

Analysis and Testing of Water Heating Gas Geyser System

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Abstract

Water heating can be attributed as the second largest energy used in the homes can account for nearly a quarter of household energy consumption. Home residents depends on a reliable and sufficient supply of hot water for multiple uses in the home and they increasingly aware of the energy and carbon implications of different hot water systems which reduce monthly expenses and at same time provide reliability and comfort. Gas geysers are one such device which are energy efficient and economical at same time.

The basic idea is to analyze the change in amount of heat transfer and calculating overall efficiency of a gas water heater by making small changes in the design of the heat exchanger of a gas geyser. Heat flow through a gas geyser was calculated firstly without use of economizer and then experiment was again performed with same variable after addition of the economizers, so as to calculate effect in heat flow.

The calculations and results are integral part of the report; first chapter of the report is dedicated to introduction of gas geyser and its mechanism, followed by objectives of the project. Then after to take observations and plotting graphs of the result to make complete analysis of system

RTS Launcher

Mr. Pratik Kadam

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Name of Guide: Mr. Prasad Bapat

Abstract

The purpose of this project is to develop, design and fabricate a projectile launcher that can be used as a safety equipment on the sea coasts. The potential energy stored in a compressed spring can be converted into kinetic energy by suddenly releasing the launching material.

This project is completely based on a mechanical force actuator i.e. spring hence no external power supply like electricity or hydraulic mechanism is used. Finally, the idea of frictional losses through mechanical interfaces can be reinforced by examining measured and theoretical results. The results will show a relationship match between the theoretical and measured distance values.

The number of deaths due to drowning on the sea coast are very high. The present safety measures on the sea coast are not adequate. Also there is no advanced machinery available to save the drowning person/s. For a country like India which has been blessed with a huge coastline of approximately 7550 kms but has very inadequate human safety measures on the coasts. The amount of human deaths on the sea coasts due to insufficient provisions for the human rescue in the cases of accidents are very high. In some of the cases it is seen that the person who is trying to rescue a drowning person also had to lose his life due to worst environment conditions as well as less experience of swimming. As we being the mechanical engineers and also being the part of this huge society it is our prime responsibility to use our technical knowledge for the betterment of the people. Thus we thought of making this project.

DESIGN AND ANALYSIS OF COMPOSITE LEAF SPRING

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Mr Israr Asif Qazi

Mr Abhijeet Dattaram Warankar

Name of Guide: Mr. Rajnitu Rakshaskar

Abstract

The leaf spring is widely used in automobiles and one of the components of suspension system. It needs to have excellent fatigue life. As a general rule, the leaf spring must be regarded as a safety component as failure could lead to severe accidents. This present work describes static and fatigue analysis of a modified steel leaf spring of a light commercial vehicle (LCV). The dimensions of a modified leaf spring of a LCV are taken and are verified by design calculations. This project describes design and experimental analysis of composite leaf spring made of glass fiber reinforced polymer. The objective is to compare the load carrying capacity, stiffness and weight savings of composite leaf spring with that of steel leaf spring. The design constraints are stresses and deflections. The dimensions of an existing conventional steel leaf spring of a light commercial vehicle are taken. Same dimensions of conventional leaf spring are used to fabricate a composite multi leaf spring using E- Glass/Epoxy unidirectional laminates. Static analysis of 2D model of conventional leaf spring is also performed using ANSYS 10 and compared with experimental results. Finite element analysis with full load on 3-D model of composite multi leaf spring is done using ANSYS 10 and the analytical results are compared with experimental results.

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HUMP OPERATED POWER GENERATION

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Mr. Panchal Prayag Dhondu

Mr. Shinde Sarvesh Sudesh

Mr. Tharkar Rohit Basavant

Name of Guide: Mr. Anand Patange

Abstract

Energy is the primary need for survival of all organisms in the universe. Everything what happens in the surroundings is the expression of flow of energy in one of the forms. But in this fast moving world, population is increasing day by day and conventional energy sources are lessening the extensive usage of energy has resulted in an energy crisis over the few years. Therefore to overcome this problem we need to implement the techniques of optimal utilization of conventional sources for conservation of energy. This project includes how to utilize the energy which is wasted when the vehicle passes over a speed breaker. Lots of energy is wasted when vehicles passes over a speed breaker as power generating unit. The kinetic energy of the moving vehicle s can be converted into mechanical energy.

This project attempts to show how energy can be produced, stored and used using the road transport pressure or any kind of pressure. The number of vehicles passing over the speed breaker in roads is increasing day by day. There is possibility of tapping the energy and generating power by making the speed breaker as a power generation unit. The generated power can be used for the lamps near the speed breakers and this will be a great boon for the rural villages too.

Design and development of sandwich composite using Eco - friendly material

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Mr. Mohammedali Muzammil Shaikh

Mr. Ajinkya Sunil Shinde

Name of Guide: Mr. Rajnitu Rakshaskar

Abstract

The composite materials constitute a significant portion of engineering materials ranging from every day product like door windows to sophisticated product like aircraft and space application. The biggest advantages of use of composite materials are due to their high strength, low weight apart from other properties like good corrosion resistance, low densities, low thermal conductivities & electrical conductivities, absorption of energy in shock and vibration and finally aesthetic color effect. The material design can be tailor made to specific application and properties requirements. Thus, the composite material offers wide business opportunity in all sectors of industries Environmental awareness today motivating the researchers, worldwide on the studies of natural fiber reinforced polymer composite and cost effective option to synthetic fiber reinforced composites. The availability of natural fibers and ease of manufacturing have tempted researchers to try locally available inexpensive fibers and to study their feasibility of reinforcement purposes and to what extent they satisfy the required specifications of good reinforced polymer composite for different applications. With low cost and high specific mechanical properties, natural fiber represents a good renewable and biodegradable alternative to the most common synthetic reinforcement, i.e. glass fiber. The stiffness and strength shortcomings of bio composites can be overcome by structural configurations and better arrangement in a sense of placing the fibers in specific locations for highest strength performance. Accordingly extensive studies on preparation and properties of polymer matrix composite (PMC) replacing the synthetic fiber with natural fiber like rice husk, areca fiber, coconut shell and bagasse etc were carried out.

Fabrication and modification of Rice planting machine

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Mr. Vishal Nathuram Janvalkar

Mr. KetanDattatray Kamble

Mr. Tanmay Sanjay Kokate

Name of Guide: Mr. Balagouda Patil

Mr. Mahesh Kale

Abstract

Agriculture is most important sector of the Indian economy. Rice is primary and major crop cultivated in India. Traditional method is costly, time consuming and labour intensive work. To make the trans-planter system several attempt has been made to design and fabricate this machine. This study is focused on design analysis and fabrication of a manually operated rice trans-planter for small scale Indian rice cultivators. By achieving the goals like solving problems during planting, simplifying the mechanism, reduce cost and reduced weight of present rice trans-planter. The existing rice planting machine works on the electric motor or internal combustion engine attached to machine. We introduce the rice trans-planter machine that is work on manual operation. In existing machine the rice crop are damages and machine is heavier. We are overcome the crop damages problem and instead of wooden base we using a fabric material to reduce weight of machine.

Ocean Wave Energy Generator

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Mr. Pranit Prakash Kalambate

Mr. Nikhil Milind Pawar

Mr. Siddhesh Pratip Sovilkar

Name of Guide: Mr. Ashish D. Chaudhari

Abstract

Ocean Wave Energy Generator is a device which converts the potential energy of wave into mechanical energy that is rotational motion. There are several techniques are used to convert the potential energy into mechanical energy and then in electrical energy. Typically technologies in used are terminators, attenuators, point absorbers, and overtopping devices. The ocean wave energy generator is new concept to generate the electricity. Generator having a rack and pinion which directly converts the potential energy into linear motion of rack and then rotational movement of pinion. In our project we were fabricate the prototype and test it at the ocean shore.

The calculations and results are integral part of the report; first chapter of the report is dedicated to introduction of ocean wave energy generator and its mechanism, followed by literature review. Third chapter is to define objectives of the study and experimental setup and result complete this thesis report.

Keywords- Different size floats, Torque, Power, Efficiency.

Inbuilt Greasing System in Heavy Vehicle

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Mr. Omkar Mahendra Dahivalkar

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Mr. Bhupendra Rajankumar Kushe

Name of Guide: Mr. Anand Patange

Abstract

This project deals with fabrication of semi-automatic greasing system which operated on vehicle air pressure. We modify hand operated grease pump with help of pneumatic actuator. Primary mover of our system is programmed with Arduino and Electronic circuit. After that we analyze the pressure losses in pipeline of air during operation and cost comparison also done with our system and current system. Our project is optimizing the total Greasing cost of Heavy Vehicle.

Keywords: Heavy vehicle, Greasing, Semi-automatic pump, pressure Analysis, Cost Analysis, optimize cost.

DESIGN AND FABRICATION OF GINGER JUICE EXTRACTING MACHINE

Ms. Supriya Dilip Parab

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Mr. Jalpen Nisharg Rajvant

Mr. Sanman Manohar Sawant

Name of Guide:Mr. Ashish D. Chaudhari

Abstract

The title of our project is “Design and fabrication of ginger juice extraction machine” which includes designing and fabricating a juice extracting machine that is operated by hand or manually. The juice to be extracted is of Ginger which is Hygroscopic (a substance that has a tendency to absorb the moisture back from the core) in nature as well as little acidic in pH scale.

Ginger juice: Health benefits and dietary tips. Possible health benefits include relieving nausea, loss of appetite, motion sickness, and pain. The root or underground stem (rhizome) of the ginger plant can be consumed fresh, powdered, dried as a spice, in oil form, or as juice. Our project is related to small scale industrial production where in the present time the ginger extract is produced using bare hands and a cloth material. Also in the current market there is small machines which are suitable for household purpose and heavy machines that has huge output. Heavy machinery is avoided due to financial issues and small machines cannot meet our requirement. The quantity of ginger juice extract by hand is relatively less and it takes lot of time. Also we know ginger is acidic in nature, this causes a light burning sensation when it comes in contacts human bare hands or skin and may cause skin irritation. In order to deal with the above problems, we are going to design and fabricate a ginger juice extraction machine

Keywords – *Designing, Fabrication, Extraction Machine, small scale industry.*

Design and development of sandwich composite using Eco - friendly material in powder form

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Mr. Pramod Mohan Chande

Mr. Prajyot Prakash Chavan

Mr. Raj Vijay Chavan

Name of Guide:Mr. Rajnitu Rakshaskar

Abstract

The composite materials constitute a significant portion of engineering materials ranging from every day product like door windows to sophisticated product like aircraft and space application.

The biggest advantages of use of composite materials are due to their high strength, low weight apart from other properties like good corrosion resistance, low densities, low thermal conductivities & electrical conductivities, absorption of energy in shock and vibration and finally aesthetic color effect. The material design can be tailor made to specific application and properties requirements. Thus, the composite material offers wide business opportunity in all sectors of industries Environmental awareness today motivating the researchers, worldwide on the studies of natural fiber reinforced polymer composite and cost effective option to synthetic fiber reinforced composites. The availability of natural fibers and ease of manufacturing have tempted researchers to try locally available inexpensive fibers and to study their feasibility of reinforcement purposes and to what extent they satisfy the required specifications of good reinforced polymer composite for different applications. With low cost and high specific mechanical properties, natural fiber represents a good renewable and biodegradable alternative to the most common synthetic reinforcement, i.e. glass fiber. The stiffness and strength shortcomings of bio composites can be overcome by structural configurations and better arrangement in a sense of placing the fibers in specific locations for highest strength performance. Accordingly extensive studies on preparation and properties of polymer matrix composite (PMC) replacing the synthetic fiber with natural fiber like rice husk, areca fiber, coconut shell and bagasse etc were carried out

EDUCTOR SYSTEM USE FOR AGRICULTURE PURPOSE

Mr. Sandesh K. Gidaye

Mr. Dinesh C. Mohite

Mr. Nilesh V. Nimbalkar

Mr. Mayur D. Parkar

Mr. Akshay V. Shinde

Name of Guide: Mr. Pradip P. Sharma

Abstract

The purpose of this project is to develop and design a eductor system that can be use as the safety process for the farmers for pestisciding the farm within a less time.This project is completely based on the eductors mechanism.The Eductor System is specialist technique used to control pore water pressure in low permeability soils such as very silty sands, silts, or clays with permeable fabric. Eductors are typically used to help stabilize the slide slopes and base of excavation in soils that would be difficult to dewater the wellpoints or deep wells. The fluid doing the work is termed the motive fluid, and the fluid being pumped is the suction fluid. The design of the eductor creates pressure differential allowing the fluid to flow naturally within the device-creating suction, mixing and pushing the liquid throughout the flow In past three years, 442 farmers and farm workers died after inhaling poisonous pesticides in India, a recent report by union health ministry revealed. Over 94% of the deaths were from Punjab (233) and Maharshta (183) and respectively from other states of India.

As per ancient techniques, farmer used to spray pesticide's in the farm manually which was dangerous and risky for the farmers health. In India, currently most of the farmers use venture process for spraying pesticides' in the farm.As this process is costly along with time consumed is also more. As it's cost is more all the farmers can't afford it. So that's why we are developing eductor system which is useful for farmer in all the way and the cost of the product is also cheaper then venture process.In short educator system makes the farmers work. i.e. pestisciding the farm easy.

EXTRACTION OF BIO-DIESEL FROM NON EDIBLE SEEDS

Mr. Shubham M Kulkarni

Mr. Aditya V Kesarkar

Mr. Tejas V More

Mr. Satyajeet M Patil

Name Of Guide: Mr. Vinayak Hiremath

Abstract

Biodiesel now a days is emerging as an alternative fuel which is a good replacement to the petroleum diesel. Biodiesel is mainly derived from fats and oils by different methods such as dilution, pyrolysis, micro-emulsification and transesterification. Simarouba oil biodiesel was prepared using transesterification process by optimizing the production parameters such as alcohol to oil molar ratio, catalyst concentration etc. Engine design also plays an important role as if it is improved it reduces fuel consumption and gives better performance parameters. In this thesis the main emphasis has been laid on optimum production of bio diesel from simarouba oil and then using the biodiesel blends with diesel studying the comparative exhaust emission characteristics and engine performance and also optimizing the compression ratio and the blends made from the biodiesel with diesel. Biodiesel added to the diesel at four different volume concentration i.e 10%, 20%, 30% and 40% of biodiesel. Based on the analysis of performance and emission parameters the biodiesel blend B20 was found optimum for the most efficient operation of the engine. The compression ratio 16.5 was found optimum.

Modification of the Machining Process of AC Fail Brake Motors and to Enhance the Productivity

Mr. Dhenkar Nabil Nazir

Mr. Khedekar Harshal Hemant

Mr. Shinde Vivek Vishwanath

Mr. Tawate Aditya Dhananjay

Name of Guide: Mr. P. V. Bapat

Mr. A. S. Biradar

Abstract

AC fail brakes stop or hold a load when electrical power is either accidentally lost or intentionally disconnected. In the past, some companies have referred to these as "fail safe" brakes. These brakes are typically used on or near an electric motor. Typical applications include robotics, holding brakes for Z axis ball screws and servo motor brakes. Brakes are available in multiple voltages and can have either standard backlash or zero backlash hubs. Multiple disks can also be used to increase brake torque, without increasing brake diameter. **Spring type** - When no electricity is applied to the brake, a spring pushes against a pressure plate, squeezing the friction disk between the inner pressure plate and the outer cover plate. This frictional clamping force is transferred to the hub, which is mounted to a shaft. The DAT 190 brake models are used in electric wire rope hoists, EOT Cranes, brake motors, material handling and lifting equipment, cross travel and Long travel: EOT / gantry / goliath / derrick cranes, lifts and elevators, winches and conveyors, and many such other applications. Pethe Brake Motors Pvt. Ltd. are manufacturers of electromagnetic clutches and brakes. Their products were recognized for best quality and cost effectiveness. Here, in this project, optimization of the production lead time by modification of the machining process is achieved by manual pen and paper method. The optimization process is supported by designing software – AutoCAD Civil 3D 2018, Flowbreeze 3 (Trial) – Microsoft Excel 2013 Add-on, CATIA V5, and Adobe Photoshop CC 2014.

SMART SAFETY HELMET

Mr. Bhuran Pranit Pradip
Mr. Dakve Sahil Rajesh

Mr. Chaudhari Kalpesh Nana
Mr. Dhenge Satish Laxman

Name of Guide: Mr. Prashant Bhise

Abstract

The number of two wheelers are growing, especially the craze among youngsters. The people are buying the two wheelers which are faster and powerful. In accordance with the growth of the number of two wheelers the safety factor also rises.

There a lot of accidents those are happening every day on the roads. These reason led to accident which result in body damage. So in order to minimise the accident hazards we came up with an idea that is SMART HELMET. The smart helmet will also bring awareness between people about wearing helmet.

PROJECT ON
**DESIGN & FABRICATION OF SEMI-AUTOMATIC
DISHWASHER MACHINE**

Submitted in partial fulfillment of the requirements

of the Degree of

Bachelor of Mechanical Engineering

by

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|-----------------------|-------|
| 1. Chaitanya V. Awate | MIS04 |
| 2. Raj R. Lakeshri | MIS42 |
| 3. Harshal S. Misal | MIS48 |
| 4. Jaydip M. Patil | MIS59 |

Under the guidance of

Mr. Prasad Bapat

Abstract

In India, Dish washing activity is manual process, involving considerable human efforts or with automatic Dish washing machines available in market which are expensive. Manual Dish washing activity requires more number of people and also it is time consuming process involving human efforts. Cost required for labour work is also considerably high. This project intends to solve the problems faced by many persons in their day-to-day life. Thus the attempt is to achieve solution of above problems with semi-automatic dish washing machine with objectives that it should minimize human efforts and should have low cost with less time consumption and must have all the basic mechanisms – washing with soda water, scrubbing with brush and rinsing in clean water. Main aim of semi-automatic dish washer machine is to reduce human efforts and time with its innovative simple design which is also environment friendly. A dishwasher is a low cost machine made up of easily and readily available parts in daily life. The model of semi-automatic dish washer machine is new concept, which in its one washing cycle does all the operations of conventional dish washing.

PROJECT ON
**Design & Analysis of Agitator Shaft in a Distillation
Reactor**

Submitted in Partial Fulfillment of the Requirements of the Degree of
Bachelor of Mechanical Engineering

by

- | | |
|-----------------------------|------|
| 1. Jayesh Suresh Chavan | M811 |
| 2. Sankalp Arvind Gad | M820 |
| 3. Vishwaraj Mahesh Ghadshi | M821 |

Under the Guidance of
Mr. Rajnitu Rakshaskar

Abstract

An agitator is a device or mechanism which is used for shaking and stirring process. There are several types of agitation machines, including washing machine agitators and magnetic agitators. Agitators can come in many sizes and shape, depending on the application. In general, agitators usually consist of an impeller and a shaft. An impeller is a rotor located within a tube or conduit attached to the shaft. Industrial agitators are machines used in industries that process products in the chemical, food, pharmaceutical and cosmetic industries, in a view of mixing liquids together, promote the reactions of chemical substances, keeping homogeneous liquid bulk during storage. They are devices used to stir or mix fluids, liquids specifically. Modern industrial agitators incorporate process control to maintain better control over the mixing process. Industry named "Excel Industries Pvt. Ltd." is chemical manufacturing and R&D based company. The industry uses agitator for mixing of various chemicals. There are 9 reactors used for distillation process and each consists of agitator device, so one agitator is failing within one and half month. Here, in this project we are going to do design and analysis of existing agitator shaft and proposed agitator shafts by using software Autodesk Inventor, CATIA V5 & ANSYS R15.0.

Keyword: Agitator, Design, Analysis, Inventor, Catia, Ansys.

A
PROJECT ON
**FEM ANALYSIS AND EXPERIMENTAL
INVESTIGATION OF VACUUM PUMP**

Submitted in Partial Fulfillment of the Requirements of the Degree of Bachelor of
Mechanical Engineering

by

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|--|----------------|
| 1. Mr. Bendre Shubham Vithal | (M805) |
| 2. Mr. Kacharekar Rushikesh Nandkumar | (M827) |
| 3. Mr. Malage Abhijit Rajendra | (M843) |
| 4. Mr. Theek Shivraj Sunil | (M879) |

under the guidance of

Prof. Vinayak S. Hiremath

ABSTRACT

Higher noise and vibrations were reported from a yarn quality-testing machine used in a cotton textile industry which is undesirable property of the any mechanical system. The vacuum pump of the system is identified as the source for noise and vibration from the field study of the textile industry. The present work is focused to identify the root cause of noise, vibration and making an attempt to suggest suitable modifications for the same root of cause of the vibration.

Preferably, an attempt has been made to find the natural frequencies of the unconstrained components of the vacuum pump and the vacuum pump assembly using Finite Element Analysis (FEA). After investigating the results from FEA, it is found that the blade pass frequency of the impeller (46 blades) incidentally coincides with the second natural frequency of the impeller at nearly 2150 Hz. Results from the Experimental Modal Analysis (EMA) of the impeller is used to validate the FEA results.

To avoid resonance conditions of the system, the second natural frequency of the impeller has to be shifted from 21500 Hz by at least 100 Hz on either side. The mass of the impeller is chosen to be varied as it is found to be more feasible and economical. The weight of the blades is increased by around 20 grams in such a way that the second natural frequency of the impeller was shifted by more than 150 Hz, which intern eliminates the resonance condition in the vacuum pump assembly which is the main goal of the present work.