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Zero Waste Design
With Sustainable Development

FU NAN

Department of Clothing
The Graduate School of Sungshin University

Zero Waste Design
With Sustainable Development

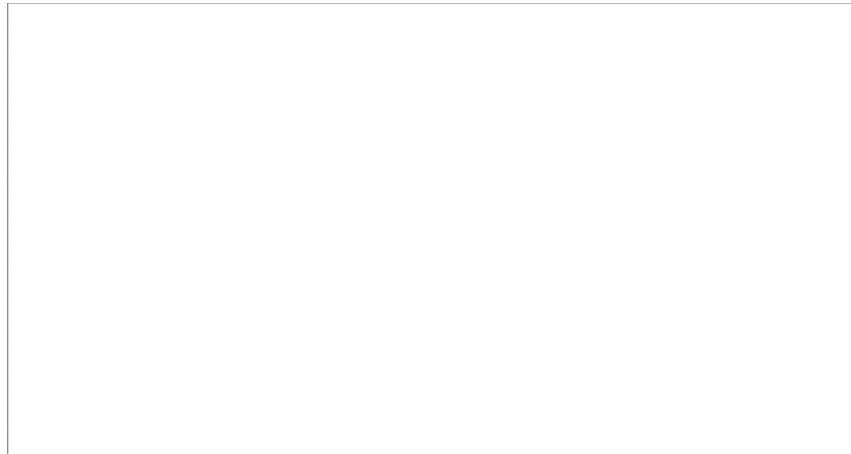
A Master' s Thesis
Submitted to the
Graduate School of Sungshin University
in partial fulfillment of the requirements
for the degree of
Master of FU NAN

FU NAN

1, 2020

This is to certify that we have examined the
Master' s Thesis of
FU NAN
Submitted to Department of Clothing

Approved as to style and content:

A large, empty rectangular box with a thin black border, intended for a signature or stamp.

The Graduate School of Sungshin University

ABSTRACT

The purpose of this study is to develop an effective “sustainable development” based on the concept and design of “zero waste” fashion, and to propose a direction for the future development of the garment industry. In China, the country with the most active economic development, people’s understanding of sustainable clothing is still insufficient. This study can make a contribution to changing the importance of ‘zero waste’ clothing and consumers’ fixed concept. Clothing composition methods are divided into zero waste pattern, upcycling and reassembly, among which reassembly design is studied in this study. The results of the study are as follows:

Project 1 is a breakdown and combination of three different styles of suit coats, suits, and knit pullovers. Meet the element that all wintry day never goes out of style, the languid of in long paragraph trench coat is tie-in loose suit coat is lazy and loose neuter version below, before side adornment pocket did not choose the symmetrical pocket of inflexible, the size of pocket slant is big, have practical already pack next to carry article, the appearance can break again depressing feeling. Project 1 in the production process, the material connection and

performance is more important than anything else.

Project 2, like Project 1, chose the same trench coat, suit and sweater as the basic types of clothing for redesign, hoping that in this way, in the face of a large amount of inventory surplus in the enterprise, the same style of clothing can be assembled in different forms to obtain more diversified transformation clothes. It can be mass produced and provide more choices for consumers. Therefore, the original collar of the high-necked sweater and the original collar of the plaid suit jacket are retained for stitching to create a false two-piece feeling to meet the needs of consumers who like multi-level style. During the production process, the emphasis is on the connection of color harmony.

Project 3, Cowboy costumes in the process of production need to bath dyeing process and the processing is completed, compared with other fabrics, denim fabrics made itself already produce more pollution and waste, so the author choose recycle denim fabric, this design chose denim jacket, jeans and army green charge baseball in three basic models to split the splicing combination both of men and things to suit. Baseball suit is a little boyish single product, the sense of youth is full, this design also intends to grasp the youth breath. Denim and army green are used to match the whole outfit. Since the two fabrics used in Project 3 are not elastic, the first consideration is comfortable dressing.

Project 4 also chose to use denim fabric for innovation. This time, it chose a slim suit with a completely different style for stitching and reconstruction. The characteristic of the suit jacket is that it will highlight a person's unique temperament in the crowd. this design retained the original dignified feeling of suit already, on the foundation that uses bull-puncher fabrics again many a few follow along with sex and recreational feeling, have the ability of city beauty does not break however nifty. The split part of the front center line of the trousers, while increasing the comfort of the movable surface, completed a completely different product from the two garments originally used as materials.

This study shows that "reassembly" is definitely one of the important methods for the development of "sustainable development" in the fashion industry. It is believed that continuing to try design and development in the fashion industry in the future will help the majority of consumers to choose products as their preference for design and understand the environment together.

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I . Introduction

1. The purpose and significance of the research

The rapid development of the economy is increasing the standard of living and consumption of people. China is also making rapid economic progress, but this is naturally aggravating the environment because it uses limited natural resources. At present, sustainable development is emerging worldwide due to a lack of natural resources, and there are claims that clothing industries closely related to human life should be responsible for sustainable development. Therefore, it is essential to push ahead with reforms to protect the low-carbon environment in the clothing industry.

In 2005, UNEP (United Nations Environment Program) for the first time, puts forward the concept of “zero abandonment” . This means the government’s efforts to minimize the generation of waste and its harm to the environment¹⁾. But take the garment industry as an example, the garment production process produces a large amount of waste, causing

1) WTO(2006), 《International Trade Statistics》
(www.wto.org/English/res_e/its2006_e/itsOb_toc_e.htm)

damage to the environment. What's more, in the clothing industry, so-called "Fast Fashion" is occupying the market due to the consumers who pursue cheap and fast-changing Fashion. As the cycles of clothing industries such as Zara and H&M, the world's leading fast-fashion companies, accelerate, The problem of waste generated in garment production has been recurring for a long time, which means the importance of sustainable development²⁾. At present, the garment industry needs more garment enterprises and designers in order to reduce the emission of waste as far as possible from garment design to production. Therefore, it can be said that the method of reducing or eliminating waste is very important. "zero waste" can maximize the use of raw materials and reduce waste at the same time. Still, until now, the industry has not done a comprehensive analysis of "zero waste" ³⁾.

This study determined the scope by analyzing the clothing composition method of zero waste clothing. There are three ways to make up "Zero waste clothing", namely "Zero waste pattern", "upcycling" and "reassembly". Reassembly design is studied. The research methods include zero waste related publications, websites and online materials,

2) 蔡培, 姜志群 (2012), 《ZARA 快时尚的背后》, 中国皮革, pp.21-23.

3) Ibid., pp. 21-23.

sustainable clothing, zero waste related papers and works and other literature review materials. According to the analysis data, we have mastered how to realize the “reassembly design” product to meet the needs of the market and consumers, and put forward an effective design scheme.

2. The scope and the method of the research

The purpose of this study is to propose effective design Suggestions through the analysis of “zero waste” fashion. In addition, in China, which has the most active economic development in the world, the understanding of sustainable fashion is still insufficient. Therefore, this study can make a contribution to changing the importance of “Zero waste” fashion and consumers’ fixed concept. Most importantly, based on the worldwide changes in the increasing attention to sustainable fashion, objective basic information can be provided for a variety of industrial and academic fields.

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II . Literature Review

1. Sustainability and Zero Waste Fashion Design

1) The concept and background of sustainable development

At present, the definition of “sustainable developmentis” not generally accepted by most people. But one definition is well known, the 1987 《our common future》⁴⁾, stated that “the needs of the present are met without prejudice to the ability of future generations to meet their own needs” . According to this definition, the interpretation of “sustainable development” in subsequent studies is mostly based on human needs and values. It emphasizes the future and is time-dependent. However, Giddings etc⁵⁾ pointed out that sustainable development is a vague concept that can form different “derivatives” . The idea has since been adopted by various government agencies, private companies, social and environmental activists, who have

4) Gro Harlem Brundtland (1987), 《Our Common Future》 , (www.Mondialisation.ca)

5) Giddings B, hopwood B, O'Brien G. (2002), 《Environment, economy and society: Fitting them together into sustainable development》 , pp.187-196.

abstracted multiple meanings from their respective positions. At the same time, most countries now have sustainable development strategies, but their importance and ideology are different from each other. This difference, on the one hand, stems from the social and economic conditions and physical attributes, on the other hand, from the interests of stakeholders⁶). For example, it was noted that addressing issues such as biodiversity and climate change requires cross-regional and cross-sectoral collaboration, but this may overlap with issues such as the protection of human rights and the eradication of poverty⁷). While these issues are not contradictory, the key is how to set its “priorities” and how to develop concrete plans to balance the interests of all parties. Therefore, so-called “sustainable development” actually leaves many problems for society and policymakers. Of course, in the narrow context, sustainable development may not be a big problem; However, the issue of sustainable development will become more complex in larger Spaces such as provinces, cities, countries or the world⁸). population growth is a major obstacle to global sustainable

6) Spangenberg J h. (2011), «Sustainability science: a review, an analysis and some empirical lessons», *Environmental Conservation*, pp.275-287.

7) *Ibid.*, pp.275-287.

8) Jenkins W. (2003), «Sustainability theory In: *Encyclopedia of Sustainability*», Springer, pp.380-384.

development, and its consequences are highly localized; Historically, southeast Asia has experienced a reluctant shift in rice cultivation. Or, in recent years, the fairness of transshipment and disposal of waste⁹⁾. To deal with such problems, how to understand “sustainable development” is particularly important. Because the sustainability of one area may be affected by the sustainability of another area.

Humans have realized that the “ripple effects” caused by environmental unsustainability can have profound effects. For example, population migration and rising crime rate¹⁰⁾. Similarly, the phenomenon of “sustainable change” , as a response, is defined as a fundamental shift towards a sustainable society¹¹⁾. This phenomenon bears witness to the spatial nature of local identity and other related factors, including political environment, natural resource endowment, resource management, and local technology and industrial specialization¹²⁾. The 1987 report our common future, published by the world commission on environment and development, was considered the starting point for

9) Wilbanks T. (2007), 《Scale and sustainability》,Climate Policy, pp. 278-287.

10) Cutter S L, Bryan J, Boruff W. (2003), 《Social vulnerability to environmental hazards》, Social Science Quarterly, pp.242-261.

11) Grin J, Rotmans J, Schot J. (2010), 《Transitions to sustainable development: new directions in the study of long term transformative change》, Routledge, p.5.

12) Ornetzeder M, Rohracher H. (2013), 《Of solar collectors, wind power, and car sharing:comparing and understanding successful cases of grassroots innovations》 Global Environmental Change, pp.856-867.

establishing the concept of sustainable development. Of course, the introduction of any concept is an evolutionary process that is further modified and recast depending on the participant and environment.

According to Mebratu¹³), sustainable development of the concept can be divided into three periods :

Pre-stockholm (before 1972) : the concept of sustainability has been around for a long time, particularly the identification of sustainable and unsustainable practices¹⁴). As early as the 18th and 19th centuries, issues such as international and inter-generational equity, conservation of natural resources, and concern for the future were hotly debated by European philosophers¹⁵). Human beings need to choose to sacrifice a certain degree of personal freedom in order to achieve a more secure and balanced social life. This idea coincides with today's concept of sustainable development¹⁶).

From Stockholm to WCED period (1972-1987); Malthus (1766-1834) is credited with being the first to foresee resource shortages limiting

13) Mebratu D. (1998), «Sustainability and sustainable development:historical and conceptual review», Environmental Impact assessment Review, pp.493-520.

14) Ibid., pp.493-520.

15) Lumley S, armstrong P. (2004), «Some of the nineteenth century origins of the sustainability concept», Development and Sustainability, pp.367-378.

16) Charles Scribner (1864), «Man and nature; or, Physical Geography as Modified by human action», new York.

economic growth. Together with David Ricardo (1772 --1823), he proposed the idea of environmental restriction¹⁷⁾. According to Malthus, land is an absolute resource, and as the population grows, per capita food production will fall; When human living conditions are reduced to subsistence, then the population may cease to grow¹⁸⁾.

Post-wced period (1987-present). There is no doubt that WCED's definition of "sustainable development" is an important turning point. Between 1987 and 1992 alone, some 70 different definitions of "sustainable development" have emerged, and this has led to intense debate¹⁹⁾. For example, a group of scholars like Redcliff have gradually interpreted "sustainable development" into a kind of truth. However, the concept of "sustainable development" is still developing and evolving, which needs to be improved according to different space and time.

2) The state of sustainable design

McGowan and Michael Braungart stressed if failed to consider for the nature of safety design materials and special design, the design concept

17) Pearce D W. (1990), 《Turner R K. Economics of natural Resources and the Environment》, JhU Press.

18) Daly H E. (1998), 《Beyond growth:The economics of sustainable development》, Economia E Sociedade, p.6.

19) Redcliffe M. (1987), 《Sustainable Development: Exploring the Contradictions》, Methuen.

of waste and chemical toxins released into the environment, can cause great harm to the environment, so we need an industrial technological innovation output that harmless to the environment and the afterlife is still at the end of the use of environmentally friendly products²⁰. Nowadays, environmental problems have become a problem of common production and development of human beings. Therefore, we should consider the impact on the environment and shoulder a sense of social responsibility when designing²¹. With the emergence of 21st century values in the field of design that emphasize the inherent necessity of taking on the environment and social responsibility, new concepts of sustainable design including environment, society and ethical will have also emerged²². This study considers the does not destroy the environment of nature and natural circulation design, the pursuit of the efficiency of energy efficiency and renewable design, environment as well as the relationship between people and society's joint and the design of the social ethics consciousness, let us through sustainable product design, environmental design, visual design in areas such as

20) McGowan, Michael Braungart (2003), 《요람에서 요람으로》, pp.128-159, 신혜영(2011), 《패션 산업의 메가트렌드로 나타난 지속가능성에 대한 연구》, 홍익대학교 대학원 박사학위 논문, p.25.재인용.

21) Ibid., p. 25.

22) 廖畅 (2018), 《“零浪费”在服装设计中的运用研究》, pp. 5.

examples to further understanding of sustainable design. First, examples of sustainably designed products and tools for the development of human life are as follows. is the representative product of “radiocan” <Fig.1> with sustainable design by Victor Papanek²³. This radio was made in the 1960s in Indonesia with the idea of reducing harm to nature. which can be turned on by using tins and peanut oil discarded by tourists, costs just 9 cents²⁴).



<Fig.1> Victor Papanek and George Seeger’ s Tin Can Radio
(<https://www.ducotedechevous.com/article/histoire-de-l’open-design/>)

23) Par Clémentine B le (2019) , 《Histoire de l’ open design 》
(<https://www.ducotedechevous.com/article/histoire-de-l’open-design/>)

24) Ibid., p.1.

The second is the impact of MacOS on paper waste, MacOS should automatically downscale content of documents that are having a single paragraph on the last page²⁵). You’ ll need 4 pages to print this New York Times article using Safari. The last page would include just a single line with a copyright credit line. MacOS could be scaled down automatically to 98% of the original size to save a sheet of paper without requiring any action²⁶(Fig.2).



<Fig.2> MacOS’ impact on paper waste

(<https://uxdesign.cc/product-design-for-sustainability-3fffbb2a7f0e#.ckfzsen0>)

25) Artiom Dashinsky (2016), 《Product Design for Sustainability》, p.1.

26) Ibid., p.1.

2. The concept and value of sustainable fashion



<Fig.4> The dark side of glamour
(<https://nowre.com/editorial/402674/shizaibixingdekechixuxingshishangdaodishishenme/>)

The fashion industry is one of the most polluted industries in the world. Under the problem of global overcapacity, the inventory problem of the fashion industry has been the most troublesome part for brands. The fashion industry, through its massive distribution model, has built a global supply system with a “ales” business model that has also created problems such as pollution and overproduction<Fig.3>.According to BoF and McKinsey’s 2018 global fashion business report²⁷⁾, sustainable

27) BoF and McKinsey’s (2018), 《The State of Fashion》,
(https://cdn.businessoffashion.com/reports/The_State_of_Fashion_2018.pdf?utm_source=articlepage&utm_medium=marketingmodule&utm_campaign=Mckinsey)

development is not just a marketing tool. It goes deep into the upstream of the supply chain of fashion enterprises, and uses the concept of circular economy to update the business model of fashion enterprises²⁸. Francois Souchet, director of the Caroline Chalmer, executive adviser and chief operating officer of Global Fashion Agenda, said, “sustainability is linked to environmental, social and ethical issues, not only in the supply chain of the Fashion industry, but also in how production, Fashion sales and consumers communicate with each other and, of course, how consumers consume Fashion²⁹” . In Chalmer’s view, sustainable fashion means sustainable for a long time. Companies in the fashion industry can develop and make profits for a long time. Compared to the west, China’s fashion industry has the advantage of being able to do different controls and management throughout the supply chain and at each stage³⁰. The United Nations economic commission for Europe has pointed out that a high proportion of waste water (20%) and carbon emissions (10%) remain the major environmental pollution problems of the fashion industry(Fig.4).

28) Ibid., p.1.

29) Liz Gioro (2019), 《势在必行的“可持续性”时尚，到底是什么》，
(<https://nowre.com/editorial/402674/shizaibixingdekechixuxingshishangdaodishishenme/>)

30) BoF and McKinsey’s., Op. cit., p.1.



<Fig.4> Environmental pollution problems of the fashion

(<https://nowre.com/editorial/402674/shizaibixingdekechixuxingshishangdaodishishenme/>)

The fashion industry’s “ethical choice” has become a hot topic. “High energy consumption” and “high pollution” have become the original sin of the fashion industry. Few brands will escape. That is why the fashion industry is increasingly environmentalist³¹(Fig.5).



<Fig.6> Fast fashion has ushered in an outbreak

(<https://nowre.com/editorial/402674/shizaibixingdekechixuxinshishangdaodishishenme/>)

In recent years, clothing markets in Asia, South America, the Middle East and other places, fast fashion has ushered in an outbreak<Fig.6>. Disposable fashion is the norm. Unlike other biannual brands, fast fashion retailers can offer consumers a staggering 52 seasons of new products a year, devouring them with cheap freshness and trends. Shorter production cycles mean more resource consumption³²⁾. But the wear cycle is surprisingly short. It is estimated that 40 per cent of fast fashion items end up in landfill after the season.



<Fig.7> Discarded clothes
(https://nowre.com/editorial/402674/shizaibixingdekechi_xuxingshishangdaodishishenme/)

In addition, Disposal of inventory is a widespread problem for

31) Ibid., p.1.

32) Liz Gioro., Op. cit., p.1.

front-line luxury goods. BURBERRY's annual report released in 2018 showed that they destroyed about 250 million yuan worth of unsold clothes in the past 12 months, which caused a great stir³³). The rationale is simple, unsold items from top-tier luxury brands rarely go on sale, which is bad for the value of the high-end brand. It can neither reduce the price of promotion, nor overstock the inventory, so destruction becomes the best choice to maintain the brand value. Just from an environmental point of view, the natural resources used to make them are wasted³⁴(Fig.7).



<Fig.8> Stella McCartney's F/W
2017(<https://nowre.com/editorial/402674/shizaibixingde-kechixuxingshishangdaodishishenme/>)

33) Liz Gioro., *Op. cit.*, p.1.

34) *Ibid.*, p.1.

3. The development of zero waste fashion design

Zero-waste clothing did not come out of thin air or have recently emerged, but evolved over a long period of time. Looking back at the course of human development, it can be found that the embryonic form of “zero-waste” clothing comes from the ancient “a-piece of cloth” . In the process of the evolution of clothing, with the improvement of weaving technology, and human gradually understanding of the structure of its own body, clothing structure changes, from pure “a piece of cloth” gradually transition to highlight characteristics of the human body clothing, at the time of making clothing more consideration to the human body structure and human activity space, makes the clothing more practical and wearing resistance.

1) A piece of cloth

“a piece of cloth” clothing refers to the clothing formed by the use of full-width fabric without any cutting or sewing process. Its basic wearing mode is realized by simple winding and draping techniques, which is relatively random, which also forms the preliminary understanding of clothing of human beings.

(1) Consistent head-style clothes

Neolithic period in China, Consistent head-style clothes has become a kind of typical clothes. In ancient Japan, there was also the custom of wearing a full head. shen said the history of Chinese costume penetration head dress “roughly split with the whole picture of fabric, without cutting and sewing, general sleeveless, penetration head and the length and the knee³⁵.” <Fig.8> In Japan, the ancient clothing in accordance with the men and women are different, generally can be divided into men’s garment “banners” , women’s clothing “penetration head” ³⁶. Japanese scholar pig bear and numerous in the ancient costume, it is pointed out that, Consistent head-style clothes , is in the middle of a piece of cloth is cut out a straight seam, slot from the set of head past, then two alar stitched up clothes³⁷(Fig.9).

(2) loincloth

The drape style is to take the shoulder as the fulcrum of the whole garment, and then drape the fabric all over the body. Wrapped type way of dressing is a rectangle or a square piece of fabric on the human body constantly intertwined, and buckle knot is fixed. These two

35) 沈从文 (2004), 《中国服装史》, 陕西师范大学出版社, p. 3.

36) 苑利 (1996), 《贯头衣——日、韩民族上古服饰研究》, p. 4.

37) Ibid., p. 4.



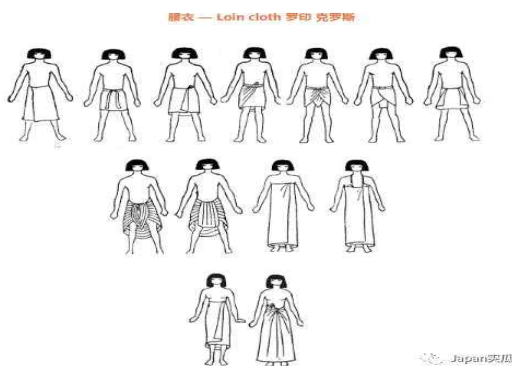
<Fig.9> Consistent head-style clothes in China
 (https://baike.baidu.com/item/%E8%B4%AF%E5%A4%B4%E8%A1%A3/2893715?fr=aladdin)



<Fig.10> Consistent head-style clothes in Japan
 (http://baijiahao.baidu.com/s?id=1596808800543958825&wfr=spider&for=pc)

methods are generally used in combination. Due to the effect of local

climate, the ancient Egyptians are more open, dress men regardless of class differentiation, stripped to the waist bottoms with white linen behind the buttocks more tighten render wear, around another (Skent) short skirt, this dress is called (LoinCloth)³⁸. This kind of clothing is the basic style of women's clothing in ancient Egypt. Sometimes they would wrap the bare upper part of the body with a short shawl and tie a knot in the chest, or hang the pleated fabric on one side of the shoulder, and the naturally drooping fabric could be put into the package skirt to cover only one side of the chest. Some of the long shawls were arranged in various ways to form decorative effects³⁹(Fig.10).



<Fig.11> loin cloth
(<https://zhuanlan.zhihu.com/p/31921953>)

38) 刘瑞璞,何鑫 (2013),《中华民族服饰结构图考》,中国纺织出版社, p. 5.

39) 郑巨欣 (2000),《世界服装史》,浙江摄影出版社, p. 7.

2) Geometric clothing

Compared with “one piece of cloth” clothing, which use the whole fabric for wearing, the geometric pattern of making clothes shows the taste of saving design. At the same time, the appearance of this way of making clothes is also a reflection of human’s further understanding of their own structure⁴⁰). At the start of the process, the geometric model of garment sewing technique, a simple structure of the garment also tends to be near the human body structure, the impetus of the objective technical and human subjective initiative, under the function of the basic structure of clothing such as “collar” , “the sleeve” , “garment body structure” has formed the basic system, at the same time have can change⁴¹). However, the basic features of these clothes are similar. Almost all of them take the t-shape, which is similar to human body shape, as the basic version, and then make appropriate adjustments and changes based on this.

(1) Plane straight line cut

Compared with the openness and freedom of ancient western clothing, the design of traditional Oriental clothing pays more attention to charm

40) 廖畅., Op. cit., p.15.

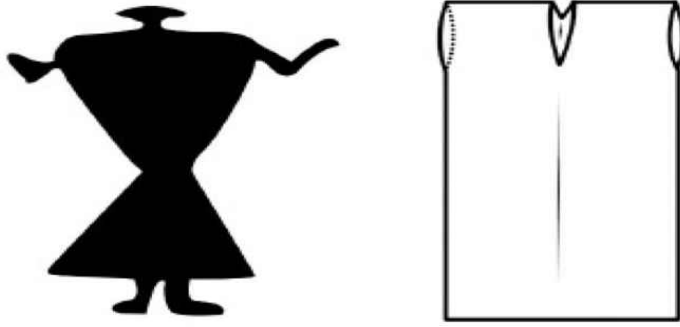
41) Ibid., p. 4.

and harmony. The structure of clothing is relatively loose and free and easy, with a large inner space. From the perspective of aesthetics, Oriental clothes lay more stress on the shaping of two-dimensional space. This kind of planar tailoring and plate making is closely related to the worship of cultural beliefs. The appearance features of ancient Chinese clothing are loose and implicit⁴²⁾. Ancient Chinese clothing is not only a history of clothing, but also a profound reflection of the aesthetic thinking, philosophical thinking and humanistic spirit of ancient Chinese traditional culture. ⁴³⁾ In the historical development of ancient Chinese clothing, the principle of plane structure remains unchanged. Flat straight cutting is carried out in the whole square fabric, and then a complete garment is formed through stitching and combination. This kind of wide and elegant clothing structure is closely related to the romantic feelings of the ancients, and shows the quiet and remote and poised national character of Oriental aesthetics. Penetration head, in the Chinese history dates back to the neolithic generation ⁴⁴⁾(Fig.11).

42) 郭雪松 (2009), 《中西审美文化渊源与比较》, 苏州大学.

43) 刘瑞璞, 何鑫 (2013), 《中华民族服饰结构图考》, 中国纺织出版社.

44) 沈从文 (1981), 《中国古代服饰研究》, 商务印务馆香港分馆.



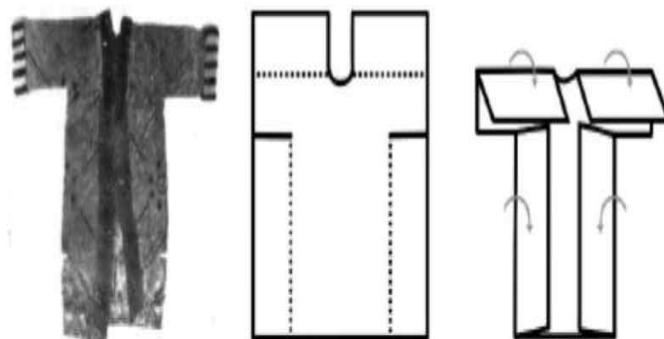
<Fig.12> head-style initial stage
 (《“零浪费”在服装设计中的运用研究》p.14)

Robes, which can be described as a typical costume in ancient China, are loose and atmospheric in shape. They are usually cut straight on the whole square fabric and then integrated into the shape of clothes through stitching⁴⁵⁾. Generally, the “x” plane structure with horizontal axis and vertical front and rear center lines as axes is its inherent original structural state. Although there are many splices, the body and sleeves are not divided, and the front and rear bodies are also connected⁴⁶⁾. Robes garment body is relatively easy, but the structure of the sleeve is fit, more in order to improve the practicality of clothing, the ancients in axillary suture a rectangular piece of cloth, as the design of sleeve fork, it’s more convenient people activities and work,

45) 钟蔚 (2007), 《从审美意象看东西方服饰文化精神》, 艺术与设计, p. 12.

46) 彭梦洁, 王小雷 (2013), 《浅析“零浪费”服装设计》, 山东纺织经济, pp. 69-70.

the practical way of plate-making brought modern “zero waste” costume design inspirational thinking and reference value⁴⁷⁾. When wearing robes, the body is supported by the shoulders, and the front and back body of the robe is naturally drooping and flowing, with smooth lines and full charm. This “ten” type structure reveals the outstanding wisdom of the ancients and the feelings of advocating nature and spontaneity⁴⁸⁾(Fig.12).



<Fig.13> Sample of regular robes
(《“零浪费”在服装设计中的运用研究》p.14)

Kimono as Japan’s traditional costume in turn 《Wei Zhi》, Japanese people recorded: “in the cloth, wear a hole, head of penetration, shall not be obliged to act according to actual circumstances⁴⁹⁾.” This is the

47) Ibid., pp.69-70.

48) 廖畅., Op. cit., p.14.

49) 徐行言 (2004), 《中西文化比较》, 北京大学出版社, p. 3.

prototype of the kimono. The kimono is based on the clothing of the tang dynasty in China. The women's style is called "guan tou yi" and the men's style is called "banner". Although kimono originated in China, but after the time of precipitation, the change and development of the kimono form has its own national characteristics. Kimono style takes the form of the upper and lower garment, and the sleeve is typical of the kimono style⁵⁰. Vibration "sleeve" is the length and ankle, amorous feelings of a kimono category. It usually appears in some important festivals and occasions of Japanese women, such as the unmarried women's coming-of-age ceremony, graduation ceremony, marriage ceremony, thank you, etc. Black vibration "sleeve" is the symbol of the most noble, garment body and sleeve is relatively wide, wearing elegant nobility has full-bodied Oriental emotional appeal⁵¹).

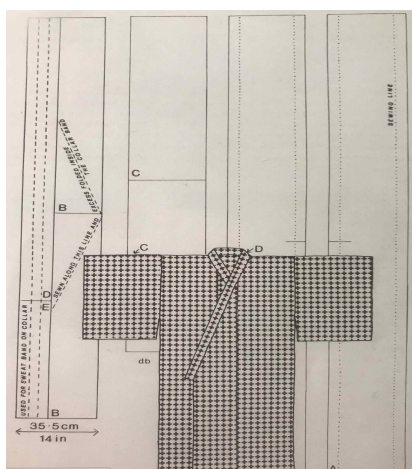
To make a Japanese kimono, a narrow cloth is woven to the required length, often 11 to 12 meters long (12-13 yards). The length is split into five lengths, and the fifth piece is split further into four pieces, for a total of eight pieces.⁵² No fabric waste is created in the cutting process. Surplus fabric in the front neck is pleated inside the collar for

50) Ibid., p.1.

51) 廖畅., Op. cit., pp.13-14.

52) Timo rissanen-holly mcquillan (2010), 《Zero waste fashion design》, Bloomsbury, p.12

structure rather than cut. Similarly, the curved sleeve hem present in some kimonos is achieved by easing the excess seam allowance inside the sleeve rather than by cutting it away⁵³). The cut of this coat demonstrates the zero waste principles of cutting present in Japanese garments referred collectively to as kimono (Fig.13) .



<Fig.14> kimono (《Zero waste fashion design》 p.13)

(2) Fold cut method

Due to material economic backwardness, the ancients in the garment will be more attention to saving design, in the process of garment will

53) Ibid., p. 2.

be as far as possible to reduce the waste of the fabric, cut way to fold the generation side of Angle was used as a reduction of the technique, this way is mainly refers to some remaining material in the form of a folded into clothing structure. ⁵⁴To maintain the integrity of the garment. From the existing materials and documents, it is found that in ancient clothing, the folding and cutting method mostly appeared in details and parts, and did not appear in a large area with a major design method. ⁵⁵ “Cloth for skirt” and “cloth for trousers” can be seen everywhere in the costumes of ethnic minorities in China⁵⁶), all of which reveal the design principle of “worship for things” . This technique of forming clothing space by folding cloth plane is just like folding paper art. Through clever folding, the fabric can be brought into full play. For example, the male trousers of huamao nationality in jingzhou, hunan province, through a complete rectangular cloth, crotch and trouser legs open constantly, through the principle of turning over to form trouser legs and trouser legs, crotch has a very large margin, which is similar to our contemporary form of haren trousers, and when the trousers are laid flat, it presents a triangle⁵⁷). This design method

54) Timo rissanen-holly mcquillan., Op. cit., p.2.

55) Ibid., p.2.

56) 郭雪松., Op. cit., p.1.

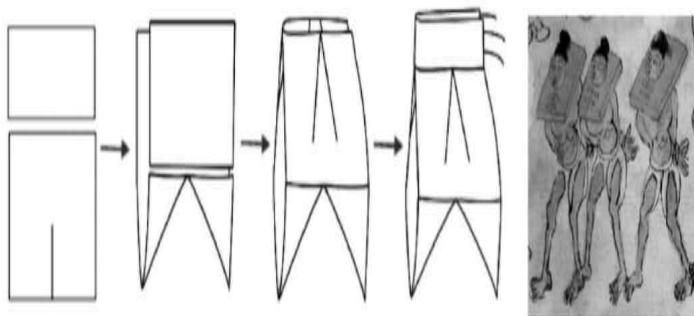
57) 彭梦洁, 王小雷., Op. cit., p.1.

and thinking show the intelligence of ethnic minorities, which has a very important impact on contemporary fashion design. In the 1990s, the yellow silk pants unearthed at the tomb of liao dynasty in daiqin tala, xingan league, Inner Mongolia, were peculiar in appearance. The pants were 71.5cm in length, with two legs in a triangle and crotch in the middle. Both sides were almost completely exposed⁵⁸). This kind of production process also has “zero waste” design thinking. First, cut the shorter side of a rectangular piece of fabric by a certain length, then fold the fabric on both sides of the parting line along its own diagonal to form a triangular shape, which can be used as the trouser leg. Then take a rectangular piece of fabric to fill the gap in the crotch, and then put it on the waist to form a complete pair of pants. The design of the whole trousers is very clever and does not waste any piece of fabric⁵⁹(Fig.14).

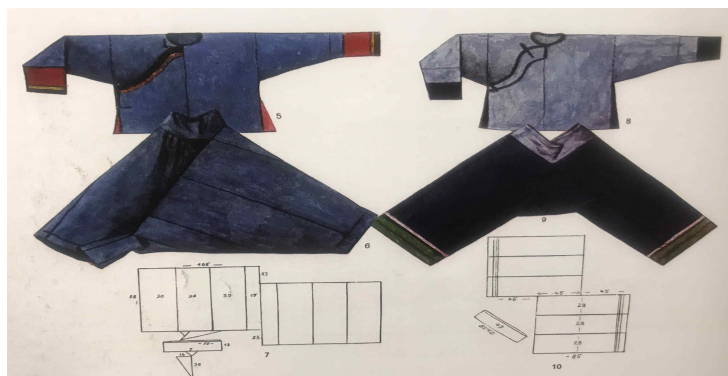
Two examples of zero or less waste trousers from China (Tilke 1956) <Fig.15>show the displacement of two large rectangles against each other, resulting in asymmetrical trousers that hang off-grain. There is no clear front or back to the pieces. In one pair, small triangular pieces are used at the waist to fit the trousers to the body⁶⁰).

58) 廖畅., Op. cit., p.15.

59) Ibid., pp.13-14.



<Fig.15> Short pants
 (《“零浪费”在服装设计中的运用研究》 p.15)



<Fig.16> The cuts of these trousers from China,
 featured by Tilke (1956)
 (《Zero waste fashion design》 p.14.)

60) Timo rissanen-holly mcquillan (2010), 《Zero waste fashion design》, Bloomsbury, p. 15.

3) Break-joint

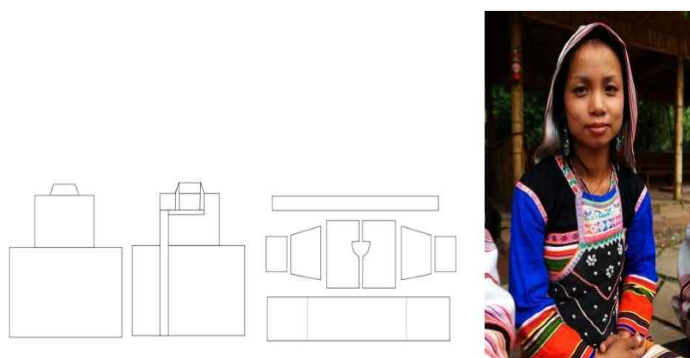
Different from “a piece of cloth” and the requirement of the fabric width under the geometric template, the clothing under the broken seam technique is almost not affected by the fabric width⁶¹⁾. By combining different sizes of fabrics together to form a unique seam breaking process, the clothing formed in this way can be regarded as a model of saving design. The values of thrift and material worship in minority areas determine the clothing structure in minority areas⁶²⁾. Seam breaking is a way to solve the problem of insufficient width, which can not only reduce the damage to the fabric cutting, but also achieve the transverse width of the garment body⁶³⁾. Flower waist dai ethnic women’s underwear the garment is shaped like a “convex” word, with a slit at the chest line of the body, separating the top from the bottom. Because carried to use this kind of transverse division, so below bosom line can use complete one piece of fabrics to be able to satisfy the need of encircle degree. At the same time, because of the upper and lower seam, the armhole structure is square, unique. This effectively solves the shortage of fabric width caused by the ethnic

61) 魏莉 (2016), 《民族服饰中的“零浪费”设计》, 应用技术.

62) 宋永莉, 王学 (2010), 《服装造型设计中“斜裁法”的研究》, 山东纺织经济, pp. 53-54.

63) 魏莉., Op. cit., p.15.

minorities' own weaving, and saves the fabric at the same time. Similarly, the upper and lower seam is also used for the men and women's clothes of jinuo nationality. The upper and lower fabrics facing the horizontal yarn match the stripe pattern to form the unique national dress of jinuo nationality⁶⁴(Fig.16).



<Fig.17> Clothing structure of Dai and Jino
(《“零浪费”在服装设计中的运用研究》p.17)

64) 廖畅., Op. cit., p.15.

III. Sustainable Zero Waste Fashion

Zero Waste, the way designers strive to create clothing that essentially minimizes the amount of scrap left over, is the latest green move in fashion. The general process from design to production is “design-plate-clipping - production”. Since the average effective usage rate of fabric in the cutting process is only 85%, and the remaining 15% fabric is eventually thrown away, it is undoubtedly a huge waste of natural resources and manpower that these fabrics are discarded before they reach customers⁶⁵). In 2015, huang lei’s research on sustainable fashion design based on zero-waste technology suggested that the three methods of zero-waste fashion are upgrading, reconstruction and zero-waste design in a narrow sense⁶⁶); According to liao chang’s research on the application of zero waste in fashion design in 2018, zero waste design methods are mainly divided into upgrading and reconstruction, reconstruction and zero waste sample design⁶⁷); In the research and application of zero-waste clothing design in 2017, zhou

65) 芮正佳, 《浅析“零浪费”的设计形式》, 山东工业技术(7期), pp. 249-249.

66) 黄蕾 (2015), 《基于零浪费技术的可持续时装设计研究》, 北京服装学院.

67) 廖畅., Op. cit., p.18.

min summarized one piece design, spell pattern cutting, Mosaic method, dpol technology and 3d printing technology⁶⁸). Therefore, the sustainable clothing design was divided into Zero waste fashion, Upcycling and Reassembly in this study. Sustainable fashion design method including zero waste pattern, to reconstruct and upgrade, the three “zero waste” costume design methods have their own characteristics, are using different design methods to achieve uniform design, through the study, it is not hard to find these three ways can be mutual confluence, to some extent also can use its three characteristics to make improvement and innovation⁶⁹).

1. Zero waste pattern

“Zero waste” pattern, is the most front end in the clothing production cycle a way to deal with “zero waste”, “zero waste” pattern design usually would start at the beginning of the design on the detailed planning of the whole picture of the fabric of row materials, such as garment cutting piece shape, size, through the special clothing

68) 周敏 (2017), 《服装零浪费设计的研究与应用》, 浙江理工大学, p. 5.

69) Ibid., pp.13-14.

version of type design, reasonable layout design, make the utilization rate of fabric to achieve the result, to reduce the waste of fabric production as much as possible⁷⁰⁾ (Fig.17, 18) .



<Fig.18> Anastasia on 12, 2017 vestido de invitada
zero waste
(<http://blog.fairchanges.com/ropa-residuo-cero/>)

The design of “zero waste” pattern is not limited to the plane structure. The draping technique can also be used in the design of “zero waste” pattern. This design technique combining two-dimensional and three-dimensional shows the inclusiveness and operability of “zero waste” pattern design⁷¹⁾. Driven by “zero waste” model research not only can effectively reduce material waste, but also has brought the

70) 廖畅., Op. cit., pp.15-27.

71) Ibid., pp.13-14.



<Fig. 19> The top and skirt by Maja Stabel (《see interview on pp.39-40》)

positive influence on the clothing design innovation fashion design master. issey miyake in 1997 in his “A - POC” (A piece of cloth) series explored the possibility of using A single piece of fabric as innovative clothing⁷²). He took advantage of the shell fabric on the basis of cuttings, identified by the dotted line clothing model, consumers through hands-on practice, simple cutting can make the whole piece of fabric as hats, gloves, socks, bags, jacket and skirt, this not only let consumers experience the fun of the design and production of clothing,

72) Ibid., pp.13-14.

and to make consumers understand practice interactive way “zero waste” design of the significance of environmental protection⁷³(Fig.19).



<Fig.19> issey miyake spring summer 1999
(<https://voguelovesme.tumblr.com/post/38518326886/issey-miyake-spring-summer-1999>)

In 2014, current female dress designer miyazaki applied the revolutionary enviromental clothing technology “3D Steam Stretch”, which uses the yarn plastic program to spin and weave fabrics with edges and creases, and uses the steam heat shrink fabric to transform the originally smooth fabric into a sculptural three-dimensional shape along the creases in an instant⁷⁴(Fig.20).

73) iFASHION (2016), 《三宅一生：时装是一块神奇的布料》，
(<https://fashion.qq.com/a/20160418/032484.htm>)

74) YOKA时尚网 (2013), 《YOKA专访三宅一生设计师宫前羲之》
(<http://www.yoka.com/dna/d/182/644.html>)



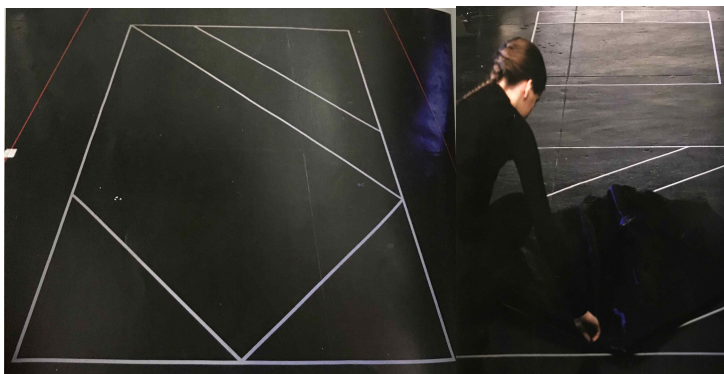
<Fig.21> FALL 2014 Issey Miyake

(<https://www.vogue.com/fashion-shows/fall-2014-ready-to-wear/issey-miyake/slideshow/collection#37/#47>)

Yeohlee Teng, an American designer, has adopted fabric waste minimization as a key element of her design practice since 1981. Teng called her autumn 2009 collection “Zero Waste” to highlight her long-standing commitment to working with fabric mindfully⁷⁵). This was shown by having the pattern of a sarong on the runway; the model took the sarong off and placed it on the diagram. A sarong by Yeohlee is cut from five pieces. Remarkably, all cut lines are on the bias,

75) Timo rissanen-holly mcquillan., Op. cit., pp.15-27.

demonstrating that intelligent cutting on the bias need not be wasteful⁷⁶). The cut was shown on the runway during the show to reiterate the importance of cut and fabric economy present in Yeohlee's work throughout her career(Fig.21).



<Fig.22> A sarong by Yeohlee (2009)
(《Zero waste fashion design》 pp.24.)

2. Upcycling

The main way to solve the waste of clothing is to recycle the textile waste before consumption and transform it into valuable products through certain design methods. The so-called pre-consumer textile waste is the leftover material that is discarded when we cut the cloth

76) Ibid., p.1.

h⁷⁷⁾. The amount of such cloth fragments is so large that many designers and teachers and students of costume institute have devoted themselves to studying various design methods to turn the waste into treasure. As for the upgrade and reconstruction design, there are already a variety of methods to transform the fabric. For example, piecemeal fabric is combined with stitching, weaving, three-dimensional cutting and other methods to form a more popular and beautiful patchwork design⁷⁸⁾(Fig.22).



<Fig.23> Upcycle Old Clothes
(<https://www.quirkybohemianmama.com/2019/06/11-ways-to-upcycle-old-clothes.html>)

In patchwork design, the designer is required to match the colors of the recycled scraps, cut out the rules, and finally form an ideal shape

77) 廖畅., Op. cit., pp.15-17.

78) 黄蕾., Op. cit., p.1.

through stitching. Up to now, we can see all sorts of styles disparate spell cloth design on the market, some are used as home to spin things, some also can be reflected in dress, some reached artistic height more directly⁷⁹⁾. In addition to reducing the amount of solid waste in clothing production, the recycled materials also meet the needs of new materials in the secondary design, which brings the sustainable fashion recycling



<Fig.24> products of Petith workshop
(《“零浪费”在服装设计中的运用研究》
p.10)

concept into play⁸⁰⁾. At present, had appeared in the international top luxury brands such as hermes launched regeneration design products, in 2011 did Petith again create workshop, the design director of the workshop is hermes PascaleMussand global art director<Fig.24>, Petith for all products in the raw materials are from hermes brand production

79) Ibid., p. 4.

80) Ibid., p. 5.

waste material left by itself, pieces of material, through creative ring of designers and craftsmen will eventually made these materials to mix and match becomes delicate products⁸¹).

The designer from South Korea, Jinah Jung, is also very good at transforming old shoes into unique design bags. I used Le Coq Sportif and CONVERSE's recycled sneaker samples to dismantle the bags and handbags⁸². <Fig.24> It can be said that personal design units such as Alexandra Heckett and Jinah Jung are using new ideas and possibilities



<Fig.25> inah Jung 2019 ss / Jinah Jung x Le Coq Sportif “Military Monster Series”

(<https://nowre.com/editorial/402674/shizaibixingdekechixuxingshishangdaodishishenme/>)

81) 冯婧怡 (2015), 《INSIDE HERMÈS PETIT H 材料的感染力》, (<http://www.modernweekly.com/gear/11900>)

82) inah Jung 2019 ss (<https://nowre.com/editorial/402674/shizaibixingdekechixuxingshishangdaodishishenme/>)

that are different from traditional clothing manufacturing to increase the circulation of clothing⁸³).

3. Reassembly

Under the rapid development of global economy, people's consumption ability is also rising, the renewal speed of our articles for daily use and clothing is becoming more and more quickly. At the same time, the pursuit of fashion and popular, cause a lot of new but out-of-season clothes also become the target of the discarded, creates more unnecessary waste of resources. And reassembly method is dedicated to solving these clothing after the consumer waste, through recycling, the combination of deconstruction and to cut and design methods, give new life to these no longer has the value of textiles⁸⁴. The reconstructed method for clothing enterprises a lot of inventory backlog also has a positive role. At the same time, this method also can reduce the resource requirements to develop new products, contribute to the sustainable development of fashion⁸⁵. In the reconstruction method, the

83) Ibid., p.1.

84) 周敏., Op. cit., p.1.

85) 廖畅., Op. cit., p.17.

required textile materials are more diversified, which contains more uncertainties, such as the degree of old and new wear of the fabric, and the diversity of fabric size and shape under the influence of clothing style, which all affect the way designers will take to reconstruct it⁸⁶). So after the old textile recycling, need particular case is particular analysis, for the place of local damage can be cut down, to reorganize design fabrics of deconstruction, joining together as a new style again, and for some out-of-season or no longer fashionable clothing, we can use the technique of deconstruction re-engineering, change the existing style, using a variety of design language, such as sewing, printing and embroidery techniques to endow them with new vitality⁸⁷).

Reclothing bank<Fig.25> is an independent public welfare project founded by zhang na in 2011⁸⁸). By recycling the completely abandoner old clothes, the project splits, reorganizes and redesigns them, so that the clothes can regain a new life and container to be worn. Reconstructive clothing bank is a window for founder zhang na to be worn. Reconstructive clothing bank is a window for founder zhang na to

86) Ibid., p. 4.

87) Ibid., p. 5.

88) Reclothing Bank (<http://web.ilohas.com/daily/1483>)



<Fig.26> Reclothing Bank (<http://web.ilohas.com/daily/1483>)

communicate with the real world. Taking clothing as the carrier, she awakes people's awe of nature and protection consciousness with the help of pure natural fabrics and environment-friendly recycled fabrics⁸⁹.



<Fig.27> Clothes for story (<http://www.fakenatonet/>)

89) Ibid., p.1.



<Fig.28> Dress from old kimono
(<https://cn.businessoffashion.com/articles/news-analysis/zhang-na-reclothing-bank-cn-2>)

She divided the remanufactured clothes into three series. “zhongbasic” is a standard ready-to-wear series, which means the patterned design and production of materials of the same type but different times, such as shirts and cowboy jackets, which are simple and practical to wear⁹⁰. “Le Ready To Wear” is a series of high-end ready-to-wear. Zhang na, on the premise of respecting the material itself, re-examines the history and era of the material, bringing a

90) 王韵 (2016), 《I再造衣银行: 一个了不起的创意, 一门严肃的生意》, (<https://cn.businessoffashion.com/articles/news-analysis/zhang-na-reclothing-bank-cn-2>)

breakthrough aesthetic and modern dress design, such as a dress transformed from kimono⁹¹). “Zai Haute couture” is haute couture. She hopes to dig up the story behind the old clothes and store the memories of the past by recreating them. From the side of friends, she used clothes to change the story⁹²(Fig26,27).

A young designer from Melbourne, Australia, Alexandra Hackett, is engaged in the field of creative design, design of material comes from the waste of life, in the eyes of Alexandra, using waste to clothing design on the one hand is for the purpose of environmental protection and resource recycling, on the other hand is also interest from her⁹³). For the fashion industry, it also has a pioneering spirit. In the design of her, It can be found that supermarket labels, shopping bags<Fig.28>, car shades and even McDonald’s takeaway paper bags<Fig.29> are all used as materials for clothing creation.⁹⁴.

91) Ibid., p.1.

92) Ibid., p.1.

93) Ibid., p.2.

94) La mode surprenante d’ Alexandra Louise Champion Hackett.
(<http://collectiftextile.com/la-mode-surprenante-dalexandra-louise-champion-hackett/>)



<Fig.28> Alexander Hackett Fashion created from waste
(<https://www.pinterest.co.kr/pin/361273201337533521/>)



<Fig.30>Alexandra Louise Champion Hackett
(<http://collectiftextile.com/la-mode-surprenante-dalexandra-louise-champion-hackett/>)

Under the high-speed business operation mode, fast fashion brands will generate more waste of resources. Therefore, some fast fashion brands have gradually assumed the corresponding responsibilities and started to participate in the sustainable fashion industry⁹⁵⁾. They use

95) 廖畅., 0p. cit., p. 5.

their brand appeal and popularity to convey the consumption concept of environmental protection, green and sustainable to consumers. In may, brands like H&M and Nike joined the Ellen Mac Arthur Foundation’s



<Fig.31> Hm Old clothes recycling project
(<https://www.bottledream.com/articles/11099>)

Make Fashion Circular program, which aims to reduce waste in the global Fashion industry by recycling raw materials and products⁹⁶). The plan includes three elements: Create a business model to ensure the long-term use of clothing; Use renewable and safe materials; Create solutions to recycle old clothes and make new ones.

In the world of fashion, H&M uses “recycling” to create a sustainable fashion attitude. The ultimate goal of H&M is to “Close the Loop” , which is to create new clothes from recycled fabrics from discarded clothes without wasting fashion⁹⁷).

96) Ibid., p. 5.

97) Ibid., p. 6.

IV. Reassembly Fashion design

1. Design intent and plan

In this era of rapid consumption, trends are changing faster and faster, with hot style sold out one second becoming obsolete the next, or even discarded fabric used to make cheap mops. A city needs to be upgraded organically from time to time. If buildings with historical features are not properly protected and renovated, they will lose their functions in a modern city and may eventually become ruins. The same is true of sustainable fashion, where going green for the sake of it can lead to waste again. When we talk about environmental upgrading, in addition to using sustainable fabrics such as organic cotton, hemp fiber and recycled polyester, this paper argues that the transformation of old clothes is also an important part.

In Europe, America, Japan and other countries, people have a high degree of acceptance for second-hand clothes, and buying antique clothes has become a popular fashion way, and the second-hand industry is also quite large. What attracts consumers is not the low

price of second-hand clothes, but the reflection of lifestyle attitude and personal style derived from them. But in China, the opposite is true. Most consumers reject second-hand goods. Aside from hygiene concerns, spending money on old clothes worn by others is a sign of shame and even bad luck. So we hope to change this mindset by upgrading old clothes, but not by labeling them green and playing an emotional card to persuade consumers to buy them. This paper believes that the success of fashion reengineering lies in the product, we hope that customers like the design first, then the concept of recognition. Through the retrofit design of the study if I can find a reengineering dress, and let the consumer is not predisposed to think that this is an “old clothes”, but was attracted by its appearance, then moved by environmental protection concept generation buys desire, so can not only enjoy fashion, and can complete to society in the process of consumption of support for the cause of environmental protection, and environmental protection in order to be really into fashion, also blended in our life. Finally, the sustainable fashion design concept of “refuse waste, recycle, fashion rebirth” is realized in a real sense.

Project1 and project2 have undergone different stitching reconstruction on the basis of the same three old clothes. Considering the basic style and color more than summer autumn and winter coat is single, so want

to modification does not destroy clothes style, common the basis of the original functional and fact wear resistance, and on this basis to add some unique design, make old clothes more novel and unique, so that make to upgrade the clothes although the design is the same, but because of the original dress fabric is different, make each reengineering dress has uniqueness and by doing so can be in the form of a certain production. Through this form, the hope can give the designer to provide inspiration and ideas of the other better solve the problem of inventory of clothing enterprises Use different design methods to create more diversified new works, providing more choices for consumers,

Project3 and project4 are the use of basic bull-puncher coat and other material basic style is tie-in, cowboy costumes in the process of production need to wash much working procedure such as processing is complete, compared with other fabrics, denim fabrics made itself already produce more pollution and waste, so the author choose recycle denim fabrics, combined using basic cowboy style and other clothing design to create more creative reconstruction.

2. Design works

1) project 1

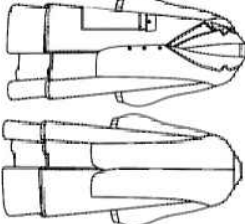
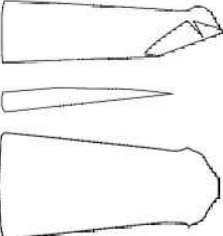
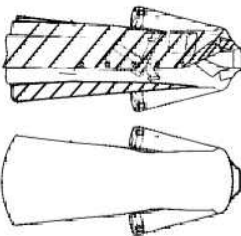
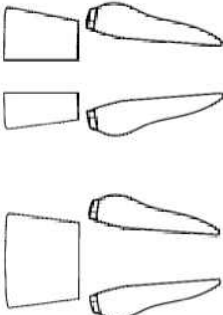
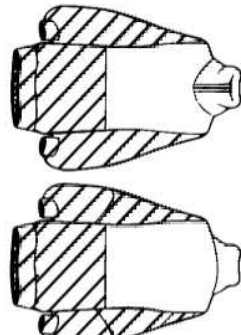
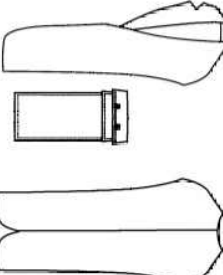
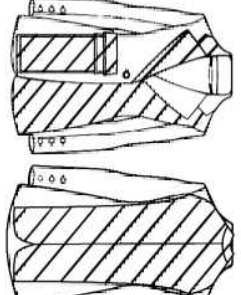
Three different styles of clothing were pieced together to create gender-specific new pieces to appeal to consumers with individualistic attitudes to their wardrobes. After deconstruction, multi-tone textured knitting and snakeskin textured suits have the lively feeling of half-stitched edge and jointed seam, which can better reflect the richness of the fabric.

Meet the element that all wintry day never goes out of style, the languid of in long paragraph trench coat is tie-in loose suit coat is lazy and loose neuter version below, before side adornment pocket did not choose the symmetrical pocket of inflexible, the size of pocket slant is big, have practical already pack next to carry article, the appearance can break again depressing feeling. The past asymmetric design tend to be small ornament, with delicate hang down and fold increase clever and lively feeling, and this design adopts a large area of strong asymmetry, paragraph dust coat grows positive direct chose left and plaid suit coat right, with the knitting and staggered superposition of double layer collar, sleeves of make public individual character and most

people can handle design, mainly in the length of the coat behind the stack above the hem suit fabrics and knitted, both in terms of color or to the stitching on the fabric structure even more to create a unique visual perception.

(1) design plan I

<Table · 1> design 1

완성	사용부분	기초 디자인
		
		
		

(2) design illustration I



<Fig.31> design illustration I

(3) project I



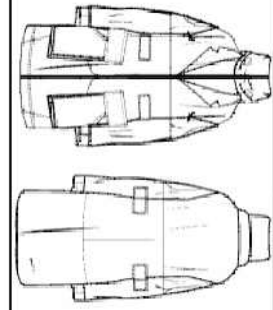
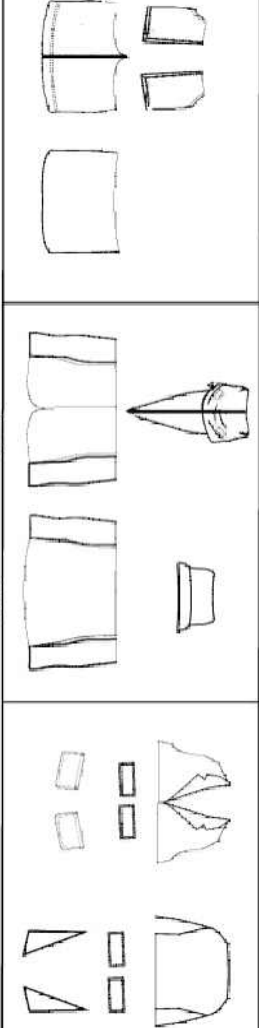
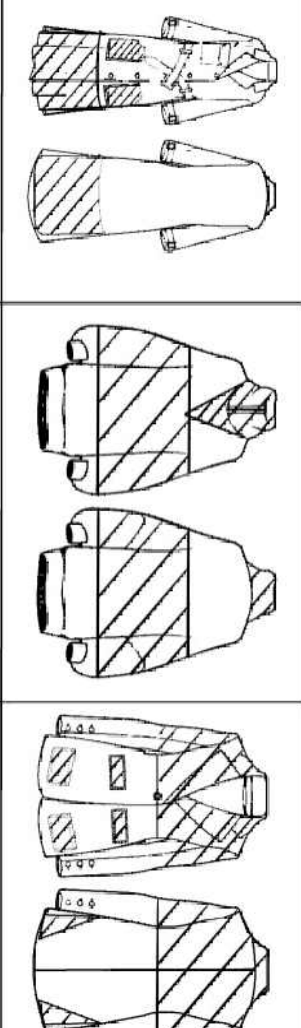
<Fig.32> project I front and back

2) project 2

Project 2, like Project1, chose the same trench coat, suit and sweater as the basic types of clothing for redesign, hoping that in this way, in the face of a large amount of inventory surplus in the enterprise, the same style of clothing can be assembled in different forms to obtain more diversified transformation clothes. It can be mass produced and provide more choices for consumers. This design considered multi-layer fold wear thick clothes in winter can appear more bloated, thus keeping the original collar and turtleneck knitted jumper plaid suit coat collar for joining together to make the fake two original feeling, meet consumer demand like multi-level style, formerly two big patch pocket, put small objects with no pressure, very practical also increased administrative levels feeling of the clothes at the same time, dark half with some s feeling of restoring ancient ways, lazy loose big version, inclusive super strong, do not restrict age skin sex oversize wind, coupled with the overall own too much warmth retention property does not need to plug in the build, You don't have to worry about the big bear in winter. Visually, it keeps you warm without crushing you. It's the ultimate weapon against the cold. The hem is also a small detail Mosaic color contrast overlay.

The recombination of materials, the old plaid treatment, the modern suit cutting and the minimalist serpentine leather give people a sense of mystery. Transformation and deconstruction are always the core concepts of men's wear.

<Table • 2> d2e2sign 2

상징	기초 디자인	사용부분
		

(1) design plan II

(2) design illustration II



<Fig.33> design illustration II

(3) project II



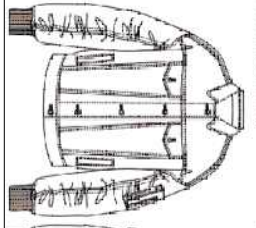
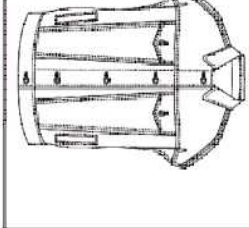
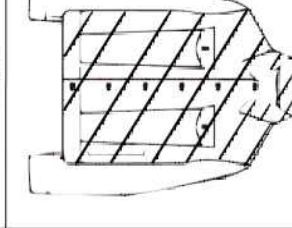
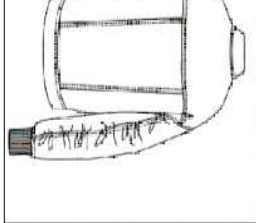
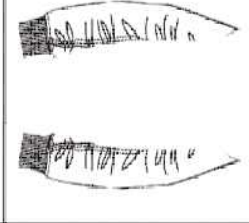
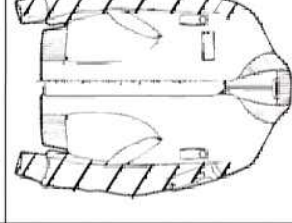
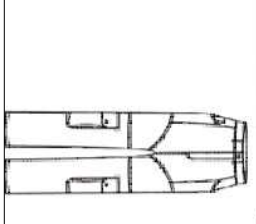
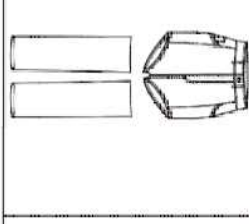
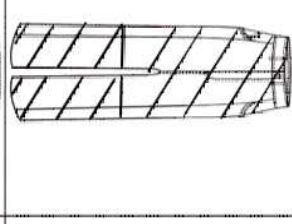
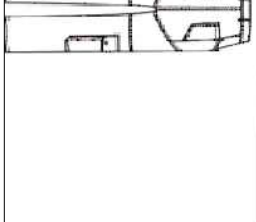
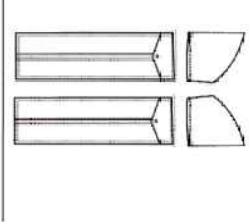
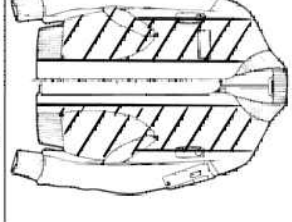
<Fig.34> project II front and back

3) project 3

Cowboy costumes in the process of production need to bath dyeing process and the processing is completed, compared with other fabrics, denim fabrics made itself already produce more pollution and waste, so the author choose recycle denim fabric, this design chose denim jacket, jeans and army green charge baseball in three basic models to split the splicing combination both of men and things to suit. Baseball suit is a little boyish single product, the sense of youth is full, this design also intends to grasp the youth breath. Denim and army green are used to match the whole outfit. The loose version has an extra lazy shoulder drop design. Since there is not much innovation in silhouette, a washed print design is added to the left shoulder of the top and the right side of the pants. The top retained the denim body and replaced it with a shoulder-down charging baseball sleeve, while the super-cool loose-fitting jacket only accentuates the patchwork feel of the fabric. The bright spot of pants depends on many cent splicing, every many cent splicing line, pants is more visible more stand wide, perfect build restore ancient ways feeling. Straight pants can be very good leg shape, plus a slightly higher waist design, lengthen leg ratio. Both the small pockets on both sides of the calves and the rear buttocks make the layers of clothing more colorful and more handsome and lively. Join

together with brunet department between, harmonious however new idea, thick teenager feels and languid is lazy feeling, let a person shine at the moment.

(1) design plan III

전경	상용부분	기초 디자인
		
		
		
		

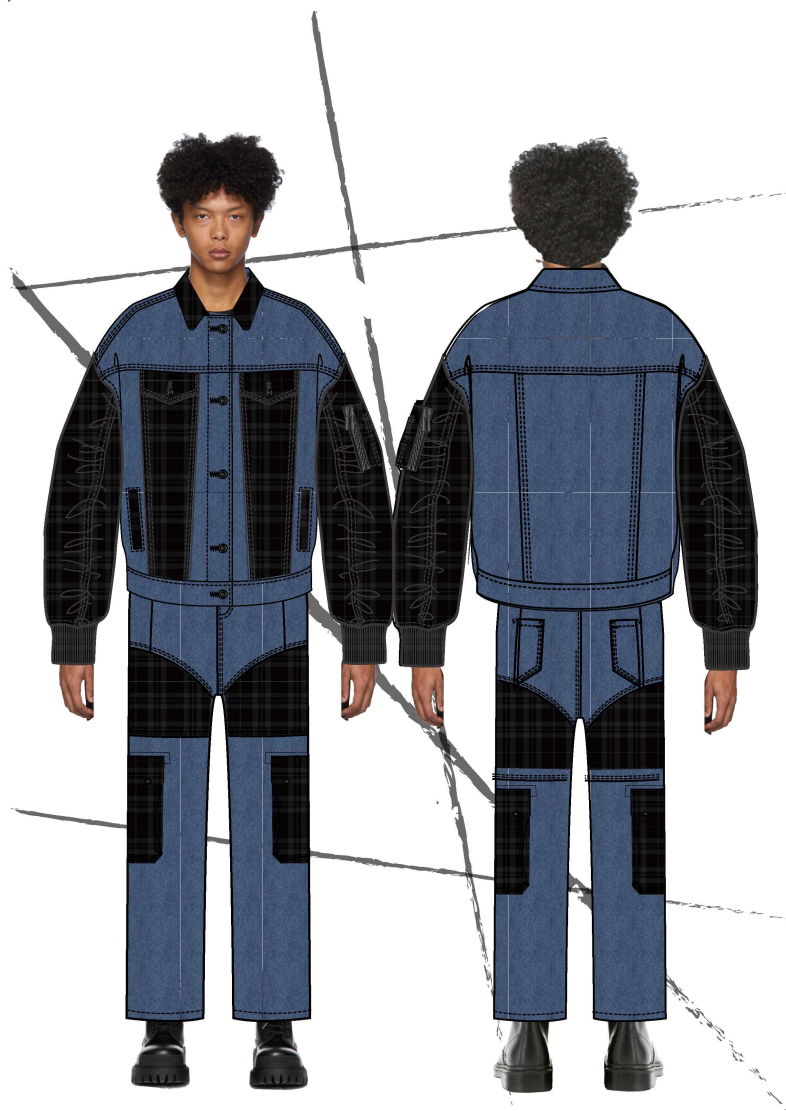
<Table · 3> d2e2sign 3

(2) design illustration III



<Fig.35> design illustration III

(3) project III



<Fig.36> project III front and back

3) project 4

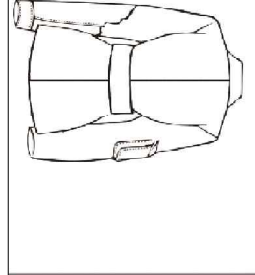
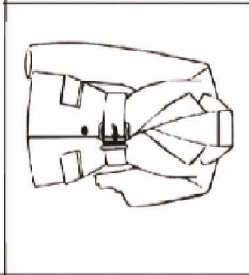
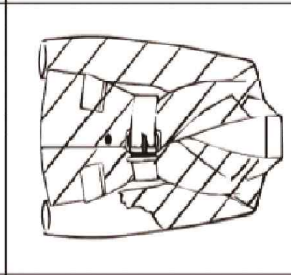
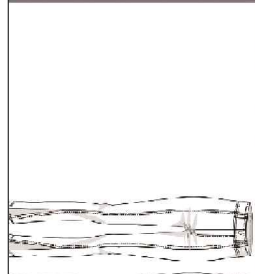
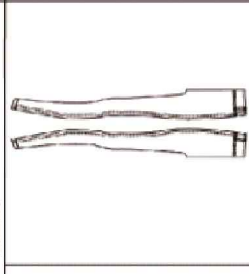
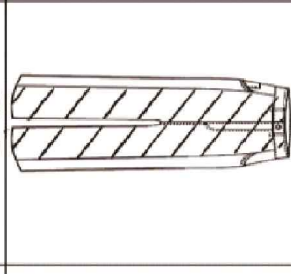
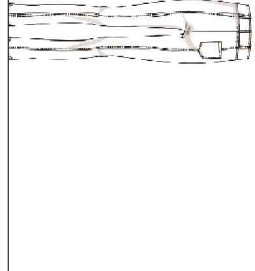
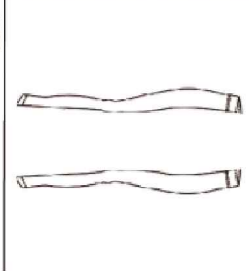
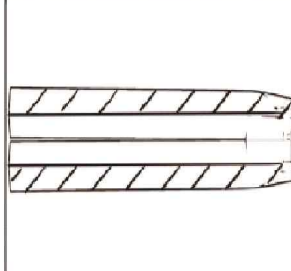

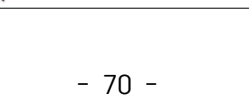

Project 4 also chose to use denim fabric for innovation. This time, it chose a slim suit with a completely different style for stitching and reconstruction. The characteristic of the suit jacket is that it will highlight a person's unique temperament in the crowd. If only recreational style is completely not enough in the chest, because this design retained the original dignified feeling of suit already, on the foundation that uses bull-puncher fabrics again many a few follow along with sex and recreational feeling, have the ability of city beauty does not break however nifty.

The frilled edge and irregular cutting line on the right sleeve are random and unruly, keeping the original belt design of the plaid suit to highlight the female figure. Asymmetrical stitching is the highlight of the jacket.

Pants are also selected two different styles of pants and jeans for the basic style of clothing stitching. Bell-bottom pants are the most feminine type of all pants, with a soft sense of line, showing leg length and maximizing leg modification. The two fabrics are symmetrically joined together, and the contrast highlights the sense of joining together of different fabrics. The long of Leggings and crus front side open fork is

window, casual reveal ankle to show the sex appeal of different kind, it is the careful machine that can bear to see.

(1) design plan IV

상용부분	기본 디자인	상용부분	상용부분	기본 디자인	상용부분
					
					

<Table · 4> d2e2sign 4

(2) Design illustration IV



<Fig.37> Design illustration IV

(3) project IV



<Fig.38> project IV front and back

V. Conclusions and recommendations

Through the investigation and analysis of the historical changes of zero-waste design and the corresponding countermeasures taken by the major garment industry to deal with the problem of waste, it can be seen that the three methods of zero-waste design have their own advantages and disadvantages. Zero-waste sample design requires great efforts in the layout of cloth, and zero-waste effect design is relatively limited. Therefore, this paper finally chooses the method of upgrading and transformation to carry out innovative design on the existing clothing.

In the process of selling, the garment industry will carry out discount and promotion activities to solve the problems left over from inventory, but it cannot completely solve the problems left over from inventory. Then, we can use these left over garments to combine and design more impressive designs.

Project 1 is an irregular overcoat combining three different styles of clothes after disassembly. Compared with traditional clothing version of type and style, this paper argues that the irregular design can reveal

personality, but through this design can be found in the irregular creative design should consider whether several fabrics can support each other, soft hard alternated with moderation, to avoid damage the profile at the same time show the clothing fashion sense.

Proect 2 shows the combination of suit, knitting and coat fabric. The mixture of three materials can make the overall shape of the garment more layered. In the design, attention should be paid to the color matching and the primary and secondary are distinct. Work 3 adopts the Mosaic of plaid suit and denim fabric, which adds some sense of leisure to the original formal suit. Asymmetric stitching can appear in any part of the garment, and a creative asymmetrical fashion design can be formed by proper matching. Because two kinds of fabrics do not have flexibility, when making clothes should consider comfortable problem, not easy too tight.

Proect 3 adopts the Mosaic of plaid suit and denim fabric, which adds some sense of leisure to the original formal suit. Asymmetric stitching can appear in any part of the garment, and a creative asymmetrical fashion design can be formed by proper matching. Because two kinds of fabrics do not have flexibility, when making clothes should consider comfortable problem, not easy too tight.

Project 4 choose baseball uniforms and basic as a cowboy coat, build motion wind restoring ancient ways, simple capable of joining together with trendy fashion sense, several pocket design is more practical,

The research on zero waste is still relatively lagging behind in China compared with abroad. Both designers engaged in zero waste and insufficient literature have brought some difficulties to the research. Therefore, this article hopes that by studying the “zero waste” design method, it can help more researchers. hope to provide help to more researchers through my research summary of zero waste design.

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성신여자대학교
대학원

본 연구는 ‘zero waste’ 패션의 개념과 디자인에 대한 고찰을 바탕으로 ‘sustainable development’에 효과적인 디자인을 개발하여 향후 패션 산업에서 나아가야 할 방향 중 하나를 제안하는 것을 목적으로 한다. 그러나 전 세계적으로 가장 활발한 경제 발전을 이루고 있는 중국에서는 아직 지속 가능한 패션에 대한 인식이 부족하기에 본 연구를 통하여 ‘zero waste’ 패션 환경의 중요성과 소비자들의 고정관념을 변화시키는 의의가 있을 것이다. zero waste 패션의 의복 구성 방법은 제로 웨이스트 패턴(zero waste pattern), 업사이클링(upcycling) 그리고 리어셈블리(reassembly) 3가지로 나누었으며, 본 연구에서는 이 중 리어셈블리 디자인을 연구하였다. 연구의 결과는 다음과 같다.

프로젝트 1은 세 가지 스타일의 서로 다른 질감을 가진 정장 코트와 양복 그리고 니트 폴오버를 분해하고 조합한 외투이다. 디자인은 전통적인 좌우대칭의 기본 스타일 보다는 이질적인 질감의 소재들을 불규칙한 비정형으로 커팅하여 연결한 비대칭의 외투이다. 작품1은 역동적이고 넘치는 위트감을 표현하며 무거울 수 있는 겨울코트의 강한

느낌을 지울 수 있었다. 작품1은 제작과정 중 소재들의 연결과 표현이 무엇보다 중요하였다.

프로젝트 2는 프로젝트 1에서 사용한 같은 옷을 기본으로 재조합한 또 다른 디자인이다. 패션브랜드들의 많은 재고가 재제작될 경우 같은 재료를 가지고도 다양한 디자인의 제품을 제작하여 소비자들에게 폭넓은 선택권을 보장할 수 있음을 보여주기 위해서다. 프로젝트 2의 작품은 앞의 작품과 달리 겨울 코트이면서도 마치 터틀넥의 폴오버위에 코트를 레이어드하여 장착한 것처럼 보이는 오버사이즈 스타일로 연출하였지만 결과적으로는 좀 더 가벼운 장착이 가능하였으며, 제작과정 중 색상 톤의 조화로운 연결에 중점을 주고 제작하였다.

프로젝트 3은 야구복과 기본형 데님 재킷을 이용하여 동적이면서도 빈티지하면서 캐주얼한 느낌의 편안한 바지 투피스로 데님 소재를 주로 사용하여 제작하였다. 데님 소재는 생산 과정 중 염색이나 워싱 등의 단계에서 환경의 오염과 물의 낭비가 많이 발생하는 소재이기에 재활용할수록 친환경적인 활동에 도움이 되는 소재이다. 상의의 기본소재는 데님이며 그 위에 공간을 나누어 정장 소재를 연결하였다. 전체 의상에 인디고 컬러와 군청 컬러가 매치되었으며, 전체적으로 넉넉한 맞음에 과하지 않은 오버사이즈 스타일로 상의는 데님을 그대로 유지한 채 어깨까지 내려오는 바람막이 야구 소매로 연결하여 원단의 조화만 부각시켰다. 바지의 포인트는 데님을 기본으로 양구복의 원단을 이용하여 여러 부분으로 나눈 뒤 여러 줄의 장식봉을 하였다. 작품3에서

사용한 두 가지 제품 모두 신축성이 없기 때문에 제작 시 편안한 착장을 우선적으로 고려한 디자인으로 하였다.

프로젝트 4는 정장 원단과 데님을 사용하여 슬림한 스타일의 정장을 디자인 하였다. 디자인의 포인트는 정장의 단정함을 그대로 유지하면서 데님 소재를 비대칭으로 사용하여 약간의 여유를 더해 도시적이고 세련된 느낌을 주지만 트렌드 감을 잊지 않은 디자인이다. 자켓과 팬츠 모두 정장과 청바지 두 가지 다른 기본 스타일의 매치하면서 원단의 이질감에 주는 시각적 리듬감이 더해졌고, 바지의 앞 중심선의 연결선에 트임을 주어 활동면에서 편안함을 더하면서 재료로 사용한 원래의 두복장과는 전혀 다른 제품이 완성되었다.

본 연구와 같이 'reassembly'는 분명하게 패션산업에서 'sustainable development'를 위한 중요한 방법 중 하나이다. 앞으로 패션산업에서 환경적인 생각을 기본으로 현실적으로 유행하는 디자인에 중점을 두어 지속적인 개발을 시도 한다면 많은 소비자들이 디자인에 대한 선호도로 제품을 선택하여 사용하게 되면서 환경에 대한 인식을 함께하는데 도움이 될 것입니다.

This is to certify that we have examined the
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Submitted to Department of Clothing

Approved as to style and content:

Thesis Advisor

문윤경



Committee Chairman

.....

Committee Member

윤지향



The Graduate School of Sungshin University