Chandni Pradhan

Her journey into the design world started with her small, family-run garment manufacturing unit. During her school days, she would go with her father for casual visits to their factory. That's where she was first introduced to the beauty and intricacy of crafting a product.

Chandni has completed her Bachelor of Technology in Textiles from Institute of Chemical Technology, Mumbai and Masters in Surface and Textile Design from Istituto Marangoni, Milan. Over the last 8 years, she has designed textiles for fashion, home décor, and surface design for wallpapers and ceramics for global companies like Loro Piana, Bisazza, House of Anita Dongre and Revival.

She is currently working with Revival as the Senior Designer and Art Direction Specialist. Her role involves design research, colour theory, material and manufacturing techniques, product innovation and storytelling. Her greatest satisfaction comes from creating beautiful and sustainable products which bring joy to people. This also aids in her role as an art director in developing and maintaining a creative vision that speaks to the audience.

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THE AESTHETICS OF SUSTAINABILITY - UNDERSTANDING TEXTILE MANUFACTURING PROCESSES TO DESIGN BETTER

Chandni Pradhan

Sustainability is undoubtedly the need of the hour. It holds immense significance in textile manufacturing as it addresses the urgency to protect the environment and promote responsible practices within the industry. The textile industry is currently included in the top 5 most polluting industries. Embracing sustainability in textile production involves rapidly expanding recyclability of existing materials, as well as developing new sustainable alternatives to existing materials. As a designer involved with textiles, I believe that by adopting such sustainable techniques, the textile industry can contribute to the preservation of natural resources and the reduction of pollution.

The aesthetics of a product play a crucial role in influencing consumers and enhancing the overall user experience. We all want beautiful products which enable us to express our own individuality. Would you buy a product made from recycled materials if it did not appeal to you visually? I don't think so!

Creating a new product in today's world is a balancing act. It needs to be sustainable as well as visually appealing to a large audience to be truly successful. You may be thinking that sustainability and recycled products do not exactly align with high-end and good quality. In this article, my aim is to show you that trash can be turned into treasure.

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RECYCLING POLYESTER

Recycling plastics like bottles, cups, bags, etc. has gained popularity as the go-to method to reuse our existing plastic and reduce its presence in our environment. Have you ever wondered how plastic bottles can be turned into yarn which is so soft?

First, the collected plastic waste is segregated based on plastic type as there are many types of plastics used across various industries. Polyethylene terephthalate, or PET, based plastic products are the easiest to sort, as almost all packaged drink bottles are made from PET. There is also a plastic number stamped on all plastic products to help identify the kind of plastic used. The plastic number for PET is #1, making it easy to double-check the segregated plastics.

These bottles are then cleaned, sanitised and cut and chopped into flakes. The flakes are melted and converted into standardised

pellets. This is done to ensure quality control in the extrusion, which converts the pellets into long strands which are finally spun into yarn. A strict control on the melting temperatures and extruding processes allows for the yarn to be impressively soft.

Conversion of PET plastic waste into recycled PET yarn

This yarn may be mixed with other materials like cotton and wool to make various products. Many well-known brands have recently been in the limelight for making eye-catching products using recycled polyester like shoes, garments, rugs, upholstery fabrics, etc.

Currently, PET is the most recycled plastic because of its thermoplastic properties. The polymer chains break down at a relatively low temperature, and so there is no degradation of the polymer chain during the recycling process. Once melted, it is very easy to mould or extrude the melt into new shapes or filaments.

While developing Revival's 'Outside-In' collection of outdoor-indoor rugs, we worked extensively with the plastic bottle recycling plant to get the appropriate texture of the recycled PET yarn. The yarn we developed was feather-soft to the touch without being shiny like plastic. A 5'x8' rug contains about 460-500 recycled plastic bottles.

The next step was creating a visually interesting weave where the colours almost 'flowed' from one another in an expanded plaid-like pattern. This visual play of colours that first attracted customers to the product, but the material is equally important. Most people could not believe that the yarns were once plastic bottles because the rug is so fuzzy and supple.

Calvin Klein sweatshirt crafted with REPREVE® recycled polyester

Revival's outdoor-indoor Bocce rug made from recycled polyester

Adidas x Parley recycled ocean plastic trainers

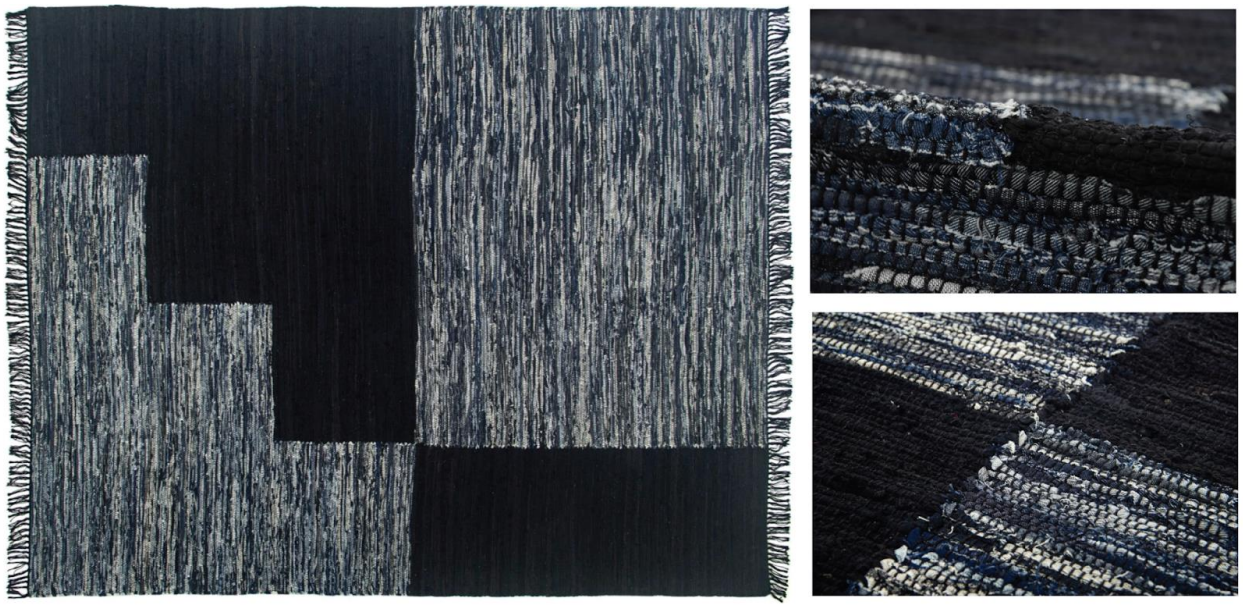
RECYCLING GARMENTS

It is no secret that thousands of tons of discarded garments end up in landfills on a regular basis. Fast fashion has cultivated the processes of quickly manufacturing trendy, inexpensive clothes in large volumes. People purchase these cheap clothes to wear a few times and then discard them when the trends change, or when they degrade in quality, which happens quickly, as they aren't built to last. We cannot make people change their lifestyle, but we can recycle these old garments into attractive new products.

India imports used garments from all over the world. According to the United Nations Comtrade database, India imported used garments worth $371 million in the year 2022. These used garments are segregated by colour and materials. The buttons, zippers, embroideries, etc. are removed and the garments are cut into small, long stripes called '*chindi*' which are then washed for sanitation.

Old, used garments and textiles are sorted by colour and materials

The next step is making a visually appealing new product with these 'chindi' fabrics. This was the challenge we faced while developing Revival's 'Denim Collection' rugs made from recycled denim. We opted to use simple, geometric shapes with some art deco influences to highlight the mélange effect created by the denim. We also had to work with the manufacturer on construction and finishing to ensure that customers receive a sturdy, high-quality product. Since denim is a very durable textile itself, these rugs are machine washable, just like your jeans!



Revival's Wrangler rug made from Recycled Denim

Frequently, the chindi is further broken down into fibres by intense shredding machinery. These fibres are spun into new yarn which are in turn used to make entirely new products. As we developed Revival's 'Chindi Cushion Collection' we not only used yarns made from recycled garments but also opted to work with small handloom weavers to weave the textile by hand - a double win for recycled materials and ethical labour practices.

Ganni's t-shirt made from yarn obtained by processing recycled garments

Revival's Chindi Mini Check cushion made from yarn obtained by recycling old textiles

Globally, mainstream fashion and textile brands have recognised the need to incorporate sustainable practices making 'recycled' the new chic. By recycling our existing resources, we are preventing new resources from being wasted. Even if we can recycle only 1% of the billions of garments which end up in a landfill, that will still be a significantly large number of garments that are given a second life. The number of recycled products will only grow from here due to the world-wide rising awareness of the sustainability crisis.

PLANT – BASED LEATHERS

The development of new technologies has enabled the textile industry to create innovative materials. One such material is plant-based leathers. Let's get one thing straight: plant-based leather is not real leather, as there is no animal skin involved in the making process. Plant-based leathers are an altogether different material which look and feel like traditional leather. The industry is currently

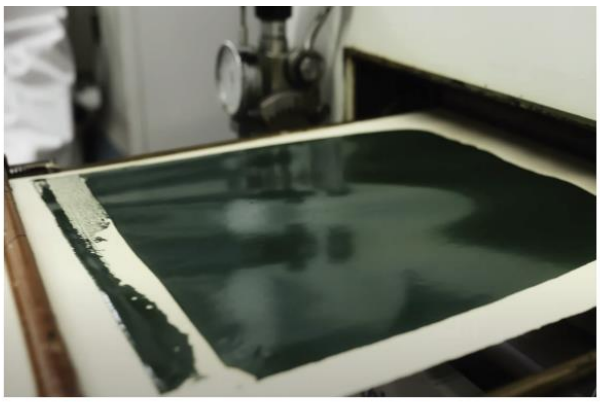
abuzz with the advent of leather lookalikes made from mushrooms, cactus and cork.

'Desserto®' is a highly sustainable plant-based material as an alternative to traditional leather. Cactus is harvested and the thorns are removed. The leaves are then chopped into small pieces and dried in the sun for 3-4 days. A chemical process is then performed on the dried pieces to extract cactus proteins and fibres in powder form. The powder is mixed with a resin to make a sticky paste-like substance. A thin layer of this paste is applied on a fabric base and dried slowly in a heating chamber to create the cracks which you see in real leather. The dried layer is then peeled off to give you Cactus leather. The same process is followed after harvesting cork bark to make cork-based leathers.

Cactus is harvested

Cactus is chopped into small pieces and dried in the sun

The dried pieces are chemically reduced to a powder



The bio-resin paste is applied on a fabric base for drying

Desserto® cactus leather

The process of making mushroom-based leathers (as developed by BOLT THREADS - MYLO™) is slightly different. Mushroom leather is actually made from mycelium. To understand what mycelium is, think of a tree with its stem and root networks in full bloom. The mushroom, which we know and love to eat, is actually the fruit of this tree. Whereas mycelium is the root system - the white thread like fibres which are seen surrounding any mushroom. The mycelium forms an interwoven network providing the nutrients required for the mushroom to grow.

A mixture of distilled water, mineral particles, starch, and hydrogen peroxide are poured into large trays and then injected with living

mushroom cells. When placed in a dark environment, the cells start to grow by consuming the starch as food. In a matter of 2-3 weeks, a fine hair-like root network is formed in the entire tray. At this stage, a plasticiser is added in the tray in order to bind all the mycelium to a base. The mycelium sheet is then dried slowly and further treated to create the leather-like surface texture.

The fine, hair-like, mycelium root network forming in the tray

The mycelium is dried slowly to form a leather-like surface texture

various textures and colours of mushroom leather

The ability to control the look, feel and colour of the final material is in itself a bio-engineering marvel. Plant-based leathers look and feel closer to real leather than PVC or PU leathers which is what makes them attractive to designers and brands. Today, these bio-leathers are being used not only to make bags but also garments, shoes, automobile seat covers and upholstery fabrics. Production of these materials can be scaled easily without being dependent on animal skins which are in relatively limited supply making them the best-available sustainable alternative to animal or plastic leathers.

The interior of the Mercedes-Benz Vision EQXX concept electric car features 'DESSERTO' cactus leather and 'MYLO' mushroom leather developed by Bolt Threads

Hermès Victoria bag made using 'Sylvania' mushroom leather by biotech company MycoWorks

Can you believe that such good-looking products are being made from recycled and sustainable materials? A recycled product is great for the Earth but as designers, we also have to ensure that the look and quality of the product is top-notch for a customer. Sustainable materials and good design are intrinsically linked. If you purchase any product made from recycled materials or sustainable alternatives, you would want it to be visually appealing and feel authentic, right? Every designer should be able to put themselves in

their customers shoes and ask, "does this product look high-end enough to compel a purchase?"

Long-lasting change is possible only when mainstream retail products can be made from recycled and sustainable materials on a large scale. Designers can—in fact, must—play a crucial role in convincing executives to incorporate sustainable alternatives by showcasing the luxury products which can be made from such materials.

Citations:

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