ISSUE 10: 2023

BEHIND THE SEAMS OF THE GLOBAL DENIM INDUSTRY

insideDenim

Out of the blue

Harnessing the power of ultrasound / Nicolas Prophte / Textile-to-dye in the loop
Bestseller's fashion forward agenda / Epic Group / Christine Rucci

Contents

Cover Danish lifestyle brand Ganni embraces colour in its Spring/Summer 2023 denim collection.

PHOTO: GANNI

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Many voices, a single purpose

Welcome to Issue No.10. It's been an incredible journey into the world of denim since we launched just three years ago. Personally, I have been astonished and impressed to see so many different professions, skills and businesses involved in the making of denim and jeans, an entire industry working together to make one iconic product.

The team that launched our print and digital publication have many years of experience in apparel, textiles, and manufacturing but not with a specific focus on denim. As its technical editor as well as an author on textiles and fashion, I realised that I still had much to learn about some basics: indigo dyeing, denim weaving, ozone, pumice stones, the evolution of denim garment manufacturing, to name just a few!

This issue of *Inside Denim* now takes a closer look at dyeing, which is the focus of intense innovation, across the board. As market trends evolve to make room for colour in a world immersed in indigo, we too investigate how suppliers, mills and brands are navigating this cyclical shift. Along the way, our denim industry insider Tilmann Wröbel takes us back to the art of indigo dyeing as practised by Sakamoto Denim in Japan, a company that has had a hand in modernising techniques that have become standard in today's industry. Looking forward, Italian mill Pure Denim is helping Sonovia, an ultrasound specialist based in Israel, put the finishing touches on a near-waterless but completely hydrosulfite-free technology that could be a game-changer when it comes to market. Unexpectedly, dyes and pigments are also playing their part in circularity. Officina39's Recycrom opened the way with a process promising a near infinite loop for textiles and pigments. Archroma's new FiberColors introduces a different solution, but also expands the types of materials, and residues, that can be reused. Good news all around.

Designing for recycling is seen as a solution to reduce waste, and this is on the agenda of Danish group Bestseller whose guide on circular design principles has been made 'open source' to have added impact. The company is also involved in a project to test a recycling technology, hydrothermal liquefaction, not generally applied to textiles. Making the right decisions from the start is what Epic Group has done for its newest facility in Bangladesh which takes advantage of its natural surroundings to lessen its impacts. This forward thinking has allowed it to achieve an unprecedentedly high LEED score in its category.

In a time of change and disruption, the industry needs more critical and creative thinking, says Nicolas Prophte, who contributed this issue's Guest Comment. This, he suggests, means developing a new business model in which brands and retailers apply to their sustainability metrics the same efficiency and efforts they dedicate to achieving their financial objectives.

One person who is used to thinking out of the box and working with the industry's biggest names is Christine Rucci, this edition's Jean Genie. The godmother of denim has a very clear vision for the future of the industry, and she is on it. Far from being as well known, Molly Spittal has devised a novel sizing system for her brand Decade Studio and exhibits another instance of smart leftfield thinking.

Other voices we have opened our pages to are similarly poles apart. Cotton Incorporated's Kim Kitchings reminds us of cotton's innate resilience and ongoing promises as a crop and a raw material. The head of a European textile recycling confederation, Mariska Boer, reveals new data on the impacts of consumer usage in a product's overall footprint.

Last, but certainly not least, communities close to us have been stricken with once in a lifetime (hopefully) tragedies. Turkey's contribution to the denim industry is far from negligible and we should take great care to support the mills that have been hit by this act of nature. We must not forget either that catastrophic floods put hundreds of thousands of cotton growers in dire conditions in Pakistan last year.

At *Inside Denim* we strive, as do many voices in this industry, to take the long view, to keep an eye on what is to come, but also to zoom in on pockets of innovation that might one day prove to be not secondary but significant for the future of our jeans-making world.

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“It is time to break existing business models”

Time is our most valuable asset as humans. For most of us in the fashion industry, taking time to push pause, reflect and find perspective in our hectic world is becoming a luxury. Our attention and focus are generally absorbed by short-term metrics, calendar milestones or collection deadlines.

The global fashion industry is definitely entering a critical pivot phase which calls for a change in how we conduct business and engage with consumers. The external disruptions we have faced in the last few years have brought to light the weaknesses and cracks that were already undermining the industry’s business model.

Unfortunately, I believe that the cadence of disruptions won’t slow down as we enter an ever-more volatile global environment. Businesses and industries will be challenged by the increased awareness and actions of policy makers. They now realise that it is their responsibility to regulate fashion, both to lower its environmental impacts and to address the social consequences of today’s garment manufacturing industry.

Times are changing, we as brands and the industry, together, have to solve a new complex equation with multiple variables. We still have to design, create and manufacture high quality and trend-setting products that fulfil consumers’ needs. A brand’s competitive advantage, and its brand equity, continue to rely on its ability to design and deliver a desirable product to consumers.

We need to engage high efficiency processes for bulk production to make sure we stay sharp with regards to costs in a very competitive market, in which financial metrics still rule over our everyday business, our supply chain choices and our sourcing strategies. But the equation is now more complex as we must integrate new responsible metrics.

Responsibility, a game changer

The integration of “responsible metrics” in the global business model is a major game changer, as we must serve and support a wider array of key performance indicators (KPIs). It is no longer an open buffet in which we can choose which metrics we choose to prioritise.

GUEST COMMENT

For denim industry leader **Nicolas Prophte**, it is time to update the definition of a successful business by adding responsible metrics to the existing and dominant financial indicators. He also believes that critical and creative thinking should be encouraged and celebrated, and there is reason to be positive: the denim industry has the potential to lead the way.

For years, we focused exclusively on the aesthetics of a product and completely ignored the raw materials used and the industrial manufacturing processes along with their potentially harmful consequences to the environment and public health.

It is time to be bold and visionary by breaking existing business models, rethinking working methods and shifting the fashion industry’s culture. This change relies on people’s mindsets, beliefs, vision, habits, behaviours, and knowledge.

The question we need to ask ourselves is how do we create the conditions for change in our industry and how do we kickstart a global movement in which the focus is on solving this new complex equation. Neither a single brand nor supplier will have the expertise or the power and weight to disrupt the status quo.

Multiple conditions for change

The conditions for change span all levels of the industry. Corporate responsibility cannot be a side activity working in a silo disconnected from the reality of the supply chain. This requires a new strategic and holistic approach to business, instead of today’s reactive mode to growing pressure from policy makers. To drive their operations in the long term, brands must implement practical roadmaps with their suppliers and identify clear focus areas.

Sadly, many corporate strategies do not go beyond the stage of a presentation slide. Their execution in the real world is low and has virtually no impact on the supply chain. It is essential to develop sound procedures, tools and measurements to track progress toward specific, quantitative and qualitative goals. To guide the roadmaps and ensure that corrective actions are effective, supplier engagement is becoming a field of expertise in itself. The key performance indicators for all suppliers should include responsible and business metrics in a single dashboard.

Education and knowledge will be essential for brands and the industry to develop and acquire new skills to keep abreast of increasingly complex issues. I believe socialising and creating awareness internally on strategic topics related to sustainability are also key to mobilise resources and engage in true change.

This in turn calls for a cultural and organisational shift. Critical and creative thinking should be encouraged and celebrated. It is time to update the definition of a successful business to include not only financial metrics, but also social and environmental achievements that a company's employees can be proud of. The classic corporate structure, with its hulking hierarchy, will not be able to adapt to the pace of change.

A collaborative mindset on strategic initiatives is another condition for change. Precompetitive agreements should be the rule when brands engage in developing circularity, take back systems, or any large-scale sustainability initiative. Scale is one of the keys to unlock and accelerate the transformation of the industry. This requires that all stakeholders agree on the definition of a 'responsible framework'. There is too much dispersion, too many initiatives that dilute the power of leverage and create distraction. Efforts need to be better coordinated between brands, suppliers, policy makers, NGOs and R&D centres. Each has a specific role to play to ensure that policy makers implement the measures that lead to better practices and investment in innovation.

Despite the challenges we face and the disruptions we will experience in the future, we must also remain optimistic and recognise the incredible opportunity we have at hand to make the necessary changes in our industry. I personally find this situation extremely exciting, and it drives me in my everyday work. Fall in love with the problems first, and then we can collectively find the solutions. The denim industry has the potential to lead the way towards more responsible business practices and serve as an example for the broader fashion industry.

A recognised leader in promoting a more responsible business culture, Nicolas Prophte is an experienced sourcing and supply chain strategist and his guest comment for Inside Denim expresses his own personal views. An engineer in textile chemistry, he began his career at French sports retailer Decathlon before working for leading denim brands, from Pepe Jeans to PVH. He is based in Amsterdam.

PHOTO:NICOLAS PROPHTE

Industry News

Kaporal's creative upcycling and strong local anchoring

Marseille-based denim brand Kaporal launched its eighth annual used denim collection campaign that invites consumers to bring their old denims to the brand's stores in exchange for a €20 discount on a new pair of jeans. Those consumers that purchase online can drop their unwanted denims in a sidewalk bin of French collector and sorter Le Relais. Since its launch in 2015, 50 tonnes of jeans have been collected in stores, according to the company, and each year, on average, it retrieves 10,000 items during the month-long initiative. The brand's partner, Le Relais collects and processes all the goods. The jeans that can no longer be worn are recycled into building insulation material by Métisse, which developed the recycled material for Le Relais.

For the past five years, to highlight the possibilities of creative recycling, promote new talents and local manufacturing, Kaporal has invited young designers to create a capsule collection from the old jeans collected, its own deadstock and unsold stock. The upcycled products are cut and sewn by a Marseille-based social organisation, A'tipik. This year, the brand chose Luis Carvalho, a young Portuguese designer who won an OpenMyMed Prize in 2019. This programme supports fashion designers and academics working in Mediterranean countries and was created by Marseille-based endowment fund Maison Mode Méditerranée.

PHOTO: KAPORAL

Cone Denim extends partnership with Oritain

Cone Denim began working with Oritain, a traceability solution provider, four years ago. Following a successful pilot run, the two companies have decided to extend their collaboration.

Founded in 2008 by Dr Helen Darling and Professor Russell Frew at the University of Otago in New Zealand, Oritain is a traceability system that does not apply a physical tracker but determines an agricultural raw material's origin by analysing its trace elements. These are said to give an indication of soil composition and other environmental identifiers. Each natural product is thus said to have a unique 'fingerprint' linked to where it was grown, and which cannot be tampered with, replicated nor destroyed. Oritain can thus guarantee where the cotton used by Cone Denim was farmed, now a legal requirement in the United States.

New pineapple-based yarn
Ananas Anam, the maker of Piñatex, a non-woven made from pineapple fibres and PLA, has moved on to make yarns from the same agro-industry waste. PiñaYarn is spun in Spain in an intimate blend of 70% Tencel and 30% pineapple. Spanish mill Santanderia has woven it into a denim fabric.

PVH joins bio-recycling project
PVH Corp has joined lifestyle brands Patagonia, Puma, Salomon and On, in a fibre recycling consortium led by French biotech start-up Carbios. The two-year project seeks to prove the viability of the company's selective enzymatic recycling process for polyester and blended textiles at an industrial scale. PVH's addition broadens the scope of feedstock for testing.

Pili scales its biotech indigo
French biotech company Pili has raised new funds ($15.8 million) to begin producing a biobased indigo in a demo plant with a capacity of tens of tonnes. The start-up claims that its hybrid technology, which it says combines "industrial fermentation and green chemistry", delivers a high-performance biotech pigment with a lighter carbon footprint.

Japan-China rPET deal
China-based Zhejiang Jianxin Jiaren New Materials is the first company to licence a chemical recycling technology for polyester from Repeat. Repeat is a joint venture set up by Japanese businesses Teijin, JGC and Itochu around Teijin's dimethyl terephthalate (DMT)-based chemical recycling process. The new PET recycling facility should open in Shaoxing next year.

Higg vets Lycra factories
Three facilities producing The Lycra Company's flagship elastane score in the top quartile of Higg facility modules for environmental impacts (Higg FEM): the Waynesboro, USA, Maydown, UK, and Foshan, China plants. Two, the Maydown and Tuas, Singapore, sites, rate as high for Higg's social & labour module (Higg FSLM). An initial self-assessment by The Lycra Company was then verified by an independent third party, the company says.

Nanollose and Birla tie-in
A new agreement between Australian bio-materials company Nanollose and Birla Cellulose, the pulp and fibre

A.P.C. under new ownership

L Catterton, a private equity firm backed by French luxury conglomerate LVMH, has acquired a controlling stake in A.P.C.. Atelier de Production et de Création, the name behind the well-known acronym, and arguably one of the first slow fashion brands, was founded by Jean Touitou in 1987 in Paris. The company's sales are said to be in the €100 million range, and it operates around 100 stores. The Touitou family will retain a minority stake.

Jean Touitou recently explained how denim was the very first product he made under the A.P.C. label. "I had no personal wealth, and I didn't trust bankers, so I started working as a 'ghost designer' for a number of companies to raise money to launch my own brand," he wrote in a blog post. One of these had a big denim business, and when Mr Touitou expressed the desire to design a pair of jeans, he gave him a bolt of Japanese selvedge denim and one piece of advice: when you make your pattern make sure the pieces are placed so that the two edges will be joined at the outside of the leg seams. "I did just that, but I didn't realise, or know about the other details and rules that denim heads take so seriously. For instance, the fact that the belt is sewn in the bias. Not knowing this, I cut it on the grain, which is how it is to this day on A.P.C. jeans."

PHOTO: A.P.C.

Soko's Stardust magic at work at Daily Blue

Introduced last November, Stardust is one of the latest innovative processes developed by Italian chemicals supplier Soko. The all-in-one solution is said to cover 80% of fading operations, from raw to vintage, in near waterless conditions. It eliminates the need for pumice, hypochlorite, potassium permanganate, caustic soda, peroxide and detergents, the company says. This in turn reduces both the chemicals and number of rinses, delivering savings, and speeding up production time.

Adriano Goldschmied chose to use Stardust to finish the entire autumn 2023 range of his recently relaunched label Daily Blue. For Luca Braschi, at Soko, this confirms that Stardust is not only very sustainable, but also achieves premium denim looks. "This is a real step toward reducing the impacts of denim processing, which is part of Daily Blue DNA's as well," he tells *Inside Denim*.

This new range also illustrates the new role ozone processing can play in denim manufacturing. Soko has modified and optimised how ozone is used to obtain a wide array of effects. In addition to savings in water, chemicals and time, Soko states that Stardust processing puts less stress on fabrics, making them more durable, while achieving the strong abrasion and mid-bleach fading of true vintage aesthetics.

Repairs under way

Spinning machine manufacturer Rieter has reopened its service station in Kahramanmaraş in Turkey, six weeks after the region was hit by earthquakes that led to more than 57,000 fatalities.

Rieter said around two-thirds of the spinning capacity in the region had been affected by the disaster and said the need of its specialist services among local fabric manufacturers was urgent.

The reopening of the Kahramanmaraş service centre means Rieter technicians are able to carry out mechanical repairs at mills in the surrounding area.

It said it was "working shoulder to shoulder with customers" to assess the damage and develop action plans to get mills up and running again.

business of India-based Aditya Birla Group, extends the partnership to 2025. The two companies began working together in 2020 and filed a joint patent in 2021 for a high tenacity 'tree-free' lyocell made from a blend of 20% microbial cellulose and 80% wood pulp.

Lenzing sales up 17%

Austria-based fibre manufacturer Lenzing has reported year-on-year revenue growth of 16.9% for fiscal 2022, a feat it "primarily" attributes to higher fibre prices caused by unfavourable global energy and raw material market dynamics. Overall, revenues reached €2.57 billion.

Rubi onboards brand partners

Cellulosic fibre developer Rubi, which says it can make "resource-neutral" lyocell and viscose using cellulose pulp from captured carbon, has gained $8.7 million in additional funding, bringing total investment to $13.5 million thus far. The start-up says it has pilots running for brand partners Patagonia, Reformation, Ganni and H&M along with resale platform Nuuly.

Spinnova's revenues up 300%

Finnish biomaterials company Spinnova has reported full-year revenues of almost €24.3 million for 2022, an increase of more than 300% year on year. During the period, it completed the construction of a first factory for Woodspin, a textile fibre made from wood pulp. The construction of a second factory, with its partner Suzano, is expected in 2024.

Pangaia features Nucycl denim

British eco-brand Pangaia created a denim jacket from 100% Nucycl lyocell fibre, produced from pre- and post-consumer cotton by Evrnu. The materials innovation company expects production to commence at its South Carolina recycling plant by mid-2024, with an initial capacity for 17,000 tonnes. Co-founder and chief executive, Stacy Flynn says partners have already committed to purchasing half of this initial volume.

Ian Berry's Levi's 501s tribute

As part of celebrations marking the 150 years of Levi's iconic 501s, British artist Ian Berry has produced a four-by-ten-metre mural. The collage, composed of "hundreds of bits of cut denim jeans", first landed in Paris' Place de la République in March, and will travel to Milan (April 17-26) and Madrid (May 4-7).

The novel 'direct colour application method' developed by Colourizd uses very little water and delivers the authentic fade and white core of denim lore from the start.

PHOTO: COLOURIZD

Room for nuance

In the denim rush that took off just out of the pandemic, driven by what is being called revenge buying, traditional indigo blue jeans were by far the best sellers. Consumers wanted 'the real thing', some would say, and it signalled that life was coming back to normal. But the 'same old, same old' can only go so far. The ever-spinning trend wheel has moved over a notch or two, bringing colour, what the industry jargon calls 'non-denim' jeans, back under the spotlight.

"Colour is coming back stronger than ever, absolutely," Jose Royo, vice-president of Spanish mill Tejidos Royo, tells *Inside Denim*. "After the post-covid focus on denim jeans, people are now tired of looking alike and demand for colour is up. The colour story is also a sign that we are happy with life." The Valencia-based mill has seen a huge increase in demand for garment-dyed products, which, he says, gives brands a lot of flexibility. "Instead of having a stock of dyed garments, they can stock undyed garments that can be dyed any day depending on the trend or weather. Today, the name of the game is flexibility, and garment dyeing is the best option." The mill has just released a new version of its Dry Indigo in black, and is currently working on transposing its waterless foam dyeing process to a full range of hues.

'Out-of-the-blue' denim products make up a small part of the market, but they play an important role in providing variety in the all-indigo world of blue jeans. Whatever the colour of day, however, they are expected to wash and fade in the same way as traditional jeans. While piece or garment dyeing offer flexibility, their so-called 'flat look' is not always welcome. This is where new, and old, techniques are being harnessed to achieve the elusive yet ideal balance of novelty and authenticity.

There is always demand for colour and for different indigo casts, says Baris Ozden, product manager for Turkey-based Isko. "Sulphur dyes are washable and come in a palette of shades that are not bright, which gives fabrics more authenticity. They can reproduce the look and feel of indigo," he says, adding that black sulphur is by far the most popular. But sulphur dyes do not cover the entire colour spectrum.

(Above:) A selection of non-denim jeans by Turkey-based garment manufacturer Efna Tekstil on display at Bluezone earlier this year. PHOTO: WTP

(Left:) In its spring/summer 2023 collection, French denim label Kaporal has focused on sandy neutral tones that are this season's on-trend tones. PHOTO: KAPORA

Neutral nuances

"Non-denim styles come and go," says Nazim Kayhan, CEO and co-owner of Strom, a mill based in Istanbul. "It is like the swing of the pendulum. The market gets tired of indigo and shifts to colour, before swinging back to indigo. These phases usually last 1.5 to 2 years, and we are now in a colour phase," he tells *Inside Denim*. He adds that the nuances that are in demand are not bright, but rather "colours that are easy to wear and to combine with other tones. We are seeing a lot of muted shades that tend towards neutrals in khakis, greys and blues."

Fatih Ozkan, head of sales for Efna Tekstil, confirms the trend towards neutral tones. This Turkey-based company specialises in non-denim woven fabrics for casualwear. "This year, colours in demand are cinnamon browns and light blues," he says. At Sharabati, the trendy tones of the day are "very soft, sandy, earthy; they are calm, not bright," says Dilek Erik. The Turkey-based mill's gabardine sales have picked up and are outpacing sales in denim. She attributes this surge to increased demand for comfort. "Gabardine is very comfortable to wear and we apply a carbon finish that gives fabrics a soft and fuzzy hand."

With its new range of denims made from cotton that grows in colour, Bossa Denim is also tapping the trend for muted neutrals. The variety of cotton grown comes in shades of brown, in a lighter or darker tone. These naturally coloured fibres are used to make the warp yarns of a fabric and are woven with a traditional white weft. "Colour is coming back strong," confirms marketing manager Ozge Ozsoy, adding that the cotton is grown in the region of Adana, where the mill is based, and the fabrics are among the most sustainable as they require no dyeing nor chemicals.

Authentic fading

The world of casualwear follows the same rulebook as that of denim, and the challenge, in woven or knitted goods, is to achieve the fading that signals wear, ideally revealing a white core, which the industry equates with authenticity. Advanced Used Look, a new concept launched by DyStar and Kaiser Tekstil, is designed to deliver the coveted fading in colour. It is based on a family of selective reactive dyes, including the new Lava Dye OZN, and can be applied on fabrics or on garments, providing mills and brands added flexibility, says Serdar Demircioğlu, Kaiser Tekstil's sales and marketing manager. After dyeing, a special chemistry developed by DyStar is applied, in waterless conditions, and creates a worn-in look, which can be controlled and is said to offer high reproducibility. "Up till now, the dyes used would generally does not have high colour fastness," he continues. The new process, which is patent pending, achieves a colour fastness rate of 5 for washing, crocking, etc. Advanced Used Look does not require hazardous chemicals such as potassium permanganate. It also contributes to saving time and energy, the company states. "Indigo has by far the largest market share, but brands also need to offer garments in other shades, and in a wide array of fadings. Advanced Used Look offers a sustainable solution for all colours as it does not require water nor harmful bleaching agents," says Mr Demircioğlu. Advanced Used Look, and the Lava Dye OZN dyestuff group, thus fill a gap in the market, offering the desired fading along with the desired colour fastness.

Colourizd, a company based in North Carolina and Hong Kong, has devised a dyeing process that gives yarns a washed down aspect from the start. Initially developed for knits, this 'direct colour application method' uses very little water and applies to cellulose-based fibres. Its key advantage is to eliminate the need for washing made-up garments. "Our system is not the traditional, one litre of water for two kilogrammes of yarn," says Jennifer Thompson, company founder with her husband Allen Thompson and Antony Lau. It is a "radically sustainable dyeing process" as it generates no wastewater. "Most of the water gets steamed off and what is released is cleaner than the one we took," she says.

Colourizd's process is said to add strength to the yarn and can be applied on greige yarns. A pre-treatment process is applied, but the yarn does not need to have been bleached beforehand. The company is working on using its system to dye indigo, but that's another story.

Montedel, the natural dye range of Italian chemicals company Montega, offers a range of shades for casualwear. PHOTO: MONTEGA

For brands looking for more sustainable colour solutions, Italian chemicals company Montega has developed a range of dyes derived from plants or agro-industry waste. The company grows some of the plants it uses to make its Montedel natural dyestuff range. The dyeing process is based on 100% natural raw materials, export manager Lucia D'angelo Maddaleno tells *Inside Denim*. For non-denim products, Montega's My Eco Finish Dye is another low impact process that gives fabrics or garments a worn-in look.

Coloured warp yarns

It remains that for diehard denim buffs, the fabric that defines a pair of jeans is made from warp yarns dyed indigo and weft yarns left undyed. But it is entirely possible to weave a fabric with the same contrasting face and back in colour. It just requires dyeing warp yarns in a tone other than indigo.

A new concept by DyStar and Kaiser, Advanced Used Look makes it possible to achieve authentic worn-in aesthetics. PHOTO: WTP

Taking the original 'recipe' for denim but translating it into colour is what Artistic Garment Industries (AGI) has done in a range it calls Kaleido. "Conventional non-denim fabrics usually have a flat look, but what was lacking in the market was more depth and more authenticity," says Faizan Ahmed, deputy manager, corporate communications and marketing for the Pakistan based mill. Kaleido fabrics feature a warp dyed in colour, a weft left white, like a genuine denim fabric, and they wash and fade like the real thing.

AGI's initial range of hues is limited. "We started with four shades and will expand if demand follows," he says, but admits that the concept is slow to come to market. "It may take years, which is often the case in our industry," he notes, citing Tencel as an example. "I anticipate that Kaleido will gain popularity. There is room for colour and what we provide is not the conventional chino look, it is very different. With the fast pace of fashion, there is a need for variety."

Fabrics made with coloured warp yarns are not new, but the process has limitations, points out José Royo, in addition to requiring high minimums (MOQs). "We used to offer coloured warp dyed fabrics, but our focus now is on a no-stock thinking. To make these profitable, we would need to make and sell each colour in 10,000 metre lots. With garment-dyeing, it is easy to dye 50 items in a given shade, and a brand can decide late in the season what tone it wants; it is much more flexible," he says.

"A coloured warp is a good story, but it is not easy to achieve the 'right' shade for a given season," remarks Italian denim designer Paolo Gnutti. He also finds that the high MOQs make them difficult to market. In his latest luxury range for Isko, he enhanced the traditional white weft yarns of a denim fabric with a silver foil. This adds a subtle sparkle to the face of the fabric, and can be used to create striking styles by playing with the two contrasting sides.

It is technically much easier to change the colour of a weft, than a warp. In traditional indigo dyeing, thousands of warp yarns go through a range of baths alternating with exposure to air. If something goes wrong, and the shade is off, 800 metres of yarns can end up in the bin. Any change of dyestuff is presumably a long and potentially wasteful process. DyStar and German machine maker RotaSpray have addressed this issue with the Spray Application Technology for denim. Combined with selected dyes and auxiliaries made by DyStar, it is said to simplify the process of changing colours in the continuous dyeing of warp yarns, and makes it possible to produce smaller lots. "Any mixture of indigo, sulphur or vat dyes can now be applied in one step, without fearing the well-known differences in affinity and exhaustion behaviours of dye mixtures. Contamination problems in bottoming and topping processes are also eliminated," says Jakob Krzysko global technical manager for denim at DyStar.

For his Isko Luxury collection, Italian denim designer Paolo Gnutti has applied a silver foil to the weft, offering not a new colour, but a novel sparkle.
PHOTO: ISKO

The 'contactless' application method developed by RotaSpray is a true breakthrough, the company states. "Eliminating classical padders and large dipping baths is a revolution in our industry. The contactless application avoids contamination between the dye liquor and the chemical liquor. This removes the risk of undesired hydrolysis of the reactive dyes and the intermediate drying phase," he says. Furthermore, he adds, "it allows a significant reduction of salt in dark colours, and up to complete elimination in bright tones. This process significantly reduces the environmental footprint of reactive dyeing and opens the door for denim producers to a wider range of shades in short lots." With the right technology, he concludes, it is possible to dye warp yarns in a variety of tones with minimal impact on the environment.

Colour may be fashion's favourite recipe for variety, and a major driver of sales, but it has always taken the back seat in the world of denim, forever bound to indigo. This does not stop the wheel of trends, nor of innovation. The various solutions to expanding the palette all share a single and very clear goal: to infuse coloured, or non-denim, jeans with the ring of authenticity and novelty. And thus, make room for nuance.

AGI's Kaleido takes the recipe for authentic denim and transposes it to colour by offering fabrics made from coloured warp yarns.
PHOTO: ARTISTIC GARMENT INDUSTRIES

Rescue workers amid the ruins following the earthquakes in Turkey and Syria this February.

PHOTO: SHUTTERSTOCK/JASMINKO IBRAKOVIC

Denim mills build back in Turkey

Devastating earthquakes hit Turkey and Syria in early February, with key regions for the denim industry among the worst affected. The recovery has already begun.

Earthquakes of extreme intensity struck Turkey and Syria in February 2023, causing more than 55,000 fatalities and severe damage to cities, towns, villages and agricultural communities over an area of around 350,000 square-kilometres. There were almost 50,000 fatalities in Turkey, making this the deadliest natural disaster in the country's modern history. It was Syria's worst since the early nineteenth century; more than 7,000 people there lost their lives this time.

In total, around 14 million people have been affected. By early March, the UN Development Programme and The World Bank were estimating the cost of damages at more than $100 billion for Turkey and more than $5.1 billion for Syria.

International organisations, national governments, aid agencies and communities in all parts of the world were moved by the effects of the earthquakes and sent money, rescue teams, food and materials to help. There was particular concern among people in the global denim industry because the parts of Turkey most severely affected by the earthquakes, including the provinces of Hatay, Kahramanmaraş, Adiyaman, Gaziantep, Diyarbakir, Osmaniye, Adana, Sanliurfa and Malatya, produce a high percentage of the country's cotton output and are home to a large number of mills.

Cotton production

A year ago, a specialist team of analysts working with the US Department of Agriculture (USDA) in the US embassy in Ankara and consulate in Istanbul forecast that Turkey would produce 4.2 million bales of cotton on its own farms in the current cotton marketing year (August 2022-July 2023). In that part of the world, most cotton farmers plant new seeds between March and May and harvest the fibre between the middle of August and November. A new USDA report is due for publication this April, which is likely to say more about projections for the effect of the earthquakes on the domestic cotton crop.

Its estimates for the current year were that Turkish farmers would sow cotton on 515,000 hectares, up by 14% year on year, and said 2022-2023 production was likely to be the largest in a decade. USDA explained that farmers were being enticed away from crops such as wheat, barley, rye, millet, corn and rice and attracted to cotton by "strong prices, better weather, and a growing sense of confidence from good harvests in the past two years". Farmers had spoken specifically of increasing their production of organic cotton and other fibre that meets the requirements of the Better Cotton Initiative (BCI).

Turkey's largest area for the production of cotton, USDA makes clear, is in the south-east of the country in a region that has become widely known as GAP. The area takes this name from Güneydoğu Anadolu Projesi, which means the Southeast Anatolia Project. This hydroelectric and, crucially for cotton, irrigation project has been under way since the 1980s. GAP provinces include Adiyaman, Gaziantep, Sanliurfa and Diyarbakir.

In 2021-2022, Turkey produced around 475,000 bales of BCI cotton; there were hopes of pushing this beyond 600,000 bales in 2022-2023. Drought conditions have caused a reduction in recent organic cotton crops, but farmers are hopeful of driving this back up, especially when all the irrigation initiatives linked to GAP are complete. According to USDA, only 25% of the irrigation projects are in place, but when the programme is completed, there should be 22 dams providing irrigation to 1.4 million hectares of farmland. Once again, the February earthquakes are likely to have set many of these initiatives back.

Cotton consumption

The denim industry is doubly interested in this region because of the number of manufacturers that produce denim fabric and jeans in it. These companies consume most of the cotton that Turkish farmers produce and they are also important consumers of imported cotton. Hand in hand with USDA's projection that Turkey would produce 4.2 million bales this year, it also predicted that the country would import more than double that volume, 8.7 million bales, from other producing countries, notably the US and Brazil.

In its market summary for 2023, cotton industry information resource Cotlook said that exports of cotton to Turkey halted in the immediate aftermath of the earthquakes to allow time for "a clearer assessment of the situation". There were also reports of shipments that were already on the ocean when the earthquakes struck being diverted away from Turkish ports. Interruptions to the denim and wider textile supply chain were unavoidable.

Houses high on the agenda

Turkey's finance minister, Dr Nureddin Nebati, who is from the region and began his professional life in the textile sector, has expressed sympathy with the plight of businesses in the aftermath of the earthquakes and insists the government wants to help. However, he has also made it clear that the top priority is to provide new houses for people who have been left homeless by February's events. He was one of three senior ministers that the government in Ankara sent south immediately after the earthquakes to support rescue efforts and to spend several weeks seeing at first hand the predicament communities had been plunged into.

Turkey's finance minister, Dr Nureddin Nebati, is putting the emphasis on building safe houses for the millions of people affected by the earthquakes.
PHOTO: SHUTTERSTOCK

In recent comments, he has said that the government has helped businesses by postponing tax bills and debt repayments. But he made it clear that what he wanted most of all is for local families, who moved first into tents and then into temporary housing made from shipping containers, to have new homes. He said he was hopeful of completing that building programme within a year, but made it clear that this will only come to fruition if private-sector businesses become involved and resist any temptation to regard the project as an opportunity to make money.

Accommodation repairs

There is an obvious connection between providing decent homes for families and providing businesses, including those in the denim industry, with the workers they need to restart and ramp up production as quickly as they can.

Sharabati's Turkish denim factory, which is located in Osmaniye province, came through relatively undamaged. Factory manager, Mohamed Zarka, says the company feels some relief in its sorrow for all the victims that the location it chose suffered less damage than many others. He also makes the point that paying strict attention to standards aimed at helping buildings withstand earthquakes may also have been a factor.

Production halted for seven days at most, he says, while Sharabati carried out checks on the facilities, as well as making sure access to energy supplies was available again. It houses some of its workforce at the site and will have to carry out repairs to some of that accommodation, but Mr Zarka says this work has already begun and that 90% of that accommodation and 100% of production areas are useable.

Support centre

To the north-east of there, in the province of Malatya, Çalik Denim runs an integrated production facility where its processes start with receiving cotton fibre and end with finished denim fabric. Çalik's factory also suffered little damage but the communities around it, including many of the company's own employees, were badly affected. Çalik decided to make the factory available for use as a shelter for people whose homes had gone, providing them with hot food. "We turned the factory into a temporary support centre," chief executive, Serhat Karaduman, says. "But we were deeply saddened by the loss of two precious members of the Çalik Denim family, Hasan Can Kalkan and Alper Gürbüz." Both of these victims of the earthquake were maintenance employees who worked on dyeing and finishing machines, and spinning machines, respectively, at the site.

Other employees were among the injured; Mr Karaduman says the company is maintaining regular contact with them and their families to keep track of their recovery. The health and safety of the workforce remain the top priorities, the chief executive insists, but production gradually got back under way in the second half of February and was running almost as normal again by early March. "Our global business partners have shown us great support and understanding," Mr Karaduman adds. "We are very grateful for this."

Painful news

There was even more painful news for another of the mills *Inside Denim* spoke to for this article, Kipaş Holdings. Its headquarters are in one of the most severely affected provinces, Kahramanmaraş. In fact, the company takes its name from the words Kahramanmaraş Iplik Pamuk AS, or Kahramanmaraş Cotton Yarn Limited. Managing director, Halit Gümüşer, says more than 40 members of the Kipaş team lost their lives in the disaster. Others are injured and some have moved away to stay with family in other parts of Turkey. In total, the company's workforce has been reduced by 50% and Mr Gümüşer supports the initiatives that are making safe, new housing the top priority because it is this that will help Kipaş and other companies build their workforce and their production levels back up. "A lot hinges on the workers," he says.

In the immediate aftermath, as soon as it became possible for the company to run some of its spinning and weaving capacity again, it decided to devote those operations to the production of tent fabric, which was in short supply, to provide homeless people with temporary shelter. Mr Gümüşer says that, if everything goes to plan, Kipaş will have recovered around 70% of its spinning capacity by the end of March.

The Sharabati facility in Osmaniye province was relatively unaffected by the earthquakes, although some repair work to workers' accommodation at the site has been necessary. PHOTO: SHARABATI.

The Kipaş managing director makes it clear that denim production has been less seriously affected than other parts of the company's operations and should hit full capacity before the end of April. Non-denim is "a slightly different story," he continues, but here, too, the company is building its way back to normal, although it may take it until the end of 2023 for it to achieve this.

In the meantime, Mohamed Zarka of Sharabati makes the point that perhaps the best way for the wider denim industry to support mills in the region is to keep placing orders with them, to help the region return to normal life as quickly as possible.

Kipaş managing director, Halit Gümüşer. There were more than 40 fatalities among the company's workforce as a result of the earthquakes. PHOTO: KIPAŞ TEXTILES

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Dyeing is considered one of the most polluting processes in the textile industry, and growing garment waste is an issue the industry can no longer shrug off. When innovative chemicals companies and start-ups develop processes to recycle textile scraps into dyes or pigments, they create a circular solution for both.

Infinite colour

It is striking how quickly waste has gone from being trash that must be disposed of, preferably destroyed, to a potential source of a new raw material. In a word, a resource. This vision is being applied to the vast variety of unused, unsold and end-of-life stuff the apparel industry usually discards.

Colour, and therefore dyes, are typically considered a hindrance to circularity. Some, fortunately, see it as a resource. Andrea Venier, CEO of Biella-based chemicals supplier Officina39, is one of these. The company has patented a method that "upcycles", as he says, cellulosic textile waste into Recycrom, a coloured powder or pigment. His first research goes back to 2017, the first commercial product was launched with G-Star in 2019, and he says the concept really took off in 2022.

The process is almost entirely mechanical. "We take one kilo of waste cellulosic textiles and produce nearly one kilo of pigment in powder form. Our process generates very little waste, around 2 to 3%," he says. Recycrom can thus boast having 100% recycled content, he insists. It can be used to dye both cellulosics and synthetics, and can also be used to print on polyester. Its main limitation is that the original colour of the fabric will generate a lighter shade once turned into Recycrom. "A red T-shirt will make a light red powder, a black one will be grey, and a dark blue will come out light blue," he says. Like any dyestuff, powders can be blended to obtain different nuances, either at the beginning of the process, by mixing various colours of waste material, or once in pigment form. An item dyed with Recycrom can furthermore be 'upcycled' several times, and at each stage the shade will continue to lose intensity.

As Recycrom turns leftover textiles into a powder, it can offer a second life to lower grade waste that can not be recycled into yarns. The process begins with a sorting phase by colour, followed by shredding. This allows the company to use small pieces of fabric scraps from garment manufacturing facilities. Mr Venier says that cutting and sewing operations generate 6% offcuts that, if not suitable for recycling into yarn, are perfect for Recycrom and could even eliminate the need to shred fabrics into smaller pieces, speeding up the process. The original dye can be reactive or sulphur. "We have not found any particular difference in reactive- or sulphur-dyed fabrics," he says.

Archroma's new patent-pending FiberColors technology has a minimum recycled content of 50% and can be used to dye cellulose-based products. PHOTO: ARCHROMA

Several patents cover Officina39's Recycrom: the waste-to-powder process, the machinery, and the binder between the micronised powder and the textile. "When a Recycrom dyed product is examined by a lab, it will find fibres, not dyestuff," he says. The powder, which is a pigment, is insoluble, he adds.

Brands looking to develop Recycrom-dyed products have two options, he continues. "They can send us their factory offcuts, their pre- and post-consumer waste, and we can upcycle it to dye new products. Or, they can use waste we have collected from our partners, in Italy, or from companies such as Reverse Resources." All pre-consumer waste must however come from an Oekotex-certified factory. He says that post-consumer products could be recycled, but it is not known how they were manufactured and this could be problematic. In a project with German collector and sorter ICO, Officina39 conducted trials, testing random batches, and did not find any toxic chemistry. But Mr Venier is not pushing for post-consumer waste, preferring to play it safe by focusing on post-industrial materials of known provenance.

Officina39's Recycrom powders can be used to achieve a wide array of effects on denim, from classic authentic vintage to acid wash and to worn and distressed looks.
PHOTO: OFFICINA39

New sources of recycled dyes

In 2014, Archroma, a global specialty chemicals supplier, introduced EarthColors, a range of dyestuffs partially made from agroindustry waste. The company headquartered in Switzerland has just launched a new family of dyes made from pre- and post-consumer leftover textiles, in cotton and/or nylon, which it intends to call FiberColors. They do not need to be sorted by colour, and make up more than 50% of the dyestuff. This allows the company to accept a wide array of post-industrial and post-consumer waste, and encompasses even residual dust from sorting facilities, Nuria Estape, Archroma's head of marketing for textile specialties, tells *Inside Denim*.

It remains that the dyestuff's content is only partially recycled. "For now, given the existing technical boundaries of using recycled fibres as a raw material, we are already very proud to be able to replace between 50% and 100% of the petroleum-based dyestuff," she says. Archroma complements the remaining portion with conventional chemistry, which she says allows the company to combine the best of both worlds: "a recycled material with a dyestuff that has affinity for cellulosic fibres, good colour consistency and good fastness." For now, the patent-pending FiberColor technology is being offered in a palette of five shades: brown, olive, burgundy, slate and dark grey.

Archroma is looking to partner with brands that seek circular solutions and having access to sorted and shredded pre- and post-consumer waste. Denim is a perfect candidate, says Ms Estape; FiberColors are sulphur-based dyestuffs that are ideally suited to create wash-down effects and denim fabrics are most often at least 95% cotton, meaning they can be feedstock for the recycled dye.

The difference between Recycrom and FiberColors is that Archroma's technology is indifferent to the original colour of the material, and the resulting sulphur liquid dyestuff does not require the addition of binders. Officina39, as seen, transforms the original colour into a lighter shade, using a mechanical process, to produce a 100% recycled pigment. Archroma does not specify how it turns old clothes into components for dyestuff, but it does add in a dose of conventional petrochemicals.

Officina39 does not rule out the possibility of combining Recycrom with a conventional petrochemical dye to achieve a darker shade, or a specific nuance. "Some brands, such as Pangaia, want a fully circular solution and will not settle for less than 100% Recycrom," says Mr Venier. "But others may want a dark shade, a true black for instance, and will decide to use 70 or 80% Recycrom and complement it with conventional dyestuffs to achieve the desired shade."

He sees this as a way to support commercial brands seeking to dye their ranges with Recycrom. Fast fashion retailers looking to develop more sustainable products are knocking on Officina39's door. "We can evolve with brands like Pangaia, but we would have a much bigger impact with high street brands and retailers," he points out. Sales of Recycrom have been picking up. Though a small part of the company's business, its sales tripled in 2022 compared to 2021 and Mr Venier expects sales to double in 2023. "In two years time, we may be able to increase sales by a factor of six," he says. Companies looking to use Recycrom are moving away from one-shot capsule collections to making entire product ranges, carried over from season to season, he says, citing Tommy Hilfiger and Italian fast fashion retailer OVS. "Before brands would use Recycrom one season for its story-telling appeal. In the past three years, we have seen a big shift with brands developing longer term projects with us."

What's next?

A number of start-ups are also looking to recycle dyes from waste textiles. The thinking of DyeRecycle, in the UK, and Induo, in France, is that unused fabric scraps and clothing should be exploited to the fullest. At a conference at Première Vision last February, Induo co-founder Pauline Guesné presented the company's Greencose recycling process for cellulose and polyester textile waste. One of the phases of its technology involves the removal of colour, which, she suggested, could itself be recycled. Work on that part of the young company's projects may be a long way down, as it is still at lab scale.

Officina39 grinds waste sorted by colour into a powder that is similar to a pigment.
PHOTO: OFFICINA39

British start-up DyeRecycle is taking the opposite path. The technology it is currently working on "selectively extracts dyes from waste fibres and transfers the dyes to a new fabric" using, it says, "non-hazardous liquids". The decoloured fabric will then be easier to recycle into a fibre and dyed anew. Initial tests at DyeRecycle appear to focus on pre-consumer waste, before it begins to tackle discarded post-consumer clothing.

The Hong Kong research institute of textiles and apparel (HKRITA) has developed and patented a decolourisation process that uses high temperature water to "drive disperse dyes out of polyester and indigo dye out of denim cotton," says senior research manager Dr Alex Chan. "Generally speaking," he adds, "the reuse of dyes is possible." But the colours may mix, "making it difficult to control the hue of the re-dyed fabric." This solution may be more suited to homogenising end-of-life textiles and apparel feedstocks for mechanical recycling into fibre. It is one of the many scenarios that sees in any form of discarded apparel, the building blocks, and resources, for new products, be they fibres or dyes.

Circle Book, an exercise in circular design fronted by Italian design agency Meidea, seeks to encourage more sustainable denims. Officina39 has been involved in the programme since its beginnings. Shown here, an item from Circle Book #3.
PHOTO: MEIDEA SRL


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Political support for linen and hemp is growing in northern France and could result in a new sovereign fund to help growers, scutchers and spinners drive innovation. The industry welcomes this but is also focusing on building bridges with garment brands.

Fibres build bridges

The Alliance for European Flax-Linen and Hemp has produced a new study that concludes that the fibres have a high potential for market growth. Specialist Paris-based consultancy Kéa carried out the research, conducting more than 100 interviews with representatives of 80 different stakeholder organisations. It worked with the support of the Alliance (formerly CELC), of the Institut Français de la Mode and of the regional government of Normandy, one of the key regions for producing the fibres.

Hemp and flax remain "marginal in the world of textile fibres", the study concluded, but they have remarkable performance attributes, undeniably impressive environmental credentials and huge emotional appeal. Their capacity to keep conquering the hearts and minds of brands and consumers is strong, the study says. "People want to buy natural fibres in higher volumes," Kéa senior partner Céline Choain says. "We've reached a plateau for polymers." The project partners held an event in Paris at the end of March to present the study and the conclusions they have drawn from it. Senior political figures from Normandy and another of the key regions for the production chain, Hauts-de-France, also took part.

Supply-chain tensions

President of the Alliance, Bart Depourcq, who runs the Van de Bilt scutching mill in the Netherlands, says everyone involved in growing and using the fibres and fabrics is aware of a tension between supply and demand at the moment. Crops from farms in northern France, Belgium and the Netherlands have, in recent years, been between 140,000 and 160,000 tonnes of flax fibre per year. These figures represent an important drop from annual volumes of more than 180,000 tonnes towards the end of the last decade. The industry blames covid-19 and three consecutive weaker harvests for this.

A new sovereign fund for flax, linen and hemp production in the European Union could help farmers secure a stable price for their crops. PHOTO: ALLIANCE FOR EUROPEAN FLAX-LINEN AND HEMP

“We ought to work with the brands as partners and not see ourselves as mere suppliers,”

BART DEPOURCQ

At the Paris event to present the findings of the Alliance for European Flax-Linen and Hemp’s new study. Left to right: Bart Depourcq, Hervé Morin, Marie-Emmanuelle Belzung and Xavier Bertrand.

PHOTO: ALLIANCE FOR EUROPEAN FLAX-LINEN AND HEMP/PATRICK SAGNES

The president’s colleague Pascal Prevost, a Normandy-based flax farmer and the Alliance’s president of promotion, says he is in no doubt that climate change is a factor, with lower-than-usual rainfall and sudden changes in temperature in the prime growing area that runs parallel to the English Channel, roughly from Caen to Amsterdam. “It’s about the relationship between the plant, the soil and the climate,” Mr Prevost says. “We will need to wait to see exactly what the impact has been on the length and quality of our fibres. It could take between three and five years before we really know.”

Bart Depourcq says he is pleased with the results the new study has produced; they make it clear that growers and mills need to deliver more product and that they deserve to attract increased investment. “And we must improve quality,” he adds. “We must look at new crop varieties and promote innovation and automation in our fields and factories. We need to try to expand the production area and we need to work together to agree on a common set of terms for describing these fibres.” He says he knows these objectives make the programme that the Alliance is setting out for itself an ambitious one.

One further clear message that Mr Depourcq has picked up from the study is, perhaps, the most ambitious of all. He says upstream players in the flax-linen and hemp value chains must work to build better relationships with clothing brands. “We ought to work with the brands as partners,” he says, “and not see ourselves as mere suppliers.”

Brand engagement

On this subject, the chief executive of the Alliance, Marie-Emmanuelle Belzung, says she takes encouragement from the success Kéa had in convincing finished apparel brands (40 of the interviewees were from brands) to take part in the recent study. “This is the first time that has happened,” she says. More than 75% of flax-linen goes into fashion, but flax fibre represents less than 0.5% of the volume of raw material the fashion industry consumes. She also takes heart, though, from what she calls the entrepreneurial spirit of the growers of the fibres and of the mills who prepare them for use in jeans, jackets, dresses, skirts, shirts, shorts and intimate apparel, sometimes on their own, sometimes in blends with wool, silk, cashmere and other fibres. Many of the companies involved are small, but she describes those who run them as “people who are ready to move forward”.

It will help Alliance members if the organisation can increase in size (“growing the eco-system” is how Ms Belzung phrases this) and cement European producers’ position as global leaders. In 2021, more than 70% of the linen produced globally bore a certified European flax label of origin. And she agrees it will also help if producers can keep improving the quality of what they bring to market. She insists that the new study will provide a solid platform for each aspect of this work.

Farmer Pascal Prevost would like to know if there are other regions in Europe that could join the eco-system; he thinks tests on the soil in some areas would be worthwhile. He adds that winter-sown flax could also be part of the answer. This practice, of sowing flax seeds in wetter winter months instead of a traditional springtime sowing programme, is becoming more common he says.

Hemp’s redemption

Normandy’s regional president, Hervé Morin, says one of the ideas he supports for eco-system expansion is growing more hemp as well as more flax (Marie-Emmanuelle Belzung says the two fibres are “cousins” and not in competition with one another). A hemp planting programme in Normandy will go from 20 hectares in 2022 to 600 hectares in 2024, the region’s president says, adding that he is not surprised at farmers’ interest. “The plain of Caen has good soil and farmers there used to cultivate sugar beet,” he explains. “But the sugar refinery has shut down now and the farmers need an alternative crop.”

For Ornella Bignami, an authority on both fibres and a long-time partner of the Alliance, there are grounds for optimism for a revival in hemp production in her native Italy too. She points out that farmers in Lombardy were producers of flax and of hemp for decades. This is the reason, she explains, why mills in provinces such as Varese, Bergamo and Biella developed world-renowned expertise in producing linen fabrics; the links to the land were strong and the levels of knowledge in companies such as Crespi and Solbiati were unparalleled. "Then, some decades ago, as many people know, there was a textile industry crisis and many companies closed," Ms Bignami says. "It was very sad."

And with regard to hemp, she says Italy was the world's largest producer of that fibre until as recently as the 1970s. Government attitudes at the time struggled to separate the idea of growing hemp for textiles from the plant's connections to drugs. "Now there is a lot of interest in hemp again," she continues. "We are seeing mills adapting machinery developed for flax fibres to make hemp fibres for weaving now. I would like to see innovation here and for dedicated hemp machinery to emerge as a result of that." Even before it reaches mills, hemp fibres require their own machinery because the plants need to be cut rather than pulled from the earth, as is the case for flax.

Benefits of buffer stock

All moves to maximise volumes make sense to the mills; they would like to be able to build up a buffer stock to allow them to respond more quickly and more positively to demand from spinners and brands. Bertrand Decock, who runs a scutching mill near Dunkirk, says recent investment in new machinery there has helped his company increase its yield by 10%. It is now able to separate more useable material from the long flax fibres it treats, but it cannot always source as much fibre as it would like. He wants to be able to store some of the straw-like flax stems and have quick access to them when needed to make scutched fibre for spinners.

Scutchers' value chain is particularly long because, although farmers in the European Union grow more than 70% of the world's flax fibres, 73% of all the spinning of linen yarn after scutching takes place in China and 59% of the weaving of fabric from the yarn takes place there as well. "There are still some spinning mills in Europe," the Alliance's head of economic research, Damien Durand, points out. "Three new ones have opened in France in the last few years, with two more in the pipeline, one in France and one in Portugal."

Scutching of flax fibres to prepare them for spinning. PHOTO: ALLIANCE FOR EUROPEAN FLAX-LINEN AND HEMP

On the spin

Two of the newer spinning mills, Emanuel Lang in Alsace and Safilin near Béthune, were partners in a 2021 project called Linpossible. The project's name was a play on words: it sounds like the word for 'the impossible', but is made up of the words for 'linen' and 'possible'. The partners said they wanted to reintroduce the spinning of hemp and linen yarn to France, with Emmanuel Lang specialising in dry spinning and Safilin in wet spinning.

Safilin president, Olivier Guillaume, says he regards spinning as the bridge between fibre production and the market. Interest and demand from consumers, which he says brand customers are passing back to Safilin, make him optimistic about the future, but he is another who insists technological innovation is imperative. "I was lucky," he explains. "For Linpossible I was able to use existing equipment, but we have to have innovation because we need to rethink spinning. At the moment, the raw material has to go through 12 machines before you produce a yarn."

Normandy-based Natup Fibres has an even newer spinning operation, having produced its first linen yarns in 2022. One difference here is that founder, Karim Behlouli, has integrated scutching and spinning into an operation that makes finished fabric as well, using both hemp and linen to offer brands products that are 100% made in France. Mr Belhouli, who received support from the national government and from Normandy's regional government to get Natup Fibres up and running, says he realises market share for his fabrics will be limited because the price will be higher. Research at the start of the Natup project revealed that a linen shirt, for sale in the European Union for €150, had cost around €15 to make in Bangladesh. "Raw materials account for 46% of the total cost," he explains, "and I can tell you the same shirt would cost €120 to make in France. If brands want to use our materials, the price will be high. Perhaps they will accept lower margins. After all, monetary margins are not the only margins or the only benefits."

Natup Fibres founder, Karim Behlouli, offers linen fabrics that are 100% made in France.

Safilin chief executive, Olivier Guillaume, calls on clothing brands to use more European-produced linen and hemp.

LVMH's Alexandre Capelli insists the group wants to support linen and hemp production, even if its consumption of these fibres is still small.

PHOTOS: ALLIANCE FOR EUROPEAN FLAX-LINEN AND HEMP/PATRICK SAGNES

Mr Behlouli echoes the Safilin CEO's supplication for machinery innovation but points out that funding models such as those available through large European Union projects provide support for research and development, training and so on, but not usually for machinery. Perhaps the brands will help, Olivier Guillaume suggests. Investment in "having this industry in France again" will pay off if fashion brands place bigger, more frequent and fairly priced orders for hemp and linen fabric. "I hope the brands will help us," he says. "I hope they will help prove that we were right to make those investments."

Current collections

Dior's current women's collection includes garments such as a flared, mid-length skirt and a blouse, both made from denim woven from 70% cotton and 30% linen. Several pieces in the collection, including a puff-sleeve top and a cardigan, are 100% knitted from seven-gauge hemp. The assistant environmental director at the brand's parent group, LVMH, Alexandre Capelli, likes the way the Dior design team has created these pieces. He is also enthusiastic about the future possibilities that blends with wool, silk and other fibres will offer.

"Previously, there was a view in design studios that these were not very 'glam' materials, but things are changing, fortunately," Mr Capelli explains. "What's happening now is that designers are telling themselves that if, say, linen is a material that crimples easily, they can use that as an asset." He insists that the group wants to support the linen and hemp production side and that, even if its consumption of these fibres is still small, "things are going in the right direction".

The president of Normandy, Hervé Morin, and his counterpart in Hauts-de-France, Xavier Bertrand, are now talking publicly about putting together a sovereign fund to help things go in the right direction more quickly for linen and hemp. Mr Morin argues that the prominence of France's luxury industry presents the sector with a clear opportunity. "What we need is a regulated system with the guarantee of a stable price in both directions, for farmers and their industry partners," he says. "The strategic fund will help us do that and support the idea of creating a buffer stock of fibres. We are going to try to set this up."

For his part, Xavier Bertrand says there is confidence in the Hauts-de-France region in the potential for hemp and linen to be key parts of what he calls "a time of [economic] transformation". He believes in the fibres and in the eco-system and says he wants to help producers create more value. "Things are already happening," he says.

A jacket made by Levi's using 58% cotton and 42% linen.

PHOTO: LEVI'S

Denim expert **Christine Rucci** has first hand experience working with the biggest names in the industry. Next year, she will be celebrating 40 years in the business of making jeans. In her consulting and mentoring activities, as well as in her everyday life, she emphatically upholds rigorous sustainable practices. The 'godmother of denim' also supports and fosters American-made jeans.

A true blue

Q Are you preparing anything special to celebrate your 40 years in the denim industry?

A I am working on my autobiography, From the Bean to the Jean. It will highlight the main events of my career that goes back 40 years, when I first started working for Adriano Goldschmeid at Genius Group. But it goes back even further, making jeans is literally in my genes. My great grandmother, an Italian immigrant, was a seamstress in the garment district in New York, and I designed my first pair of jeans when I was only ten years old. My hope is that my experience, as a woman in a male-dominated industry, will inspire other women, as well as non-binary persons, who seek to build a career in this sector.

You have worked for brands based in all parts of the world, in Europe, the United States and in Asia. What do you see as the key differences between these markets?

There is a common denominator in the jeans business across all regions of the world, but there are also distinct differences in the details. In Asia, the Chinese market has its own styles; the Korean and Taiwanese markets are similar, and Japan is a whole other story. The US is really all about five pocket jeans. And in Europe there are more of what I call 'tricked out' jeans.

With regards to jeans design and trends, workwear-inspired utilitarian styles are making a comeback. Is this an important trend for you and how do you see it evolving?

The workwear trend is really interesting, and could be a path to better practices. Take the chore coat, it was designed for form and functionality. Paired with overalls or carpenters, it made workers look like they were wearing a denim suit. And take the blanket-lined jean jacket, born out of cowboys' need to be warm on the range, it confirms the adage that necessity is the mother of invention.

One evolution I see that exasperates me is the trend to make lighter weight denim fabrics. They don't last. When they are lasered, they are further weakened. This trend is just creating more waste.

Workwear is made from sturdy fabrics that last. I prefer working with branded fibres, because they are made by companies that do their research. The first step in developing more sustainable collections is to choose a quality fabric and combine that with cleaner finishing. What's also important to me is to exhaust a fabric. A single reference should be used to make twenty different products. This is better for mills, too, as it simplifies their operations.

Are there any recent developments in fibres, processes or technologies that have caught your eye?

I am a textile chemist geek, and I focus on facts. Many denim mills are integrating new fibres and technologies, and this is good. The problem is that, very often, their customers are only interested in the bottom line, the price, and many of these innovative and better solutions never make it to market. I believe that if everyone bought premium jeans made from quality denims, their price would go down. And this is what we should all be focusing on.

For added comfort, an essential feature for many consumers, using Tencel can be a good option. The new Lycra Adaptiv is a great solution as it allows the body to expand. I'm happy to see recycled elastane come to market, and the natural indigo that Sarah Bellos is producing at Stony Creek Colors.

Christine Rucci's résumé reads like a who's who of the world of denim. She began her career working for the Rosen family, who sent her to Italy to learn the ropes with Adriano Goldschmeid and Renzo Rosso at the Genius Group. Back in the US, still with the Rosens, she had a hand in making jeans for Calvin Klein Jeans and Marithé + François Girbaud, and later for Donna Karan, Tommy Hilfiger and Ralph Lauren, where she would become the senior design director for Double RL. Through her consultancy, Godmother NYC, she continues to work for leading companies but also dedicates her energy and efforts to giving a helping hand to the next generation of denim designers.

PHOTO: MARK ADAMS PICTURES

Everyone talks about sustainability but there is usually little real action on the ground; what do you see as the most pressing issue, and what is your advice for brands?

The single most critical issue in my opinion is overproduction. Do brands really need to offer hundreds of stock keeping units (SKUs)? Mills too are guilty of this. When they develop 100 new references, there are usually only ten that will sell well.

I am also tired of seeing brands develop "sustainable" capsule collections alongside hundreds of SKUs that continue to pollute. When brands test a single sustainable reference and continue to make 200 conventional styles, they are not addressing the real issue at hand. All that money could be put to better use.

Excess inventory is a recent issue, because back in the day, we would refurbish unsold goods. We would rework them, overdye them, embroider them; jeans that don't sell can also be lasered.

The industry also needs to keep in mind that sustainability is not only about fibre choice but also covers socio-economic issues, working conditions and human abuse. Too often, it is all smoke and mirrors.

What projects are you working on now that you can tell us about and that illustrate where the industry should be focusing its efforts?

I am currently working with four women denim designers who are all launching new brands that specifically address women's needs. I've tapped my network to have the products made in the United States. I talked Mount Vernon Mills, in Georgia, into making smaller runs for us. It is the oldest mill in the US and it makes fabrics for workwear, the military and denims. It is the company that makes Wrangler's legacy broken twill. Its archives are a treasure trove.

For finishing, we will be working with Star Fades International in Los Angeles. This laundry has accepted small lots, and the products will be ozone faded. This works also because I can bring four new clients to a single vendor. Small brands and companies need a godmother, and that's why I am called the godmother of denim.

My goal is to support small and local businesses. For the bigger brands that seek to hire my services, I consider that they are lucky if I agree to work for them. Everything I do is totally transparent, and research based. All my clients must be plastic-free for packaging and shipping. We need to avoid single use plastics and switch to bio-compostable materials made from agricultural waste.

"Making jeans is literally in my genes"

You feel strongly about ethical manufacturing, how do you further this agenda in your work?

I believe in Made in America. My company Godmother NYC Inc was approved for a new grant programme for women-owned businesses and my hope is to make New York a denim-making hub, as it used to be. In the 1980s, it was where most of the premium or fashion jeans were manufactured. Before the 1980s, there were 10,000 contractors in the city, only 78 are left today. When the industry started to offshore production in the late 1980s, it threw the baby away with the bathwater. The big brands played a major role in decimating the US denim industry. Now we need to rebuild the supply chain. Sometimes I feel like I am the Norma Rae of denim.

I seek to avoid what I call washer's remorse; acid wash for instance, is the worst. Sand blasting too. But why wash down? Heavy washing ruins the fibre. My ethos is less is more.

As much as is possible, I make the brands I work with produce their products in factories that reclaim their water. I appreciate that laser finishing helps save water, but it requires a lot of energy, and it is an expensive technology that not all mills can afford. It begs the question: why do we need to make our jeans look old? I always say you 'grow' a pair of jeans, every sign of wear is uniquely yours.

In your teaching and mentoring, what are you telling the next generation of denim industry professionals?

I dedicate 10% of my time to mentoring young designers who cannot afford my services. The Gen Z and Millennials often don't have a clue about all the processes in making jeans. I recommend that young people who want to be good designers start by working in a factory, that is where they will learn the most.

On a personal level, what do you feel is important and what's next for you?

My plan is to go back to school. When I went to Italy to work for Adriano in Italy, I never ended up graduating from college. I'd like to get a degree in fashion journalism and in sustainability. I'm also launching a podcast. The first episode features Adriano.

On a personal level, I am a tree steward, I take care of 40 trees in the city. In everything I do, I seek to lighten my own carbon footprint. I buy local. The food I purchase comes from a local farmers' market. I never buy online. But if I have to, it has to be from a small business. If I had just one thing to say, I'd say shop small! ■

SALVAGE DENIM

In the ongoing effort to raise the bar on circularity Advance Denim announces a new addition to its “Salvage Denim” collection that uses a mixture of RCS certified recycled cotton and Lenzing’s Refibra to creat a denim with no virgin cotton yet has a plush soft hand and increased durability of your favorite premium denim. Salvage Denim means you don’t have to sacrifice quality to be circular.

ADVANCE® DENIM

Tencel™ Feels so right X REFIBRA™ technology

A leather bag designer decided to create a perfect pair of jeans. Her first step? Getting rid of standard industry measurements.

Fittingly inclusive, ahead of the curve

"There's a lot of denim-related trauma out there," says Molly Spittal, designer and co-founder of Vancouver-based Decade Studio. "When customers come to my fitting room in our shop, it's a kind of personal journey because I make jeans in a different way."

Decade Studio describes its jeans as "shape-inclusive denim for every body". The brand's line of jeans is based on what it calls 'ratio fit' — referring to the proportions, or ratios, found in women's measurements. Your ratio, according to Decade, is the difference in inches between waist and hips. Women for whom this ratio is higher or lower than industry standards have long had to settle for ill-fitting jeans, typically sizing up or down to accommodate one body part while creating gaps or discomfort in another.

In a world where jeans are among the most ubiquitous items of clothing — and having a 'favourite' pair of jeans is a social norm — struggling to find even a single pair that fits in a flattering or comfortable way can be painful and alienating.

"Shopping for jeans is hard for folks who fall outside of the industry standard fit model," says Ms Spittal. "Our patterns are contoured to fit curves; it's not the industry standard that you expect. It can be really emotional, to be honest, because people really care and so do I."

Discovering a need

Ms Spittal did not know what an important problem she was setting out to solve when she designed her first pair of jeans. At the time, it was more of a fun project than a mission. In 2014, she was designing for her brand The Stowe, the leather bag company she and her partner Matt Atkinstall were running. Close friends and fellow entrepreneurs Morgan Ellis and Ezra Kish challenged Ms Spittal to create 'the perfect' pair of jeans and she began denim fieldwork.

Molly Spittal, designer and co-founder of Decade Studio

ALL PHOTOS : DECADE STUDIO

“Shopping for jeans is hard for folks who fall outside of the industry standard fit model”

MOLLY SPITTAL

The Andy jean – Decade Studio makes “shape-inclusive denim for every body.”

“In the early days, I asked anyone who would talk to me about common issues of fit,” she says. Having worked in design, she knew her own measurements were not industry standard — in fact, she had never found jeans that fitted her own body properly. “I started asking every woman or female-identifying person I came in contact with if they struggled too. It wasn’t unanimous, but there was a high percentage of folks who had the same issues.”

Many women find shopping for jeans to be as traumatic as shopping for swimwear, she learned. “Denim is such a personal item of clothing and it’s meant to break in according to your body and your needs, but the pattern must be right from the first try for that to happen,” she says. Too many people found that right pattern to be utterly elusive.

She began to design what would become The Bonnie, using her own ratio for primary guidance. It was “nerve wracking to design a pair of jeans that didn’t follow the industry standard measurements or ratio, because that creates a niche product,” she says, “and we weren’t sure if that was the direction we wanted to head in.” But when the first prototype for the Bonnie came in, they fitted her perfectly — a lifetime first, for Ms Spittal — and the four friends suspected they were onto something special.

Bringing new proportions to market

Decade Studio launched publicly in 2019 with the Bonnie and the Alex, and consumers were thrilled by these jeans designed around the ratios Ms Spittal had uncovered. From the start, the Bonnie was the most popular.

“It’s an incredibly common ratio — having eleven to thirteen inches between your waist and your hip at any size,” she says. “It’s the first go-to, where customers say, ‘Oh wow, these are different. They really feel different. Why don’t they gap at the waist? They’re also really high waisted.’ That feels good for a lot of people, they feel held in.”

A family-run production team in Portugal manufactures the jeans. Sometimes, Ms Spittal says, “they have a hard time understanding why we do what we do. There’s a lot of back and forth between us and the pattern team. When they say, ‘we can't make this happen,’ what they’re actually saying is, ‘this is risky for us, it’s not conventional.’”

Ms Spittal acknowledges an element of risk, but “we won’t hold them responsible for something we’ve requested. We’ve made oopsies here and there, and some designs are extreme, but we’re in daily contact and we love our factory. Not only do they make an incredibly high-end product, they also make space for us to explain our vision.”

It was not long before Decade announced it was going to offer extended sizes. “It really took off,” says Ms Spittal. “Thousands of people began lending us their data. We have thousands of lines of data now, which we translate into ratios.”

But bodies being bodies, ratio-fit is more akin to a philosophy than any fixed proportion. “In higher sizes, the ratio has to change as the weight distribution changes,” she says. The waist area on one model will increase at a different rate than the butt area and might increase on another. The Decade team conducted five rounds of fit testing before bringing extended sizes to market. “We made so many adjustments,” she says. “We had to make sure the ankle wouldn’t increase at the same rate as the hip because, you know, your butt doesn’t grow at the same rate as your ankle.”

The process of researching the needs of consumers in the extended-sizes space proved to be what Ms Spittal describes as “the highlight of my career”. Through her consultations, she came to recognise she had to think both as a designer and as a person. “Working with our plus-size community here, with all the fittings and having them come with me along the journey, has been amazing.”

This ethos of working closely with customers has been integral to the success of Decade Studio. When the pandemic struck a year after the brand launched online, Ms Spittal found herself isolated from any feedback. “I couldn’t see my customers try on my product, and the best way to find the right size is just to come try them on.”

Last summer the brand opened its first bricks-and-mortar location — a part-time shop that encourages in-person consultations. “It’s kind of tucked away,” she says. “But if you know what to Google, you’re going to have the best shopping experience ever.”

With the effects of covid-19 lightening, Ms Spittal is once again able to solicit direct feedback from customers. Crucially, having this in-person space also informs her designs moving forward. If a customer cannot find the right fit, she can pull out a prototype from the back and let them try it on. This happened repeatedly with a prototype that would become the Andy. “The Andy prototype worked for so many people that I felt I had proof of concept before we even launched it. And lo and behold, it’s our bestseller of the season.”

Relaxing without stretching

Ms Spittal believes the Andy has been popular for two reasons: the rise is high, but not as high as the Bonnie, and it is “a little slouchy, a little loose”. In the post-covid world, “people want to feel comfortable when they’re out in the world again,” she says. “You can look polished, but feel like you’re wearing sweatpants.”

Having this more relaxed fit offers welcome wiggle room within a label that made a deliberate decision not to weave stretch into its jeans. Decade jeans are 100% cotton and contain no elastane. Yes, this decision complicates her design options, Ms Spittal says, but she refers to elastane as planned obsolescence (as it impacts a denim’s recyclability) and links the synthetic fibre with fast-fashion and over-consumption in the apparel industry, which counters what the brand stands for. “I want longevity in the closet,” she says, which translates into “a timeless silhouette” made with “beautiful, natural materials.”

Using elastane, Ms Spittal concedes, makes it possible to “design one pattern that fits a variety of bodies and weight distributions” — a luxury she does not allow herself. This is another reason why the Andy has been so successful. Ironically, its looser fit relies less on the brand’s founding ratio-fit.

Initially, Ms Spittal says, ratio-fit was a key differentiating feature for the company. But it also led to some confusion. “Our customer was finding it a bit rigid — the measuring and the importance of finding your ratio. It was something that they had never done before and it was adding to the online shopping journey.”

As a result, Decade is designing more pieces that do not require such specificity for a good fit. “The Andy Jeans are a good example of the new area we’re moving into. They have a relaxed loose fit, they don’t need a break-in period, and neither do they need to conform to our measurement system.”

“Our patterns are contoured to fit curves; it’s not the industry standard that you expect.”

MOLLY SPITTAL

Creating space in a crowded market

This move to mixing human-friendly sizes with environmentally-friendly material resonates powerfully with Decade’s consumers, but, as Ms Spittal points out, it is difficult for a small business to penetrate the denim market.

“Our customer is incredibly loyal,” she says, describing a base that covers not only Canada, but the US, Australia and even New Zealand. “Once they find us, they're like, ‘Holy cow, here it is. This is it. I’ve been waiting for this my whole life.’”

As a “bootstrapped business” with limited manpower (Ms Spittal and Mr Atkinstall run all day-to-day operations), customer acquisition in a saturated market is challenging. “Everybody loves blue jeans. A lot of designers include it as part of their collection, as a subcategory, while it's all we do. As an independent designer, it’s been tough to dig out a little corner for ourselves. But we’re getting there.”

Getting there involves ongoing work on new designs, continuing to nurture Decade’s online community, and increasing focus on developing wholesale. Consumers can expect to see new silhouettes and fabrics for spring and winter, and the brand will attend trade shows in New York and Los Angeles. “I'm really looking forward to having some face time with buyers and shop owners once again,” she says.

When Molly Spittal moved from leather bags to denim some five years ago, she pivoted from “focusing on form and beauty and sellability” to “a space where every curve and every inch is highly considered,” she says. “To be clear, it doesn't have to be highly considered, but I do. That’s what I hear makes my jeans so different.”

The Bonnie was Molly Spittal’s first design. Its ratio and high waist have proven popular.

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Denim brand Jack & Jones, Bestseller's most sizeable company, will use 340% more direct-to-farm cotton this year compared to 2022.
ALL PHOTOS: BESTSELLER

Sustainability stripes

Danish clothing group Bestseller, home to brands such as Jack & Jones, Vero Moda, Only, JJXX, Name It and Selected, says its mission is "to bring fashion forward". One of the founders' sons, Anders Holch Povlsen, now today something of a conservationist, became the company's chief executive – and sole owner – in 2000, aged 28. (Mr Holch Povlsen also holds significant shares in European fashion e-tailers Asos and Zalando.) Bestseller launched its Fashion FWD sustainability strategy in 2018 and achieved record-level revenues of $5 billion or DKK 35.3 billion for the 12 months ended July 31, 2022, a 33% rise on the year previous. The group is now present in around 70 markets, Germany being its largest.

Turning up the heat

For a business of its size, sustainability is inevitably a multipronged effort. A key focus of Bestseller's attentions in recent years, however, has been ReSuit (Recycling Technologies and Sustainable Textile Product Design), a three-year, Danish Technological Institute-led national fashion research and development project centred on how parties based in Denmark, and ultimately elsewhere, can design with circularity in mind. This includes working together to improve how polyester fabrics can be recycled chemically, in addition to exploring how hydrothermal liquefaction (HTL), not normally applied to apparel waste, might be looped in, alongside Dansk Shell. Through a combination of water, heat and pressure, HTL can be used to degrade and convert mixed fibres unsuitable for textile-to-textile recycling into bio-oil for fuel, plastics or other synthetic textile fibres. Supported by approximately $1.9 million (DKK 13 million) in investment from Innovation Fund Denmark, the consortium's other members are Design School Kolding, Aarhus University, research firm Fraunhofer, textile services provider Elis and consumer behaviour organisation Naboskab.

> Bestseller ponders some of the key threads that together make up the multidimensional tapestry that is its ever-evolving circularity road map.

With just over a year to go, ReSuit has already resulted in the publication, last July, of an article in *Resources, Conservation and Recycling*, titled 'Hydrothermal liquefaction of post-consumer mixed textile waste for recovery of bio-oil and terephthalic acid'. A second is currently awaiting publication, having now made it past the approval stage, the group tells *Inside Denim*. As the title of the study suggests, authors Aisha Matayeva and Patrick Biller, both affiliated with Aarhus University, experimented with producing bio-oil and terephthalic acid (TPA) from Elis-supplied, manually sorted and shredded post-consumer textile waste via HTL temperatures of 300, 325 and 350°C. Three different blends of polycotton were tested: 95% polyester (PET) and 5% cotton; 50% PET and 50% cotton; and 5% PET and 95% cotton. Dichloromethane and potassium hydroxide were used as catalysts.

The researchers found that cotton-rich blended textiles attained a maximum bio-oil yield of 26% at 325°C. Oil production from the PET-rich waste, meanwhile, was ''insignificant'', they said, but as much as 91% TPA was recovered. The 50:50 blend of PET and cotton proved the most optimal of the three. Although a final summary of learnings and outcomes gained from ReSuit will not be published until the project concludes in April 2024, Bestseller's innovation manager, Camilla Skjønning Jørgensen, describes progress so far as proceeding "as planned", with the quality of insights into chemical recycling and HTL technologies considered "good". Their findings have already led to two editions of what Bestseller calls its Circular Design Guide, which the company has produced in partnership with Design School Kolding. First released last year, the open-source document was created internally to function as a manual for the group's many brands. An updated version followed this past February.

Best intentions

The guide emphasises minimum circularity criteria such as 98% mono-material composition, specifically those pre-screened as "better" or "best" by its Fashion FWD team. Notably, certified organic cotton is listed as a "better" fibre, while certified recycled cotton from textile waste ranks higher as "best". (Fibre grown under the Better Cotton programme, incidentally, is, for now, scored at a level below "better" for purposes of circular design.) Manmade cellulosic fibres or MMCFs like Lenzing's Ecovero and Tencel-branded lyocell stand out among the "better" cut in their category, beaten only by Birla's 80% wood pulp and 20% pre-consumer fabric waste-blended Liva Reviva and MMCFs manufactured from recycled textiles.

Version 2.0 of the group's open-source handbook for designing with circularity in mind landed in February.

Importantly, the guide is not set in stone and is never to be signed off as complete, Ms Skjønning Jørgensen cautions. Rather, it is meant to be a flexible, continuously evolving tool that reflects the business' own understanding as decision-makers "get wiser" over time. Bestseller advises its brands to join hands when placing raw material orders, if supplier minimums would otherwise be too high for them working alone.

That said, the group is still not immune to market upheaval. Last year, for example, Bestseller's use of organic cotton declined by 10% in a single year, down to 11% versus 21% of the mix in 2021. Senior project specialist at the company, Danique Lodewijks, tells us that "extreme price fluctuations" and "widespread integrity issues around organic cotton" across the world were primarily to blame for this. The group's Fashion FWD targets include an expectation that each of its brands will dedicate 30% of their entire cotton supply to organic or in-conversion fibres by 2025. After holding up its hands in acknowledgement of 2022's organic cotton drop-off, Bestseller's biggest brand, Jack & Jones, made a major announcement regarding its commitment to cotton lint grown under partner direct-to-farm programmes this calendar year. The denim business said that it had upped its order by 340% to over 6,600 tonnes, compared to the roughly 1,500 tonnes it booked ahead of 2022. Significantly, this cotton will support replenishment of the brand's seasonless Never Out Of Stock (NOOS) lines, which it says account for about half of its total turnover.

Senior project specialist Danique Lodewijks talks with direct-to-farm organic cotton growers in India.

Bestseller is involved in multiple direct-to-farm efforts, Ms Lodewijks explains, such as the Organic Cotton Accelerator scheme in India, Cotton made in Africa in Tanzania, the independent projects of Turkish denim mills Çalik and Bossa, not to mention Pakistan-based denim manufacturer Artistic Milliners' own Milliner Organic programme, which the fashion group has supported since at least 2021. As we reported back in issue nine, Bestseller is believed to have increased its financial contributions to the latter scheme in recent months. Outside of providing funds, the company also has "a lot of ongoing involvement" with direct-to-farm initiatives like Milliner Organic, Ms Lodewijks shares, including monthly progress calls with on-the-ground implementation teams, during which various challenges, updates, expectations, farmer feedback on training and more are all discussed. By scaling up use of direct-to-farm cotton, Bestseller therefore hopes to "avoid altogether" the prohibitive fibre prices and integrity concerns which so affected last year's sourcing, thereby making them a thing of the past.

Pastures new

As its Circular Design Guide fibre hierarchy would suggest, longer-term sustainable sourcing solutions, for Bestseller, involve increased use – and support – of lower-impact fibres, developed with "new" recycling technologies. While direct-to-farm cotton might be "produced in the best possible way", in Ms Skjønning Jørgensen's words, the group is at the same time conscious of its consumption, so remains focused on decoupling its material supply from virgin feedstocks "as much as possible" in the short term. Substantial investment in regenerated fibre technologies such as Ambercycling, said to be able to recycle end-of-life polyester textiles indefinitely, Infinited Fiber Company's Infinna and Spinnova, a manufacturer of textile fibres from textile, food and leather waste, plus wood pulp, indeed demonstrates the company's willingness to back up its words and wishes for the future with measurable action steps.

Of course, real circularity is not limited to "better" or "best" fibres alone, or even the availability of viable recycling technologies, as Bestseller well knows. Ms Skjønning Jørgensen underscores this fact by bringing us back to where things will be moving next: "innovative materials must also be designed from a circular economy perspective".

Jack & Jones became the first brand globally to use in-conversion cotton grown under the Milliner Organic project in Kohlu, Balochistan, last year. It had originally booked enough to produce 200,000 pairs of jeans from the first harvest.

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Cotton always seems to bounce back from challenging times. Here, a senior vice-president of industry body Cotton Incorporated explains how.

Fibre fightback

The senior vice-president for consumer marketing at Cotton Incorporated, Kim Kitchings, says one of the attributes that she likes best about cotton is its resilience. Speaking at a recent event organised by the International Cotton Association, she said this resilience should give hope and reassurance in these difficult times to farmers who grow the fibre, to the companies that process it, and to the clothing brands that use it in their products.

Ms Kitchings explains that global market insight is an integral part of her role and that having access to Cotton Inc's 50 years of data is what prompts her to highlight the fibre's ability to stand up well in challenging times.

Consumer concerns

And these are challenging times, with economic headwinds in all parts of the market coming after three years of covid-19. With concerns about covid easing, inflation is what now looms large in the minds of consumers. This was a clear finding in a recent study by Ipsos, based on 20,000 interviews with consumers in 28 different countries. Inflation was at the top of the list of concerns.

It was inevitable that this would lead to price volatility, she insists. Prices went up with the onset of covid-19 in spring 2020 and continued to go up until a commodity sell-off began last May. There have been further spikes since then, notably because of weather; the Cotton Inc senior vice-president refers to weather as "the usual suspect". Drought conditions in Texas caused the US Department of Agriculture to lower its cotton forecasts. Then, at the opposite extreme, severe flooding in the middle months of the year had a dramatic effect on growers in Pakistan.

Percentage share

"We know cotton will always recover," she says, "because we have a 50-year history that shows us it will. We would probably like prices to be higher and to be more stable, but it's not just price that matters to us, it's also how much cotton is utilised in the marketplace."

Her figures for recent years show that cotton's percentage share of apparel imports into the US held steady in the low-50s until midway through 2020. It was no surprise to her to see a steep drop around that time because of the volumes of personal protective equipment, mostly made from non-woven synthetic fibres, that began to flow when the pandemic took hold. The fibre had recovered to a 50% share by the end of 2020 and even peaked at around 55% in the first half of 2021. "Consumers were buying more goods than services," Ms Kitchings explains, "because services were not available. At that time, you could even say sales of apparel were artificially high. Now we are starting to see some declines again, which is to be expected and we will see that change and turn around again thanks to cotton's resiliency."

Low prices bring some benefit

One of the reason prices are low again is because production in the 2021-2022 cotton season exceeded mill use. According to Cotton Inc this has the benefit of helping retailers and brands at a difficult time. They know they do not have to worry about supply, she explains, and they know that, having stuck with cotton when the price was high, they can certainly stick with it now. "They know they can afford to stay in cotton, and we need them there," she adds.

A cotton farm in California.
PHOTO: SHUTTERSTOCK/ SUNDRY PHOTOGRAPHY

Among the studies that are informing Ms Kitchings' current opinions is one Cotton Inc carried out recently with promotional body Cotton Council International. They spoke to consumers in 13 countries to ask what drives them to shop. Clothing comes out at number one, she reveals, then groceries, electronic devices and shoes. In the study, 76% of respondents said they either like or love clothes shopping. "It's a community event," she says. "People go together to do this and they're happy to be back together. And when we asked what they are looking for in apparel, 77% said they prefer cotton, cotton blends or denim. And, by the way, not everyone knows that denim is cotton. That's a message we have to continue to remind consumers of globally. That is part of who we are."

What matters most

The studies show that comfort, fit and quality are what matter most to consumers when choosing apparel. After that, durability emerges as a priority, alongside price, style, fibre and environmental footprint. Brand names and the origins of garments come lower down. In messages to consumers around the globe to show that Cotton Inc is engaging fully on these issues, Ms Kitchings says she focuses on three E's: economics, environment and emotional value.

Cotton matters economically, with global production worth more than $50 billion per year. She points to figures that show almost 100 million families are involved in producing the fibre, many of them in emerging countries, which means the industry plays an important role in the fight against poverty and want.

She thinks the growing importance of durability also adds weight to cotton's sustainability story. "When consumers talk about sustainability," she explains, "it's often not what we're thinking in the supply chain. They're talking about durability and longevity. We have asked consumers in 13 countries which fibre they think lasts the longest in clothing, and 57% said cotton. That's two times more than the people who said polyester and four times more than those who said rayon."

Why pay more?

She recalls market studies from 2006 that suggested only 67% of people were willing to pay a higher price at retail for better-quality clothes. "It was the advent of fast fashion," she says, "and there was a push for changing styles frequently, but consumers, retailers and brands in the supply chain understand better now that those garments didn't look so great when they went to landfill." A shift has taken place, she insists, and now 76% of consumers say they are willing to pay more for better quality. Being able to present a product that will last longer brings opportunities for denim brands and any other company using cotton.

Interesting points emerge from answers consumers give in surveys to questions about fibres they view as safe for the environment. Natural fibres come out on top, with more than double the number of consumers specifying cotton, compared to rayon, polyester and nylon. Cotton Incorporated began looking at biodegradability and the emission of microfibres in 2017 and has now run a second study on the same subject.

In wastewater, according to the study, 89% of cotton fibres break down, which compares favourably to the 45% that a polyester-cotton blend will achieve and just the 5% of pure polyester. In freshwater, cotton's score slips to 77%, but this still shows cotton in a better light than poly-cotton blends with their 33%. Polyester on its own scores zero in freshwater, which means it does not biodegrade at all. Polyester's biodegradability improves slightly in a salt-water environment, with 4% of the fibres breaking down over the study's timeframe of 40 days. Cotton's percentage in salt water is 49%; poly-cotton's is 14%.

Emotional ties

On the last of the E's, she says it is important not to underestimate consumer emotion. She insists that a strong emotional connection has formed over decades between cotton garments and the buying public. She adds: "The question for us is how to leverage the emotional connection that we have been building with the consumer for more than 50 years."

Cotton Inc ideas that are in development at the moment include ways to improve processes for producing longer-staple cotton fibres. This will be of interest to the denim industry; in the eyes of many experts, denim mills make their finest fabrics from long-staple fibres. The Cotton Inc senior vice-president says her organisation and the denim industry showed themselves to be ahead of the curve when, more than 15 years ago now, they launched a programme called Blue Jeans Go Green. It consists of partnerships with retailers and brands to have consumers return denim garments they no longer want to wear. Customers receive a voucher they can use when buying a new jacket or dress or pair of jeans while the old product goes for recycling. A newer programme called Cotton Lives On is rolling out in Europe now. Consumers can drop off used garments at participating retailers and contribute to the effort to find new uses for the fibre.

This is the circular economy in action, according to Ms Kitchings, and also shows why cotton deserves to have a bright future.

Jeans for all are part of a new collection that Good American has developed with H&M.

PHOTO: H&M / GOOD AMERICAN

A specialist group dedicated to textiles that the European Recycling Industries Confederation (EuRIC) set up in 2019 has published a lifecycle assessment (LCA) report. Important findings to emerge include the statement that reclaiming used garments for people to wear instead of manufacturing new ones has an environmental impact that is almost 70 times lower. The group's president, **Mariska Boer,** explains all here.

Reuse jeans to lower impact

At the moment, 62% of used clothing and textiles end up in household waste and valuable materials are being incinerated or landfilled.

ALL PHOTOS: BOER GROUP

Q: How helpful is a complex and detailed LCA study in driving home messages about clothing reuse to consumers?

A: There is a danger sometimes of LCA data being over-simplified. It is a scientific tool; it generates a lot of information, and perspective is always important in looking at that information. At the same time, though, we want simple, clear messages to come out of our study.

What are the key messages that have come out of it?

That there is a market for second-hand clothing and always has been. Around 70% of the global population needs second-hand clothing because they don't have the financial means to buy new clothing. For this reason, compared to plastics or metal, textiles represent a positive waste stream, one that has value and one for which there is demand. But it has to be clothing that meets the particular needs of those people, including the materials the clothes are made from and how much they cost. Second-hand fashion has trends and seasons too.

EuRIC Textiles has said that manufacturing a new garment instead of reusing an old one has an environmental impact that is 70 times greater. Can you explain this figure?

Consultants from three agencies worked on the EuRIC Textiles LCA: Norion from Denmark, Vito from Belgium and EigenDraads from the Netherlands. They analysed 16 impact categories and used a weighting method adopted by the European Commission and software to calculate a single score for different products in 'micropoints' (µPt), a measurement in use in LCAs, linked to estimates for the annual environmental footprint of the average consumer in the US. In the report, a high-quality T-shirt scores 9 µPt if it is reused. If a T-shirt of the same quality is new, its score is 628.4 µPt, which is 69.8 times more. In the case of a second-grade T-shirt, the reused garment has a score of 7.9 µPt, while the new one scores 549.6 µPt, which is 69.5 times more.

“Twenty years ago, a pair of jeans would almost certainly have been 100% cotton. Now, almost all jeans contain elastane and elastane is a show-stopper when it comes to recycling”

EuRIC Textiles president and co-owner of Dutch collecter and sorter Boer Group, Mariska Boer.

What is the extent of textile waste at the moment?

Regrettably, 62% of used clothing and textiles in the European Union end up in household waste, meaning valuable textiles are likely to be incinerated or landfilled. Existing waste legislation stipulates that member states must have in place by 2025 a separate waste collection for textiles. This is good, but it means that by 2025, the quantity of textiles collected after consumers no longer want them is likely to increase. The European textile reuse and recycling industry envisages a circular textile value chain where every piece of clothing is reused in an optimal way or recycled. That hierarchy remains in place: reuse is better than recycling; recycling is better than waste.

Independent analyst Veronica Bates Kassatly asked recently if a fall in the profitability of collecting and sorting clothes when consumers have finished with them and preparing them for someone else to use is one of the reasons why “mountains of clothing” have begun to appear in the global south. What is your response to that?

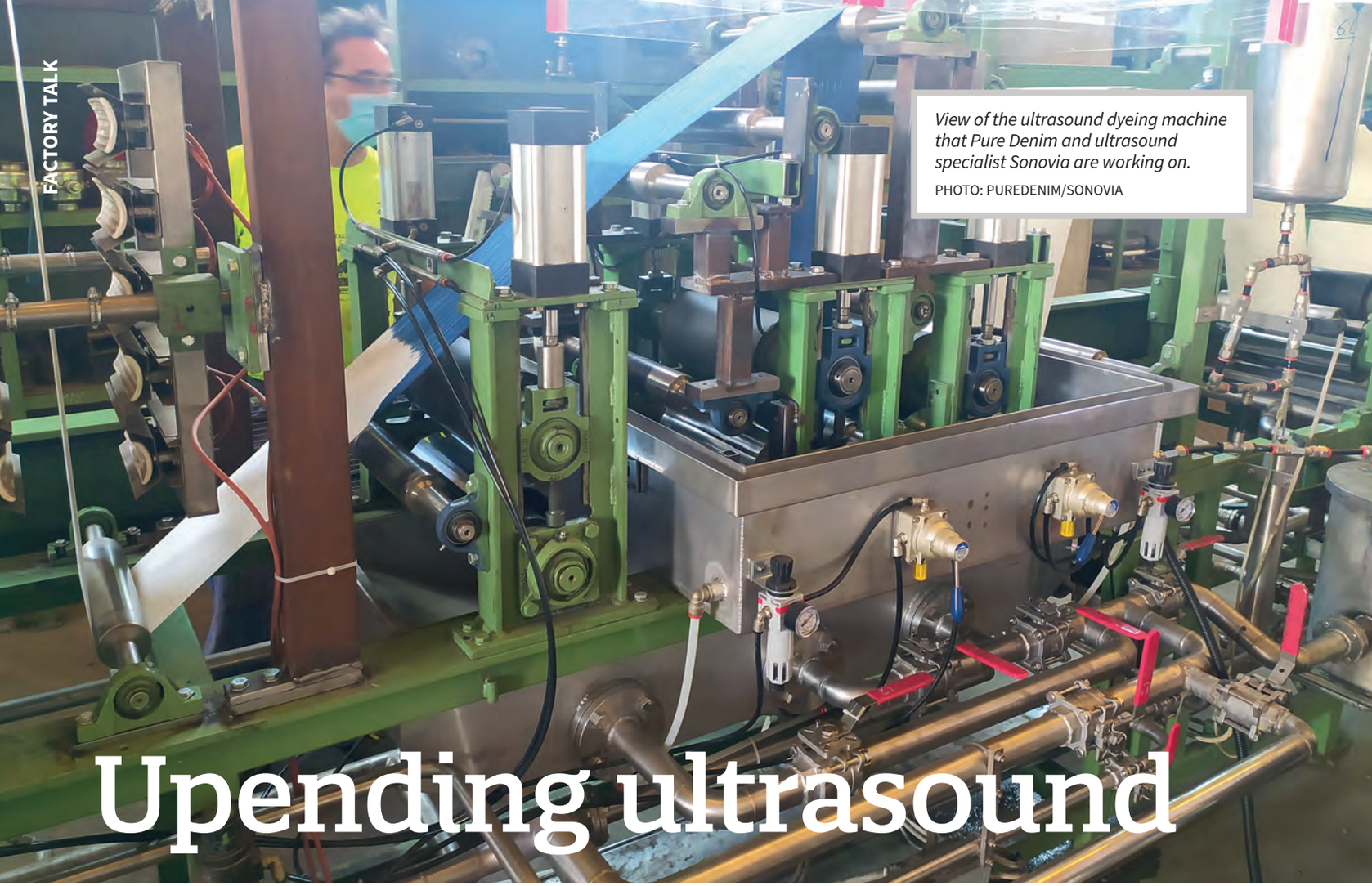
Clothing consumption has more or less doubled in the last two decades and that also means people are discarding more clothing. We need a refined, meticulous sorting process. And it needs to be carried out by well trained people who understand what consumers and wholesalers need. The difficult part is that what’s in demand is not always what you can supply. If you cannot tell the difference, you end up with unsorted textile waste and this is what the photographs we have all seen of dumped and discarded piles of clothes amount to.

What would you like to see happen to change this?

One thing we would like is for the European Commission, as part of its Strategy for Sustainable and Circular Textiles, to make it mandatory for producers of new garments to use a proportion of recycled fibres that come specifically from used textiles. In this way, clothing manufacturers will become avid users of their own waste. Only 1% of the fibres going into apparel production at the moment would fulfil this criterion. That figure really needs to go up. You see claims on the label about recycled content, but if you check, it’s not usually from textiles. We haven’t really seen the industry react yet. It will probably take a mandatory system with a legal framework to make it happen. Once they face a mandate, companies will develop a business case for recycling. This will also have an impact on design. What we’ve seen in recent years is that design has been about the look and feel of a garment, not its reusability or recyclability. We can see this in the rise of mixed fibres in clothes.

Does this apply to denim too?

Twenty years ago, a pair of jeans would almost certainly have been 100% cotton. Now, almost all jeans contain elastane and elastane is a show-stopper when it comes to recycling.



View of the ultrasound dyeing machine that Pure Denim and ultrasound specialist Sonovia are working on.
PHOTO: PUREDENIM/SONOVIA

Upending ultrasound

PureDenim's Luigi Caccia is always on the lookout for innovative solutions that can help reduce the industry's environmental impact. He is currently working with Israel-based start-up Sonovia to finalise a radical new method for dyeing using ultrasound.

"We have been dyeing fabrics indigo in pretty much the same way for ages," says Luigi Caccia, co-founder and CEO of Pure Denim, a mill located close to Milan. D(y)enim, the name of the new solution he is working on with Sonovia, does not require indigo pigment to be reduced. This removes the need for sodium hydrosulfite, a hazardous chemistry to handle during manufacturing, difficult to manage in wastewater, and downright toxic if it ends up in waterways.

Mr Caccia had been looking into the possibility of washing denim fabrics with ultrasound waves when he was introduced to Sonovia, which specialises in this technology for the textile industry. It is a physical – that is non-chemical – process used in textile manufacturing for cleaning purposes that does not require much water. "It can reduce the amount of water consumed by up to 90%," he says.

But Sonovia has upended this technology by using it not to remove impurities but as a carrier to embed colour, or a functional finish, into a textile. Its research, an evolution of a patent it purchased from Bar-Ilan University, has led to the development of a first industrial machine, SonoFIX. This device uses ultrasound waves to anchor a chemical additive deep inside a fabric. It is in advanced trials at Delta Galil, an apparel manufacturer based in Israel, to apply an anti-odour finish that is said to be nearly permanent.

FACTORY TALK: PURE DENIM

No sodium hydrosulfite, very little water. High frequency sound waves. This is the new recipe for indigo dyeing that Pure Denim and Sonovia are working on.

The power of sound waves

For indigo dyeing, Sonovia is taking the same core technology, but has modified it so that it does not embed the pigment too deeply. The world of denim wants its dyed yarns to have a white core. "We needed to tweak the ultrasounds for indigo pigment and our main tool for this is to modify the frequency of the ultrasound waves," says Sonovia CEO Igal Zeitun. The company also needed to devise a machine made to treat continuous warp yarns, not fabric rolls. The two partners are currently using a lab-scale device (pictured). A larger scale machine should be ready to be installed at Pure Denim later this year, they say.

Once ultrasound-dyed, a denim fabric also has to behave as does a traditionally processed fabric. The two partners are also focusing their efforts on achieving the same effect as the 'real' thing. A challenge, they admit. "If this process requires any change in the current supply chain, we know it won't fly," says Mr Caccia. Tests are currently underway to see how the ultrasound-dyed fabrics react to ozone and laser finishing.

Archives at Pure Denim: the Italian mill has been an early adopter of several innovative processes in dyeing.
PHOTO: PUREDENIM

Saving fresh water

Indigo is not soluble. Various substances have been used to made it soluble, urine back in the day, now sodium hydrosulfite. Indigo also needs to oxidise, which makes it blue again. These are the usual conditions of indigo dyeing. D(y)enim does not require indigo to be made soluble. “There is no oxy-reduction and this allows us to bypass all that harmful chemistry,” says Mr Zeitun.

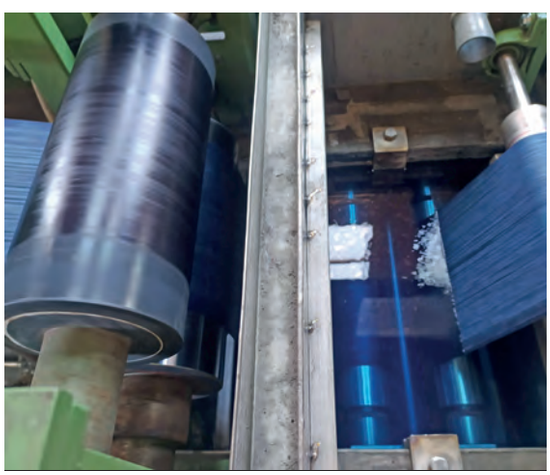
“Sonovia is introducing a completely new method that removes the problem of salt and achieves exactly the same effect,” says Mr Caccia. This leads to significant savings at many levels of production, the two partners claim. “In traditional dyeing ranges, 800 metres of yarn are lost in between lots. Not only does Sonovia’s process reduce the water, chemicals and energy needed for indigo dyeing, it also saves the energy not used to remove hydrosulfite from wastewater,” he adds. Instead of 10 indigo dye bathes, our system requires only one or two, notes Mr Zeitun, this further reduces water consumption. Mr Caccia adds that there is no need for the water to have a special pH, which also makes the process easier and cheaper.

The two partners are conducting tests on a small scale machine. PHOTO: PURE DENIM-SONOVIA

D(y)enim leads to significant savings during production, but it is expected that the machine itself will represent a substantial investment. Sonovia’s business model is to install the machine at mills and dyehouses and provide the specially formulated indigo pigment. “Our indigo is basically the same raw material, but it needs to be made compatible with ultrasound,” says Mr Zeitun.

Water is a critical issue that Mr Caccia feels very strongly about and why he sees in D(y)enim a game-changing solution for the industry. “It is possible to recycle water, and there are mills that can do this,” he remarks. “But the truth is, when you recycle water, all you are doing is moving the problem, that is the salt, from the water to the sludge.”

He insists that D(y)enim has the potential to revolutionise the industry like nothing else seen to date. “This revolution is at a scale of what digital printing has done to the traditional printing industry.” He adds that its greatest impact is not for a company like Pure Denim that produces in the north of Italy, but “rather for all the denim producers in water-stressed countries. Sonovia’s technology removes the problem of salinity in water, avoids creating ‘blue rivers’, and virtually eliminates pollution.”



The process is not waterless, as ultrasounds are said to travel better in water.
PHOTO: PUREDENIM-SONOVIA

Leading with impact

FACTORY TALK: EPIC GROUP

Epic Group's executive vice-president of innovation and sustainability, Vidhura Ralapanawe, decodes how its newest 'green' micro-factory in Bangladesh leveraged its immediate surroundings to achieve the world's highest LEED score in its category.

It might be said that Hong Kong-headquartered manufacturer Epic Group, founded as a textile trading house in 1983, has put itself on the map for all the right reasons. The company, which produces its apparel at facilities in Ethiopia and Bangladesh, made quite a splash back in February when it announced it had obtained the highest Leadership in Energy and Environmental Design (LEED) certification for a newly built factory anywhere in the world. The site in question scored 104 points out of a possible 110, taking it well beyond the threshold for the highest LEED level, Platinum, which requires a minimum score of 80 points. With sourcing offices in Vietnam, sales teams spread across Dubai, New York and Hong Kong, plus design studios in the latter two cities, Epic's vantage point is certainly wide-ranging. Once its latest Bangladeshi facility, EGMCL7, is complete and its new site in Jordan begins operations during the second quarter, establishing a sales-meets-design presence in London is next on the agenda. The group presently employs 30,000-plus individuals worldwide.

At the centre of Epic's latest LEED achievement is a campus-style Green Textiles Hub erected on 17 acres of land in Nijhury Baraid Bazar at Bhaluka in Mymensingh, around 70 kilometres from Dhaka. First set in motion in 2014, the hub's entire built area today amounts to roughly 53,000 square-metres, with plans already in place to further develop the plot "in the near future," Dr Ralapanawe tells *Inside Denim*. Right now, though, the site comprises four Green Textiles Ltd (GTL) factory units, including 48 sewing and finishing lines, as well as an on-site laundry and employee training and development locus Epic University. Total GTL capacity is in the vicinity of 20 million garments per year for tops and bottoms alone, in addition to 8.7 million garments for washing. Garment dyeing is a particular specialism.

Globally, jeanswear production represents approximately 30% of all apparel made by Epic, Dr Ralapanawe shares. The company opts to buy in denim fabrics from China, India and Bangladesh for the large part, he continues, which ensures a measure of uninterrupted access to "high-quality materials at competitive prices".

Healthy outlook

Initially developed by the US Green Building Council, a non-profit, in the 1990s, the internationally recognised LEED rating system variously focuses on criteria such as carbon, energy, water and waste efficiency, the sustainability of materials and indoor environmental quality. GTL-4, the ground-breaking Epic unit that achieved 104 LEED points, notably attained full marks for site sustainability and water efficiency, according to the group. The factory, a joint concern with Envoy Legacy, also only dropped a single point when it came to energy and emissions management. Significantly, about 60% of the facility's electricity supply is drawn

According to Dr Ralapanawe, it can be difficult to obtain higher-level LEED scores for a factory's interior environment on the subcontinent, due to material availability, so well-thought-out design is imperative to workers' well-being.

ALL PHOTOS: EPIC GROUP

from a 733-kilowatt rooftop solar energy system, while collected rainwater serves as a key source of water. Although special attention was paid to the purchasing and use of construction material, Dr Ralapanawe says it was the unit's more rural location that helped things along immensely.

The building's orientation was a major focus, for instance, as the team knew this could be leveraged to reduce its heating load. Larger windows were installed on the northern side, to allow for extra natural light penetration during the day. "We did not plan on achieving the highest LEED score," the senior executive explains, but rather "the best factory from an operational and resource efficiency point of view and the best indoor conditions for our staff." Planning began in late 2020 and work commenced in early 2021. Time inbetween was dedicated to design optimisation cycles – with modelling and simulations to improve lighting and ventilation, for example – which suggested that the unit could go on to earn a high number of LEED points. This led Epic to investigate how far it could "push the [building] envelope" in that regard, informed by past successes such as the nearby GTL-3 factory, another LEED Platinum project. Its efforts have already been celebrated by the government in Bangladesh, keen to incentivise the apparel industry to decentralise away from high-density urban areas, out to the country's regions and rural areas.

Opened late last year, annual capacity at GTL-4 is six million garments and the factory is expected to reach full capacity in July. It is home to more than 1,300 workers, over 75% of whom are female. Associates are required to attend 30 days' training at Epic University at the lower level, whereas supervisors must pass 75 days' training on every machine. Described as a "micro-factory of the future", GTL-4 was built to facilitate shorter lead-times, smaller sewing modules and low work-in-progress by applying waste- and resource-reducing Lean thinking to its manufacturing methods. It features automated fabric spreading and sewing machines and cloud-based needle dispensing trollies and boasts real-time tracking of processes throughout with a system based on RFID smart tags, which harness radio frequency to identify, monitor and communicate with both people and objects. The facility is also outfitted with mould prevention equipment and its final packing areas are precision humidity controlled.

Importantly, each new unit builds on insights gained from the last, Dr Ralapanawe tells us, and the company makes "a very focused effort" to explore what can be done better each time. Across the board, machinery and automation decisions, steam systems, lighting and ventilation, architecture and engineering plans and landscaping and water use are all revisited frequently. Epic's Green Textiles Hub is especially well-organised and more spacious, with ample open space, he says, adding that the surrounding "lush greenery" makes the group particularly conscious of how it should proceed with its operations and new building projects.

A deeper blue

Addressing denim-making colleagues specifically, the executive vice-president acknowledges that LEED's energy efficiency criteria can prove complicated for denim fabric mills and laundries, especially if there is a reliance on fossil-based steam generation. "That makes meeting the energy prerequisites and higher scores in the energy section difficult," Dr Ralapanawe states. But this is also where thinking about challenges beyond LEED certification, which focuses solely on the building itself, comes in. Epic's own sustainability strategy looks at overall operations, with an eye to the difficult task of transitioning from an "outdated" global industrial model towards more regenerative and circularity minded practices, all the while endeavouring to rapidly shrink its water and carbon footprints. "This is easy to say, but extremely difficult to execute within a business context that is not already set up that way," he underlines, framing the industry's next steps as "a collective journey that spans and touches all partners in the value chain".

Particularly meaningful strides the group has made in the sustainable denim realm so far include last summer's agreement with US-based CleanKore, the developer of a patented yarn-dyeing technology that can generate energy savings of up to 60% during dyeing, plus water savings of up to 44% at the garment finishing stages, according to the partners' own tests. CleanKore's method retains the authentic white core of yarns and eliminates the need for potassium permanganate. Dr Ralapanawe notes that the deal has involved significant investment on Epic's part, primarily due to the scale of the undertaking, as the technology's price proposition was fortunately not found to be prohibitive. Progress has already been made to increase the volume of CleanKore-treated denims from four million garments initially to 15 million by year two. The goal is to scale up to 20 million pairs of jeans by 2025.

A roof completely given over to solar panels supplies roughly 60% of GTL-4's electricity requirements.

There has been a great deal of enthusiasm from customers about CleanKore so far, Dr Ralapanawe observes, and Epic expects more brands to sign up "as we refine our skills and offerings with the technology". Aware that "real benefit comes with impact reduction at scale", the apparel manufacturer is confident it can roll the technology out across the majority of its denim production, so long as customers are on board. Elsewhere, the group continues to build up its volumes of recycled polyester and sustainable manmade cellulosic fibres. It already believes "all" of its cotton to come from more sustainable sources and has been involved with the Better Cotton programme since 2019. Epic does source some organic cotton, but has not been able to scale this to the level it would like just yet, Dr Ralapanawe says. Integrating recycled cotton fibres into its denim blends is another top priority at present.

The industry is still feeling around the contours of what a contemporary denim mill or laundry should look like, and Dr Ralapanawe believes it is crucial to consider how these facilities would function and consume resources within a regenerative context, as well as to ask how a denim factory should define the role it plays in the wider ecosystem today. "Once we figure that out, then LEED certification would not be all that more difficult."

Plans for the unit sought to optimise operations and reduce overall costs by incorporating smart machinery, smaller sewing modules and real-time tracking systems.

BLUEZONE

INTERNATIONAL DENIM TRADE SHOW

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Skeins of hand-dyed indigo yarns at Sakamoto Denim.

PHOTO: TILMANN WRÖBEL

Telling the tale of indigo

FACTORY TALK: SAKAMOTO DENIM

We are all familiar with the names of famous Japanese denim mills, located between Kurashiki and Hiroshima. But have you ever heard of Sakamoto Denim? I had a blast when discovering and visiting the company's headquarters in Fukuyama. Here's why.

Many stories have been written about the main mills based in Kojima, Kurashiki, Okayama, Hiroshima and so on. But has anyone ever heard, or written about, the Sakamoto Denim Company? When I visited Sakamoto Denim, I thought it would be just another young and recent "jump on the heritage bandwagon" denim mill. Actually, not at all. Not only has Sakamoto a long history in denim fabric manufacturing, it is also a very modern mill that is working to the highest sustainability standards. It even has an incredible indigo museum. And the things I saw in that museum blew my mind.

But, let me give you first a brief overview of the company. Sakamoto Denim is located in the city of Fukuyama, in the Hiroshima prefecture. It was founded by Matsujiro Sakamoto in 1892. Back in the day, he exclusively dyed indigo by hand, following the traditional Ai-zome dyeing technique. This method creates an antibacterial and insect-repelling blue fabric, which, by the way, is what indigo-dyed workwear fabric was all about. He dyed indigo yarns using the huge and ancient Japanese pots, many of which are now on exhibition at the mill.

In 1964, Yasusi Sakamoto, a third generation Sakamoto to head the company, started working with the first continuous indigo yarn dyeing method, introducing the world's first slasher dyeing machine in 1967. Very early on, his continuous warp dyeing machine was to be a huge success in Japan.

From then on, the company pursued its research and development into state-of-the-art machinery and manufacturing. In the mid 1970s, Sakamoto Denim introduced a new process it called "pollution free dyeing". The term may sound bold and brazen, but, at that time, it was proper pioneer thinking that water pollution might one day become the denim industry's worst enemy.

The company's main desire was to drastically reduce water and salt consumption, but it was also intent on "cleaning" the process of indigo dyeing without losing any of the depth of original Japanese dark dyes. This led the Sakamoto team to investigate the possibilities of electrolysed water. It found that using this type of water cleaned the indigo dyed yarn without requiring high temperature water nor any detergent.

Today, when you enter Sakamoto Denim and get a full product presentation, you immediately learn about the vast use of electrolysed water in the different stages of its indigo dyeing process.

Sakamoto Denim has, of course, all the requisite ecological certifications of the highest standards. And, to finish on a great, local and human initiative, the entire staff, employees and management, bring their plant-based kitchen waste to the company. This organic garbage is mixed in with its indigo sludge. It then goes through a bio-treatment machine to be transformed into compost, which is used to fertilise the company's rose garden. This is something that I have often seen at the Japanese factories I have visited, a particular attention to small natural things, to flowers, plants…and I am not saying this just because I am a huge fan of bonsais!

Traditional natural indigo dyeing in buried vats.
PHOTO: SAKAMOTO DENIM

This is admittedly a detail, so let's move on to the initial blast I had when first visiting the Sakamoto Museum. In 1991, when the company was using 99% modern-day dyeing and weaving machinery, it established its Aikyokan Ai-zome Preservation Museum.

And what a wonderful move this was. As you may know, when you travel to Nîmes, to Genova, to Buttenheim and to San Francisco, these are places where denim has its roots and where it has left many signs of its DNA and history. Only a small number of these have genuine denim museums, not to mention the even smaller number of denim museums that have noteworthy examples from the history of denim other then recently acquired 'collectible' jeans.

In the Aikyokan Ai-zome Preservation Museum, visitors are allowed to touch and feel true ancient samurai combat equipment, of which the textile parts were hand-dyed with natural indigo to prevent bacterial growth on wounds from battles. They can admire antique indigo kimonos and hand-laced indigo details on vintage Japanese workwear. These were, again, dyed with natural indigo to protect workers in the fields from mosquito bites. I still have goosebumps.

Behind this first room, ancient Japanese natural indigo pigments are on display. These include, yes, a near white coloured indigo. Back in the day, indigo pigments went from almost white to sky blue, to dark and to deep indigo.

The company's Aikyokan Ai-zome museum houses samples of indigo and historic samurai armour with some elements dyed in indigo to offer antibacterial and mosquito protection.
PHOTOS: TILMANN WRÖBEL

A vintage indigo textile decor.
PHOTO: TILMANN WRÖBEL

This room opens on to another space where vintage indigo pots were buried in the ground, or shall I say into the soil. This is where the Indigofera plant's pigments slowly matured from green to blue, and where Matsujiro Sakamoto started making indigo dyed yarn in 1892. It's still all there, the pots, the bamboo hangers for the dyed yarns and examples of yarns made years ago. If you are an indigo lover, it is really worth the trip.

One more thing, lest I forget, Sakamoto Denim also sells denim fabric. Great denim fabric.

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. He is based in Dusseldorf, Germany, and Biarritz, France.

MONSIEUR_T_OFFICIAL/PHOTO: CHRISTIAN GEYR

Tetyana Chumak initially rose to prominence with her debut fashion label Tago in 2006. A farmer's daughter, her affinity for the natural world, its fibres and plant-pigmented dyes ultimately led to the birth of TG Botanical during the covid pandemic. The totally made-in-Ukraine brand participated in Copenhagen Fashion Week as a Zalando Sustainability Award finalist in February.

PHOTO: TONYA MATYU

CLOCKING ON...

Designer and TG Botanical creative director **Tetyana Chumak** weaves moments of wellness into her workday as she balances running her Ukraine-based brands and family farmland remotely from Catalonia.

A natural flair

The designer smiles next to her models backstage at Copenhagen Fashion Week.

PHOTO: TONYA MATYU

7.30am

I wake up, make breakfast for my daughter and then drive her to school on weekdays. I brew my morning coffee while she gets ready and then meet the new day by enjoying this drink after I've dropped her off.

9.00am

Meditation time. It is very important for me to start my day in conversation with the Universe, in order to set my mood and dream a little.

10.00am

My working day begins at 10.00 am CET, which is 11:00 am in Kyiv. It is difficult to schedule meetings with my teams right now, as my colleagues are all in Ukraine and there is a constant lack of electricity and internet connection. As a rule, though, I tend to work for an hour each morning, which mainly consists of communicating with colleagues via various work chats.

11.00am

My breakfast is always very simple. It can be avocado toast or scrambled eggs with vegetables. I follow a low-carb keto diet and practise intermittent fasting. I have breakfast at 11.00 am and dinner at 5.00 pm.

12.00am

Movement. I alternate between online Pilates classes and tennis. I only discovered Pilates recently and I try to never miss a session now. It makes me feel wonderful and lifts my spirit, body and mind.

1.00pm

This is when my working day really gets going. As I said earlier, there are a lot of work chats to manage, since we are currently forced to collaborate at a distance. I try to coordinate each team's workload separately, which helps me to focus and resolve issues quickly.

Unexpected details give next season's flared jeans a romantic edge

PHOTO: TG BOTANICAL

3.00pm

I have an online meeting with TG Botanical's stylist and production team. Today, we discussed our global goals for the brand and tomorrow we plan to talk filming and promotional strategies. The day after that, we will choose fabrics and materials for the next collection. We're also collaborating with U Space at the moment, a concept store spotlighting Ukrainian design which recently opened in Barcelona.

4.00pm

Meetings regarding our agricultural activities. My family back in Ukraine is mainly engaged in farming, so I work on agriculture-based projects in parallel with my work in fashion. Our business has been deeply impacted by the war with Russia. In the first few months following the invasion, some of my family's fields burned down and we are still recovering from this awful incident.

5.00pm

Time for dinner. To be completely honest, I really love delicious food, but I don't like to cook and spend time preparing meals. If they came up with a pill to replace food, I would happily take it!

7.00pm

I don't even know if I can really relax after a working day. Most likely this is not possible for me.

9.00pm

My evening begins once everybody has finished dinner and retreated to their various places. No phone calls or messaging. Sometimes, I will go for a walk, other times I might watch a film, meet for dinner or spend time with my daughter… nothing unusual, just simple human pleasures.

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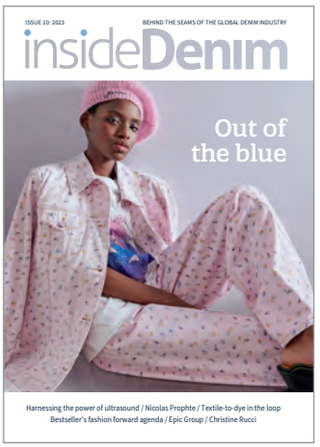

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