen and there is also greater flexibility in production.

Under the Berry Amendment in the United States, prior to 2002, athletic footwear for the military had to be produced there, as were dress shoes and combat boots. In 2002 athletic footwear was deemed to be exempt. This is now being re-considered as it is felt that there are US manufacturers such as New Balance and Wolverine who have the capability to produce them. Some estimates claim that as many as 4,000 new jobs could be created as a result.

New Balance has in fact successfully used the 'Made in United States' promotional strategy for some time, producing about 25% of all its footwear

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domestically. Even so, the bulk is still produced in China and Vietnam, plus some in a plant in the UK. These examples perhaps indicate that a relocation is most likely where special factors such as US military/political need for local suppliers or high value/quality products such as Church's shoes are involved.

To put it in context, whilst these increases in production in developed countries are heart warming in that it helps to prolong shoe manufacturing in Europe and North America, they are relatively small in quantity compared with the developments of Kingmaker, Young One and Huajian where 15 to 20 million pairs may be involved.

To enable shoe production to move back to the developed countries will require several "sine qua non" such as equipment for greater flexibility, ability to produce smaller runs, quicker response especially for fashion footwear, greater range of styles, innovative design, ability to serve niche markets such as very high quality, safety and industrial footwear, military footwear, specialised sports and making use of new sales channels.

EUROPEAN RE-EXPORTS

One of the more recent problems in tracking the flow of global production of footwear is the phenomenon of re-exporting and triangulation whereby footwear is sent to one country only to be shipped on to a final destination for whatever reason. Among the worst instances of this phenomenon is Europe where countries that have virtually lost their footwear production capability entirely have become leading exporters of already imported footwear.

In volume terms, some of the largest re-exporters in Europe in 2013 included Belgium with 196 million pairs, followed by Germany with 185 million, Netherlands 156 million, UK 141 million and Slovakia 95 million. So, a total of 773 million pairs of shoes were exported just from these countries alone although they actually produced no more than 36 million in total themselves. Although it can be surmised with some degree of probable accuracy that the bulk of these re-exports will have originated in China, it nevertheless tends to 'muddy the waters' when tracking the production supply line globally.

INCREASED FREE TRADE?

Whilst Free Trade areas have been with us for many years it does appear that ever newer ones are arising with the potential to have a greater impact on global trade. Perhaps the one that is causing most concern at present is the TPP (Trans Pacific Partnership) and, with Japan joining in 2013, covers 12 countries with a total population of 792 million, a combined GDP of USD 45.2 trillion, which represents 40% of the world economy.

The countries covered are the United States, Canada, Australia, Mexico, Malaysia, Singapore, Chile, Peru, New Zealand, Vietnam, Brunei and Japan. At present China is an obvious omission but the Chinese have stated that they are interested in joining if issues such as intellectual property rights can be resolved. China is also in discussions with the US about a bilateral investment deal if it can be decided which industries should be excluded. There is substantial resistance to TPP, however, with fears that, for example, multinationals could sue governments and become over dominant.

There are many other regional free trade areas as, for example, ASEAN, the Association of South East Asian Nations. This was set up in 1967 and has 10 members including Vietnam, Thailand, Indonesia, and Cambodia. These and other developments are all pointing to stronger regional free trade which may well impact on the global footwear industry over the next few years.

THE NEXT 5 YEARS

The top ten shoe producers in the world manufactured around 1.7 billion pairs in 2013 or, put another way, 7.5% of global shoe production. Whilst there has been a move to larger production units, especially in China and Brazil, typical manufacturing companies are still small- to medium-sized. This is likely to remain so as the increasing diversity of consumer demands and preferences makes flexibility of the manufacturing and supply chain a key necessity.

There is also talk of more vertical integration so that shoe companies can better control supply of raw materials, components and completed footwear right up to retail. Again this can happen but only to a limited

extent and involving relatively few companies as smaller ones lack the financial resources to create such a complex structure.

In the retail sector, the diminishing status of independents and the growth of non-specialist shoe retailers is almost inevitably set to continue. In particular, the impact of on-line retailing of footwear in common with so many other consumer items is likely to go from strength to strength as it is combines both choice and convenience.

Finally, the rise of the BRIC economies—Brazil, Russia, India and China—has not gone quite as smoothly as was once envisaged with Russia and Brazil both experiencing some problems, China at an interesting stage and India still not realising its full potential. The world's footwear manufacturing is therefore still extremely fluid and is likely to remain so for the foreseeable future. We live in a very uncertain world.

A report published in November 2014 by BSG, the Boston Consulting Group, entitled 'Apparel at a Crossroads', questioned whether the demand for 'fast fashion' would mean the end of the seemingly endless search for ever cheaper labour costs. The report suggests that buyers are beginning to understand the inefficiencies in sourcing from further and further away are beginning to outweigh the cheap labour costs.

In the apparel sector, retailers are desperate to have key 'sell-out' and time scale between the emergence of catwalk trends and mass dissemination reduced from a year to as little as three to four weeks. A delay can now mean the difference between a gross margin of 50% and one of only 5%. Using far-flung supply chains can also mean taking a hit on transportation, write-offs, time delays and losing customer loyalty and confidence.

The conclusion was that countries like the UK and Spain with the lowest adjusted labour costs in Europe could take advantage of 're-shoring' as has the US', particularly in high end manufacturing. While it has not happened so far, there is no reason why it could not in the future. 

This article is based on extracts from the author's 6th annual World Shoe Review.

Polyolefins could set new standards

STEVE LEE

The footwear industry is an interesting environment as it is a great market for the introduction and testing of new ideas, products and manufacturing processes. This is because all footwear presents very demanding structural requirements due to the high stress levels experienced in the everyday wear of shoes. They may look innocuous and low-tech but are in fact high performance products.

Initially they were constructed, by skilled craftsmen, from natural products, mainly leather, wood, natural rubber, reeds, grasses, etc., who utilised the innate properties of these materials along with nails and cotton laces to produce viable footwear in all parts of the world. However, as the population of the world increased and living conditions changed, the demand for greater production and increased performance led to the introduction of

more synthetic materials.

This can be seen most clearly through the way soling materials have changed over the last nine decades as shown in *Table 1*.

From this table it is clear that ever since the 1930s, a new soling material has been introduced every decade with two exceptions. In the 1970s there was intense activity with three new materials appearing—PU, TPR and TPU, whilst the other exception is the 2000s with no new material appearing at all. I would imagine that, by now, most people in the footwear industry are familiar with the first ten materials listed for 2010, from leather down to latex rubber; but what does one make of POE or polyolefin elastomers? Just another Poly-whatsit that no one knows about. Well, it is about time we all did know more about these exciting materials. They are part of the same family of polymers—polythene and

polypropylene—that we use every day, merely produced in a different way to offer new and remarkable properties.

WHAT EXACTLY ARE POEs?

Most industry people are very familiar with the established polyolefin family of materials from their ubiquitous use in packaging films, containers, stackable chairs, automotive, rope and a huge range of other applications. The polymerisation of ethylene into polyethylene has a long history but it was not until the work of Ziegler and Natta during the 1950s and 1960s that efficient catalyst systems based on transition metals (normally titanium with aluminium-based co-catalysts) were developed and the process became fully commercial. Chromium-based catalysts for the production of broad molecular weight products were developed at about the same time by Phillips. Since those early days great progress has been made in both catalyst and process technology.

However, these conventional processes always produce heterogeneous polymers and the grades of polyethylene produced can be made to differ in a range of parameters. For example, variations in molecular weight, chain length, amount of short chain branching (SCB), level of alpha olefin comonomer, density, linearity can all be controlled but, even so, all more or less result in a random polymer that varies in both molecular weight and SCB distribution.

About 40 years ago, a new range of catalysts was discovered; called metallocenes, they revolutionised the production of polyolefins. It is not too dramatic to say that the

ALL CREDITS: DOW CHEMICAL



Table 1 – Introduction of soling materials.

1930	1940	1950	1960	1970	1980	1990	2000	2010
L	L	L	L	L	L	L	L	L
NR	NR	NR	NR	NR	NR	NR	NR	NR
	VR	VR	VR	VR	VR	VR	VR	VR
		RR	RR	RR	RR	RR	RR	RR
			PVC	PVC	PVC	PVC	PVC	PVC
				PU	PU	PU	PU	PU
				TPR	TPR	TPR	TPR	TPR
				TPU	TPU	TPU	TPU	TPU
					EVA	EVA	EVA	EVA
						LR	LR	LR
							POE	POE

Key:

L	Leather
NR	Natural Rubber
VR	Vulcanised Rubber
RR	Resin Rubber
PVC	Polyvinyl Chloride
PU	Polyurethane
TPR	Thermoplastic Rubber
TPU	Thermoplastic Polyurethane
EVA	Ethylene Vinyl Acetate
LR	Latex Rubber
POE	Polyolefin Elastomer

phrase 'Metallocene Revolution' truly describes the enormous changes brought about in the design and production of polyolefins. Like the Ziegler-Natta catalysts, metallocenes are based on transition metals such as zirconium but are significantly different in structure in that they have several ligands (neutral molecules that bond to a central atom), usually cyclopentadienyl compounds, attached to the metal.

These ligands are also usually bridged by other species. It is the specific nature of these ligands and bridges plus the overall orientation of the molecule that determines the precise catalytic activity of a particular metallocene catalyst. As with the Ziegler-Natta catalysts' metallocenes need co-catalysts to activate the system and are again based on aluminium, usually MAO (methyl aluminoxane). Other cheaper alternatives are under investigation in order to extend the performance and efficiency of the metallocene catalyst package.

The major difference of metallocene catalysts, when compared with Ziegler-Natta or chromium catalysts, is that their structure, often referred to as single site, produces precisely the same polymer species each time. This results in a much more homogeneous product with a narrow molecular weight distribution or MWD and a specific, predictable composition of the short chain branching due to

the co-monomer. So far so interesting—certainly as far as chemists are concerned—but plastics are no of use to the footwear soling industry that requires elastomeric materials.

Whilst these new metallocene polyethylenes were extremely versatile materials, they were still typically 'plastic' in nature, i.e. they do not recover when stretched beyond a certain point but permanently deform. So they are not 'elastic' and therefore not much use in the footwear market. However, in the early 1990s, ethylene-based copolymers were manufactured using metallocene catalysts and were commercialised by Exxon Chemical Company and the Dow Chemical Company that were plastomeric (POPs - polyolefin plastomers) or, more importantly, could be made elastomeric (POEs - polyolefin elastomers) in nature. This was the key breakthrough as far as the footwear industry was concerned.

The 1990s served as a technical and marketing testing ground for a whole range of metallocene products: plastomers and elastomers introduced by Exxon and Dow; the metallocene-based LLDPEs developed by Exxon, Dow and several other producers such as Borealis, Elenac, Evolve, Japan Polychem Corporation, Japan Polyolefins, Mitsui Chemicals, Phillips and Ube Industries Ltd., plus metallocene-based polypropylene introduced by Exxon, Targor and Finna. During this period, DuPont Dow Elastomers also introduced metallocene-based EP elastomers. Over the course of two decades, Dow and ExxonMobil have established themselves as the global market leaders in the metallocene plastomers/elastomers and polyolefins industry.

In the late 90s, the polyolefins industry witnessed the maturing of metallocene-based polyolefins, especially ethylene-based products. At the bottom of the density range, elastomers have been mainly competing against EPDM, LDPE, EVA and flexible-PVC amongst other materials. Plastomers have particularly established themselves in film markets, especially in food packaging applications, where they compete against ionomers, EVA and LLDPE. The use as a sealant layer represents the major application for POPs in food packaging.

HOW DO POEs FIT INTO THE FOOTWEAR MARKET?

Different polymer materials can be used in a wide variety of applications in shoe construction including the following

Infuse could create a new generation of midsoles.



Table 2 – Soling market 2014 (Ktonnes – estimate).

L	NR	VR	RR	PVC	PU	TPR	TPU	EVA	LR	POE	OTH	TOTAL
690	475	2,585	440	2,995	690	1,625	200	970	405	20	150	11,245

Table 3 – Midsole market 2014 (Ktonnes – estimate).

EVA	PU	POE	OTHER	TOTAL
218	128	40	50	436

ten areas (alphabetically): adhesives, coated uppers, counters, foam linings, sockliners, sole inserts, soling, upper components, upper materials and water-proof barriers. To tease out how the polyolefins fit into shoe construction it will be easiest to focus on the products from the current market leader in this area, The Dow Chemical Company Ltd (DOW).

This is especially relevant as the earliest POE introduced to the footwear market, first seen in a trial form at Simac in the late 1990s, was the ENGAGE elastomer then produced by DuPont Dow Elastomers (DPDE) and now by DOW. It made a strong impact but did not immediately find acceptance by sole moulders. There were problems, as is often the case with new materials, regarding the bonding of unit soles to uppers, pigmentation, release agents, lacquers, etc. Even though DPDE offered solutions there were perceived to be too many problems. It was also easier to fulfil the demands of the other application areas being investigated, so they took the limited amount of ENGAGE available at the time, rather than the footwear market. What elastomeric and plastomeric products are now available from DOW that are of interest to the shoemaker and where do they fit into the market? There are four:

ENGAGE – ethylene-octene (or butene) elastomeric homogeneous copolymer. These grades offer a combination of flexibility and toughness, making them very suitable for footwear and have found use in such applications as wellington boots, overshoes and simple unit soles but their greatest presence has been in the production of midsoles for athletic footwear. Here they are used on their own or more usually as a blend with EVA and formulations based on ENGAGE provide numerous improvements compared to EVA on its own, including, as claimed by DOW:

- Lightweight foams at equivalent hardness
- Excellent low temperature flexibility
- Enhanced resiliency
- Lower shrinkage
- Improved abrasion resistance
- Enhanced filler capacity

Taken overall, these qualities can bring real benefits to the performance of athletic shoe midsoles and many of the major OEMs are now using them in their designs.

INFUSE – ethylene-octene elastomeric block copolymer. These are olefin block copolymers (OBCs) that consist of alternating blocks of hard (highly rigid) and soft (highly elastomeric) segments, where the block structure offers a performance balance of flexibility and heat resistance compared to random polyolefin copolymers or other materials. One of the major advantages of these OBCs is their increased dimensional stability. This offers footwear OEMs the potential to reduce production costs while delivering a longer lasting performance midsole and several of today's largest footwear brand owners are launching or are currently in development of new shoe models with INFUSE-based midsoles.

VERSIFY – ethylene-propylene plastomeric and elastomeric copolymers. These plastomers and elastomers are at the early development stage for use in shoe components. Some of the areas being looked at are as diverse as coated fabrics for uppers, toe puffs and heel counters. They provide a good combination of excellent sealing and hot tack performance, plus elasticity, flexibility, softness and compatibility in blends.

NORDEL – ethylene-propylene-diene monomer rubbers. Hydrocarbon rubbers can be used for both outsoles and midsoles, and these next generation EPDMs are clean and consistent. They also deliver improved performance, processing and efficiencies that benefit both

compounders and processors alike in the footwear industry.

The other key player in the metallocene polyolefin market is Exxon and for the footwear industry it has focused on the use of its Exact plastomers. Blending these plastomers with EVA results in midsoles with improved low foam density and durability with similar performance claims to those made by DOW:

- Increased stability, comfort and durability
- Advanced new 'super light' athletic shoes
- Less midsole compacting or breakdown for longer shoe life
- More comfortable cushion and bounce to return energy
- Increased shoe flexibility

The claim is that brand owners can rely on Exact plastomers in shoe design and manufacture to help them achieve optimal cushioning and weight goals without sacrificing performance. Exxon claims that OEMs and EVA compounders use these plastomers for their outstanding toughness and low-temperature flexibility.

It is therefore quite clear that there is now a range of practical polyolefin elastomers and plastomers available to the footwear industry.

HOW SUCCESSFUL HAVE POEs BEEN SO FAR?

It is estimated that around 23.4 billion pairs of shoes will have been produced globally in 2014 consuming about 11.3 million tonnes of soling materials. *Table 2* shows the split of this volume across the eleven key different soling materials whilst *Table 3* provides the values for the midsole market. POEs, 15-20 years after their introduction, only account for around 0.2% of the total outsole market and even taking into account the amount of POE used in midsoles this only increases to about 0.6%.

Polyolefin elastomers have therefore still not made a dramatic impact on the footwear market and the question has to be why, as they are excellent products. Is it still down to the original reason they experienced difficulty such as problems with the bonding of unit soles to uppers, pigmentation, release agents, lacquers, etc., or is it more critically down to the focus of the producers of these materials who appear to be focusing more on other applications than footwear?

WHAT IS THE FUTURE FOR POEs?

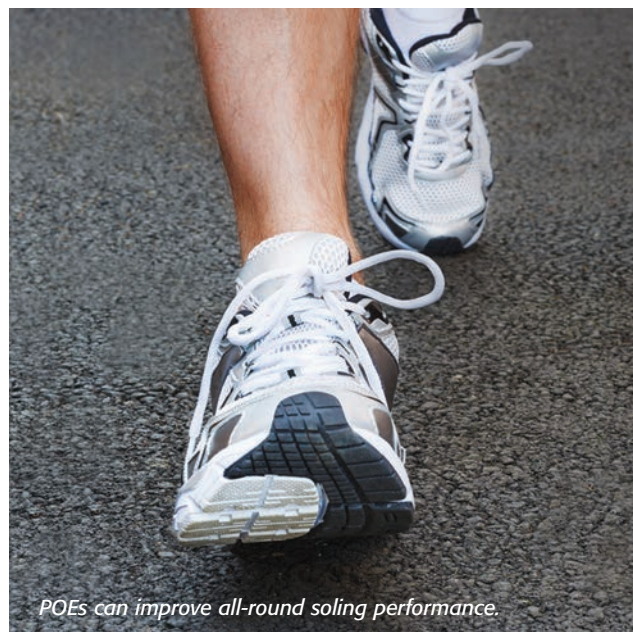
Key points in favour of POEs and POPs are:

- Natural low density
- Can be made in a wide hardness range
- Can be blown to very low density without rapid loss of properties (cf to PVC and TPR)
- Blend easily with EVA
- Improved softness and comfort
- Easy to recycle

Despite all these apparent advantages, both POEs and POPs are struggling to establish a position in the footwear market. Why is this? One reason is that they are still seen as very novel materials; another is that they are competing against a broad range of traditional materials that currently continue to meet the demands of shoe manufacturers.

Finally, there is the question of price. Polyolefins are currently some 15-20% more expensive than EVA which,

while clearly not as good, is well established, reliable and, in terms of performance, still considered satisfactory by a majority of sports shoe producers operating in a competitive market. Perhaps polyolefins are destined to be like polyurethane: excellent materials with much to offer but restricted to a niche in the footwear market due to price, so often the final arbiter as far as the industry is concerned. Time will tell. 🌀



POEs can improve all-round soling performance.

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Personalised insoles using 3D printing

3D printing is opening up new possibilities for shoe design and manufacture as revealed by Sergio Dulio in the July/August 2014 issue of *World Footwear*. It is also a process where advances are being made at a rapid rate as more experience is gained and an ever wider range of materials are explored so that new applications will be constantly developed. Some will succeed and some will fail, such is the nature of progress.

A very clever one that has all the appearances of succeeding has been developed by RS Print, a new joint venture set up last year by 3D printing services provider Materialise and an existing long-term partner, specialist foot scanning technology provider RSscan International. The two Belgian companies have brought their knowledge and expertise together to create customised insole inserts for athletes that can help to enhance their existing performance or bring them back to previous levels of performance after injury.

Take the example of UK runner Paula Radcliffe, holder of the women's marathon world record. On a mild autumn morning last year, she did something she had not done for over two years and completed a 10 kilometres competitive race. She finished third, but winning the 2014 Worcester Road Race was far from her main objective on the day; she is on the comeback trail. One of the great home hopes for a medal at the London 2012 Olympics, she was forced to withdraw after a persistent injury problem in her left foot returned and, having reached her late 30s and not confident she could regain full fitness, she decided to end her career.

RS Print is helping her to make a comeback through the use of its personalised 'dynamic' insoles that match the feet and running style of the individual. The improvements she has experienced plus a desire to make the London Marathon in 2015 her swansong, have combined to convince her to start competing again. The company is now so sure of the positive effect that its insoles can have that it is making them much more widely available to athletes in all sports and of all levels of ability; not just world record holders.

HIGH FREQUENCY MEASUREMENT

The scanning method is the one RSscan International has been using for some time, whereby pressure sensors are inserted into a plate or floor and, by inviting an athlete to run or walk over the surface, the system creates a 'high-frequency measurement of the dynamic movement of the feet'. The plate can be covered with wood, plastic, tarmac, synthetic grass or any other surface to get as close as possible to imitating competition conditions. This makes it a great deal easier to analyse the gait of any runner.

The business model is to set up testing facilities like this in the shops RSscan International runs in three locations in



Paula Radcliffe racing in the 2011 Berlin Marathon, part of her preparation for the 2012 Olympic Games in London that ended in tears. After more than two years, she is now making a comeback, thanks in part to new-generation insoles from RS Print.

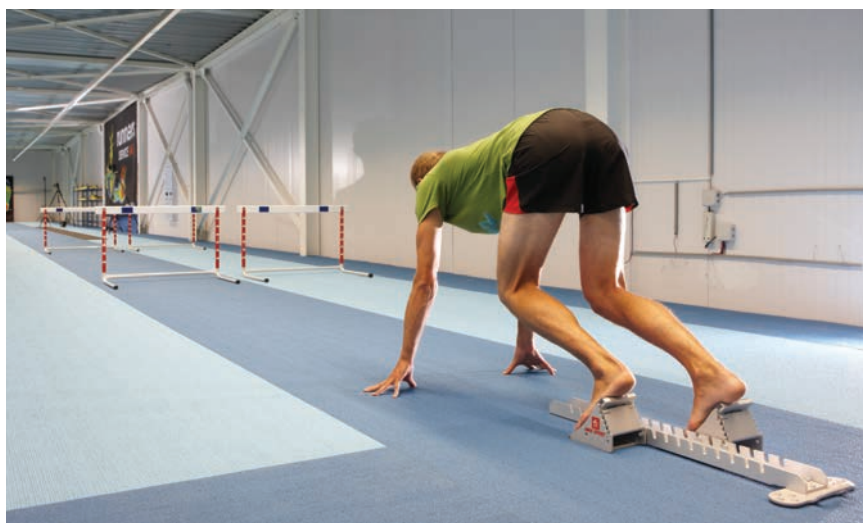
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Belgium, at its headquarters near Beringen, in Antwerp and in Ghent. Members of the public can come in, have their gait analysed and have staff in the shops recommend shoes that will best fit and work for their particular needs. The shop in Antwerp has a facility called the ProLab, in which elite athletes can receive dedicated help with particular foot and footwear challenges. This, in fact, was how the company came into contact with Paula Radcliffe. Around 200 elite athletes from all parts of the world avail themselves of the services on offer at the Antwerp facility every year and prominent athletic footwear brands are frequently instrumental in pointing their sponsored athletes in the direction of the RSscan International ProLab in times of injury; the Belgian company has paid many of the brands back by supplying important, detailed product development information.

The company began talking to Materialise about developing a 3D printing project for insoles as far back as 2008, but it was only in 2014 that they set up RS Print together. CEO Dennis Vandebussche says that the market is now ready for products of this type and 3D printing techniques have now also become mature enough for serious production to be viable. The inserts have two parts; the first is the 3D-printed section which comes out as a thin, lightweight, hard plastic polyamide after sintering through the Materialise 3D printing system in powder form. The second is a top layer, which is typically in polyurethane or EVA and is there for comfort. These are then bonded together to complete the insole.

PERSONALISATION GOES FURTHER

Although dynamic analysis of a runner's gait is not new, Dennis Vandebussche says that what is new and is happening for the first time, is that all the information from the scans is being used in a very controlled way to make an 'intelligent' insole. The information built up about a particular person and a particular foot can be linked to the digital design of each 3D-printed insole, putting all the information the scans have made available inside the insole. Each insole is therefore completely personalised to a far greater degree than has ever been achieved before.



Pressure sensors in the floor can help build up high-frequency measurement of the dynamic movement of an athlete's feet.

CREDIT: RSSCAN INTERNATIONAL

The way we bring our feet into contact with the ground can clearly say a great deal about us, provided you know how to analyse the data. Officer candidates for the UK army provided RS Print with an interesting case study for its business idea. Young people selected as potential officers have to undergo an intensive period of physical training and RS Print carried out gait analysis on one group before the training programme began.

It used the information to put the candidates into three groups: high risk of dropping out before the end owing to physical problems, medium risk and low risk. The pre-assessment was confirmed by the fall-out rates in the three groups. A follow-up study, providing some of the people in the high- and medium-risk groups with personalised insoles to use during the physical training resulted in a 65% improvement in drop-out rates.

RS Print will continue to focus on feet and one idea to have emerged recently from the work it has done so far is that it will also be able to analyse fully what happens when a cyclist rides a bike in a race. And, by mimicking what is going on on the bike, the company will be able to develop cycling-specific insoles. It is

also interested in developing products for sports such as tennis and badminton, which are characterised by very short movements and often on very aggressive surfaces. It wants to be able to make a difference to athletes at the top of such sports by providing them with special, targeted, personalised support in a very thin insole.

RS Print's direct customers are retailers rather than individual athletes, with the RSscan International shops in Belgium being the most obvious examples. Other retail groups in Belgium and the Netherlands have now also begun to use the technology and the company hopes to expand into other countries during the course of 2015. "What we want now is to help those retailers upgrade," says Mr. Vandebussche, "to allow them to order insoles for their clients from RS Print. They are using the scanning technology to help their customers choose shoes already and they will be able to use the same technology to order personalised insoles too with a delivery time of just two weeks." 

RS Print insoles are in two parts, a top layer for comfort and, the clever part, a thin, lightweight 3D-printed layer underneath.

CREDIT: RS PRINT



Jack Erwin's Sullivan and Foster collections use Goodyear welt and Blake construction techniques.

CREDIT: JACK ERWIN



Manhattan-based shoe start-up Jack Erwin appears to have had a remarkable first full year in business in 2014, cementing its reputation as a provider of affordable, high-class, handmade shoes for men and attracting investment from one of the biggest names in the global footwear industry. The design of its three collections takes place in New York, but the company has found its ideal manufacturing partners on the other side of the Atlantic.

New York brand turns to Spain for supply of handmade shoes

Last year, 2014, was momentous in the admittedly young life of New York men's footwear brand Jack Erwin. In September, the start-up, which specialises in offering high-quality handmade boots, brogues and loafers, announced that a major name in the global footwear industry, Brown Shoe Company, had taken a stake. Brown Shoe chief executive, Diane Sullivan, said at the time that her company had identified Jack Erwin as "a great incubator brand". She said Jack Erwin had high growth potential and "an interesting, new business model".

It conducts almost all of its business online and only ships to the 48 contiguous states of the US (the whole of the US except Hawaii and Alaska). In addition, it opened a new fitting room in November in the Manhattan neighbourhood of Tribeca, which customers can visit to ascertain their size and choose styles, with the company then shipping the finished shoes to the customer's home, just as it does for non-NYC customers whose only access is through the website. The company believes the fitting room idea will have an important impact; it's a consumer-facing initiative and the direct-to-consumer space is the only one in which Jack Erwin wants to operate. Founders, Lane Gerson and Ariel Nelson, have shown, according to Diane Sullivan, "an unwavering commitment to quality and detail and represent the next generation of business in our industry".

Luxury for less

For his part, Ariel Nelson said at the time of the announcement that investment from Brown Shoe will provide the new company with the chance to build up the

Jack Erwin brand and business model "using the knowledge and expertise of a respected industry leader". He and Lane Gerson started Jack Erwin in 2013, setting themselves the goal of providing luxury, handmade men's shoes for under \$200. It currently has three collections: Sullivan, Foster and



Access to quality materials and traditional artisan skills attracted Jack Erwin to manufacturers in Spain.

CREDIT: JACK ERWIN

Wright. Prices in the first two still start at \$195, while the summer suede loafers in the Wright collection are \$95. Sullivan and Foster are collections of dress shoes and boots, the former using Goodyear welt construction and the latter Blake construction. They are designed in New York, along very classical lines, but are handmade on the other side of the Atlantic, by artisan manufacturing partners in Spain.

The founders have said that they toured “dozens of factories” before choosing a small number of family-run footwear businesses in Spain as partners. Jack Erwin has described these suppliers as, typically, companies that have been in operation “for hundreds of years” and produce handmade men’s shoes using, at the footwear firm’s insistence, leather from tanneries in Italy and France. It says “generations of skilled artisans” work there and that these companies enjoy the additional advantage of proximity to “the finest raw materials in the world”, a reference to the leather.

Pan-European search

The company’s head of customer experience, Kiernan Heine, explains that, Jack Erwin had looked at factories “all across Europe” but found that the manufacturing partners in Spain it has chosen to work with were able to offer “the highest-quality shoes for the best price”. And he insists that it’s also because of this commitment to quality that the company continues to source its leather from tanneries in Italy and France. And all for \$200 per pair.

“Lane and Ariel, our two co-founders, realised that [as consumers and young business people] they had been priced out of the classic, amazing men’s shoes that they had grown up seeing on the feet of the men they respected and could not understand why these styles needed to cost a fortune,” Kiernan Heine says. “Through traditional retail channels, men have been flooded with options that are

either poorly made, over-designed, or prohibitively expensive. We plan to always offer a curated selection of shoes that are honestly-priced and made by hand to ensure the highest quality.”

Any name you like

Spanish footwear industry federation FICE made moves in 2014 to encourage this type of partnership with shoe manufacturers there. It even launched a new event called Co-Shoes, which took place in October in Elche, the country’s main footwear-producing area. The idea behind Co-Shoes is to help Spanish manufacturers link up with customers who want to source well made shoes from Spain and put their own brand names on them.

High-end Israeli footwear designer Kobi Levi said earlier in 2014 that he will launch a new “factory-friendly” collection in the near future, with Spanish manufacturers among the likely partners he will turn to. A much better known New York-based label, Stuart Weitzman, has made all of its shoes in Spain for decades. So Jack Erwin is far from alone in sourcing high quality shoes from family-run footwear businesses in that part of the world.

Similarly, Scarosso, a German-owned footwear brand specialising in handmade shoes, which started off selling online only, like Jack Erwin, but which has since opened a chain of own-brand boutiques, sources all of its shoes in Italy. Scarosso was founded in Milan in 2010, but by two German students, Moritz Offney and Marco Reiter, who met at the city’s Bocconi University. Another parallel with Jack Erwin is that Scarosso also aims to make high-quality handmade shoes available to its customers at affordable prices; its prices start at around €200 per pair.

For Spain and (in the case of Scarosso) Italy, this policy represents a bit of a change in direction. For years now FICE and its Italian counterpart Assocalzaturifici have been



Part of the attraction is easy access to high-quality leather from tanneries in France and Italy.

CREDIT: JACK ERWIN



Brown Shoe Company took a stake in Jack Erwin in 2014.

CREDIT: JACK ERWIN

encouraging their member companies to work hard on branding, to build up a portfolio of brands and expand those brand names into lucrative international markets such as China, Russia and, of course, the US. This policy has brought good levels of growth for many footwear groups in southern Europe, but for others, perhaps smaller manufacturers, the investment and effort involved in launching brands and promoting them around the world have proved too demanding. It's clear from FICE's 2014 Co-Shoes initiative and from the success Jack Erwin and the others have had in building up strong manufacturing partnerships that there are enough companies around who are content to concentrate on what they have always been best at, making high quality handmade shoes.

Growth curve, learning curve

Kiernan Heine believes that Brown Shoe's investment will allow Jack Erwin to take its time in creating "the sustainable company that we have always wanted to build". The start-up firm says it will use Brown Shoe as a constant point of reference as it continues along what it hopes will be a healthy growth curve. And even though Brown Shoe has a long and successful history in the global footwear sector, Heine says it has never made an investment like this before and that the experience ought also to provide Brown Shoe with a new experience and, possibly, an opportunity for it to learn something too. 🧐



Founders Lane Gerson and Ariel Nelson set up Jack Erwin in 2013 because they believe traditionally handsome, hand-made shoes ought to be available to men for around \$200.

CREDIT: JACK ERWIN

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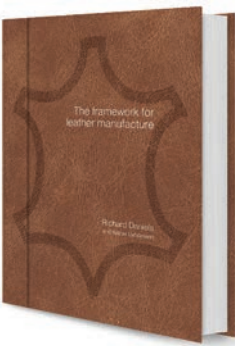


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9	American & Efid	1
7	Bayer Material Science	2
33	Camtex Fabrics Ltd	3
27	Cleansport NXT	4
23	Emtex Global	5
4	Faytex	6
39	ICL Rhenoflex	7
Cover 4	Rafik Heel	8
19	Rhenoflex	9
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28	Sheehan Associates	11

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