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Sustainability Project

Task 1: Document



Task 2: Bill of Materials

<file:///C:/Users/Alison%20Keane/Downloads/Parka%20Bill%20of%20Materials.pdf>

Task 3: Read

The fashion waste crisis is the overall amount of textile waste that is formed when users are done with their clothing. 84% of the clothing Americans are done with is sent to landfills. That's 14 million pounds in 2016 or 80 pounds per person. With all this waste comes environmental problems. Natural fiber clothing technically could decompose in the landfills but they produce methane in this process which is a greenhouse gas. Also, chemicals like bleach and dyes seep into groundwater. Synthetic, plastic-like materials will not decompose and leave massive amounts of waste in landfills. Overall, there is a massive problem with the enormous

amount of textile waste that Americans throw out. But, it's really not their fault because there needs to be a better method of recycling old clothing to divert waste from landfills.

Goretex is a breathable fabric that is waterproof so it can repel liquid but at the same time allows water vapor from the wearer to pass through. Gortex is made by W. L. Gore and was founded in Newark, DE. The life cycle assessment says that production and distribution has the greatest impact. 65% of the global warming potential occurs at the beginning of a jacket's life cycle and <1% is from disposal. A jacket has a carbon footprint of 72.7 kilograms CO₂ equivalent. The life cycle assessment can tell makers how to make jackets to lower many measures of harmful environmental hazards.

Responsible down is down and feathers that are sourced from ducks responsibly. This means that the well-being of the ducks are fully up to standards. Live ducks are never plucked, there is no force-feeding, and ducks are fully respected. The Responsible Down Standard is a certification that makes sure all down and feathers are sourced responsibly.

Disperse dye is usually the dyes that are used for polyester which is a synthetic colorant.

Polyester is usually not dyed with natural dyes because of the highly crystalline structure and a lack of polarity which make polyester fiber hydrophobic. Because of this, chemical dyes are used to penetrate the fabric.

Nylon and polyester can be recycled. Methods of recycling can be mechanical (melting and then extruding into yarn) or chemical (going back to the monomer or polymer phase before extruding yarn). Usually recycled synthetic fabric is made from industrial waste of non-clothing polymers like fishing nets.

Mordant dyes, reactive dyes, and natural dyes are not usually used on synthetic fibers because they won't penetrate the fiber due to the structure of synthetic fibers.

Three ways a zipper can be sustainable are 1) It can eliminate hazardous chemicals such as surfactants, heavy metals, and PAH used in the chemical management of the material 2) It can use ECO-DYE technology that utilizes supercritical fluid dyeing technology that allows the reduction of the amount of water used for dyeing zippers and 3) It can use molasses, which is a byproduct of sugar, for the fabric of the zipper.

Two ways of measuring waterproofness in fabrics are 1) Simulate rain on the fabric, fabric is considered rainproof at 5000 mm water column and 2) Create water pressure or hydrostatic

pressure on the fabric, waterproof fabric by this method should reach 10,000-15,000 mm water column.

Fair trade is a global movement of producers, companies, shoppers, advocates, and organizations that put people and the planet first. Fair Trade Certified goods support responsible companies, empower farmers, workers, and fishermen, and protect the environment.

Even though cotton is a natural fiber, there are environmental issues. In the agricultural production phase of cotton, fertilizers are used to grow the cotton which are harmful to the environment and also energy intensive. Also, cotton uses a lot of water in irrigation to grow compared to other natural fibers and obviously synthetics which don't "grow". In the textile manufacturing phase, a lot of energy is used to clean the fibers and spin it into yarn and then woven or knit into the fabric. This includes all the washing and drying of the fibers, yarn, and fabric which uses a lot of water and energy at this stage too. In the consumer use and disposal phase washing and drying of garments uses a lot of water and energy to dry cotton which is very absorbent.

_____ Conflict minerals are currently the metals tantalum, tin, tungsten, and gold. Conflict minerals are held at a standard for ethical sourcing. The conflict minerals reporting template is considered the industry standard reporting template for conflict minerals compliance.

Task 4: Research

Component	Material	Sustainability Issues
Shell fabric	100% Nylon	● Non-biodegradable, made from petroleum ● Nylon manufacture creates nitrous oxide ● Manufacture is very energy intensive ● Washing releases microfibers into water ● Harsh chemical dyes ● Toxic finishes for anti-static and anti-wrinkle ● Could have unethical working conditions to make the garment
Lining fabric	Omni-Heat™ Reflective lining 100% Polyester and reflective silver	● Not recyclable ● This fabric is trademarked to Columbia so they are the only company that can reuse it or recycle it ● Silver nanoparticles can release in the wash which is harmful to humans and the environment

Cuff fabric	Nylon Rib-Knit	• Non-biodegradable, made from petroleum • Nylon manufacture creates nitrous oxide • Manufacture is very energy intensive • Washing releases microfibers into water • Harsh chemical dyes
Insulation	600 Fill Power, Goose Down Insulation	• Unethical plucking of the geese • Irresponsible breeding or over-feeding of the geese to get a large amount of down • Breeders/farmers could have poor working conditions or unethical financial burdens to force them produce a lot of down
Thread	100% Polyester	• Synthetic material • Synthetic dyes • If too thin or cheap, it could break and the whole garment could be thrown out
Brand label	100% Polyester Woven	• Synthetic material • Synthetic dyes
Care label	100% Polyester Plastic, screen printed	• Synthetic material • Synthetic dyes especially in screen printing • The cheap material fibers easily release in wash into waterways
Zippers	Brass two-way separating jacket zipper	• Could use heavy metals • Are non recyclable • If it is cheap and breaks, wearers are likely to throw out the whole garment
Snaps	Silver 4 part snap	• Could use heavy metals • Could be sourced unethically where minerals are scarce
Draw-cord	Elastic Draw-cord toggle and stopper	• Made out of polyester and elastic which is synthetic and not recyclable since they are together • Small plastic stopper pieces that can not be recycled

Task 5: Evaluate and Recommend

Component	Improvement
Whole parka	● Provide customers a repair service so they can wear their jacket longer, Columbia would pay for this service if the jacket was bought within the last three years ● Berbrand is a tech innovation that customers can get direct information about a garment on their smart phones through the care label. Customers scan the tag for more information about the making of the jacket and care instructions. ● Columbia can partner with Cora Ball which is a ball that consumers put into their washing machines and it catches all the plastic particles and fuzz so less enters the water. A great idea would be with every jacket purchased, a Cora Ball comes with it so it can be used washing the coat and every other load washed. ● Use recycled and recyclable cardboard boxes and no styrofoam to ship to customers, customers pay for all shipping ● On the website there needs to be transparency about where the garment was made and about the factory and conditions ● Working conditions: should not enforce child labor, should earn a living wage, should not work more than 40 hours a week, the factory should be well ventilated and have fire safety procedures ● Certify the garment as certified Fair Trade
Shell fabric	● Use recycled polyester which uses half as much energy ● OR use Tencel which originates from renewable raw material wood ● Use Orco Lanamide dye which consists of non-hazardous, non-chrome acid dyes which is applicable to nylon. Use color Green CB which is an olive color ● Use a citric acid/xylitol combination for anti-wrinkle properties which is more environmentally friendly than using a formaldehyde application ● Wash this fabric in large loads so it saves water
Lining fabric	● Run a life cycle assessment for this fabric since it is so unique and trademarked to Columbia ● Source the silver ethically and responsibly ● Try to produce as little waste as possible when cutting this material since it metal and polyester, cost efficient
Cuff fabric	● Since this piece is a rectangle, you can cut it from the fabric using a zero waste method easily, or you can knit the fabric directly as cuffs so there is zero waste, this is also cost efficient ● Use Orco Lanamide dye in the same color on cuff fabric too

Insulation	● Obtain the Responsible Down Standard, do not use down pulled from live or force-fed ducks, and must be fully respected, use as a byproduct of the meat industry ● OR use an organic cotton option called Annecot ● You can use less down if you are using the reflective lining because the lining is so warm, more cost efficient to use less down
Thread	● Use Wildcat Repreve Recycled Polyester thread from Amefird ● Use Orco Lanamide dye in the same color on thread too ● Make sure the thread is high quality so it lasts as long as the garment
Brand label	● You can use a recycled polyester label or a organic cotton label ● OR instead of a label, embroider the brand logo on the lining fabric, most cost efficient
Care label	● Use Avery Dennison company recycled polyester satin care labels, they are FSC-certified and made from 10-100% pre- or post-consumer waste ● If not using the above label, do not screenprint which could use harmful dyes, instead weave or embroider ● Make sure instructions are easy for the consumer to read and follow so that the consumer will take care of their garment properly which will allow the garment to last longer
Zippers	● Don't use zippers with hazardous chemicals such as surfactants, heavy metals, and PAH ● Use ECO-DYE which allows the reduction of the amount of water used for dyeing zippers ● Use plant-based materials such as molasses, which is a byproduct of sugar, for the fabric of the zipper
Snaps	● Use snaps from recycled metals and not dyed ● Source all snaps, zippers, and draw-cords as close as possible to the manufacturing factory so less transportation is needed for such small materials, cost efficient
Draw-cord	● Use a recycled polyester material and recycled plastic material for the stopper ● Does not need to be dyed since its inside the jacket

Task 8: Reference

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