

MASTERS STUDENTS



Mr. John Olumide
Olusanya

Project Title: Fatigue of Nanophased Glass Fibre Reinforced Polymer Structures

FRC based products are finding increased application in Automotive and Aerospace industries, and these FRC components undergoes frequent Fatigue or cyclic loading. The objective of this research is to improve the fatigue properties of GFRC laminates using nanoparticles addition. It is expected that, the GFRC laminate enhanced with nanoparticles should exhibit good fatigue strength. This is because the matrix modifications will enhance mechanical properties of the laminates and will reduce the brittleness of epoxy matrix.

The introduction of nanoparticles is expected to enhance both interlaminar shear strength and in-plane tensile properties so that the fatigue life of the strengthened GFRC laminates could be improved and recommended for maximum fatigue life. The nanoparticle chosen in this study is Cloisite 30B based Montmorillonite clay and its concentration in the matrix material varied from 1wt% to 5wt%. The polymer matrix chosen in this study is thermoset epoxy polymer and the reinforcement is plain woven E-glass fibres.



Ms. Sathie Chetty

Project Title: Fatigue Studies of Carbon Fibre Reinforced and Nanoclay Filled Polyester Composites for Aerospace Applications

Carbon Fibre Reinforced Polymer (CFRP) is incredibly strong and is composed of carbon fibres which are best suited for a design program that demands weight savings, precision engineering, excellent mechanical strength and simplification of parts in both production and in operation. It's for these reasons that they are used in the automotive industry; bicycles, sailboats, motorcycles and Formula 1 vehicles; and more especially in the aerospace industry.

Fatigue is one of the biggest problems facing CFRP in aerospace applications and this problem is compounded as the moisture content increases. The effect of moisture on fatigue properties is severe during extreme environmental conditions and this causes deterioration in its Mechanical Properties. This research looks at the method to improve the mechanical properties of CFRP composites by modification of the polymer matrix by nanoclay addition. Testing will be done using the 100kN Servo Hydraulic machine (MTS), to which an environmental chamber will be attached to simulate the extreme conditions.



Mr. Lebina R.
Thoothe

Project Title: Improvement of Energy Absorption of Nano Infused Solar Coating

This project will focus on the design of a high energy absorbing flat water heater panel. The study examines the efficiency improvement by adding small amount of nano-particles with the selective coating. Investigations of a modified metal coating which is based on carbon nano-particles will be carried out, these metal coated nano-particles can be made to absorb or reflect light at a specific wavelength in the visible and infrared spectrum.



Mr. Prajan
Ramdeen

Project Title: Nanoclay & Carbon Nanotubes Filled Epoxy Polymer Reinforced with Glass Fibre Hybrid Composites

The research is essentially based on improving the strength of Glass Epoxy Composites by infusing it with Carbon Nanotubes and Nanoclays; with the desired outcome of creating a hybrid material composite to possess enhanced fatigue and impact properties over a wide temperature range from subzero to elevated temperatures. This new hybrid material could then be applied as a material of choice during the manufacturing and construction of Space Grade equipment.



Mr. James Mupa

Project Title: Nano-Robotics for Medical Applications

The project focuses on the state of the art field of nano-robotics by describing various means of controlling it, navigation power and locomotion. The nano-robots in context are of dimensions comparable to bacteria, to be used specifically in the medical field for treating chronic diseases like cancer, kidney stones, etc. This project shall focus on how to create a nano-robot by simulating at macro-scale. Currently there are a number of nano-components / machines that exist in nature and there is an opportunity to build more of them by copycatting method. Even though the field of nano-robotics is fundamentally different than that of macro robots due to the differences in scale and material, there are many similarities in design and control techniques that eventually could be projected and applied.

Hence the project shall focus on nano-robot navigation, powering the nano-robot, and nano-robot locomotion.
