INNOVATIVE AND SUSTAINABLE MODELS IN THE ECODESIGN OF GREEN-VEGAN FOOTWEAR

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The ECODESIGN concept, which has appeared since the early 1960s, plays a fundamental role in the life cycle of a fashion product, from design, production, service life to recycling. The main vectors of ECODESIGN are guided in several directions: the selection of materials and their impact on production - non-toxic natural fiber materials will be used, recyclable rubber, all obtained with low energy consumption; designing models and making samples - these will be produced from material obtained by recycling used textile fibers with a high durability and low weight; production - the aim is to optimize the production process, replacing toxic auxiliary materials with natural ones (natural rubber, water-based adhesives), identification and elimination of toxic emissions, as well as the use of unconventional, solar and wind energy; packaging - it will be made of recycled vegetable fibers and will be designed in such a way as to protect the product as well as possible without damaging it. All these vectors will contribute to extending the “life” of the product, offering comfort, durability and eco-efficiency.

Keywords: VEGAN-DESIGN, recycling, fashion.

INTRODUCTION

Globalization and online sales are a reality of these times. Markets and sales spaces have been reinvented, and consumers are paying much more attention to fashion, style and are reorienting towards ECO products. An important role in this approach is played by ECODESIGN, starting with the discovery of the latest materials up to design, lifespan, recycling (Dufrene, 2016).

The ECODESIGN concept has appeared since the early 1960s and plays a fundamental role in the life cycle of a fashion product, from design to production, service life, and recycling, in other words DESIGN - PRE-PRODUCTION, END OF PRODUCT LIFE (Stefano and Ferreira, 2013).

The main vectors of ECODESIGN go in several directions:

- Selection of materials and their impact on production;

Non-toxic, used, natural fiber materials, and recyclable rubber will be used, all obtained with low energy consumption.

- Designing models and making samples;

These will be produced from material obtained by recycling used textile fibers with a high durability and low weight. Also, the other components must use the same production elements with low costs.

- Production;

The aim will be to optimize the production process, replace toxic auxiliary materials with natural ones (natural rubber, water-based adhesives), identify and eliminate toxic emissions, as well as use unconventional, solar and wind energy.

- Packaging.

These will be produced from recycled vegetable fibers and will be designed in such a way as to protect the product as well as possible without damaging it.

All these vectors will contribute to extending the “life” of the product by providing comfort, durability and eco-efficiency (Laruccia and Garcia, 2015).

SELECTION OF MATERIALS

Designers and all the factors involved in the development of an ECO product must find the newest materials that can be recycled as easily as possible, with low energy consumption. Natural fibers come first to the attention of designers. The fabrics from recycled cotton, linen, hemp, to which are added those made of pineapple or palm fiber, from certified crops respecting the international directives are the main components of an Eco fashion product. In addition, materials obtained from synthetic yarns after recycling plastic containers can be used. They will be combined with biodegradable polyamide and natural fibers (cotton, hemp). The accessories will in turn be made of plastic recovered from the oceans in combination with mother of pearl (shells) and wood fiber.

DESIGN OF MODELS AND MAKING SAMPLES

A first aspect that is required in the design of models is the identification of eco materials with high durability and low costs in the recycling and production process (Guerra Ashton, 2018). The design in terms of volumes and colors will focus on the predictions of fashion specialists. Vegetable pigments will give dynamism and color to natural fibers.

Sketches of ideas, and then the use of 2D and 3D CAD design systems will reduce work time in the different phases of product development.

SKETCHES OF IDEAS GENERATING NEW AESTHETIC CONCEPTS IN ECO-DESIGN

In order to create footwear that meets the growing demand for market-specific niches, in accordance with sustainability and circular economy criteria that combine elements of recyclability, organic use, non-use of animal products (leather) and natural components, it is necessary to design idea sketches.

The proposed models (Fig. 1) are based on the STROBEL circular system, which consists in attaching a non-woven textile material to the upper through sewing. After that, the assembly of the upper material on the sole is done by seams, with a minimal use of a water-based adhesive.

The “helmet” type sole from SBR + EVA (styrene-butadiene copolymer + ethylene-vinyl acetate copolymer) was chosen. It has up to 70% recycled rubber and synthetic rubber.

Figure 1. Model sketches

PRODUCTION

An important role in the organization of production will be the elimination of toxic components and their replacement with natural ones. The products presented in Figure 2 are exclusively “vegan” with elements of vegetable origin only in their composition.

The upper ensemble of the shoes is made of textile material obtained by interweaving hemp and linen yarns.

The materials are dyed using vegetable tannins (turmeric, dandelion, beetroot).

Also, unconventional materials are used resulting from the weaving of textile strips obtained by recycling used clothing.

Crepe soles made from natural rubber are 100% ecological and recyclable. They are very resistant to abrasion, water, acidic, alkaline, and salty solutions and are very elastic and flexible. In the process of calendering natural rubber, all operations are environmentally friendly. No dust, vapors are produced, and the residues are reused in the production cycle.

Cork also comes to the attention of vegan shoe manufacturers. It is used in the manufacture of anatomical and very light soles, as well as pure cellulose insoles, giving stability and torsional resistance.

Water-based adhesives in turn help eliminate toxic emissions.

Figure 2. “Vegan” shoes

PACKAGING

Their design will primarily aim to give the shoe a firm protection so as not to damage the product. When they are made, plant-based materials obtained exclusively from their recycling will take precedence. The packaging will be inscribed with vegetable dyes, green being the color that will signal to the consumer that it is an ecological product.

CONCLUSIONS

All the listed factors are of the primary importance in the eco-design of the footwear and not only. The use of natural, renewable and recyclable resources, materials, eco-design, production and distribution, consumption duration, unconventional energies will be found in the concept of circular economy, sustainability and eco-efficiency.

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