BUSITEMA UNIVERSITY

FACULTY OF ENGINEERING

DEPARTMENT OF TEXTILE AND GINNING ENGINEERING

STUDY OF THE MEHANICAL PROPERTIES OF SANSEVIERIA FIBER REINFORCED BIO-COMPOSITE.

BY

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DECLARATION

I,HABBI Geofrey, do hereby declare that this report is as a result of my own work and is in no way a copy of any proposal that has been submitted anywhere before. Where other work has been quoted, it has been duly referenced.

Name ---------- HABBI GEOFREY

Signature ----------

Date---------- 29-May-2013

ACRONYMS AND ABBREVIATIONS

UIRI -Uganda Industrial Research Institute in Kampala

MCL-Makerere Civil Laboratory.

SRNYTIL- Southern Range Nyanza Textiles Industries Limited in Jinja.

STF- Sansevieria trifasciata fiber.

PE-polyethylene.

PP-polypropylene .

PEEK-polyether ether ketone .

PVC-polyvinyl chloride

LIST OF FIGURES.

Fig2.1- Growth Outlook for Bio-based Composites by Application in United State, 2000-2005.

Fig2.2 -Use of Natural Fiber for Automotive Composite in Germany and Austria 1996-2002.

Fig2.3- Categories of Natural Fibers.

Fig3.1 showing freshly extracted ST fibers and fiber extraction

Table 3.1 showing results for fineness and fiber density of treated sansevieria fiber

Table showing results for specimen 1

Table showing results for specimen 2

Table showing results for specimen 3

Table showing results for specimen 4

Table showing results for specimen 5

Table showing results for untreated specimen 1

Table showing results for untreated specimen 2

Table showing results for pure specimen 1

DEDICATION

I dedicate this final year project report to my parents Mr. HISAMA Eriazali, Mrs. HISAMA Esinasi, Mrs. HISAMA MIRIA, brothers and sisters and to the house of Mr. HIGENYI Edward in Jinja. I further dedicate this project report to all my dearest lecturers for the tireless work and knowledge they have passed over to me.

APPROVAL

This report has been handed in for examination with the approval of the following supervisors

Eng. RWAWIIRE Samson.

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Mrs. NAMUGA Catherine.

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I would like to thank the almighty God for having enabled me to complete the final year project proposal and writing of this report may He bless the mighty Busitema University and you all.

ABSTRACT

Many can dispute the tremendous values of Sansevieria plant which is one of nature's greatest treasures. Sansevieria fibers are long filament category, and as such the fiber is spun on a long-fiber spinning system. The project brings awareness towards the eyes of many Ugandans and the world at large for its potential use. The tensile and flexural properties of Sansevieria trifasciata fabric/epoxy (STFE) composites were evaluated. Composites were fabricated using Sansevieria trifasciata fabric (STFs) with uniform lengths (210mm). When the length of the STF composite was increased, the tensile and flexural strength properties of the composites were increased, and then a curtailment in properties occurred when composite length further increased. Some of the fibers were treated with alkali solution and some untreated, the composites were prepared by hand lay-up method. STFE composites showed a regular trend of an increase in properties with fabric and afterwards a decrease in properties of composites with greater fiber elongation percent. Tensile tests revealed that an average tensile strength was about 6.2028 MPa, the Young's modulus was 0.160 GPA and the elongation at the break was 10.07%. The flexural strength was calculated to be 36.06MPa. Chemical resistances of the STFE composites were significantly improved for all NaOH chemical. These results indicate that high performance all natural products composite materials can be developed from the resources that are readily available locally.

Table of Contents

DECLARATION i
ACRONYMS AND ABBREVIATIONS ii
LIST OF FIGURES. iii
DEDICATION iv
APPROVAL v
ACKNOWLEDGEMENT vi
ABSTRACT vii
CHAPTER ONE 1
1.0 INTRODUCTION. 1
1.1 Background of the study. 1
1.2 Problem statement. 3
1.3 OBJECTIVES. 3
1.3.1 Main objective 3
1.3.2 Specific objectives. 3
1.4 Justification of the project. 4
1.5 Scope of study 4
CHAPTER TWO 5
2.0 LITERATURE REVIEW 5
2.1 Basic Steps in a Composites Manufacturing Process. 7
2.1.1. Wetting/impregnation 7
2.1.2 Lay-up 8
2.1.3 Consolidation 8
2.1.4 Solidification. 8
2.2 Hand layup process 8
2.2.1 Processing steps 9
2.2.2 Advantages of the Hand Lay-Up Process 9
2.2.3 Limitations of the Hand layup Process 10

2.2.4. Applications 10
2.3. Matrix 10
2.3.1. Functions of the matrix. 10
2.3.2. Selection of Matrix 10
2.3.3. Matrix Materials 11
2.4. Current Trend of Composite. 12
2.5 Natural Fibre 13
2.6 SANSEVIERIA PLANT. 16
CHAPTER THREE 18
3.0 MATERIALS AND METHODOLOGY 18
3.1 Data collection 18
3.2 Data analysis 18
3.3 Raw materials 18
3.4 Extraction process of the fibers. 18
3.5 Treatment of extracted sansevieria fibers 19
3.6 Testing mechanical properties of sansevieria fibers. 19
3.6.1 Fiber strength/breaking strength and elongation. 19
3.6.2 Fiber length 20
3.6.3 Fiber fineness /mass per unit length 20
3.6.4 Density of ST fibers 21
3.6.5 Fiber moisture content 21
3.7. Weaving of continuous fibre 21
3.8. Mould preparation 22
3.9. Preparation of epoxy and hardener 22
3.10 Setting Time 22
3.11 Sansevieria fabric bio-composite formation 22
3.12. Testing Methods 23
3.12.1 Tensile Testing 23
3.12.2. Three-point bending (flexural) tests 25
CHAPTER FOUR 27

4.0 RESULTS AND DISCUSSION 27
4.1 Fiber mechanical properties 27
4.2 Mechanical Properties for composite material 30
CHAPTER FIVE 41
5.0 CONCLUSION AND RECOMMENDATIONS 41
5.1 CONCLUSIONS. 41
5.2 RECOMMENDATIONS 41
REFERENCE 42
APPENDIX 43

CHAPTER ONE

1.0 INTRODUCTION.

This chapter comprises the background, problem statement, objectives, justification and the scope for investigating the mechanical properties of Sansevieria fiber reinforced composite.

1.1 Background of the study.

Composites are combinations of two or more than two materials in which one of the materials, is reinforcing phase (fibres, sheets or particles) and the other is matrix phase (polymer, metal or ceramic). Composite materials are usually classified by type of reinforcement such as polymer composites, cement and metal- matrix composites (Chemical and Materials Engineering Department, home Page 2011; About.com, home page, 2011).

Polymer matrix composites are mostly commercially produced composites in which resin is used as matrix with different reinforcing materials. Polymer (resin) is classified in two types thermoplastics (polyethylene (PE), polypropylene (PP), polyether ether ketone (PEEK), polyvinyl chloride (PVC), polystyrene (PS), polyolefin etc.) and thermosets (epoxy, polyester, and phenol–formaldehyde resin, etc.) which reinforces different type of fibre like natural (plant, animal, mineral) and man-made fibre for different application. In metal matrix composites, metal is one of important part of element and other part may be metal, ceramic or organic compounds. Cement matrix composites are made up of cement and with aggregate and basically used in building applications.

The first known composite material in human history was clay reinforced by straw used in building construction developed by the ancient Egyptians approximately 3000 years ago. In fact, this composite was a natural fibre composite. However, with the advancement of materials technology, materials with better performance, such as metals, plastics, ceramics and even manmade fibre composites were intensively being used and the use of natural fibre composite was abandoned for very long time.

Until recently, the use of natural fibre composites starts gaining popularity in engineering applications. This is due to the fact that this material possesses characteristics that are comparable to conventional materials. Properties like light weight, low material cost, renewable and environmentally friendly are among the most important selling points of this

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