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DEPARTMENT OF MECHANICAL ENGINEERING

Major Project Abstracts

Academic year: 2020-2021

Project coordinator- Dr.V.R.Khalkar

Academic year: 2020-2021

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MAJOR PROJECT ABSTRACTS

Academic year: 2020-2021

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Vishal Dilip Telange Ankur Anil Lohar Kalpesh Narhari Thakur Rahil Aslam Maniyar	Rocker bogie mechanism	NASA recently started an ambitious exploration program of Mars. Pathfinder is the first rover explorer in this program. Future rovers will need to travel several kilometres over periods of months and manipulate rock and soil samples. They will also need to be somewhat autonomous. Rocker-bogie based rovers are likely candidates for these missions. The physics of these rovers is quite complex. To design and control these, analytical models of how the rover interacts with its environment are essential. Models are also needed for rover action planning. Simple mobility analysis of rocker-bogie vehicles have been developed and used for design evaluation. In the available published works, the rocker-bogie configuration is modeled as a planar system. Improving the performances of a simpler four wheel rover has also been explored. In this work, actuator redundancy and the position of the center of mass of a vehicle (the Gophor) is exploited to improve traction. The method relies on real-time measurements of wheel/ground contact forces, which are difficult to measure in practice. Traction can also be improved by monitoring the skiding of the rover wheels on the ground. However, detailed models of the full 3-D mechanics of rocker-bogie rovers have not been developed. Further models including the manipulator's influence are also required to effectively planning and controlling the actions of these rovers. For example it is important for a planner to be able to predict if a rover can successfully negotiate a given terrain obstacles, such as a ditch, without being trapped. This paper describes a physical model of a rocker-bogie rover, the Lightweight Survivable Rover (LSR-1). An efficient method of solving its inverse kinematics and its quasi-static force analysis is outlined. The methods include the effects of the rover's manipulator, actuator saturation and tire-slip considerations. A graphical interface that enhances the understanding of the physics of the model is also described.
Asim abdul sattar antule Yakub khalil dabilkar	Design & fabrication seat lift assist	The young ones have a good strength to get over the muscular pains whereas the elders face a lot as there is an increase in age, which makes it difficult for the elders lately to have good muscular joints. The struggle

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Abdullah irshad anwari Tuffel abdul hamid pathan		they face while getting up from a sitting position is the main complexity. To make it easier for elders & to make them lift so easily from a sitting position Seat Lift Assist is the upshot which will work for them. The seat lift assist includes a piston-cylinder arrangement which runs through hydraulics. When the individual sits on it, the lift is in a steady position. Further, when the individual tries to get up from the seat the hydraulics functions over there and gives a little push to the individual, which reduces the struggle they used to face while getting up. This mechanism allows for an efficient push with the seat lift assist.
Mr. Ratnesh Sunil Remje Mr. Aetikaf Saeed Chougule Mr. Sarvesh Suresh Chavan	Studies on the effect of crack geometry on mode shapes of crack cantilever beam	Structures are weakened by cracks. When the crack size increases in service, the structure becomes weaker than its earlier condition. Lastly, the structure may breakdown due to a small crack. Therefore, crack detection and classification is a very important issue. Many aspects of defects have already been dealt with, but with the wider applications of non-destructive testing methods to structural materials. However, the effect of arbitrary and random defect geometry on the applicability of these methods has been overlooked. So as to investigate this issue, this study carries out a free vibration analysis of a cracked cantilever beam. A new crack model, unlike the widely known Vshaped crack, is introduced and the effects of the crack geometries on the mode shapes are investigated, both theoretically and numerically. A code is written in MATLAB to the get the natural frequencies and mode shapes for all cracked cases of beams. The mode shapes results obtained from both the new (Rectangular) and the V-shaped models are compared with each other, and it is found that the results are less sensitive to the geometry change.
Shubham dasharath kuvalekar Yogesh nanaso patil Darshan deepak khapare Pratik prashant bhoir	Crop cutting and laying machine	Agriculture plays a vital role in Indian economy. India is a country which is dependent on farming as a main source of income for many families. As far as Indian scenario is concerned, more than 75 percent farmers are belonging to small and marginal land carrying. So any improvement in the productivity related task help to increase Indian farmer's status and economy. Now a day's agriculture equipment have lot of limitation and it required more energy to operate. The purpose of the project is to study and enhance the design specifications of harvesting machine for multipurpose crop which should be helpful for the farmers having less & marginal land. Further, the comparative study of

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		harvesting from manual method, machine method and proposed machine method is discussed. It is observed from the results that, the proposed machine method shows reasonably good result when compared manual method and machine method. [1] This project tends to provide the design and development of cutting mechanism and crop collecting mechanism used for crop harvester machine. The current situation in our country the traditional use of harvesting mechanism is more tedious, time consuming and not able to develop the agricultural sector of the low farmers in economic. Developed cutting mechanism in this project has two sets of blade which cut the crop in a scissoring type of motion. A simple crank and slotted lever mechanism used to provide reciprocating action to cutting blades. The stalks are cut with the impact and shear forces at the linear velocity by cutting blades. This system has a crop collecting mechanism guiding the whole-stalk to one side of machine to stop being crushed under tires and for easy collection. Reciprocating blades have better cutting force and energy consumption reduction performance than ordinary rotary blades. [7]
Sahil Rajesh Gaikwad Mohd. Ramiz Riyaj Dange Safwan Ibrahim Mahadik Maruf Irfan Chougle	Design and fabrication of electric kick scooter	The idea of this project is to build an electric scooter which can overcome the problems like traffic congestion and pollution in large cities. Due to the hitherto dominant paradigm of urban transport based on petrol and diesel vehicles, the inhabitants have to cope with air and noise pollution, traffic, sedentary lifestyle and other factors that decreases the comfort and the quality of life. The concept of Electric Kick Scooter is based on the human machine interface. The human exertion is assisted with the help of electrical energy, which makes it easy to use. It is also lightweight, easy to carry and most importantly it is eco-friendly. Kick scooters are becoming more popular, not only among children and youth, but also among adults. riding kick scooter can be considered as a sport activity, but also as an ecological and physical activating means of mobility. Our Electric Kick Scooter is consists of common features like foldability, USB phone charging, compact size and specifications like motor power, batteries etc, with strong, durable and light weight body. Since we have decided to build a scooter for short distance and indoor transport so the objective of this project are to reduce the product cost and optimize the features and specification, providing complete safety and a comfortable riding experience.

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More Rohit Bhagavan Niwate Sanket Santosh Pawar Aniket Jitendra Satpute Mayuresh Gajanan	Waste Heat Utilization from Domestic Appliances	Domestic appliances like refrigerator and air conditioners are widely use to preserve the food and to control the inside room conditions in various weather conditions respectively. When AC is tuned on unequivocally it diminishes the excruciating ambiance of the room, in spite of this fact, it exhalesbalmy air outside the expanse resulting in escalation in temperature in vicinity of the cubicle. If we somehow manage to utilize that waste heat, then ultimately the COP of the system will increase and also the power consumption will decrease. So, to design a system must have a heat storage device with a material which will absorb the waste heat and releases it for the other purposes. To get this desired effect we use the Phase Changing Materials as they have the required properties.
Shreyas Deepak Ghosalkar Gaurav Uday Otari Saurabh Shailendra Shinde Shubham Gajanan Vaidya	Design and fabrication of proton exchange membrane fuel cell	Due to demand of energy in world during energy deficiency, Proton Exchange Membrane or Polymer Electrolyte Membrane Fuel Cell, commonly known as PEM Fuel Cell has proven to be a promising outcome from the current researches. It is a proposed alternative proving itself efficient on grounds of energy production in safer and economical way, for sustainable development of environment. In the current situation, with the rapid economic development in populous countries like India, they suffer with deficit of energy with an unabridged gap in supply and demand. This has led India to look for alternatives of fossil fuels and there comes entry of Fuel Cells. Fuel cells are having a variety of usage in all sectors; industrial, commercial and residential. Later with use of different kind of fuel cells, a conclusive product came from a good research providing PEM Fuel Cells, as a promising solution to the development of fuel cells and energy market. With the current research, the technology of portable power, both stationary and transportation will come soon into existence, adding on to the current valuable uses of PEM fuel cell like passenger vehicles, telecommunication, remote power. With India moving on from carbon fuels to hydrogen fuels to fair extent and the possible availability of hydrogen from various sources, PEM fuel cell technology can add considerable number of bricks to construct a bridge to cover the demand and supply energy gap. The purpose of this project is to demonstrate the working of such technology by creating a small prototype and to try

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		finding out the power output of the pilot scale technology using appropriate formulae. We further aim to study the other attempts in providing an alternate material for the membrane in our PEM Fuel
Suraj Rajaram Utekar Shubham Sandesh Shetye Nitesh Dipak Kondalvilkar Amit Vishwanath Sutar	Investigation polymer nano-material gear	It was planned to develop polymer matrix composite through Poly aryl ether ketone blends and multiwall carbon nanotubes (MWNT) by melt-mixing technique with improved mechanical properties which can be utilized for several potential applications. The specific objective of this work is to study the effect of MWNT as nano filler in the presence of polymer matrix on the mechanical properties of the polymer based nano composite materials. It is envisaged that a polymer layer adsorbed on the MWNT surface may improve mechanical properties due to good adhesion between the filler and the matrix material. Few characterization techniques are utilized to study the advanced nano material. Crystallization and phase change behavior of PA6/Hytrel blends and MWNT studies through differential scanning calorimetry (DSC). Mechanical properties are studied with the help of dynamic mechanical thermal analysis (DMTA) and tensile testing methods
Tushar Subhash Gurav Siddhesh Ashok Mane Sanket Prakash Gurav Shubham Krishnakant Kadam	High Entropy Alloys for Light Weight Application	Nowadays light weight HEAs had become hot topic in material science showing excellent properties for potential application in structural and transportation sectors. While making, if synthesize the light weight HEAs easily form intermetallic compound rather than solid solution. Material selection and manufacturing strategy and they are directly affects on properties of light weight HEAs In this overcome these difficulties to attain desirable properties like high strength, low density, high resistance, etc. by using proper way of selection of materials, these synthesis and criterion single phase solid solution microstructure. We select this project with main aim that is research about light weight HEAs and fabricate to achieve superior properties which take material science upper level.
Ansari asif abdul qayyum Chiplunkar kamil khalil ahmed Tambe shaizad	High entropy alloys for high temperature application	In the developing world high entropy alloys having high temperature applications has become hot topic in the material science. We selected W,Nb,Mo,Ta and V elements and produce refractory HEA with near equiatomic concentrations with the help of vacuum arc

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salim Wagle zaid zikriya		melting process we found that exceptional micro hardness in these alloys is greater than any individual constituent. We select this project with main aim that is research about HEAs for high temperature applications and fabricate to achieve superior properties which take material science upper level
Arbaz Aslam Kundlik Talha Abdurrauf Meerkar Abrar Mohammed Hajwani Muaaz Mukhtar Hafiz	Design and fabrication of portable table using natural fiber reinforced composite material	A portable table is a type of portable furniture, a table with legs that fold up against the table top. This is intended to make storage more convenient and to make the table more portable. Many portable tables which are available in market are made up of lightweight materials to further increase portability. This table is available in market in material like wood and aluminum and in this project, there is use of Natural fiber reinforced composite to build the table. Composite material is a material produced from two or more constituent material with notably dissimilar chemical or physical properties that, when merged, create a material with property, unlike the individual elements. Natural fiber are the fibers which are widely used in Natural fiber polymer composites (NFPC) which are a composite material consisting of a polymer matrix embedded with high-strength natural fibers, like jute, oil palm, coir, rice straw, baggase, sisal, kenaf, and flax, etc. Thus this project describes by merging the matrix and fiber a economical and high strength portable table can be fabricated. Project also described the analysis on the composite material built
Mate aditya chandrakant Pechkar mohmmad rihan niyaz Pevekar saqlain akbar Utekar rajesh dilip	Design and fabrication of window cleaning machine	Window cleaning machines are developed to cater to the demands of the building maintenance sector. The ability to climb vertical surfaces is one of the crucial requirements of a window cleaning machines. Machines that can climb vertical surfaces by adhesion to a surface are preferred since those do not require additional support structures. Vacuum suction mechanisms are widely used in this regard. The suction force acting on the robot due to the negative pressure built up is used by these machines for the adhesion This report proposes a design for a window cleaning machine that is capable of adapting vacuum power based on the adhesion-awareness to improve safety and reliability. A fuzzy inference system is proposed here to adapt the vacuum power based on the variation of the adhesion and the present power setting of the vacuum. Moreover, an application of fuzzy logic to produce a novel controlling criterion for a window

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		cleaning machine to ensure safety and reliability of operation is proposed. The design details of the machine are presented with due attention to the proposed control strategy. The limitations of the work and future design suggestions are also discussed.
Kailas .g. helgaonkar Ashirwad .m. jogale Asmit .a. kamble Siddhesh .s. pimpalkar	Design & fabrication of gear testing machine	Gear wear is sometimes the dominating problem in engineering. Wear testing of several gears with different testing parameters and methods is time consuming and expensive. For different testing parameters and method different test rig is required. A test rig has been designed to test different diameters gears under controlled conditions, with different testing parameters and methods. The test rig is specially designed for wear testing. Test rig can test different gears like polymer, composite with different manufacturing errors and different design parameters. In addition the rig can be used to test gear life under wet condition with temperature, Torque, and Rpm. By modification in loading mechanism the construction of test rig is suitable for Metal gears also.
Lambade amir majeed Gavade vishwajeet vilas Ritik vijay mohite Parab pratik shridhar	Experimental setup for carbon capture	The carbon capture also known as CC plants started in European countries in 1990. The prime objective of these research and development is to find an alternate and renewable fuel source. The idea came into action as a result of a reminder that the fossil fuel on the under the planet's surface won't last for a very long time. These researches and developments (i,e: R&D's) are co-funded by E U (i,e: European Union). These plants are still not globally acclaimed. For their global acceptance and large deployments further R&D's are required to reduce cost and the efficiency penalty and rigorous demonstration program to test existing and developing technologies and their integration and to demonstrate their long-term operational availability and reliability. As there are still concerns about long term safety of underground CO2 (carbon dioxide) storage.There will be 35-90 % higher advanced technologies used in it and also increase of 30-50% in operating cost.
Mr. Vaibhav Pappu Dalvi Mr. Aditya Rajesh Dandekar Mr. Asad Aslam Logde	Some Studies On The Vibration Characteristic Of Multi Degree	Torsional vibrations occur in the punching presses, motor-generator set and internal combustion engines. Rotating systems at running speed near the natural frequencies are prone to excessive angular deflections and hence large stresses which can cause rotating components failure or premature fatigue failures. The

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Mr. Shahid Shabbir Shaikh	Freedom System	objective of the present work is to study the torsional vibration characteristics of multi-rotor and gear-branched systems using finite element method. Finite element method (FEM) is a numerical technique based on principle of discretization to find approximate solutions to engineering problems. The information about the natural frequencies for rotating systems can help to avoid system failure by giving the safe operating speed range. In the present work, Holzer method has been used to find these natural frequencies for different possible cases of multi-rotor and gear-branched systems. The various mode shapes for several cases are also shown to illustrate the state of the system at natural frequencies. The results obtained have been compared with FEA results to study the effectiveness of the Holzer methods for such systems.
Saish Prakash Kadam Ashish Dilip Khambe Sunny Deepak Sonawane Sumit Sayaji Tambe	Design and fabrication of segway hoverboard	The Segway Personal Transporter is a small footprint electrical vehicle designed by Dean Kamen to replace the car as a more environmentally friendly transportation method in metropolitan areas. This project deals with the design and fabrication of an electrically powered stand-up scooter called three wheeled Segway which has higher degree of freedom than normal vehicles and can be used as a personal transport in urban environment. Most commonly used segway is the two wheeled self-balancing Segway, which is known for its zero-turn radius. The three version is just like the two-wheel one. The only difference is that it replaces complex electronics like accelerometer and gyrometer with a simple swivel wheel (the third wheel) making it more stable, economical and fail-safe. This vehicle uses two wheeled driver wheels to control the motion and a swivel wheel for balance. The third wheel obstruct the smooth movement of the Segway which can be minimized by providing spring which will help in absorbing shocks experienced by the vehicle and provide smooth movement.

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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

Name of the students	Title of the project	Abstract
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.