

ISSUE 7: 2022

BEHIND THE SEAMS OF THE GLOBAL DENIM INDUSTRY

insideDenim

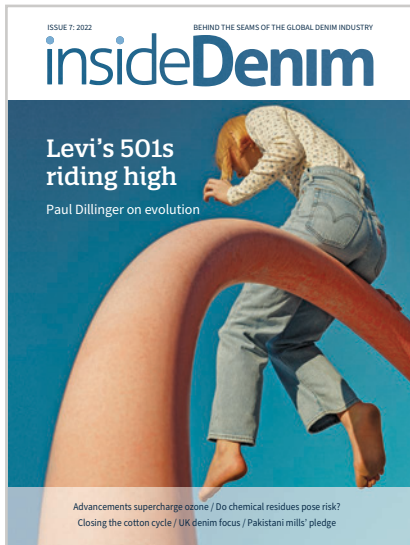
Levi's 501s riding high

Paul Dillinger on evolution



Advancements supercharge ozone / Do chemical residues pose risk?
Closing the cotton cycle / UK denim focus / Pakistani mills' pledge

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Cover Levi's Circular 501s contain 60% organic cotton, 24% wood pulp, 10% Circulose from industrial textile waste and 6% Circulose from post-consumer denim waste.

PHOTO: LEVI STRAUSS & CO

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Meet the team



Clare Grainger Editor

With two decades of experience in publications, including ten years covering the global trade sectors of technical performance textiles, footwear and leather, Clare has now focused her journalistic skills specifically on the denim world. Her editorial and specialist knowledge of the sports and financial worlds also enables Clare to add a further dimension to Inside Denim's coverage of the denim arena.

Jo Tait Associate publisher

Jo has over 20 years' publishing experience in both print and digital media, developing effective marketing strategies, with commercial focus for global clients including those in the performance textiles and footwear industries.



Sophie Bramel Technical editor

Sophie is one of the most respected technical journalists in the global textile industry. With a career spanning over three decades there is little that she does not know about fabric and more specifically performance fabrics; her passion and enthusiasm are infectious.

Stephen Tierney Consultant editor

Stephen has been a writer for 30 years, working on projects for newspapers, government departments, and an extensive range of private-sector organisations. An award winning journalist, he has edited specialist trade and technical magazines. He also has specialist knowledge of international supply chains and logistical issues.



Charlotte Robson Assistant content developer

Charlotte's writing career began with a residency at a UK gallery. Since then, she has published on art, fashion, materials and footwear, including for *World Footwear*, *World Leather* and *WSA* magazines. After living and studying in both Shanghai and Seoul, she maintains a keen interest in the latest industry developments from China and South Korea.



Many small steps can cover a lot of ground

It always seems such a pity that consumers have no idea of the amount of research and development that goes into creating new styles, new fabrics and designs when they browse denim garments in stores or online. The many thousands of people who come up with ideas, or who diligently test, refine and remake, to produce new blends and textures, colours and effects. The mills, manufacturers and laundries updating offerings each season, bringing brands' and retailers' ideas to life; not to mention the chemicals groups, technology providers and other suppliers working to make the industry cleaner and more efficient.

Racing to push product onto shelves without the necessary trials – even in the name of sustainability – could be akin to 'fast sustainability' and has little more valuable than fast fashion, according to Levi's head of product innovation, Paul Dillinger. He explains how the brand's Wellthread collections provide an ideal testing ground for "mistakes, as well as developments"; a freedom to experiment over longer periods of time and thereby laying the foundations for evolution. Some of the biggest developments and discoveries are then shared or later used by industry counterparts.

Collaboration is also one of the themes discussed by Jeanologia's co-founder Enrique Silla as this issue's Guest Comment. He suggests denim companies could take some pointers from the automotive industry in terms of working together on big themes: something we also look at from Pakistan's perspective in our article about Net Zero. Here, competing mills have pledged to share best practice and ideas to slash emissions by 2050: "There's no point us all reinventing the wheel," says Interloop's Faryal Sadiq.

“People are so excited to share ideas; to converse face to face, feel the fabrics, gauge the mood and take the big decisions”

Our news stories also highlight examples of competitors working together: European brands pushing for wage transparency, and Fashion for Good consortiums testing methods that could have industry-wide benefits. Many people we have spoken to are so excited to share ideas at upcoming trade shows and events, itching to converse face to face, feel the fabrics, gauge the mood and take the big decisions. As well as relax and enjoy themselves.

Developments of all kinds will be on display, not least some of the ozone products, machinery and auxiliaries that we look at in Science Behind the Style. How risky could old clothes be as a feedstock for new material? And what progress are the man-made cellulosic companies making in terms of supplying the volumes of fibre that might soon be demanded?

Perhaps it is a good thing that consumers don't know the extent of the behind-the-scenes work for fear of 'information overload', but they are able to tell which brands align with their values, and which ones they trust to do things well. This will become increasingly important as storytelling and transparency rise further up the agenda and technology allows the supply chain to map and share progress in a more easily digestible way.

Until then, it has to be enough that those within the industry know: which companies are striving to make improvements, sharing progress and ideas, and helping each other with the big leaps... or even just the incremental steps. As Crescent Bahuman's Zaki Saleemi says, "a collective step forward can change the world". And with more in-person events around the corner, and big-issue discussions to be had with the changemakers, those collective steps can cover more ground for us all. ■

Clare Grainger

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 GUEST COMMENT

Enrique Silla, co-founder of Jeanologia, offers his views on where the industry is heading and how on-demand manufacturing and collaboration will be vital to increase efficiency.

“A strong eruption of colour will boost the industry to another level”

When we think about the most important developments in the denim and jeans industry, we need to distinguish between what is happening in the market, what is happening in production and what is happening in the product.

In the market, we are seeing a very strong consolidation of manufacturers and brands. The biggest brand controls only 2% of the market and the biggest jeans manufacturer only 1% – so consolidation will continue over the next five years and will have tremendous consequences. It’s time for better and stronger brands and time for better and stronger manufacturers.


In terms of the business model, I think the focus for sustainability will move slightly from raw materials to efficiency in production. Raw materials are increasing in price, but sustainability in production means eliminating waste, and reducing or eliminating water and CO₂ emissions. It’s aligning the interests of the planet with the interests of the industry because it is reducing costs. Automation is key. We need humans and machines to work together; for instance we recently launched Handman, where one human collaborating with two robots and eight lasers can produce 10,000 jeans per day.

We also need to have the right product in the right place at the right time, so it’s not necessarily about nearshoring but about market intelligence and data analysis. This data analysis, together with the way we use technology, is going to lead us to on-demand manufacturing. We need to produce what we sell, rather than sell what we produce. Remember that 15% of the jeans that are produced are never sold because it’s the wrong fabric, the wrong colour, the wrong fit or just because the right product is in the wrong place. This needs to change as it’s extremely inefficient from an economic and environmental point of view.

We launched Urban Factories for end-to-end connection between consumer and manufacturer, meaning we are able to produce near the consumer in a very fast way. We have already built them in Italy, Spain, China and Japan. They are completely automatic, small production centres that are able to produce one by one at the cost of mass production. We also need postponement, meaning we can do the stitching in one country – perhaps in Pakistan, Bangladesh, Vietnam or Mexico – and then the finishing near the consumers, or do it all in one place but at different times. We believe 20% of the jeans in the market will be manufactured in this way in the next three years.

In the product, we will see a strong eruption of colour. Jeans are not necessarily about only blue denim, they are about five-pocket jeans and the fit. New garment dye technologies will allow us to wear jeans not only in vintage blue but in every colour of the spectrum. After the pandemic, consumers want to see more colour but it’s also a cycle: we’ve been in a cycle of blue for the last seven to eight years and we are entering a cycle where colour and blue are going to be combined. This will boost the jeans industry to another level. This industry has been driven by fabric for many years and now it is going to be driven by consumers.

As an industry, we need to learn from the software and automotive sectors: companies that are competing for a contract on a Monday are collaborating on a Tuesday to add value to the consumers. I don’t see that in our industry, it’s extremely traditional. We need to have a culture of creating an ecosystem where you are competing and collaborating with the same companies.

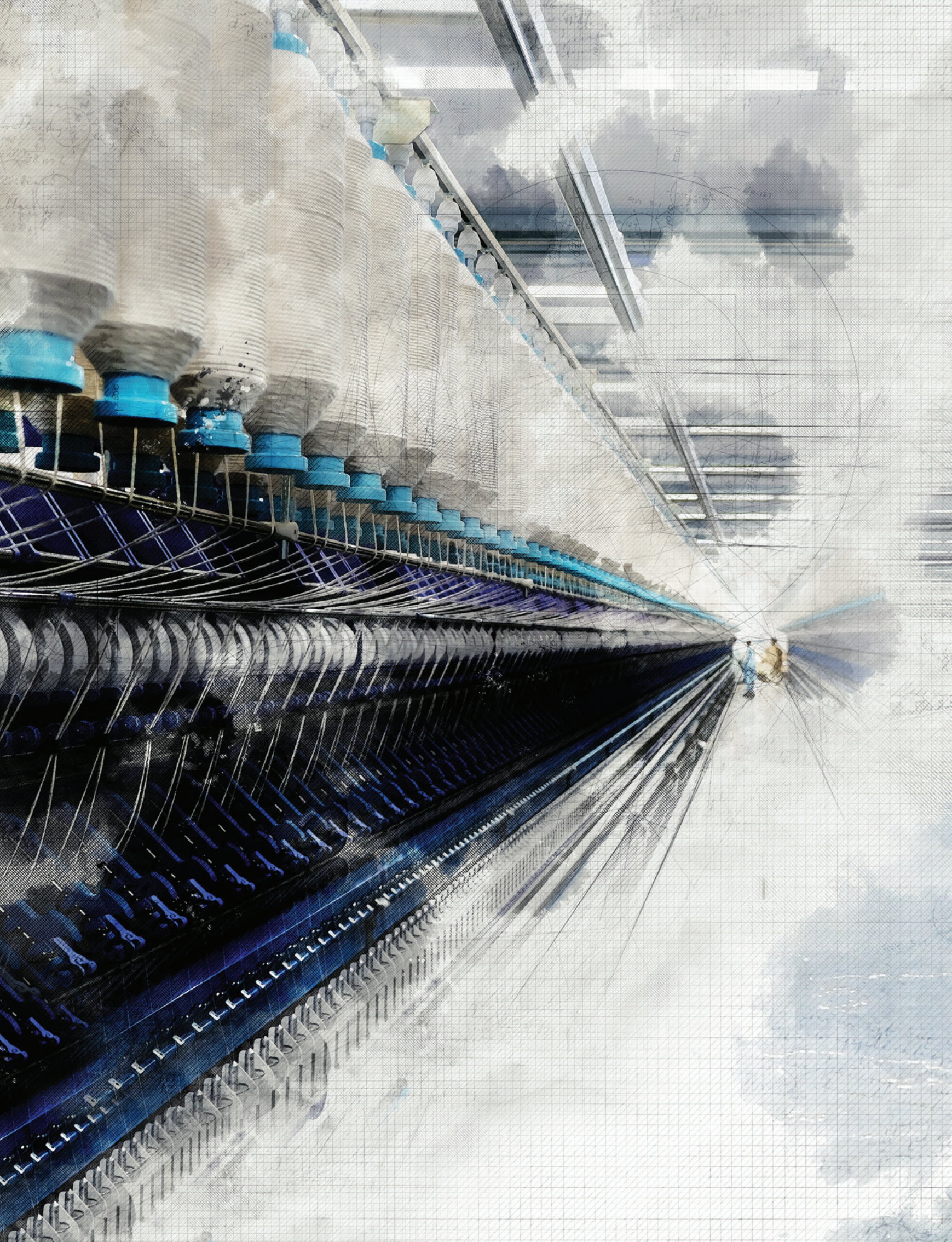
A portrait of Enrique Silla, a middle-aged man with light-colored hair, wearing a light blue button-down shirt. He is smiling slightly and looking directly at the camera. The background is a blurred industrial or factory setting with rows of blue denim jeans hanging on racks.

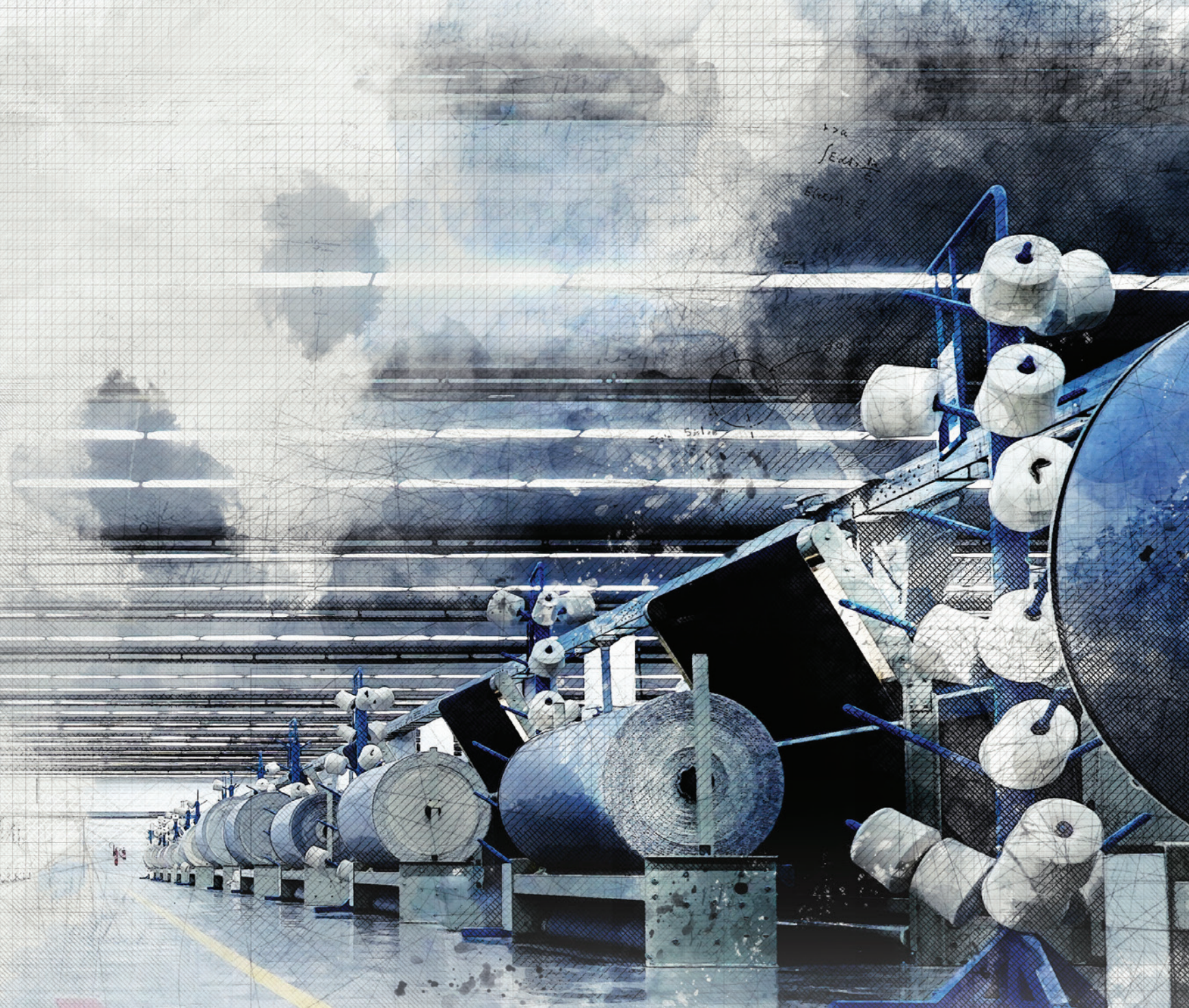
Enrique Silla is the co-founder and president of technology and software provider Jeanologia, based in Valencia, Spain. Jeanologia's developments in laser, ozone, washing, dyeing and wastewater technologies are capable of enhancing productivity, reducing water and energy consumption and eliminating emissions and discharge.

PHOTO: JEANOLOGIA

Sustainability is not going to happen if it's more expensive, and it can only be scalable if it's at neutral cost or cheaper. For that, you need collaboration between the brands, the suppliers and the technology providers. This is our main fight, to try to change people's mentality because it's not about the technology, it's about the way we use the technology and it's about market intelligence. Technology is the tool to align planet and profit but the real way to do it is market intelligence and collaboration. This is a must, and the brands and retailers that understand this are going to have a winning position. It's time for strategic partnerships.

When we started Jeanologia 27 years ago, we had a clear mission that we called Mission Zero: to completely eliminate the use of water in jeans and textiles manufacturing and eliminate waste, including CO₂ emissions and chemicals of concern. Now, this is the trend, but for many years we felt like a lone voice and no one was listening. In 2018, we created Laundry 5.Zero, and established the first one in Nevada, USA, in the middle of the desert. This was the first time that we were able to produce jeans or any textiles without water. Today, there are 10 Laundry 5.Zeros, so 10 places where we have accomplished our Mission Zero. This touches our hearts because it has made the dream that Jeanologia was created for a reality.■





TRANSFORMING TOMORROW TODAY

33 ACRES OF RESPONSIBLE DENIM PRODUCTION

Our state-of-the-art Industrial Park is vertically integrated and powered by Industry 4.0 using automation for cleaner and more efficient textile production.

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Global News

France French denim maker Atelier Tuffery will triple the size of its headquarters in Florac. Sale have grown from €100,000 to €3.5 million in five years. The company will expand production, logistics, marketing and administration as well as the showroom and the onsite shop. The investment of €2.5 million is backed by state and regional institutions.

- Tissage de France, a maker of denim and woven fabrics based in Rupt-sur-Moselle, is adding a cutting and sewing facility specialising in jeans manufacturing. Production capacity will be 100,000 jeans per year. The €700,000 investment is partially funded by the French government.

UK Textiles technology provider Kornit Digital and social enterprise Fashion-Enter have launched Fashtech Innovation Centre in London, with the goal of bringing on-demand fashion and mass customisation back to the UK. The centre uses Kornit's direct-to-fabric and direct-to-garment digital production solutions, which the company says offer production capabilities that minimise carbon footprint.

Spain Spanish denim mill Evlox has teamed up French metal trim maker Dorlet and label maker Close to Clothes for its s/s 2023 collection made from organic cotton and biodegradable elastane. The collection also features the company's Smoothic denim fabrics, which have a smooth texture obtained by a mechanical finish made from manmade cellulosic fibres such as viscose.

Germany The first jeans made in C&A's new Industry 4.0 factory in Monchengladbach have been launched online. The facility, C&A FIT (Factory for Innovation in Textiles) features equipment supplied by European companies, including machinery maker Sip Italy's Factor-Hit concept. As part of the group's ambition to achieve zero carbon emissions, fabric and supplies are also sourced in Europe.

- Taking a step towards a circular business model, sustainable denim brand Armedangels is launching a resell platform. The company has partnered with Reverse.supply, a start-up based in Berlin that will manage the logistics.



Morocco A new sustainability-minded jeans manufacturer, CBD Denim, is offering jeans made from fabrics "woven from the natural world": organic European cotton denims blended with hemp, linen and bamboo, as well as recycled denim. These fabrics are supplied by Evlox, which has a facility in Morocco, founder Alexander Levy told *Inside Denim*.

Tunisia The United Nations Industrial Development Organisation (UNIDO) and Swedish denim brand Nudie Jeans have concluded a pilot project in Tunisia, recycling cotton from old jeans as well as using pre-consumer waste. Since the project started in 2020, the companies have repurposed 6,530 pairs of jeans into 16,000 new pairs of jeans with a composition of 20% of recycled cotton.

Kenya Heads of state and representatives from 175 nations agreed on a resolution to end plastic pollution and create a legal framework to uphold the ban at the UN Environment Assembly in Nairobi. "Plastic pollution has grown into an epidemic. With today's resolution we are officially on track for a cure," said Espen Barth Eide, Norway's Minister for Climate and the Environment.

Japan Following an initial display of 150 product samples, Ryoji Yamazawa's project to reprocess 20 tonnes of discarded Levi's 501 jeans has resulted in an exhibition of over 200 upcycled styles, created by more than 60 brands. Sergio Rossi, Golden Goose and Pellico have helped transform the denim into apparel and footwear, plus accessories, toys, furniture and works of art.

Korea North Gyeongsang province, a designated "free zone" for industrial hemp cultivation since 2020, is set to invest almost \$30 million in the construction of a "bio industry complex" for hemp fibre production. From now until 2026, the province will also invest \$20 million in the creation of a site dedicated to the recycling of biomass resources such as rice husks and pulp into cellulose nanofibres.



Bangladesh Representatives from Bangladesh Garment Manufacturers and Exporters Association travelled to the US to meet hemp processor Panda Biotech to accelerate the use of the fibre in the country. BGMEA president Faruque Hassan said the industry was looking to shift away from traditional cotton and that hemp could be a perfect complement fibre.

Uzbekistan The Cotton Campaign, a US-based non-profit that has been campaigning against state-imposed forced and child labour in the Uzbek and Turkmen cotton industries, has ended its call for a global boycott of Uzbek cotton. Campaign co-founder Patricia Jurewicz said: "After encouraging hundreds of companies to avoid Uzbek cotton over the past 12 years, we're happy to announce the time has come to lift the pledge."

Australia The Australian denim community is taking steps to support those affected by flooding across areas of Queensland and New South Wales. Outland Denim has teamed up with #WeWearAustralian as well as Thread Together, a non-profit that works to supply Australia's vulnerable communities with donated clothing. Outland is donating product that will be shared with people living in flood-affected areas.

US Denim brand Wrangler has launched a series of state-specific jeans made from cotton grown in Alabama, California, North Carolina and Texas in its s/s 2022 Rooted collection. The cotton fibres are traceable back to the farms and are part of the brand's pledge to source 100% sustainable cotton by 2025.

- Star Fades International (SFI), the Los Angeles-based design studio and denim laundry owned by Pakistani mill Artistic Milliners, said it is "thrilled" with the results of the recent Yeezy Gap Engineered by Balenciaga collection. The collection's denim jackets and jeans "pay tribute to Gap's timeless American icons," it said.



Vietnam Jeans manufacturer Saitex has opened its first denim fabric making mill in Vietnam. The 100,000 square metre facility is located 40 minutes from its cut and sew factory near Ho Chi Minh City, where 18,000 pairs of jeans are made per day. It will produce 2 million metres of fabric per month and will employ 1,000 at full capacity.

Thailand Austrian cellulosic fibre manufacturer Lenzing has commenced production at what it describes as the world's largest lyocell plant, following two-and-a-half years of construction. The complex has capacity to make 100,000 tonnes of lyocell per year.

- Textile waste brand Stelapop has launched its first range of products made from denim waste with Edwin USA. The company, which is backed by Saitex, recycles end-of-use apparel and fabric off-cuts into a new material. The first products are coasters, serving trays and storage boxes.

Industry News

CBL and Miles Johnson champion light wear for heavy impact



Pakistani denim manufacturer Crescent Bahuman (CBL) has launched its latest collection with UK-based design consultant Miles Johnson.

Lighter Touch, created from traceable cotton and recycled fibres, is described as a range which harks back to a “vintage” era, particularly a time when lighter washes were celebrated.

The mill has created four new shades: Natural Earth (a “natural” colour with a green cast ecru weft), Az Ocean (a mid-shade with an ecru weft), By River (a French light indigo with an ecru weft) and E Z Sky (a greyish light indigo shade with, also an ecru weft).

Developed using CBL’s Naya Denim indigo-dyeing process, which reportedly results in water savings of 98.5% and skips

pre- and post-wash steps, the partners emphasised the need for shoppers to “take utmost care” of their denim post-purchase by choosing to handwash the fabric and even allowing it to dry in natural sunlight.

Mr Johnson said: “Until 1971, nothing was washed. Rigid, unwashed denim in much lighter shades was the only option for 98 years. Worn-in naturally from new is the look we have all been wastefully trying to replicate. This natural wear is not only the most unique experience, but also perhaps the kindest thing you can do to a jean.

“The natural wear increased the strength of the fabric, but also does not waste water, chemicals or energy in processing, as it simply requires wearing to get the effect.”

Zaki Saleemi, vice-president of strategy at CBL, added: “The story of each denim article is crafted exclusively by its user, whereas the resilience and eco-friendly elements of this product make it stand out from the rest. Each pair of jeans in the Lighter Touch collection will have a unique emotional value for its wearer.”

Women’s styles include a cropped taper leg, high wide fit, bootcut, skinny boot and very slim. For men, the collaborators have produced 1970s and 1990s-style, five-pocket jeans, plus cropped and baggy five-pocket versions. A unisex pullover hooded jacket also features.

Miles Johnson and CBL previously collaborated on Now or Never, an “all-natural and recyclable” hemp-centred denim collection, which included blends of core-spun hemp yarn, Tencel and both organic and Better Cotton Initiative-certified cotton. ■

Naked & Famous serves milk-fibre jeans

Montreal-based denim brand Naked & Famous is known for experimenting with unconventional raw denim fabrics. Its s/s 2022 collection features Strawberry Milk Selvage denim made from a blend of 77% cotton and 23% milk fibre, with a subtle yet distinct pink weft, in a 12.5 oz denim fabric.

The milk fibre is placed in the weft, and will deliver a soft and cool touch on the skin, the company claims.

The Strawberry Milk series follows up on the Canadian brand’s original Milk Denim, released in 2021, and other series having pink wefts such as the Hanami and Sakura denims.

Like all of its products, the company sources its fabrics in Japan and the jeans are manufactured in Canada. ■

Jeanologia optimises garment dyeing

Technology provider Jeanologia has unveiled the Colorbox series of machines for garment dyeing, which it claims can reduce water and chemicals usage and lead to significant savings in salt. Colorbox also allows a manufacturer to dye a product at any stage of the process, which could allow them to respond faster to customer needs, according to the Spanish company. Its machines and processes have contributed to helping the industry reduce water usage by 18.2 million cubic metres in 2021, the company states.

Garmon enables cracked effects

Garmon Studio has developed a “special” application of its Copy Binder – a glue for the application of metallic foils – to achieve a “cracked” effect on the garment’s surface, as opposed to the evenness of conventional applications. This causes part of the foil to unstick from the fabric, creating a “unique” look that can be dyed either tone-on-tone or with high-contrast hues.

Kaiser “activates” ozone

Istanbul-based auxiliaries supplier Kaiser Tekstil has launched an ozone activator which it describes as a way to bypass the oxidising agent’s limitations when it comes to bleaching. Lava Con DOZ improves ozone’s effects and can achieve “very light colours” that ozone cannot typically attain alone, according to the company. The activator can be applied by dipping, spraying or via conventional machine applications, or by injection in closed machinery systems.

Polygiene sets ambitious goals

Antimicrobial technology provider Polygiene has reported 2021 revenues of €17 million, an increase of 116% compared with 2020. It has set the target of growing its sales fivefold to reach 1 billion Swedish kronor by 2026, which it will achieve through organic growth and by an ambitious acquisition strategy. Polygiene’s recent highlights include an agreement with denim brand Diesel.

OTB sales up 18%

Diesel owner OTB Group returned to pre-pandemic sales levels in 2021 with “significant” improvements in earnings and margins and an 18% increase in sales to €1.5 billion. It was the first full year with Glenn Martens at the creative helm of Diesel, which the group said paved “the way for a new phase of development designed to position the brand in the alternative luxury segment.” ■

Fashion for Good tackles dyeing and dry processing



PHOTOS: KATRIN HAUF / UNSPLASH

Sustainable fashion hub Fashion For Good has launched several projects that could benefit the denim industry, including an initiative it says could reduce emissions from textile processing by up to 89% and cut water consumption by as much as 95%.

D(R)YE Factory of the Future will have adidas, Kering, PVH Corp, Arvind and Welspun India as partners, and includes Alchemie Technologies, Deven Supercriticals, eCO₂Dye, GRINP, Indigo Mill Designs, imogo, MTIX and Stony Creek Colors as technology providers.

They will demonstrate innovations in pre-treatment and colouration for cotton, polyester, blends, denim and wool, with technologies including plasma and laser treatments, spray dyeing, supercritical carbon dioxide (CO₂) and foam dyeing.

Fashion For Good said innovations that exist in this space “are often explored in isolation”. Instead, the project will look at several innovations together to validate their combined impact and potential to scale.

Fashion For Good managing director Katrin Ley said: “Textile processing is the largest contributor to carbon emissions in the supply chain and a shift to mostly dry processing is crucial for the path to net-zero.”

Another project aims to develop black pigment for the dope dyeing of man-made cellulosic fibres and recycled polyester yarns, evaluating the technologies of Graviky Labs, Nature Coatings and Living Ink, which produce pigment from industrial carbon emissions, wood waste and waste algae, respectively. Thus far, their technologies have only been used in printing applications. The innovators will be supported by Birla Cellulose and Paradise Textiles.

The Amsterdam-based hub has also named the eight innovators that will benefit from its 2022 Global Innovation Programme, a nine-month programme supporting their technologies with mentoring and funding routes. The start-ups represent technologies across raw materials, processing and end-of-use, focusing on impact and carbon-reduction opportunities.

They include DyeRecycle, a UK-based company that can selectively extract dyes from coloured waste fabrics; French company Ever Dye, whose chemicals can speed up the dye process; Kintra Fibers, which has developed a plant-based polyester replacement; and Modern Synthesis, which has a microbial textile platform that grows a new form of textile made of nanocellulose. ■

Brands unite behind living wages

A consortium of European brands including Kings of Indigo, Armedangels, Mini Rodini and Nudie Jeans have teamed up with Amsterdam’s Fair Wear Foundation to implement a “new standard” for their factory workers.

The objective, they said, is to raise garment workers’ salaries from minimum wage to a living wage, despite not owning the factories and, therefore, paying workers directly themselves.

To bypass this, Fair Wear has been working on a “true [open] costing methodology”, Kings of Indigo revealed, which it is hoped will empower brands to uncover the amount factory workers are actually paid for their time and, as a result, help buyers avoid negotiating cost prices which would negatively impact these workers’ wages.

In the case of Kings of Indigo and its Turkish supplier Mergu, the difference between a minimum and a living wage was found to be 42%, it stated. ■

Kingpins in celebratory mood

Denim trade show Kingpins (April 20 and 21) will celebrate several significant industry anniversaries in Amsterdam. A “happy hour party” will take place in celebration of Bavarian chemicals company Rudolf Group’s centenary. Italian technology provider Tonello is marking 40 years, chemicals manufacturer Officina+39 will celebrate 30 years, and Lenzing is also celebrating 30 years of Tencel lyocell cellulosic fibre.

Novel wood-based fibre

Nordic Bioproducts Group, a spin-off from Aalto University in Finland, has created a wood-based textile fibre it calls Norratex that can use a variety of raw material sources, such as forest by-products, textile waste and paper pulp. It claims some viscose needs to be made from dissolving pulp which can be more expensive than paper pulp, offering a potential cost advantage. Nordic Bioproducts has signed a partnership with CMPC Ventures, the investment arm of one of the largest producers of pulp.

Graphene boosts denim

Graphene-based products developer Directa Plus presented two denim garments at Milan Fashion Week that incorporated the company’s Graphene Plus material. Benefits include thermal regulation, antimicrobial functionality and UV protection, according to the company. The articles were designed by Romy Calzado and worn by model Naomi Campbell.

Kontoor CEO optimistic

The CEO of Kontoor Brands has said a solid financial performance in 2021 shows its strategies are working as the Wrangler and Lee owner reported a “high single digits” revenue increase to \$2.7 billion for the year. Scott Baxter said investments in digital, ESG (environmental social governance) and “demand creation platforms” helped secure the growth.

Progetto’s latest stones

For the past two years, Progetto 19.8 has been working on developing a synthetic alternative to pumice. Its “Spike” stones are based on a thermoplastic elastomer compound that can be reused and recycled. Progetto 19.8 tested a set of Spike stones for 3,000 hours, finding that they lose only 6% of their weight and size. It takes back the synthetic stones when they are no longer efficient, to regenerate them and make new ones. ■



Jeanologia's G2 Dynamic device is designed to treat fabrics; it is a complement to the company's two other ozone application machines made for garment processing, G2 and G2Atmos.

PHOTO: JEANOLOGIA

Smart oxidising agents

Ozone has become the go-to solution for laundries seeking more sustainable solutions. In the past 15 to 20 years since it was first introduced, it has led to significant savings in water and chemicals. From its initial use as a cleansing agent to lift excess indigo, eliminate back-staining of the weft and pocketing, it has gradually evolved to provide nearly fully 'bleached' effects. Bleach is not, however, a term the industry favours as one of the key advantages of ozone is precisely to avoid the use of hypochlorite.

"I don't like to talk about ozone as a bleaching process because it is much more than that," says Fernando Cardona, Jeanologia's Brain Box Team manager. "Ozone is a technology that optimises our processes, reduces water consumption and the use of chemicals and eliminates hazardous ones. It helps speed up processing times and increases productivity. With ozone it is possible to clean, it is possible to get abrasion effects and, yes, it can fade down colour, without using water. When these options are combined, ozone delivers huge eco-efficient benefits," he tells *Inside Denim*.

The Valencia-based company's ozone processing machines, G2 and G2Atmos for garment finishing, and G2 Dynamic for fabric finishing, apply the gas in dry conditions. They are designed to be safe for workers as a security system locks the door when the presence of ozone, a toxic gas, is detected inside the machine.

Dry, humid or wet

Ozone is applied in three different conditions – on dry, humid or wet items of clothing, directly in a washing machine or tumbler. "In a dry tumbler we can work with garments in dry, wet or controlled humidity conditions to achieve different effects," says Mr Cardona. Ozone can also be dissolved in water, though it is said that controlling the level of ozone and its homogenous diffusion is more complicated in this case.

First used to address the troublesome issue of back-staining, the mark of a low-end product, ozone is a powerful oxidising agent that is widely considered more sustainable than conventional chemicals. New developments in machinery and chemicals suggest that it has yet to reach its full potential.

The ozone-based technologies developed by Tonello are all made for applications inside washing machines. There are two reasons for this, says Alice Tonello, marketing manager for the Vicenza-based company. "The first is safety. Our washing machines are equipped and prepared to perform treatments with ozone without any possibility of gas leakage," she says. The second is a technical reason. "After the application of ozone on garments, they need to be neutralised through a chemical wet process." Once the ozone is completely neutralised, an operator can handle the garments without risk, and presumably, no ozone residues are left on the garments. "The presence of residues could further oxidise the garments which tends to give them yellowish stains or smudges, and they wouldn't even be safe for sale," she points out.

“Ozone delivers huge eco-efficient benefits”

HELENE SMITS, RECOVER

Tonello is investing in R&D to further develop and expand on its ozone solutions. Its patented OBleach process is said to improve aesthetics by delivering authentic and bright ‘bleached’ effects “using only ozone”. O-zone technology, another new development, is a static cabinet that, again using only ozone, makes it possible to obtain “unique and customisable aesthetics, such as sun-faded looks, localised discolouration or ombre effects,” she says.

“Ozone is part of a general trend to reduce water and chemicals use in denim finishing,” Vittorio Della Valle, technical manager at Nexia Italia, tells *Inside Denim*. “It reduces steps during treatment, helps gain time and is a fast, powerful and eco-sustainable technology.” The company, founded in 2015 and based in Rosà, in Italy’s Veneto region, acquired laundry specialist Defranceschi, and manufactures ozone generators along with washing and dyeing machines.

Nexia has developed a system in which a single ozone generator can power three to four machines at the same time. The fully automated equipment provides a safe working environment, and a certified catalyst prevents ozone from escaping into the outside air, guaranteeing zero emissions, the company states. Mr Della Valle points out that three conditions are necessary to achieve a stable system and consistently repeatable productions: “Constant oxygen concentration of the inlet gas, constant humidity of incoming air, and stable temperature of the cooling water in the system.” He sees ozone processing as continuing to grow as brands request that their suppliers reduce water and chemicals usage. “Our ozone technology leads to important reductions in water consumption (about 50-60%), energy (about 30-40%) and chemicals (85%) normally used during the washing phases. It also helps reduce water pollution,” he says.

For laundries looking to achieve a higher level of abrasion, the company has developed a patented abrasive layer that can be inserted inside the drum. “No Stone scrapes the fabric while ozone bleaches it without chemicals, leading to less rinsing,” he says.

Ozon Denim confirms growing interest for ozone machinery in laundries. “It helps reduce water usage, chemical consumption, and is generally more sustainable for the world,” says Aslan Kenan Yagcilar, marketing and technical manager for the



Istanbul-based manufacturer of ozone machines. Despite progress in machinery, he says that processing times remain more or less the same as that of other bleaching methods. But as ozone generators become more powerful and compact, they may also become faster, he says.

Innovation in ozone

A relative newcomer to ozone processing machinery, Wisser Wash has developed a patented technology that calls on artificial intelligence. Its algorithm-driven equipment is said to reduce variations, decrease cycle duration by 40% and achieve better bleaching results through homogenous ozone infusion, for an overall increase in production capacity that it says can reach 66%. The company’s newest machine, Wox, combines an ozone drum and generator with advanced data management. In 2021, it won a Chicago Athenaeum Good Design award. Wisser Tech, the digital services branch of the US and Turkey-based company, contributes to increased efficiency and productivity while also providing predictive maintenance. Wisser Wash machines are currently operating at the facility of Musa Çakici, the company’s business development director, in Turkey, at Arvind in India, Elleti in Europe and Phong Phu in Vietnam.

The addition of Tonello’s OBleach to ozone processing makes it possible to achieve stronger fading.

PHOTO: TONELLO

Nexia Italia’s ozone-based equipment has been found to achieve water savings of 50% and reduce chemical usage by 85%. It also contributes to cleaner wastewater.

PHOTO: NEXIA ITALIA





Examples of garments having undergone ozone processing in humid conditions with Ozon Denim equipment.

PHOTO: OZON DENIM TEKSTIL LTD.

Nexia Italia is working on developing higher performance machines that would consume less energy and need less air. The company is planning on introducing next-generation machines at ITMA 2023 in Milan. It has also joined a scientific research programme to investigate possible health concerns related to ozone. Devalia, a consultancy founded by denim industry expert Dalia Benefatto, is the project lead and is working with the Institute of Intelligent Industrial Technologies and Systems for Advanced Manufacturing - National Research Council of Italy (STIIMA-CNR) of Biella.

“Ozone is widely used in agriculture, in the food industry and in hospitals. But no sector uses ozone in the concentrations that the denim industry uses,” says Dalia Benefatto. “After processing, ozone (O_3) reverts back to oxygen (O_2), but a certain amount of by-products could remain in the fabric,” she says. They may react later on, she surmises, and could have an impact on fabric longevity and on skin. “All assumptions are open, but as there is no official testing protocol within the industry, and no third-party verification, we don’t know,” she says. As ozone usage increases, she is concerned that the industry should not make the same mistake it did with sandblasting. Had it been used in the right conditions, it is thought that it would not now be banned. The goal of the research programme is to create a globally recognised scientific protocol for testing the presence of ozone. It may also include stricter safety regulations for ventilation.

Ozone is a toxic gas and its handling obviously dangerous. This raises the question of how sustainable it is compared with other oxidising agents. Is ozone better than bleach? Are critical safety protocols respected throughout the industry?

Boosters and alternatives

Like many textile processes, ozone is not without setbacks. In some instances, it generates a greyish cast, which requires a new set of operations to revert to blue. At times it creates a fuzzy surface texture that, again, will call for an additional biopolish. Controlling the degree and reproducibility of discolouration

seems to be a delicate matter.

The limitations of ozone applications have inspired chemicals suppliers to develop new solutions. These address some of the shortcomings of the gas or offer alternatives for companies that have put off investing in new machinery in the past couple of years when business-as-usual was put on a hiatus.

Oz-One Powder is Officina +39’s solution for laundries that have not yet invested in ozone equipment. Part of the company’s suite of Aqualess Mission products, it is used in waterless conditions and does not require special machinery or safety measures. “This product is not ozone, but an oxidising agent that produces results that are better than potassium permanganate (PP) and hypochlorite. It is a smart replacement for those conventional and harmful chemicals,” says Andrea Venier, Officina +39 CEO, who insists “there is no excuse not to phase out PP and chlorine”.

Kaiser Tekstil’s new Lava Con DOZ is presented as an ozone activator that bypasses the gas’s limitations with regards to bleaching. An “ecological replacement” to potassium permanganate and sodium hypochlorite, it is described as “worker-friendly”, formulated without toxic chemicals and can be neutralised with a simple detergent wash cycle after application. “It is the future of ozone bleaching,” says Kaiser marketing manager Ezgi Nur Ondas. “It removes ozone’s shortcomings, improves its effects and can achieve the very light shades that ozone cannot typically attain alone.”



Lumia is Soko Chimica’s pre-treatment solution for ozone finishing that is said to introduce a completely new way to fade. Shown here, an item treated with Lumia and the new J-Rex and J-Lux finishes.

PHOTO: SOKO CHIMICA

Jeanologia is currently working with its customers to develop a substitute for pumice stones by pairing its G2 technology with Atmos08, a chemical booster. “This combination makes it possible to obtain the abrasion results and colour fade-down of traditional stone washing, but with a brighter and cleaner look,” says Mr Cardona.

Lumia, a patent pending treatment by Soko Chimica, is not just a substitute for bleaching, but a completely different process which works in combination with ozone, says Luca Braschi, denim laundry expert and consultant for the Florence-based company. Originally developed as an alternative to potassium permanganate (PP) and hypochlorite, the company has found that “it has much more potential than we initially thought,” he tells *Inside Denim*.

The key advantage of Lumia is that it works with ozone in dry conditions and as opposed to bleach and PP, does not react on the fabric until it is activated by ozone. It is thus safe to use. Another plus is that it will not corrode metallic components. “Most alternatives will oxidise immediately. Lumia simplifies production planning,” he says. “Lumia exalts abrasion better than bleach, and creates deeper salt and pepper effects.” It can eliminate the need for pumice and reduce enzyme processes. And, the fabric will have not undergone as many aggressive treatments as usual.

Soko Chimica has extended its patent application for Lumia to several countries as it believes it is a game-changer in denim finishing. “At Soko, we seek to develop sustainable processes that perform better than conventional ones. Not less so. Not almost the same. Better,” he says.

A bright future

Ostensibly, the possibilities of ozone are poised to expand well beyond cleaning. Under pressure from brands to reduce their environmental footprint, laundries are investing in the technology. “Since the launch of the G2 systems, we have seen huge expansion, and we think that the product has not yet reached maturity,” says Fernando Cardona at Jeanologia.

It remains that the gas, like any oxidising agent, is toxic, and it does appear to be tricky to obtain consistency from batch to batch. Suppliers, as seen, are busy addressing these issues, and chemicals companies also intent on unlocking new oxidising options. These efforts combined may yet make this technology a true alternative to bleach and PP. ■



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An investigation into the presence of harmful chemicals in textile waste seeks to assess whether it is safe or not to recycle old clothes into new ones. Initial findings have found this risk to be low, but not negligible. It is a signal that further research is needed, along with a better understanding, and tracking, of chemical usage.



A collaborative study led by H&M and Ikea on the presence of harmful chemicals in textile waste has revived an issue that some recyclers have been flagging for years.

PHOTO: IKEA SWEDEN

Do old threads pose new threats?

To meet growing demand for recycled cotton, denim mills have been reorganising their workflow to capture as much unused fibre and fabric as possible from their own operations. They supplement this limited resource, in a well-run factory, by working with collectors and recyclers of used clothing. The availability of mechanically recycled cotton has thus steadily increased, a positive evolution by any measure.

Brands and retailers need to keep this momentum going if they are to meet their goals to source more sustainable materials. This is what inspired Ikea and H&M Group to take a closer look at one of the lesser known facets of recycling: the presence of hazardous chemicals in materials intended for a second life. Launched in 2019, the research project was expanded in 2020 to include Gap, PVH and Bestseller, among a new set of industry partners. The findings will be used to create a databank that will be shared within the industry and with legislators.

The study's first run examined three sets of textile waste made from cotton, wool and polyester, collected in Europe, the USA and Asia. Literally thousands of tests were conducted on the shredded material. For the most part, no regulated substances exceeded accepted limits based on the restricted substances list (RSL) of the Apparel and Footwear International RSL Management (AFIRM) group, a widely recognised resource. Within the 172 cotton samples, 99.97% were given a pass, and in 98.23% of the lot, no restricted substance was detected at all. Harmful chemicals were found to be above the accepted threshold in eight instances out of a total of 24,700 analyses. Polyester waste was similarly considered clean, as 99.3% of the 169 samples passed. For wool, while 98.5% of the 154 wool samples were considered safe, 216 tests found chemical content to be above accepted limits, and in 145 instances these were nonylphenol ethoxylates (NPEOs). "Although the overall fail rate was low, the failures were spread over many samples," say Negin Farhadi, H&M's project manager for recycled textiles, and Mirjam Luc, project leader for recycled textiles at IKEA of Sweden.

“The study shows that the risk profile is not so high for post-consumer cotton textile waste as originally thought”

HELENE SMITS, RECOVER

At first look, these findings can be considered reassuring. For the vast majority of samples, no restricted substance was detected and, when present, remained under accepted limits. The report confirms nonetheless that textile waste can be tainted by chemicals of concern. Formaldehyde showed up in many wool samples, and the APEO group of surfactants (covering NPEOs and OPEOs) were found across all three material categories. A common component of detergents, scouring or wetting agents, dye-dispersing agents and spinning oils, their enduring presence could be problematic.

“Nonylphenol ethoxylates, or NPEs, pose no risk to consumers of apparel and footwear themselves, but they degrade into nonylphenol (NP) in wastewater systems and in the environment,” says AFIRM Group director Nathaniel Sponsler. NP is considered persistent in the aquatic environment, moderately bio-accumulative, and extremely toxic to aquatic organisms. Legislation around the world restricts the presence of APEOs in finished goods.

How and why they turn up is an open question. Their presence may not be intentional. The precise formulation of chemicals used in the textile and apparel industry is not always known. A harmless substance may become harmful in some conditions. It is also possible that the textile waste comes from items of clothing made at a time when there were fewer restrictions.

An ever-evolving notion of safety

The evolution of chemicals regulations policies is one of the issues this study brings to light. “The number of restrictions for chemicals has grown from only one in 2014 to over 5,000 in 2022,” said Carole Mislin, Archroma’s head of global product stewardship, at a conference organised by the French National Institute for Industrial Environment and Risks (Ineris), on hazardous chemicals in textiles.

The definition of what is safe keeps changing, says Mr Sponsler. “A substance that was perfectly legal a few years ago may become illegal at a later date, or the residual amount allowed in a product may be substantially decreased by new regulation. This means that a material manufactured today may face stricter rules later on that would not allow its use in new products.”



The EU is in the process of potentially adding over 1,000 new restrictions, of which 20% are thought to be relevant to the apparel and footwear industries, says Mr Sponsler. “Some of the new guidelines bring allowed levels down to parts *per billion* (ppb).” These difficult to detect trace amounts could have an impact on the recyclability of used textiles.

As new data emerges on the presence of hazardous chemicals in used textiles, new questions will emerge. “It may be possible to wash out some of the unwanted, or now illegal, chemicals. But that may require a lot of water, energy and additional chemicals, and may not be sustainable,” says Mr Sponsler. This situation raises another set of questions. “Should specific rules be set for recycled content? A separate RSL could be developed for recycled materials, but would it meet basic market requirements?” he asks.

Textile waste is not the only source of concern, as polyester recycled from post-consumer PET bottles has been found to contain trace amounts of bisphenol A (BPA). “All possible sources are being investigated, but early indications are that it could come from polycarbonate bottles mixed in with PET plastics,” says Mr Sponsler. If that were the case, it would be necessary to implement finer sorting processes to keep polycarbonate bottles out of PET feedstock or treat the solution to filter out the BPA. “We are learning as we go,” he says.

Recover has recently added chemical screening to the tests it conducts to certify the quality of its mechanically recycled cotton.

PHOTO: RECOVER

Chemsec, like AFIRM, was consulted by the Ikea and H&M research team. “Chemsec reviewed the findings, and we commend it as a great example of collaboration for good. There is a huge lack of information on recycled textiles, and this is an attempt to fill that gap,” says Chemsec senior policy advisor Theresa Kjell. The environmental NGO based in Sweden advocates for the removal of hazardous substances from consumer goods.

“I was surprised that the results were so good for cotton. This issue of chemicals in waste textiles is not problem free, but slightly better than expected,” she says. Azo dyes, for instance, did not show up. “This confirms that regulations have an impact.”

Tracing chemicals

The new data revealed by H&M and Ikea sends a clear signal to the industry that more information is needed on the chemicals it uses. In addition to providing recyclers with a go ahead to recycle identified waste, it could also increase the value of used textiles, says Ms Kjell.

Currently, most traceability systems focus on keeping track of fibres throughout the supply chain. Few cover chemicals.

Toxnot, a company founded in 2016 and based in Fort Collins, Colorado, includes data on chemicals as part of its sustainability compliance services. Its software platform creates material passports for textiles used in apparel, furniture and architecture. “Brands try to do good, and we are working with them to achieve this. But the industry does not have the tools to screen chemicals used to make their products. We are filling a gap,” says Toxnot CEO and founder Peter Girard.

In circularity, he says, there has been a lot of focus on recycling and not much on chemistry. To support the addition of sensitive data to its traceability platform, Toxnot allows companies to make ‘blind’ information they do not want to share if they feel this is necessary to protect intellectual property. They can decide what data will be made available to whom. Recyclers may be given access to information on chemicals that would otherwise be withheld.

Are used textiles and clothes toxic?

For those promoting circular solutions and mechanical recycling of textile waste, the presence of hazardous chemicals is, unsurprisingly, a cause for concern. But so are the escalating quantities of unwanted clothes, which have likely been worn and washed for years before being discarded. “This is clearly an important issue. Yet, we need to recognise that we collectively produce a tremendous amount of post-consumer material. In my mind, it is better to recycle it than send it to landfill,” says Accelerating Circularity founder Karla Magruder. This point of view may well be shared by the many companies specialising in the reuse, resale or rental of second-hand clothes. These are not known to be subject to chemical testing or to any specific standards.



“The Ikea and H&M study shows that the risk profile is not so high for post-consumer cotton textile waste as may have been originally thought,” says Helene Smits, chief sustainability officer for Recover. A global producer of mechanically recycled cotton, founded by 70-year-old Spanish spinner Hilaturas Ferré, Recover was spun off as an independent entity and acquired by US private equity firm Story3 in late 2020.

The company recycles cotton textile waste into fibres that it sells to spinners, who most often blend the recycled material with other sustainable fibres. “Our products are all certified Oekotex 100 class 1. We test them at 100% concentration level, meaning 100% recycled content, to guarantee they do not exceed accepted levels of detection,” says Ms Smits.

Jeans make up most of Recover’s post-consumer recycled cotton fibres. This feedstock is relatively easy to sort out. The vertically integrated denim supply chain may make materials and chemicals tracing easier.

PHOTO: RECOVER



Swedish retailer H&M has pledged to use 100% recycled or sustainably sourced materials by 2030. Its newest denim capsule is dubbed ‘Water Saving Collection’ and includes articles made in recycled material from industrial waste and collected garments.

PHOTO: H&M

A hand is shown holding a ball of white, fluffy recycled cotton. The background is a soft, out-of-focus green field. The text is overlaid on the top left of the image.

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Recover currently processes post-industrial waste for some 95% of its business, which Ms Smits says is expected to be REACH compliant, whether produced in Europe or elsewhere. The remaining 5% of its production is cotton recycled from post-consumer jeans.

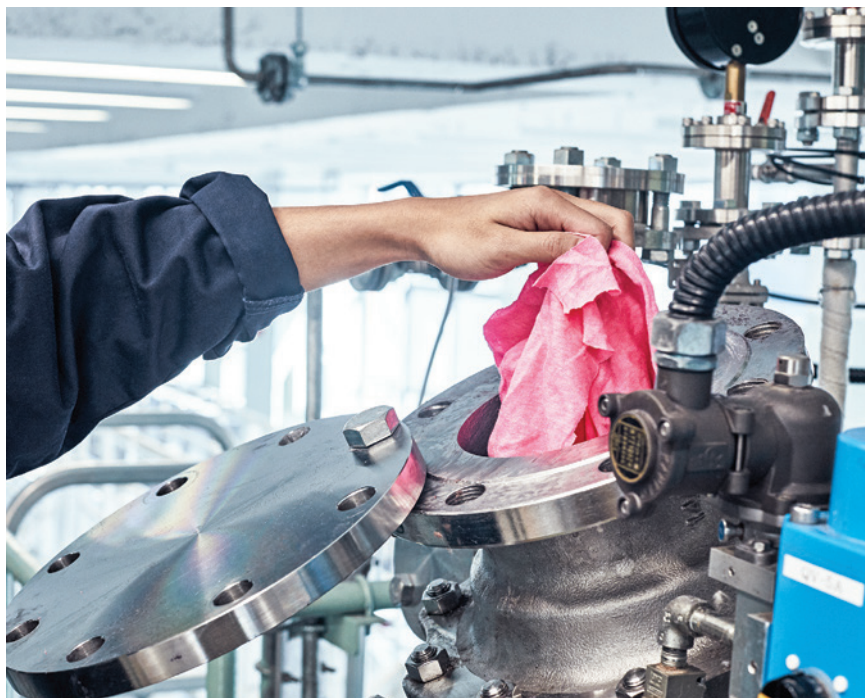
Whatever the source of the material Recover recycles, each bale will have highly variable content. To uphold its certification, the company tests random samples twice monthly, says Ms Smits. It now tests every lot for specific chemicals on top of that. For post-consumer fibres, it takes samples from multiple places in one lot and mixes them to get a good average sample. “If we sampled from a single area, we could be lucky or unlucky,” she says. This raises the question of whether different testing protocols should be applied to post-consumer waste, which is by nature heterogenous. “We need standards that ensure safety, and that allow us to keep costs manageable,” she says.

Can chemicals be stripped out?

Some point to chemical recycling as a possible solution to remove toxic chemicals in used textiles, as it dissolves the feedstock and can then filter out problematic substances. But the Technological Readiness Level (TRL) of chemical recycling processes is low, from three to six, on a scale of nine, says Jeanne Meillier, project manager at French material innovation and sustainability cluster Euramaterials. “Mechanical recycling is much more advanced, and has greater economic potential,” she says. She also notes that mattress recyclers sanitise used goods to neutralise any pollutants before recycling them.

Various methods to strip away dyes from waste textiles, using supercritical carbon dioxide or ozone, could be an option for removing unwanted substances, and increasing the value of recycled feedstock. But these, says Ms Meillier, can be energy intensive. Lei Yao, director of product development at Hong Kong-based textile research centre (HKRITA), says that supercritical water could be a solution. “It is a very powerful and efficient technology, but there are lower-cost methods,” she says.

HKRITA has recently finalised a study on the decolouring of polyester textiles. It has found that a combination of high temperature, high pressure and water “makes the polyester fibre swell and release its colour,” says Lei Yao. Activated carbon is then used to absorb the discharged dyes. “This process does not affect fibre quality, and it is not very expensive,” she says. Though it sounds simple enough, Ms Yao admits there are some challenges. “The system works well on some dyes and not on others. We need more comprehensive studies of different dye families.”



Hong Kong research centre HKRITA developed a recycling process for used textiles it calls the Green Machine. It is also looking into methods that could remove dyes.

PHOTO: HKRITA

“It is better to recycle post-consumer material than send it to landfill”

KARLA MAGRUDER, ACCELERATING CIRCULARITY

This circles the issue back to the initial question that the H&M and Ikea project was looking to answer: what chemicals remain lurking in a random bale of discarded, no longer wearable clothes? The chemical experts consulted tend to insist that legal limits are legal limits and, to be put onto the market, any recycled product must be guaranteed to be safe.

But they also intimate that as regulations become ever more stringent, it may become near impossible to find feedstock suitable for mechanical recycling. “It will be challenging to tackle the issue of legacy chemicals, but developing closed waste streams is one way to decrease the problem, as open ones could be too contaminated,” says Theresa Kjell, at Chemsec.

For those who favour mechanical recycling, as does Karla Magruder, at Accelerating Circularity, it is commercially viable and should be encouraged. “It will support the development of sorting and pre-processing technologies. A recycler should be able to say, I need this and don’t want that, and be able to place an order that meets its standards,” she says.

The two camps agree on one matter: hazardous chemicals should be phased out from the start. This would take care of the problem of having to remove them later. ■

Keeping cotton in the loop

Of all the waste that the apparel industry generates, cotton is arguably one of the more valuable resources to keep out of landfills and incinerators. Demand is high for cotton-rich fabric scraps, deadstock, unsold goods and whatever post-consumer clothes and household linens can be culled from the mounting piles of discarded textiles. These can be shredded down and mechanically recycled into new cotton fibres, or they can be liquified into pulp to make any one of the regenerated cellulose fibres, from viscose to lyocell. While mechanical recycling tends to break down cotton fibres, the process of regenerating their cellulose content creates a new fibre whose properties are akin to virgin manmade cellulosic materials. As the companies investing in these technologies begin to scale up, industrial volumes of these regenerated materials are being made available. A telling sign of a promising future for this new crop of fibres is the launch by Levi's of its Original 501s in a blend of organic cotton and Circulose, a regenerated cellulose fibre made from cotton pulp by Swedish company Renewcell. This marks a true breakthrough for the company, as "it is truly an iconic product," says Nora Eslander, Renewcell's head of communications. With this symbolic achievement, it hopes to convince other major brands to envision replacing cotton, or polyester for that matter, with its circular regenerated cellulose solution.

Renewcell, which was set up in 2012, is far from the only company that is chemically recycling cotton into cellulosic fibres. Since 2017, Austrian manmade cellulose fibre producer Lenzing has been producing Tencel Lyocell with Refibra technology, and progressively increasing the proportion of recycled textile waste. Infinited Fiber Company was established in 2016 to further develop a cellulose carbamate made from textile waste, a research programme initiated by VTT, the Technical Research Institute of Finland. Evrnu, founded in 2014 in Seattle, is yet another company developing a similar technology. It recently raised \$15 million to meet surging demand for its fibre regeneration platform called NuCycl. The company says it will use these funds to expand its operations in South Carolina.

What would jeans be without cotton? The natural fibre is literally a staple of the denim industry. The raw material is nonetheless presented by many sustainably minded brands as having negative impacts on the planet's finite resources, from water to land. Thanks to innovative companies regenerating cotton waste into cellulose pulp and fibres, the mountains of used clothing discarded every day could become an infinite resource to make new materials.

Building up production capacity

Renewcell has recently announced that to meet demand for its Circulose pulp, it has decided to double the production capacity of its new plant in Ortviken, some four hours north of Stockholm, from 60,000 to 120,000 tonnes per year. Located in a former paper pulp processing mill, which closed in 2020, the company will be reusing both the building and the water treatment plant. "The infrastructure is there; we do not need to build a new factory and we have hired staff, experienced workers, who were laid off when the paper mill closed," says Ms Eslander. A second-hand drying line was acquired, another eco-responsible move by the Swedish company. Its existing facility, located in a former Akzo-Nobel factory in Kristinehamn, in the east of Sweden, produces up to 4,000 tonnes a year of Circulose pulp.

Renewcell has also formed partnerships with traditional manmade cellulose fibre producers to transform its Circulose pulp into fibre. "Sanyou in China is our biggest partner, it processes two-thirds of our production, representing 40,000 tonnes," says Ms Eslander. Chinese viscose manufacturer Yibin, another partner, has successfully produced a recycled viscose filament made from 100% Circulose. This represents a new achievement as most companies using Renewcell's pulp most often blend 30% to 50% Circulose with conventional wood pulp.

In Europe, Renewcell signed a letter of intent with German viscose maker Kelheim. "Production has not yet started," says Dr. Marina Crnoja-Cosic, business development director for Kelheim. "We are in the phase of technical feasibility and optimisation of production." Kelheim could be one of the first Europe-based companies to turn post-consumer waste into new fibres when operations begin. Lenzing's Tencel Lyocell with Refibra technology can include post-consumer waste, but its main feedstock is post-industrial cotton.



Lenzing's Tencel Lyocell with Refibra technology is now a part of the company's carbon-zero platform. It has a carbon footprint of 2.5 CO₂ eq/kg (cradle to gate), and refers to the fibre itself, not to the recycling technology. This data will be added to the Higg MSI, the company says.

PHOTO: LENZING

“Levi’s launch of its Original 501s with Circulose marks a true breakthrough as it is truly an iconic product”

NORA ESLANDER, RENEWCELL



The recycling process developed by Södra separates cotton from polyester in blended fabrics, and then incorporates conventional wood pulp with the cellulose pulp made from cotton fibres.

PHOTO: SÖDRA

A large-scale facility is also in the works at Infinited Fiber Company, a €220 million investment. It currently produces its regenerated Infinna-branded fibre from post-consumer textile waste at two pilot facilities, located in two different cities in Finland. “This allows us to produce enough fibre to send sample batches and small commercial batches to our customers, and we are fine-tuning the processes at our pilots so that we can boost output this year and next. Unfortunately, even with this additional production, we can’t serve everyone,” says Kirsi Terho, Infinited Fiber Company the company’s key account director. The new plant will begin operations in 2024 and will have a capacity of 30,000 tonnes per year. The company has a short-list of possible locations, and will soon be announcing its choice.

The Finnish company also intends to license out its technology. “We are first and foremost a technology company, and licensing our technology is a key part of our strategy,” says Ms Terho. This will enable other fibre producers, such as existing viscose manufacturers, to add Infinna to their product portfolios. “We want Infinna to become a mainstream material as quickly as possible so that it can really make a positive global impact by reducing textile waste and the burden on virgin resources from creating new textile fibres. We can’t do this on our own,” she adds.

Since 2019, Swedish cooperative wood pulp producer Södra has been producing a regenerated cellulose fibre from textile waste it calls OnceMore at its main plant based in Mörrum. Initial research goes back to 2016, with the first lab tests beginning in 2018, says Angeline Elfström, OnceMore’s business development manager. The cooperative structure, with its 52,000 members, may be slower to develop new processes compared to single-focused start-ups, but it has the advantage of an operational mill running 24/7. “We are a small team at OnceMore, but we are backed by a very large organisation,” she says. In its first iterations, OnceMore contained only 3% textile waste, but it now incorporates 20% certified recycled content. “Our target is to reach 50%, and we are moving forward progressively as we want to maintain the same attributes. The material needs to align with industry expectations,” she says.

Production capacity is growing steadily, and was increased tenfold to reach 6,000 tonnes last summer.

A well-established wood pulp producer, Södra is a long-standing supplier to many major manmade cellulosic fibre manufacturers. “We are seeing a lot of interest for alternatives to cotton, we feel a real market pull,” says Ms Elfström. Södra and Lenzing came to an agreement in June last year to work together to increase the use of post-consumer textile waste in their processes. The cooperation involves the transfer of knowledge between the two companies with the goal to recycle 25,000 tonnes of textile waste per year by 2025.

Levi Strauss is now offering 501s made from a blend of organic cotton and Renewcell Circulose.

PHOTO: LEVI STRAUSS



Lenzing has been steadily increasing the proportion of recycled content in its Tencel Lyocell with Refibra fibres, going from 20% to 30%, with plans to reach 40% in 2023, and 50% by 2025. The cooperation with Södra will enable Lenzing to broaden the range of suitable materials used to make the Tencel lyocell with Refibra fibres. “We can currently add white cotton/polyester to our sources of raw material with further increase of the raw material base to come,” says Caroline Ledl, head of product management at Lenzing. Lenzing says that more than 90% of the mills exhibiting at Kingpins this April will be presenting fabrics made from Tencel Lyocell with Refibra technology. The group intends to highlight blends with mechanically recycled cotton at the show.

The need to secure waste resources

The companies turning used cotton into cellulose pulp need to secure a constant stream of waste materials, whether pre- or post-consumer, which have a high proportion of cotton, as close, ideally, to 100% as possible. Södra is an exception as its technology separates cotton from cotton/polyester blends. “The polyester is incinerated and used to power the process,” says Ms Elfström.

Up till recently Södra’s process required waste that was either white or light-coloured, supplied by hotels, restaurants and laundries working for the hospitality industry. It has partnered with hotels in UK through the Textile Services Association (TSA), a trade association for the textile care services industry. “We need volumes, not just 100 kg here and another 100 kg there,” says Ms Elfström. “If we were to use household waste, we would need a partner that collects and sorts it, like paper.”

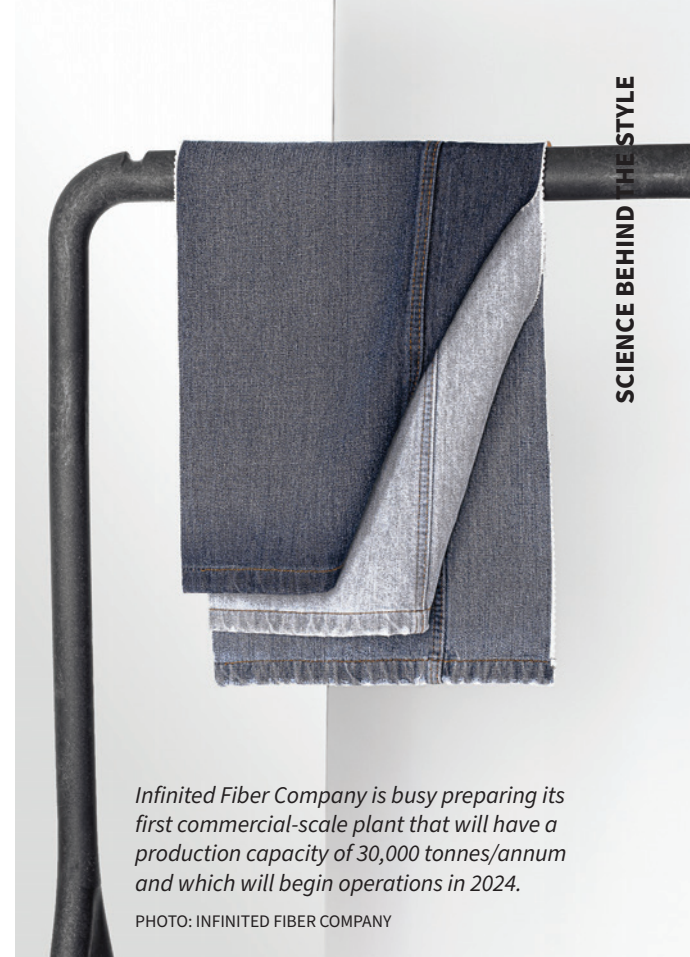
Renewcell is seeking to lower the threshold of suitable feedstock to 90% cotton content, which would allow it to accommodate the presence of elastane. It has formed partnerships with used garment collectors, including Bank and Vogue, one of its largest suppliers, and says it has secured 50,000 tonnes of used clothing yearly. Last December, it signed new multi-year purchasing agreements with three European textile sorters, SOEX in Germany, Texaid in Switzerland and Sysav in Sweden. Lenzing says it is working with customers and partners to develop customer specific take back systems.

Infinite Fiber Company is working with suppliers in Finland and abroad to secure its supply of textile waste. It has recently signed an agreement with Lounais-Suomen Jätehuolto (LSJH), a Finnish municipal waste collection company, which, says Ms Terho, is building a processing plant for discarded textiles.

They are all looking forward to the evolution of waste management policies in the European Union. As part of its Green Deal, EU member countries are being asked to implement the separate collection of used household textiles by 2025. Finland has already passed this legislation which will start in 2023. The EU lets each country decide how they will manage this waste, whether it will be the responsibility of municipalities or specially formed organisations. In France, Refashion (formerly known as Eco-TLC) levies a tax on all companies that sell apparel, footwear or home linens in the country. These funds are used to increase waste collection and its recycling. In 2020, the latest figures available, it collected 204,000 tonnes of used goods and received €34.5 million in ‘eco-fees’. Part of these funds are used to finance research into recycling processes. Refashion has distributed €5 million to some 55 projects since its inception 11 years ago.

What’s next?

Backed by EU funding, Infinite Fiber Company launched and heads a research programme known as The New Cotton Project in October 2020. It has rounded up a consortium of 12 companies, from all stages of the recycling supply chain, and focuses exclusively on post-consumer textile waste. Fashion For Good, based in Amsterdam, is the communications partner.



Infinite Fiber Company is busy preparing its first commercial-scale plant that will have a production capacity of 30,000 tonnes/annum and which will begin operations in 2024.

PHOTO: INFINITE FIBER COMPANY

The project is making good progress, says Paula Sarsama, New Cotton Project coordinator and Infinite Fiber Company product manager. Dutch used clothing collector Frakenhuis and REvolve waste, which tracks waste materials, have mapped the textile waste flows within the EU, and have evaluated available textile streams to identify which are best suited to Infinite Fiber Company’s process. Xamk, the South-Eastern Finland University of Applied Sciences, has refined the pre-treatment process. Spinning partners, Turkey-based Kipas, Slovenia-based Tekstina and Portugal-based Inovafil, have made yarns from regenerated Infinna fibres. These, she says, have been made into fabrics for quality review and dyeing and printing tests. Brand partners adidas and H&M have meanwhile finalised designs, conducted consumer research, and run fabric tests to compare the qualities of Infinna to virgin cotton. The positive results from these tests now enable the consortium to move on to the next step, which is to carry out the process on a larger scale. If all goes as planned, adidas and H&M will be presenting clothing made from regenerated Infinna fibre by the end of the project in 2023.

By then, the new factories at Renewcell and Infinite Fiber, along with expected new production capacities at Kelheim, Lenzing and Södra will no doubt also contribute to building up the availability of manmade cellulosic fibres made from textile waste. The outlook for this chemical recycling method is thus very positive. It is nonetheless very narrow, as it relies on securing high stocks of cotton-rich waste materials. ■



Moreno De Angelis, head of Italy-based washing research centre Iskoteca, says the chemistry involved in making great jeans needs to be a key consideration throughout the entire process.

Making the magic happen

Q What should the industry be focusing on?

A Over the last two years, there have been many changes within the industry. But this has given brands the opportunity to adapt and have a new vision for the future. The new textile industry set-up needs to be fully integrated and with a completely circular approach. Making this happen is only possible through radical and long-term programmes and partnerships with one vision for the entire supply chain.

What are your favourite types of projects to work on?

What really gets my heart pumping is working with a designer who has a really great vision and being able to translate that vision into a real ready-to-wear garment. I remember once, after a long discussion with a designer, I was unable to fully understand his expectations on his chosen fabric. The last piece of inspiration that I got from him was an image of [The Doors' lead singer] Jim Morrison, singing under the glow of a red light. He sent it to me and said, "This is what I mean." It was in that moment that I understood that my role was to "break on through to the other side".

Moreno De Angelis is the garment washing manager for Turkish group Isko at Iskoteca, its Italian research centre for finishings based in San Benedetto del Tronto. Mr De Angelis has more than 20 years' experience in consultancy for industrial laundries and previously worked for Dolce & Gabbana as a technical manager for denim. He has been with Isko for 14 years, working closely with brands, laundries and the R&D teams to create samples and prototypes and develop the global collection.

ALL PHOTOS: ISKOTECA



“The traditional processes where denim was treated in various tumbler machines will be transformed into a static process”



How does your background in chemistry inform the way you approach things?

Chemistry plays a significant role in our business. My background in this area helps to make many different variables understandable. From eco-sustainability, to greenwashing, to the choice of one fabric wash over another. Laundries especially are like a chemistry lab, where we work to make the ‘magic’ happen. However, the main challenge that I am facing in our industry is with the transferability of this chemical knowledge from the beginning of the design process right through to the engineering of the product. Keeping this in mind throughout the whole chain will significantly help the efficiency of the process and therefore the sustainability.

How do you work with Isko’s fabric developers in term of achieving end results?

This is one of our key successes as a company, helped by our integrated 360-degree approach. We have a large R&D department at Isko which works on developing great fabric innovations but the final result cannot be achieved without the input from the laundry. At this stage, where all fabrics get their final make up, we can see the wider result of all processes by testing the fabric with the right chemical and wash recipes all within a closed-loop system. This is then fed back to the R&D teams and to our customers, so that we can achieve the desired end result.

If money was no object, what machinery or technology should be used for all jeans?

There is no one technique that is better than another, there is only the correct technique that is needed for that particular look to be achieved on that specific fabric. The way in which the weaving, washing, sewing and packaging processes are selected will have a significant impact on the efficiency of the production and also on the environmental and economic impact.

What I am hearing a lot in regards to washing technology is always related to ozone and laser techniques, which have both existed in the industry for almost 20 years. It is much better to use this technology in the correct and most efficient way to deliver the desired result. Digitalisation in this area is also helping to propel these processes forward to achieve Laundry 4.0.

How do you see the industry changing over the next few years?

Laundry processes are changing dramatically and in two directions. Firstly, fabrics will not drastically change during the washing process but instead gently emphasise its original characteristics. To achieve this, we need greater knowledge of the raw materials to make the right choice when designing the product.

Secondly, a change is coming from the latest technologies using fewer mechanical actions, which will reduce overall water and energy consumption. In other words, the traditional processes where denim was treated in various tumbler machines will be transformed into a static process. The fabric will be cut and then laser washed in one step only. Then the stitching, and the jeans dried in standing cabins. The future is coming!

What makes you happiest?

When I am in the shops with my daughter Giulia and she recognises a pair of jeans that she already saw in my office some years ago because that’s exactly where they come from, and I could not be any prouder. ■

Iskoteca organises workshops and brand visits, and houses a vast library of former fabric collections for inspiration.



ALL PHOTOS: LEVI STRAUSS & CO

Wellthread: Levi's evolution accelerator

Keeping “eyes and ears open” is part of the remit for Levi's Wellthread team, and it was in Barcelona at the International Textile Machinery Exhibition (ITMA) that they encountered the technology company that has enabled recent collections to be dyed using sound waves. Used in collaboration with Stony Creek Colors' natural indigo, the sonic dyeing process helps the dye penetrate the fibres without the need for the heavy-metal mordants often used to fix organic or mineral colours. “For lack of a better word, it ‘vibrates’ the colour into the fibre, rather than having to score the surface of the fibre – so it's replacing the mordant with sound,” Paul Dillinger, Levi Strauss & Co.'s global head of product innovation, tells us. “It doesn't use chemistry so there's no question about whether it's benign chemistry or toxic chemistry. It's a really exciting new technology.”

From dyeing with soundwaves, via natural indigo and new fibres, head of product innovation **Paul Dillinger** explains how Wellthread collections operate as a type of R&D hub, laying the groundwork for successful main line interpretations, including the first Circular 501s.

Discovering new technologies, chemistry and fibres are the basis of the Wellthread collections, which offer a space for Levi's designers and developers to test ideas and innovations with supply chain partners. Wellthread was initially set up as part of Levi's brand Dockers more than 10 years ago, under the watchful eye of Mr Dillinger, and moved under the main company's umbrella in 2015.

“Wellthread is a great place to make mistakes as well as a great place for finding solutions”

PAUL DILLINGER, LEVI STRAUSS & CO

The Stony Creek Colors partnership was announced at the end of last year, with the companies working to scale up the indigo grown on farms in the US – a kind of homecoming for Levi’s, whose original jeans were dyed with plant-based indigo. A new pre-reduced form called IndiGold will enable the dye to work as a drop-in replacement for synthetic indigo – a “really exciting evolution”, says Mr Dillinger. “There’s no special equipment required, no special processing; a dye house can acquire and drop it in, it’s a one-for-one replacement.”

Circular 501s

One of the most recent and significant evolutions has been the launch of the Circular 501s, a recyclable interpretation of its most iconic design, built on the Wellthread team’s work with Swedish textiles company Renewcell. Its Circulose pulp is made from dissolved denim and textiles waste and from this, new fibres are formed. Levi’s blended Circulose with wood pulp and organic cotton, made pocketing details, labels and threads from 100% organic cotton, and dyed and finished the line using its Water<Less programme to create a jean which has a reduced environmental impact and is designed to be remade.

Wellthread launched two Circulose-containing fits in 2020, to check the fibre would move through the supply chain system without disruption. “We can’t introduce great new sustainable ideas that are going to break the looms or that are going to be unspinnable or make it harder to dye,” explains Mr Dillinger. “Sustainability is too important for us to allow it to be associated with disruptive production, so Wellthread is scaled small so that we don’t make potentially big mistakes. But when we figure out something valuable like Circulose, we immediately ask, ‘How can we make this bigger?’ That’s what you’re seeing with the Circular 501, which are orders of magnitude larger in scale of production and distribution; it’s available globally and it’s a dual gender offering with multiple finishes. It’s becoming a real part of the assortment.”



The next challenge will be securing subsequent supplies of Circulose, as more companies become interested and begin to compete on price. The textile-to-textile recycling sector is growing rapidly (see article ‘Keeping cotton in the loop’), and these types of companies are scaling up nascent technology, creating partnerships and working on ways of securing decent feedstock. However, Levi’s is not putting all its eggs into this basket as a material source – “it’s a very full basket and we are interested in many of the technologies, but there is a maximum blend level of viscose we’re comfortable with to make it still feel like a jean”; that level is 40% for the Circular 501. The company has worked with Evrnu’s regenerated cellulose and is testing the potential of others. “We’re excited to see their developments, but there’s also the need for a healthy natural cycle as well as the technical cycle – healthier fibres like cottonised hemp.”

Hemp’s natural appeal

Levi’s was one of the first brands to invest heavily in research and development in hemp. While some of the industry buzz around the fibre appears to have quietened over the past year or so, Levi’s is scaling up its use “considerably”. Hemp’s natural properties and favourable impact profile in terms of yield per acre, the minimal use of pesticides, herbicides and fertilisers, as well as rainfed opportunities, are added to a macroeconomic construct that means a hemp garment has a significantly lower import duty into the US than a similar cotton one, explains Mr Dillinger. “You can leverage these sorts of hiccups in trade policy and come up with a highly favourable cost of goods for using sustainable, natural fibres.”

The inclusion of circular principles into the iconic 501 is an example of how ideas mature and develop through the collections.

The success Levi's is having with hemp – from 12,000 garments to 1 million in less than two years – is a direct result of the lengthy testing process. When the first collection was released through Wellthread in spring 2019, there had already been five years of R&D behind it, working on hand feel, yarn elongation and spinning. “We finally launched a commercial proposition that felt like butter, it was so soft because we had spent so much time managing the enzymes for softening and making it a viable proposition. We don't just have an idea and then six months later, it appears in store, it takes a lot of work to make sure we have something the consumer will really want. We also have a brand to protect, we have to protect the equity of that product franchise as much as we're protecting the environment.”

Cultivating change

This is where the beauty of Wellthread comes in, he says: it isn't tied into short development cycles, so ideas can be cultivated over years rather than months. “We don't hold ourselves to the expectation it is going to yield a new sustainability solution every season. When you start treating sustainability as ‘fast sustainability’ you can start valuing it as much as you value fast fashion, which isn't very much.”

The company is also “not giving up on” cotton, researching regenerative agricultural techniques that will help restore biodiversity, sequester more carbon and work with natural cycles through crop rotation. And it is a fan of transitional organic cotton (it can take up to three years to convert conventional to organic) as an answer to tight supplies, and will be introducing it into more collections going forward.

For the consumer, at \$128 in the US, the price point of the Circular 501 is slightly higher than the other lines, but Mr Dillinger points out that many customers in Europe are already acclimated to that level and there hasn't been resistance, and this might just be what a jean should cost. “We are confident that each of the decisions that have gone into the production and the design are the right decisions. The slight pricing premium that the Circular 501 takes on might just give us a view of what the industry in the future needs to look like, which is fewer, better things.”

Data-driven decisions

This message was central to the recent marketing campaign ‘Buy better, wear longer’, which encouraged customers to be more mindful of their choices, to buy second-hand or extend the life of the garment through repairs. All these initiatives combine to create better products, and ones whose impact can be more quickly understood as a result of thanks to new technology and approaches to data management. Instead of a five-year lifecycle assessment calendar, it is now possible to receive targeted data at individual product level to enable a

Strongest results in decades

Levi Strauss & Co.'s first sustainability report, launched last autumn, outlined plans and progress in 2020 and set targets for 2025 and beyond, with the challenge of being “more ambitious, impactful and transparent”. Most key suppliers, representing 80% of volume, have agreed to reduce carbon emissions between 40% and 60% by 2025 from a 2018 baseline, as well as reducing water use in manufacturing in water-stressed areas by 50%. All key suppliers have also committed to meeting Water<Less targets in three years' time.

The Water<less finishing techniques and water recycling systems that Levi's helps to set up could also benefit other brands that source from the same factories. “As an influential company, the best thing is to lead by example, but also when we help improve our vendor base structurally, it's improving it for the whole industry,” says Mr Dillinger.

As part of its 2021 annual report, published in March, Levi Strauss & Co. CEO Chip Bergh describes the business as “the strongest it's been in decades”. It beat all internal plans, delivered sales ahead of pre-pandemic 2019 levels as well as the highest revenues since 1998. The group said Levi's is bigger than the next three denim brands combined. In the US, Levi's was number one in men's and number two in women's denim in 2021.

quicker understanding.

“It's exciting to see some of the behind-the-scenes work on impact evaluation coming online,” explains Mr Dillinger, on which evolutions he predicts next.

“Rather than a hypothetical impact, we can quantify value or, conversely, if a product doesn't have value, we know that quicker. Nothing is going to change the look and feel of a pair of jeans just yet and we're still going to be making jeans for a while, but we're going to get better and faster about understanding our relative impact of making those jeans.”

The impact of the innovation and testing through the Wellthread collections starts to make a big difference when they launch into the main lines: hemp started in Wellthread in 2019 and was in the main collection by autumn-winter 2020; Circulose-containing products appeared in July 2020 and reached the shelves as the Circular 501 at the start of this year.

Similarly, the intention with Stony Creek Colors is to apply the learnings around dye application and costing and bring those into the main collections eventually.

“That's just the inevitable process of the work that we do,” concludes Mr Dillinger. “If we're trying to solve an important problem, solving it at the Wellthread scale means we learn a lot but we don't have a lot of impact. Impact comes from scaling up for the main line, for Red Tab, and that's always the goal: to create impact.” ■





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An anatomy of denim

For decades, the utilitarian past of a fabric originally made to sustain arduous working conditions was swept away by fashion trends. An infinite variety of washes, distressing and finishing techniques were, and continue to be, developed to feed the need for novelty.

With the introduction of elastic yarns, jeans embraced the notions of comfort and fit, further fuelling its steadfast success as one of the world's favourite items of clothing. Skinny styles, for women and men alike, have long dominated the market. "Elastane has been the engine that powered nothing short of a revolution in denim, which was traditionally very rugged and outdoorsy. Elastane helped birth one of denim's most popular items ever, women's stretch denim," says Baber Sultan, director of product development and R&D for Pakistan-based Artistic Milliners.

While stretch denims undeniably drove denim sales for years, signs of a shift to looser and more rugged styles are nonetheless under way. Designers are now pushing for a return to authenticity and to more durable, and possibly more sustainable, denim fabrics and styles.

The workwear trend is making a strong comeback, says Adriano Goldschmied. "The functionality of uniforms made for the women who worked in factories in the UK and the US during WWII, when the men were fighting on the front, are very inspiring for

An entire industry is built on one iconic fabric, a twill weave made from a warp-dyed indigo and a weft, left white. This specific weave pattern produces one of the defining features of the storied fabric, its predominately blue face and mostly white back. As fashion trends evolve towards more authentic looks, richer textures and bolder slubs are back, reviving what makes a denim fabric so special, its character.

today," he tells *Inside Denim*. While he is critical of mills that "always want to produce more at cheaper prices", he has hopes that "the new generation, which is more sensible, will push for more durability and more sustainability" – causes that he actively supports in his own work.

The workwear trend is driving the revival of authentic weaves and a true denim renaissance, says denim designer Mohsin Sajid, founder of design and consultancy agency Endrime. This, he says, comes after years of "cutting corners, overlocking edges and baggy lightweight fabrics."

The classic denim fabric is a 3x1 twill in which the outer face will be roughly 70% warp-dominated and blue, and roughly 75% white on the back. Shown here, warp beams at an Isko factory.

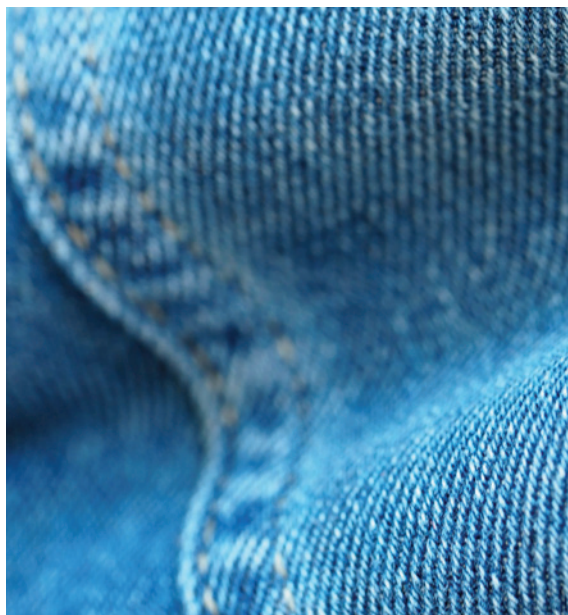
PHOTO: ISKO

“There is a move to highlight the original craft and identity of denim, and to shift away from mass market products,” says Tilmann Wröbel, denim designer and founder of design and consultancy agency Monsieur T. “It is leading to the development of denim fabrics that have a richer hand feel, more slubs, and bigger slubs, like those of authentic vintage denim fabrics. In the current context, there is a desire for higher quality jeans that last longer,” he points out.

Enduring legacy of twill

The iconic twill construction that defines a denim fabric is rooted in the utilitarian origins of jeans and overalls. Each of the founding brands chose to develop a specific weave pattern as a key differentiation point. “When jeans were first developed 200 years ago, durability was the most important feature and a twill weave delivers that strength and resistance,” says Baris Ozden, product manager for Turkey-based Isko. “Levi’s were originally made in a right hand 3x1 twill, Lee chose to develop a left hand 3x1 twill, and Wrangler introduced the broken twill as its signature weave. A broken twill prevents the skewing of the fabric on the legs,” he says. Twills in 2x1 patterns are said to be even stronger, but now developed in lighter weights, for tops mainly.

It is a limited series of weave patterns that define the world of denim. Mills have, of course, since expanded into many other patterns, including satin, 4x1 or even 6x2 constructions. “Whatever the case, and even in the knit-look fabrics we develop, our aim is to reproduce the distinctive diagonal twill lines,” says Mr Ozden. It should be noted that these weave patterns create a warp-dominated fabric and present a dominant indigo outer face. “A 3x1 twill is roughly 70% warp, and blue, while the back will be roughly 75% white. These are the roots of denim,” he says. He adds that 3x1 right hand twills continue to dominate the market and may even represent 90% of all denims made.



For Mohsin Sajid, twill is truly a “clever construction” as it gives “the illusion that the entire fabric is indigo. This cost-saving measure is now one of the distinguishing features of denim”. There is another reason for the limited range of weave patterns, he notes, as in the early days, it allowed mills to keep the same warp, and offer variety by changing the course of the weft yarn.

The beauty of imperfection

A yarn’s make plays a key role in the look and feel of a denim fabric, as denim experts are quick to point out. Before the arrival of smooth, uniform yarns made by modern open-end spinning machines, denim was woven with ring-spun yarns, their irregular surface creating coarser textured fabrics.

“Authentic denim is made with ring spun yarns, which create variations and imperfections. This is what we want,” says Mark Ix, Advance Denim’s marketing director for North America. “Ring spun yarns make it possible to play with different textures, there is a lot of opportunity for creativity,” he says, adding that these yarns can be made to have rounder or sharper slubs. He pushes further the quest for the original look and feel of denim by promoting Supima cotton. “The best denim fabrics are those that are made with long staple Supima cotton. It creates a different shine, feel, softness, it really delivers. A good fabric starts with a good yarn,” he says.

As mills sought to produce more and faster, open-end yarns became the norm. They reduced glitches and problems with machinery, leading to more efficient and consistent production runs. “Everyone loved it and denim became even more popular,” says Mr Sajid, but this is when jeans became fashion items. “Open-end yarns are not as strong as ring spun,” he says.

Historically, “yarn spinning was not as regular, there were imperfections, and those irregularities became an important feature of denim,” agrees Mr Ozden, at Isko. “Today’s spinning machines are faster and form ‘perfect’ yarns. To reproduce the original ‘imperfections’ of vintage denim, we engineer the slubs into the yarns.”

(Top:) Denim samples made by Tejidos Royo displaying the distinctive blue warp and white weft yarns.

PHOTO: TEJIDOS ROYO

(Left:) A denim fabric dyed with Tejidos Royo’s Dry Indigo features the emblematic diagonal twill pattern.

PHOTO: TEJIDOS ROYO

Purists will grumble that this is faux vintage. “A fabric made on an original shuttle loom with ring spun yarns will have a completely different hand feel. The weft yarns are less taught and create more texture,” says Mr Wröbel. For others, the quest for efficiency is part and parcel of industrial evolution. “Today, ring spun effects are designed into the yarn by computer, this makes it possible to engineer the unevenness and spacing of slubs,” notes Mr Goldschmeid.

The vintage look

China-based Panther Denim uses both ring-spun and open-end yarns, but Polly Cheung, its senior project manager, says demand for open-end is decreasing due to a shift in trends. “We are emphasising slub and character and tuning our weaving machines to address the emerging trend for more texture,” she tells *Inside Denim*. The 3x1 twill remains its core business. “It is the roots of denim and though novelty textures and weaves are also important, there is a huge demand for vintage-look denims,” she says.

The notion of what constitutes premium or high-quality denim has shifted over time, but what has not changed are the fundamentals, says Baber Sultan, at Artistic Milliners. “It starts with selecting the right fibre. Innovation in weaving has helped improve construction and allowed us to infuse the most rugged, authentic and prized denim with exceptional softness.” But he says that by far the biggest evolution is sustainability. “It pushes us to experiment with greener denim that has the look and feel of what has traditionally been expected of top-quality fabric,” he says.

Advances in technology in spinning and weaving processes, along with the introduction of new fibres, have given denim manufacturers a free rein to design and develop new styles. “It is a garment and fabric that could be described as all-terrain, as it is perfect for almost any type of occasion. Denim is a key part of the fashion world. It lends authenticity in any form,” points out Juan José Lopez, product manager for Tejidos Royo.

Tomorrow’s denims

Artistic Milliners recently launched a new division, Artmill, which it says is the next step in the evolution of its ‘Artistic Milliners Ecosystem’. “This is where we combine what we do best, denim and leading-edge eco-tech, and use them to unlock new frontiers,” says Mr Sultan. The company is introducing denim hybrids, which it calls Art-Cross, combining its most popular constructions and translating them into woven ready-to-dye products. “This offers new possibilities for our clients as you can play with an authentic aesthetic and combine it with characteristics such as flexibility, shape retention and low abrasion resistance. They’re fun and functional all at once,” he says.



A new reference from Panther Denim highlights the trend towards more texture and more intense high/low fading.

PHOTO: PANTHER DENIM

Sustainability is another key concern of mills around the world, and Isko has taken many measures to reduce the impact of its activities. “Our main challenge today is to reduce the use of virgin resources,” says Mr Ozden. In the past four to five years, the company has significantly scaled down their presence. Its new collection, presented this April, has 70-80% recycled content, in cotton and in polyester, while delivering the look the market wants, he says. Two new sources of recycled fibre are in development within the textile group. A spinning facility of Isko-owner Sanko Group is testing the new manmade cellulosic fibres made from cotton waste (see article ‘Keeping cotton in the loop’). It has invested in and is testing a technology that separates cellulose from polyester developed by Hong-Kong based textile research centre HKRITA.

Whatever new, or old (think hemp), fibres are introduced, modern mills will seek to preserve the original character and appeal of denim. “It is fairly easy to use recycled cotton yarns, but if a garment doesn’t sell, it is not sustainable,” Mr Ozden points out. The circular solutions Isko is developing need to live up to this incontrovertible standard. “If the second-hand or even third-hand market is to grow, we need to make jeans that last longer,” he says.

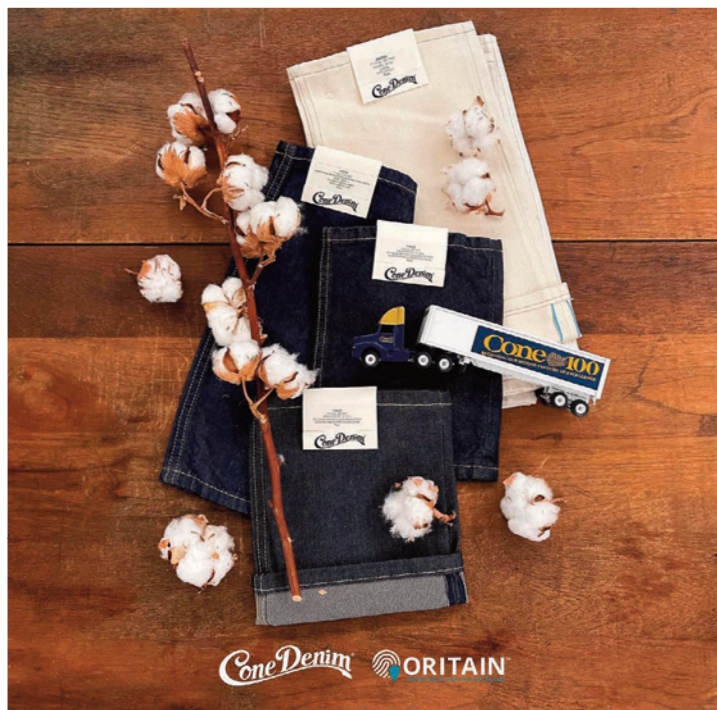
This trend can be seen across many mills. “The future of the textile sector is circularity, sustainability and digitalisation,” says Mr Lopez at Tejidos Royo. “We are facing the most important change since the industrial revolution.” He believes it is a true textile revolution. Besides continuous technological innovation, efficiency in industrial manufacturing process and excellence in product, the company is also engaged in the circular economy and new business models. “Our motto is to manufacture better with less. Minimising resources in the production process is key to our business strategy,” he says.

Ultimately, manufacturing a denim fabric capable of lasting through multiple lifecycles could be just another way that it stays true to its heritage. It might even be said that everything must change so that nothing changes. ■



USING TRACEABILITY TO DRIVE BUSINESS: ONE YEAR ON WITH ORITAIN

While the fashion and textile industries have made large strides within the realm of sustainability and supply chain traceability, there is still much progress to be made. From social responsibility to environmental and animal welfare, the many permutations of sustainability can provide as much confusion as they do clarity and direction.



Regardless of where or how you decide to act first, transparency and traceability are key.

Transparency is essential as a measure of success. By opening up your operational processes, supply chain components and goals to the public, you provide opportunities for feedback and review. You also help other brands and consumers see the process and understand that sustainability is a journey, not a destination.

A key partner with Oritain in the apparel and textile industry is Cone Denim, the iconic supplier of denim since 1891 and with a rich history of sustainability and innovation. In 2020, Cone expanded upon their social responsibility practices by becoming the first denim mill in the world to use forensic science to verify the origin of the cotton used in their denim.

This partnership is allowing Cone to provide the utmost transparency to its customers and as a result, strengthened the level of trust between Cone Denim and the brands they work with. Reflecting upon a year in partnership with Oritain, Cone Denim President Steve Maggard remarked, “Our partnership with Oritain has been a significant success and was absolutely the right direction for Cone. Being able to verify the growth origin of the cotton Cone uses and prove that our claims are valid was a major advantage for Cone and the brands and customers we service, ultimately driving a stronger more creditable business. However, the trust wasn’t solely business to business—Cone witnessed an increase in customers who were intrigued by the new technology and its benefits.

“It’s been a year of learning and collaborating with our customers to educate more about the Oritain technology and the ways in which it better supports their sustainability and transparency goals. We have great momentum going into our second year of partnership. The key to the technology is Oritain’s scientific traceability.”



The key to the technology is Oritain’s scientific traceability. Oritain works alongside Mother Nature, analysing the unique elements that materials absorb from their environment. Everything that is grown, reared, or made absorbs a unique ratio of these elements. Some environments are naturally high in elements, some are low. Some have lots of one type of nutrient and not so much of others and vice versa. This is what Oritain measures, using world leading forensic science and statistical models to analyse the data and create an ‘Origin Fingerprint’ for each product. Steve Maggard cites the accuracy of this technology as a key selling point. “We are very pleased to be able to provide scientific certainty of our commitment to responsible sourcing. The fact that Oritain’s unique process provides documentable transparency that is admissible in a court of law and passes the Daubert standard truly strengthens both our ethical and sustainable sourcing claims.” Maggard continues, “This has allowed us to assure our customers that Cone Denim products do not contain any cotton from prohibited regions, offering an elevated level of confidence and peace of mind.”



Our reliance on transparency is only
as good as our traceability.

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Partners prepare to take AeonIQ forward

PHOTO: HUGO BOSS

Apparel brand Hugo Boss has emerged as a strategic investor in HeiQ AeonIQ, a subsidiary that materials innovation specialist HeiQ set up towards the end of last year. AeonIQ is a cellulosic yarn derived from renewable raw materials. HeiQ attracted high levels of attention when it introduced the new product last year, saying it had the potential to replace polyester and nylon in the global apparel market.

It said it wanted to work on “very deep innovation partnership and go-to-market strategies” with two strategic partners and immediately presented The Lycra Company as the first of the two. Early this year, it presented Hugo Boss as the second. The fashion brand is making an initial investment of \$5 million in equity in HeiQ AeonIQ and has said a further \$4 million will follow if the partnership achieves certain performance milestones and agreed goals.

A complement, at first

The apparel company has said that using AeonIQ will help it meet ambitious sustainability targets that it has set itself, including its aim of achieving climate neutrality. It wants to reach this within its own area of responsibility by 2030 and throughout its entire value chain by 2045. In addition, the company aims to establish an end-to-end circular business model. It has said specifically that, in the medium to long term, it sees the potential of using AeonIQ first to

Last year, HeiQ introduced AeonIQ yarn as a climate-positive (the raw materials capture rather than emit carbon) alternative to polyester and nylon. Now the fashion world is paying careful attention.

complement the polyester and nylon fibres it puts into its clothing, and then to replace them. Chief executive, Daniel Grieder, has described the “exciting partnership” through which it will help scale up the production of AeonIQ as game-changing. He says it will drive “measurable impact for the environment and society alike”.

Hugo Boss has told *Inside Denim* that, in 2020, synthetic fibres made up around 20% of its material consumption, and that these fibres are in extensive use in the wider fashion industry. However, they also play a major role in the problem of microplastic pollution in the oceans. AeonIQ appeals to Hugo Boss because of the promise of reducing pollution and of decarbonising the fashion industry without setting aside extra agricultural land for growing cotton.

Ramping up

It is aiming to include AeoniQ fibre in a series of small capsule collections in the second half of this year and to have “a much more impactful ramp-up” in 2023. HeiQ is still in the process of securing investment to build a mass-manufacturing plant for AeoniQ by the last quarter of 2024. It does not yet know where this facility (it uses the term gigafactory) will be, but it estimates it will have the capacity to 30,000 tonnes of the yarn per year, meaning that, by early 2025, it will be able to offer what it calls “recurring mass deliveries” of AeoniQ. Hugo Boss has said that, when this day comes, it intends to establish “an even deeper integration” with HeiQ.

What has given Hugo Boss the confidence to already invest millions in this project is the potential it sees in AeoniQ for providing “a cellulosic alternative to synthetic fibres” at the right scale and with an “outstanding” environmental, social and corporate governance profile. Unlike oil-dependent polyester and nylon, the material that mills will be able to make from AeoniQ will have a stable cost structure and its use will be ‘business as usual’ for weavers, knitters and dyers; they will not have to invest in new machinery. “To our knowledge, no other existing yarn offers the same competitive capacity regarding key performance indicators such as performance, scalability and sustainability,” Hugo Boss says.

Market access

In its most recent public comments, The Lycra Company has said it wants to continue to work closely with HeiQ to “fast-track the commercialisation of AeoniQ”. It will be the exclusive distribution partner for the new yarn. Clearly, then, it is in Lycra’s interest as well as HeiQ’s to convince brands to include AeoniQ in their material mix. “The approach is to combine both companies’ capabilities to establish a pilot plant stage,” Lycra’s chief brand and technology officer, Steve Stewart, tells *Inside Denim*, “and then move to full-scale production as quickly as possible.”

HeiQ will source ingredients, develop the fibre, and build manufacturing facilities. Lycra’s Steve Stewart says the company’s “deep knowledge” of textile processes, and of quality and product requirements, will help it bring the yarn to market. “This summer, our development labs will evaluate the fibre properties and fine-tune as needed for specific application needs,” he continues. “We will also focus on providing yarn and fabric best-practice processing guidelines and technical service resources to enable mills to deploy the technology easily.” It aims to use its “textile market value chain access” to introduce key customers to AeoniQ quickly and will also work closely with early adopters on developing what Mr Stewart calls “relevant consumer communications that highlight the unique properties of this fibre”.



HeiQ's new AeoniQ yarn. PHOTO: HEIQ

“To our knowledge, no other existing yarn offers the same competitive capacity”

HUGO BOSS

These characteristics include an exceptional tenacity, according to Lycra, and this allows the fibre to be texturised, coloured, and processed into high-performance quality fabrics for activewear, denim, and other applications. It will combine well with Lycra fibre, if garment manufacturers use it, without detracting from comfort, fit, and shape retention. Specific to denim, this is also true of combinations with Lycra dualFX fabric technology, which uses two stretch fibres to enhance the stretch of denim fabric. The strength of AeoniQ, coupled with the potential to produce it from a variety of carbon-negative cellulosic sources, or used cellulose, could have a transformative influence on the textile industry, the fibre producer says.

Revolutionary solution

Lycra has polyester and nylon products of its own, but it has not hesitated to join HeiQ’s effort to replace these petrochemical-based fibres with AeoniQ. “Sustainability is central to our company strategy,” Steve Stewart says. “We are focused on opportunities where we can bring value-added technologies to help our customers create and bring to market fabric and garment offerings that combine comfort and performance with the potential to reduce environmental impact.” He says Lycra is proud to partner with HeiQ, and to work with it to market “a potentially revolutionary solution”.

Beyond denim

Denim designer Adriano Goldschmied is another figure from the fashion world to have shown early interest in AeoniQ. He points out that in the denim business the use of polyester and nylon is more limited than in the wider fashion industry. He acknowledges, however, that polyester plays an important role in stretch denim and he regards it as “imperative” to find substitutes that are not derived from petroleum. AeoniQ could be an option, Mr Goldschmied thinks, although tests and proofs are still required.

“My interest goes beyond denim,” he says. “My dream is to bring indigo-dyed fabrics into performance apparel. AeoniQ is a cellulosic fibre, which means for sure that it can be indigo-dyed. This means we can bring the look of faded jeans into outerwear, into shoes and into sporting goods. This could be a fantastic opportunity to make an important addition to the look and fashion direction of all those products while, at the same time, making them more sustainable.” ■

A meander around the UK reveals an enthusiastic core of talented designers, dedicated consultants and skilful makers.

Britain's rich and varied denim landscape

“**I**nnovate and iterate” is the advice **Hiut Denim’s** co-founder Clare Hieatt gives to companies that want to stay fresh and relevant in today’s denim sector – something the Welsh jeans brand and manufacturer excels at. Formed in 2012, the company has nurtured a loyal following using a combination of great product and great storytelling, putting the makers at the front of the narrative. Hiut is among a small number of jeans manufacturers, but a growing number of denim brands, that are creating their own space in the market, alongside fashion experts and consultants who fill the high streets with denim ranges of all kinds.

When the UK-based clothing manufacturing businesses largely moved overseas from the 1970s, much of the infrastructure, as well as the skills, went with it. Protecting these skills and creating work for local people was a key consideration for Hiut, employing people who had worked in the then-closed jeans factories in Cardigan. Learning about the materials and processes, and passing on this knowledge, is also important. “Keep educating the customer about their impact on the environment, and keep learning,” adds Ms Hieatt. “And only work with people who share the same values as you.”

These ‘people’ include Turkish mill Isko and Italy’s Candiani. Last September, Hiut launched its first washed styles at Isko’s new Creative Room in West London. The Rosie Slim Fit Utility Jean and the Betty Taper Jean opened the brand up to customers who wanted softer and more comfortable jeans, rather than its staple raw styles. “We are proud of these suppliers, and their sustainable fabrics really add value to our brand story and product offering.”



Hiut at home: The Welsh coastline provides a beautiful backdrop for the jeansmaker.

PHOTO: ANDREW PAYNTER

The Creative Room is Isko's way of bringing washing knowledge into the UK, offering a hub for retailers and brands to test the technology and washing recipes before producing on a bigger scale elsewhere. This is also the idea behind **Blackhorse Lane Ateliers** (BLA)'s soon-to-launch laundry project, which aims to become a place to educate students on the washing side of the business. The East London manufacturer sits alongside Hiut as one of the main makers in the UK, producing for its own label as well as brands including Christopher Raeburn.

Towards the end of 2021, BLA transformed its allotment into an "indigo garden", run by designers Luisa Uribe and Liza Mackenzie from Indigo Works. Beginning this April, they are launching a seven-month course on growing and dyeing with natural indigo and participants will dye a pair of BLA jeans to take away.

Start-ups versus juggernauts

The idea to upskill retailers is also behind LaundRE, a project by Salli Deighton to establish a small wash centre to reduce waste, keep garments in circulation and repurpose garments that aren't sold (see *Inside Denim Issue 6*). "In the UK, we have a lot of good people doing good things," says consultant **Rowan Hunt**. "For instance, Salli Deighton, who shares all her knowledge and never reserves anything just for herself."

Mr Hunt describes himself as a responsible-denim specialist and has worked with retailers including Next and Debenhams. He now develops ranges for fabric mills and garment producers. He admits that without the plethora of brands and manufacturers in the UK, and no big fabric makers, the focus is more on the retailers, which can sometimes struggle to balance sustainability improvements with costs and margins. "The denim industry in the UK definitely has a 'could do better' mark," he admits. "We do have great start-up brands who can begin with sustainable principles and be true to them. With smaller production they use fewer factories so, in theory, keeping things sustainable is easier to police. But on the other side of the coin are the juggernauts of the high street. They may want to do something to improve but can't turn the ship as fast as they want."

In these instances, he focuses on small steps in his advisory role: examining every element and making them 1% better each time. If they'd like organic cotton but can't afford it, he suggests trying Better Cotton as a minimum and adding in some recycled content. "Adding 20% recycled cotton might only give you a price increase of 7%," he says. "Next is a deeper dive into dyes and chemicals. Is natural dye better than synthetic? Look at all your options and build a road map to where you want to get to."



Flow of experience

Rowan also gives guest lectures as part of Transformers ED, helping to educate young people entering the industry, passing his knowledge and experience on. The series is run in collaboration with the Kingpins team and by educators including **Mohsin Sajid**. For the past few years, Mohsin has organised or co-led longer denim projects with Royal College of Art and Ravensbourne University London, as well as the London College of Fashion and Central Saint Martins.

He recently presided over the 2021-2022 Ravensbourne University London x Kingpins Show Denim Innovation Project with fellow lecturer Sue Barrett. Fifteen groups of students created denim brands from concept to finished collection over 10 weeks. The winning 'brands' were Morvah Denim (paired with Candiani), Interim (Crescent Bahuman) and Novanta (also supported by Candiani). Two students from each of the three winning teams will attend the Kingpins trade show in Amsterdam.



Clare and David Hieatt, the couple behind Hiut Denim.

PHOTOS: HIUTDENIM

Rowan Hunt is looking forward to meetings at trade shows: "Face to face we tend to let more out as it's not on the paper trail."

PHOTOS: ROWAN HUNT



Claire Ford has ranges in the pipeline for *Whitestuff* and *SWK* for *Anthropologie*.

PHOTO: CLAIRE FORD

As well as lecturing, Mohsin creates collections through his brand *Endrime* and consults for companies including *Lenzing*. He is currently working on a made-to-order collection of British heritage garments in limited edition denims with **Chris Hewitt**, founder of *Hewitt Heritage Fabrics*, which introduced UK-woven selvedge in 2020 (see *Inside Denim Issue 3*).

Hewitt Heritage is moving into a new phase to become *Hewitt Denim Mills*, which will include the UK-woven fabrics as well as collaborations with brands and other denim mills. Mr Hewitt is also working with *Dukinfield*-based mill *English Fine Cottons* for non-indigo denims made with Australian cotton, and trialling denims using recycled wool and cotton weft yarns and as well as hemp, Tencel and lyocell. “I’ve concluded it’s impossible to finish denim in the UK, so I’ve moved my finishing to Italy,” he says. “My new partner has ozone finishing, which significantly reduces the energy and is zero water. I’ve also partnered with *Kuehne + Nagel*, a net-zero shipper, so we can reduce the carbon footprint associated with shipping to Italy and back.”

Tailored approach

Reducing carbon footprint and achieving a lower-impact product is also vital for consultant **Claire Ford**, who works with brands including *Reiss*, *White Stuff* and *Anthropology UK*. “I look at every element of a jean to make each piece more sustainable and recognisable to the brand,” she says. “What’s important is giving a tailored service and really understanding what they need to deliver their best range.”

The English consultant moved to Australia during the pandemic and is eager for the borders to reopen properly so she can visit factories and laundries once again. The lack of travelling makes relationships vital; she works with Turkish factory *Strom UK* for many of her ranges. “*Strom* has such an artistic space in Istanbul; walls covered with art and album graffiti on the factory building. The owners, *Baris* and *Omer*, play guitar and drums while you design and everyone who works with them loves their job.”

She admits the biggest challenges are price, transparency and improving working conditions; brands need to take a more active role in looking after workers, she says. For increased control, she is eyeing her own ranges. “As [designer] *Orsola de Castro* says, ‘The most sustainable garment is the one already in your wardrobe’, so it will have to be something special, sustainable and the best product I can deliver,” she says.

Style and longevity

This is exactly the ethos behind *I AND ME*, a brand launched by **Jessica Gebhart**, a former denim buyer for *Topshop*, in response to the huge amount of waste she was witnessing in the fashion industry. The first collection came out in 2017, and year on year, customers’ interest in sustainable products is increasing. “The *I AND ME* customer wants to know that their product has been made in a low impact way, with natural fibres that will not be left behind on our planet,” says Ms Gebhart. “Style and longevity is also very important and this is why we focus on key wardrobe staples that are built to last.”



Jessica Gebhart promotes a transparent process for *I AND ME*, so customers understand the value behind each product.

PHOTO: JESSICA GEBHART

From cities to hamlets, home-grown denim brands carve their niche

Hebden Bridge HebTroCo is an online retailer that has developed a loyal following through its down-to-earth marketing and tone of founders Brant Richards and Ed Oxley. Following a meeting at Bluezone, the company sources fabric from Candiani and uses a local manufacturer to make the jeans. It only uses raw denim, with no stretch, as it says this will make jeans age better and is more sustainable.

Blackburn Community Clothing is both brand and social enterprise, creating jobs in some of the UK's most deprived areas. Jeans are sewn and washed in Blackburn using BCI fabric from Turkey and China. The Blackburn factory, Cookson & Clegg, also makes jeans for other brands.

Porthmadog Start-up Antur used TikTok to ask what customers wanted from a jean. A post about 'usable pockets' for women had more than 2 million views and over 4,000 comments; they were then designed to hold an iPhone. Antur is finalising the wash, trims and silver finishing and the jeans are due to go into production soon.

Manchester Clothing brand Joe & Co, headed by Josef Schindler, values local production, with jeans made with Hewitt's UK-woven selvedge as well as fabric from Italy and Japan, manufactured within a 30 miles radius. A partnership with local spinner English Fine Cottons produces shirts and jumpers, and footwear collaborations include Gola and Tricker's. An e-commerce site will launch this year.

Cheltenham After starting as an online retailer, &Sons launched its first store five years ago with help from Kickstarter backing. It creates "vintage-inspired clothing for the modern-day pioneer" with denim fabric supplied by Isko, and jeans are made with an antibacterial finish. This year, it is partnering denim fade competition Indigo Invitational, a community of denim enthusiasts who decide which pair of jeans fades in the best way.

Peak District Flax & Loom focuses on paying workers a fair wage; founder Phil Wildbore sources materials and manufactures in Turkey to reduce carbon footprint. Despite launching during the pandemic, the products are now available in 100 retailers and the company is expanding rapidly. Mr Wildbore says he wants to enlighten consumers about the real cost of jeans, and offers hemp and organic cotton blends, as well as a recycled wood pulp blend in its new Wood Jeans.

Sheffield Founder Kaye Stanton started P Denim in 2017 after being unable to find any simple, good quality denim pieces for her children. Working in the vintage clothing sector, she initially repurposed the waste from used jeans into children's designs at her studio in Sheffield. She now buys 100% organic cotton fabric from Candiani.

Fleet I am Denim is a niche brand focusing on "tummy friendly" jeans for post-operation or post-caesarean section needs. Designs include wide, supportive fabric waist bands, extra stretch or elasticated waists.

Hove Kelly Dawson and Scott Ogden, co-founders of Dawson Denim, offer British-made selvedge workwear using traditional manufacturing techniques. The denim is woven and dyed in Okayama, Japan, and the designs are cut and sewn on 1950s sewing machines in their workshop. This season, Dawson will launch childrenswear and a 10-year anniversary capsule collection.

London United Overalls uses Hewitt fabric, woven in Lancashire, and makes the jeans at Blackhorse Lane Ateliers. Founder Tom Burke values UK production and wanted to make high-quality jeans with a traceable supply chain. The latest product is a selvedge denim apron.

▪ **Sons of Selvedge:** not a brand, but a collective of denim enthusiasts who talk all things denim via a monthly podcast. Recent topics have included caring for indigo and raw denim. Regular voices include Tom Burke; David Giusti, founder of Sons of Selvedge and Wornout Global; Illya Sobotchak, head of social media at BLA; Lex Cawley, owner of Field Denim Workshop; Kevin Proctor, co-founder of Wornout Global; and "denim head" Andy Carr.

Although fabrics have always been made with natural fibres, threads and labels have been a poly-cotton mix, so the latest collection is a 100% biodegradable denim as Jessica works towards a plastic-free business. A 'zero waste' biodegradable knitwear range, made in Aberdeenshire, Scotland, has been a success.

The business is also partnering traceability platform Retraced, adding QR codes so customers can track products through the supply chain, and view all certifications. The company has begun to offer free lifetime repairs, has two more collaborations in the pipeline and a second core range coming out in 2022 – added to Jessica's guest lecturing at Ravensbourne University: "It's set to be a busy year," she says.

Return to travel

London-based **Luke Walsh** also branched out on his own, setting up L W Design Consultancy last October, designing, developing and sourcing for clients, following years on the big-retailer circuit. "After working from home through the pandemic, I didn't want to go back to the normal ways of working, I wanted to work in a more dynamic way," he says. "Don't get me wrong, I've really enjoyed my career to date and having the opportunity to work in Shanghai for Next Sourcing and in Hong Kong for Levi's has been incredible. But now it's time to start something new."

He is collaborating with Chinese mill Freedom Denim to help grow sales across the UK and EU market, working with the Shanghai research and development teams and the New York-based innovation department to launch products for autumn 2023. "It's been really exciting building the collection together, rebranding and working on new marketing strategies," he says.

Mr Walsh has also collaborated with Next across denim and casuals, as well as Own, the new denim brand at Next, designing and sourcing the autumn-winter collection that will launch in September. "It's been a tough few years for everyone but what's exciting is the return to travel," he adds. "I was recently in Turkey working on a new denim collection, which was fantastic. To be on the factory floor, working on new washes and developments again was so rewarding. Talking denim, seeing and touching denim makes me happy."

Zero-waste approach

Janelle Hanna, founder of White Weft, will also be talking denim at her London studio as the host of The Ecosystem of a Jean, part of Fashion Revolution's Open Studio programme, at the end of April. Through White Weft, she upcycles denim waste into new jeans, bags and accessories, and is also working on upcycled denim designs for a large retailer and a field-to-fabric denim project. "Much of my time is spent developing our designs and figuring out production – it's much more complicated than conventional products," she explains. "We've also just launched a denim repair service which has had an incredible uptake."



Luke Walsh's new consultancy gives him more freedom to network and visit shows and factories.

PHOTOS: LUKE WALSH



White Weft founder Janelle Hanna is looking for new local manufacturing partners for her upcycled denim ranges.

PHOTO: JANELLE HANNA

Five percent of sales from White Weft go towards helping the OR Foundation, which supports communities in Ghana, specifically the Kantamanto used clothing market in Accra. Here, traders gamble on buying bales of second-hand clothing with no idea of the quality and minimal chances of good returns. Around 40% of the clothing goes straight to landfill outside Accra, according to the foundation. "Some of the poorest, most vulnerable communities in the world are shouldering the burden of our fast-fashion waste," says Ms Hanna. "My business is small but it's essential that we contribute to this work."

Although small, word is growing, and new retailers are on board to stock White Weft products. "Sadly, the UK has lost most of its manufacturing capability and we're known mainly as a design and retail centre," she comments. "But we're lucky to have a number of inspiring, community-minded denim brands like Blackhorse Lane and Hiut who are both blazing a trail for quality product, mindful consumption and ethical manufacture. I really hope that's what the UK denim industry will become renowned for and that White Weft will be a part of that."

Real opportunity

In the same vein, Hiut has also now moved into the upcycling category – its latest range touted as its "most low impact yet", crafted from leftover fabrics gathered over 15 months. For Clare Hieatt, the appearance of more small brands that are trying to make locally and sustainably, or that have positive messages, added to an increasing desire from consumers to find out how things are made, are all positive signs for the domestic industry. "One of the big issues will be finding an experienced and skilled workforce to make these products and training will be key to developing UK garment manufacturing," she concludes. "But there's a real opportunity here for business and government to work together to bring a maker culture back to the UK."

At both ends of the spectrum – start-up or juggernaut – the passion for denim and knowledge of the trade is obvious and inspiring. And buoyed by a fresh wave of enthusiasm, new and younger designers and makers will inherit this knowledge and continue to weave the narrative of the UK's varied denim landscape. ■

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Stellar progress towards circular ambitions

Q: How important is it to embrace initiatives such as Cradle to Cradle and why did you select this standard to follow? How much of the responsibility for creating lower-impact product lies with the brand?

A: If we want to be here as a denim brand in the future, we need to design in closed loops today. The Cradle to Cradle Products Innovation Institute helps us to do just that. Their philosophy is inspired by nature, where there is no concept of waste; all materials are reutilised in cycles. Closed loop or circular design strives to mimic these natural principles. It is crucial for the entire industry to embrace this circular approach, so we can make the most efficient use of resources and drastically improve our combined environmental impact.



Dutch brand **G-Star Raw** says customers are increasingly invested in sustainability.

In 2018 we presented the world's first Cradle to Cradle Certified Gold denim fabric through Our Most Sustainable Jeans Ever. The innovative fabric contained 100% organic cotton and was dyed using zero harmful chemicals while not wasting a single drop of water. We have been building on this innovative fabric ever since to expand our sustainable offer and make it easier for our customers to make a responsible choice.

G-Star's spring 2022 collection is inspired by the Dakar Rally and Japanese design, with a desert-themed colour palette.

PHOTO: G-STAR RAW



How easy is it to explain Cradle to Cradle, and other sustainability drives, to your customers, and what are their reactions?

Circularity is a complex topic, it encompasses so many aspects which makes it hard to explain in just a few sentences. Circularity looks at much more than just the raw materials or just the water usage. It looks at the entire product lifecycle and that is exactly what we need to educate our customers about, because they are part of the process as well and they can contribute, too, through how they take care of their garments or how they part from them. So, although it is a challenge to bring the bigger story across, we feel it is our responsibility to do so because when our customers truly understand, we can make the biggest impact, together.

G-Star has set a target that by 2025, 75% of materials will be recycled, organic, bio-based or compostable, and in 2030 this will be 100%. How close are you to achieving this, and what are the hurdles?

We are confident that we will make these targets, we see an exponential growth in our sourcing of more sustainable materials. Given the progress we are making right now, we might even exceed the target of 75% by 2025. One of the most difficult hurdles for the denim industry is the scarcity of organic cotton. We recently joined the Organic Cotton Accelerator to support more and more conventional cotton farmers making their way to organic cotton farming, securing a greater availability of organic cotton.

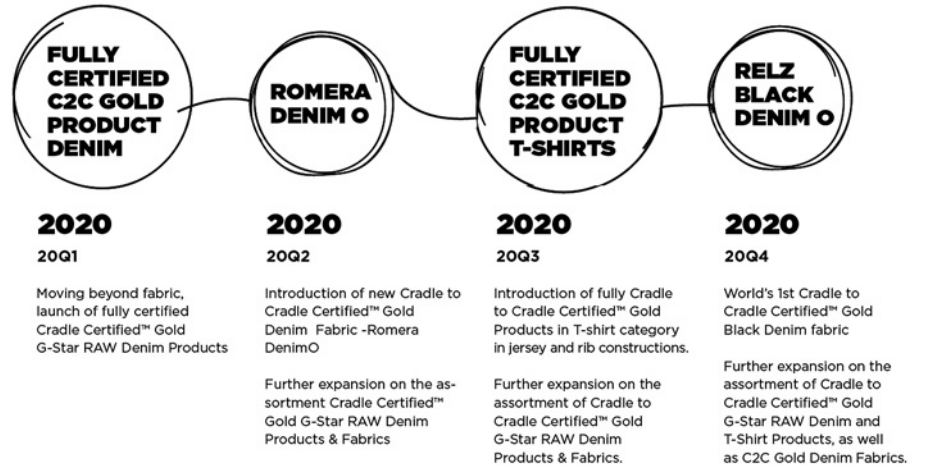
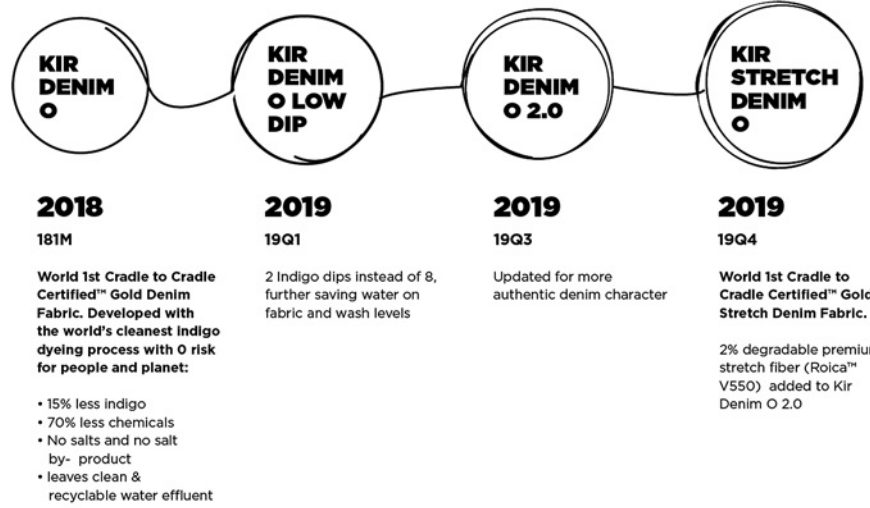
Another hurdle is in the quality and durability of recycled cotton. The fibres are shorter and more vulnerable after the recycling process, and often need to be mixed with conventional cotton to achieve the same level of quality. To reach our targets, we need to be part of the process to raise the demand, to support transformation, to find solutions for all hurdles and to innovate the industry.

Could you tell us a bit more about your new fabric with a regenerative indigo dyeing concept?

In collaboration with Italian denim mill Candiani, we introduced a denim fabric with the world's first regenerative indigo dyeing concept. This means that the waste from the indigo dyeing process is developed to function as a fertiliser or food for the agricultural industry.

What would a new supplier have to do to impress you or to make you partner with them?

Suppliers with an innovative mindset that can offer fibres and blends that add to circularity (in the entire process) without losing durability. We want our suppliers to be our partner in this process, rather than have them merely comply with our regulations.



“ We might even exceed the target of 75% sustainable materials by 2025 ”

In terms of your worker-focused strategies, one of the goals is working towards an industry-wide agreement on regional living wages by 2025. Can you give us any update on how you will do this?

By being a member of ACT on Living Wages we aim to achieve living wages for all textile workers through collective bargaining at an industry level. We have committed to purchasing practices that will ensure fair terms of payment, full coverage of wage increases, better forecasting and planning, training and responsible exit strategies. With sector-common indicators, the ACT accountability and monitoring framework helps us to measure progress towards more equal supplier partnerships.

Which of your goals or strategies makes you proudest, or are you most excited about?

The thing that excites us most is that these days the topic of sustainability is no longer an expert topic only. We see the entire industry as well as our customers more and more invested in the topic. That makes us feel like our goals are no longer merely a framework to deliver on our own strategy. These goals are a roadmap to further improving the impact of the entire industry, together with our peers and our customers. ■

FACTORY TALK: NET ZERO PAKISTAN

Half of the signatories to Net Zero Pakistan – which aims for net-zero carbon emissions by 2050 – are mills and manufacturers in the denim supply chain.

Pakistan's proactive pledge

For humanity to stand a chance of survival, CO₂ emissions from man-made activity must reach net zero by 2050: the sobering message from the Net Zero Coalition for Pakistan, and one which is echoed by the United Nations Intergovernmental Panel on Climate Change. Pakistan is the eighth most vulnerable country in terms of experiencing the devastating effects of climate change, despite creating only 0.8% of global emissions, according to the Global Climate Risk Index. Increasingly severe weather patterns, such as droughts, floods and heat waves, are threatening the food and water security for millions; these adverse effects could be disastrous without seismic change and commitment from industries globally.

Last August, non-profit organisation Pakistan Environment Trust (PET) launched Net Zero Pakistan, an alliance of prominent textile, apparel and consumer goods companies committed to achieving net-zero greenhouse gas (GHG) emissions by 2050. Long nurtured by members of the UN, the concept is considered a relatively workable guiding principle of international climate action, perhaps easier to disseminate than temperature goals or thresholds (such as the “well below” 2°C global warming figure agreed upon during the 2015 Paris summit).

Now 22 members strong, Net Zero Pakistan was named an official accelerator programme of the UN's own Race to Zero campaign in February. Notably, most of its signatures are from the clothing supply chain, and half are denim mills and jeans manufacturers: AGI Denim, Artistic Milliners, Crescent Bahuman, Interloop, Sapphire Textiles, Siddiqsons, Soorty, Sadaqat and US Apparel & Textiles. Coalition signatories have also committed to the periodic disclosure of their GHG emissions and wider environmental footprint, investment in low-carbon technologies and collaboration on an industry-wide decarbonisation framework.

Without commitments from the supply chain, fashion brands will be unable to meet their own emissions or science-based targets (SBTs) and, as a major denim-supplying country, Pakistani mills and manufacturers are aware that some of the onus lies with them. The country's textile exports for the year ending June 2022 could register their highest levels yet (increasing 40% year on year to around \$21 billion), according to government advisor Abdul Razak Dawood, and in 2021, Pakistan passed China to become the third-biggest supplier of denim to the US, worth \$390 million, according to the US Office of Textiles and Apparel.

Harnessing the wind

The Pakistani government has not announced a net-zero year but has committed to cutting 50% of projected emissions and achieving 60% renewable energy by 2030. However, much of this hinges on major infrastructure investments and hydroelectricity, with a plan to build 10 big dams in the next 10 years.

Artistic Milliners owns Artistic Energy, which supplies renewable energy to the national grid. The company's 50-megawatt wind farm is based in Jhimpir, also the site of Pakistan's first wind power project.

PHOTO: ARTISTIC MILLINERS



Mill and manufacturer Artistic Milliners took matters into its own hands several years ago, setting up renewable energy projects under a spin-off company, Artistic Energy. In 2018, it commissioned a wind farm in the Jhimpir wind corridor, in south-east Pakistan, in collaboration with GE Renewable Energy. Now, these companies generate 100 MW of wind energy for the national grid per year and there are plans to expand into 118 MW of hydropower and add a 50 MW solar park.

“With such tremendous clean energy operations, we felt that there was always a big hiatus when viewed in the context of the country and we wondered how we could inspire other companies to follow this futuristic path,” says Artistic Milliners’ corporate responsibility manager, Syeda Faiza Jamil. “Net Zero Coalition gave us the platform to showcase our example. They are also helping us engage with global leaders, for instance from CDP (Carbon Disclosure Project), and to facilitate SBT for our company.”

The vertical manufacturer, which produces 108 million metres of fabric and 30 million garments per year, is classed as climate positive as it offsets 48% more GHG emissions than it emits. “In the short term, the coalition is a vehicle for us for advocacy, a best practice sharing and knowledge platform. In the long term, this momentum will lead to the larger industry committing to climate goals and help us achieve our shared objectives,” adds Ms Jamil.

In a similar vein, Karachi-headquartered Soorty is in the process of setting up an energy production company, NASDA Energy, and commissioning its first 50 MW on-grid wind power unit in Jhimpir. The supplier to Calvin Klein and PVH has also invested in solar projects, installing a 0.9 MW unit at its flagship facility, DenimKind, with plans to add 14 MW more. Its new plant is LEED (Leadership in Energy and Environmental Design) certified, and it is in the process of implementing LEED practices at its other factories. It plans to phase out coal boilers and replace them with biomass boilers by 2027 and has also started to install a recycling plant, which will allow it to recycle 80% of water.

“We are able to exactly pinpoint, through GHG calculations, which processes have the greatest impact on our emissions,” says Mustafa Ahmad, Soorty’s head of climate action. As such, it invested in a zero wastewater dyeing system that eliminates pre-washing and post-washing baths, and an G2 Ozone system. These two processes resulted in dramatic reductions in chemical, energy and water use, he says.



A mutual willingness to support one another was detectable in the responses of all the Net Zero Pakistan denim signatories Inside Denim spoke to.

PHOTO: CRESCENT BAHUMAN

Investment priorities

All the manufacturers that have joined the Net Zero pledge were already working towards reducing emissions and becoming more sustainable, and some had signed the Fashion Industry Charter for Climate Action and United Nations Global Compact. The Net Zero pledge has been a way of refining and sharpening goals, and for AGI Denim, a catalyst for structuring its investment priorities around climate targets. It has installed 1.8 MW of renewable energy across the organisation and is exploring options to increase this and boost resource efficiency.

“The climate crisis is the defining issue of our age, and AGI is aware that to fight it, we need to redesign the way we do things,” AGI executive director Ahmed Javed tells us, as the company drafts its first sustainability report. “In the short term, it will help us accelerate our sustainability transition by providing established frameworks, immediate goal-setting and capacity-building opportunities to lower our carbon emissions. These steps, taken on a year-to-year basis, will eventually help us in our decarbonisation efforts to meet the net-zero goal by 2050.”

Crescent Bahuman (CBL) also says affiliating with Net Zero Pakistan will focus its sustainability drive. The vertical denim plant was built in the 1990s on previously waterlogged land, transforming it into a green space with over 850,000 trees planted. Before signing the pledge, the business had installed 1.3 MW of solar power and is now finalising an additional 6.7 MW. Energy efficiency and resource conservation will be a deciding factor when investing in new technology.

“We are in the process of buying an energy-efficient air compressor that is the latest technology and probably the first of its kind in Pakistan,” says Zaki Saleemi, CBL’s vice-president. “This compressor will save us a large amount of electricity and subsequently CO₂. After that, we are going to replace our old electricity generators with newer and more efficient ones.”

Like the others, Siddiqsons is having its buildings certified by LEED. The group, which began as a denim manufacturer in 1959 and has since expanded into tin and real estate, has installed enough solar energy to replace 20% of its energy needs and plans to increase this to 25%. Its Jeanologia 5.0 sustainable laundry, a recycling effluent treatment plant, electronic vehicle chargers and 100% LED lighting are also helping bring down its energy consumption. It is planning to plant trees in collaboration with WWF, and aiming for zero liquid discharge.

It has also invested in software and is adding production upgrades throughout its facilities. “You can’t change what you don’t measure,” explains Siddiqsons CEO Abdur Rahim. “Pakistan is still a developing country and it suffers most significantly from global warming. Net Zero will be a beacon to bring together best-in-class companies to eliminate domestic pollution, which should have a global impact.”

Working in tandem

These best-in-class companies are expected to collaborate as part of the agreement, but are generally working independently. The mills say they are open to further sharing and support: “We’re not necessarily working together, but we would love to,” explains Faryal Sadiq, head of sustainability at Interloop. “Most of these solutions and technologies will be the same, and instead of all of us working separately and reinventing the wheel or arriving at the same situation in a sub-optimal way, we might as well pool resources and achieve it together.”

Interloop launched with 10 knitting machines in 1992, growing to employ more than 24,000. Its jeans-making division in Lahore has a capacity of over 500,000 pieces per month. To meet its targets, a big factor will be switching as much fuel to renewable as possible, even if it is more expensive. It has added solar panels and will phase out coal by 2025. It is looking at phased heat recovery, improving processes as well as changing “the culture” around sustainability, for instance “whether someone turns off the light when they leave their office, and not wasting water”, explains Ms Sadiq. “We realise these ambitious, lofty goals are nearly impossible for us to achieve if we all don’t get together: industry, academia, scientific experts and regulators.”

“We are in this together,” agrees Ms Jamil from Artistic Milliners, which hosted the first in-person Net Zero Pakistan meeting in March. “It’s either all of us who survive and come out of the climate crisis stronger, or all of us will suffer.”

Government support

Many point to an encouraging stance from the government on climate action, with initiatives such as Clean Green Pakistan and Billion Tree Tsunami, but there is a long way to go. There are some programmes for financing green technologies, but the denim makers generally wish more funding or fiscal incentives were available, either within the country or from international bodies. Of all the signatories that *Inside Denim* spoke to, none has received financial support from the government, although AGI’s Ahmed Javed says his company is “constantly lobbying to do so”.



The hot climate in Karachi, where many Pakistani denim mills are based, makes it a particularly fruitful spot for harvesting the sun’s own energy.

PHOTO: ARTISTIC MILLINERS

Meeting the globally agreed targets without help will be challenging, agrees Mr Saleemi. “There will be technology and resource limitations for developing countries like Pakistan, so at some stage – and the sooner the better – the government has to play its part in achieving this goal because it may not be easy for an industry to achieve this target within its own limited resources.”

There should also be better legislation around renewable energy bonds and certificates, agrees Ms Saddiq, “making it easier for companies who are willing to pay extra to achieve more green energy”.

“As part of the 2015 Paris climate agreement, the developed countries agreed to provide \$100 billion in annual assistance to developing countries until 2020,” adds Mr Javed. “But an independent review last December estimated that only a fraction of that assistance materialised. As the developing world struggles to deal with the economic costs of the pandemic, this support is even more critical for pushing the climate agenda forward.”

Realistic target?

As to whether 2050 is a realistic target, the mills admit there will be challenges, but all have set out frameworks and plans. “It’s the question of a generation as to whether we can achieve it,” says Ms Sadiq. “If we don’t limit emissions by 2050, there will be irreversible changes. However, I think with collective efforts, it is possible.”

Many of these suppliers are leading by example, dramatically upgrading and investing in new technologies that they know will be vital to secure the business of global fashion companies. In many ways, they are the ones that bear the brunt of targets: brands often set them and gain kudos, but for the most part, it is the suppliers that must invest large sums of money and implement change. After the initial investments, many new systems can lead to cost savings over the longer term, but Pakistani suppliers’ proactive approaches should serve as an example, and increasing collaboration between competitors could be the driver needed for country-wide change.

“Sustainability is not just a business case, it is a corporate responsibility,” concludes Mr Saleemi. “It is about giving back to our community, our country and the whole world. Even one step forward counts. If we all collectively take one step forward, we have the ability to change the world.” ■



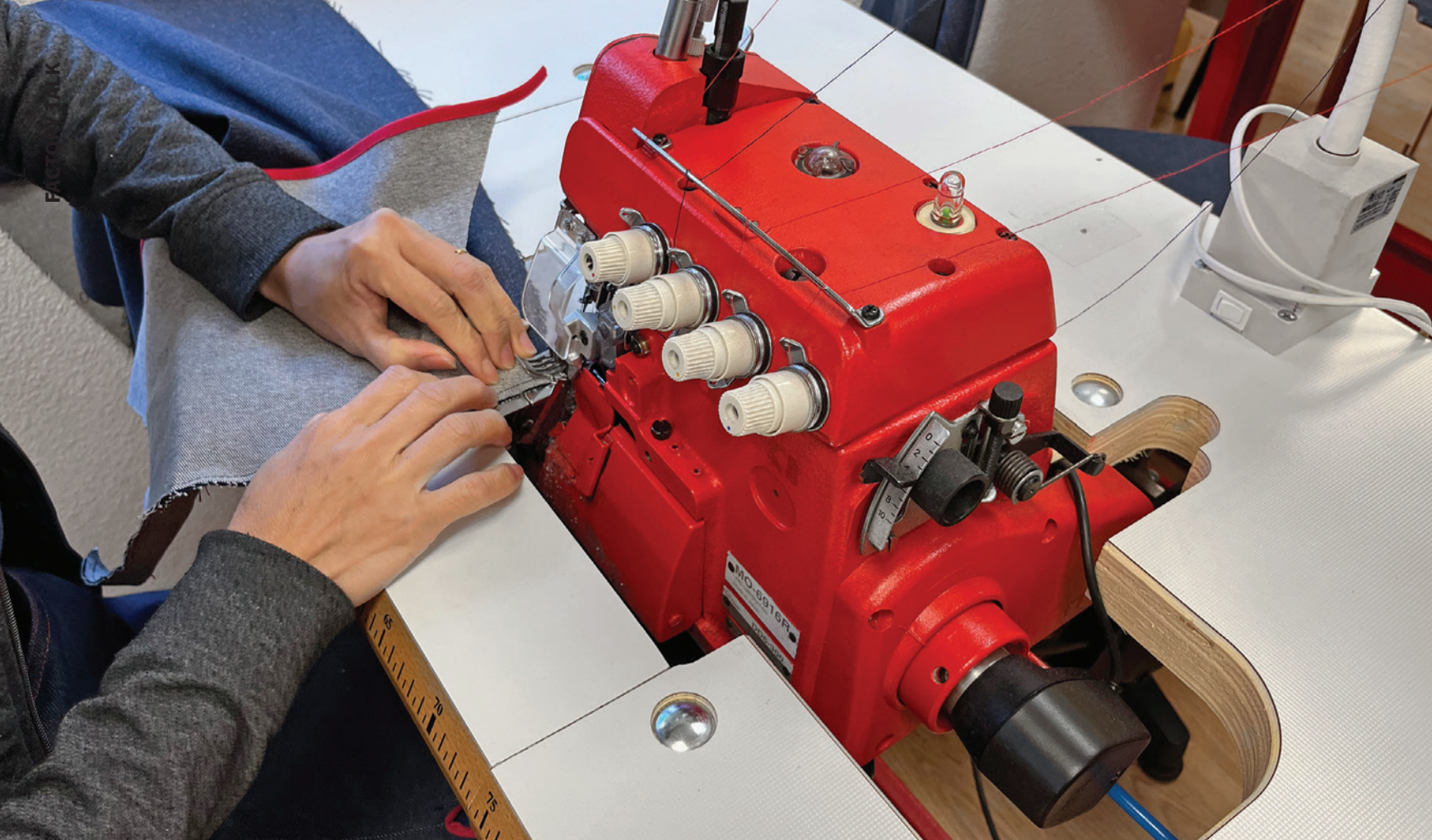
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Needlework in one of the 1083 factories.

ALL PHOTOS: TILMANN WRÖBEL

Romans empire

Once upon a time, jeans were made and manufactured in France. We all know the stories about denim beginning in Nimes and the South of France... and then, this incredible weaving and manufacturing know-how left the country. But history seems to be weaving a new path now Thomas Huriez has entered the denim industry.

The “denim made locally” movement has given birth to locally manufactured jeans in many European countries. Besides Italy – where denim fabrication and jeans manufacturing never really stopped – brands and workshops such as Blackhorse Lane Ateliers and Hiut, both from the UK, Atelier Tuffery and Kiplay from France or Braves & Company from Germany are great examples of fantastic denim “made just around the corner”.

All these companies have one thing in common: the desire to make extremely beautiful jeans. Thomas Huriez decided to create a brand-factory-mill, to slow down the global consumption of jeans while creating labour for textile workers in France, in his hometown Romans-sur-Isère. The city was formerly famous for shoe manufacturing but this was more or less abandoned when international outsourcing became the standard in France.

FACTORY TALK: 1083

Tilmann Wröbel visits 1083, a French brand and manufacturer that is among a growing number of companies showing that, with a little determination, supply chains can be established and textiles jobs created domestically.

Starting to manufacture denim in a country, in a city, where no textiles have been sewn for a while is not an easy endeavour. You have to find and train your workers first. And that is the point: it's not just about the product, but the labour and the local sourcing that matters. Sometimes Thomas reminds me he is conscious his jeans are not perfect – yet – but it's all about re-establishing a know-how to bring back work to his country; to create a community of denim workers who are gaining greater expertise every day.



Short supply chain

It was in 2007 when Thomas, a former IT specialist, opened a store in Romans retailing exclusively ethical clothing. He started thinking about the best category of clothing that would be durable, with classic timeless designs, that he could manufacture in his city in a totally transparent, ethical and eco-friendly way, and then sell it in his store. And denim it was.

The brand, which he launched with his brother Gregoire, is called 1083. The number stands for the length of France at its widest point, the idea being that no ingredient of the jeans shall have more than 1,083km to travel – cotton, ginning, weaving, trims and manufacturing – creating textile jobs in France.

When he established 1083 in 2013, he soon realised that nothing was easily available and that he would have to relocate the entire value chain to his country. Not afraid of this, he simply called his project ‘Re-Made in France’.

Over the next few years, he set up small factories in and around the city of Romans, creating employment for 150 textiles workers. He organised training sessions in which experienced textile professionals shared their knowledge and taught staff how to operate sewing machines. Since all fabrics for jeans start with cotton, Thomas decided to import exclusively Global Organic Textile Standard (GOTS) certified cotton, to gin his own yarn and weave his own fabrics, first in two separate French partner mills, then in 2018, the company acquired one them and named it Tissage de France. Now the brand was able to develop its own fabrics on its own weaving machines.

Along with the mill, another 40 workers joined the team. With a strong focus on eco-responsibility, recycling and cradle-to-cradle methods, some of the cotton is recycled from worn jeans. The Infinity Jeans collection was created by charging a small deposit, and recycling 1083 jeans into a second or third life.



Positive thinking

Today, 1083 has a core denim offer of about 40 styles, for men, women and children. It makes 80% of its turnover in France, and if export volumes ever rise, Thomas told me, he would prefer developing more 1083s in selected countries, creating jobs in each new country, rather than building an export shipment strategy from his headquarters to long-haul destinations.

What strikes me most, each time I am in the 1083 factories or offices, is this very young, very positive mood. The way the team works as a strong group, trying to keep everything as simple as possible. Slow, and as quality driven as possible.

Behind the red logos, the red sewing machines and Thomas’s eternal red T-shirt, 1083 is more than a factory or a brand, it’s a state of mind. And when talking with friends who wear these 1083 jeans, I can confirm that the Re-Made in France message behind it is understood by the final consumer. Even more, it has become a statement. A calm, humble and strong statement, in a noisy fashion industry. ■

(Left) French TV filming at 1083.

(Above) Thomas and the 1083 design and development team.



Tilmann Wröbel is the founder of Monsieur-T, the ‘denim lifestyle’ studio. He started his career as a haute couture designer before moving into streetwear and denim. He has worked as a designer and consultant for some of the world’s top brands, and is based in Paris, France.

© MONSIEUR_T_OFFICIAL/PHOTO: CHRISTIAN GEYR



Ana Paula Alves is the founder of Buenos Aires-based denim consultancy Be Disobedient and is the creator of IndigoFest LatAM, a celebration of indigo, and digital sourcing event Trippin'Blue, which will host its third edition between 27 and 29 April. She was previously a senior designer at Brazilian fashion brand Osklen and product manager at denim maker Tavex/Santista. She also lectures on fashion courses and teaches workshops at universities (University of Buenos Aires, Monterrey and University of Belgrano).

PHOTOS: ANA PAULA ALVES



Ana works with retailers, brands and the supply chain, advising on trends and manufacturing practices.

CLOCKING ON...

Argentina-based **Ana Paula Alves** has a packed schedule, working as a consultant, educator and organiser of South American denim events.

Buenos Aires bound

6.45am

My alarm clock helps me wake up slowly with good background music. Rule number one: I don't touch my cell phone before greeting my partner. I enjoy life without device demands and really enjoy my mornings. I prepare my son's backpack, our breakfast and answer the easiest and most urgent emails.

8.00am

I take a quick look at my schedule as I walk to a park near my house. Twice a week, I try to get some exercise outside. I move and start getting ready for the day.

9.00am

I go home, take a shower, choose the jeans I'm going to wear and prepare my work kit: notebook, chargers, notes, pencil case, catalogues and samples from denim mills.

10.00am

I travel by taxi to optimise my time. While listening to the radio, I make a few morning calls to get things done.

11.00am

I arrive at the client showroom, one of the biggest denim distributors in Argentina. I meet the marketing and products teams to discuss immediate actions. I'm training the team there, to help with customer services, trends, research and sales. For the Central/South America market, I deal with denim mills including Advance Denim, Global Denim, Vicunha, Canatiba, Nuevo Mundo, Fabricato, Santista, Tavex and Alpagatas. I also work with other mills and manufacturers, depending on the region.

12.00pm

I dedicate myself to answering emails and doing some video conferences, on average three per morning. I set aside 30-35 minutes to resolve pending issues. I'm kind of obsessed with my schedule. Through my consultancy Be Disobedient, I help designers, brands and businesses across South America to improve their production chain, while identifying more sustainable, eco-conscious processes. The region has a huge potential for growth.

1.30pm

When I'm not home working, I usually order food, mostly sushi. I share this time with some co-workers and use it to catch up on their news. I can mix work and personal life easily... I love talking about travel and projects.

2.30pm

We start our weekly workshop for the commercial team on textile processes and consumption trends. I really like the synergy between product, marketing and sales. It gives us a very assertive panoramic business scenario.



4.40pm

I pick up my son from school, we make a short stop for an afternoon coffee and cold chocolate. We always talk about his day at school and mine at work. When we get home, I keep working on sustainability projects with two Latin companies, Osklen and Fabricato (from Brazil and Colombia).

6.30pm

I finish my workday to continue it as a woman and mother. I really admire my work version, but I also love being Dante's mum and Pablo's wife.

8.30pm

We always have dinner together, relaxed as a family, and we like to play "The Best of the Day", where we tell each other the best parts of our day, whether it's small actions or big achievements and it's wonderful to see how our family is also a beautiful team.

10.00pm

We're addicted to watching series on Netflix. While we decide which one, I check my Instagram. I update myself about the current scenario, review my schedule for the day ahead, and prepare to rest. ■

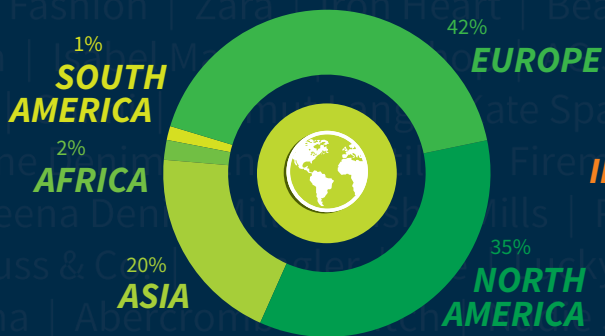


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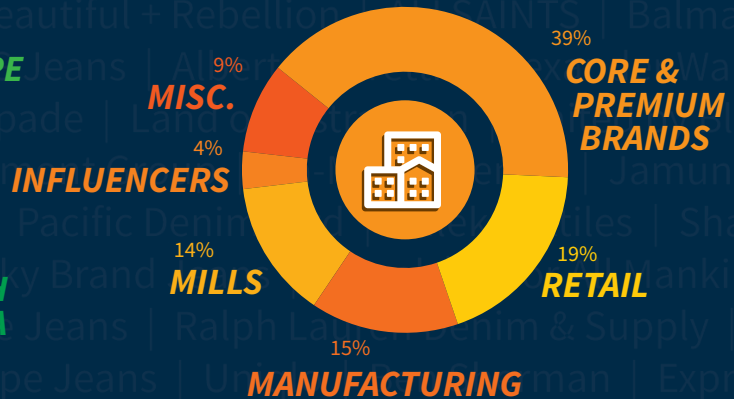
BEHIND THE SEAMS OF THE GLOBAL DENIM INDUSTRY

We want our readership to be as valuable and as valued as our journalism. It's why we have left no stone unturned in identifying key global contacts in the global denim industry.

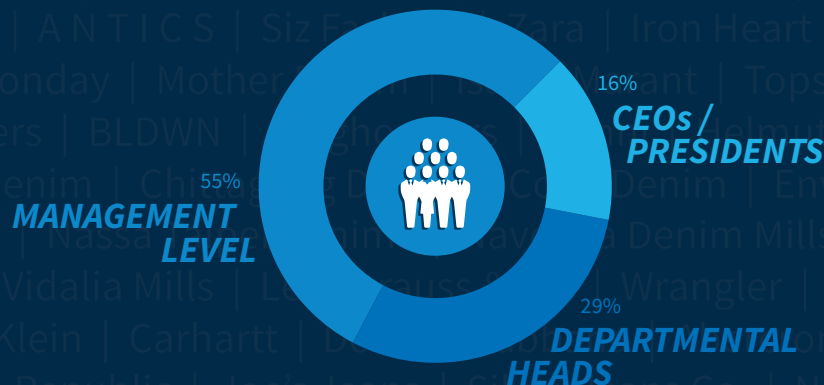
GEOGRAPHICAL



TYPE OF BUSINESS



JOB TITLES



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