



Production of Inverter-Powered Tjanting Tool with Locally Sourced Materials for Batik Design

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ABSTRACT

The textile industries in Nigeria have suffered at alarming rate due to negligence and political will-power to fund the sector. Inflation has also added its bite on this deplorable state. These has given rise to many problems now facing textile artists in sourcing alternative power supply in the face of continuous epileptic power supply and the high cost in procuring other alternative power in the like of the use of gas for the purpose of heating wax in preparation for batik dyeing. Additionally, health hazard designers are exposed to from the fume of wax from the heating pot during the process affects batik practice in Nigeria. In view of the above, locally fabricating Tjanting tools with locally sourced and available materials became imperative as substitute to imported and highly cost Tjanting tools due to import duties imposed on it. Thus, these served as the motivation for the construction of Inverter-Powered Tjanting tool at almost zero cost in its operation. Findings shows that locally fabricated Inverter-Powered Tjanting tools will greatly prevent the enormous health implications associated with the crude process of batik making thereby encouraging students and staff of institutions to constantly get involved in the textile art production. The aim of this paper is to encourage designers' exploration in indigenous technology in proffering solution to textile industry.

Key Word: Batik; Element; Refractory; Tjanting; Inverter- Power.

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I. INTRODUCTION

From inception till date, textiles and its products are interwoven into the human society. The most known advancement has and will not displace this practice. Textiles and garments are products of the textile industries which plays foremost role in the development and Industrialisation process of countries and their integration into the world economy (Hosein Mahmoudi, 2018). Cheryl Rezendes (2013) opined that in most developing countries, textile products accounted more than half of all the world exports and that account for their large net-exporting position. Unfortunately, the textiles and clothing industries account for only a small percentage. This implies that Nigeria has not tapped into the industry to harness maximally its importance for her economic growth. In most developing countries, the importance of textiles and clothing industries have direct bearing on it economically: providing incomes, jobs, especially for women, and foreign currency receipts as initial gains and in the long-run, provides sustained economic development to these countries with

appropriate policies and institutions that enhances the dynamic effects of textiles and clothing. According to Jodie Keane and Dirk Willem te Velde (2008), the potential of the textile and clothing industries to contribute” these economic benefits “on the quality and effectiveness of government policies and institutions in developing countries to build on this investment.” In the textile industries, colour applications are invaluable as it holds the potential to create custom designs to meet with the current demand of textiles and fashion products (The Textile Institute, 2000).

In addition, the Nigerian economy is experiencing a hyper-inflation rate due to the COVID-19 pandemic, the resultant effect of the Russian war in Ukraine and the cash-less policy of the Central Bank of Nigeria. These have negative impact on the textile industries. The major problems that textile designers in the face of epileptic power supply and the high cost living, are in sourcing alternative power supply in the face of continuous epileptic power supply and the high cost in procuring other alternative power in the like of the use of gas for the purpose of heating wax in preparation for batik dyeing. On the other hand, foreign Tjanting tools and its equipment or spare parts are imported at high cost due to import duties. Added to this is the problem of health hazard textile artists are exposed to from the fume of the local heating pot of wax during the course of making batik design. This situation has had a very negative effect on batik practice in Nigeria. Thus, these birthed the construction of Inverter-Powered Tjanting tool at almost zero cost in its operation which will greatly prevent the enormous health implications associated with the crude process of batik making thereby encouraging students and staff of institutions to constantly get involved in the textile art production.

Colour Application in Textile: Resist Techniques

The traditional methods of applying colours onto fabrics with the resist effect are tie-dye and the batik techniques.

i. Tie-Dye Technique: It is an ancient art which is also known as ‘Adire,’ deals with twin or raffia in tying the fabric in various patterns before the introduction of colours onto fabric by submerging it in a dye bath. This art originated from two Indian states Rajasthan and Gujrat as ‘Bandhani.’ While the technique originated in Java and known as ‘Shibori’ in Japan. In Nigeria, Tie-Dye is popularized in Abeokota, Ibadan, Osogbo and in Hausa land. It is a resist technique where sections of fabrics are tied, folded, clamped with tie rods to keep the tied area from absorbing dye, resulting in an un-dyed pattern against dyed background (Kukoyi O. T, 2013). Tie-Dye technique requires limited space and equipments in providing satisfaction in its unique creation.

ii. Batik Technique: According to Woodhead (2011), batik process of wax resist dyeing requires the introduction of heated wax in a liquid state on the fabric’s surface to create a resist when submerged into a dye bath. The un-waxed area absorbs dye and the wax on the waxed pattern area resists the dye. The fabric is then removed from the dye solution and allowed to oxidize. The wax is removed either by immersing in hot water or placing plain sheet of paper in between the fabric and then ironed with pressing iron to remove the wax. Kimberly Kight (2011) sees this technique as the application of wax on designated area of fabric that is not to be dyed.

According to The wax resist dyeing of fabric is ancient art forms, which existed in the 4th century BC in Egypt. It was used to wrap mummies, linen was soaked in wax and scratched, using stylus. The art of Batik is highly developed in the Island of Java in Indonesia. It is a technique of wax resists dyeing applied to the whole fabric or cloth. Batik is made either by drawing dots and lines of the resist with a spouted tool called Tjanting or by printing the resist with a copper stamp known as Cap. It is a method of dyeing in which patterned areas are covered with wax to resist colour, until recently batik were used for printing on fabrics, dresses and tailored garments. Modern batik is now applied in different items, such as Murals, Wall hangings, paintings, household linen and scarves with livelier and brighter patterns.

Importance of Tjanting in Batik Resist Method

All over the globe, according to Smithsonian (n.d), Tjanting or Canting tool is widely known as a hand-held tool or device that help textile designers to make application of intricate and detailed designs easier to introduce on fabric or cloth to create beautiful designs that are appealing to the eyes. Tjanting Javanese batik tool came to lime light since 1914. The Tjanting is a pen-shaped tool used to draw a design with melted wax on cloth, for Batik or wax-resist dyeing on cloth. It has a short tabular handle with a copper applicator tip. The handle can be wood or bamboo, and it protects the worker from the hot wax and a thin hollow sport through which the wax is drawn onto the cloth.

In the textile industries, one of the major problems that textile artist or designers face in Nigeria is epileptic power supply and the high cost in procuring gas in the heating of wax over the period of designing, waxing on fabric in preparing it for dyeing. On the other hand, foreign Tjanting tools and its equipment or spare parts are imported at high cost due to import duties. Added to this is the problem of health hazard technicians are exposed to from the fume of the open pot of wax during the course of making batik design. This situation has had a very negative effect on batik practice in Nigeria.

Construction of Inverter-Powered Tjanting Tool

The Tjanting equipments was constructed with durable materials that will stand the test of time and its power system was based on the best known and trusted products that will constantly meet the challenge of the batik process. The researchers embarked on the design and fabrication in different stages and they are as follows: production of the Tjanting, assemblage of the Power Station and finishing of the hand held tool.

a. **Production of the Tjanting:** The construction of an Inverter-powered Tjanting tool embraces the fabrication of the heating chamber the refractory and the heat element along side with the heating section design to hold and melt the wax. The production started with the procuring of preformed ordinary household objects and waste equipments such as stainless cups, hydrogen electric stove, nozzles for gas burners, gas tape and woods. See the following Fig. 1-4 below:



Figure 1: Stainless Steel Cup



Figure 2: Stainless Steel Cup Lid



Figure 3: Gas Burner Nozzle



Figure 4: Gas Tape

The researchers embarked on the construction of the heat chamber with the creation of a convenient refractory for the Tjanting by adapting the refractory in the hydrogen stove to suit the space in the stainless cup which was closely fixed to the cup with the heat element connected to its two ends with wires that run underneath the refractory as seen in Fig. 5 and 6.



Figure 5: Heat Element



Figure 6: Mounting of the Element on the Cup

Next, the researchers drilled two 6mm holes on the adapted shell close to the element to give allowance for air expansion and breathing to avoid the explosion of the element. Next, with circular drill bit, a circular space was drilled at the front side and later cut up to the top to enable the cup expand to accommodate the twin cup with the tap and the nozzle (see figures 7 and 8). The researchers drilled the twin cup with the same circular drill bit and further welded the tap with oxy-acetylene welder. On the other end of the tap, the nozzle was next attached by welding. At this point, the cup with the tap was placed on the inside of the cup that houses the refractory and its element as seen in Fig. 9 and 10.



Figure 7: Drilling of Circular Hole on the Cup



Figure 8: Cutting of the Tape space on the Cup



Figure 9: The Fabrication of the Tjanting



Figure 10: Installation of the Cup on the Element

With the installation of the Tjanting, it became obvious that the handle of the cup will not be sufficient enough to carry the weight of this device, hence a need to fix a wooden handle to balance the overall weight of the tool and to make it handing to allow for easy manipulation of design during wax application on fabrics. The wooden handle was fixed to the device with two screw nails and a groove was incised under the handle to accommodate the line of wire and the subsequent attaching of the switch to enable on-and-off of the device as shown on figure 11.



Figure 11: The Completed Tjanting Tool

b. Assemblage of the Power Station: The following equipments the researchers used in the adventure of the construction of the Tjanting electrical compartment are: electric elements, inverter, batteries, switches and wires.



Figure 12: Tiens 1,200 Watt Power Inverter



Figure 13: Felicity G12V 200AH Deep Circle Battery

c. **Finishing:** In this step, the researchers ensured that the Tjanting tool and its components were presentable. Hence, they carefully prepared the device to be environmentally friendly for the practice of batik textile design.

Operation Guide of the Tjanting Tool

The operations of the Tjanting device requires a mode of operation which involves set of rules compiled to guarantee the its maintenance and longevity in the production of batik design. The following steps should be taken when starting session of batik design with the Inverter-power Tjanting.

- a) Start the device by plugging the terminal wire to the 12 volt stepdown unit or to the unit on the 12 volt battery directly to allow the flow of current to get to the switch. Then, connect the inverter to the national power grid to place the inverter on a charge mode (this will enable the automatic switching of power during power outage or failure).
- b) After ensuring proper connection, turn on the first switch and ensure there are no current losses at the terminals.
- c) Before turning on the second switch, the Tjanting's chamber should be cleaned and its tap should be properly locked to prevent the flowing out of low-heated wax from the nozzle before loading the wax. The heating of the wax chamber should be continued for 10-15 minutes.

- d) Allow the wax to be heated continuously for about 10-15 minutes until it is completely liquefied with sufficient heat to avoid clogging in the supply through the nozzle.
- e) To apply the wax on fabric, handle the Tjanting tool at an angle where the nozzle will be placed at vertical direction on the fabric to avoid blurring application.
- f) To shut down the device after the process of wax design application has been completed, lock the wax supply to the nozzle and empty the wax from its chamber.
- g) Turn off the inverter and unplug from the National grid.
- h) After some minutes, turn off the switches of the power supply. The device will gradually cool off. Next, clean up the wax chamber and neatly roll up the wire for proper maintenance and storage.

Maintenance of the Tjanting Device after Use

The durability of the device hangs or depends solely on the maintenance culture of the textile designer operating it. The following steps are essential for the durability of the Tjanting tool:

- a) Remove the primary wire connection.
- b) Close the tap.
- c) Take out the left over wax from the wax chamber
- d) Unplug the inverter from the national grid.
- e) Clean all these components with the help of soft cloth or foam and remove all the wax deposits.
- f) Roll up the wire and store up properly.

II. Findings, Recommendation and Conclusion

In batik making, the stress faced by Textile designers in order to exhibit intricate and detailed designs to show the aesthetics and usability, call for tedious work and attention. Thus, the birth of the construction of inverter-powered Tjanting tool that is at almost zero cost in its operation. The use of Inverter-Powered Tjanting tool will greatly prevent the enormous health implications associated with the crude process of batik making, thereby encouraging students and staff to constantly get involved in the art. Thus, the construction of the Inverter-Powered Tjanting tool will increase the practice of textiles in school of higher learning.

This paper is aimed at encouraging textile designers to explore indigenous technology and local content in proffering solution to textile industry. Therefore, it is recommended that textile designers be acquitted with technical knowledge to create equipments that will foster avenues for learners and experts to easily express their creativity in batik by producing delicate and detailed designs of their choice. It is the researchers' objectives to create avenues for learnt and unlearned textile designers to easily express their creativity by producing delicate and detailed designs of their choice because originality is essential in art. The importance of this project is of great need to encourage quality and consistent batik making activities in school of higher learning. The construction of an Inverter-Powered Tjanting tool with locally sourced materials was less expensive since accessories of foreign spare parts were not needed.

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