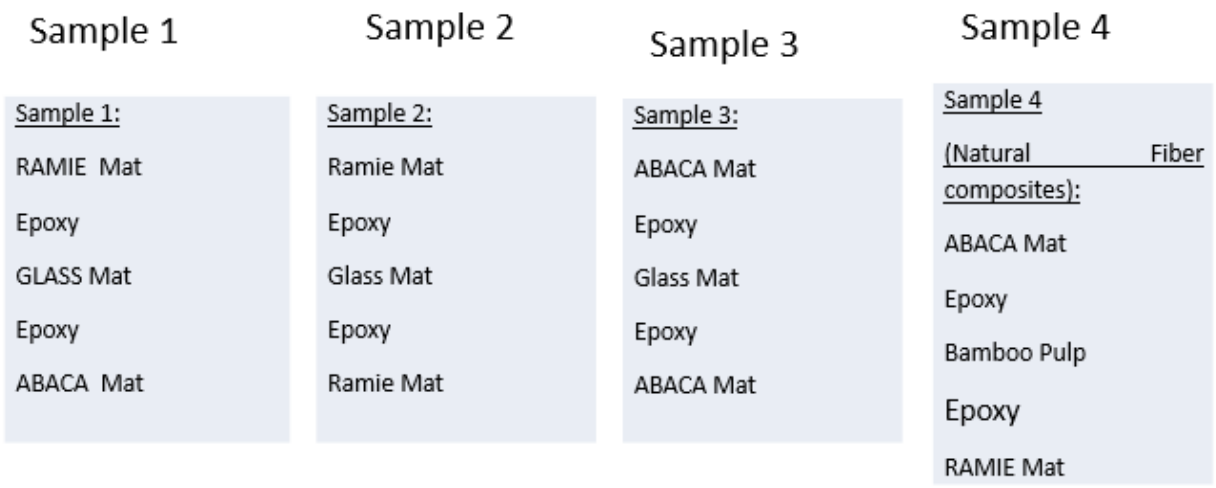
Effect of fibres orientation on interfacial Mechanical Characteristic for adhesively bonded composite plates

- Environmental awareness and trends to develop sustainable resources have directed much research attention towards ABACA fibre as an alternative reinforcement in composite manufacturing. Numerous studies have been conducted on ABACA and its hybrid composites. Most studies were conducted on kenaf/glass hybrid composites compared to other kenaf/Jute (Natural fibres) composites. Similar with other materials, mechanical properties were the fundamental knowledge identified by the researcher. Limited studies conducted on other properties have restricted the use of ABACA, RAMIE, BAMBOO PULP and GLASS FIBER composites to automobile components applications like sun roof cover.



Experimental analysis in Mechanical properties of **Natural Hybrid Composite for Roof**

ABSTRACT

In the scenario the environment the demands for technologies of the best suitable composite materials has begun instead of Roof steel. Materials having required characteristics along-side remaining non-pollutant are being researched and formulated to be put them in use. With the availability of natural fiber composites which share proportionate properties with that of manmade fibers are added together with a matrix to achieve best and good outputs. The hybrid composite materials are a blend of natural and synthetic fibers which are either in same proportion ratio to have desired properties. This present work deals with the study mechanical properties of basalt fiber mat(BI directional) composites having bamboo fibres pulps to which reinforced with epoxy resin as the matrix. The overall mechanical properties of the composites showed improvement to change the roof material into Hybrid composites.

Development of Polymer Composite Battery Pack Case for an Electric Vehicle

ABSTRACT

The evolution toward electric vehicle nowadays appears to be the main stream in the automotive and transportation industry. The required battery pack is a big, heavy, and expensive component to be located, managed, climatized, maintained, and protected. This paper develops some engineering analyses in material of some possible solutions that could be adopted. The possible consequences on the position of the vehicle center of gravity, which in turn could affect the vehicle drivability, lead to locate the battery housing below the passenger compartment floor. This solution is also one of the most interesting from the point of view of the battery pack protection in case of a lateral impact and for easy serviceability and maintenance. The integration of the battery pack's housing structure and the vehicle floor leads to a sort of sandwich structure that could have beneficial effects on the body's stiffness (both torsional and bending). This paper also proposes some considerations that are related to the impact protection of the battery pack, with particular reference to the side impacts against a fixed obstacle, such as a pole, We manufacture our battery cases from BASALT fiber, PP sheet 3 mm and glass fiber in the form of sandwich composites material using Epoxy. The excellent properties of the fiber composite construction make the battery enclosure a supporting element of the vehicle structure.

An investigation about stresses and crash analysis in explicit dynamics of CFRP plates structure

ABSTRACT

- Unidirectional carbon fiber reinforced polymers (CFRP) laminates are widely employed in different fields due to their low density combined with high stiffness and strength. However, unlike usual materials, composite laminates may present many different failure mechanisms. Additionally, the stress distribution depends on the material properties due to its anisotropy, making the composite design a hard task. This study deals with a plate made of CFRP. The main goal of this investigation is to carry out an analysis of the stress distribution and mechanical characteristics.
- Experimental Analysis of composite plate using Composites material objective to study the effect of replacement of steel reinforcement by carbon and basalt fibre reinforcement. To conduct Tensile, flexural and Impact strength test in Hybrid composites material. To develop a non-ferrous hybrid reinforcement system for crash box (Automobile) by using continuous placing of fibres mats reinforcement. Main objective of this project is to restrict the fire and collision avoiding in automobile industry by using inner layer of Basalt and Carbon Fibre. By using Glass Fibre chopped in-between the layers for Heat reflection in summer days. Design a crash box with different types of structure using CREO like Traditional, Triangle and Honeycomb Structure. In explicit dynamics to compare the deformation and stress of three different structures of crash Box using ANSYS.

Sample 1:

Carbon Fiber Mat (BI)

E- Glass fiber chopped (Filler)

Basalt Fiber Mat (BI)

Sample 2:

Carbon Fiber Mat (BI)

E- Glass fiber chopped (Filler)

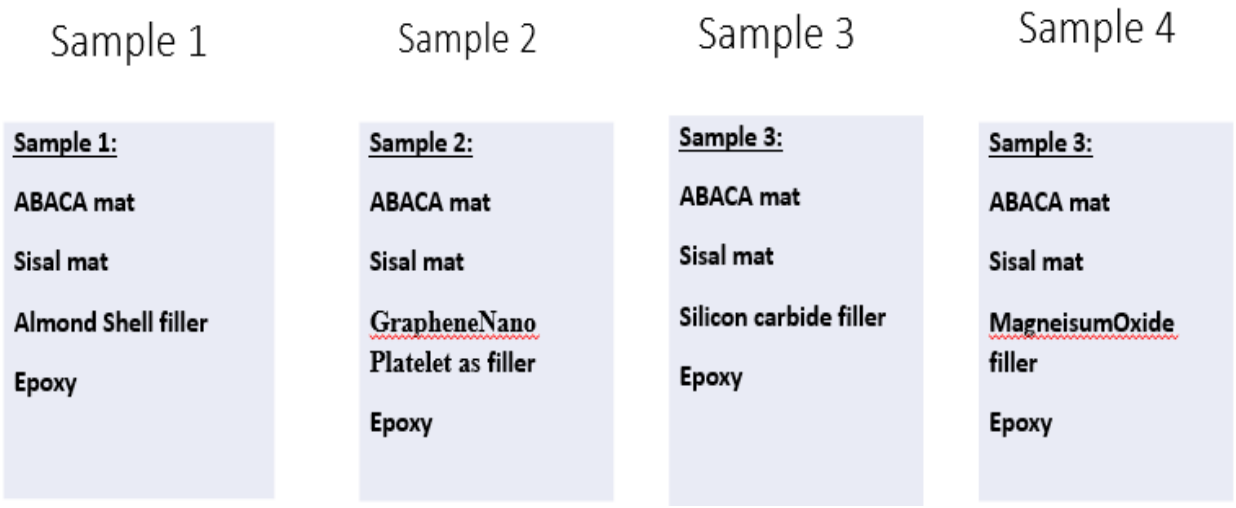
Carbon Fiber Mat (UD)

Development of graphene nano-composite fibres for improving the toughness of thermoset composite

ABSTRACT

We report on the development of phenoxy-graphene nano-composite fibres for improving the toughness of thermoset composites. In this paper, a systematic experimental investigation into the underlying mechanisms of graphene nanoplatelets (GNP) reinforcement of Natural and Synthetic fibres prepared via hand layup compression molding metod using Epoxy.

Development of the Polymer Composites with natural fibers and fillers like Graphene Nanoplatelets (GNP composites) as a sustainable alternative material for some engineering applications, particularly in aerospace applications and automobile applications are being investigated. Natural fibre composites such as ABACA mat, SISAL mat and JUTE mat appear more attractive due to their higher specific strength, lightweight and biodegradability and low cost. In this study, ABACA mat, SISAL mat and JUTE mat with Filler Materials Of Almond Shell/ graphene Nano platelets /SiC Nano particles are reinforced epoxy composites are prepared and their mechanical properties such as tensile strength, flexural strength, Hardness and impact strength are evaluated.



Implementation of lightweight roller in roller conveyor using Hybrid composites

- *In the scenario the environment the demands for technologies of the best suitable composite materials has begun instead of steel. Materials having required characteristics along-side remaining non-pollutant are being researched and formulated to be put them in use. With the availability of Hybrid composites which share proportionate properties with that of manmade fibers are added together with a matrix to achieve best and good outputs. The hybrid composite materials are a blend of natural and synthetic fibers which are either in same proportion ratio to have desired properties. This present work deals with the study mechanical properties of basalt fiber mat(Bi directional) composites having Carbon fiber mat (UD) filler as Glass Fiber chopped are to reinforced with epoxy resin as the matrix. The overall mechanical properties of the composites showed improvement to change the roller material for conveyor into Hybrid composites.*

- *The paper highlights investigate the existing roller conveyor system and material optimize and analyses the critical parts like Roller to minimize the overall weight of the assembly and material saving. This work also involves geometrical and finite element modelling of existing design and optimized design. Geometrical modelling will be going to do by using*

CREO 5.0 and the finite modelling tool. Molding the composites Samples and Results of Tensile, Flexural and Impact test to be carried out on the sample will do using a universal testing machine (UTM In LAB). In this work, the composite material is considered for the sample testing for CFRP.

Material Preparation- LAYER by LAYER Mat Fiber

(SAMPLE 1 - Carbon Fiber (Bi), Abaca Fiber Mat, Glass Fiber Mat
SAMPLE 2 - Carbon Fiber (Uni), Abaca Fiber Mat, Glass Fiber Mat
SAMPLE 3 - Carbon Fiber (Bi), Chopped Glass Fiber, Abaca Fiber Mat)

Effect of Plasma Nitriding Pre treatment on the Mechanical Properties of AlCrSiN-Coated Tool Steels

Abstract: Surface modification of steel has been reported to improve hardness and other mechanical properties, such as increase in resistance, for reducing plastic deformation, fatigue, and wear. Duplex surface treatment, such as a combination of plasma nitriding and physical vapor deposition, achieves superior mechanical properties and resistance to wear. In this study, the plasma nitriding process was conducted prior to the deposition of hard coatings on the SKH9 substrate. This process was done by a proper mixture of nitrogen/hydrogen gas at suitable duty cycle, pressure, and voltage with proper temperature. Later on, the deposition of gradient AlCrSiN coatings synthesized by a cathodic-arc deposition process was performed. During the deposition of AlCrSiN, CrN, AlCrN/CrN, and AlCrSiN/AlCrN were deposited as gradient interlayers to improve adhesion between the coatings and nitrided steels. A repetitive impact test was performed at room temperature and at high temperature to assess impact resistance. The results showed that the tribological impact resistance for the synthesized AlCrSiN increased because of a progressive hardness support. The combination of plasma nitriding and AlCrSiN hard coatings is capable of increasing the life of molding dies and metal forging dies in mass production.

Use of plasma nitriding to improve the wear and corrosion resistance of 18Ni-300 maraging steel manufactured by selective laser melting

18Ni-300 maraging steel manufactured by selective laser melting was plasma nitrided to improve its wear and corrosion resistance. The effects of a prior solution treatment, aging and the combination of both on the microstructure and the properties after nitriding were investigated. The results were compared with conventionally produced 18Ni-300 counterparts subjected to the same heat- and thermo-chemical treatments. The plasma nitriding was performed under the same conditions (temperature of 520 °C and time of 6 h) as the aging in order to investigate whether the nitriding and the aging could be carried out simultaneously in a single step. The aim of this work was to provide a better understanding of the morphology and chemical composition of the nitrided layer in the additive-manufactured maraging steel as a function of the prior heat treatments and to compare the wear and corrosion resistance with those of conventional maraging steel. The results show that nitriding without any prior aging leads to cracks in the compound layer, while nitriding of the priorheat-treated additive-manufactured maraging steel leads to benefits from the thermochemical treatment in terms of wear and corrosion resistance. Some explanations for the origins of the cracks and pores in the nitride layers are provided.

overview of polylactic acid (PLA) nanocomposites for sensors

Abstract

Polylactic acid (PLA) nanocomposites are lightweight, environmentally friendly, easy fabrication, low cost, and excellent biocompatibility. Its nanocomposites are usually made of PLA matrix filled with nano-fillers such as nanotubes (e.g., carbon nanotubes), quantum dots, nanoclays, nanofibers, graphene, and even other polymers. Compared to PLA, PLA nanocomposites can have improved electrical properties, higher thermal conductivity, dielectric constant, better thermal stability, biodegradability, and so on. Thus, PLA nanocomposites have been widely used for various sensing applications. This review discusses the common methods, such as chemical/physical modification and electrospinning, used to prepare the PLA nanocomposites. Meanwhile, recent applications of PLA nanocomposites as sensors in the field of moisture, piezo/strain, chemical/bio, thermal, and other fields are summarized in this review. The performances of each type of sensors have been highlighted in each section.

Environmentally Friendly Protective Coatings for Brake Disks

Abstract

Recently, environmental concerns have initiated intensive research and development in the field of friction brake systems with the aim to minimize particle emission. First brake systems with thermally sprayed protective coatings applied to grey cast iron brake disks have been introduced in automotive industries and have proven to strongly reduce particle emission. However, there is a desire to use materials that show improved environmental compatibility and lower price using processes that permit improved performance of protective coatings with reduced production costs. Different approaches concerning the choice of base and coating materials as well as the production processes are discussed with respect to technological, economic and ecological aspects. Besides grey cast iron, aluminum alloys are considered as base materials. Regarding coating production, HVOF spraying and laser cladding offer specific advantages and recent progress concerning the expansion of their production rate limitations is presented. Finally, novel feedstock materials that show excellent compatibility with stainless steel and aluminum alloy matrices have been developed and applied for coating production.