

Production of Taper Product from Weaving Waste Cotton Yarn and Beeswax

Zinabie Degu*

Department of Textile Engineering, College of Engineering and Technology, Wolkite University, Wolkite, 07, Ethiopia

Abstract

This paper claims how to use textile hard waste for the production of taper. Taper is a product which is produced from cotton yarns and ignitable waxes. The body of the product is yarn and only the wax materials are coated on the yarn strand in order to give lighting properties and to give cohesiveness/strength of yarns. The difference between candle and taper is that candles are produced with only few number of yarns and the main constitute is paraffin wax, but in taper the wax is apply in small extent and the number of fiber is too much more. Taper is used for lighting especially in the celebration of holidays and programs in christen churches. In most of textile companies especially in spinning and weaving sections there is high waste accumulation, conversation of those waste requires special attention, in order to make and build the most profitable textile companies. This project aims to produce taper product by using textile waste yarns and natural wax which is extracted from waste honey. In textile industry there is high waste generation because of different reasons. This project converts this waste to usable product in order to increase the value of wastes in textile industry. The natural wax is extracted from Teji (traditional alcoholic drink in Ethiopia) residue, which has the properties of igniting. This wax has good odors which can be used for the production of taper product. This paper contains both the extraction methods of natural honey wax (beeswax) and production of taper product by using textile waste yarns which are produced from post spinning and weaving preparatory sections.

Keywords: Taper • Waste yarn • Product development • Beeswax

Introduction

This project focuses on weaving section of Textile Company. Weaving section is one section of textile mills which converts textile yarns in to fabrics, before the fabric is produced the yarn is subjected to yarn preparation especially for warp yarns there is three common stages, those are winding, warping and sizing. During this yarn preparation stage there is high waste yarn generation. From those preparatory sections high amount of wastage is generated in sizing processes, this wastage is due to the length variation of warp yarns in warp beam, operator carelessness, operators are not initiated to use standard warp waste, and during beam changing there is high waste which will be used for the production of taper product. Waste is accumulated in the creel area when the beams begin to run out. This creel waste is in the form of un-sized yarn. Since this yarn has not been run through the slasher and has not been coated with size, this yarn waste has a different cost value than that of yarn which has been sized. Waste can occur all throughout the slasher if a defect is detected and must be removed. Waste also occurs when two sets are joined together, and is referred to as set out waste. However, some of the waste caused from the set out procedure is unavoidable waste but it can be minimized. One example of this unavoidable waste is the amount of yarn needed to thread up the machine. Generally waste can be classified in to two un-sized waste and sized waste.

Taper is thin types of candle made of beeswax/ignitable and environmental friendly coats and from textile materials, which is in the form of yarn. Textile yarns and wax (paraffin or tallow) are two main components used to produce candles [1]. The difference between candle and taper is that candles are produced with only few number of yarns and the main constitute is paraffin wax, but in taper product the wax is apply in small extent just like

a coat and the number of yarns used is too much more than candle, so we can say confidently more than 80% of the taper is yarn and less than 20% is an ignitable beeswax. Taper is produced for gifts to churches and used for lighting, especially in the celebration of spiritual holydays and programs in christen churches. The main reason which intended to produce taper is that because of there is too much amount of waste generation in loom preparatory section especially in sizing (Figure 1).

These textile waste and scrap products may comprise overruns, products which fail to meet desired standards or simply waste during manufacture. Due to the cost of raw textile materials, it is desirable to reuse or recycle as much as possible discarded textile product [1,2]. Both The materials (beeswax and yarn) used to produce the product (tapper) are wastes .beeswax is extracted from the remnant of Teji and the textile materials are from sizing wastes. Teji is one of the most popular traditional drink of Ethiopian people which is beavered by using honey and other additives, her other additives are not our concern but the honey which was add for the beverage of this traditional drink is wasted after the alcohol is prepared and can be used for extraction of beeswax.

Candles have been known and used since early civilization. A typical candle is formed of a solid or semi-solid body of wax such as paraffin wax or beeswax, and it contains an axially embedded combustible fibrous wick [3]. Traditionally, a candle is made up of a single or multi combustible, porous core or wick surrounded by a fusible, flammable solid wax or wax-like material, such as absolute or blends of petroleum (paraffin) wax, mineral (montan) wax, synthetic wax (polyethylene or Fischer Tropsch), natural waxes (vegetable or animal) and clear candle waxes or "gels" (ETPA) [4-6].

*Address for Correspondence: Zinabie Degu, Department of Textile Engineering, College of Engineering and Technology, Wolkite University, Wolkite, 07, Ethiopia, Tel: 251914740247; E-mail: zinabie2019@gmail.com/zinabie.degu@wku.edu.et

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Figure 1. Application of taper in orthodox church.

Statement of Problem

The problem which initiates to produce taper product is due to the problem of high waste accumulation in sizing machine and due to the problem of honey waste in Teji remnant pollutes the environments. This means both material are considered as waste in different areas, therefore changing those materials to the products has advantages of gating more income from sells and keep the environment clean.

Objective

General objectives

To produce taper from waste yarn (preparatory weaving section) and from beeswax.

Specific objectives

To do some experiment of production of taper from waste yarn and beeswax extracted from Teji remnant.

To study how to produce taper from textile waste yarns

To increase the profits of textile companies from selling of taper product.

To create job opportunities for the workers

To satisfy the customer's needs of taper

Significance of the study

The product taper will have significant role for the users or customers in terms having low cost; therefore due to this the customers will have opportunity to choice the products as they want in varieties. The main aim of this product development is in order to develop products having low costs, and environmental free, this is one classification of new product development and from this view of product is produced, taper products having low costs.

Limitations of the product

The constraint of this work is that there is no any machine which will produce this product here and before due to this all the material preparation and production of sample is done in hand and by using available equipment's in textile lab. In order to produce taper product in mass production it has to be aware the people who have Teji honey remnant to put in good way rather than throwing away to the environment.

And the second limitation of this study is that there is no any paper directly related to taper without my work that had been published in Journal of Production Research Management, "Conversion of Textile Waste Yarns to Candle Product by Designing Simple Candle Producing Machine", due to this reason getting direct related reference was difficult [7-10].

Methods and Materials

Materials

The materials used to produce taper from the waste yarn are; Waste yarn from textile industries, Beeswax (honey waste from Teji), Weighting balance, beaker, Cutter, Ruler, and Stove

Methodology

To produce taper by using beeswax and by using waste yarns, we must have two stages. First prepare the yarns thickens and length according to the required dimension and second stage extract the wax from the Teji remnant and add the beeswax to the prepared yarns by melting and filtering the wax finally wait the product until it dry by air or it's possible to use drying mechanisms [11-13].

Procedures

1. Collect the remnant from honey waste; this waste is collected from the bottom of the Teji remnant, it has to be dry and separated from any other materials as shown in the Figure 2 below.
2. Prepare beeswax from Teji (honey) remnant: First put the remnant into the water and boil until it riches melt, this process helps to soften the wax and then the next step is that filter the wax from its shell by using gray fabric and squeeze it until all wax out from the waste (Figure 3).
 - 2.1 Separate the wax from its cover by using gray fabric having good porosity, it requires applying force to squeeze in good manner (Figure 4).
3. Prepare group of yarns from waste and give twist to bind yarns together, yarns are prepare according to the required thickness and length and also according to the requirement they may be twisted or not twisted,



Figure 2. Honey waste from Teji remnant.



Figure 3. Melt the remnant.



Figure 4. Filter the wax.

this twist has significance effect on burning rat, yarns with twist will have low rat of burring and yarns with no or low twist will have high burring rate (Figure 5).

4. Melt the wax and keep it liquid: after extraction of wax it become sold when it gets put at room temperature, for coating it's expected to keep it liquid (Figure 6).

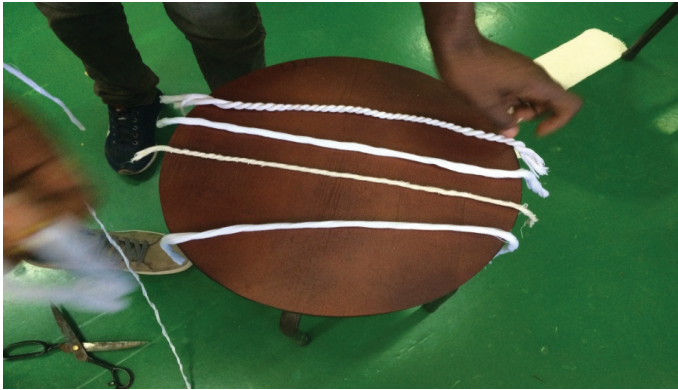


Figure 5. Yarn preparation.



Figure 6. Extracted wax from beeswax.



Figure 7. Hung the taper to dry.

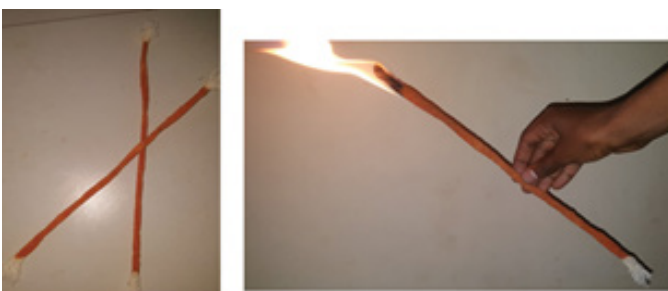


Figure 8. Taper product produced form waste cotton yarn and waste beeswax.

2. Produce the taper product by Coating the prepared yarns by beeswax; the yarn which were previously prepared form waste yarns are expected to be coated by the wax, and this coating will have two significances on the yarn strand, one is it makes the yarn strand to be stiff and stand alone and second it makes the strand to be ignitable when it gets flam.
3. Wait until it drays by air. The coated strand should be dried by using dryers or air, and then it will be ready for use (Figures 7 and 8).

Result and Discussion

After completion of this study the taper product is produced from waste yarn and beeswax which has good burning and good odors during lighting .the main aim of the study is to use waste textile yarns for the production of taper product and this is successfully conducted, the product is produced. When the product were tested, it has good smells and it has good light intensity .The parameters of the product like length and diameter of the product can be determined according to the customer needs. It is possible to produce the taper product according to the required yarn in length and in thickness by increasing the numbers yarns used in a single taper product, this makes the product become more flexible (°).

Conclusion

In this experiment textile waste yarns and natural beeswax are used for the production of tapper product. The waste yarns which were taken for the production of taper products are only un-sized yarn and waste yarns in weaving and in preparatory weaving sections, except sized yarns. The reason why only un-sized yarns are selected for the production of taper product is because of sized yarns are treated with sizing chemicals those chemicals will have risk on the users during inhaling of oxygen. So next work is expected from researchers to check whether it's possible to use the sized yarn or not by studying the effect of size chemicals on human health when they are burning in the form of taper products which are sized.

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