

**BUSITEMA
UNIVERSITY**
Pursuing Excellence

FACULTY OF ENGINEERING

DEPARTMENT OF TEXTILE AND GINNING ENGINEERING

FINAL YEAR PROJECT REPORT

Design and Construction of a Hand Screen Printing Table With a Drying Unit

SSEGUYA DUNSTAN

Reg. No: BU/UG/2011/48

Email: 256musimbi@gmail.com. Tel:+256750635775

SUPERVISORS:

MAIN SUPERVISOR: Mr. Ssembatya Martin

CO-SUPERVISOR: Mrs. Tusiime Yvonne

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I thank all my supervisors who guided me throughout the different work concerning my project. I owe them all my thanks and acknowledgements.

In addition, I thank all the textile department members who gave me the courage to continue with my project this has made me learn a lot of new things.

DEDICATION

I dedicate this report to my lovely mum Jessica and dad Matovu Isaac thanking them for the great work well done for supporting me financially throughout the four years.

ABSTRACT

This report contains the general procedures carried out while designing and constructing a hand screen printing table with a drying unit as a project carried out at Busitema University by Sseguya Dunstan for partial fulfillment of a bachelor's degree in Textile engineering.

It contains of five chapters, chapter one has introduction, problem statement, the objectives as to why the above project was carried out, justification and the general significance of the project

Chapter two contains the literature review and this is where all information concerning hand screen and printing rules as a whole, types of pastes on the market. It also has information comparing the existing tables on the market and explains the advantage and disadvantages of hand screen printing in Uganda.

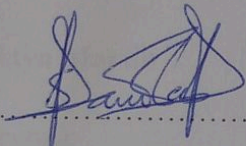
Chapter three has the general procedures, considerations and dimensions of the project.

Chapter four has the results attained during construction and after testing of the constructed project. These results are further discussed in this chapter.

Chapter five contains the challenges met during the designing of the project and after testing the project. It also contains recommendations that should be done to overcome the above challenges.

DECLARATION

I **SSEGUYA DUNSTAN** declare that this report has been compiled be alone and it has never been produced by anyone else. It contains information on the project I designed and constructed about a a hand screen printing table with a drying unit with the help of my supervisor Mr. Ssembatya Martin and Mrs. Tusiime **Yvonne**

Signature: ..... Date: 29th / 05 / 2015.....

APPROVAL

This is to certify that this report is a true effort of **SSEGUYA DUNSTAN** on the account of the project designed and constructed for the partial award of a Bachelor's degree in Textile Engineering.

Signature:..... **Date:**.....

Mr. Ssembatya Martin

Main Supervisor

Signature:..... **Date:**.....

Mrs. Tusiime Yvonne

Co- Supervisor

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1. BACKGROUND

The history of the printing process has been a long and interesting one. It began with the discovery of the printing press in the 15th century. The first printing press was invented by Johannes Gutenberg in 1469. This was a major breakthrough in the history of printing. Before this time, books were hand-written and were very expensive. The printing press made it possible to produce books in large quantities and at a much lower cost. This led to the widespread distribution of books and the growth of the printing industry. The printing press also played a major role in the development of the modern world. It was the printing press that made it possible to spread new ideas and to challenge the authority of the church and the government. The printing press was also responsible for the development of the printing press as we know it today. The printing press has become an essential part of our lives and has played a major role in the development of our society.

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CHAPTER ONE

1.0 INTRODUCTION

This chapter introduces the study by providing a background to the study, problem statement, and objectives of the study, justification of the study and finally purpose plus scope of the study.

1.1 BACKGROUND

Historically, simple printing techniques have existed since ancient times. The early Egyptians carved designs on the ends of walking staffs. These were dipped into strongly colored dye solutions and then stamped onto fabrics. In other early civilizations, the art form "batik" was developed. In this technique, liquid wax is applied by hand to the fabric in a pattern. Once the wax has dried the fabric is dyed. Subsequently, the wax is removed, and the fabric is dried (Greoly 1997). Next a new pattern of wax is applied and the fabric is dyed a different color. This process can be repeated over and over to develop many unique patterns and colors. Batik is the early version of the modern resist printing process. For example, in a two dyeing batik where one dye is red and the other dye is blue, the fabric will exhibit unique specific properties. Where the wax pattern covered the fabric the first dyeing but not the second, the fabric will be red. Where the wax covered the fabric the second dyeing but not the first, the fabric will be blue. Wherever the wax was present for both dye baths, the fabric will be white. Where no wax was present for either dyeing, the fabric will be violet. (Greoly October 1997) However, in addition to the complex color formation possible with this technique, the wax cracks during each dyeing process resulting in very fine random pattern lines of color in the original fabric. This creates a unique batik fabric.

Early developments in textile printing closely followed developments in the paper printing industry. Methods used by Guttenburg for his printing press in the Middle Ages were employed by early German textile printers. These people used designs carved into wooden plates or wood cuts to stamp various designs onto fabric. Initially this was done strictly by hand. As time passed, printers attached both wooden and metal design plates to cylinders to somewhat mechanize the process. This led to the development of the modern engraved copper roller printing technique.

Screen printing is a printing technique that uses a woven mesh to support an ink-blocking stencil to receive a desired image. The attached stencil forms open areas of mesh that transfer ink or other printable materials which can be pressed through the mesh as a sharp-edged image onto a substrate. Screen printing first appeared in a recognizable form in China during the Song Dynasty (960–1279 AD) (Philp H.1956) It was then adapted by other Asian countries like Japan, and was further spread all over the world.

In Uganda today hand screen printing is now running on mostly small scale businesses. Hand screed printed products are on demand mainly by schools, companies, and different organisations. But small scale businesses are characterised by using poor printing work places and printed pastes are dried using sunlight which takes about 1 hour to dry one colour paste print. This becomes a problem if very many pastes prints are required on to a design to be put on the same fabric because it will take a lot time. Sometimes temperatures, climates and work place conditions may hinder permanent fixation of these pastes in to the fabric.

Therefore designing and constructing a cheap and reliable hand screen printing table with a drying system will help to improve on ergonomics of workplace, reducing on the drying time required, and increasing the productivity and neatness of the job.

In cases of multicolor printing were interesting effects can be made by having a two color or more print on overlapping areas. These overlaps can add a third (darker) value to the print. Speedball Transparent or Extender Bases are formulated to enable screen printers to achieve this. But if a drying unit is not available it takes a lot time to finish a job of multicolor printing. Multicolor printing can be seen in printing images of people on to t-shirts, animals, budges and logos on various fabrics.

1.2 PROBLEM STATEMENT

Hand screen printing in Uganda has increased due to a high demand of hand printed products, however its productivity is mainly hindered by using poor printing work places and luck of dying units which can also increase on the fixation levels. Drying these pastes has mainly been by

using sunlight which takes a lot of time to dry these pastes. This becomes too hectic if there is a big load of work.

On market today available printing tables are too expensive since they use expensive drying materials others are just incorporated with dry-lacks which again require sunshine.

Putting a simple and cheap table with good drying unit in place will improve on the ergonomics of workplace and productivity will increase since drying time will be reduced to a range of 2-5 minutes.

1.3 OBJECTIVES

Main objective

- The main objective is to design and construct a hand screen printing table with a drying unit

Specific objectives

- To design a multipurpose table with good ergonomic work place principles
- To fabricate and assemble a drying unit using a common cook plate on to a table so as to reduce on the drying time
- To carry out economic analysis of the prototype

1.4 JUSTIFICATION

If the study is implemented the ergonomics of a hand screen printing work place will be boasted since the table will be adjustable to fit various height. It will also boast the neatness of the place and favor both genders.

Drying time will be reduced so as to boast the productivity of the job.

This table will be cheaper than the available tables because of using cheaper materials and simpler construction.

1.5 PROJECT SCOPE

This project will cover the design and construction of a hand screen printing table with a drying unit

1.6 SIGNIFICANCE OF THE PROJECT

Besides the advantages of hand screen printing it still have disadvantages like;

Slow production rate as almost all the process is done manually hence the production rate becomes lower than other printing process

Small scale production if one wants to own a big screen printing factory, the hand screen printing techniques may not cop up.

Hand screen printing is a Labour intensive process. A labour has to work manually and all the processes of hand screen printing is done by hands so it needs more time to produce products

Fastness properties are average since all the processes are done manually the fastness properties of printed products is not well

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