EFFECT OF CERAMIC FILLERS ON MECHANICAL BEHAVIOR OF ROYAL PALM-GLASS HYBRID COMPOSITES

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Abstract: **Natural fiber bolstered composites is Associate in Nursing, rising a space in chemical compound science. These natural fibers are low value fibers with tenacity and high specific properties. These are biodegradable and nonabrasive. The fiber composites supply specific properties such as those of typical fiber composites. However, in development of those composites, the incompatibility of the fibers and poor resistance to wet, typically scale back the potential of natural fibers, and these draw backs become vital issue. This review presents the reportable work on fiber bolstered composites with special respect to the kind of fibers, matrix polymers, treatment of fibers and fiber-matrix interface. The proposed research work arrives at investigating the mechanical, viscoelastic and tribological properties of royal palm/glass-epoxy composites with some ceramic fillers. The specific objectives, methodology to be followed to realize the objectives and possible outcomes have been discussed in the subsequent headings.**

1. INTRODUCTION

Natural fibers are being considered as a promising reinforcement for use in polymer composites due to their low cost, low density, high specific strength, high modulus, low health risk, easy availability, and easy renewability, manufacturing ease, bio degradability and eco friendliness. In recent past, many Investigations have been carried out on natural fiber-reinforced composites by many researchers [1–5]. Automotive, packaging, agriculture, furniture and Construction fields are already taking the advantages of natural fiber reinforced composites. Most of the interiors of the automobiles are being made with natural fiber composites. Keeping in view the eco-friendly advantages of green materials, a large number of industries throughout the world are indulging in the design and engineering of green products.

Sustainable growth and bio degradability assume more significance for majority of industries.

Processing of polymer matrix composites does not involve high pressure and high temperature. Also equipment required for their manufacturing are much simpler. For this reason polymer matrix composites developed rapidly and soon became popular in diversified applications. But mechanical properties of polymers are unable to meet the requirements of structural applications. In particular, their strength and stiffness are low when compared to those of metals and ceramics. These difficulties can be overcome by reinforcing other materials with polymers. The use of polymer matrix composites is diverse and far reaching, ranging from commercial aircraft and military applications to simple sport items.

1. OBJECTIVES:

After carrying out the literature survey the objectives of proposed research are set as outlined below:

1. To fabricate the new class of royal palm-glass reinforced epoxy hybrid Composites with and

without fillers to evaluate the effect of alkali treatment on various properties of produced Composites.

2. Evaluating and comparing the Static Mechanical properties of hybrid composites with and without fillers.
3. Evaluating and comparing the Dynamic Mechanical properties of hybrid composites with and without fillers.
4. To evaluate the water absorption behavior of the hybrid composites with and without fillers.
5. Statistical analysis based on taguchi experimental design for parametric appraisal of dry sliding and Body abrasive wears in the hybrid composites under study.

3. METHODOLOGY

Fiber extraction: Royal palm would be extracted through water retting and mechanical extraction method.

Fabrication of composite: Composites of various types i.e. with varying fiber and filler content would be fabricated by VARTM (Vacuum assisted RTM) or Hand lay-up technique.

4. TESTING:

Tensile testing: progressive tensile properties information generation for strengthened composites materials as well as durability, tensile modulus and Poisson's quantitative relation mistreatment align-pro, strain gages or extensometers performed at close, high or Low temperatures with or without moisture conditioning.

ASTM D3039 tensile testing is employed to live the force needed to interrupt a compound composite specimen and also the extent to that the specimen stretches or elongates to it edge.

Flexural testing: ASTM D7264 outlines testing of flexural properties of compound matrix composites using a bar of rectangular cross section supported on a beam and deflected at an unbroken rate.

The test method summarizes two procedures.

Procedure A outlines a 3 purpose loading system for center loading.

Procedure B outlines a four purpose loading system for 2 equal loading points.

Impact testing: The High Speed Impact check is employed to work out toughness, load-deflection curves and total energy absorption of impact events.

Since speed may be varied, it will simulate actual impact values at high-speeds.

This subtle impact check provides full force and energy curves throughout the time unit of the impact, employing a "Tup" which contains a control head and a load cell.

5. POSSIBLE OUTCOMES:

- New class of Epoxy composites reinforced with royal palm and glass fibers would be obtained with various fillers.
- The increased interface between hydrophobic polymer matrix and hydrophilic natural fiber is expected to be enhanced after alkali treatment of fiber.
- Mechanical, visco-elastic and tribological investigation on composites would provide the insight of their suitability for various applications.

6. CONCLUSION:

There is a good scope of stuff in automotive, aerospace, wind energy, electrical, sports, domestic purpose, civil construction, medical chemical industries etc.

Composite materials have a good potentiality of application in structures subjected primary

engaging aspects just like the comparatively high compressive strength, sensible ability in fabricating thick composite shells, low weight, and rarity and corrosion resistance.

Composite materials have sensible mechanical, electrical, chemical properties, because of that we are able to use stuff in many different industries.

Various elements of automobile and parts are factory-made by stuff because of sensible properties.

Composite materials are used for domestic purpose like article of furniture, window, door, mating, civil construction etc.

In the marine, chemical industries, sports, we are able to use stuff for higher performance of the elements.

With the assistance of review, we tend to conclude that stuffs have wide benefits & application in varied industries; we are able to create higher life vogue with the assistance of composite material.

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