Fibre to Fibre Recovery Design

Rijkswaterstaat
Ministry of Infrastructure and the Environment

ECAP european clothing action plan

Project supported by LIFE funding

From 2016 until 2019 nine fibre to fibre pilots have been implemented by the European Clothing Action Plan - ECAP. The fibre to fibre pilots were aiming to support the use of recycled post-consumer textile fibres.

Three workwear companies, a linen supplier and five fashion companies were involved in the ECAP pilots. They individually trialed the use of fibres from post-consumer textiles in new garments and shared the learnings from their experiences in case studies and factsheets.

Key findings

- The design of clothing influences the degree of recyclability by the composition of linings, pockets and accessories.
- The industry is still at discussion about the need to use 100% mono material fabric for recycling.
- Design for easy disassembly makes the recycling process more efficient.
- The customer prefers aesthetics over technical design for recyclability.
- Managing the customers' expectations is possible by informing them about the design for recycling issues.

Design for recycling

Producing clothing and textiles from recycled post-consumer material was the main aim of the F2F pilots. Less attention went to the challenge of producing textiles that can be recycled again after disposal. To achieve this, designers need to take another perspective with regard to the materials composing the products. The recyclability of clothing depends on two factors: the fabric itself and the design. The design includes the position of linings, pockets and accessories like buttons and zippers and finally the choice between using the same or different materials in the garment, like its labels, linings and sewing threads.

Fabric composition

As for the fabric, there is a discussions going on about whether to use a blended yarn or 100% pure material for recycling. While blending cotton for example is beneficial for the strength of the yarns, it might have a negative effect on the next recycling cycle. At the same time, the trend is moving towards blends with a 50-50 ratio of cotton and polyester for products formerly made of 100% cotton. This is true for the workwear and linen sector but also occurs more and more often in fashion. Therefore, designers have an important decision to make when choosing their materials. New materials like viscose and Tencel are more environmentally friendly than polyester, but questions arise about the characteristics of these materials. Additional research is required.

Efficient recycling

Before recycling, all accessories have to be taken off the fabric. They can either be reused of recycled themselves, depending on the materials. Apart from the accessories, the kind of sewing thread and finishing layers have consequences for the products recyclability. Also, the position of components like pockets, linings and trims matters. Some garments, like suits, have many components. Therefore, it takes a lot of time to disassemble these pieces and the contamination risk is high. In general, the conclusion is: the easier disassembly, the more time efficient and cheaper the recycling process. To make the recycling process more efficient, designers should consider using less different materials and less components and accessories.

Aesthetics is key

Although recycling requires adjusting the design, most pilot companies still prioritise aesthetics. This is also the case in in the workwear industry. Not all customers like the simplicity and minimal use of logos, which would make the product most suitable for recycling. In the end, whether or not the product is technically recyclable, it still has to be appealing to customers. The design of the product is in most cases what motivates people to buy certain clothing, whereas the story behind it is often just a nice to have.

Managing expectations

Although several companies have already manufactured recyclable products, reusing the fibres was not as easy as you may expect. The pilot companies are still looking for the right quality that matches the aesthetic and functional expectations of the customer.

Elastane is regularly used in clothing but causes difficulties in the recycle process. Although there are some other solutions to reach the stretch effect, more research on this subject is necessary. In the pilots we found that by telling the customer why elastane was left out, it seemed to be accepted by the customer.

Another issue is that colours often don't remain as bright in the recycling process and in case of mixed fibres they become paler. Also the white colour is a problem, every contamination with another colour is visible. Extra dying or bleaching the fabric could solve this problem, but this solution results in a less sustainable fabric.

Circular textiles requires a new perspective for the design process. The pilot companies have indicated a need for training on circular design.

More tips and practices on circular design can be found on the ECAP platform Design for Longevity. www.designforlongevity.com

Best practice case study

The family owned fashion retailer JBC developed jeans made from 20% post-consumer denim in the ECAP pilot. To make the jeans more circular the design of the jeans highly contributed to its own recyclability. To begin, the accessories are made from recycled material: the linings, zipper tape, buttons, labels and even the hangtag. Secondly, they placed the position of the pockets and zipper slightly higher than usual. This way, a larger piece of jeans fabric is useable for recycling later. Finally, the use of trims and thus cut waste was minimised.

The European Clothing Action Plan - ECAP is €3.6 million EU LIFE part funded project. ECAP contributes to creating a more circular approach to reduce clothing waste and water and energy use during production.

ECAP mission
Cutting the environmental impact of clothing across the supply chain. Generating value for business through collaboration, measuring and sharing best practice.

The fact sheets were generated as a result of pilots carried out for ECAP by Rijkswaterstaat and the named organisations from 2016 to 2019.

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