

## Composites with experimental and FEA Titles 2023

### **1. Investigation Of Fiber Reinforcement Epoxy Composite Used As Orthopedic Implant**

#### **ABSTARCT**

*This paper constitutes the Tensile strength and compression strength of 10%,20% and 30% Natural (Sisal) fibre reinforcement epoxy composite materials used as bio-material. An attempt has been made to develop 10%, 20% and 30% sisal fibre reinforcement epoxy composite materials with low density and economical, according to ASTM D – 3039 and ASTM D-1621 using resin -LY556 as a matrix material and hardener -HY 951 with 10%, 20% and 30% Sisal fibres as the reinforcement material (with fiber weight fraction) using hand layup fabrication technique. The Tensile strength and compression strength tests were conducted on the varying percentage standard samples prepared. It is found that appreciable improvements in Tensile strength, compression strength properties of the 30% natural (sisal) fibers reinforced epoxy composites (SFRECM) when compared with 10 % and 20% SFRECM. This study suggests 30% SFRECM can be used for different applications in the human body bone replacement or orthopaedic implant. But according to literature survey the human femur bone mean tensile strength in males is  $39.74 \pm 4.80$  MPa and in female it is  $30.08 \pm 7.96$  MPa. The mean compressive strength in males is found to be  $141.6 \pm 15.91$  MPa and in females it is observed to be  $118.91 \pm 18.99$  MPa .,In this research work it is found that the Tensile strength of 30% Natural (Sisal) fiber reinforcement epoxy composite material is 77 N/mm<sup>2</sup> but compression strength of 30% Natural (Sisal) fiber reinforcement epoxy composite material is 64.66 N/mm<sup>2</sup>.And hence in this work Tensile strength of 30% Natural (Sisal) fiber reinforcement epoxy composite material is matches the femur bone tensile strength but compression strength will not match .Hence further work is require by increasing the % of Weight fraction of sisal fiber to fabricate the specimen and ultimately it reaches to the femur bone compression strength.*

## **2. ANALYSIS OF MECHANICAL PROPERTIES OF NATURAL FIBRE MAT HYBRID COMPOSITE**

### **Abstract**

Natural fibers along with reinforced plastic material gain a positive approach for the development of green composites to meet the demands which prevail in contemporary life. In this work, natural fiber sisal and natural mats made of Jute and aloe vera are used to produce the composite materials by hand laying method as the natural FRP composites are lightweight, strong and biodegradable and have the potential to be used in various automotive, furniture and architectural applications. This paper deals with the study of woven flax, aloe vera and sisal fibre and with the chosen fiber sisal and flax + aloe vera, two different specimens are prepared using epoxy resin as binder and by varying the positioning of fiber mats. The testing of mechanical properties of the fabricated hybrid composite is done to identify the high strength hybrid bio composite material and the influence of positioning of fiber mats.

### 3. INVESTIGATION OF MECHANICAL PROPERTIES OF POLYCARBONATE CORE COMPOSITE WITH STEEL REINFORCEMENT FOR ORTHOPEDIC IMPLANT

#### ABSTARCT

- *The aim of this study is to characterize and evaluate the mechanical properties of dispersed **SS Polycarbonate SS composites** with same fibers mass fraction.*
- *The composites materials and sampling are to be prepared in laboratory by using hand layup method with a suitable fabrication procedure & quality control. Prepared Specimen of **SS Polycarbonate SS** dispersed composites are evaluated by means of destructive tests.*
- ***Polycarbonate** composites are considered to have potential use as a reinforcing material in epoxy polymer based composites because of their good strength, stiffness etc., in present study, mechanical properties for **Polycarbonate** fiber composites were evaluated. Mechanical test such as **Hardness and tensile** test performed.*
- *FEA analysis was carried out by considering four specimens. The parameters like von misses stress and displacement were obtained from Static Structural analysis by using ANSYS software. Compared to the former material the new material found to have less weight and better stiffness.*

Existing material

- STAINLESS TEEL

Alternate material

- SS – **Polycarbonate** -SS

Application: **ORTHOPEDIC IMPLANT**

#### 4. Investigating the Mechanical Behaviour of Jute fibre, sisal fibre, spider web and Chicken Feather Reinforced Hybrid Composite

##### Abstract:

Variety of application use fibre reinforced composites because of their intrinsic properties in mechanical strength, renewability and low production cost compared to conventional materials. Natural fibres are environmentally friendly their use will not break the budget when used as an alternative to the regular materials. Recently there is a rise in use of natural fibers from various natural resources which are available abundantly. Composites based on natural fibres have their advantages of cost in making the fibres from different vegetables, wood, animals and minerals. In this work a thorough and systematic inquiry regarding better utilization of **Jute fiber, sisal fiber, spider web and Chicken Feather** for making value-added products has been carried out. Various hybrid composite test specimens as per ASTM were prepared with natural fillers such as **Jute fiber, sisal fiber, spider web and Chicken Feather** by using hand layup method. The various mechanical properties of the hybrid composites like **TENSILE STRENGTH, HARDNESS, AND FLEXURAL** strength are studied by standard experiment methods. The experimental results were discussed.

## 5. FEA and Experimental Investigation of Sandwich COMPOSITE MATERIAL made by SS Composite with NYLON

### ABSTARCT

- The aim of this study is to characterize and evaluate the mechanical properties of dispersed **NYLON with and SS composites** with same fibers mass fraction.
- The composites materials and sampling are to be prepared in laboratory by using hand layup method with a suitable fabrication procedure & quality control. Prepared Specimen of **SS, NYLON and SS** dispersed composites are evaluated by means of destructive tests.
- nylon composites are considered to have potential use as a reinforcing material in epoxy polymer based composites because of their good strength, stiffness etc., in present study, mechanical properties for nylon fiber composites were evaluated. Here, nylon fiber is the fiber reinforcement and epoxy polymer resin as a matrix material. Mechanical test such as **Hardness and tensile** test performed.
- FEA analysis was carried out by considering four specimens. The parameters like von misses stress and displacement were obtained from Static Structural analysis by using ANSYS software. Compared to the former material the new material found to have less weight and better stiffness.

Existing material

- STAINLESS TEEL

Alternate material

- SS –NYLON-SS

**Application:** It is used in outdoor deck floors, but it is also used for railings, fences, landscaping timbers, cladding and siding, park benches, etc.

## 6. FEA and Experimental Investigation of Sandwich COMPOSITE MATERIAL made by SS Composite with NYLON

### ABSTARCT

- *The aim of this study is to characterize and evaluate the mechanical properties of dispersed **PVC with and SS composites** with same fibers mass fraction.*
- *The composites materials and sampling are to be prepared in laboratory by using hand layup method with a suitable fabrication procedure & quality control. Prepared Specimen of **SS, PVC and SS** dispersed composites are evaluated by means of destructive tests.*
- *PVC composites are considered to have potential use as a reinforcing material in epoxy polymer based composites because of their good strength, stiffness etc., in present study, mechanical properties for nylon fiber composites were evaluated. Here, PVC is the fiber reinforcement and epoxy polymer resin as a matrix material. Mechanical test such as **Hardness and tensile test** performed.*
- *FEA analysis was carried out by considering four specimens. The parameters like von misses stress and displacement were obtained from Static Structural analysis by using ANSYS software. Compared to the former material the new material found to have less weight and better stiffness.*

Existing material

- STAINLESS TEEL

Alternate material

- SS –PVC-SS

**Application:** It is used in outdoor deck floors, but it is also used for railings, fences, landscaping timbers, cladding and siding, park benches, etc.

## 7. EXPERIMENTAL ANALYSIS OF COMPOSITE AL WITH FLY ASH AND ACTIVATED CARBON ARE FABRICATED THROUGH 'STIR CASTING METHOD'

### Abstract

*The ever-increasing demand for light weight, economy and environmental purpose has lead to the development of advanced materials. MMCs are widely used in industries, as they have excellent mechanical properties and wear resistance. So in this project introduced Particulate-reinforced hybrid composites because of it is cost less than fiber-reinforced composites owing to the lower cost of fibers and manufacturing cost. In addition to improved physical and mechanical properties, particulate-reinforced hybrid composites are generally isotropic and they can be processed through conventional methods used for metals. Thus, the fly ashes, aluminum A356, activated carbon reinforced with aluminum composites are increasingly used as substitute materials for high temperature applications.*

*This project deals with the selection of better material for the process of more hardness and temperature resistance, in that Aluminum hybrid composite are produced by AL A356 as matrix material and fly ash and activated carbon as reinforcement in different composition. Different sample are produced by using stir casting methods. Various tests have been conducted to evaluate the different properties of Aluminium composites and they are compared with commercial Aluminium alloy.*

## 8. Material optimization for aircraft interior application by using natural fibers

### ABSTRACT

*Polymers and their composites are one of the most advanced and adaptable engineering materials. The strength of any composite depends upon number of factors such as volume/weight fraction of reinforcement, types of fibers, orientation angles, chemical treatment of reinforcement, and many others. The present work focuses on the analysis of mechanical properties (**tensile and flexural**) of synthetic and natural fiber (**Sisal Fiber & BANANA fiber**)-reinforced with epoxy composites. An attempt is made to reduce the usage of synthetic glass fibers by incorporating natural banana fibers such that the resultant hybrid composite shows increased strength when compared with single synthetic fibers (**Glass fibers**). The test specimens were prepared and tested according to ASTM standards. Experimental results revealed that reinforcement of natural fibers up to some extent increases the mechanical properties and reduces the overall cost of fabrication of composites.*

Application - Interior aircraft applications, flooring

Existing material	- Synthetic fiber ( <b>Glass fibers</b> ).
Alternate material	- <b>Banana fiber + Sisal Fiber + epoxy</b>



## 9. Mechanical Behavior of Hybrid Composites Analysis, Moldings and Testing

### ABSTRACT

*The strength of any composite depends upon number of factors such as volume/weight fraction of reinforcement, types of fibers, orientation angles, chemical treatment of reinforcement, and many others*

*The present work focuses on the analysis of mechanical properties (**TENSILE FLEXURAL AND HARDNESS**) of synthetic and natural fiber (**GLASS & BANANA fiber**)-reinforced with epoxy composites **Hybrid Composites**.*

*An attempt is made to reduce the usage of synthetic glass fibers by incorporating natural banana fibers such that the resultant hybrid composite shows increased strength when compared with single Synthetic fibers (**GLASS FIBERS**). The test specimens were prepared and tested according to ASTM standards. Experimental results revealed that reinforcement of natural fibers up to some extent increases the mechanical properties and reduces the overall cost of fabrication of composites.*

Application - Automotive seat shells

Existing material

- Synthetic fiber

Alternate material

- **Hybrid Composites**

## **10. Experimental investigation and FEA analysis of CARBON FIBER reinforced with Low carbon steel rod**

### **ABSTARCT**

*Infrastructure development is raising its pace. Many Reinforced concrete and masonry building are constructed annually around the globe. On account of this there are large number of structural members which are deteriorate and becoming unsafe due to changes in use, changes in loading, changes in design configuration, interior building materials used and due to natural calamities, Hence Repair and Retrofitting works are in great usage in the market for the Existing Structures. There are several situations in which a civil structure would require strengthening or rehabilitation because of lack of strength, stiffness, ductility, and durability. There may be requirement of Strengthening of Beams, Columns, Plates by using Carbon Fibre Reinforced STEEL bonded to the tension zone using the Epoxy as a common adhesive. The paper makes a comparative study between load carrying capacity and ductility of an RCC beam and other beams with CFRP bonded. Experimental Investigation on the Flexure and Shear behaviour of beams strengthened using continuous Carbon Fiber Reinforced STELL are carried out.*

## **Mechanical properties of composite aluminum matrix reinforced with tungsten carbide and Fly Ash(Almonds Shell) hybrid composite**

### **Abstract**

*Metal matrix composites are formed by combination of two or more materials having dissimilar characteristics. In the present investigation, Aluminium (A356) is taken as base matrix metal, Tungsten Carbide particulate (WC) and Fly Ash (Almonds Shell) as reinforcements. The metal matrix composites are fabricated by stir-casting process. The Tungsten Carbide particulate was added in proportions of 1.5%, 2.5% and 3.5% and Fly Ash (Almonds Shell) was added in constant proportion of 0.5%, 1% and 1.5% on mass fraction basis to the molten metal. The different combination sets of composites were prepared. Mechanical properties like hardness and tensile strength were studied for both reinforced and unreinforced Al356 samples. From the results, it was found that the hardness and tensile strength of the prepared metal matrix composites.*

## **Mechanical properties of composite aluminum matrix reinforced with tungsten carbide and molybdenum disulphide hybrid composite**

### **Abstract**

*Metal matrix composites are formed by combination of two or more materials having dissimilar characteristics. In the present investigation, Aluminium (7075) is taken as base matrix metal, Tungsten Carbide particulate and Molybdenum Disulphide ( $\text{MoS}_2$ ) as reinforcements. The metal matrix composites are fabricated by stir-casting process. The Tungsten Carbide particulate was added in proportions of 1%, 1.5% and 2% and Molybdenum Disulphide was added in constant proportion of 1%, 1.5% and 2% on mass fraction basis to the molten metal. The different combination sets of composites were prepared. Mechanical properties like hardness and tensile strength were studied for both reinforced 7075 samples.*

# **INVESTIGATION OF MECHANICAL PROPERTIES OF NEEM FIBER AND GLASS FIBER COMPOSITES**

## **Abstract:**

*Natural fibers are abundant and represent a significant cost reduction compared to wholly synthetic composite materials.*

*The present work focuses on the prediction of tensile & compressive properties of the natural fiber reinforced composite materials, and the values were compared.*

*In this investigation the glass fiber composite and the neem fiber composite were fabricated using hand-lay-up method. For tensile test, Specimens were cut from the fabricated laminate according to the ASTM D 638 standards. After that experiment is performed under Universal testing machine (UTM).*

*From the test results, the tensile & compressive properties of glass fiber composite material and neem fiber composite material were compared.*

*The glass fiber have excellent properties and are being extensively used in variety of applications and suitable alternative material due to their advantage like low cost, low density, high strength and stiffness to weight ratio, low energy consumption, a lesser amount of pollutant emissions and biodegradable materials.*

# **MECHANICAL PROPERTIES OF ALMOND AND WALNUT SHELLS COMPOSITE WITH EPOXY**

## **Abstract**

A large amount of almond shells and walnut shells are disposed of every year. The mechanical properties of almond and Walnut shells composite with epoxy are investigated in this paper in order to contribute to better utilization of these shells.

In the present work walnut particle reinforced composite material was developed. 25 wt% and 25 wt% (weight percentage) of walnut & Almond Shells particles were mixed with 50 wt% epoxy resin. However, addition of walnut particles in bio composite increased the hardness.

## **Mechanical behavior of Hybrid fiber composite and Testing**

### **Abstract**

The mechanical properties of the Hybrid composites using Glass, Coconut Coir and Egg shell reinforced epoxy resin composites were studied in this work. The composites were fabricated by hand layup technique and tested according to ASTM standard. From the experiment the following conclusions has to be drawn. It has to be observed that the various properties of the composites are greatly influenced by the fibre loading and fibre length. From the ASTM mechanical property tests of tensile, Flexural, shore hardness "D" can be analysed from composites in the strength properties. The hardness value and ultimate tensile strength in Hybrid composites to be compared with Glass fibre enhanced value.

# **Mechanical behavior of natural fiber composite and Testing**

## **Abstract**

Polymers and their composites are one of the most advanced and adaptable engineering materials. The strength of any composite depends upon number of factors such as volume/weight fraction of reinforcement, types of fibers, orientation angles, chemical treatment of reinforcement, and many others

The present work focuses on the analysis of mechanical properties (tensile and flexural) of natural fiber (Hair, Coconut coir & Egg Shell fiber)-reinforced with epoxy composites. An attempt is made to reduce the usage of synthetic glass fibers by natural fibers such that the resultant composite shows increased strength when compared with both natural fibers (Hair, Coconut coir & Egg Shell). The test specimens were prepared and tested according to ASTM standards. Experimental results revealed that reinforcement of natural fibers up to some extent increases the mechanical properties and reduces the overall cost of fabrication of composites.




## Thermoplastic

### ABSTRACT

Polymers and their composites are one of the most advanced and adaptable engineering materials. The strength of any composite depends upon number of factors such as volume/weight fraction of reinforcement, L/D ratio of fibers, types of fibers, orientation angles, chemical treatment of reinforcement, and many others.

The present work focuses on the analysis of mechanical properties (tensile and Hardness) of thermoplastic reinforced with natural fiber (jute fiber)-reinforced epoxy composites. An attempt is made to reduce the usage of synthetic nylonfibers by incorporating natural jute fibers such that the resultant hybrid composite shows increased strength when compared with single natural fibers (Jute fiber). The test specimens were prepared and tested according to ASTM standards. Experimental results revealed that reinforcement of natural fibers up to some extent increases the mechanical properties and reduces the overall cost of fabrication of composites.



# INVESTIGATION THE MECHANICAL PROPERTIES OF PLA AND PA POLYMER COMPOSITE

## Abstract

The focus in this work has been to study if PLA can be used as reinforcement in polymers based on renewable raw materials. The materials have been Polyamide (PA) and polylactic acid (PLA). PLA is a thermoplastic polymer made from lactic acid and has mainly been used for biodegradable products, such as plastic bags and planting cups, but in principle PLA can also be used as a matrix material in composites. Because of the brittle nature of PLA was tested as Specimens for PLA and PA composites in order to improve the impact properties. The studied composite materials were manufactured in different %weight ratios. The mixed compound was compression moulded to test samples in injection moulding using die. The processing and material properties have been studied and compared to the more commonly used PLA & PA. Preliminary results show that the mechanical properties of PLA & PA composites are promising. The composite strength is compared to similar composites, which are used today in many automotive panels. The PLA/PA composites did not show any difficulties in the extrusion and compression moulding processes and they can be processed.

## **Mechanical properties of composite Al with Fly ash and activated carbon are fabricated through 'Stir Casting Method' by powder metallurgy**

### **Abstract**

The ever-increasing demand for light weight, economy and environmental purpose has lead to the development of advanced materials. MMCs are widely used in industries, as they have excellent mechanical properties and wear resistance. So in this project introduced Particulate-reinforced hybrid composites because of it is cost less than fiber-reinforced composites owing to the lower cost of fibers and manufacturing cost. In addition to improved physical and mechanical properties, particulate-reinforced hybrid composites are generally isotropic and they can be processed through conventional methods used for metals. Thus, the fly ashes, aluminum A356, activated carbon reinforced with aluminum composites are increasingly used as substitute materials for high temperature applications.

This project deals with the selection of better material for the process of more hardness and temperature resistance, in that Aluminum hybrid composite are produced by AL A356 as matrix material and fly ash and activated carbon as reinforcement in different composition. Different sample are produced by using stir casting methods. Various tests have been conducted to evaluate the different properties of Aluminum composites and they are compared with commercial Aluminum alloy.

## **Mechanical properties of composite aluminum matrix reinforced with tungsten carbide and Fly ash hybrid composite**

### **Abstract**

Metal matrix composites are formed by combination of two or more materials having dissimilar characteristics. In the present investigation, Aluminium (7075) is taken as base matrix metal, Tungsten Carbide particulate and Molybdenum Disulphide ( $\text{MoS}_2$ ) as reinforcements. The metal matrix composites are fabricated by stir-casting process. The Tungsten Carbide particulate was added in proportions of 1%, 1.5% and 2% and Fly ash was added in constant proportion of 1%, 1.5% and 2% on mass fraction basis to the molten metal. The different combination sets of composites were prepared. Mechanical properties like hardness and tensile strength were studied for both reinforced.

## **Mechanical properties of composite aluminum matrix reinforced with tungsten carbide and molybdenum disulphide hybrid composite**

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# **Experimental analysis to into mechanical properties of Walnut shell reinforced with almond shell composite using Epoxy**

## **Abstract**

A large amount of almond shells and walnut shells are disposed of every year. The mechanical properties of almond and Walnut shells composite with epoxy are investigated in this paper in order to contribute to better utilization of these shells.

In the present work walnut particle reinforced composite material was developed. 25 wt% and 25 wt% (weight percentage) of walnut & Almond Shells particles were mixed with 50 wt% epoxy resin. However, addition of walnut particles in bio composite increased the hardness.

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## **Abstract**

Polymers and their composites are one of the most advanced and adaptable engineering materials. The strength of any composite depends upon number of factors such as volume/weight fraction of reinforcement, types of fibers, orientation angles, chemical treatment of reinforcement, and many others

The present work focuses on the analysis of mechanical properties (tensile and flexural) of natural fiber (Hair, Coconut coir & Egg Shell fiber)-reinforced with epoxy composites. An attempt is made to reduce the usage of synthetic glass fibers by natural fibers such that the resultant composite shows increased strength when compared with both natural fibers (Hair, Coconut coir & Egg Shell). The test specimens were prepared and tested according to ASTM standards. Experimental results revealed that reinforcement of natural fibers up to some extent increases the mechanical properties and reduces the overall cost of fabrication of composites.

# INVESTIGATION THE MECHANICAL PROPERTIES OF PLA AND PA POLYMER COMPOSITE

## Abstract

The focus in this work has been to study if PLA can be used as reinforcement in polymers based on renewable raw materials. The materials have been Polyamide (PA) and polylactic acid (PLA). PLA is a thermoplastic polymer made from lactic acid and has mainly been used for biodegradable products, such as plastic bags and planting cups, but in principle PLA can also be used as a matrix material in composites. Because of the brittle nature of PLA was tested as Specimens for PLA and PA composites in order to improve the impact properties. The studied composite materials were manufactured in different %weight ratios. The mixed compound was compression moulded to test samples in injection moulding using die. The processing and material properties have been studied and compared to the more commonly used PLA & PA. Preliminary results show that the mechanical properties of PLA & PA composites are promising. The composite strength is compared to similar composites, which are used today in many automotive panels. The PLA/PA composites did not show any difficulties in the extrusion and compression moulding processes and they can be processed.



## **INVESTIGATION OF MECHANICAL PROPERTIES OF NYLON COMPOSITE WITH STAINLESS STEEL REINFORCEMENT**

The aim of this study is to characterize and evaluate the mechanical properties of dispersed NYLON and STAINLESS STEEL A304 composites with various fibers mass fraction.

The composites materials and sampling are to be prepared in laboratory by using hand layup method with a suitable fabrication procedure & quality control. Prepared NYLON and STAINLESS STEEL dispersed composites are evaluated by means of destructive tests.

NYLON Fiber composites are considered to have potential use as a reinforcing material in epoxy polymer based composites because of their good strength, stiffness etc., in present study, mechanical properties for NYLON fiber composites were evaluated. Here, NYLON fiber is the fiber reinforcement and epoxy polymer resin as a matrix material. Composites were prepared with longitudinal (Unidirectional) and cross (Bidirectional) PVC fiber reinforced with epoxy-based polymer. Mechanical test such as compression and tensile test performed.

# **AN INVESTIGATION AND JOINING EFFICIENCY OF UHMW-PE PLATE BY FRICTION STIR WELDING PROCESS USING TRIANGULAR TOOL PROFILE**

## **ABSTRACT**

Polypropylene is one of the thermoplastic materials used in the lot of engineering applications such as marine, aerospace, automotive, toys and etc. Friction Stir Welding (FSW) is a solid-state method of used for joining metals. FSW process was successfully extended to join thermoplastic materials. Friction Stir Welding (FSW) is a solid-state process in joining thermoplastic materials. Polymers are engineering materials used for future technological development as the polymer processing and fabrication techniques have developed novel plastic products and components in major industries. Particularly UHMWPE is one of the polymer materials with a lot of engineering applications and a study on the behavior of the joining properties of polyethylene by FSW is necessary at this stage. In this investigation, FSW process has to be applied to join a polyethylene plate of 8 mm thickness with specially designed threaded tool pin profile. The research will be applied Taguchi Method on UHMWPE specimen of dimensions  $100 \times 100 \times 6$  mm, which have following parameters: various RPM, Feed and Axial Load. The experiments will be done in following aspects: Ultimate tensile strength and other mechanical properties. The main objective of the experimental of factors affecting to mechanical property of UHMWPE with FSW at different welding parameters and it has to be followed by L4 arrays.

# Material optimization for aircraft interior application by using natural fibers

## Abstract

*Polymers and their composites are one of the most advanced and adaptable engineering materials. The strength of any composite depends upon number of factors such as volume/weight fraction of reinforcement, types of fibers, orientation angles, chemical treatment of reinforcement, and many others*

*The present work focuses on the analysis of mechanical properties (**tensile and flexural**) of synthetic and natural fiber (**Sisal Fiber & BANANA fiber**)-reinforced with epoxy composites. An attempt is made to reduce the usage of synthetic glass fibers by incorporating natural banana fibers such that the resultant hybrid composite shows increased strength when compared with single synthetic fibers (**Glass fibers**). The test specimens were prepared and tested according to ASTM standards. Experimental results revealed that reinforcement of natural fibers up to some extent increases the mechanical properties and reduces the overall cost of fabrication of composites.*

# **EXPERIMENTAL ANALYSIS OF WELD CHARACTERISTICS OF STAINLESS STEEL 409 and EN8 MILD STEEL THROUGH GTAW**

## **ABSTRACT**

Austenitic stainless steel is widely used materials in the current industrial area including higher and lower temperature applications such as storage tanks, pressure cups, furnace equipments etc. Using ratio of those materials are increasing constantly due to having superior corrosion resistance and mechanical properties, GTAW process are widely used for stainless steel welding, especially for full penetration welds in thin gage materials. Selection of shielding gas and filler material is crucial parameter for the quality, the microstructure and properties of weldments. The weldment properties strongly depended on the shielding gas, since it dominates the mode of metal transfer.

Shielding gas not only affects the properties of weld but also determines weld ability, the appearance, the shape and penetration of bead as well. Pure argon is mainly used for GTAW as shielding gas at present. The most common shielding gases are argon riches mixtures, such as argon with a few percent helium, carbon dioxide, hydrogen, oxygen, nitrogen for GTAW process. In this project we will be made many attempts for made test pieces on SS409 and EN8 MILD STEEL compared with ARC welding to predict the process parameter of TIG for getting maximum weldment and good weld deposition, best mechanical properties and min HAZ. The planned experiments are conducted in the TIG are welding machine; the test piece examination is carried out by following process

- 1) Tensile Test
- 2) Hardness test
- 3) Impact test

## **EVALUATION OF MACHINING BEHAVIOURS OF ALUMINIUM METAL MATRIX COMPOSITE (Al+SiC+Zn)**

Technology is advancing, demand of the hour is increasing and to face that engineers are also ready. Maintaining the economic production with optimal use of resources is of prime concern for the engineers. Metal machining is one of them. In machining process, there are various parameters involved. Some challenges that the engineers come across are to find out the optimal parameters for the desired product quality and to maximize the performance of manufacturing using the available resources. In today's manufacturing industry, special attention is given to dimensional accuracy and surface finish. The surface quality is an important parameter to evaluate the productivity of machine tools as well as machined components. Surface roughness is used as the critical quality indicator for the machined surface. Formation of a rough surface is a complicated mechanism involving many parameters. The quality of the work piece (either roughness or dimension) are greatly influenced by the cutting conditions, tool geometry, tool material, machining process, chip formation, work piece material, tool wear and vibration during cutting.

In any machining process, apart from obtaining the accurate dimensions, achieving a good surface quality is also of utmost importance. A machining process involves many process parameters which directly or indirectly influence the surface quality of the product. Surface roughness and waviness in turning process are caused due to various parameters of which feed, speed, depth of cut are important ones. A precise knowledge of these optimum parameters would facilitate reduce the machining costs and improve product quality. Extensive study has been conducted in the past to optimize the process parameters in any machining process to have the best product. Current investigation on turning process is a ANOVA optimization technique applied on the most effective process parameters i.e. feed, cutting speed and depth of cut while machining Aluminium metal matrix composite as the work piece.. In this project turning experiments have been conducted by varying mass fraction of SiC&Zn with zinc.

# **Experimental investigation of mechanical Properties of Fiber Reinforced polymer (FRP) for cylindrical application**

## **Abstract**

Composite Materials Are Engineering Materials Made From Two Or More Constituent Materials That Remain Separate And Distinct On A Macroscopic Level While Forming A Single Component. In This Work the Mechanical Properties of FRP (Fiber Reinforcement Polymer) and Their Composite with steel Were Evaluated With Reference To ASTM standard E9. while applying Load, The Maximum Strain, And Stress Are Obtained. The Maximum Strength Is Found In Composite of FRP Instead Of Steel. Composite Material Has Shown An Improvement Of Mechanical Properties When Compared With Individual Materials.

To Analysis the Structure In Any Shape By Modeling In CREO And Analysing By Using Finite Element Analysis Is Performed On ANSYS Workbench.