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3.3.3 Number of books and chapters in edited volumes/books published and papers published in national/ international conference proceedings per teacher during the academic year 2020-2021

Name of the teacher	Title of the book/chapters published	Title of the paper	Title of the proceedings of the conference
Dr.S.Jeevanantham		Design and Stress analysis of ATV's Frame	JNANA CHILUME-2020 Technical information in Materials, Manufacturing, Design, Automation and Energy Engineering TMMDAEE-2020
Mr.S.Nishanth		Design and Stress analysis of ATV's Frame	JNANA CHILUME-2020 Technical information in Materials, Manufacturing, Design, Automation and Energy Engineering TMMDAEE-2020
Mr.L.Franklin Arokiya Raj		Design and Stress analysis of ATV's Frame	JNANA CHILUME-2020 Technical information in Materials, Manufacturing, Design, Automation and Energy Engineering TMMDAEE-2020
Dr.V.M.M.Thilak		Investigation of design and application of manually operated wheel spray pump in agricultural sector	JNANA CHILUME-2020 Technical information in Materials, Manufacturing, Design, Automation and Energy Engineering TMMDAEE-2020
Dr.S.Jeevanantham		Investigation of design and application of manually operated wheel spray pump in agricultural sector	JNANA CHILUME-2020 Technical information in Materials, Manufacturing, Design, Automation and Energy Engineering TMMDAEE-2020
Mr.R.Suresh Babu		Investigation of design and application of manually operated wheel spray pump in agricultural sector	JNANA CHILUME-2020 Technical information in Materials, Manufacturing, Design, Automation and Energy Engineering TMMDAEE-2020
Mr.L.Franklin Arokiya Raj		Experimental Investigation on Mechanical Properties of Coconut Fiber Reinforced Composite	JNANA CHILUME-2020 Technical information in Materials, Manufacturing, Design, Automation and Energy Engineering TMMDAEE-2020
Dr.S.Jeevanantham		Experimental Investigation on Mechanical Properties of Coconut Fiber Reinforced Composite	JNANA CHILUME-2020 Technical information in Materials, Manufacturing, Design, Automation and Energy Engineering TMMDAEE-2020

Mr.R.Suresh Babu		Experimental Investigation on Mechanical Properties of Coconut Fiber Reinforced Composite	JNANA CHILUME-2020 Technical information in Materials, Manufacturing, Design, Automation and Energy Engineering TMMDAEE-2020
Mr.S.Nishanth		Experimental Investigation on Mechanical Properties of Coconut Fiber Reinforced Composite	JNANA CHILUME-2020 Technical information in Materials, Manufacturing, Design, Automation and Energy Engineering TMMDAEE-2020
Dr.S.Jeevanantham		Conceptualization of Solar powered fertilizer sprayer Machine	e-Conference on Recent Development in Automobile and Mechanical Engineering
Dr.V.M.M.Thilak		Conceptualization of Solar powered fertilizer sprayer Machine	e-Conference on Recent Development in Automobile and Mechanical Engineering
Mr.S.Nishanth		Conceptualization of Solar powered fertilizer sprayer Machine	e-Conference on Recent Development in Automobile and Mechanical Engineering
Mr.L.FranklinArokiya Raj		Conceptualization of Solar powered fertilizer sprayer Machine	e-Conference on Recent Development in Automobile and Mechanical Engineering
Dr.S.Jeevanantham		Investigation of Extra terrestrial vehicle with rocker bogie suspension system	e-Conference on Recent Development in Automobile and Mechanical Engineering
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Mr.L.FranklinArokiya Raj		Investigation of Extra terrestrial vehicle with rocker bogie suspension system	e-Conference on Recent Development in Automobile and Mechanical Engineering
Mr.Nishanth.S, Mr.L.Franklin Arokiya Raj	Mechanisms and Machine theory		
Mr.L.FranklinArokiya Raj	Mechanics for Engineers Statics and Dynamics		
Dr.V.M.M.Thilak	Industry 4.0 Future of Manufacturing		
Dr.P.Senthilkumar, Mr.S.Nishanth, Dr.P.Maniiarasan, Mrs.P.Bagyalakshmi	Foundation Skills in Integrated Product Development		

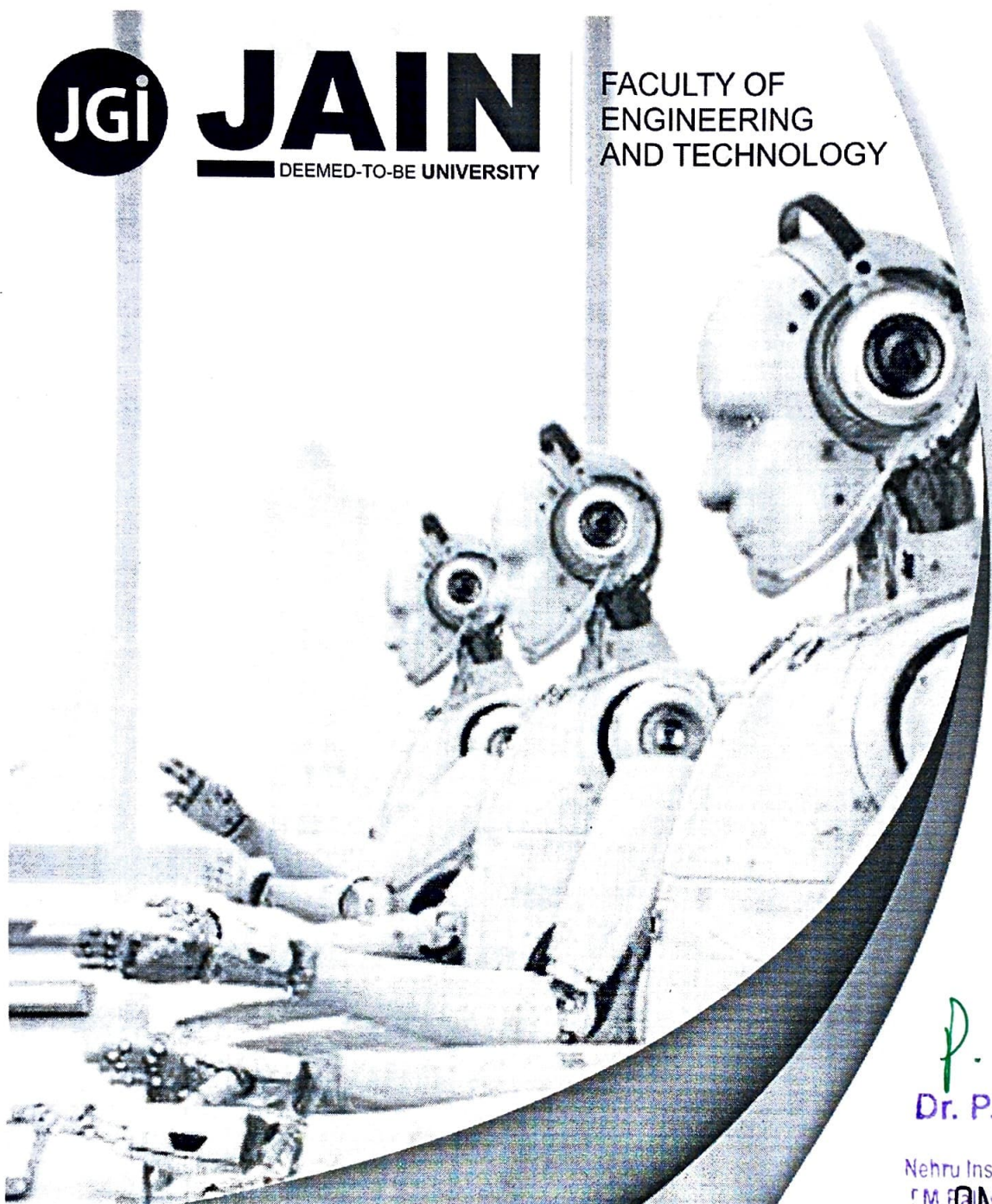
Dr.P.Senthilkumar, Dr.P.Maniiarasan	Entrepreneurship Development		
Dr.P.Senthilkumar, Mr.AL.Arumugam,Dr. P.Maniiarasan	Lean Manufacturing		
Dr.S.Jeevanantham, Mr.L.FranklinArokiya Raj, Mr.S.Nishanth	A text book on Welding Technology for Engineers		
Mr.M.Madhusuthanan	MCQ Series on ETD		
Dr.P.Elumalai	Enhancement of Energy Efficiency using Environmentally benign Refrigerant blends in Vapour Compression Refrigeration System		
Mrs.N.Sathiya Priya		Influence of cadmium acetate for the Growth control and surface modification in v- glycine single crystal for the'enhanced optoelectronic applications	International Conference on Recent Innovation in Science, Engineering and Technology
Dr.S.Shalini Packiam Kamala		Parametric analysis and performance of laser cutting on strenx steel	Materials Today: Proceedings
Dr.S.Shalini Packiam Kamala		Experimental analysis on effect of infrared light source for moisture content test of silica sand	Materials Today: Proceedings
Dr. M Mano Raja Paul, Dr. R Kannan	Power Quality		
M. Mano Raja Paul		Optimization of Beamforming in Subarray Antennas Using Firefly Algorithm	ICCSSL 2020.
M.Mano Raja Paul, R.Kannan		Fault identification in a grid connected solar PV system using back propagation neural network Controller	ICCSSL 2020.

Dr. R. Ramaswamy		An Overview on Mechanical Properties of Particular Reinforced Titanium Alloy with various Reinforcements using Metal Matrix Composite	
Mr. P. Karthikeyan		An Overview on Mechanical Properties of Particular Reinforced Titanium Alloy with various Reinforcements using Metal Matrix Composite	
Mr. S. Balaji		An Overview on Mechanical Properties of Particular Reinforced Titanium Alloy with various Reinforcements using Metal Matrix Composite	
A Basith Rahman, S.Abhirami	Comparative Analysis on Mechanical Properties of Al 6061 and Al 7075 Cross Matrix Composites		



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ISBN:9789384893132



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Design and Stress Analysis of ATV's Frame

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Abstract: The process of Finite Element Analysis (FEA) is expensive and time consuming as well as simulating the problem statement is unnecessarily tedious at an initial design stage. Therefore, it is always advantageous to do extensive research on the basic requirements of roll cage design. To understand the changes that need to be incorporated in the design, perform the static stress analysis first. This will offer a simplistic simulation criterion of the problem statement and requires a lower computational time; and then dynamic analysis to validate the safety of the preliminary design. The paper aims to give an introduction to the material selection procedure, pipe size selection and various tests that need to be done before finalizing the design, using ANSYS® WORKBENCH 14.5. This project deals with designing and analysing of the frame of All Terrain Vehicle. Our aim is to analyse an All-Terrain Vehicle (ATV) as per the constraints given by the ATV team. The need is to design safe and dynamically balanced ATV through predicting the chances of failures has led to the origin of the idea of this paper. The design is generated with the help of SOLIDWORKS 16 as per the dimensions. In this present work, various factors such as impact force determination, loading points, the mesh size dependence of generated stress, Von-Misses Stress, Deformation and Factor of Safety (FOS) are studied.

Keywords: Finite element Analysis, ANSYS® WORKBENCH 14.5, SOLIDWORKS 16, ATV.

I. INTRODUCTION

All-Terrain Vehicle or in short called as an ATV is basically an Land based automobile capable of reaching remote areas where normal cars/bikes cannot reach. Main focus of an ATV is to provide comfortable and safe in uneven terrains. They function in environments like River banks, mountains, snow, Forests etc. Pretty much anywhere taking your everyday cars/bike isn't practical. Roll Cage can be called as skeleton of a vehicle, besides its purpose being seating the driver, providing safety and incorporating other sub-systems of the vehicle, the main purpose is to form a frame or so called Chassis. We have designed the roll cage keeping in view the safety and aesthetics. These are the two factors which matters us the most, therefore they are given utmost consideration. This paper deals with design of chassis frame for an All-Terrain Vehicle and Various loading tests like Static testing, Front Impact, Rear Impact, One wheel bump test & Roll over test have conducted on the roll cage. High strength requirements generally require a substantial measure of elasticity of the frame. However, the frame must also have a relative rigidity so as to not damage components of the ATV and maintaining good dynamic vehicle behaviour. Therefore, the strength of the frame (which requires and introduces elasticity) must be balanced with the rigidity.

II. REVIEW OF LITERATURE

Stress Analysis of Roll Cage for an All-Terrain Vehicle. An all-terrain vehicle (ATV), also known as a quad, quad bike, three-wheeler, or four-wheeler, is defined by the American National Standards Institute (ANSI) as a vehicle that travels on low pressure tires, with a seat that is straddled by the operator, along with handlebars for steering control. A roll cage is a skeleton of an ATV. The roll cage not only forms the structural base but also a 3-D shell surrounding the occupant which protects the occupant in case of impact and roll over incidents. The roll cage also adds to the aesthetics of a vehicle. So determining strength requirements of roll cage, stress analysis is carried out using FEA software Ansys workbench. This paper deals


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Investigation of the Design and Application of Manually Operated Wheel Spray Pump in Agricultural Sector

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Coimbatore

Abstract: India is a land of agriculture which comprises of small, marginal, medium and rich farmers. Small scale farmers are very interested in manually lever operated knapsack sprayer because of its versatility, cost and design. But this sprayer has certain limitations like it cannot maintain required pressure; it led to problem of back pain. However, this equipment can also lead to misapplication of chemicals and ineffective control of target pest which leads to loss of pesticides due to dribbling or drift during application. This phenomenon not only adds to the cost of production but also cause environmental pollution and imbalance in natural eco system. This project report suggests a model of manually operated multi nozzle pesticides sprayer pump which will perform spraying at maximum rate in minimum time. The Normal Spray pump works on electrical battery or using manpower to operate lever for spraying pesticides. In Push operated spray pump a one trolley is there in which a special mechanism for translating rotary motion into reciprocating motion this reciprocating motion used to operate the pump lever. This lever operated pump increases the pressure of pesticides and pesticides will be sprayed. It is a device which is used to sprinkle pesticides minimizing the efforts.

Keyword: Lever operated pump, Multi nozzle pesticides, Sprayer pump, Push operated spray pump, Pesticides.

I. INTRODUCTION

Agriculture a vital role in Indian economy a r o u n d 65% o f the population in the state is depending on agriculture. Although its contribution to GDP is now around one sixth, it provides 56% of Indian work force. In 1960-61. The share of marginal and small farmer is around 81% and land operated is 44 %. As far as Indian scenario is concerned, more than 75 per cent farmers are belonging to small and marginal land carrying and cotton is alone which provide about 80 % employment to Indian workforce. So, any improvement in the productivity related task help to increase Indian farmer's status and economy. The current backpack sprayer has lot of limitation and it requires more energy to operate. The percentage distribution of farm holding land for marginal farmers is 39.percentage,for small farmers 22.6 percentage, for small and marginalfarmers 61.7 percentage, for semi-medium farmers 19.8 percentage, for medium farmers 14 percentage and for large farmers 4.5 percentage in year 1960-61.Clearly explain that the maximum percentage of farm distribution belonged to small and marginal category.

II. REVIEW OF LITERATURE

During the literature review carried out the following papers were found related to the research carried out in this project. Founk carried out a research on "Modification of a Knapsack Sprayer for more efficient use". Use of an open-head knapsack sprayer is a practical method of applying several pesticides to small test plots, but the commercial knapsack sprayers commonly available present some difficulties.

Dev et al have carried out a research on "Small farmers in India-Challenges and opportunities" It covers trends in agricultural growth, cultivation patterns, participation of small holding agriculture, linking small holders with markets including value chains, role of small


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Experimental Investigation on Mechanical Properties of Coconut Fiber Reinforced Composite

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² Associate professor, Department of Mechanical Engineering, Nehru Institute of Engineering and Technology, Coimbatore, India.

Abstract: Fiber-reinforced polymer composites have played a predominant role for a long time in a variety of applications for their high specific strength and modulus. The fiber which serves as reinforcement in reinforced polymer is in the form of natural fibers. Natural fibers are not only strong and lightweight but also relatively very cheap. The present work describes comparison on the development and characterization of reinforcing the matrix (Epoxy resin & Polyester resin) with natural fiber (Coconut fiber). The natural fibers were exposed to chemical treatment (NaOH) before manufacturing of laminates and the pretreated fibers are tested and the fibers were chopped into 3mm, 5mm, 7mm, and 10mm before reinforcement. Samples of coconut-Epoxy and Coconut Polyester laminate were manufactured using hand layup method where the fibers are dispersed randomly. Specimens were cut from the fabricated laminate according to the ASTM standard for different experiments. For Tensile test, flexural test, and Impact test samples were cut in the desired shape and its results were observed and compared with epoxy and polyester composites to perceive the properties of composites.

Keyword: Coconut fibers, Epoxy resin, Polyester resin, hand-layup, compression moulding, Mechanical Properties.

I. INTRODUCTION

A composite is a material made by combining two or more dissimilar materials in such a way that the resultant material is endowed with properties superior to any of its parental ones. Fiber-reinforced composites, owing to their superior properties, are usually applied in different fields like defense, aerospace, engineering applications, sports goods, etc. Nowadays, natural fiber composites have gained increasing interest due to their eco-friendly properties. A lot of work has been done by researchers based on these natural fibers. Natural fibers such as jute, sisal, silk and coir are inexpensive, abundant and renewable, lightweight, with low density, high toughness, and biodegradable. Natural fiber reinforced polymer composites have raised great attentions and interests among materials scientists and engineers in recent years due to the considerations of developing an environmental friendly material and partly replacing currently used glass or carbon fibers in fiber reinforced composites. They are high specific strength and modulus materials, low prices, recyclable, easily available in some countries, etc.

II. REVIEW OF LITERATURE

Brahmakumar, et al [1] used Coconut fiber as reinforcement in low density polyethylene. The effect of natural waxy surface layer of the fiber on fiber/matrix interfacial bonding and composite properties has been studied by single fiber pull-out test and evaluating the tensile properties of oriented discontinuous fiber composites. The waxy layer provided good fiber-matrix bond such that removal of the layer resulted in drastic decrease of the fiber pull-out stress, increase of the critical fiber length and corresponding decrease in tensile strength and modulus of the composites. The waxy layer of polymeric nature also exhibited a stronger effect on interfacial



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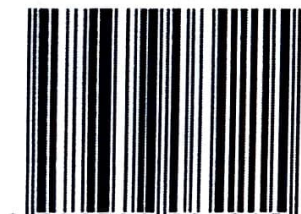
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CONCEPTUALIZATION OF SOLAR POWERED FERTILIZER SPRAYER MACHINE

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Sprayers are mechanical devices that are specifically designed to spray liquids rapidly and efficiently. In this research, a solar operated mechanical sprayer was conceptualized and manufactured. A sprayer of this type is a great way to use solar energy. Solar based fertilizer sprayer pump is one of the improved version of petrol engine fertilizer sprayer pump. It is vastly used in the agriculture field & also used for many purposes. This is having more advantages over petrol engine sprayer pump. It uses the solar power to run the motor. It is a pollution free pump compared to petrol engine sprayer pump. This charged battery can also use for home appliances like glowing of CFL bulbs, mobile charging etc. The solar panels make up most (up to 80%) of the systems cost. The size of the PV-system is directly dependent on the size of the pump, the amount of water that is required (m^3/d) and the solar irradiance available. The solar sprayer has many advantages. Besides reducing the cost of spraying, there is a saving on fuel/petrol. Also, the transportation cost for buying petrol is saved. The solar sprayer maintenance is simple. There is less vibration the operation of solar powered pumps is more economical mainly due to the lower operation and maintenance costs. Solar pumps are useful where grid electricity is unavailable and alternative sources. The farmer can do the spraying operation by themselves without engaging labour, thus increasing spraying efficiency.

Keywords: Solar power, Mechanical Sprayer, Solar pump, Spraying efficiency, Fertilizer spray pump.


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INVESTIGATION OF EXTRATERRESTRIAL VEHICLE WITH ROCKER BOGIE SUSPENSION SYSTEM

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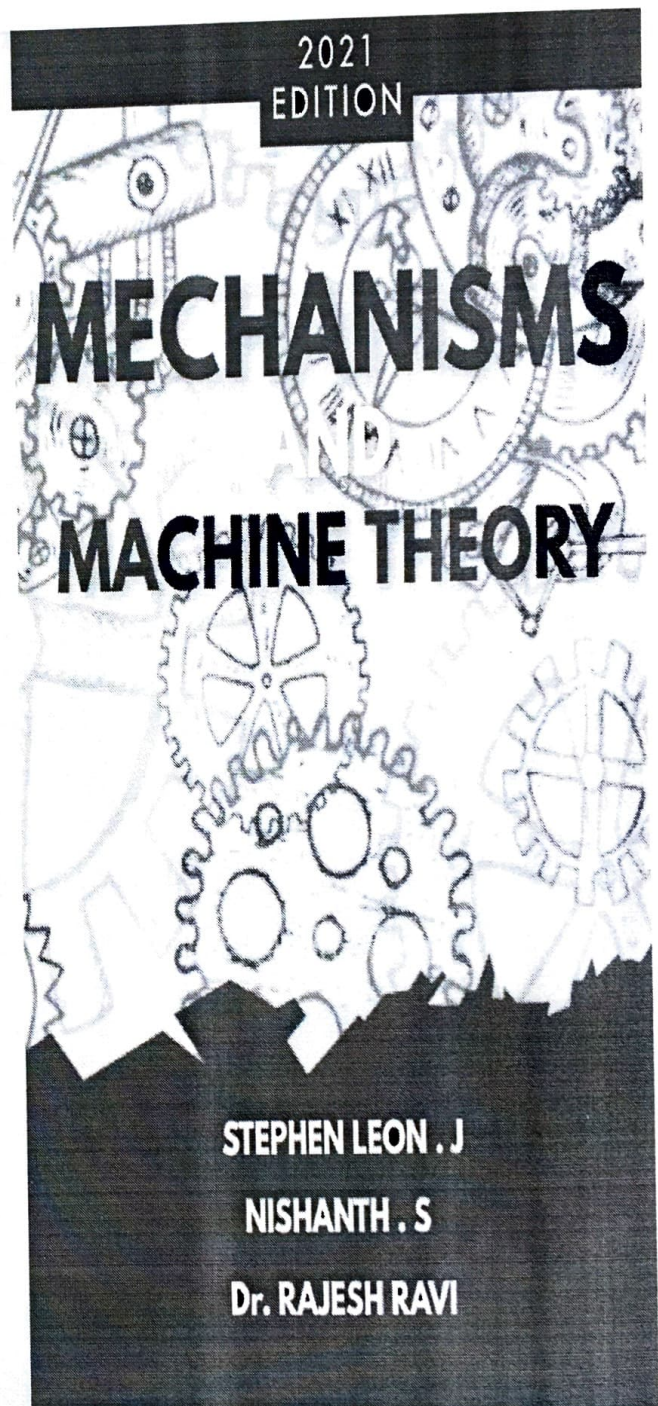
^{3,4} Assistant Professor, Nehru Institute of Engineering & Technology, Coimbatore, India

The objective of this Rocker Bogie Suspension System is to develop a surveillance robot for defense purpose, which is capable of moving in all surfaces and is capable of driving in rock terrains and live video streamlining with help of a camera. This robot has a special mechanical structure which is capable in driving rock terrains which is only possible with chain robot, but chain robot has some bugs and to overcome those bugs we designed a mechanical structure rocker bogie mechanism is a mechanism primarily used in the mars rovers to overcome the rough terrains while maintaining stability. It is NASA's commonly used mechanism for space vehicles & rovers. It consists of two arms with wheel mounted to each. Both arms are connected through a movable joint. This enables to have a suspension based mechanism that distributes the vehicle load as evenly as possible even on bumps and irregular surfaces. The design consists of a spring free suspension based differential drive system that allows the bogie to move over rocks, pebbles with ease. The sensors and cameras mounted on a rover must be stable to work properly and also to increase their life span. The vibrations and jerks lead to faster wear and tear in in sensors, circuit boards and cameras. The rocker bogie mechanism was designed keeping this in mind by providing maximum stability in all terrains. A four wheeled rover capable of traversing rough terrain using an efficient high degree of mobility suspension system. This investigation deals with fabrication of a rocker bogie with 8 wheels having independent drive on each wheels. A series of mobility experiments in the agriculture land, rough roads, inclined, stairs and obstacles surfaces were concluded that rocker bogie can achieve some distance traverses on field.

Keywords: Extraterrestrial, Rocker bogie suspension, surveillance robot, suspension systems, multi terrain vehicle.




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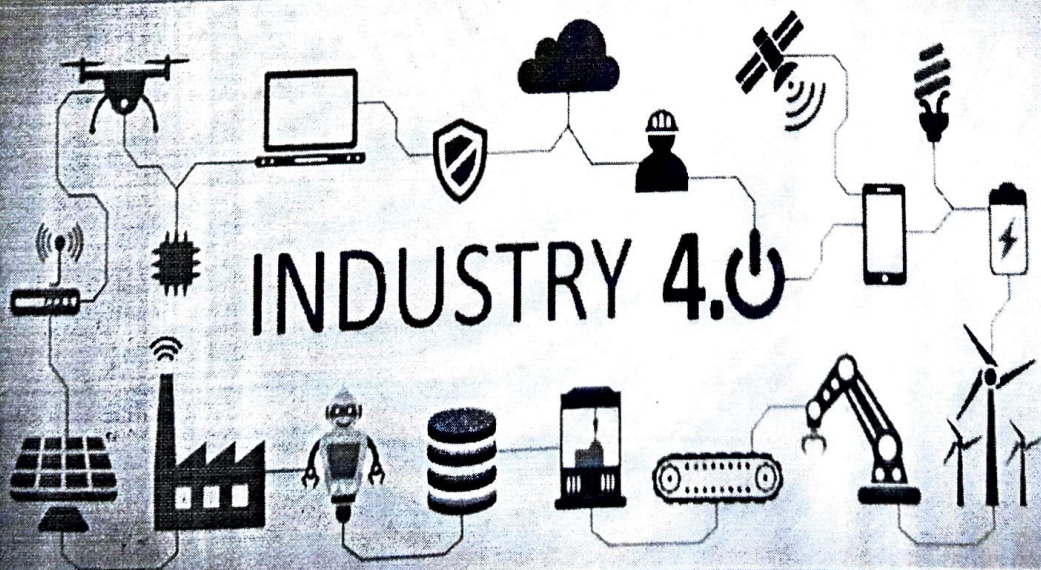
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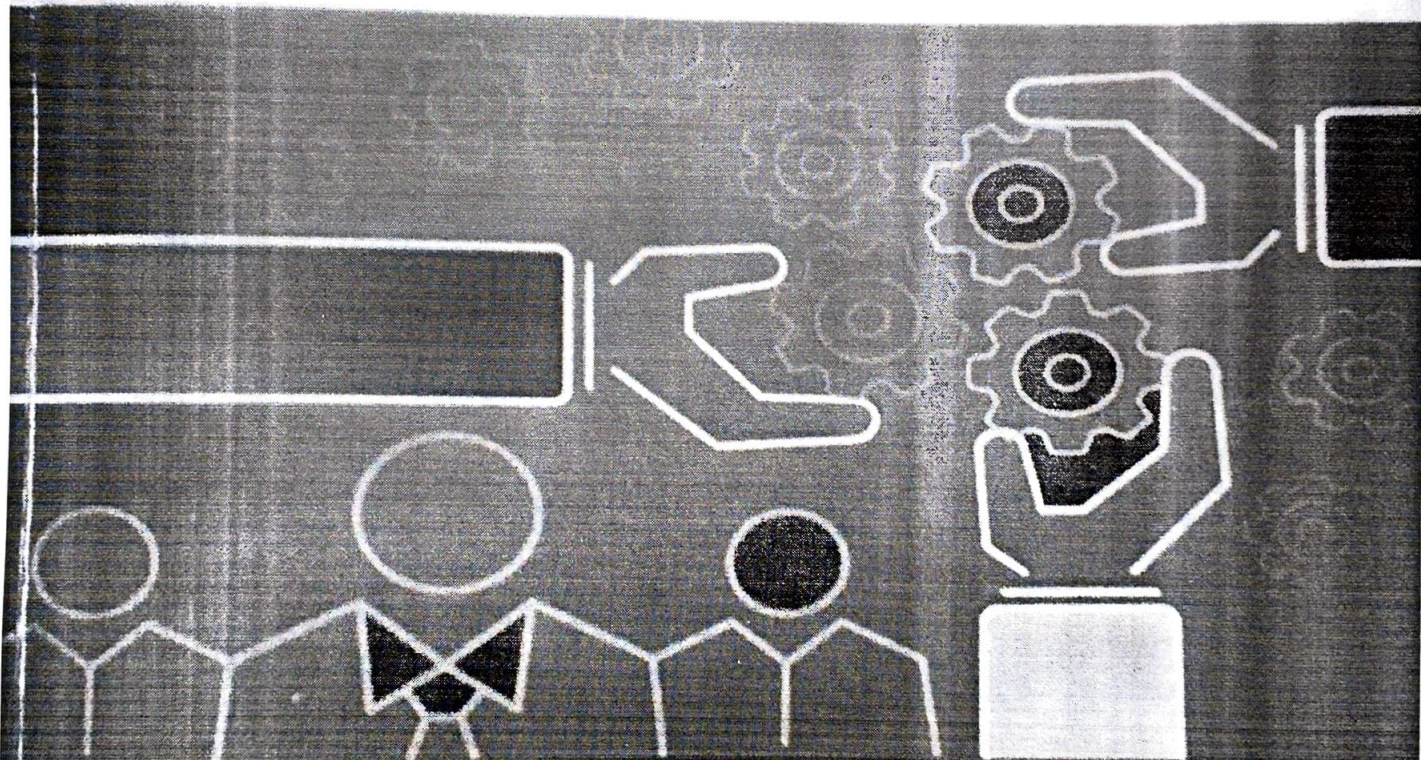
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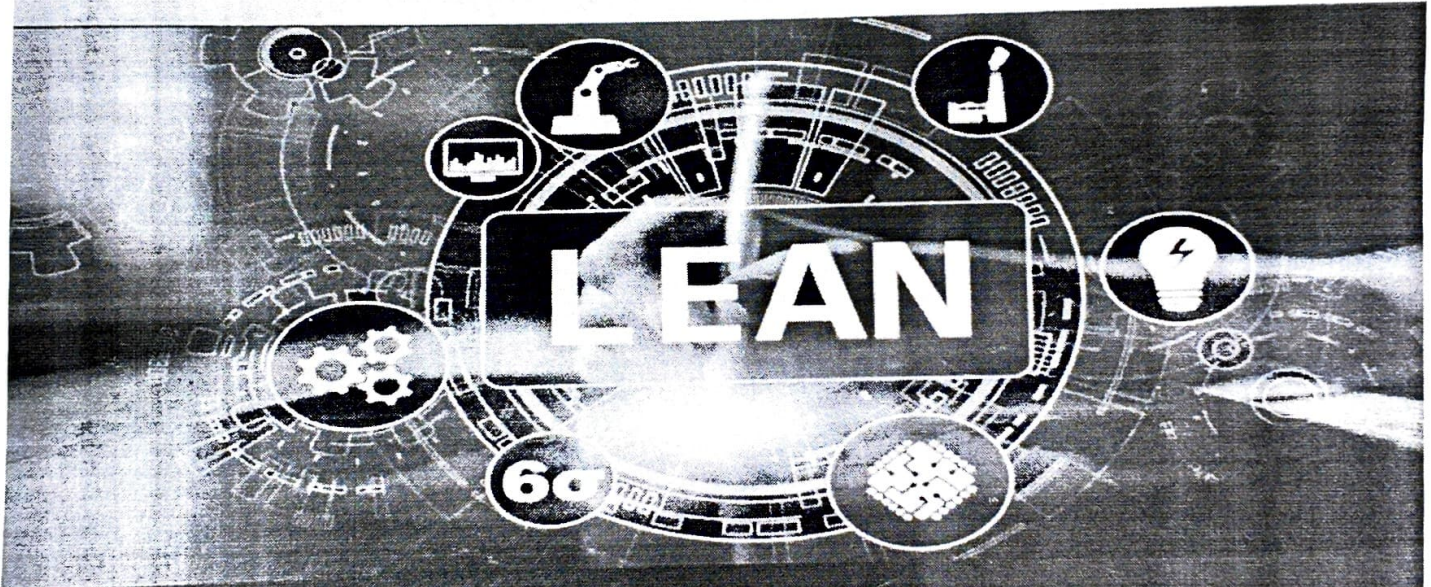
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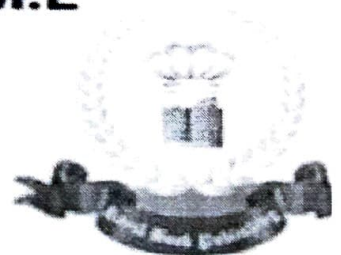
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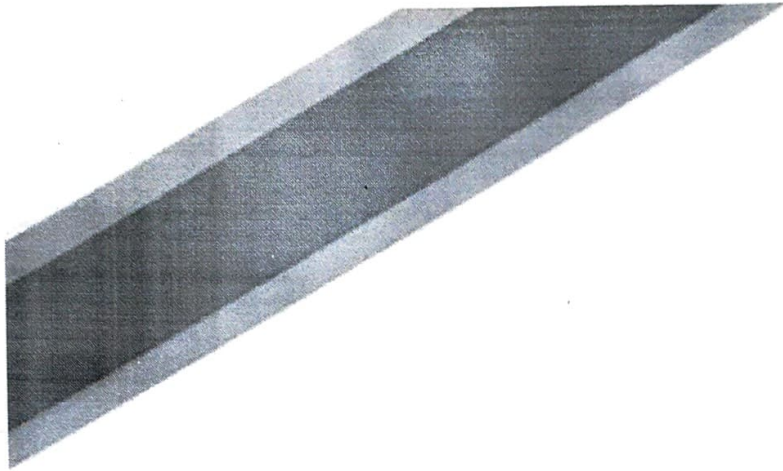


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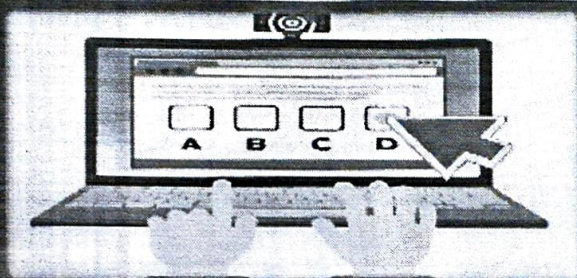


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Chapter

Enhancement of Energy Efficiency Using Environmentally Benign Refrigerant Blends in Vapour Compression Refrigeration System

January 2021

DOI:10.1007/978-981-15-4739-3_88

In book: Advances in Industrial Automation and Smart Manufacturing (pp. 1021-1033)

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Abstract

This study involves theoretical investigations made on a simple vapour compression system working with R152a/R1270/R600 refrigerant mixture. The properties of the mixtures along with that of R22 were obtained from REFPROP 7.0 software for the operating temperature ranging from 0 to 50 °C. CYCLE_D software has also been used for finding the proposed refrigerant mixture's performance. Test results from theoretical study presented that the coefficient of performance of the HFCs and HC refrigerant mixtures being 2.1% higher than that of R22. Compressor power of the mixtures was 1.8% less than that of R22 at 7 °C evaporator temperature and 53 °C condenser temperature. Mixture of the refrigerants showed higher mass flow rate than that of R22, and also its deviation was 36% from R22. Compressor shell outlet temperature of the refrigerant mixtures was 9.6% lower than R22 at 7 °C evaporator temperature and 53 °C condenser temperature. In this study, the selected ternary refrigerant mixture was found to provide better energy efficiency, and hence, it can be used as a suitable replacement for HCFC 22 in residential air conditioners.



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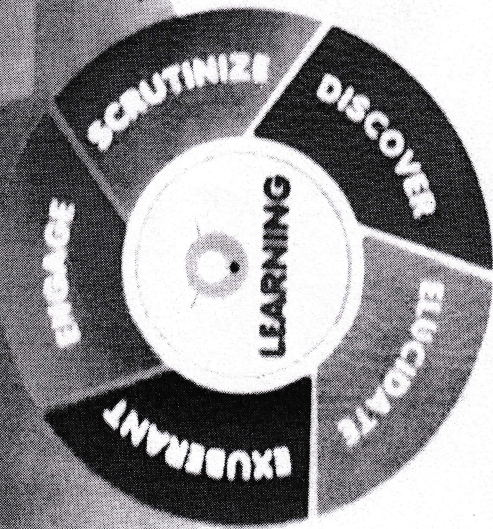
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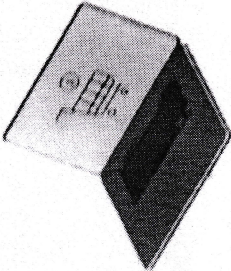
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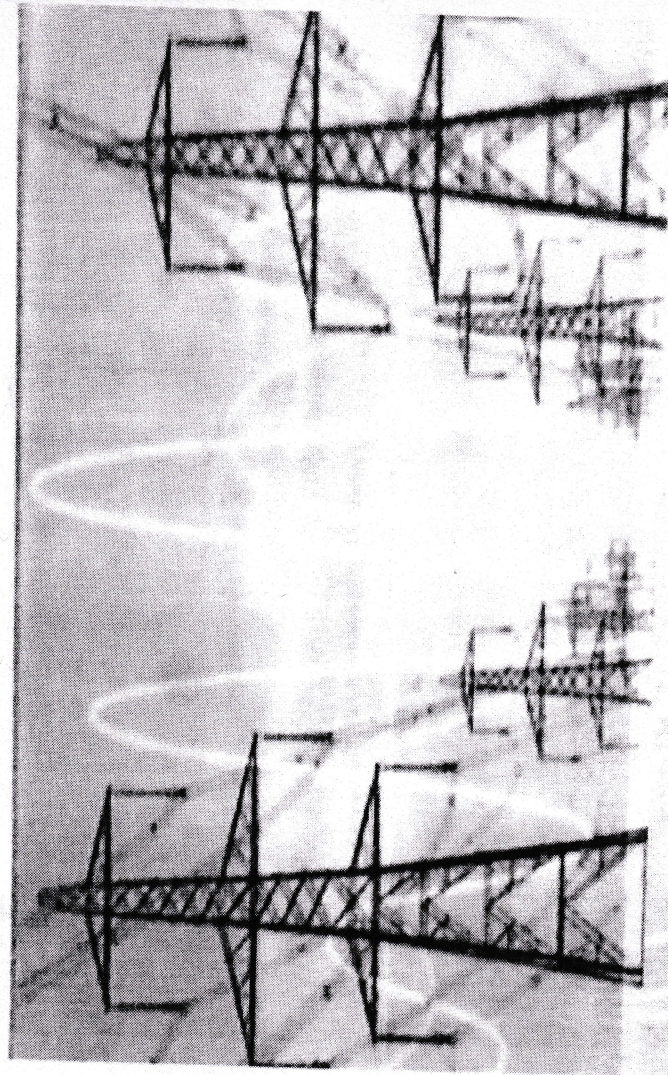
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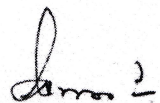
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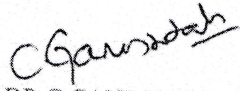
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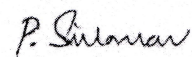
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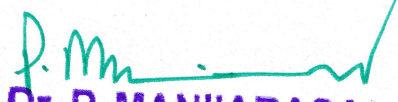

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An Overview on Mechanical Properties of Particular Reinforced Titanium Alloy with Various Reinforcements using Metal Matrix Composite

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Abstract--- Metallic Titanium and alloys found their wider applications in the domain of aerospace since they possess more strength, low density and capability to withstand high temperatures as well as to resist wear losses. In the titanium alloy group, Ti-6Al-4V (Titanium Grade-4) is the mostly used in titanium industry and it is contributing for more than 50% of total titanium usage. It is recommended for the situations where the working temperature is around 350oC. But it is not recommended for wear applications.

In general, titanium based materials have the tendency of transforming reversibly from an alpha structure (HCP- hexagonal close packed) to a beta structure (BCC- body-centered cubic) whenever the temperature exceeds beyond certain level. This allotropic nature rely upon the volume or weight percentage of alloying constituents, makes it viable for more diversified microstructures and associated strengthening attitudes than the alloys made up of non-ferrous materials such as Cu and Al. Ti-6Al-4V based metal matrix composite (MMCs) have been produced by adding ceramic reinforcements such as boron carbide, silicon carbide, titanium carbide and titanium boride, yttrium oxide etc...

Among the available host materials, ceramic reinforcements have acknowledged much attention in recent researchers due to its excellent material properties and its aptness as a waveguide and a laser host. The material properties such as high refractive index (1.7 – 1.9) and excellent thermal conductivity is suitable for engineering applications. The main objective of the current research work presented here is to develop a Ti-6Al-4V based composite by varying the reinforcement to produce titanium alloy based composite with enhanced high temperature mechanical performance is expected. The powder metallurgy route will be used for preparing the composites preforms. The major processes of this study will be manufacturing of composite preforms, mechanical testing and evaluating microstructures. The works carried out and their associated results and discussions will be helpful to strengthen the Ti6Al4V composites by means of ceramic reinforcements.

Keywords--- Titanium Alloy, Particle Size, Sintering, Metal Matrix Composite, Hot Extrusion, Microstructure, Powder Metallurgy.

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The modern industrial components require superior mechanical and physical properties to meet out the challenges against the development of new technologies in the area of aerospace and automotive industries. The



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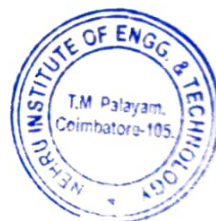
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ISBN 978-981-15-5150-5 ISBN 978-981-15-5151-2 (eBook)
<https://doi.org/10.1007/978-981-15-5151-2>

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Comparative Analysis on Mechanical Properties of Al 6061 and Al 7075 Cross Matrix Composites



R. Balaji, J. V. Muruga Lal Jeyan, A. Basithrahman, Talasila Estheru Rani, and S. Abirami

Abstract Aluminum alloy 6061 and aluminum alloy 7075 (or simply denoted as Al 6061 and Al 7075, respectively) are widely used in the field of aviation, automobiles, and marine due to their exceptional properties such as good strength, lightweight, and better corrosion. In this paper, Al 6061 and Al 7075 are used as base materials for reinforcement to further enhance their mechanical properties. Alumina, silicon carbide, boron carbide, and titanium oxide are used as reinforcement particles. The cross matrix composites of Al 6061 and Al 7075 are produced by the widely used stir casting method. The different weight percentages of reinforcement particles are used to prepare different composition of cross composites. The resultant composites are heat-treated in T6 condition and machined in the suitable dimension for testing. The mechanical characterization was carried out by performing hardness, tensile, and impact tests, and their results have been presented. Moreover, the comparison of mechanical properties of alloys Al 6061 and Al 7075 is also given; specifically, the tensile stress and impact value of Al 6061 are shown to be increased when the reinforcement particles are added comparing to Al 7075 cross composites.

Keywords Cross matrix composites · Aluminum alloys · Stir casting · Mechanical properties · And heat treatment

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