

DEPARTMENT OF TEXTILE AND GINNING ENGINEERING.

FINAL YEAR PROJECT REPORT

**DEVELOPEMENT OF A BAMBOO-BANANA FIBER REINFORCED POLYESTER
HYBRID COMPOSITE FOR MICRO WIND TURBINE APPLICATIONS.**

BY

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ABSTRACAT

Wind energy is among the cheapest means for the production of renewable energy currently existing. But wind power generation will be impossible without an effective or an efficient wind blade. Currently, wind turbine blades are high performance synthetic and hybrid material structures. Bamboo has been observed to be more sustainable than the current materials in terms of life cycle and renewability of the resource. Bamboo which is known to have notable properties of good strength and high modulus across the culm wall has been used to design wind turbine blade. However, it has low energy output compared to the current materials used like glass fibers. Hence an attempt was made to manufacture a composite by combining bamboo with banana fibers due to their high strength, light weight and smaller elongation to increase on the performance of the composite to meet the required properties to be fully used in small wind turbines. Chemical method of bamboo fiber extraction and mechanical method of banana fiber extraction were used. Treatment of fibers with sodium hydroxide to further lignin, hemicellulose and other fiber remnants removal for the improvement of bond and interfacial shear strength of the bamboo fiber. Next, the composite was fabricated in different bamboo to banana fiber ratio using hand lay-up technique. Then tensile and morphological properties were tested.

DECLARATION

I **AINEBYONA RONALD**, Reg. No. **BU/UG/2016/5** hereby declare that this project research is my original work and that the information contained in this report is out of my research, except where denotative citation has been made and it has not been presented to any institution of higher learning for any academic award.

Signature

Date

APPROVAL

This project report has been submitted for examination with approval from the following supervisors:

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LIST OF ACRONYMS AND SYMBOLS

GW gigawatts

MW megawatts

NDPII second National Development Plan

Kwp kilowatt peak

KV kilo volt

W Watts

KW kilowatts

NFRP Natural Fibre Reinforced Polymer

GFRP Glass Fibre Reinforced Polymer

CFRP Carbon Fibre Reinforced Polymer

AFRP Aramid Fibre Reinforced Polymer

Mpa mega pascals

Gpa giga pascals

CAN chemical assisted natural retting

CMT compression molding technique

RMT Roller mill te