

## METHODOLOGY OF ECO-DESIGN IN THE FASHION CYCLE

### Reuse and recycling of wasted clothing

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#### **SUMMARY**

*The management of waste and recycling is one of the present major problems in textile and clothing industry. A great million tones of textiles, including dumped clothes, are annually discarded, while part of them could be reusable.*

*Faced with these problems, it is important to develop strategies and create tools that reduce not only pollution but also the consumption and waste textiles. Outside Portugal, there are several initiatives and different areas of intervention, generated by public or private sector.*

*This proposal aims to expose the "Design" as interventionist and demonstrate how it can participate in the fashion cycle according to a sustainable way.*

*Minimizing the environmental, social and economic impacts at the same time meeting the needs of the market are objectives that Design can do and must plan. In this sense, the proposal of "Eco-Design" methodology in fashion process aims to reduce waste and monetize resources through rational analysis in all life cycle products phases<sup>1</sup>. It emphasizes the continuous recycling and a reuse of raw materials after the products end their life where they are inserted.*

#### **KEY WORDS**

*Waste, Reuse, Recycling, Disposal, Clothing Design*

### **1. SUSTAINABLE ON CLOTHING**

The philosophy of 70's boosted an environmental concern in the consumption field and in clothing production. Although it was only since 90's, with the implementation of ISO 14000, that textile companies have begun to develop their ethical and sustainable projects, changing the frivolous fashion image that they had been before.

"The reuse of materials and their processing in new high value-added products have gradually developed the ecological consciousness of those who produces and who consumes products"<sup>2</sup>. Since then, environmental issues have begun part of market demand and now they are a common requirement in the enterprises management and media promotion, as well as they are subject of study in scientific researches. The environmental, social and economic impacts in textile and clothing industry are felt in all procedural stages<sup>3</sup>. The organization "Forum for Future"<sup>4</sup> and the honorary Greenpeace investigator, David Santilho<sup>5</sup>,

<sup>1</sup>Manzini, Ezio. Design, ethics and sustainability: Guidelines for a transition phase. *DIS-Indaco*( 28-08-2006),1-8

<sup>2</sup>Schulte, Neide Köhler; Lopez, Luciana Dornbush. Sustentabilidade Ambiental no Produto de Moda. *ENSUS 2007* Brasil. (2007), 5

<sup>3</sup>Black, Sandy. *Eco-Chic: The fashion paradox*. Black Dog Publishing Limited, London. 2008

<sup>4</sup> *Fórum for the Future* é uma organização que trabalha com líderes de negócios no sector público e privado com o objectivo de criar estratégias justas e sustentáveis.

identified some of the main non-subsistence problems of those economies. They are: 1) Fashion consumption, 2) Water use up, 3) Working conditions, 4) The energy spent, 5) The use of chemicals, 6) The materials production, taking into account the unsustainable fibres and animal welfare, 7) The carbon are spent in the transportation of fabrics and clothes around the world, 8) The complexity of the supply chain, 9) The management of waste and recycling.

As a result, it is visible that textile waste is then one of the concerns will be reviewed in the development of new products, especially when there are no management policies or collection of them.

### 1.1. Textile reuse and recycling

Wasted textiles have significantly increased due to the growth of fast-fashion that cooperates with standardized levels of quality and low prices. This process encourages consumers to have a great amount of clothing and discard them quickly. These, in turn, go to the landfill because they no longer are in fashion, they are damaged or they are not sold, becoming wasted resources if they will not be recycled.

Recycling garments or other textile items is not at all so simple. Its complexity starts in the planning and logistics implicit stages of that process, which describe: 1) Collection and transport, 2) Identification and separation, 3) Dismantling and crushing, 4) Washing or cleaning, 5) Pre-production of secondary raw materials.

Many countries that developed textile recycling policies or even have integrated reuse textiles practices carry out those procedures, in private or state level, causing labor costs.

In England, for example, there is a selective distribution, collection and recycling of discarded textiles in both governmental and private sectors, where innovation is the key for some successful green business strategies. The English Brand *Marks & Spencer* have been developing an action for reuse in collaboration with *Oxfam institution* (plan A). Other innovative examples by private levels are the German company *VauDau* or the Finland Company *Lindström*. The German company outdoor clothing, *VauDau*, decided to incorporate zips, labels, cables, fasteners and other components from dressing only in polyester, the same composition of their tissues, to reduce the recycling costs and facilitate the process, once recycling involves the disassembly system of metals or other contaminants. The Finnish company *Lindström Ltd* has another type of strategy: it offers a full service life of *workwear* which produces, including the first clothes *Redesign* to their clients, their maintenance, upkeep and repairs.

At the State level, the French system adopted the law of extended producer responsibility, in which it is obliged to pay a financial contribution that reverts to the organization *EcoTLC*, whose responsibility is to encourage the reuse, recycling and value creation, from used clothes. This organization helps textiles collectors and dealers supporting employment. Another country, which has invested in several guidelines and recycling activities, is Japan, which before only recovered 12% of the clothing worn. The best known schema is the *Teijin ECOCIRCLE*, a recycling system for closed-loop polyester products, developed in 2000 by Japanese company *Teijin fibers Ltd*.

## 2. DESIGN INTERVENTION

The supply chain is one of five areas of intervention, identified by DEFRA (Department for Environment, Food and Rural Affairs)<sup>6</sup>, for the improvement of sustainable performance in clothing. In its action plan, *Sustainable Clothing Roadmap*, the garment circuit should be mediated by *Design*, to outline correctly fibers and textiles, according to their maintenance way, and predict the life cycle of projected clothing to improve a better reuse and recycling after its disposition.

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FUTURE, FORUM FOR THE. Fashioning sustainability: A review of the sustainability impacts of the clothing industry. 2007. (Retrieved 26/ 10/ 2010).

[http:// www.forumforthefuture.org/files/Fashionsustain.pdf](http://www.forumforthefuture.org/files/Fashionsustain.pdf)

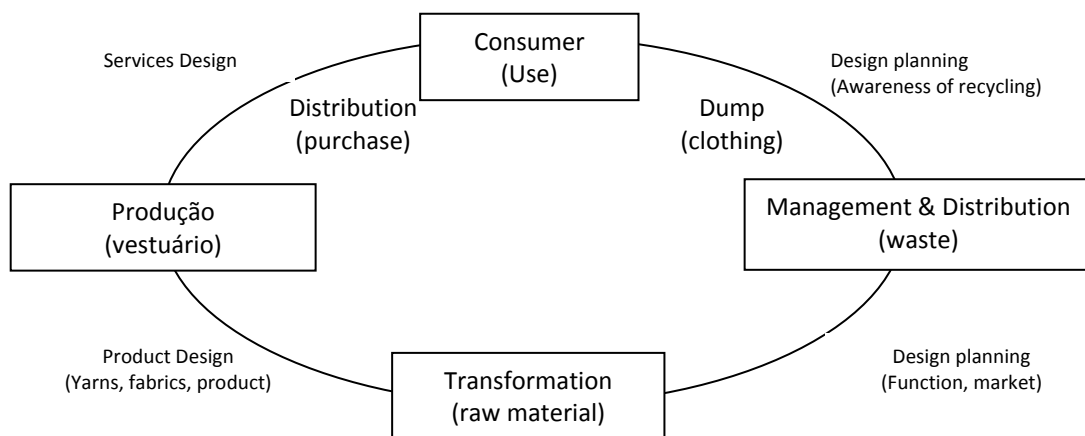
<sup>5</sup> Autor de *An Overview of Textiles Processing and Related Environmental Concerns*. Em CENTRO DE INTELIGÊNCIA TEXTIL, [CENIT10]. Da produção ao Retalho: Têxtil cada vez mais amiga do ambiente. *Jornal Textil*, 138, 4-5.

<sup>6</sup> [DEFRA08] Department for Environment, Food and Rural Affairs. Sustainable Clothing Action Plan. (2008). p. 27

Design has no longer ceased to focus on specific issues related to form or function, to define a global solution which must pass through the rational planning in all phases of the product life cycle, since distribution (packing, packaging, delivery, display and sales), use (transportation, installation, maintenance and use of objects) to your disposition<sup>7</sup>, theory advocated by Manzini that corresponds to the exchange of *inputs* and *outputs* between the environment and production processes<sup>8</sup>.

## 2.1. Eco-Design Methodology in the Fashion Cycle

The cycle of Fashion, more than any others, must integrate a process more sustainable than the one has been taking because their products are fast and rotating, exerting a strong influence on people. The methodology of Eco-Design is one of the found solutions that help to resolve the problem of obsolescence in consumption and the short life-cycle of products. Through a comprehensive analysis, covering all stages of the clothing process (Figure 1), intends to integrate viable opportunities from your dump. This will require the intervention of public and private organizations which help in proper planning of "collection", management and distribution of unwanted clothing, which then will be transformed under processes of "partial recycles or complete recycles" (Figure 2 in attachments).



**Figure1:** Sustainable Design review cycle/Global Design for the maximization of reuse and recycling of discarded clothing.

## 3. MULTIMEDIA ATTACHEMENTS

The figures in attachments complement the presented theory, among which appear: "Figure 2: Outline of research Agents in conventional fashion cycle for sustainable rehabilitation", "Figure 3: The environmental impacts of a product", "Figure 4: Textile waste solutions in UK" and "Figure 5: Conventional Fashion cycle".

## 4. CONCLUSION

Though, the proposal of design methodology is being in the study process and analysis too, it is of utmost importance. The recovery of waste textiles as current priority to recycle is a rule of European legislation since December 12, 2007.

In Portugal, the actions of strategies for textile recycling has been of little visible and this is just one of many possibilities that, in addition to hosting a specific sector, the discarded and contaminated clothing by mediation of *design*, will certainly help future operations of another type of textile waste.

## 5. REFERENCES

[Black08] Black, Sandy. *Eco-Chic: The fashion paradox*. Black Dog Publishing Limited, London. 2008.

<sup>7</sup> [Pereira08] Pereira, Ana Rita Aguiar Soares. Multi-look: Vestuário Multifuncional, Metodologia de Criação em Design. Guimarães: Universidade do Minho, 2008, Mestrado, 190.

<sup>8</sup> [Rech08] Rech, Sandra Regina; Souza, Renata Karoline Rodrigues de. Ecoluxo e Sustentabilidade: Um novo comportamento do consumidor. *Anais do XIX Seminário de Iniciação Científica*, 2008, 7.

- [CENIT10] CENTRO DE INTELIGÊNCIA TEXTIL. Da produção ao Retalho: Têxtil cada vez mais amiga do ambiente. *Jornal Textil*, 138, 4-5.
- [DEFRA08] Department for Environment, Food and Rural Affairs. Sustainable Clothing Action Plan. (2008). p. 27
- [FFF10]FUTURE, FORUM FOR THE. Fashioning sustainability: A review of the sustainability impacts of the clothing industry. 2007. (Retrieved 26/ 10/ 2010).  
[http:// www.forumforthefuture.org/files/Fashionsustain.pdf](http://www.forumforthefuture.org/files/Fashionsustain.pdf)
- [Koch99] Koch, Kathryn; Domina,Tanya. Consumer textile recycling as a means of solid waste reduction. *Family and Consumer Sciences Research Journal*. 28:1 (1999).3-17.
- [Manzini06] Manzini, Ezio. Design, ethics and sustainability: Guidelines for a transition phase. *DIS-Indaco*( 28-08-2006),8
- [Pereira2008] Pereira, Ana Rita Aguiar Soares. Multi-look: Vestuário Multifuncional, Metodologia de Criação em Design. Guimarães: Universidade do Minho, 2008, Mestrado, 190.
- [Rech08] Rech, Sandra Regina; Souza, Renata Karoline Rodrigues de. Ecoluxo e Sustentabilidade: Um novo comportamento do consumidor. *Anais do XIX Seminário de Iniciação Científica*, 2008, 7.
- [Schulte07] Schulte, Neide Köhler; Lopez, Luciana Dornbush. Sustentabilidade Ambiental no Produto de Moda. *ENSUS 2007 Brasil*. (2007), 5