GHARDA INSTITUTE OF TECHNOLOGY
A/P: LAVEL, TAL.KHED, DIST.RATNAGIRI.
Tel.: 02356 - 262795 – 99, Fax: 02356 – 262980
Website: www.git-india.edu.in, Email: principal@git-india.edu.in

DEPARTMENT OF MECHANICAL ENGINEERING

Major Project Abstracts

Academic year: 2021-2022

Project coordinator- Dr.V.R.Khalkar

Academic year: 2021-2022

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MAJOR PROJECT ABSTRACTS

Academic year: 2021-2022

Name of the students	Title of the project	Abstract
Mr. Mayuresh v. dalvi Mr. Prashant p. gaikar Mr. Maheshwar s. panshikar Mr. Nishad s. wad	Design & fabrication of cloth dryer	Cloths are the first impressive thing which we wear on our body, which keeps us protected from external dust and dirt from directly attacking on our body, so this is every one's priority to keep clean the cloth time to time. Before wearing the cloths, it is essential to dry them completely and moisture free. But in rainy season many times as we see that cloths remains un-dried or wet because of insufficient sunlight and heat which is developed due to radiation of the sunlight on earth's surface. To overcome this problem people starts to hang the cloth on rope which are mounted on the opposite sides of the wall, but this idea is not that much aesthetic & not also sufficient in rainy season because the atmospheric air is already containing water in it in the form of moisture. To avoid this problem, we have created a Cloth Dryer which will minimize the drying time of cloth & and also includes aesthetics while drying the cloth because it consists a drying cabinet which keeps the clothe inside it. The drying cabinet also having fan and heating coil arrangement which blows hot air on cloth to remove the moisture from the wet cloth. For monitoring purpose cloth dryer also consist temperature & humidity sensors which senses the temperature & humidity inside the cabinet throughout the process. To ensure that the cloths are completely dried weighing sensor is also placed in the cabinet in such a way that it measures the weight of wet cloth & also measures the time-to-time difference between the weights of cloths thought the drying process.
Mr. More rohit ravindra Mr. Pitale shubham suryakant Mr. Mali sahil sandip Mr. Bhuvad aditya eknath	Automatic water bottle filling machine by arduino	The current scenario in industries is to embrace new technologies to proceed towards automation. The same vision is exercised in bottle washing and filling plants. To meet the customer demands and accelerate the washing and filling of bottles, all operations are nearly automated. The automation of bottle washing and filling involves use of PLC for control but it is costly. Despite of all such advance technologies small industries are still involved in manual washing and filling of bottles. They might be discouraged to adapt to new technology due to high cost involved in

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		automation. The study emphasize on reduction in cost using arduino microcontroller. The arduino microcontroller is relatively cheap and widely available. In small industries bottle washing and filling operation is done manually. In this Arduino project we design a prototype for Automatic Bottle Filling Machine using Arduino Uno, conveyor belt, solenoid valve, IR sensor, and Stepper motor. Belt conveyor is driven by a stepper motor at a constant preset speed. The stepper motor will keep driving the belt until an IR sensor detects the presence of a bottle on the belt. We used the IR sensor as an external trigger. So whenever the IR sensor goes high it sends a trigger to Arduino to stop the motor and turn on the solenoid valve. A preset required delay is already entered in the code for bottle filling. The Arduino will keep the solenoid valve on and stepper motor off until that specified time. After that time, the solenoid valve turns off the filling, and the conveyor starts moving so that the next bottle can be filled.
Mr. Gaurang Kesarkar Mr. Omkar Prabalkar Mr. Shailesh Kavitkar Mr. Swapnil Karande	Analysis of casting defects in case of microwave and conventional casting of non-ferrous metal(TIN)	In this project casting defects in case of microwave and conventional casting going to studied. Power conservation and cost reeducation in microwave furnace in many time less where compared with muffle furnace. Huge time is saved in microwave furnace process. Tin material, exclusively (ASTM B23 Babbitt Bulk Material) is widely used for plating steel cans used as food containers, in metals used for bearings, due to several useful characteristics, some of them being a low melting point, malleability, resistance to corrosion and fatigue, and the ability to alloy with other metals. Casting of metals is a process known to mankind for thousands of years, and widely used for sculpture, especially in bronze, jewellery in precious metals, and weapons and tools in the ancient time. But as technology advanced with human progress this has become a major and integral part of today's manufacturing process. While lot of work has been done to identify the casting defects there is little contribution in the field of casting of alloys specially non - ferrous alloys. This study identifies various defects in non-ferrous alloys castings giving during process of casting.

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Kamble pankaj ravindra Gundekar omkar anil Joshi partik devidas Patil pratik dilip	Design, analysis and assembly of atv braking system	All-terrains-vehicles (ATV) are largely used in forest working and patrolling, supporting rangers and many other workers. Now a day's even in racings. A titanic factor in handling of any vehicle is making it come quick and easy stop. It is prerequisite to retard the vehicle in order to get over all control by driver. The very first vital part is to select the one perfect mechanism to actuate the brakes. Even though there are numerous mechanisms for actuating brakes hydraulically actuated disc brakes have been used for both front and rear. The safety while braking is first and foremost and reckoned by evaluating mathematical model of braking. The evaluation of models is done by calculating various braking parameters such as applicable forces under certain circumstances. The data used to achieve average values of design parameters, making the theoretical calculations as realistic as possible. The work emphasis design of braking system, includes numerous mathematical calculations, CAD designs and analysis of various components to achieve optimum, yet effective braking.
Mr. Pranay ravikant matkar Mr. Amol sakharam jamdar Mr.Nikhil anil sakpal Mr.Sankalp maruti chavan	Design analysis and assembly of suspension system of all terrain vehicle	The immense feel of driving an all-terrain vehicle (ATV) can be felt by driving it in off-road conditions. However, this feeling can only be experienced when the comfort level of a driver as well as vehicle is maintained. To sustain such off road conditions an ATV must have excellent suspension system. Hence it is concluded that suspension system of an ATV (responsible for comfort) is one of the most important subsystems of design in all-terrain vehicle. The above project highlights the selection of suspension system, its design as well as its analysis. The project describes the material selected along with its specifications for manufacturing such sub-system. Project also describes about the analysis performed on the suspension system of all-terrain vehicle and its expected outcomes. We have taken front shock absorbers of length 14 inch and rear shock absorbers of length 16 inch for double wishbone suspension system.
Mr. Pranav Dipak Pandit Mr. Priyanshu Sanjay Wagh Mr. Pratik Ramchandra Kap	Design, analysis and manufacturing of transmission system for baja atv	This report will give you the detail information about the working, design consideration and mathematical analysis of transmission system of an all-terrain vehicle. It will also help you in selecting different component of a transmission system for all terrain vehicles. In this report our main intention is to make you aware of important of transmission system in an all-terrain vehicle. Our focus is to design a transmission system which will give optimum power output with minimum maintenance and less cost. This report will also help you in selecting and differencing between manual

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		transmission and automatic transmission. It will also give you the information about different resistance available to an ATV and how to consider this resistance during design of transmission. Our part selection criteria will be based on the availability and reliability of component.
Mr. Bade Suraj Suresh Mr. Chavan Shubham Sunil Mr. Dalvi Abhishek Ganesh Mr. Pawar Manish Shankar	Prototype of solar based eletrical system of an automobile	Solar energy is the radiation from the sun capable of producing heat causing chemical reaction or generating electricity. The total amount of solar energy received on Earth is vastly more than world current and anticipated energy requirement. According to the SESI (Solar Energy Society of India) and SECI (Solar Energy Corporation of India) solar energy highly diffused source has the potential to satisfy all future energy needs cause is inexhaustible supply contrast to the finite fossil, fuels and petroleum. Hence in this project main focused on to reduce the use pollution causing fuel and use the green method to run the electrical system of an automobile. Which is cost friends to the user and comparatively safe. The solar base electrical system of an automobile is most promising option as it reduce the cost, ensure the safety of environment and attain optimum efficiency and contribute towards the net zero emission promise. The 21st century is witness the change in energy sector particular in green energy.
Mr. Khetale Pranay Pratap Mr. Kadam Vidhyadhar Vishnu Mr. Mane Shubham Rajesh	Preparation and characterization of Mg-Al based FML composites	Fiber Metal Laminates are now-a-days a dominant material for applications such as automobile body panels, aircrafts cabins and railway wagons, because of reasons such as superior mechanical properties such as high strength and less weight. Hand Lay-up technique was used to fabricate four fiber metals laminates comprising of aluminium alloy 5052-H32 as the skin material and E-glass fiber as the core. The formability behavior of the laminate was found using Erichsen cupping test using an indigenously developed test setup. The fibers were subjected to brittle failure while the skin material sustained ductile fractures. The Erichsen cupping index value depended upon the factors such as complexity of composite sheet forming operations, simple mechanical property measurements made from the tension test area of tested value. Other mechanical properties are found by using Tensile Test, Flexural Test. Lap Shear Test, Impact Test. There was non-uniform distribution of reinforcement in material, Microstructure revealed

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		fiber cracks which were oriented in line to the crack growth on the skin material. Hence, it can be concluded that the proposed material can be safely applied for automotive, aeronautical and locomotive body panels or as a skin material.
Mr. Jay Suryakant Wadke Mr. Sabeel Riyaz Parkar Mr. Mohammed Ali Abdul Razzak Parkar Mr. Faizan Mushtaque Masurkar	Design, CFD analysis and optimization of tesla valve	The concept of tesla valves is a long-lost invention with very little research carried out. It is type of non-return valve with no moving parts. The geometry inside includes conduits, protrusion or arranged flow deflectors. The selection of design is done on the basis of factors as durability, efficiency and ease of manufacturing. Since tesla valve should be designed specifically for desired conditions, selection of material, working conditions are also taken into consideration. The CFD analysis carried out displays the characteristics behaviour of valve and its functioning. The drop pressure, change in velocity, flow behaviour is analysed using appropriate solver model. Using the dimensions of design which was optimized based on the analysis conducted on the designs which were rejected, a prototype was build. It was used to conduct a pressure test and obtain experimental results. These experimental results were compared with the analytical results and the analysis and optimization of tesla valve is concluded.
Mr. Saidip Dipak Ambre Mr. Tejas Umesh Chandivade Mr. Rahul Kishor More	Analysis Of Paek Based Polymer Composite Spur Gears	Gearing is one of the most critical components in mechanical power transmission systems. For polymer composite gears offer several benefits including design flexibility, reduced noise and the ability to operate without lubrication. Other benefits include lower cost and weight, higher efficiency and chemical resistance. Design effort was required to improve plastic gear performance. In this project the polymer gear model was created on Solid Work software. And then it was export to ANSYS workbench to calculate the contact stress, strain and total deformation. The solution of general problem by finite element method always follows an orderly step-by-step process. The loading condition are assumed to be static. The polymer composite material PAEK (Poly-aryl-ether-ketone) was selected and it is compare with the low duty applications which can be defined in terms of contact stress and temperature for dry running gear.
Mr. Kalpesh Kishor Lambade Mr. Hrushikesh Ashok More	Analysis Of High-Performance Polymer Material For	Composite materials have revolutionized material engineering today. The evolution of composite materials has given various designers the opportunity to use new and better materials, resulting in cost savings, increased efficiency, and better resource

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Mr. Ashish Ashok Kadam Mr. Meet Manoj Sheth	Gear Application	utilization. Composite materials are being used in a variety of industries, including aerospace, automobiles, and manufacturing. The importance of materials in modern world can be realized from the fact that much of the research is being done to apply new materials to different components. However, it is natural for a design engineer to rely on trusted and tested materials, but now the world is changing. Today composite materials have changed all the material engineering. The evolution of composite materials has given an opportunity to various designers to use new and better materials resulting in cost reduction, increase in efficiency and better utilization of available resources. Composite materials are finding their applications in aerospace industry, automobile sector, manufacturing industries etc. This Project presents design method and analysis of mechanical properties of composite materials for gear application. The goal of this thesis is to use composite material gear applications. The selection of matrix material and filler material to develop polymer composite material for high performance applications. The parameters like material cost, wear properties, and thermal properties, as well as surface properties, are considered when choosing a material; the behavior of materials is considered nonlinear isotropic. The tensile strength analysis, compression analysis, flexural and modal analysis are preconformed for this study. The experimental study is not successful after some efforts, due to unavailability and technical issues in the experimental facilities.
Mr. Kadapa Saud Ahmed Khawjabhai Mr. Kazi Yahya Sharik Mr. Khadpolkar Arbaz Ayub Mr. Tambe Nahid Nisar Ahmed	Experimental investigation and analysis of polyester- glass fiber- rice husk hybrid composite	A composite material is a combination of two are more material with different physical and chemical properties. When these two or more materials are combined, they create a material when is more stronger and lighter. They can also increase strength and stiffness. They can also increase strength and stiffness This project contains the details about the analysis Composites. The composites have good mechanical properties. This project deals with the composites made with the calculated combinations of polyester, glass fiber and Rice Husk . The composite is prepared using Compression Molding Process and the analysis is done by conducting flexural test, tensile test, izod impact test and Rockwell hardness test.

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Mr. swapnil ashok kamble Mr. pramod subhash pimpalkar Mr. ibrahim arib pagarkar Mr. faeez mullaji	Study of polymer composite gear	Polymer gears are used in power and motion transmission work under different loads and speeds. Polymer gears find an edge over metals owing to its accuracy and finish but are severely influenced by loading rate. A polymer composite is a multi-phase material in which reinforcing fillers are integrated with a polymer matrix, resulting in synergistic mechanical properties that cannot be achieved from either component alone. Polymer composites are polymer materials with a reinforcement, in which the polymer acts as a matrix resin that penetrates the reinforcement bundles and bonds to the reinforcement. Polymer composite materials are used mainly in automotive and aerospace applications, and this chapter focuses on automotive polymer composites, the most common of which is polyester polymer resin. These polymers are typically combined with glass fibers and have particular characteristics, including cycle times less than 2 min, service use temperatures of 60-70?C, and use of lower cost glass fiber and resin materials, among others. The chapter discusses the chemistry, polymerization methods, properties, products, and characteristics of polymer composites, which can use either thermoset or thermoplastic polymers. This study includes polymer gear analysis at different conditions. Finite element analysis is performed for this study. Experimental analysis is not performed due to technical difficulties in processing facilities.

Major project abstract, Academic year: 2022-23

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Mr. Prabodhan Anil Gamare Miss. Samidha Santosh Shinde Mr. Pranay Chandrakant Jadhav Mr. Saurabh Sadanand Lad	Transmission System of BAJAATV	Our objective was to design, engineer, build and test Power transmission, Suspension system of an ATV (All-terrain vehicle) within the limits of the rules of SAE (Society of Automotive Engineers) India. This study presents the design methodology, design analysis processes and mathematical study of these systems designed for engineering design competition of BAJA SAE India 2018, which is a national ATV design competition organized by SAE India. Considering difficult track and off-road environment for an ATV, various test conditions are incorporated such as different impact tests, Traction test, manoeuvrability test, Acceleration and Brake test to get the design parameters for the competitive performance and around those parameters designing is done for the ruggedness over rough terrain with reliable performance in a cost-effective manner. This design is then implemented and tested for the required performance parameter. The goal was to achieve reliable performance, durability, market-ready and maintainable systems which conform to each other to give our ATV a versatile driving capacity and make it suitable for economic production. As a result, we were able to achieve the maximum Speed of 50 km/hr. with 70% grade ability, 300 mm ground clearance with 362 mm center of gravity, turning radius of 1.85 meters and stopping distance of 3-4 meter.
Patne rutik nilesh Zujam vivek vasant Rane manthan ankush Baviskar suyog kailas	Solar power utilization for heat storage	Solar energy is the most available, clean, and inexpensive source of energy among the other renewable sources of energy. Solar energy it is a source of energy which have high intensity. This high solar radiation could be utilized to produce steam and then could be used to produce electricity. This work was deal with utilization of sunlight with the help of convex lens to produce steam. The solar collectors using lens to concentrate heat from the sun upon the receiving tank to produce steam. This work deals with experimental steady to determine the performance utilization of sunlight through lens to produce steam for various reasons. The results of this work produce steam at temperature 200 ?C+. Solar steam generation with low-cost and excellent energy efficiency is of great significance for alleviating an energy crisis, reducing water pollution and promoting seawater desalination. However, there are still numerous challenges for solar steam generation system to practical energy utilization. We studied a series of effecting factors for solar

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		steam generation.
Mr. Mhadlekar Gaurav Ganesh Mr. Padyal Vaibhav Vijay Mr. More Yash Pravin Mr. Pawar Aniket Anant	Effect of multi-walled carbon nano tube on mechanical behaviour of GLARE	The present research work has been undertaken with an objective to fabricate the combination of sandwich structure-AA/GF/AA. Sandwich structures are new type of composite materials which could improve the defects of traditional composites in ductility, formability, impact and damage tolerance. In this research work Multi- walled Carbon Nano Tubes (MWCNT) is used as nano filler that is dispersed with the Epoxy resin at different percentage of weight like-3%, 4% and 5%. The fabrication of samples is done with the help of hand layup technique which is a cost effective method. Dispersion of nano filler (MWCNT) particles in resin simply improves the mechanical properties, electrical and flame retardant properties of the sandwich materials. Macro characterization of sandwich structure is done with the help of numerous mechanical tests like-tensile, flexural, izod impact test. The formability parameters and mechanical properties are determined from the tests performed.
Lodhi fulchandra ramdev Mali raj ramesh Mali sahil ramesh More rushikesh shankar	Development of 3d printing filament using waste plastic	The main purpose behind this project is "Development of 3D printing filament by using waste plastic". In recent times , the issue of plastic recycling has become one of the leading issues of environment protection and waste management . The objective of this research is"Using plastic waste to create 3D printing filaments". Polymer materials are used in many years in many areas of daily life and industry. With their long - term use, the problem of plastic waste arise as they become persistent harmful waste after they cease to be used . Environment pollution by recycling plastic waste and provide a cost-effective alternative to traditional 3D printing filament . The process involves shredding and melting plastic waste waste, extruding the molten plastic into filaments, which are then wound onto spools. The resulting filament were then tested for physical properties such as tensile strength, elongation at break , and uniformity of selection . The study concluded that plastic waste can be effectively used to produce 3D printing filaments with properties comparable to conventional filament. This approach has the potential to significant reduce the amount of plastic waste in the environment, while providing a sustainable source of 3D printing . filament can be made from various waste plastic such as PET, ABS , PLA . The end product meet the quality standards required for 3D printing .This approach offer

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		viable solution toenvironment and economics challenges , turning waste into a valuable resource for the 3D printing industry . Quality control measures and testing methods used to ensure consistency and reliability of the final product are also discussed. Using waste plastic to produce 3D printing filaments has potential to revolutionize the 3D printing and contribute to a more sustainable future.
kazi zubair mustkim mukadam mohammad kaif noor shaikhnag ashar khalid bavdhane tejas tukaram	Design, analysis and assembly of atv braking system and steering mechanism	All-terrains-vehicles (ATV) are largely used in forest working and patrolling,supporting rangers and many other workers. Now a days even in racings. A titanic factor in handling of any vehicle is making it come quick and easy stop. It is prerequisite to retard the vehicle in order to get over all control by driver. The very first vital part is to select the one perfect mechanism to actuate the brakes. Even though there are numerous mechanisms for actuating brakes hydraulically actuated disc brakes have been used for both front and rear. The safety while braking is first and foremost and reckoned by evaluating mathematical model of braking. The evaluation of models is done by calculating various braking parameters such as applicable forces under certain circumstances. The data used to achieve average values of design parameters, making the theoretical calculations as realistic as possible. The work emphasis design of braking system, includes numerous mathematical calculations, CAD designs and analysis of various components to achieve optimum, yet effective braking.
Mr. Kalekar Nivrutti Vasant Mr. Lohar Anuj Anil Mr. Mankar Pranit Prakash Mr. Nachankar Abhishek Chandrakant	Redesign And Analysis Of Suspension System For An All Terrain Vehicle (ATV)	In this report our work was to study the static and dynamic parameter of the suspension system of an ATV by determining and analyzing the dynamics of the vehicle when driving on an off road racetrack. Though, there are many parameters which affect the performance of the ATV, the scope of this paper work is limited to optimization, determination, redesign and analysis of suspension systems and to integrate them into whole vehicle systems for best results. The goals were to identify and optimize the parameters affecting the dynamic performance suspension systems within limitations of time, equipment and data from manufacturer. In this project we will also come across the following aspects a. Workout the parameters by analysis, design, and optimization of suspension system. b. Study of existing suspension systems and parameters affecting its performance. c. Determination of design parameters for suspension system.

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Indraneel Kishor Phadke Shubham Hemant Bhagwat Chinmay Prashant Bendarkar Saurabh Narayan Patil	Experimental comparison of pcm through solar fish dryer	This project aims to investigate and compare the performance of different Phase Change Materials (PCMs) in a solar fish dryer system. Fish drying is a traditional preservation method, and solar dryers offer an environmentally friendly and cost-effective alternative to conventional drying methods. The incorporation of PCMs in solar dryers has shown promising potential in enhancing the drying efficiency and preserving the quality of dried products. The study involves designing and constructing a solar fish dryer prototype equipped with PCM containers. Various PCMs with different melting points and thermal properties will be tested to assess their impact on the drying process. The dryer's performance will be evaluated based on parameters such as drying time, moisture removal rate, temperature distribution, and fish quality attributes like color, texture, and nutritional content. Experimental trials will be conducted under controlled conditions using different PCM configurations and solar radiation levels. Data on drying kinetics, energy consumption, and fish quality will be collected and analyzed. The results will provide insights into the effectiveness of PCM utilization in solar fish dryers and identify the most suitable PCM for efficient and sustainable fish drying applications. The outcomes of this research will contribute to the development of improved solar drying technologies for the fish industry, promoting energy efficiency, reduced post-harvest losses, and enhanced product quality. The findings will serve as a valuable reference for researchers, engineers, and policymakers interested in the advancement of sustainable food preservation methods utilizing solar energy and phase change materials.