

WORLD FOOTWEAR

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MAGAZINE FOR THE GLOBAL SHOE INDUSTRY

**Children's brand
with feet, eyes and
ears on the ground**

**Old shoe materials
are recyclable**

**Customised and
sustainable**

**Brands want
suppliers to keep
unrest to themselves**



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 Image: Van Gastel Shoes

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News

SPAIN Footwear's manufacturing output achieved growth in value of 2.4% to a record €2.25 billion in 2013; the 2012 result indicated a decline of 6.4%. For the first time in a number of years, the value of exports exceeded the value of imports by €190.5 million. In terms of volume, shipments reached 135 million pairs, an increase of 1.9%.

PORTUGAL Footwear association APICCAPS said it will spend €1 million a year to double exports by 2025 from the 2010 level of €1.2 billion. Executive director João Maia said 90% of the money would be spent on helping the country's manufacturers take part in international trade fairs. Portugal exported around 74 million pairs last year worth €1.7 billion, an 8% rise over 2012.

TUNISIA Footwear exports from Tunisia fell 6.1% in 2013, owing to the closure of a plant in Menzel Bourguiba in May 2013, which had been run by Italian safety footwear specialist JAL Group. JAL said its investors were unwilling to continue with operations there owing to disputes with the workforce. Footwear still accounted for 51.3% of all leather sector exports, with shoe uppers claiming a further 20.9%.

UK One of the largest shoe collections in the world is to be digitised and made available online for footwear enthusiasts everywhere in the world to see. Northampton museums have been collecting shoes since the 1870s and today there are over 12,000 pairs of shoes in the collection dating from as long ago as 1000 BC to the present day.

DOMINICAN REPUBLIC The government of the Dominican Republic will provide funding for training footwear workers for companies that set up factories or manufacture products in the country. A delegation has attended a meeting of Wolverine suppliers in China to promote the country as a footwear manufacturing destination. More than 30 multinational brands including Rocky Brands and Timberland manufacture shoes in the country.

BELGIUM Compulsory labels of origin on shoes, leathersgoods and other products sold in the European Union (EU) came a step nearer on April 15 with a vote in the European Parliament to approve the idea. Organisations such as the Italian footwear manufacturers' association, Assocalzaturifici, have worked hard to convince politicians of the need to apply 'made in' labels. The EU's Council of Ministers will now be asked to approve the legislation.

MEXICO Footwear industry leaders in Mexico have expressed concern at a new free trade agreement between their country and Panama. "We know some companies ship shoes through Panama and sometimes even put a new label on them," said the president of CICEG, the Guanajuato footwear industry association. This is a reference to shoes coming into Mexico through a third country subject to Mexico's footwear import restrictions, a process known as triangulation.

TURKEY A warm winter in Turkey has hit the footwear business hard. Huseyin Cetin, managing director of Turkey's footwear manufacturers' association, said sales of winter shoes and boots are at levels 50% below what they were last year. "This has meant financial crisis for some of our members," he said, "and will cause the closure of some companies."

INDIA The Central Board of Secondary Education is considering making leather shoes mandatory rather than compulsory after being influenced by PETA secretary Gauri Maulekhi, who wrote to the board wrote complaining of "environmental concerns" of leather. "The production of leather involves highly toxic chemicals," he said.

CHINA China exported 10.6 billion pairs of shoes in 2013, with a value of \$48.1 billion, an increase of 5% in volume and of 8.5% in value compared with 2012. Shoes with leather uppers accounted for only 8% of the total volume, at 866 million pairs, but nearly 25% of the value, at \$12 billion. China imported 55.5 million pairs of shoes with a combined value of \$1.7 billion.

PAKISTAN Exports of leather footwear brought \$62.3 million into the country from July 2013 to January 2014, an increase of 3.5% compared to the same period a year ago.

BANGLADESH Export earnings from footwear, footwear and leathers goods grew by 40% in the first seven months of the current fiscal year, July 2013 to January 2014, according to the Bangladesh Export Promotion Bureau. Footwear exports were 33.2% higher at \$338.8 million.

NICARAGUA Brazilian footwear manufacturer Tecshoes is to double the capacity of its operations in Nicaragua by 2015, giving it a capacity of 10,000 pairs per day. Tecshoes has made footwear for Clarks in the Central American country since 2011; the CAFTA free trade agreement between Central America and the US means the brand can ship shoes from Nicaragua to the US duty free. The government hopes the free zone set-up will work as well in Nicaragua as it has in the Dominican Republic.

THAILAND Exports of footwear from Vietnam to Thailand had a value of \$25.9 million in 2013, an increase of almost 300% since 2010. This has led to speculation that Thailand will cease to produce its own footwear and rely on imports. Thailand is facing a shortage of labour, observers in Vietnam said, as well as challenges posed by an unstable currency, high labour costs and competition from other producers.

UNITED STATES Sales of fashion footwear, which includes all types except athletic footwear, in the US totalled \$41.52 billion in 2013, a 4% increase over 2012, according to research firm NPD Group. Outdoor and casual footwear experienced the largest growth by value, at 10% and 7%, respectively.

● The US government has altered a long-debated policy on athletic footwear for its armed forces, meaning they will now have to be made by companies on US soil. New Balance, which makes a quarter of its shoes in the US, and Wolverine Worldwide have been campaigning for a change for several years. New Balance's Matt LeBretton called it a "big win".

Footprints

YVES MORIN RE-ELECTED PRESIDENT OF UITIC

The International Union of Shoe Industry Technicians (UITIC) has elected CTC chief executive, **Yves Morin**, as its president for a second term. Mr Morin was first elected to be president of UITIC in 2010.

Also on the executive committee of UITIC will be Malek Khelil from Tunisia as vice-president, Enrique Montiel from Spain as treasurer, and Françoise Nicolas from France as general secretary. Other committee members will be Sergio Dulio from Italy, a regular contributor to World Footwear, Leandro De Melo from Portugal, V.B. Parvatikar from India, Martyn Shorten from the US, Uwe Thamm from Germany, Ricardo Guerra Sanchez from Mexico and Li Yuzhong from China.

UITIC aims to develop technical knowledge in the footwear industry in particular by organising international conferences and setting up information exchanges between its members.

OVER 6,000 VOLUNTEER FOR NATIONAL FOOTWEAR CARES MONTH

Employees from US-based sports and outdoor brands have been volunteering across the country as part of Footwear Cares Month, an initiative organised by the Two Ten Foundation to support communities.

Reebok, New Balance, Under Armour, Wolverine and Puma joined around 100 other companies, with over 6,000 people donating their time.

Volunteers in Kansas City helped build a garage and packed a month's worth of groceries for more than 1,000 senior citizens and 700 children. In California, volunteers packaged 1,360 pounds of rice and bread for distribution to food banks, and more than 750 in Indiana gathered to pack 247,800 packets of food for children in need.

Blake Kruger, CEO of Wolverine Worldwide and chairman of the Two Ten, said: "This level of support from a single industry is unprecedented. For our industry, it's only the beginning."



Rachel Bilson, wearing Brian Atwood shoes and a dress by Preen.

CREDIT: EVERETT COLLECTION/SHUTTERSTOCK

ATWOOD AND MADDEN JOIN FORCES

US footwear designers **Brian Atwood** and **Steve Madden** have bought the Brian Atwood intellectual property and related assets from The Jones Group.

Mr Atwood has operational and creative control in the design, production and distribution of the Italy-based Brian Atwood designer collection and will continue as an owner and chief creative officer of Brian Atwood intellectual property.

Mr Atwood said: "I've always had a clear vision for the Brian Atwood brand and the women who wear it. I look forward to the next phase of my business with support and expertise of Steve to drive strategic growth and category expansion to continue to create experiences that women love."

The US-based Jones Group, which owns brands such as Kurt Geiger and Stuart Weitzman, bought the Atwood

brand in June 2012 for an undisclosed amount.

Mr Madden suggested that the partnership could include a men's collection and potentially handbags, alongside a higher-end line of shoes.

NEW CHAIRMAN FOR AAFA

During the 2014 American Apparel & Footwear Association (AAFA) annual executive summit, **Philip Williamson** handed over the chairmanship to Rick Helfenbein, president of TellaS, Luen Thai USA.

AAFA executive vice-president Steve Lamar said: "Philip has been an instrumental partner as AAFA carried out its mission in Washington over the past year. Because of his leadership, AAFA continued to amplify our political voice, expand our valuable educational programmes, and grow our membership. As a fourth-generation apparel and footwear business leader, Philip brought great vision, and we appreciate his service to our organisation."

Mr Helfenbein is a strong advocate for a robust US trade agenda and lectures on the subject of supply chain and international trade at universities around the country. He participates annually in the Consortium for

Operational Excellence in Retailing at Harvard University and the Wharton School of Business.

He said: "The US apparel and footwear industry moves at rapid pace, so it's essential our trade association stay ahead of the immense challenges before us. We must encourage Capitol Hill to rise above partisan gridlock and work to help us maintain our competitive edge in the global marketplace."

ITALIAN FOOTWEAR INDUSTRY 'NEEDS LONGER-TERM VISION'

Full-year results for 2013 exports of Italian shoes confirmed the picture manufacturers association Assocalzaturifici has presented in previous results announcements – that while exports grew modestly (3.3% in value to €7.4 billion and 1.8% in volume to 202 million pairs), domestic consumption collapsed.

Cleto Sagripanti, president of

Assocalzaturifici, warned the industry needs to set longer-term strategies with adequate planning. "The time for improvisation, if it ever worked, is definitely over," he said.

He said, by still not adopting a label of origin strategy within the EU, it is paying the price for a short-sighted view that ... we can sustain consumption solely by selling products made by others.

"Demand is in the hands of traders/importers," he said, "who capitalise on low-priced and low-quality products with huge margins and without informing consumers. We are not against delocalisation *per se*, but we are against those who delocalise by hiding behind the absence of rules and therefore without declaring the country of production. In Europe, the risk is that of triggering a battle based purely on prices that will end up making production in Europe unsustainable, even at the higher end of the market, because consumers are not able to gain information on what is produced outside Europe."

While the EU faltered, exports to the US and Canada grew 6% and 13% respectively, while exports to China grew 27%, those to South Korea increased 10% and exports to Hong Kong grew 11%.

HOTTER'S NEW CHAIRMAN TO DRIVE ONLINE GROWTH

UK footwear brand Hotter has appointed a new chairman to help steer the company's growth following its acquisition by private equity firm Electra at the start of the year.

Alan White, who is a non-executive director at Direct Wines and Topps Tiles and was CEO of home shopping business N Brown, takes up his position with immediate effect.

Peter Taylor, CEO of Hotter, said: "Alan brings a wealth of home shopping experience as well as direct knowledge of retail and international expansion. His knowledge and advice will be invaluable in helping us continue to grow the business over the coming years."

Hotter has grown significantly over the last four years and the now employs over 1,000 people. It produces a pair of hand finished shoes every 20 seconds, making it the UK's largest shoe manufacturer.

ADIDAS TAKES THE LONG ROAD TOWARDS FINDING NEXT CHIEF EXECUTIVE

Herbert Hainer will remain as the chief executive of sports group adidas until 2017, the company has announced, giving it time to choose his eventual successor carefully.

Mr Hainer's current contract was due to expire next year, but adidas has asked him to stay on for a further two years. He has been at the head of the company since 2001.

Adidas said it wanted its next chief executive to come in during 2017 as it will be a quieter sporting year than 2016, in which Rio de Janeiro will host the Olympic Games, and 2018, in which Russia will host the FIFA World Cup.

NIKE APPOINTS BANKER AS CHIEF INFORMATION OFFICER

US sportswear brand Nike has hired **Anthony Watson** as the company's chief information officer (CIO).

He joins from Barclays Bank, where he has been their London-based managing director and CIO for Europe and the Middle East, as well as for global operations, since 2009.

He was also the chair of Barclays' Europe, Middle East, retail and business banking operating committee and co-chair of Barclays' global diversity & inclusion council. 

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Products & Services

BUREAU VERITAS ACCREDITED TO TEST FOR CHROME VI IN LEATHER

UK-based testing service Bureau Veritas has announced that it has won accreditation to test for chromium VI in leather products.

As a result, Bureau Veritas will be able to carry out tests "to meet the challenges brought by the amendment of Annex XVII of the REACH regulation" at its laboratory in Warrington.

This annex of the much wider REACH legislation that the European Commission is in the process of introducing imposes a restriction on chromium VI in leather articles that come into "direct and prolonged or repetitive contact with the skin".

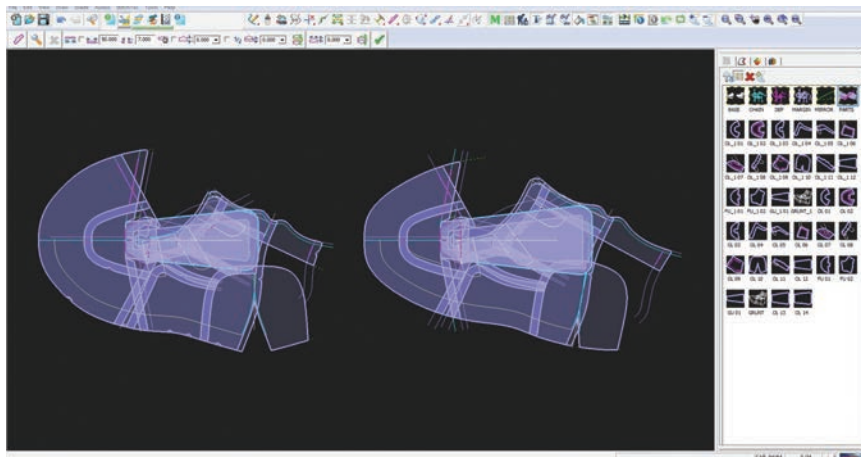
Changes that will come into force in the first quarter of 2015 will, potentially, have an impact on a wide range of products, including footwear, gloves, garments, accessories, car seats and furniture. The new requirement prohibits content of chromium VI equal to or greater than 3mg per kilo of the total dry weight of leather (three parts per million). This is not applicable to second-hand items.

"Much of the world's leather production is tanned with chromium salts," Bureau Veritas said in a statement. "Chromium VI is not intentionally used in the preparation of leather but may be formed during the processing by oxidation of chromium III, used for the tanning of the leather.

"The only internationally recognised analytical method available to detect chrome VI in leather is EN ISO 17075." It is this test that the testing services provider is now accredited to carry out.

ZDHC OUTLINES CHEMICAL DISCLOSURE METHOD

The Zero Discharge of Hazardous Chemicals (ZDHC) Group has published the results of research into chemical disclosure methodologies among manufacturers, which it describes as a "critical step" towards identifying a platform that will improve chemicals management in the apparel and footwear supply chains.



DELICAM OFFERS ORTHOPAEDIC FOOTWEAR PROGRAM

Technology provider Delcam Crispin has launched an updated version of its Engineer Pro software specifically for the manufacture of orthopaedic footwear.

Engineer Ortho's multi-point transformation function transforms the style lines of an existing pattern to match a new last. This allows shoe designs to be transferred directly on to any individual last developed to match the patient's foot.

If parts have been developed as well as the style lines, then the same operation will adapt their shapes to the new last as well, says the company. "While the pieces are unlikely to be produced exactly as required for manufacture, the adjustments necessary will take, at most, one tenth of the time needed to develop the equivalent parts from scratch," it said.

It added that time savings will be particularly beneficial if the patient is suffering from a non-static condition, for example, progressive deterioration resulting from diabetes. In these cases, new footwear will be needed on a regular basis, with each pair needing to be redesigned based on new lasts.

The UK-based company launched the product at the OT World exhibition in Leipzig, Germany, in May.

It has selected Pollutant Release and Transfer Registers (PRTs) as its preferred tool, saying they are most widely used, and the move has been commended by the UN Environment Programme.

"The principle of disclosure and transparency underpins our work," said Cheryl Kreindler, ZDHC programme manager.

"After researching disclosure methodologies, the ZDHC Group recognises PRT as one of the best methods for addressing the specific issues posed by ZDHC and advocated by the Right-to-Know principle. However, we are also mindful of the timescales involved and the need to take interim action. This will be achieved by introducing a system to prevent intentional use of hazardous chemicals

in the manufacturing process."

The group, which includes Adidas, Jack Wolfskin, Li Ning, New Balance, Nike and Puma, intends to release a manufacturer's Restricted Substance List and prioritisation framework in the coming months.

CTC EXPANDS ASIAN HUB WITH INDONESIA BRANCH

Footwear and leather training body CTC has added to its South-East Asian hub with the opening of a branch in Indonesia.

The facility is based in Surabaya and will offer factory audits, physical and chemical analysis, certification, consultancy and training.

Indonesia exports more 640 million pairs of shoes per year, according to CTC, and as such is home to a large

number of footwear manufacturers.

Yves Morin, CEO of CTC Groupe, said: "CTC Indonesia is part of our continuing strategic expansion programme in Asia for all our business activities, from quality assurance services to corporate social responsibility consultancy programmes."

The Indonesia branch will join a network of six other Asian branches and will be run by Thomas Yong Mevel, CTC Vietnam manager.

AAFA LAUNCHES ONLINE VERSION OF CHEMICAL MANAGEMENT TOOL

The American Apparel & Footwear Association (AAFA) has launched a web-based version of its Voluntary Product Environmental Profile (VPEP) tool – a system through which companies can exchange environmental and chemical management information with their partners along the supply chain.

Built in partnership with software solutions provider TEXbase, the tool streamlines data and offers a more efficient way to communicate, the companies stated.

TEXbase founder Joe Walkuski said: "With increasing transparency and traceability requirements, VPEP providers can now easily collaborate with manufacturers, brands and retailers, to securely share chemical and environmental information for product development, compliance and sustainability initiatives."

The AAFA is the political voice of more than 1,000 brands and four million workers.

NEW FOOTWEAR LEATHERS FROM PRIMEASIA

Tannery group PrimeAsia has launched two leathers for footwear in its Fall Casuals and Varsity Athletics categories.

The Fall Casuals collection is targeted at the outdoor sector and combines "traditional leather craftsmanship with innovative technologies".

The Varsity Athletic collection brings together heritage leathers for athletic shoes. "This category includes smart engineered innovative leathers which provide designers with creative new leather products," it said.

The PrimeAsia tanning group is

headquartered in the US with facilities in China and Vietnam.

LUBRIZOL OFFERS LATEST RESINS AT CHINA FACILITY

Speciality chemicals company Lubrizol has launched two Oeko-Tex-certified thermoplastic polyurethane (TPU) resins for use in breathable textiles and footwear and which are now available from its Shanghai-based manufacturing facility.

"We have listened to the global apparel industry, and there is a need to shorten the length of the supply chain. Now, our processing partners are better positioned to supply their customers in a more efficient manner," said Sally

Lenhart, Lubrizol global market manager.

The resins have moisture vapour transmission values greater than 10,000 g/m²/day when tested under the ASTM International test method, E96 BW. 

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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.

12.05.14

PFMA revives Lahore footwear event

09.05.14

Beast to Beauty conference: Saddleback CEO named as keynote speaker

Jonathan Tisch, chairman of the Loews hotel group, picks Paris for footwear

08.05.14

Nike outlines progress in sustainability report

OutDry court case: Geox responds

07.05.14

Extreme weather hits US footwear sales

Adidas mulls Rockport sale

OutDry wins interim court decision against Geox

Shanghai consumers spend more on shoes

Crocs blames exchange rates for plummeting income

06.05.14

New safety shoe for food and health workers

UGG owner credits move away from sheepskin for 'recent success'

02.05.14

A&E to acquire Gütermann to accelerate global growth

01.05.14

Nike unveils 'fastest' boot for World Cup
Karl Lagerfeld to open 18 new stores by 2018

30.04.14

Hidesign branches into footwear

Columbia Sportswear reports 30% increase in footwear sales
Wolverine issues Q1 results

29.04.14

Puma owner wins award for environmental accounting system
Yue Yuen counts the cost of strike action

28.04.14

'Outstanding' sports and outdoor performance delivers strong Q1 results for VF

US: Shoe brands volunteer time to help communities

25.04.14

Ecco extends partnership with design school

24.04.14

Record first-quarter sales at Skechers

23.04.14

Labour of love for Toronto shoe entrepreneur

Firm that was Portugal's 'footwear university' faces liquidation

Yue Yuen says impact of escalating strikes has been mild

Italian shoe brands head to Turkey for Aymod

17.04.14

Nike supplier strikes to continue

16.04.14

Pikolinos builds new Maasai collection from a social responsibility project

Management buyout for Kurt Geiger

DSW buys into Canada's largest footwear retailer

Two-thirds jump in recycled PET for Timberland in 2013

15.04.14

H&M ups commitment to 'certified' leather

New owner acquires Garmont

Bata Pakistan posts profit and production increases, despite challenges

11.04.14

Small Portuguese shoe firm gets boost from Cristiano Ronaldo

10.04.14

Timberland plants more than 1 million trees in 2013

09.04.14

Mara Hoffman works on new Havaianas collection

German footwear firm to expand its operations in Portugal

New footwear unit for Sri Lanka's ambitious textile sector

Crocs outlines social and sustainability achievements

FDRA thanks Chinese suppliers

08.04.14

Dominican attracts Taiwanese footwear group

APLF meetings confirm Turkish tanners' 2014 concerns

07.04.14

Ghanaian footwear brand aims to be Africa's biggest footwear company

Cambodia: Ventilation problems at Puma and adidas suppliers

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Outsourcing trap. Big brands want all the benefits of having highly efficient manufacturing partners in Asia, but at the first sign of poor publicity, they are ready to walk away, whether the headlines are fair or not.

CREDITS: NIKE



Brands want cheap shoes but without social strife

Occasionally, you still hear commentators claim that there is no such thing as bad publicity, but consumer brands know it's not true, or at least not if the bad publicity is connected to social responsibility. News of any failure, or perceived failure, to look after the environment or workers properly is likely to spread quickly. Athletic footwear brands, many of whom make no product themselves, have found out the hard way that this also applies to suppliers.

When negative reaction began to build up in April to the response of outsource footwear manufacturer Yue Yuen to industrial action by the workforce at one of its factories in China, it would probably have been easier to count the major athletic footwear brands that were unaffected than those who must have known from the outset that their names would soon be mentioned in despatches. And it took no time at all for some of the biggest to begin talk of moving business to other partners.

The background here is that workers at Yue Yuen's factory in Gaobu, near Dongguan in southern China, began industrial action on April 14. The facility employs 45,000 people and

A strike by workers at one of Yue Yuen's factories in China in April 2014 brought widespread condemnation for the outsource footwear manufacturer, including threats from big brands that they would take their business elsewhere. Yue Yuen felt it had done nothing wrong except manage its business as efficiently as possible while sticking to all the rules, which is the reason the brands source from it in the first place.

makes shoes for Nike, adidas, Reebok, New Balance, Puma, Under Armour, Converse, Merrell, Asics and around 60 other brands. This factory alone produced more than 30 million pairs of shoes in 2013.

Above the minimum

As is the case with other large manufacturing plants in this part of China, many of the workers come from other provinces and live in factory dormitories, returning home only for major holidays such as Lunar New Year. Many of them send money back to their families, or spend a few years working in Guangdong to save up enough capital to start small businesses such as shops back in their home villages.

In Guangdong, which is the Chinese province with the highest overall gross domestic product, the authorities are strict about minimum wage levels. In May 2013, for example, official minimum wages went up by almost 20% compared to the previous year, with levels in and around the provincial capital, Guangzhou, rising to around \$250 per month. Many businesses have complained that it's impossible to hire people in parts of the province at the minimum wage. Therefore, the monthly wages companies often find themselves paying have to be higher than the minimum. For this reason, in addition to agreed wage rates, Yue Yuen pays workers at Gaobu a series of benefit payments and it was a demand for an increase in these benefit payment that led to strike action in mid-April.

On April 17 and April 24, Yue Yuen issued statements to the Hong Kong stock exchange saying it had agreed to increase the benefit payments for "certain employees" (based on seniority) from May 1 and that, by the time of the second statement, more than 80% of Gaobu employees had returned to work. It also said that, in addition to the higher benefit payments, it had agreed to pay workers there an additional living allowance of around \$35 each per month. It said the incident had cost it approximately \$27 million because of interruptions to production and air freight costs to meet delivery deadlines. As this issue of *World Footwear* goes to press, Yue Yuen has made no further official comment on Gaobu.

'Minimise the impact'

However, there has been plenty of comment elsewhere. On April 24, adidas gave a statement to business media outlet Bloomberg, saying: "We are currently reallocating some of the future orders, originally allocated to Yue Yuen Dongguan, to other suppliers." It explained that it wanted to "minimise the impact on our operations" of the strike. This is ironic because when, in 2012, German television company ARD asked adidas for access to two typical supplier factories in Southern China, the brand nominated a Yue Yuen facility near Dongguan (there are two: one in Gaobu and the other in Huangjiang). As part of this exercise, adidas took ARD to a hospital that Yue Yuen has built in the area to look after the medical needs of its workforce there. After filming was over, the sports brand said it knew none of its suppliers were perfect, but it believed it has a number of "very committed suppliers". We can assume it includes Yue Yuen among these, or it probably would have invited ARD to film somewhere else. In the end Yue Yuen hardly featured in the finished programme.

It took until May 1 for Nike chief executive, Mark Parker, to give his views on the Yue Yuen strike. Speaking in Boston that evening, he said: "We didn't move product out in this case, but we're staying close to it. We're always considering it."

Yue Yuen is part of the Pou Chen Group, which is Taiwanese-owned and was founded in the 1960s. It set up Yue Yuen to concentrate on outsource manufacturing of



The adidas Supernova running shoe, one of the products that Yue Yuen makes for the brand in southern China.

CREDITS: ADIDAS

athletic and casual footwear in 1988 and in the same year set up the first of its factories in China. It has been at the heart of the shift in the global footwear industry: sourcing shoes rather than producing them has become the key for big brands. Last year, Yue Yuen made 313.4 million pairs of shoes across its whole production network, which comprises five factories in China, one in Vietnam and one in Indonesia. At the end of 2012, it had 423,000 employees.

Brands helped build the model

Pou Chen's business built up in the second half of the twentieth century because big brands in North America and Europe moved away from manufacturing to concentrate on marketing, branding and design. In the last five years, adidas has grown its revenues from €10.4 billion in 2009 to €14.5 billion in 2013, an increase of 40%. Over the same timeframe, Nike's sales revenues have increased from \$19.1 billion in 2009 to \$25.3 billion in 2013, growth of more than 32%. They are proud of their management of supply networks and of the contribution this makes to growth, but it would be impossible for them to manage the supply chain as effectively as they do without long-term partners such as Yue Yuen. Yue Yuen has no monopoly, but it is one of only a limited number of manufacturers with the ability to produce the shoes the big brands need, delivering them on time, to specification and on budget. Yue Yuen and companies like it have that ability because they have spent years building up their own economies of scale and establishing strong relationships with the authorities in the countries in which they carry out their manufacturing operations.

Big brands know what is on offer from Yue Yuen and other producers of its size. It suits them to continue to run their supply chains the way they do. It is unfair of them to set up a dynamic that works extremely well for them and then walk away from it, or threaten to do so, at the first sign of a negative headline. 🌀

Dow Microbial Control partnered sportswear manufacturer Xtep to find an odour control solution that would work for the Chinese consumer.

A fresh approach to athletic footwear

The best partnerships, it has been said, are those in which the parties are stronger working together than they would be working separately. Xtep International Holdings, a China-based manufacturer and marketer of sports apparel and footwear, and Dow Microbial Control overcame challenges to enable Xtep's recent introduction of antimicrobial performance in its athletic footwear and related products.

The use of silver-based antimicrobial systems in sportswear, footwear and other apparel products is hardly front-page news. In recent years, the trend has been fuelled by the growing demand among consumers for reliable odour control and long-lasting freshness.

However, meeting this consumer demand has not been without its issues for mills, manufacturers and brand owners. In 2010, partners in the apparel industry expressed concerns to Dow Microbial Control, a business unit of The Dow Chemical Company, that many traditional antimicrobial systems affected the colour of fabrics, were limited in their durability and were costly and difficult to handle in textile mills. In an industry where customer loyalty hinges on consistent product quality and performance, and streamlined operations are critical to business success, these were not inconsequential concerns. Dow's technical experts were asked to provide solutions to their issues based on the company's decades-long experience in the antimicrobial marketplace. However, the world of textiles was entirely new to Dow.

"Since we had never participated in the textile space, our learning curve was steep," says Karel Williams, global strategic marketing manager at Dow. "We had many discussions with key players, trying to learn more about their operations and their most pressing problems with traditional antimicrobials. The more we knew about their businesses and their concerns, the better we were able to assess our ability to help them."

Based on these discussions, Dow accepted the challenge of developing a silver-based antimicrobial that would provide long-lasting performance, would not discolour textiles and would improve the efficiency of the antimicrobial application process. After 18 months of development work and extensive



Artist's impression of the shoes in action.

CREDIT: SHUTTERSTOCK / CLICK IMAGES / WTP

independent testing, Dow introduced Silvadur Antimicrobial to the marketplace in late 2012.

Its key feature is a patented technology that “intelligently” controls unwanted bacteria by providing silver ions only at the surface of the shoe or fabric and activates them only in the presence of the bacteria. As the silver is consumed in the process of eliminating the odour-causing bacteria, more silver is released and the process continues. In addition to its high degree of efficacy, Silvadur addresses all of the manufacturing, durability and other shortcomings of traditional antimicrobial systems.

Perfect timing

The timing of Silvadur's launch coincided with Xtep's search for an effective antimicrobial to meet the growing demand in China for long-lasting freshness and odour control in footwear, particularly athletic shoes.

“Improving the long-lasting comfort of our shoes has been a priority for us and we had been looking for a reliable odourcontrol product for years,” explains Li Xia, director of the Footwear Commodities Center at Xtep. “When Dow introduced Silvadur, we thought it might be the answer we'd been looking for. But our challenge was to prove to ourselves, under a very tight timeline, that it would perform as well on footwear as it did on apparel.”

Soon after the product launch, technical experts from Xtep and Dow were working together to evaluate Silvadur's performance on running shoes, both in lab tests and in field trials. The process got off to a fast start, because Dow research and development and marketing teams were already well established in China. Ten members of these Dow teams were assigned to work with their Xtep counterparts on the project.

“China has established much higher standards for antimicrobial performance than other countries, particularly for running shoes,” claims Williams. “Our challenge from day one was to partner with Xtep to validate that their athletic footwear treated with Silvadur would consistently meet or exceed the Chinese standards, as well as Xtep's, which were even higher.”

Validating brand promises

The validation process was far reaching, and it essentially focused on three areas: odour control and freshness, effectiveness and durability and consistency of performance.

Based on its extensive consumer research and experience in the marketplace, Xtep understood the importance to Chinese athletes of odour control and freshness in their running shoes. To deliver this performance, the company's approach was to treat the linings and insoles of running shoes – rather than the surface – with the new technology.

Odour control and freshness are directly related to the number of bacteria present. The fewer bacteria present, the greater the odour control and freshness. So the companies' technical experts relied on internationally recognised tests to evaluate antimicrobial activity inside running shoes.

Test results showed that Siladur exhibited a high degree of efficacy in controlling a broad spectrum of odour-causing bacteria in shoe linings and insoles. Wear tests were also conducted in the field with similar results. In some ways, the most meaningful and positive feedback came from employees of Xtep, including many of the company's senior



Consumers put the shoes and socks treated with Silvadur through their paces.

CREDIT: XSTEP

managers, who personally tested the performance of the treated shoes and socks.

An important issue for the two technical teams was determining the right amount of Silvadur necessary to exceed China's standards for microbial performance in shoes and Xtep's expectations. This played to Silvadur's strength because its intelligent microbial control technology requires only small concentrations of silver ions to control unwanted bacteria.

In China, unlike other parts of the world, consumers typically use brushes to clean running shoes, rather than relying on machines to wash them. The challenge for the Xtep-Dow team was to develop a test method that would simulate the frictional effect of cleaning shoes with brushes.

They opted to use a protocol that included steel balls with the shoe linings and insoles in the laundry tests to achieve the desired frictional effects. Those tests showed that Dow's new product had a 99% antimicrobial control rate against bacteria and fungi after 50 rigorous launderings.

Another challenge for the researchers was determining whether Silvadur would consistently perform on all of the substrates and materials used in the linings and insoles of Xtep's running shoes. “Consistent microbial control performance has everything to do with the even distribution of the antimicrobial on the substrate,” says Li Xia. “Our testing showed conclusively that Silvadur can be much more evenly applied on the substrates in our footwear than other antimicrobials we have tested, because of its liquid formulation.”

Based on the results of its intensive and accelerated evaluation, Xtep is currently treating much of its athletic footwear, including shoes for casual, performance and trail running, as well as socks and winter shoes, with the technology.

Having successfully cleared so many hurdles in recent months, what is the future of the Xtep-Dow partnership? “According to a Chinese proverb,” says Karel Williams, “the man who moves a mountain begins by carrying small stones.” I believe we have only scratched the surface of what our two companies can accomplish by working together to benefit consumers. 🌐

Bunnies Jr made a breakthrough at iconic retailer Harrods last year.
CREDIT: VAN GASTEL SHOES



Young footwear professional Hilde ter Steege's first full-time jobs in the industry have been in Surabaya in Indonesia, initially going for a two-month trial in 2010, but now in her fifth year there. Since 2012, she has worked for Dutch children's brand Van Gastel Shoes, interpreting design requests and checking samples before they reach Europe. The fact that she has remained in Indonesia suggests that this idea is working well.

On the ground in Asia

Hilde ter Steege is a young Dutch person who grew up with a passion for shoes, a desire to learn everything she could about the industry and an ambition to build a footwear career for herself. For the last few years, she has been product manager at one of her native country's most famous footwear companies, Van Gastel Shoes, a position that, ironically, means she now lives in the shoe-producing hotbed that is Indonesia. She is very happy there.

Van Gastel Shoes is synonymous in the Netherlands with high-quality, well fitting, hard-wearing shoes for children. Its history goes back to 1842 when a footwear entrepreneur named Pieter Wijdemans founded a factory in the shoemaking town of Kaatsheuvel, in the south of the country. His son, Johannes, took over in the 1880s and introduced steam power. He ran the business until 1921, when he handed over the reins to his daughter Caroline and her husband Josephus van Gastel.

The company is still in the hands of the van Gastel family, with Marcel van Gastel at the head, and continues to run from Kaatsheuvel, but, as has happened with many European footwear companies, its production set-up began to change at the end of the twentieth century with Van Gastel Shoes finding its first outsource manufacturing partners. By 2004, more of the group's footwear was being made in Asia, where it has partners in China and Indonesia, than in Europe, where the partners it works with are now in Portugal. It still pays close attention to its lasts and its choice of materials so that its products continue to fit well and offer parents good value for money. "Children today want fashion too," Ms ter Steege says. "Boys, too, with sporty looks and bright colours. So we try to combine everything. We have simple designs, but they are more special and the leathers are more alive than you would see from a lot of more traditional shoe companies."

Under a variety of brands (Bunnies Jr, for children up to 5 years old, Twins, for girls up to 13, Trackstyle, for boys up to 13, and Braqueez, for boys and girls up to 13) it now sells its shoes in important export markets, especially Germany, the UK and Belgium, as well as in the Netherlands. Each has its own specialist market: for example, there are special widths (narrow and broad) in the Twins and Trackstyle ranges, while Bunnies Jr focuses on soft materials for crawling babies and first shoes for new walkers (although plans are in place to expand the age-range to eight from spring-summer 2015).

Material girl

Part of Hilde ter Steege's job is to source the materials her design colleagues have stipulated. "We are a team," she explains, "and the designers give me a lot of direction. They



Fashionable shoes from the Braqueez range.

CREDIT: VAN GASTEL SHOES

give me colours, they give me materials, they make their designs, they come with their swatches, and I just have to make sure that what they want combines well with what is available. We stick to 1.2 millimetres to 1.4 millimetres as our standard thickness. We do use thinner, trend leathers for some items."

In 2013, Van Gastel Shoes made an important breakthrough when it managed to interest iconic London department store Harrods to put Bunnies Jr shoes into its children's footwear range. Harrods liked the design and the fashion elements of the Bunnies Jr collection (for spring-summer 2014), which is

currently on sale in the store. The shoes are on sale in plenty of other outlets too, of course, and optimism for growth in 2014 is high.

Passion for the product

Hilde ter Steege's path to Surabaya began when she studied footwear at the TMO Fashion Business School in Doorn in the Netherlands. She was always set on footwear. "Even when you are a child, you either like shoes or you don't," she says. "I like shopping, of course, and I can take a long time choosing clothes, but with shoes it's different for me and it always has been. I know exactly what I want and know immediately which shoes are the right ones. It's a passion, and I've had it for a long time."

She went to Doorn straight from school, but not before completing 100 hours' work experience in her chosen field, which is something the course organisers insist on for all candidates on the three-and-a-half-year course. She gained this experience by working in a shoe store near her home at weekends and in school holidays. Some of the people who completed the bachelor's degree course with her dreamed of owning their own shoe stores, but Ms ter Steege says it was in shoe production where she saw everything she had learned come together. "How you make a shoe, how you make leather and whether the leather comes from cows or sheep or goats; all these things are of interest to me," she says. "How do all the small details combine to make a finished shoe? I thought it was very interesting and I wanted to learn more and more about it. You do more with your brain in production. You have to solve problems there all the time. So many things can go wrong there."

How to build a line

Part of the course was an internship in the final year. Never having travelled outside her home country before that point, Ms ter Steege decided that the best way to secure a good internship was to travel to Milan, visit Micam, see which brand's she liked best and just ask for a position. "The people at one women's fashion shoe brand said they might have something for me and, after quite a few calls to them over the autumn, they took me on. It was exciting and I was soon working as an assistant line builder, making requests to suppliers' factories, specifying details, and then checking that the details were correct when the samples came. And I think I built that role up into a proper job, with all the details properly organised and so on."

She says the brand showed its appreciation by allowing her to go on a shopping trip to London with the line builder to see the shoes there. "I would probably rather have gone to the production unit in Portugal," she says of what would be many young women's dream business trip.

She took all this experience back to class and completed the course a few months later, writing her thesis on how best to construct service level agreements between retailers and manufacturers. This was in 2010. Before she was much older, she was on a flight to Indonesia, equipped with a guidebook her parents had given her as a present, to start the job she still does today.

Fewer rejections and less reworking of samples are among the benefits of having your own people on the ground in Asia.

CREDIT: VAN GASTEL SHOES

The value of spotting problems early

She accepts that CAD systems, virtual samples and communications technology have made it easier for design and production teams to stay on the same page as one another, but it is her contention that it is still very important even for footwear brands that outsource the making of all their shoes, to have their own eyes and ears at production sites, which is the role that took her to Asia. "If you don't have someone there to explain what we, as Europeans, want, you don't always get what you want," she says. "You have to have someone to explain, someone to make things better there, on site." She volunteered to be that person and her employer allowed her to go for two months to see if the idea worked. Fewer rejections and less reworking of samples was one of the first things the company noticed. In some instances, she has even stopped "in the line", just before production of a shoe began, incorrect interpretations of what the design team wanted. This is still translating into important savings in money and time.

Her years at the TMO Fashion Business School taught Hilde ter Steege a lot about shoe production, but she says that watching it happen in real time, at full speed, in big volumes has also been a good learning experience. She says that if she had the chance to go back to talk to a new intake of footwear students at Doorn today, she would seek to encourage them to build a career in the shoe industry, the way she has done. But there are also one or two points that she believes would be worth straightening out. She explains: "You shouldn't think that having a job and living and working overseas is always fun. It's really hard, hard work and you have to give a lot to the job and be very passionate about it, or you wouldn't be able to do it. It can be lonely too and you can spend hours and hours in traffic. If you're not passionate, you won't be able to do it. Apart from that, the best thing I could tell them would be that it's better to make a wrong decision than to make no decision. If you hold back and don't decide what to do, production will stop, samples will stop and nothing can get through. If you prepare well and think about things in the right way, most of the decisions you make will be the right ones anyway." 



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Recycling materials from worn shoes

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In the EU alone, it is estimated that the amount of waste arising from worn or unwanted footwear could become as great as 1.2 million tonnes per year. The vision of 'Zero Waste to Landfill' thus remains a major challenge for the footwear industry. This is an extremely ambitious target as less than 5% of the 20 billion pairs of shoes produced worldwide every year are currently recycled or reused. Nevertheless, increased raw material costs, producer-responsibility and forthcoming environmental legislation look set to force the issue.

It is a widely held view that material recycling is often the best means of dealing with discarded shoes that are potentially unsuitable for reuse. However, for the long-term sustainability of such an approach, an economically viable material recycling system is essential. The automotive and electronic industries already have established recycling chains mainly because their products contain a large percentage of easily recoverable metallic materials of sufficient residual value to make it financially viable. Footwear, on the other hand, typically contains a complex mixture of leather, rubber, textile, polymers and metallic materials that make this difficult to achieve as most have relatively low recycled value.

BACKGROUND

There are in fact four main options for dealing with used footwear: landfill, incineration/gasification, reuse and recycling. Landfill is the most undesirable due to environmental impact, depletion of resources, increasing landfill taxes and, in some countries, lack of available land. Incineration remains controversial due to environmental concerns over polluting emissions. Reuse involves collection for distribution to mainly developing countries. It is likely



CREDIT: SHUTTERSTOCK/SLOAN 1971

however, that as their economic power increases, demand for second hand shoes will fall. Furthermore, not all shoes can be reused due to their poor condition and, in such situations, material recycling is the best option.

Nike is currently the only footwear manufacturer to recycle on a commercial scale within its so called 'reuse-a-shoe' scheme. Consumers can return any brand of unwanted athletic shoes via a worldwide network of collection points in retail stores. These then go to recycling plants in either the USA or Belgium for shredding and mechanical recycling to separate them into three material streams: Nike Grind (rubber), Nike Foam and Nike Fluff (textiles). These are then used for various sports related applications such as running track underlay, playground surfacing and basketball court underlay. It is not however designed to recycle other types of footwear, so a more generic approach must be found.

CHALLENGES

Worn footwear constitutes a largely untapped commodity with a significant potential for recycling with both economic and environmental benefits. Current material recycling facilities and operators are, however, either incapable of dealing with the specific material mix in footwear products or do not provide the best method of recovering the maximum value. This is hardly surprising as there are serious challenges involved, namely the diversity of shoe types and constructions, plus the significant number of materials involved and their individual characteristics.

At their most simple as for example with flip-flops, a shoe may consist of only two components, a sole and a strap. At the other extreme, it can be highly complex with as many as 60 or more components. The majority, however, can be said to have a subset of parts generally common to all types of shoe. These include upper materials, soling components (insoles, mid-soles and soles), reinforcements (counters, toe puffs, metal shanks and eyelets) and fastenings (laces, zippers and buckles). A typical footwear product will be assembled from a number of components using a variety of joining technologies, such as gluing, stitching and moulding.



A typical sports shoe with main parts and commonly used materials.

ALL CREDITS: SMART

To recycle such a complex product calls for an automated process based on feasible and commercially viable recycling technologies. Recycling products in this manner generally involves shredding or granulation, such that the product is split into different components and/or material types. Separation machines that exploit differences in material properties, such as magnetic or electromagnetic properties, size and density are then used to provide automated separation into different material streams. Generally speaking these technologies are effective for separating materials such as plastic and metal which have distinctly different properties. However, problems often arise when trying to separate materials with similar properties, such as the different types of polymers and rubbers commonly found in footwear.

At present, material separation based upon particle size and weight is probably the most cost-effective, high-capacity process that could be used on an industrial scale. A recycling system based upon fragmentation and air-based separation has therefore been developed for footwear at the Centre for Sustainable Manufacturing and Recycling Technologies (SMART) at Loughborough University. The process has been designed to cover the vast majority of footwear types and styles and involves three stages: sorting, metal removal and material separation.

SORTING

Any commercial footwear recycling system will need a sorting stage to separate shoes into categories that can then be processed in batches so the yield and purity of the target material types (leather, foam, rubber, textile and metal) can be improved. To reclaim foam materials such as EVA and PU in the appropriate manner means that footwear having high foam content (sports shoes) should be recycled separately from those that are leather-based. This is because separation of low density foams from leathers using air-based technology poses a significant challenge at the present time.

METALS

Several options are being considered, the first being to remove the metal manually, which is only feasible for shoes that are very simple in design. Alternatively, shoes could be pre-shredded to expose embedded metal parts which would then be sent to a picking line for manual sorting and removal of the individual items. Initial trials have shown that, depending upon the labour cost involved, these options might not be economically sustainable. The second is mechanical separation using specialist equipment such as shredding followed by magnetic, eddy current and induction sensor based 'detect and eject' chutes. When processing metal parts, shredding is generally necessary because



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granulators are often unable to process metals without incurring unacceptable wear and damage. It does of course add cost and complexity.

Initial experiments with an over-band magnetic separator during shredding trials with commercially available equipment indicated good recovery of ferrous metals when shoes were shredded to 20–30 mm. As they contain both ferrous and non-ferrous metals (e.g. aluminium and brass), there will naturally be a certain percentage of non-ferrous metals still present after separation.

A subsequent stage is therefore needed to remove these non-magnetic metal particles. This could be done with an eddy current separator although this might not prove to be the best solution either technically or economically. An alternative inexpensive method is to use a sensor-based 'detect and eject' chute such as those employed to protect plastic process equipment from foreign metal parts. However, in this case, a certain amount of additional non-metallic material will be ejected together with the metal parts, which may reduce the overall yield of recycled materials.

Another idea has been to use a simple sink-float liquid based density separation process and a commercial dense media separator such as a hydrocyclone. Magnetite powder is dissolved in water to create a liquid with a medium density of 2.00 g/m. Metals have a density of >2.00 g/m and will sink. All other footwear materials have one of <2.00 g/m and will float.

Concerns still remain however over the technical feasibility of completely removing all metallic content with any of these technologies and, as metal contamination can significantly reduce the value of the other recycled materials, it would suggest there is a need to reduce or even eliminate metallic components at the footwear design stage.

SEPARATION

Once metal parts have been removed, additional fragmentation is needed to further liberate materials and generate the required yield and purity from the developed air separation stages. Experiments have shown that optimal results occur when the waste stream is fragmented down to 3–6 mm in size.



Lab-scale footwear recycling rig.

Fewer particles will remain interconnected (e.g. particles consisting of both leather and rubber), enabling higher purity material to be recovered. A granulator provides the most practical approach as they are available in a range of specifications and throughput rates enabling a system to be easily scaled up for commercial implementation. A key aspect of the research has been the development of a low cost, air-based separation technology to separate the various granulated materials.

Air-based separation technologies rely predominately on the exploitation of the terminal velocity difference between dissimilar material particles. This in turn is dependent upon both its size and weight. Both of these parameters have been exploited for the separation of footwear materials. First, different footwear materials tend to fragment in different ways. For example, textiles tend to fragment into a fine dust that has a low terminal velocity and can then be separated from larger rubber and foam particles which have higher terminal velocity. Second, a difference in material density exists between certain footwear material types providing different terminal velocities so, as rubber particles are heavier than foam particles, they can be effectively separated.

Following these principles, experiments with zigzag columns, air-cascades, aspirators and vibrating air-tables have proven that it is technically possible to reclaim four of the most

widely used footwear material types: leather, rubber, foam and textiles. At present, the most economically viable system appears to be a two-stage process using an air-cascade separator to remove the lighter textile, leather and foam residues, followed by a vibrating air-table for final separation of rubber from foam or leather. However, other novel air separation processes are also under development to provide higher purity and yields of material sub-sets such as thermoplastic rubber from leather.

COST

A number of specific factors must be considered before the commercial implementation of a footwear recycling system, including factors such as market conditions, material revenues, local and geographical influences (e.g. cost of labour, transport, landfill taxes, etc.). All the work carried out by Loughborough has been UK-based, so any values given here are of necessity based on conditions prevailing there.

For a small scale system processing 0.5 tonnes per hour, the total equipment investment costs are likely to be in the region of £160,000. Energy will be approximately £5.80 per tonne and labour based upon three people on a minimum wage of £6.08 per hour for sorting, loading and material packing will be £36.48 per tonne. There are, of course, other indirect costs such as maintenance, management, buildings,

etc., which would also have to be considered. At present, due to the lack of established values for recycled footwear materials, there are also uncertainties regarding the revenue streams that could be generated.

One way to offset this would be to charge a gate fee to end users such as textile/shoe reuse companies or local waste authorities that would otherwise be sent to landfill and so incur fees and taxes. This is in fact common practice in the UK recycling industry. According to a recent study, this varies between £57 and £100 per tonne per ton, with £84 being the average. Thus for footwear recycling it would be justifiable to charge a minimum gate fee of £57 (currently below UK landfill tax plus gate fee). This income would then, at the very least, offset the direct energy and labour costs and leave the potential for a profit to be made from recycled material sales.

APPLICATIONS

Using this recycling process, it is possible to liberate four different and commonly used footwear material types—leather, rubber, foam and textiles. If footwear recycling is to become widespread, it is vitally important that these reclaimed materials have viable applications. A preliminary study has therefore been carried out by researchers at Loughborough to this end. The fibres contained in tannery and shoe factory

leather scrap have long been used to produce leatherboard and similar products. It could be possible to use recycled leather granules in the same way. They can also be treated to remove chromium and then used as fertiliser. Leather's acoustic and thermal insulation properties make it a candidate for insulation.

Reclaimed rubber also has a variety of established uses and initial studies indicate that it may also be feasible to finely grind some types of footwear rubbers into a remouldable material that can be used in the manufacture of new products. For recycled foams, applications can be found in underlay material for laminate floors and carpets and for sports pitches. The mixed textile (lighter fluff) reclaimed from footwear can be used for a variety of applications, such as mixing with cement as a filler for construction work, insulation materials for buildings and, once again, sound-proofing materials.

Although the majority of these material applications for footwear waste are considered down-cycling there is clearly still considerable environmental benefit when compared with disposal to landfill. In addition, due to the variety of potential applications there is real potential for economic value to be gained from each of the four reclaimed material streams, clearly highlighting that further development of a material recycling system for shoes shows promise.

STUDIES

Recovery trials with a lab-scale prototype system have been carried out with three different shoe types, namely sports shoes, men's leather shoes with compact rubber soles and men's leather shoes with foamed rubber soles. For each trial there are three output fractions, heavies, lights and fines, each with associated target materials. The material is pneumatically removed from the bottom of a granulator and taken into an air-cascade which removes the majority of the textile fluff. The remaining rubber foam/leather then falls into the middle of an air-table where it is separated into different fractions.

An important consideration has been scalability and the developed technology can be easily scaled up to reach the higher throughputs needed for a commercial system simply by using a larger granulator and multiple air separation units in a modular fashion. In these trials, a 3-4mm average particle size has proved to be the optimum size. Larger particles were found to include a significant proportion of mixed material while smaller ones significantly reduced process throughput. As the lab system does not include metallic separation, this was carried out before granulation and separation.

During the lab trials there was an issue in obtaining a balance between yield and purity. For example, it was possible to improve the purity of the rubber stream,



Sports shoes separated (left to right) into foam, textile and rubber at 3-4mm average particle size.



Leather-based shoes with high density rubber soles separated (left to right) into foam, textile and rubber again at 3-4mm average particle size.

but only with a reduced yield, since more of the smaller particles of rubber were found to report to the foam waste stream. This yield-purity balance in a commercial recycling operation would most likely be directed by the configurations of material value chains and the specific requirements of the final applications for the recovered materials.

The study has shown that the proposed air-based recycling system can successfully separate certain sub-sets of used footwear products into distinct material categories. For both sports shoes and leather-based footwear with compact rubber soles, separation of rubber with over 80% purity and yield is possible. For textiles, leather and foams, both values are considerably lower. Furthermore, for shoes with foamed rubber soles, there is clearly a poor level of separation using the developed system. In particular the separation of foamed rubber from leather shows only 58% purity and 60% yield. Further work is therefore necessary using different technologies and particle sizes.

In spite of the varying degree of separation purity and yield the resulting materials would be satisfactory for the down-cycled applications mentioned earlier. For example, the purity of textiles for insulation is not as important as being light and fluffy. Rubber has the greatest potential to be reused into higher values applications such as manufacture of new shoe soles. As rubber forms a large material percentage in many shoes, this proposed recycling system would appear to have potential.

CONCLUSIONS

The increasing scarcity of virgin material, the existing and forthcoming European producer responsibility directives and ever-increasing landfill charges necessitates that the appropriate end-of-life management and recycling of products are implemented in every manufacturing sector. In waste from electrical and electronics and end-of-life vehicles, there has been a rapid growth in recycling activities driven largely by the economic value of materials they contain. For consumer products such as footwear with limited valuable material content there are significant challenges for establishing an economically sustainable recovery and recycling process.

Until legislation arrives, the establishment of a sustainable footwear recycling system is at present very much dependent upon the economic viability of the operation. To this end an automated recycling process, based on low cost air separation technologies, has been developed. The four primary recycled material streams examined (rubber, leather, foam and textiles) all have potential applications as surfacing, insulation and underlay products. It must be noted, however, that this is essentially a down-cycling approach and may not necessarily offer the greatest environmental benefit, thus highlighting the need for further

investigation into higher grade recycling scenarios in order to support long term recycling activities for the industry.

For high value applications on the other hand, such as the manufacturing of new products, it is widely acknowledged that the reclaimed material stream requires purity in excess of 95%. Clearly it may not be possible to achieve this with the proposed system. Further work therefore needs to be done to investigate the technical feasibility as well as the economic and environmental impacts of alternative recycling approaches (e.g. sensor based sorting or electrostatic separation).

Improved material recovery can also be achieved through proactive approaches, such as better footwear design to support recycling, improved reverse logistics and collection and the creation of novel recycled materials applications. In particular footwear design is seen as a key factor to enable significant improvements to material reclaim yield and purity. Thus we are currently working with producers to investigate the implementation of 'design for recycling' within the industry. It is also our view that such a proactive approach will give early adopters a significant competitive advantage when environmental legislation becomes mandatory. 🔄

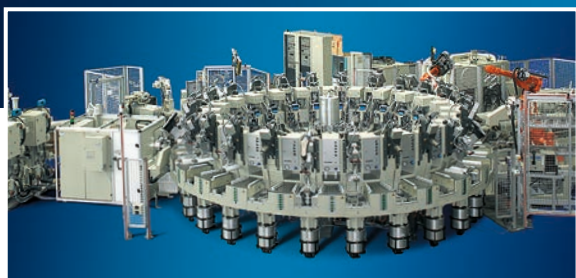
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Stitching department of a modern carbon-efficient Portuguese shoe factory.

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Reducing the carbon footprint

MARIA JOSÉ FERREIRA, VERA PINTO & JOSÉ RODRIGUES, CTCP, PORTUGAL

Global warming, climate change and greenhouse gas emissions have now become terms of everyday life and topics of concern and discussion worldwide.

The drive for industrial and technological growth during the 20th century and the increase in greenhouse gas (GHG) emissions that accompanied it, have had a profound effect on our climate. But it is only more recently that we have begun to feel and understand the impacts and consequences of these climate changes. Now, new concepts such as 'sustainable growth', 'carbon economy' and 'carbon footprint' have entered our vocabulary.

As in every other manufacturing sector, companies in the footwear industry are faced with the challenge of reducing their carbon footprint both for the health of their business and that of the environment. CTCP has conducted a

research programme focused on estimating the Portuguese footwear industry's carbon footprint and establishing eco-efficiency strategies to cope with climate change and global warming through the use of better carbon management.

BACKGROUND

The last few decades have witnessed a rapid and intensive transformation of Portugal's footwear industry. In the 1980s, the conditions offered by Portugal in terms of proximity to large European markets and low production costs, combined with the finalisation of the single European market, attracted foreign investment that transformed the structure of the industry. The presence of large international companies and heavy investment by domestic manufacturers led to a rapid growth in production that reached a peak in the

mid 1990s.

The second half of that decade and the beginning of the new millennium brought big changes to the international footwear market. Removal of the last barriers to international trade and the addition of new members to the World Trade Organization decreased the competitive advantages that Portugal had previously enjoyed and caused many of the large international footwear companies that had set up in Portugal to relocate their operations to other parts of the world where production costs were lower.

Portuguese manufacturers responded to these new challenges with a profound restructuring of both their manufacturing capabilities and marketing strategies. Innovation, internationalisation and training were defined as the main pillars of the new approach. Companies that, in the past,

could only accept orders of thousands of pairs re-engineered their manufacturing processes to allow them to respond to orders for just a few. They now focused on fast response, fashion or functional products, advanced technologies and customer service. Many took up the challenge of making their way as fashion producers under their own brand names.

The resilience the Portuguese footwear industry has demonstrated during the recent serious economic international crisis shows this to have been the right course to take. The average export price has increased by more than 70% during the last 20 years reflecting the industry's focus on moving into greater value-added segments. Total quality, environment, sustainability, and social responsibility concepts were embraced and are being integrated in the global management.

EMISSIONS ESTIMATE

The initiative for the CTCP programme came originally from APICCAPS, the Portuguese footwear association. Although its members had performed well in recent years, it nevertheless wanted to identify areas where manufacturers could become more efficient, particularly in terms of energy usage and emissions reductions. It also reasoned that, as the subject was complex, any survey would need to be carried out by a national body such as CTCP which would have the necessary expertise and resources as well as detailed knowledge of the industry. The results would also be made available to all APICCAPS associated companies.

The research did indeed prove both difficult and time consuming as it initially called for in-depth analysis of existing legislation, recommendations and reports relating to the carbon footprint concept and relating them to the needs of the footwear industry. Needless to say, that comprised a considerable amount of documentation from organisations such as the WBCSD (World Business Council for Sustainable Development), WRI (World Resources Initiative), IPPC (United Nations Intergovernmental Panel on Climate Change), APA (Portuguese National Environment Agency) as well as many other papers and protocols.

The estimate itself was broken down into three aspects: 1-DE (direct



Kyaia uses energy efficient automatic cutting systems.

FIGURE 1: OPERATIONAL LIMITS

1 DIRECT EMISSIONS

- Production process: non-methane volatile organic compounds (NMVOC) emissions
- Stationary combustion: own production of heat, steam or electricity
- Mobile Combustion: own cars, trucks, forklifts, other - own vehicles combustibles consumed
- Emergency generators
- Refrigeration systems

2 INDIRECT EMISSIONS

- Electricity consumption

3 OTHER INDIRECT EMISSIONS

- Transport of raw materials to the company
- Transport of final product based on weight, distance and transport type
- Transport activities other: business travel of workers, other
- Effluents and waste treatment
- Water consumption
- Raw materials
- Packaging

FIGURE 2: TOTAL CO₂E EMISSIONS (INITIAL ESTIMATE)

Totals Carbon dioxide equivalent CO ₂ e (ton)				
	Source	Lower limits	Higher limits	Bibliography
1 - DE	Fossil combustibles	24,435.15	42,761.52	36,075.23 (A)
	Process (NMVOC)	4,364.20	4,959.32	8,926.77 (C)
2 - IE	Electricity use	17,480.54	26,220.81	22,923.19 (A)
3 - IE	Water use	146.65 (A)		
Other	Packaging	5,912.99 (B) or 92.9g CO ₂ e per pair		
	Effluents	50.20 (A)		
	Industrial waste	70.45 (A) assuming 100% landfill		
	Product transport	5,382.08 (Estimate)		
Total		57,842.26	85,504.02	79,487.56

Bibliography key for figures 1 and 2:

(A) Application of the Life Cycle Assessment of Footwear 1998.

(B) Pontifícia Universidade Católica do Rio Grande do Sul (Brazil) 2009 (materials).

(C) European Environment Agency 2009 (emissions).

**FIGURE 3: INDIRECT EMISSIONS
(ELECTRICITY CONSUMPTION) GHG EMISSION PER GAS**

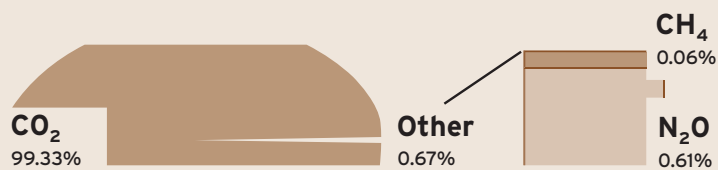
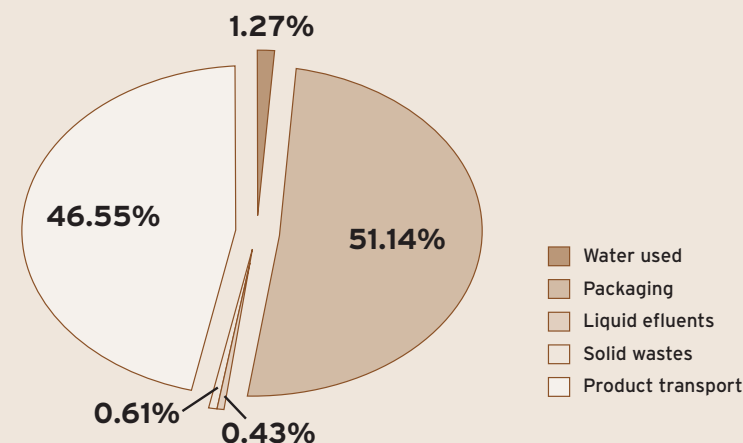


FIGURE 4: TOTAL ESTIMATED GHG EMISSIONS PER SOURCE



emissions), 2 - IE (indirect emissions due to electricity and 3 - IE (other indirect emissions). It was carried out based on data collected from 39 footwear producers plus additional published data A, B, C as detailed in Figure 2. These companies represented 11% of the industry's labour force and 12% of the total pairage produced. An initial estimate was made based on data from 2009 and then partially updated in 2013 with data from 2012. Figure 1 outlines operational limits for a typical footwear company.

The carbon inventory estimate is based on ranges of data collected in the 39 companies, thus the GHG emissions as total emissions of CO₂e are presented as lower and higher limits (LL and HL) respectively. Figure 2 shows the estimates obtained and for aspects 1 and 2 compares them with those reported in the relevant references. Based on these figures, it would appear that the Portuguese footwear industry in the LL limit area is already performing better than is reported for the global footwear industry in general.

DE represents 50% to 56% of total estimated GHG emissions, IE approximately 30% and other IE between 13% and 20%. With regard to the DE values, fossil combustibles due to own vehicles represents around 80% to 85% of the emissions while NMVOC due to

adhesives, finishings and other solvent-based products accounted for only 10% to 15%. Figure 3 shows GHG emissions per type of gas related to electricity consumption and, as would be expected, CO₂ represents over 99% of these.

Figure 4 shows the total estimated GHG emissions per type of source. According to the estimates made, packaging and final product transport, represent 51% and 47% respectively of the total. Materials GHG emissions were not included in this initial estimate but are nevertheless expected to be relevant, suggesting this area should be accounted for in a future step.

ECO EFFICIENT MEASURES

Comparing the number of pairs produced in 2009, the carbon footprint (total GHG emissions per pair) was in the range of 0.91 to 1.34kg CO₂e per pair. The footprint associated to DE combustibles and IE electricity ranged from 0.66 to 1.08kg CO₂e/pair. These indicators are in line with other estimations and show that companies in the LL perform better than that generally reported for the industry in general.

More recently and working within the framework of European project IEE/11/949/SI2.615946 IND-ECO (Industry alliance for reducing energy consumption and CO₂ emissions) partners from six European countries

are identifying the energy consumed by the footwear and leather sectors' industrial processes in order to find suitable eco efficient technical solutions and financial support initiatives with the object of reducing CO₂.

In the footwear sector the focus has been mainly directed on identifying and reducing emissions resulting from electricity consumption. The indirect emissions associated with electricity acquired per country were first estimated in 2013 based on 2012 data. Portuguese companies (75 checked) performed well and their carbon footprint in this aspect was in the range of 0.4 to 2.4kg CO₂e per pair. Furthermore, it would also appear that the companies that are actually in the lower range of the indicator are, on the whole, the same ones that participated in the 2009 study.

The study carried out so far has enabled us to identify a set of approaches and good management practices that can be followed by footwear companies to improve their energy efficiency and reduce their carbon footprint. The recommendations fall into four sections which are as follows.

Electrical energy management:

- Regular analysis of tariffs to find the best energy provider
- Contracted capacity correlated with the used
- Reactive energy control through the use of systems monitors
- Substitute magnetic ballasts by electronics
- Produce in lower cost periods (e.g. automatic nesting and cutting)
- Detailed analysis of consumption to identify potential improvements.

Compressed air:

- Careful planning and selection of equipment and systems
- Evaluate older equipment and consider replacement
- Adjust pressure to actual needs (7 down to 6 bar = 8% saving)
- Recovery of hot air produced for further usage
- Variable-speed drivers (VSD) to regulate motor speed
- Staff training and systems maintenance (e.g. reduce leaks).

Motors and equipment:

- Select high efficiency motors (HEM)
- Avoid over-sized systems and always

turn off when not in use

- Air input and ventilation (circular tubes and no curves)
- VSDs, staff training and systems maintenance.

Illumination:

- Natural light and pale colours wherever possible
- LEDs or compact fluorescent lamps to be preferred
- High pressure sodium or metallic iodine lamps instead of high pressure mercury
- Changing magnetic ballasts for electronic (classes A1 or A2)
- Automatic systems (e.g. photocells and motion sensors).



Efficient lighting systems and pale paintwork improve working conditions and reduce the carbon footprint.

The calculation of a product's carbon footprint is recommended on two counts. First, it can make the producer more cost- and environmentally-effective. Second, consumers are becoming better informed and, as a consequence, are increasingly seeking out products that can be shown to have had the least impact on the environment during their manufacture. The actual

results obtained are, however, dependent on the aspects considered and that the tools used to measure a product's carbon footprint are suitable.

As far as CTCP Portugal is concerned, this work is far from finished and more information needs to be collected, correlated and continuously updated in the future. The same will naturally apply to companies seeking to make

themselves increasingly efficient as regards their energy consumption and carbon footprints. As with every other aspect of business, it requires constant attention and review. And, even though it is yet a further call on management, it is one that should not be ignored; indeed, it is likely to become ever more important as the 21st century progresses. 🌀

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Mass customisation and sustainability

SERGIO DULIO



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Last year, *World Footwear* ran an article in its May/June issue concerning what was referred to as the 'lean, green and clean paradigm'. Although there is as yet no official standing for such a paradigm, we can summarise its goals simply as 'to produce only what is needed, minimising wastes and inefficiencies throughout the entire manufacturing process, with the lowest possible energy consumption, and respecting and protecting the environment'. It is a way of thinking and acting that is more than just lean, goes beyond green and expands in a certain way the concept of sustainability.

We can best think of it as a multi-disciplinary approach that aims at exploiting the common, overlapping area between three main domains: lean processes and organisation, using power conscious machines, and processing clean materials to produce clean products. Looking at it from another perspective, we can consider

this as nothing less than a roadmap to sustainability, where rules and best practices are adopted. In the green domain this relates to machine design, energy efficiency and power saving. Similarly, the clean domain addresses materials and substances used in products and in their manufacturing processes. Lean teaches us how to structure our organisation at all levels, particularly in manufacturing, minimising waste of all kinds and preserving value with less work, the true meaning of lean (*Figure 1*).

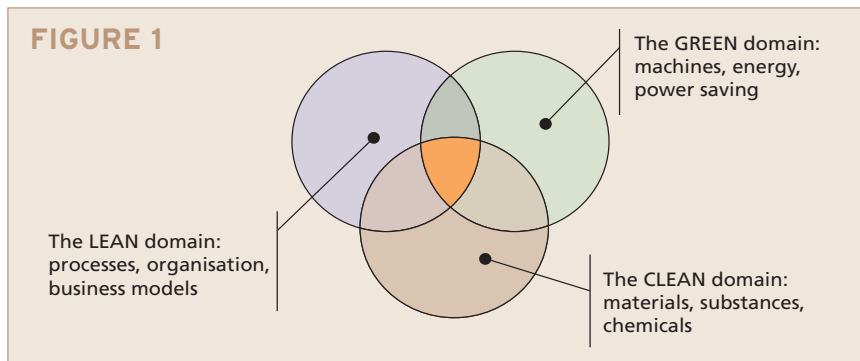
CONSUMER PERCEPTIONS

This leads us to sustainability and its perception among consumers who are becoming more attentive to environmental impact, healthy products and to a careful use of energy resources. A way of thinking that should be turned into an 'added value' for the products we buy and which, at the same time, asks companies to innovate

products and processes in order to minimise their environmental impact, optimise the use of resources of all kinds and adopt organisational schemes in the broad sense to reduce such waste to a minimum.

It is in fact widely recognised and accepted by both consumers and institutions, that the ever more dramatic climate changes we increasingly experience in our every day life are very likely—although not yet proved beyond any doubt—the result of human actions on the delicate equilibrium of the planet. These effects have become more evident and important with the advent of industrial production and, among the largest contributors to such impacts, we have the production of consumer goods. As an example, the European Union has set itself a goal of reducing carbon dioxide emissions by 20% by 2020, a very ambitious goal that can only be achieved if both manufacturers and consumers develop

FIGURE 1



Lean, green and clean: a roadmap to sustainability. CREDIT: SERGIO DULIO

the right mind-set at the same time.

Unfortunately, change in this direction is not easy for manufacturers as it implies relevant investments and challenging reorganisation processes that companies do not seem willing to tackle on their own. On the other hand, policy makers and institutions have proved most of the time to be reluctant or unwilling to enforce this evolution, which explains why these changes have so far happened so slowly. This leaves a big choice and a great responsibility on consumers. Sustainability has to be regarded as an ethical imperative for today's consumers.

With regard to the challenges of climate change that the global community is facing, we simply cannot afford to neglect environmental aspects any more. Manufacturers depend on their customers and, subsequently, consumers have substantial bargaining power. Consumers need to accept this responsibility and should try to influence the behaviour of manufacturers through their own behaviour. The public awareness of the issues of climate and the need for sustainable development is constantly increasing. J. Elkington, in an article for the *California Management Review* in 1994 titled 'Towards the Sustainable Corporation: Win-Win-Win Business Strategies for Sustainable Development', had already observed this development in the 1990s and termed it 'green evolution'. However, this increase in awareness still has to manifest itself in a widespread change of consumer attitudes in order to truly impact manufacturer behaviour.

MASS CUSTOMISATION

Let us now consider mass customisation, another topic that *World Footwear* has featured on numerous

occasions in previous issues, particularly with regard to its applications and practical implementations in the footwear sector. Why should we be thinking of mass customisation (MC) in relation to sustainability? Because, if the push towards a green evolution, a sustainable economy and lean, green behaviour must come from the consumer, there is no better business model than mass customisation to empower consumers and give them the opportunity to impose directly or indirectly, virtuous behaviour on manufacturers.

The success of a mass customisation business model does indeed depend strongly on a company's ability to interact with its customers. Mass customisation is strictly customer-centric and thus demands the customer to take an active role in the value creation process. Therefore, companies that have been able to successfully adopt a mass customisation strategy have also been forced to integrate customers as much as possible. This business approach encourages a 'customer-active paradigm' with customers seeming to have stronger bargaining power and influence on these companies.

In this respect mass customisation sounds like the best chance that we, as consumers, have to stimulate our producers into adopting sustainable behaviour, thanks to the enhanced role that this business model affords us. The companies engage themselves in listening to consumers' desires and, in some cases, to involve them to such a degree as to make them co-designers of the products they will later buy. Intercepting this growing sensitivity towards environmental issues and sustainability becomes yet another effective way of satisfying customer

demands. Products will become greener because consumers will prefer them greener, design them greener and buy green ones more than otherwise.

FURTHER DIMENSIONS

There is, however, another dimension to mass customisation in relation to sustainability that we need to introduce here, the claim that it is inherently sustainable for at least three good reasons. First, it is about producing goods on demand. This means producing (i.e. allocating materials, consuming energy and dispersing carbon dioxide in the environment) only items that are certain to be purchased, instead of remaining unsold in a warehouse or on a retailer's shelf. This is in itself a huge source for savings. In the final chapters of 'Mass Customisation and Footwear: Myth, Salvation or Reality' by C.R.Boer and S.Dulio, a rough calculation of this effect was attempted.

An early survey in 2001 showed the potential market for customised footwear in Europe to be around 1.5 billion pairs of shoes per year which, although it sounds like an enormous amount, is in fact less than 10% of the world's annual shoe consumption. Taking a figure of 30% as representative of the typical share of shoes that are unsold or returned every year, we have roughly 500 million shoes consuming approximately 3 kWh of energy each



Outline configurators allow customers to have a direct influence on the shoes they wish to buy. CREDIT: CALZOLERIA RIVOLTA

(a reference figure quoted by Timberland at that time), which would be produced but not sold. This accounts for 1.5 billion kWh wasted each year. If the potential of MC was fully exploited, that 30% would not exist and a huge amount of power would be saved. Even if we consider this extra optimistic scenario, it does give us an idea of just how big the potential might be in avoiding wasting energy uselessly. In a more recent book by Boer, Bettoni, Pedrazzoli and Sorlini titled 'Mass Customization and Sustainability' and published last year, these argumentations are fully presented together with precise calculations of the overall effect of MC on sustainability.

The second inherent positive effect of MC relates to the longer lifespan a customised product tends to have. Buyers have a much stronger affection for a pair of shoes they have designed or configured to meet their most intimate desires, will take more care of them and also keep them for longer. Consumers will therefore live with fewer shoes for a longer period of time. Perhaps not the best outcome for footwear manufacturers but, most certainly, a positive point for the environment.

Finally, there is a third consideration we can make that also has a positive side. MC customers establish a very loyal kind of relationship with the companies they buy their shoes from. It is therefore more likely that they will enlist in 'cradle to cradle' initiatives, in which the producer takes care of the

FIGURE 2: BREAKDOWN OF CO₂ EMISSIONS

VALUE CHAIN	CO ₂ EMISSIONS	% OF TOTAL CO ₂ EMISSION
Order Transaction	9.9 kg CO ₂	25.13%
Delivery of Material	0.181 kg CO ₂	0.46%
Production	13.63 kg CO ₂	34.60%
Distribution	5.778 kg CO ₂	14.67%
Buying Process	9.9 kg CO ₂	25.13%
TOTAL	39.181kg CO ₂	100%

CREDIT: KLEER/STEINER

'End of Life' of the product when the customer, after a long and successful lapse of time in which they enjoyed their customised shoes, wants to dispose of them. This can lead to recycling initiatives in which parts of the shoes are separated, recycled or taken in in more efficient disposal schemes than simply throwing them into a landfill. Nothing that normal producers cannot do, but it might well mean that the extra costs of this service would be 'embedded' in the price premium for a customised shoe as compared to the typical margins of traditional manufacturing and classical retailing.

ANY PITFALLS?

Mass customisation and sustainability would apparently seem to go quite well together, two paradigms that perfectly complement each other. But, is that really so? Two recent studies offer an interesting insight. The first one was published a couple of years ago by Robin

Kleer and Frank Steiner from the Aachen University in Germany. They studied the case of the company Selve, a manufacturer and retailer of high quality ladies and mens customised shoes, with shops in Munich and London, and manufacturing facilities in China. Their purpose was to calculate the total CO₂ emission involved in all the selling, manufacturing and delivering processes of each pair of customised Selve shoes. It turned out that the total carbon footprint (total emission) was about 39 kg of CO₂. This total figure may not be particularly revealing as the study did not contain any comparisons with footwear produced traditionally. It does nevertheless offer some useful hints on potential pitfalls that could counter-balance the positive effects described earlier (*Figure 2*).

The three major sources of CO₂ generation are the manufacturing process (accounting for almost 34% of the emission), the order transaction (when the customer goes to the shop to

FIGURE 3: IMPACTS OF MC ENABLERS ON SUSTAINABILITY KEY PERFORMANCE INDICATORS (KPIs)

MC ENABLER NAME	IMPACT OF SUSTAINABILITY KPI		
	WASTE PRODUCTION	WASTE CONSUMPTION	EMISSION
Involve current and potential customers	None	None	None
Support customers via human resource	None	None	None
Support customers via IT and technical resource	None	None	None
Improve robustness of production processes	Decrease	None	None
Knowledge creation	None	None	None
Modular product design	Decrease	Decrease/None	None
Define solution space dimension	None	None	None
Elicit customers' requirements	None	None	None
Postponement	None	None	None
Integrate suppliers	Decrease	None	None
Select flexible partners	None	None	None
Deliver at point of sale	None	Decrease	Decrease/None
@ Home delivery	None	Increase	Increase

CREDIT: POURABDOLLAHIAN/PILLERITAISCH

get their feet scanned) and purchase (when they return to collect their shoes). The first big contribution depends very much on the manufacturing location. In this instance China which may well involve rather inefficient power usage combined with the 'dirty' energy generation often associated with that country. The second two items are, on the other hand, strictly connected with the necessity for the customer to travel to a physical shop for the initial foot measurement and model selection and to go back there to collect the shoes.

A shorter supply chain, with a local production site much closer to the destination market, together with a greater use of the upcoming digital technologies that could spare the customers the double trip to the shop, could greatly reduce the CO₂ footprint. Both these evolutions would come at a cost or a somewhat higher transaction risk for the customer. These, however, are possibly drawbacks that future generations of environmentally conscious consumers will be ready to accept.

In another more recent study Pourabdollahian, Piller and Taisch of Aachen University in Germany and the Polytechnic of Milan in Italy, presented an empirical study to assess the environmental impact of the MC business model. The authors considered three major key performance indicators (KPI): waste production, energy consumption and the amount of emissions (*Figure 3*). The study did not really aim at developing any quantitative model to assess or predict such indicators but rather to investigate the dominant opinions among academics, the shoe industry and producers of customised footwear about the correlations between a certain number of characteristic elements of the MC business model and the three environmental KPIs.

To no one's surprise, it emerged that the academic and industrial worlds seem to have different opinions on these matters. Researchers appear to have a more swinging position between positive or no impact, while the industrial world is definitely more optimistic on such effects. In particular, among the several aspects that define the MC business model, four are perceived to have a positive (decreasing) effect on the KPIs; robust process design affecting primarily the reduction of waste, modular product design with an impact both on waste reduction and energy consumption, integration of suppliers that again is seen to reduce waste and, finally, delivery at point of sale that has a positive effect both on energy consumption and emissions.

The outcomes of the study are certainly interesting and would somehow seem to indicate that a positive correlation between mass customisation and sustainability does in fact exist. The indications emerging from the study are however too partial and, in certain cases, contradictory, so it is then difficult to draw any final conclusion on how relevant this impact is considered to be by the MC community. So, looking back at all we have discussed and after analysing the academic work that has been done on this topic, here are some known facts. Mass customisation is a business model that 'inherently' leads to sustainability, provided that some basic implementation choices are made correctly, there is a general perception that going for mass customisation can positively affect some environmental key performance indicators although the amount and enablers of such effects are still controversial and, finally, that it is certainly a topic that deserves further attention and research. 

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LEATHER GOODS
GLOVES



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*Salewa's award winning
après ski shoe.*

CREDIT: SALEWA



Sporty gets fashionable

BY PENNY LEESE

ISPO 2014 in Munich clearly demonstrated how much the lines between sport and fashion are blurring. Natural materials like wood, wool, leather and felt are making a resurgence in equipment, clothing and accessories. But these materials often have high-tech details such as waterproof membranes, sealed seams and waterproof zips. After all, an urban environment can be just as challenging as the great outdoors: for example, winter cycling in slush and snow needs good waterproof gear.

Heritage feelings

It's all about the total look – no longer is it just jacket and dungarees to match or tone; the socks, hats, mittens, and snowboard boots are all toning, matching, or are even made in the same materials. Natural materials, like those used for active

sports almost a century ago, have come back. Sporty snow jackets and thigh-length coats come in tweed and felt. Lumberjack check wool or rib knit appear as collars on snow boots, while cosy snowflake patterns and felt panels decorate warm winter boots.

Many brands have gone back to their roots to recreate a feeling of high quality, long-lasting leather boots from the past, such as Dolomite's Karakorum collection, with its simple, long, down-filled coats and retro-looking shoes and boots in oiled suede and cow hair.

AKU has made an entire heritage project, showing black-and-white photos of traditional farmers and their families in the Italian Alps by Lorenzo Di Nozzi and, at the same time, showing their classic hand-finished leather boots, inspired by their own archives of climbing and hiking boots of 80 years ago.



(Left) Dachstein boot with tweed collar and bright contrast and (right) examples of Dolomite's latest Karakorum collection. CREDITS: DACHSTEIN / WTP

Bright colours and technical details

Winter safety and comfort combine in spiked winter boots – Icebug has now launched a safety boot version, the first with retractable spikes with lightweight metal toecap that meets EU safety standards. Vibram has soles using Multi Control Tech with tubes of fabric co-moulded separately in the rubber lugs which are in contact with the ground, improving grip on icy surfaces. Nordic Grip (from Norway) makes moulded rubber boots and galoshes called Ice Lock, which have fibreglass that is perpendicular to the surface in the outsole to create good grip. The same company also has stretchable and adjustable studded rubber bands to be put over shoes. All these come in a range of vivid colours including bright green, yellow and blue. The Nordic Grip studded performance running shoes, with and without membrane, have a HyperGrip sole inserted with fixed tungsten spikes from Finland.

Desigual, the Spanish clothing brand famous for its vivid clashing colours and prints, has now launched a sportswear collection, with shoes. The shoes are cross-over sports, for those who want to be glamorous, and to show off and be different. They have EVA wedge heels on the colourful printed jogging shoes.

Barefoot running, logically enough, is more of a summer sport than winter. There has been some research that the transition from traditional running shoes to barefoot might not suit all

runners. Vibram's Five Fingers have led the way in this category (they were the shoes used in the research "Foot Bone Marrow Edema after 10-week Transition to Minimalist Running Shoes"). For autumn they have made the toed sock shoes on more sturdy soles with more wrap around at the sides and toe tips.

All sorts of footwear, ski boots, running shoes, hiking boots and even 'being cosy in the tent' shoes, have taken colours from outerwear, where vivid colours and neon brights are still in the lead. Salewa's award-winning après ski shoe is very colourful. It is built on an ergonomic last, with a super soft and slipper-like comfy upper, and has a thick insulated sole with a special grip pattern for non-slip on ice. So, after taking the ski or mountaineering boots off, and relaxing indoors to warm up, the wearer can easily pop outside to fetch some firewood, for example.

Fur and warm

At the deluxe end of sportswear, black and white are standards from Emporio Armani and the other Italian designers, worn with white or black moon boots or leather sneakers. Black is the colour of the new Porsche Design Sport shoes for winter 2014 – with some yellow technical details. The new shoes use adidas's Bounce suspension technology with more cushioning and elasticity, and lighter weight. The metal springs have been removed and the rear "suspension" is a leaf construction with no material at the heel that would need to be compressed, the



Nordic Grip's HyperGrip sole with tungsten spikes from Finland.

CREDIT: NORDIC GRIP



Porsche Design uses adidas Bounce technology.

CREDIT: ADIDAS



Kamik Stormin 2, lightweight moulded rubber with 7mm neoprene on the leg part.

CREDIT: KAMIK

sole acts as a spring. The upper is made in seamless mesh, as is the lining to remove any seams that could rub.

In the luxury market, real fur is making a huge comeback on and off the slopes – on jackets, inside jackets, on hats and boots. Boots can be all over fur like the old Yeti boots, back in fashion again, or just trimmed at the top. Lambskin and wool are strong in the middle market. The ongoing Ugg boot influence is seen by the amount of visible fur in the top of most warm lined boots – they need to look cosier rather than streamlined.

Kids and women

The sports world has really woken up to the fact that women and children need just as high specification technical products as men. Gone are the days of “shrink it and pink it”. Women’s ski wear is made to fit women’s bodies, and sports shoes are on women-specific lasts. Kids’ clothes are bright and colourful, mixed and matched to their parents’, while their winter boots need to be as warm, if not warmer than their parents’ as kids

are often out in the cold for longer if they are playing in the snow. Winter boots for boys and girls are not just standard two or three hook-’n-loop styles with a rugged sole any more: fashion plays a greater part for younger and younger consumers. Lowa has sneaker-inspired winter soles, with studding on the uppers for the girls and tartan and suede for the boys. Feminine, slim leg long shaft styles have front lacings and embroidery and fur tops, like scaled-down lady boots. For ease of wear many incorporate an inside zipper, so no need to adjust or re-tie the laces after the boots are fitted to the leg.

To keep feet warm, fur linings are not the only solution. Kamik’s winter boots for kids use a 7mm waterproof four-way stretch neoprene on the shaft. Added features are a lighter-weight rubber, Kamik’s proprietary RubberHE, a Canadian-made innovation. It’s a recyclable PVC-free synthetic rubber that the company says is 50% lighter than natural rubber and 30% lighter than other synthetic rubbers. Overall, Kamik claims that the boots are 23% lighter than corresponding products and that they are comfortable down to -32°C (including wind chill factor). Reima of Finland offers warm wool felt boots with wool lining. The wool felt makes the boots warm and snow-resistant, and the boots can be sold in Russia where synthetic linings in children’s footwear are not allowed. But it is the last that is the most important feature. The broad and roomy toe box is typical of northern Scandinavia as there is plenty of “wriggle” room for toes, so that the kids can wear more than one pair of socks, and their circulation is not restricted. 🌀



Lowa kids winter boots with sneaker inspiration.

CREDIT: LOWA

He rarely gives interviews, believing that his track-record in the athletic and outdoor footwear sectors speaks for itself, but it's clear from recent comments that Deckers Corporation chief executive, Angel Martinez, still thinks deeply about the best ways to help his footwear brands connect with the changing demands of consumers.

Shoe man, not show man

Angel Martinez has been a dominant figure in the sports and outdoor footwear sector since the 1980s, having played an important part in developing Reebok, then Rockport, then Keen as international brands. His career has taken him from coast (California) to coast (New England) and back again to his current position as chief executive of Deckers Corporation, a role he took up in 2005. It's a far cry from his native Cuba, which his family left for the US following the revolution in the late 1950s. The move worked out well for young Angel: he went to the University of California at Davis and excelled as a track-and-field athlete. Leaving college for the world of work in the 1970s, his first job was at Carter Hawley Hale department stores, a famous west-coast retail firm, but one that went out of business in the early 1990s. Angel Martinez had left long before then, making a move into sports, becoming general manager of Starting Line Sports, a retail and mail order operation specialising in running shoes. His entrepreneurial spirit won through a little later and he decided to launch his own athletic footwear company, Island City Sports, which he ran until joining Reebok in 1980.

Reebok revolution

Reebok is one of the most recognised sports brands in the world now, but it had run as a small, local manufacturer of running shoes in Bolton in the north of England for nearly 60 years before taking this name. Joseph Foster, the company's founder, is credited with inventing the spiked running shoe around 1890. He passed the company on to his sons, and they to his grandsons, Joe and Jeff Foster. It was the Foster grandsons who renamed the firm Reebok, after a South African antelope, picking the name at random from a South African dictionary one of them had won as a prize in a running race. This happened in 1958, which, by coincidence, was the year Angel Martinez was born.

Twenty years later, Reebok was still barely known outside the UK, but a man from Massachusetts by the name of Paul Fireman changed that. He saw some Reebok shoes at a trade show in 1979 and immediately embarked on a deal to distribute the brand in North America, changing Reebok for

After decades in athletic and outdoor footwear, Angel Martinez is still fascinated by how to connect brands and consumers together.

CREDIT: DECKERS CORPORATION



Until the 1980s, Reebok was barely known outside the UK. Angel Martinez was one of the key people to change that.

CREDIT: REEBOK

ever. One of the first things Paul Fireman did was hire Angel Martinez as a sales representative on the West Coast and together they spent the next 15 years or so building Reebok up as an international phenomenon and, as the phrase had it at the time, “making sweat fashionable”.

Fitness movement

Looking back on those years, Mr Martinez believes the highlights of his particular contribution included seeing the business opportunity in designing athletic footwear for women, which he says positioned Reebok “at the forefront of the women’s fitness movement”. He led the team that designed and marketed the Freestyle aerobic shoe and, as vice-president of marketing, introduced basketball shoes, tennis shoes, walking shoes and fitness shoes to Reebok’s collections. He was also the architect of the Reebok Classic line of products, which helped the brand establish a presence in Hollywood, earning it visibility with high-profile celebrities, a phenomenon that continues today with tie-ups such as the one with singer Alicia Keys for the Grammy Awards. In 1992, Angel Martinez was appointed president of the fitness division, Reebok’s largest, which meant moving with his family to corporate headquarters, which, under Paul Fireman’s stewardship, had moved by this time from the UK to Stoughton, Massachusetts.

Rockport catches the eye

One insider suggests that if Paul Fireman was the more dominant figure in helping Reebok take North America and the wider world by storm in the 1980s and early 1990s, what is not in doubt is the importance of the role Angel Martinez played next, in the development of Rockport as, first, a subsidiary brand of Reebok (it acquired Rockport from its founders, Saul and Bruce Katz in 1985) and, later, a prime target, with Reebok itself, for the adidas acquisition team. He

became Rockport’s chief executive in 1994 and directed the development and global implementation of a product and marketing programme, dedicated to broadening the brand’s appeal to attract younger consumers.

By the time adidas made its move for the Reebok group, in 2005, Angel Martinez had moved on. He left in 2001



Hooray for Hollywood. Mr Martinez understood early on the value of engaging non-sports celebrities as supporters of athletic shoe brands, including singer Alicia Keys.

CREDIT: REEBOK



after 21 years with the company and took a break before partnering with Martin Keen to launch Keen Footwear. He was chief executive of Keen from April 2003 until March 2005 and helped the outdoor shoe brand make a strong initial impression with its protective sandal styles, which were immediately popular among enthusiasts of sailing and other outdoor activities around water. Retail co-operative REI named Keen as its vendor partner of the year after only a little over 12 months in business.

At the helm of Deckers

The chance to lead a much bigger operation at Deckers proved too hard to resist in April 2005 and Angel Martinez remains at the head of the corporation, whose current footwear brands include Teva, Sanuk, Ahnu, Hoka One One, Tsubo, Mozo and, most famously, UGG.

He feels much has changed at Deckers during his time there, helped by a large number of former Reebok people who followed him. Deckers' annual revenues in 1993 were under \$20 million, while the figure for 2013 looks certain to have surpassed \$1.5 billion. Twenty years ago, the group had 50 employees; the figure today is 2,500. The group recently celebrated 20 years as a public company, and this has prompted the chief executive to reflect on the Deckers he knew as a competitor. For example, it seems obvious that technical sandal brand Teva's success in and around outdoor activities involving water must have provided part of the inspiration for Keen. But that's not to deny that Teva, too, had need of further development. "In 1993, we had three brands," Mr Martinez says, "and Teva was the flagship. We typically made money in the first half of the year, unless it was a rainy spring, and we would lose money in the back half due to the seasonality of Teva. The business was all domestic, it was all wholesale." At current levels, across the group, direct-to-consumer sales account for 33% of the total and Decker brands are increasingly international, none more so than UGG.

The Deckers chief executive says UGG is synonymous with "luxurious comfort". CREDIT: DECKERS CORPORATION

Luxurious comfort

UGG is a 35-year-old brand, although it has only been on the radar of most consumers, certainly in North America, for perhaps the last decade, Mr Martinez believes. Over the course of that decade, Deckers has grown the value of the brand from \$100 million to more than \$1 billion. But he feels UGG has plenty of scope to grow further because it's competing in a leisure footwear market that Deckers values at \$85 billion, across all brands and all geographies. UGG offers what he calls "luxurious comfort" and he believes this quality appeals to almost everyone on earth. "It's kind of a human condition," he explains. "We human beings are conditioned to go from discomfort to comfort. And once they've experienced comfort, no one wants to go back to discomfort."

Specifically, he says the men's market offers "a huge opportunity" for UGG. Slippers are what brought most men to UGG, often because wives or girlfriends did the buying. But in the past four years, non-slipper business in the men's category has grown by 70%, helped by a high-profile marketing campaign involving American football star Tom Brady. "Most men thought we were a women's brand, but Tom Brady has changed that," the chief executive says, adding that the involvement of a sports star of Tom Brady's stature "allowed" men to become enthusiastic about UGG, especially as the brand was introducing "more masculine" styles of boots to its collections.

More broadly, Deckers is keen on using new analytical tools to "get closer" to its consumers, recognising them and communicating with them in the same way, whether they turn up at a bricks-and-mortar store or only engage online. "We're very excited about this," the chief executive says. "We know it's an area that's evolving for virtually every vendor in this industry, but we feel we are at the cutting edge of this." 🌀

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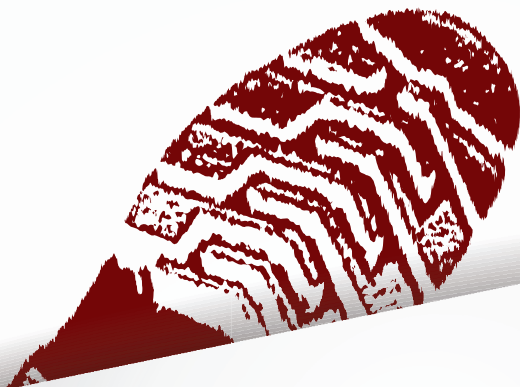
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