

Experiment and Exploration of Black Plastic Bags as a Sustainable Material for Semicouture Clothing through Project Based Learning Method Case Study: PELLEHELL Collection

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Abstract. Parkesin, the first thermoplastic ever created, was discovered and patented by Alexander Parkes in 1856. Plastic bags started to become extensively used in the US in 1966 as a result of his invention's ongoing growth. As an alternative to paper containers, the grocery sector adopted plastic shopping bags in 1977. Plastic bags are useful carriers or media for transporting and loading a lot of luggage. This condition causes issues because there are so many plastic bags in daily life, especially black plastic bags because they have more concentrated chemical residues and dyes than colored plastic bags. In order to create new forms of the plastic material, experimental and exploratory methods were applied to black plastic bags as part of the project-based learning approach. The end product is a plastic bag with particular qualities that may be mixed with imitation leather and taffeta fabric to create a semi-couture collection. It is slightly stiff but flexible like a cloth.

Keywords: black plastic bag, experiment, exploration, semicouture fashion, sustainable materials.

1 Introduction

In 1856, Alexander Parkes discovered and patented a type of plastic called parkesin, a thermoplastic. The material was first introduced to the public in 1862 at the London International Exhibition [1]. The invention continues to grow so that plastic bags appear and are widely known in the United States in 1966. In 1974, giant retail companies in the United States such as Sears and Jordan Marsh began to use plastic bags en masse as carrying bags made of plastic. Then in 1977, plastic shopping bags began to be used in the retail and supermarket industries as an alternative to paper containers. In Indonesia, plastic bags are generally classified as LDPE (Low Density Polyethylene) [2].

Plastics are made through the polymerization process of their monomers at certain temperatures and pressures [3] [4]. Plastic is an artificial polymer that is widely used in everyday life in the form of an arrangement of large molecules (polymers) that have thousands of the same atomic group and form bonds that come from processing crude oil [3]. Plastics consist of polymers and additives. Additives are additives in the form of fillers, colorants, plasticizers or dispersants that can increase plasticity or decrease the viscosity of a substance that is added to change its physical properties.

The process of making plastic in general starts from crude oil that has just been lifted to an oil refinery through a refining process together with natural gas. The results of the oil refining process in the form of ethane and propane are then broken down in a hot furnace into ethylene and propylene. In a reactor, ethylene and propylene are combined with a catalyst to form a powder-like substance. This substance is called a plastic polymer. Furthermore, the process of extrusion of liquid plastic is carried out. The plastic in liquid form is allowed to cool and then enters the pelletizer process, which is the process of forming polymers into small pellets. These plastic pellets then become the basic material for the manufacture of various plastic products, one of which includes plastic bags.

Plastic is very good as a heat insulator, so plastic is often used to wrap electric wires in various electrical appliances and household appliances. The top plastic bag of a plastic bag is a packaging bag made of polyolefin or polyvinyl chloride plastic. Plastic bags function as containers or media to carry and load many consumer goods. The types of plastic bags are plastic bags for packaging, shopping bags, garbage bags, to large bags for industrial purposes. The first plastic bag was introduced by Montgomery Ward, Sears, J.C, Penny, and Jordan Marsh to the public in 1975 [5].

Black plastic bags are the last recycling of various types of plastic bags. Plastic bags themselves are very difficult to recycle into other plastic products, especially black plastic bags which can only be recycled into black plastic bags of lower quality. Therefore, the use of black plastic bags is the basis for the idea as a sustainable material and its application in the fashion industry in the manufacture of clothing.

Based on the explanation above, regarding the abundance of black plastic bags in daily life, it is one form of reducing plastic waste and at the same time utilizing it into a product that has a longer usability. It is hoped that in the future the public will be able to see that plastic bags do not only function as carriers of groceries or disposable consumption, but can be used in other forms by applying elements of creativity and art in them [11].

2 Research Method

The method used in making sustainable materials from black plastic bags is Project Based Learning (PBL) through creativity, experimentation [11] and material exploration. The PBL method itself is a learning model that involves a real project in the learning process [6][7]. The Project Based Learning (PBL) method generally has three stages, namely planning, creating, and processing [8]. The PBL method applied in the PELLESHHELL semicouture clothing collection is in line with research conducted by Ayda and Astuti [9] divided into several stages as follows:

- a. Literature study, the stage to find sources of information related to the theme raised, namely about plastic bags from scientific journal articles, internet articles, and other information media
- b. Moodboard, the stage for determining goals, directions, and guidelines in designing clothes so that the creative process is clearer and more focused through references to similar clothing collections such as semicouture and ready-to-wear deluxe [10]
- c. Design, the stage to realize the source of ideas from moodboards into designs that have characteristics according to the theme raised in the form of applying heat pressed and knitting techniques in the PELLESHHELL collection.

- d. Product realization, the stage of working on the PELLEShell collection which includes making fashion patterns, cutting fabrics, sewing fabrics into clothing, applying manipulation fabrics (heat pressed and knitting), as well as finishing or perfecting fashion collections by adding product accessories.

2.1 Tools and Materials

The tools and materials used in the PBL PELLEShell collection are divided into two parts, namely activities when sketching fashion designs and when combining fabric patterns to be sewn into clothes. Tools and materials for making design sketches are carried out in two processes, namely manually and digitally. The manual design stage uses drawing paper, pattern paper, 2B pencil, rubber eraser, black marker or pen, ruler, and glass table to trace the pattern. The digital design stage uses a computer device with specifications for graphic design, namely Adobe Illustrator software. Meanwhile, the sewing stage uses portable sewing machines, overlock machines, needles, threads, cloth scissors, taffeta cloth, imitation leather fabrics, as well as sheets and knitted materials resulting from heat pressed black plastic bags.

2.2 Experiment and Exploration

The experiment is a heat pressed technique, a technique to apply pressure or press to a plastic bag that has been cut and in the form of sheets with a certain temperature so that it creates a new effect on the plastic bag by slightly changing its structure. The application of pressure at a temperature of 180°C causes the plastic bag structure which was originally thin and more flexible to become harder, stiffer, but flexible while also keeping the initial plastic structure intact as if it will be crushed. The results obtained are changes in the shape of the plastic bag and also the effect of breaking on the plastic surface. By pressing, one plastic bag can be combined with another plastic bag, forming a plastic sheet with a larger size.



Fig. 1. Black Plastic Bag That Has Been Cut Into Sheets



Fig. 2 The Heat Pressed Technique is Carried Out Using a Press Machine

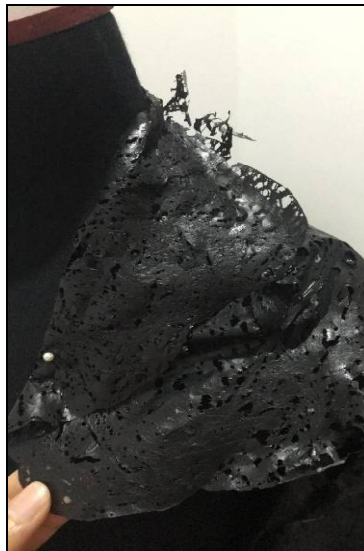


Fig. 3. The Result of Pressed Plastic Bag Sheets

After the plastic bag experiment was completed, the next stage of exploration was carried out as part of the design of the materials in the PELLESHEEL collection. Plastic knitting is made with a tool in the form of knitting chopsticks and the material used is a 'thread' made of plastic as shown in figure 4.

The main material used in making knitting or crocheting is knitting yarn with rows of staple fibers (short fibers) or a combination of filaments or spun by giving a twist so that it becomes a continuous strand [12]. Yarn is a material with a relative length of hundreds of times the diameter of the combined fibers, both single fibers and mixed fibers, and obtained

through the spinning process. Yarn can be categorized into two types, namely natural threads such as cotton threads and artificial threads such as nylon, polyester, and so on according to the origin of the fiber, one of which is thread from plastic bag sheets [13].



Fig. 4 How to Make Yarn From Plastic Bags

Furthermore, the technique of knitting plastic yarn is carried out like how to knit in general. Knitting technique or crochet is the art of hooking using threads that have been known for a long time. As for knitting a plastic bag, the first step that must be done is to make a skein of yarn from a plastic bag. The plastic bag is folded horizontally and then cut with a width of 1.5 centimeters. Pieces of plastic bags are joined one by one into long as if like yarn for knitting. Then the yarn is knitted using knitting chopsticks, with the shape of the knitting adjusting the shape of the fashion pattern. The material used as the thread is a black plastic bag that has been cut into small pieces and spliced together to resemble a plastic raffia rope. Then in the knitting process, what needs to be considered is the need for the use of plastic yarn for the manufacture of this type of product to match the expected final result.



Fig. 5. The Results of the Exploration of Knitting From Plastic Yarn

3 Result and Discussion

In the PELLEShell collection, 50% of the use of plastic bag material is used plastic bags obtained from the results of independent collection from homes and donations from several acquaintances in the surrounding environment. While the remaining 50% use new plastic bags due to lack of resources and limited time for the process of collecting and processing used plastic bags before being heat pressed and knitted.

The basis for designing this semicouture collection is a trend reference from the Indonesia Trend Forecasting 2019/2020 “Singularity” which is divided into four major themes: Exuberant, Neo Medieval, Svarga, and Cortex [14]. The explanation of the four major themes is as follows:

EXUBERANT, has the sense of being very alive, happy, and passionate, filled with energy and enthusiasm as a result of a long search for prosperity. Life cannot be separated from digital technology embracing cultural reconciliation in music, entertainment and art visualized with colorful graphics, street art, comics, and cartoons.

NEO MEDIEVAL, inspired by the term Neomedievalism which Hedley Bull first put forward in 1977 in "Anarchist Societies: A study of rules in world politics to describe the erosion of state sovereignty in a globalized contemporary world". The result is a theme that breathes medieval, but is very futuristic and looks high-tech in the background.

SVARGA, comes from Sanskrit which means Heaven, to describe the spiritual approach of humans. The design shows high-value craft-based products, to showcase the priceless heritage of tradition and local wisdom of traditional craftsmen.

CORTEX, digitization blends into life as a whole. The algorithms of social media used dictate the tastes, tendencies and even the way people think. In the process of drawing designs, it has been proven that AI not only functions as a designer's assistant tool, but can also be a designer himself. This theme depicts AI as an external neocortex for mankind, acting as a tool for exploring forms, materials, and mediums in design research, the results of which are often unexpected opening new horizons regarding vision, form, and materials.

The PELLESHHELL semicouture fashion collection is aligned with the Indonesia Trend Forecasting 2019/2020 Singularity with the theme Cortex with the Glitch sub-theme. The choice of the theme and sub-theme was carried out because it was in accordance with the principle of displaying processed plastic bags as a new sustainable material so that the resulting fashion designs were able to open new horizons in the field of design. New ideas in PELLESHHELL fashion designs in the form of irregular shapes applied as accents or motifs formed from plastic materials are explored in such a way that new works become more valuable.



Fig. 6. PELLESHHELL Collection Moodboard

The moodboard is the first stage in the design process that serves as a guide for showing a collection of ideas and images as inspiration for a fashion collection. In general, a moodboard is formed from a collection of inspirational images, colors that represent the fashion collection, silhouettes of clothing pieces, and other needed inspiration.

PELLESHELL is a semicouture fashion collection consisting of four fashion looks. Each look consists of three parts, namely top, bottom, and outer. The following is a sketch of the entire fashion collection from the front and back with the appearance without and when wearing the outer.



Fig. 7. The PELLESHELL Collection Looks Front (Top) and Back View (Bottom) Without Outer



Fig. 8. The PELLESHELL Collection Front View (Top) and Back View (Bottom) With Outer

3.1 1st Look

The look 1 design consists of three pieces of clothing, namely a bustier bra, skirt, and cape. Bustier bras use straps on the shoulders to help pin the clothes on the body for a better fit when worn. The design of the material used in the bustier bra is plastic knitting combined with

leather. The skirt is designed above the knee with a tulip skirt model using a plastic knitted design combined with faux leather. The opening at the back of the dress uses an iron zipper. The cap features a heat pressed plastic design with added snap fasteners for openings from the front.



Fig. 9. The Results of the Look 1 Fashion Photoshoot in the PELLESHHELL COLLECTION

3.2 2nd Look

The look 2 design consists of three pieces of clothing, namely a one-shoulder top, trousers, and also an outer in the form of a biker jacket. The outer is in the form of a jacket with the entire surface consisting of plastic elements, namely using heat pressed plastic and plastic knitting designs to decorate the front of the clothes. The one-shoulder top uses a plastic knitted design and heat pressed plastic on a taffeta fabric to support the realization of the fashion form and also as a furing or upholstery. The clothing opening is on the edge using an iron zipper. Body-fitted pants made of leather with a length of up to the ankles combined with a plastic knitted design.



Fig. 10 The Results of the Look 2 Fashion Photoshoot in the PELLESHHELL Collection

3.3 3rd Look

The look 3 design consists of three pieces of clothing, namely a sleeveless waist top, a pants skirt, and an outer coat. The sleeveless top is the result of a combination of faux leather with heat pressed plastic and plastic knitwear. Wrapped skirt with a straight skirt with a length below the knee combined with leather shorts inside. The outer is a poncho coat with an H-line cut made of leather combined with a heat pressed plastic design with an accessory in the form of a belt to complete your clothing needs.



Fig. 11. The Results of the Look 3 Fashion Photoshoot in the PELLE SHELL COLLECTION

3.4 4th Look

The look 4 design consists of three pieces of clothing, namely sleeveless tops, trousers, and outers. Waist-length sleeveless top using a plastic knitted design combined with faux leather, there are also two belts in the front that serve as openings and also fashion accents. Body-fitted pants with a length to the ankles made of leather combined with a heat pressed plastic material design. The outer is a half-coat made of heat pressed plastic, faux leather, and knitted plastic with an opening in the form of a belt.



Fig. 12. The Results of the Look 4 Fashion Photoshoot in the PELLE SHELL Collection

4 Conclusion

The attention and interest of fashion industry players, especially sustainable fashion, is increasing from year to year. In realizing this fashion collection, it must be able to display an urban impression while still being able to convey the concept of sustainable fashion itself. The creation of this prototype of the PELLESHHELL fashion collection can be a new alternative choice from the concept of sustainable fashion with the material from black plastic bags. The creative potential of this creation is expected to be able to enrich urban and modern fashion designs, for example with a combination of archipelago material such as batik, weaving, songket, and so on as a form of preserving the culture of the archipelago.

After undergoing the process of working on the PELLESHHELL fashion collection using the Project Based Learning (PBL) method, the following conclusions can be drawn:

- a. Plastic bags that originally had the function of making and carrying goods can be explored into works of art after going through certain experimental stages
- b. Introducing to the public about the use of plastic bags as new materials or sustainable materials that can be applied in the fashion world into a unique fashion
- c. Utilization of plastic bags by knitting and hot pressed technique as a new breakthrough in the manufacture of semi-couture clothing
- d. The use of plastic bags by knitting and pressing with a certain heat can be combined with imitation leather to produce an edgy and modern look
- e. The PELLESHHELL collection design process requires a trial and error process in the process because there is a lot of manual work that takes a lot longer.

Thus, the application of the Project Based Learning (PBL) method through the planning, creation, and processing stages has been fully implemented in the process of creating and designing the PELLESHHELL semicouture fashion collection..

Authors' Contributions

The main contributor in this paper is Dewi Isma Aryani, while Intan Talia is a member contributor.

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