Proceedings Book of
9th ICEEE – 2018 International Conference on
"Climatic Change and Environmental (Bio) Engineering"
22nd - 24th of November, 2018
Budapest, Hungary
ISBN 978-963-449-105-7 Publisher: ICEEE, RKK Óbuda University

SOLUTIONS FOR NON-WASTE TAILORING METHODS

Márta KISFALUDY, Éva HOTTÓ

Óbuda University, Budapest, Hungary

Abstract

The fashion industry after the oil industry is the second most polluting industry in the world. Both the production of clothes and the afterlife of the pieces give rise to high pollution. Developing environmentally friendly technologies for production and zero-waste efforts are a deliberate intention to alleviate the problem. More than 400 billion square meters of fabric are produced annually, but out of this is 15-20% loss. [2] The issue that has become very important since the early age is still very important, although other reasons have proved the use of non-waste sorting methods at that time. In history, there have been many examples in which people have tried to make full or nearly full use of the fabric when making their clothing. This article presents some main stages of these, and also demonstrates student project tasks as illustrations. These tasks start with the study of the methods of cutting and then the different aspirations of contemporary designers. In the fashion designers' collections, the eco-conscious lines play key role the help of which the waste in tailoring can be minimized and the natural materials come into view. The proper use of drapery is an opportunity in this direction, while another direction seeks to use the entire material width. Third and fourth year students, after completing basic professional design tasks, experiment with special shaping based on such principles. Students need to design as many variations as possible from simple geometric patterns, as far as possible from the given fabric. The characteristics of the textiles are analyzed and the varied shapes that provide solutions to the most up-to-date clothing and features are also in the focus. The design process results in creative form solutions and this enhances students' eco-conscious thinking. The result of such experimental work is that development and understanding are considerably simpler than usual fashion-oriented design tasks, though it is a concrete solution to optimize the treatment of sartorial waste.

Keywords: *Zero-waste, ecodesign, drapery.*

1. INTRODUCTION

1.1. Historical background of zero waste

The history of costumes gives plentiful examples of clothing made with the application of non-waste tailoring. We have different source materials at hand to present them. On the one hand, in addition to the examination of survived original clothes, there are written documents and depictions in creations of fine arts, on the other one. These are completed by pattern books, sometimes difficult to interpret, available to us.

In history, there have been many examples in which people tried to make full or nearly full use of the fabric when making their clothing. The prehistoric men wore garments, fastened onto his body only for protection and possibly wizardry. They wore bottom cloth, loin cloth or skirt, made of leather, fur and plant fibres to get protection against adverse weather conditions. As these pieces were fully made of natural materials they were organic, thus their degradation was fast and posed no problem on the environment.

In the ancient Egypt, due to the nice weather, only light linen clothes were typical and they were mostly white. Men wore shenti that is loin cloth, wound on their hips and knotted in the front. Women wore *kalasiris* a straight lined sheath dress worn down to the knee or the ankle.

The clothes of the Greeks typically consisted of rectangle sheaths of different materials and sizes draped and secured with ornamental clasps. These clothes were worn by men and women as well. Chiton was a typical piece of clothing fastened on the shoulders. The himation was made of wool and it was worn like a cloak wound on the chiton. The peplos was typical attire for women. Its folded top edge was pinned on both shoulders. (Figure 1)

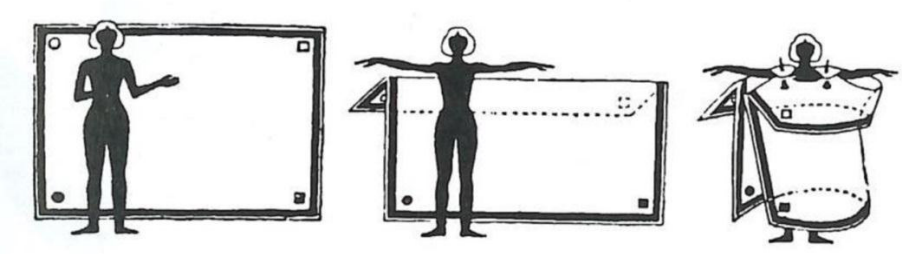


Figure 1. Chiton wear

Clothing in the ancient Rome was greatly similar to the Greek one. Roman people used their clothing to show their status and luxurious lifestyle. Both women and men wore full-length *tunic* sewn from two pieces. The tunics were with or without sleeves. The poor and the soldiers wore short tunics. *Toga* was the privilege of the Roman citizens. The costumes of the ancient Greeks and Romans clearly exemplify how the most diverse clothes can be made of a single rectangle by folding and draping the material.

In the middle ages the costumes of the conquering Magyars greatly depended on their geographical location. The riding and wandering lifestyle determined their lives. They wore shirts or underwear with wrist and neck straps with baggy trousers the wide legs of which were tucked into their boots. Their outer clothing was a knee-length caftan clamped with a decorated belt. The geometric lines of the caftan suggest a sparing cut. [7]

1.2. Traditional costumes

Among the traditional costumes of different peoples the intention of the best possible utilization of the fabric can be observed, Nowadays the Japanese word kimono is meant for a narrow and long garment having angular T sleeves. In a narrower interpretation this piece is the *kosode* that is the “small sleeve” that, until the 19th century, was a general casual wear in Japan for both women and men. The pattern of the *kosode* followed simple straight lines but it was richly decorated in the process of weaving or subsequent dyeing. (Figure 2)

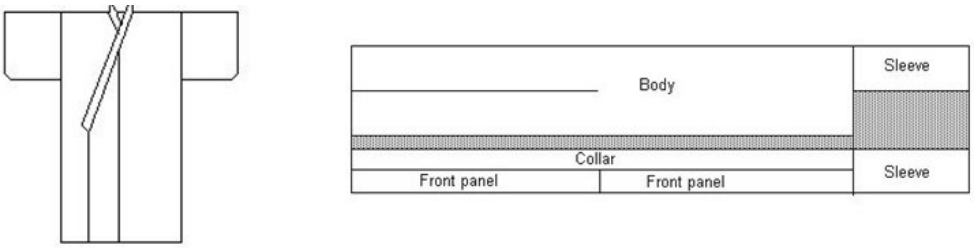
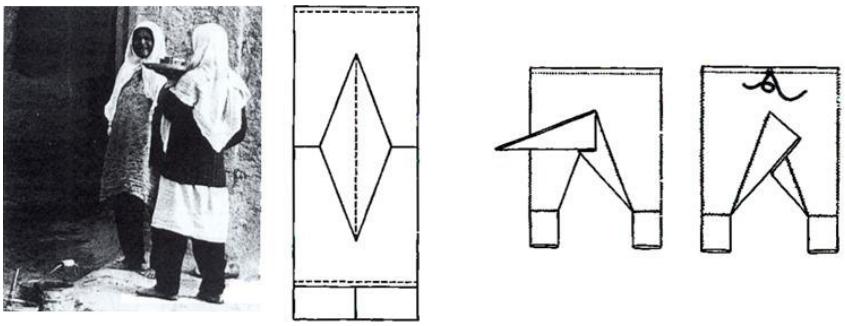


Figure 2. Kimono and layout drawing of kimono

The Arab women wear trousers under their long shirt. Only the part of the trousers, falling below the knees, is visible. The full width of the material is used for tailoring the baggy trousers. The rhomboid form, cut out in the process of tailoring, will be sewn between the inner legs. (Figure 3)



a.) b.) c.) d.)

Figure 3. Costume of the Arab women (a), Marker of the parts of the trousers (b), Steps of sewing the parts of the trousers together (c-d) [5]

1.3. Hungarian folk costumes

Until the end of the 19th century the Hungarian peasants made their clothes of extremely durable homemade materials. These clothes could serve several generations. The decorated textiles, festive pieces, clothes, intended for the layette were made by women. As the preparation of the fabric required a lot of time and effort, the full use of the fabric can be clearly observed. This makes logical the almost wasteless cutting of parts, following simple geometric forms, of the clothes. When cutting the individual pieces, one part closely follows the other (Figure 4).

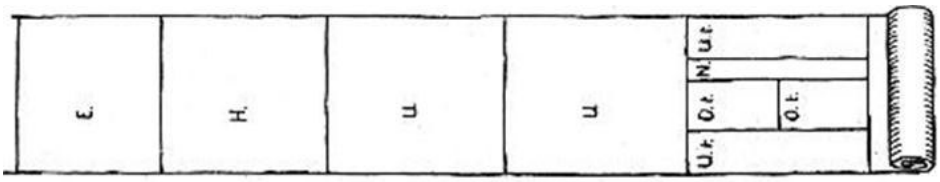


Figure 4. Markings of the patterns of shirt parts on the fabric
(E: front, H: back, U: sleeve, Ut: fitting-in of the sleeve, Ot: side gusset, N: neck strap)

The thrifty use of materials was also sought when sewing shirts, baggy trousers and skirts. The free motion of the arms was ensured by gussets which was a linen square sewn into the armpit of the shirt having set in sleeve or sided sleeve. The differences between the cutting lines, to be sewn together, were usually eliminated by gathering which had a strong decorating function as well. [3]

Basically two types of shirts are distinguished:

- shirts with set in sleeves (tunic type)
- shirts with sided sleeves (renaissance type)

The cut of the shirt was decisively influenced by the dimensions of the fabric. The formation of the shirts with set in sleeves is characterized by the linen, folded in two with a T shaped opening at the neck. The sleeves are sewn to the bodice at right angle (Figure 5).

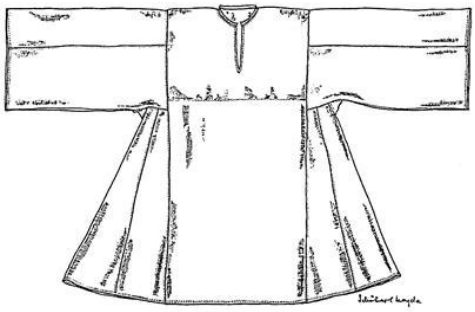


Figure 5. Shirt with set in sleeves [3]

The parts of the shirts with sided sleeves are also rectangle or square shaped. However, when sewing their parts together, the sleeves are sewn beside the front and the back part (not at right angle). Gussets are necessary for this type of shirt, too (Figure 6).

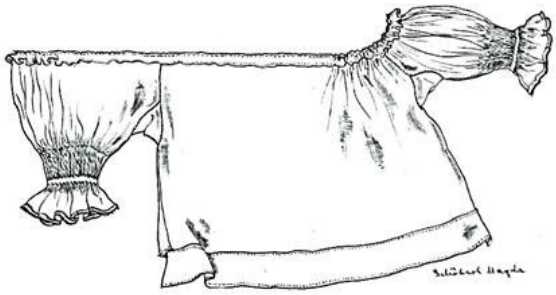


Figure 6. Shirt with sided sleeve [4]

Occasionally, the name gusset was used for the bottom part of the baggy trousers. Here the use of the gusset also resulted in a wider range of motion. The two legs of the trousers were formed from a single piece of linen, either keeping their full width or making them narrower downward. After sewing the legs together, the square shaped bottom part (gusset or leg part) was subsequently sewn between the legs (Figure 7).

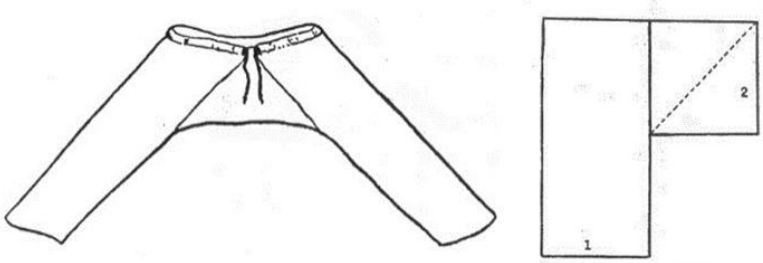


Figure 7. A pair of trousers and its pattern

The so-called *szűr* (embroidered felt coat) was a garment with a large collar. This garment was also made of rectangles. At the beginning, its material was leather, later on fine felt was used. When folded on the head, its large square collar protected its wearer from the rain.

The szűr was never put on; it was always worn slung on the shoulders. Its festive variant was the so-called *cifraszűr* (embroidered peasant cloak). It was characterized by abundant decoration. The loose short coat of angular cutting lines, used on the Great Hungarian Plain, was called *Guba*. Rarely it was made of woven wool fabric and contained wool clusters as well. [3]

2. OBJECTIVE

Eco-solutions involve not only technical but social, cultural, economic and political dimensions. Eco-logical design, as an approach to social and environmental problem solving, deals with complex, open systems. Reduce, reuse and recycle are the three essential components of environmentally-responsible consumer behavior.

The recovery of the waste is a key element in the environmental strategy of the companies. Taking into account the environmental effects this kind of product design and development covers the entire life cycle of the products.

In the 20th century, environmental ideas continued to grow in popularity and recognition and gained rapid speed around the world from the early nineties. Eco fashion began to look less like a funny spectacle and more like a serious business proposition. One of the strongest trends in fashion nowadays is the expression of ecological, social and community consciousness. In the

education we musn't disregard this phenomena and we have to prepare students for these kind of conceptual ways of thinking. [1]

It is a big challenge for students who study fashion design mainly from the industrial part of it, to develop a specific approach in design methods. After their one year's professional studies of fashion they research new and innovative ways to become more sustainable.

The eco-product design is a new, responsible approach, new attitude, and new philosophy, the problems of which all the student have to be well aware. Through a one semester project they learn to identify themselves with ecological, social and community consciousness.

This research highlights the accumulated sources worth dealing with and the eco-conscious way of thinking. For obtaining the theoretical background of this growing sustainable design philosophy fourth year students get a practical reuse/redesign project.

3. THE PROCESS OF METHOD

In the sense of zero waste, students can experiment on two different lines. One is the non-sewing dressing created by drapery, and the other is to design coat forms experimented with folding.

Study of historic costumes and the latest trends is essencial for starting this project. This experimental work is based on the connection between the body and the differently draped/folded fabrics and students try to work without any previous idea.

The silhouettes should be in harmony with the fabrics therefore they target to use the final products as real dresses/coats. No cheep calico is used but crispy woven cotton, chiffon, transparent organza, silk, muslin and soft knitted jersey for drapery and soft wollen fabrics for the coats. [6]

Draped dresses can be created by using:

- pleats, gathers and tucks,
- draping around the body,
- rubbers,
- stiching,
- straps,
- studs,
- buttons and buttonholes,
- maximum three cuts on the fabric.

Folded coats can be realised by using:

- stiching,
- overlapping,
- buttons and buttonholes,
- belts.

4. CASE STUDIES

4.1. Form studies for the folded coat types

In the course of carrying out the studies the student tried first to form the textile around a body, using a trapezium shaped part and two triangle shaped parts. Later the fabric was divided into several pieces but the student took care of avoiding the effect of frittering the product away.

The first studies were performed in small size to save both material and time. The mock ups were made for a wooden dummy. From a certain aspect the dummy properly followed the proportions of the human body, although from sartorial point of view it proved imperfect, it was suitable as a starting point. The width of the fabric was determined on the basis of the distance between the arms of the dummy. The mock ups resulted in exciting silhouettes even in the case of mock ups having identical patterns.

4.1.1. List of requirements

For the designing of the collection it is important to summarize the general quality and technological expectations to be met by the pieces. Zero waste: The goal is that the individual pieces could be constructed without the formation of sartorial waste.

Longevity: It should not contain the extreme style features of the current fashion and it could be blended in the existing fashion trends.

Simplicity: Application of pure forms and lines that facilitate and shorten the manufacturing process.

Comfort: The cut and form of the coat should satisfy the ergonomic and physiological requirements, make the free motion of the body possible. The coat should be manufactured with the use of high-quality materials.

Uniqueness: Novel use of Geometric lines in the spirit of zero waste (Figure 8).

Figure 8. A prototype from the collection of Daniella Bolla [8]

4.2. Form studies for draped dresses

The global shape is formed by applying local rules.

4.2.1. Form 1

For gaining a Greek silhouette 3 meters of chiffon was used but in this case with the help of strap-keepers and rubber-keepers. The sculpted look needed two diagonal and two horizontal keepers in the front and in the back while the fabric was gathered on the shoulder as well. In the middle of the fabric 30 centimetres long cut hole was made for the head. The only decoration is the lilac satin ribbon. (Figure 9)

Figure 9. The greek silhouette by Anna Herendi [8]

4.2.2. Form 2

Straps play important role in the folded mini dresses as looping them in a very decorative way. 5 pieces of 170 centimetre long straps were laced up thought three strap-keepers with the help of which several different shapes could be gained. (Figure 10)

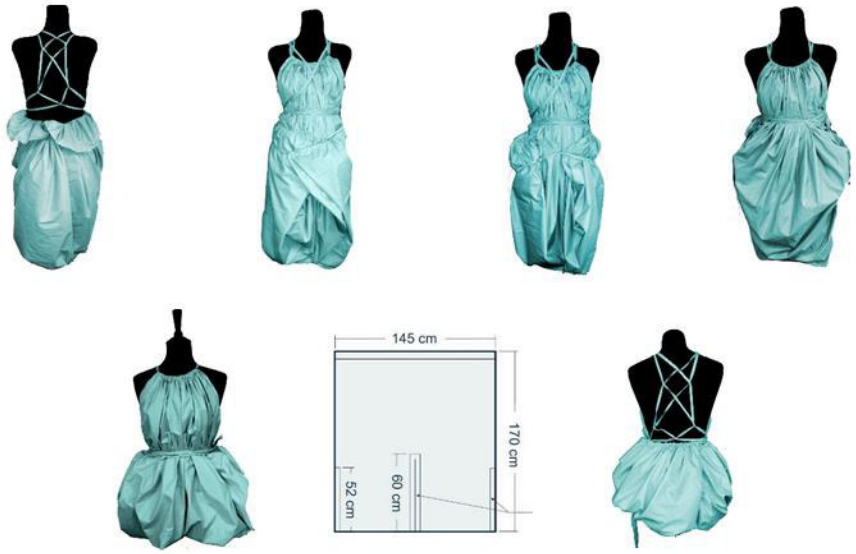


Figure 10. Draping with straps by Krisztina Szegedi [8]

CONCLUSIONS

We all know that sustainability isn't just one thing like organic cotton or wind energy, or not using PVC or genuine leather, but involves thousands of other small steps that help to replace what we have taken from the environment. Fashion designers have to consider the impact they have on the planet as they design clothing, and manufacture products considering the future of ethical design. The highest quality they create the better step they do.

In the course of doing their research work of this type the students bear in mind, all the time, the question of corporate social responsibility. The pieces of their collections can be constructed with zero waste and their technologies bring not only environmental protection benefits but also they have positive consequences concerning manufacture and economy.

The zero waste tailoring improves the manufacturability. As a result of using the geometric cut lines, the work processes become shorter and the production gets cheaper. The cost of textile waste management ceases, too, as no unnecessary waste remains in the course of the manufacture, thus the time and energy, to be spent on this, can also be saved. The prototypes of students demonstrate that the subject of these studies is really very inspiring and leading to different solutions with the help of the method used. This is a creative process which is a real design problem and the conclusions give solutions for further ideas.

REFERENCES

[1] Doró, Viktória (szerk.): A hulladék új élete – Ökodizájn Magyarországon, ReCity Kiadó, Budapest, 2016

[2] Előd, Fruzsina; Divatosan rohanunk a katasztrófába https://index.hu/gazdasag/2017/08/27/divatipar_kornyezeti_hatasok_viszkoz_fast_fashion

[3] Flórián, Mária: Magyar parasztviseletek. Planétás Kiadó, Budapest, 2001

[4] Katona, Edit: Félre gatya, pendely. Látható és láthatatlan a magyar népviseletben. Néprajzi Múzeum, Budapest, 2002
[5] Meedom, Hanne: Hosen, Form und Funktion. Verlag Burgbücherei Schneider GmbH. Baltmannschweiler, 1987
[6] Suman, Pant: Methods of Obtaining Different Drape Effects in Garments, Textile Review, June 10. 2010
[7] Szűcs, Ágnes: Művészettörténet-divattörténet. Műszaki Könyvkiadó, Budapest, 2003
[8] Works of students of fashion design, 2014-2018

Corresponding author:
Prof. Dr. Márta KISFALUDY
Institute of Product Design
Rejtő Sándor Faculty of Light Industry and Environmental Engineering
Óbuda University
Doberdó u. 6
1034 Budapest, Hungary
+36 1 666 5930
E-mail: kisfaludy.marta@rkk.uni-obuda.hu