Water-soluble plastic as a medium to make polyester patchwork embroidery craft

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Abstract. This study aimed to describe the process of polyester fabric waste to be an alternative material to make interior textiles. The characteristics of polyester fabric waste meet the qualities needed to be used as the material for making interior textile. The problem in this study is the effectiveness of using water soluble film paper as a medium for the application of manual embroidery techniques to make polyester patchwork. This study used experimental and implementation methods on textile crafts. The results of this study show that water soluble film paper can be used as a medium for applying manual embroidery techniques on polyester patchwork which is profitable and does not leave any residual waste. Thus, this medium is considered environmentally friendly. This method can be applied to bring out the element of craftsmanship based on the scope of textile craft study. Functional products made by using this method are also expected to provide aesthetic value in a room. This study is essential and useful to contribute to an overview to the community about alternative resources for apparel industry waste from the local area that can be created into new products with higher value.

1. Introduction

The use of fashion products has increased in terms of function. As the initial function, fashion products are merely for body protection but now it has developed to other functions, such as supporting human look and as visible markers of social status [1]. The development of this clothing function makes the flow of production and consumption grow faster. Therefore, such process is called fast fashion. Fast fashion refers to a collection of low-cost clothing by imitating current fashion trends [2]. This fast fashion helps consumers easily get what they want, i.e. to wear clothes with the latest styles [3]. The concept of this fast fashion is commonly carried out in the production of ready-to-wear clothing in the garment and apparel industry or it is popularly known as clothes convection (usually they are in the form of home industries or small scale apparel industries) in Indonesia [4].

This study focused on processing waste of polyester patchwork in the apparel industry sector. Processing the waste supports the reuse and recycle concept to preserve the environment. The apparel industry targeted in this study is a clothes convection established by the community and legalized as a legal industrial center by the local government of Banjaran, Tembok, Tegal Regency, Central Java Province, Indonesia. In one week, each clothes’ convection can produce 20 scores or 500 pieces of cloth waste which are usually distributed to Cirebon and local shops in Tegal. Moreover, 70% of the fabric used is polyester fiber. This may be due to its affordable price and attractive characteristics. Processing polyester patchwork aims to provide alternative options in order to utilize the waste of apparel industry
which can be used as new products with higher added value. These efforts are done by conducting some techniques that can be simply learned by the community [5]. In addition, this polyester patchwork will be processed into interior products, since interior products usually require raw materials whose characteristics are not easily decomposed, can last for long time usage, and are easy to maintain [6].

2. Methods

Polyester patchwork waste from the clothes convection industry becomes the main raw material in this project [7]. The characteristics of polyester fabric are shiny, light, textured and not easily wrinkled. These superior qualities make textile companies produce more products using this fabric type, especially because of the support from the Indonesian Textile Association (local abbrv: API) which strongly suggests the use of polyester fabric as the main raw material to make textile products. This may be due to the fact that cotton fiber as the raw material for cotton fabric is an imported product until now. In the period of 2000-2016, the use of polyester in global garment industry increased from 8.3 million tons to 20.1 million tons and accounts for 6% of plastic waste in Indonesia each year. Polyester patchworks selected were knit (local term: wolfsis), voile (hycon) and satin. The selection was based on a survey of patchwork availability at the clothes convection center at this time [8].

In this study, the polyester patchwork was joined with manual embroidery technique using a clamping medium like sandwich in the form of water soluble film paper, i.e. a sheet of film made from polyvinyl alcohol (PVA) composed of fibers, adhesives and protective colloids [9]. The production of PVA fiber is in the form of polyvinyl granules and sheets. Polyvinyl alcohol is still less common in Indonesia, even though it actually has been found since 90 years ago [10]. Polyvinyl alcohol has a wide range of applications, including as a key ingredient in the formulation process in various industries like food packaging, construction, electronics, coatings, printing, textiles, cosmetics, and paper [11]. The highest demand of this material is from food packaging industry accounting approximately 31.4% of global plastic volume in 2016. PVA is a capsule material made of film and it is water soluble. The application of PVA is widely found in medical industries, such as capsule packaging in medicines, which is called edible film, while PVA used as packaging is called soluble film. This film or sheet membrane is developed in such a way to make it easily soluble during the washing process, even when washed in cold water. This provides benefits to consumers in terms of safety and comfort [12]. Water soluble film paper is designed to not dissolve and break too early (e.g. when touched with wet hands, or when put in the mouth). It also serves to resist compression, for instance when pressed by a child or pressed by an accidental touch [13].

3. Results and discussion
The process of joining polyester fabric waste that has been cut into small pieces employs manual embroidery techniques [14, 15]. Water soluble film paper is required in this process as a basis or clamping material in the preparation of waste pieces which will be joined and put together using manual embroidery techniques. This intermediate medium serves to provide a strong grip on the surface of the fabric so that it becomes steady during the embroidery process, and it can also glue the embroidery thread perfectly.

The aesthetic emerges from the composition of the color arrangement derived from the patchwork of polyester fabric and the diversity of applied manual embroidery techniques [16]. The condition of polyester fabric waste from clothes convection production is usually limited in colors and motifs; thus, they need to be well organized. In the making process, the patchwork whose same color tone or shades will be grouped and then arranged according to the design [17].
Figure 1. Patches of polyester fabric that have been selected were cut into 1 to 2 cm size.

Figure 2. Sheets of water-soluble film paper that will be used as a medium for clamping the patchwork before the pieces of the patchwork are joined with manual embroidery.

Figure 3. Stretch the water-soluble film paper in two parts (top and bottom) to clamp the cut patchwork.

Figure 4. Join the patchwork by applying manual embroidery technique (a). Pay attention to the right color composition between the yarn (b) and the color of the waste in order to get an attractive visual (c).
Figure 5. After being embroidered, soak it in clean water for 3 minutes. Water soluble film paper will dissolve and the cloth made of patchwork and threads which have been joined is produced.

Figure 6. Clean the remaining water-soluble film paper that still sticks to the cloth and hang it to dry.

The results of the experiment on the application of water-soluble film paper as a sandwich medium for clamping the patches in the process of making manual embroidery show that water soluble film paper does not increase the thickness of the embroidered fabric surface [18]. This is certainly a significant advantage, because the use of other complementary media, such as cloth or paper, tends to add the thickness to the final embroidered fabric. In addition, the use of water-soluble film paper also does not change the color or the structure of the fabric and embroidery thread. Another superiority of this material is that it does not produce residual waste because the water-soluble film can dissolve when washed. Joining polyester fabric patchwork with this technique produces new sheets of fabric that can be used as the elements of interior textile. The definition of interior textiles is the material used for space or room in order to obtain a good atmosphere in residential and public homes by applying textile basic materials, such as curtains, drapes, upholstery, rugs, wall coverings, and so on [19].

4. Conclusion

Processing waste of clothes convection industry is an effort to reduce the impact of environmental pollution. The result of the experiment of using water soluble film paper as a medium for embroidery applications on polyester patchwork in this study can be an alternative idea or reference to create local products which employs the craftsmen and active clothes convection waste. Accordingly, the waste can contain better usage value. One of the product applications is for the interior textile element in a room partition. This room partition made of polyester patchwork embroidered fabric has dual functions, i.e. as an insulator or divider of space functions, and to beautify the room. The advantages of interior textiles made of polyester are for instances, they are commonly strong, durable, and easy to maintain.

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