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"Recent Advances in Mechanical Engineering"

on 24th & 25th February 2023

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Dr.P.Santosh Kumar Patra

(ICRAME-23)

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Department of Mechanical Engineering

2nd International Conference on
“Recent Advances in Mechanical Engineering”
(ICRAME-23)

ISBN No: 978-93-91420-29-1

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& Editor in Chief**

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Sri. M. LAXMAN REDDY
CHAIRMAN



MESSAGE

I am extremely pleased to know that the Department of Mechanical Engineering of SMEC is organizing Online International Conference on “Recent Advances in Mechanical Engineering” (ICRAME-23) on 24th and 25th of February 2023. I understand that the large number of researchers has submitted their research papers for presentation in the conference and for publication. The response to this conference from all over India and Foreign countries is most encouraging. I am sure all the participants will be benefitted by their interaction with their fellow researchers and engineers which will help for their research work and subsequently to the society at large.

I wish the conference meets its objective and confident that it will be a grand success.

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M. Laxman Reddy

M.LAXMAN REDDY
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Sri. G. CHANDRA SEKHAR YADAV
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MESSAGE

I am pleased to state that the Department of Mechanical Engineering of SMEC is organizing Online International Conference on “Recent Advances in Mechanical Engineering” (ICRAME-23) on 24th and 25th of February 2023. For strengthening the “MAKE IN INDIA” concept many innovations need to be translated into workable product. Concept to commissioning is a long route. The academicians can play a major role in bringing out new products through innovations.

I am delighted to know that there are large number of researchers have submitted the papers on Interdisciplinary streams. I wish all the best to the participants of the conference additional insight to their subjects of interest.

I wish the organizers of the conference to have great success.

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G. CHANDRA SEKHAR YADAV
Executive Director



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Dr. P. SANTOSH KUMAR PATRA
PRINCIPAL & GROUP DIRECTOR



I am delighted to be the Patron & Program Chair for the 2nd International Conference on “**Recent Advances in Mechanical Engineering**” (ICRAME-23) organized by the Department of Mechanical Engineering on 24th and 25th of February 2023. I have strong desire that the conference to unfold new domains of research among the Mechanical Engineering fraternity and will boost the knowledge level of many participating budding scholars throughout the world by opening a plethora of future developments in the field of Mechanical, Engineering. The Conference aims to bring different ideologies under one roof and provide opportunities to exchange ideas, to establish research relations and to find many more global partners for future collaboration. About 63 research papers have been submitted to this conference, this itself is a great achievement and I wish the conference a grand success.

I appreciate the faculties, coordinators, and Department Head of Mechanical Engineering for their continuous untiring contribution in making the conference a reality.

Dr. P. Santosh Kumar Patra
Principal & Group Director



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Dr. D.V. SREEKANTH
CONVENER & DEAN ADMINISTRATION



The world is always poised to move towards new and progressive engineering solutions that results in cleaner, safer and sustainable products for the use of mankind. India too is emerging as a big production center for world class quality. Mechanical Engineering has always played a vital role in this endeavor.

The aim of the 2nd International Conference on **“Recent Advances in Mechanical Engineering” (ICRAME-23)** being conducted by the Department of Mechanical Engineering of SMEC, is to create a platform for academicians and researchers to exchange their innovative ideas and interact with researchers of the same field of interest. This will enable to accelerate the work to progress faster to achieve the individuals end goals, which will ultimately benefit the larger society of India.

We, the organizers of the conference are glad to note that 63 papers have been accepted for presentation during this conference. Steps have been taken to publish these papers with ISBN number in the Conference Proceedings and all the selected papers will be published in Scopus / UGC recognized reputed journals.

The editorial Committee and the organizers express their sincere to all authors who have shown interest and contributed their knowledge in the form of technical papers. We are delighted and happy to state that the conference is moving towards a grand success with the untiring effort of the faculties of Department of Mechanical Engineering of SMEC and with the blessing of the Principal and Management of SMEC.

Dr. D.V. SREEKANTH
Professor & HOD, ME



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Dr. S V S RAMA KRISHNAM RAJU
DEAN ACADEMICS



MESSAGE

It gives me immense pleasure to know that St. Martin's Engineering College, Department of Mechanical Engineering is organizing 2nd International Conference on Recent Advances in Mechanical Engineering (ICRAME-2023). I am sure that this conference will provide a forum to national and international students, academicians, researchers and industrialists to interact and involve in Research and Innovation. Such academic events benefit the students, teachers and researchers immensely and widen the horizons of their knowledge and work experience in the field of Mechanical Engineering.

I sincerely appreciate the humble efforts of the Institute in providing a platform for students, academicians, researchers and industrialists to share their ideas and research outcome through the forum of this Conference.

I give my best wishes to all delegates and organizing committee to make this event a grand success.

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Best Wishes

Dr. S V S Rama Krishnam Raju

Dean Academics



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Dr. SANJAY KUMAR SUMAN
DEAN R&D



MEMESSAGE

Research, curiosity and discovery has been in existence ever since man's presence on this planet millions of years ago, civilization has been characterized by curiosity and discovery. Therefore, the curiosity to explore what will happen, how it happens, is there a better way to do it, has been the driving force behind all research efforts. During the past few decades, the engineering faculties have taken a number of initiatives to reorient the engineering machinery to play leading roles in the industrial development process.

I am delighted to acknowledge the “**2nd International conference on Recent Advances in Mechanical Engineering**” organized by the Department of Mechanical Engineering. I appreciate organizing team for showing their keen interest in organizing a successful conference to provide a platform for contributors to explore new ideas and exchange research findings among researchers. I thank the support of all students, authors, reviewers, conference team, faculty members, and conference Convenor for making the conference a grand success.

Best Wishes

**Dr. Sanjay Kumar
Suman**

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Design of 360-degree Wheel Rotation Vehicle

A. Satya Sai Ram¹, Dhanaraj Savary Nasan^{2*}, T. Thrinathreddy³, T. Yashwanth⁴, P. Suresh⁵

^{1,2,3,4,5} UG Scholar, Department of Mechanical Engineering, St. Martin’s Engineering College, Dhulapally,
Secunderabad, Telangana, India.

² Associate Professor, Department of Mechanical Engineering, St. Martin’s Engineering College,
Dhulapally, Secunderabad, Telangana, India.

* Corresponding Author

E-mail: drdhanarajme@smec.ac.in

ABSTRACT

The design and fabrication of 360-degree wheel rotation vehicle using DC motor and steering is done to reduce time to turn from one direction to other direction. This vehicle can move in all direction at a same position by used of steering, gears, DC motor, bearing and wheels. Main function of this vehicle is easy to move from one direction to other direction. Modern development and economical progression of Indian society resulted in increase of people on railway platform, increase of vehicle on the road, due to space constraints, in hospital is major problem of the country. Present study aims for development of a system to reduce the turning radius of vehicle. In this system at first vehicle is stopped and wheels are then turned in the required direction with help of steering system and DC motor. It has turning radius nearly equal to negligible of length of the vehicle itself. This vehicle used to carry the goods in various area such as, railway platform, hospital, industries, and market.

Keywords: Bearing, DC motor, Gears, Steering and wheels.

Development of Dual Axis Solar Tracking System

Gourav Roy^{1*}, G.Vidya Sagar², J. Ganesh Yadav³, S.Shiva Sai⁴, D.V. Sreekanth⁵

^{1,2,3,4,5} UG Scholar, Department of Mechanical Engineering, St. Martin’s Engineering College,
Dhulapally, Secunderabad, Telangana, India.

² Professor, Department of Mechanical Engineering, St. Martin’s Engineering College, Dhulapally,
Secunderabad, Telangana, India.

* Corresponding Author

E-mail: Gouravroy19@gmail.com

ABSTRACT

The goal of this project is to develop a prototype of a solar tracking system, which is able to enhance the performance of the photovoltaic modules in a solar energy system. The operating principle of the device is to keep the photovoltaic modules constantly aligned with the sunbeams, which maximizes the exposure of solar panel to the Sun’s radiation. As a result, more output power can be produced by the solar panel. The work of the project included hardware design and implementation, together with software programming for the microcontroller unit of the solar tracker. The system utilized a microcontroller to control motion of two servo motors, which rotate solar panel in two axes. The amount of rotation was determined by the microcontroller, based on inputs retrieved from four photo sensors located next to solar panel. At the end of the project, a functional solar tracking system was designed and implemented. It was able to keep the solar panel aligned with the sun, or any light source repetitively. Design of the solar tracker from this project is also a reference and a starting point for the development of more advanced systems in the future.

Keywords: Sun’s radiation, solar tracking, photovoltaic cells, Solar panel, Servo motors.

Development of Glass Fiber Reinforced Gypsum (GFRG) Hollow Bricks

G. Snehith¹, Ravinaik Banoth^{2*}, Jaswant S³, K. Prahlad Kumar⁴, M.S. Kiran Reddy⁵

^{1,3,4,5} UG Scholar, Department of Mechanical Engineering, St. Martin’s Engineering College,
Dhulapally, Secunderabad, Telangana, India.

² Professor, Department of Mechanical Engineering, St. Martin’s Engineering College, Dhulapally,
Secunderabad, Telangana, India.

* Corresponding Author

E-mail: dravinakme@smec.ac.in

ABSTRACT

A well-planned and socially inclusive city provides an unprecedented opportunity to transform its challenges like urbanization, management of infrastructure, etc. to a smooth sustainable transformation. The implementation a material technology like Glass Fiber Reinforced Gypsum (GFRG) in construction also links itself to the important Sustainable Development of providing affordable housing for all (besides its other possible applications). This technology involves greater thought in planning and rapid construction of quality eco-friendly homes. Thus, weighing the advantages, uses, and shortcomings of this gypsum composite material through key governing attributes, the technical, economic, and social implications of this perspective solution for mainstream construction challenges were theoretically discussed. Further, the reasons for its limited practice in the Indian industry, user satisfaction, and challenges in the incorporation of this technology were also studied and compared with the conventional methods of construction in our point of view.

Keywords: Eco-Friendly use, Easy and sustainable.

Development of Self Driving Car Using AI

G. Uday Kiran¹, L. Sunil^{2*}, K.Chanakya Goud³, S.Chandra Shekar⁴, and S.E.Prince Joseph⁵

^{1,3,4,5} UG Scholar, Department of Mechanical Engineering, St. Martin’s Engineering College,
Dhulapally, Secunderabad, Telangana, India.

² Assistant Professor, Department of Mechanical Engineering, St. Martin’s Engineering College,
Dhulapally, Secunderabad, Telangana, India.

* Corresponding Author

E-mail: sunilme@smec.ac.in

ABSTRACT

A self-driving car, also known as an autonomous vehicle (AV or auto), driverless car, or robotic car (robot-car) is a vehicle that is capable of sensing its environment and moving safely with little or no human input. Self-driving car combine a variety of sensors to perceive their surroundings, such as camera, ultrasonic sensor, thermal sensors and inertial measurement units. It analyzes the given navigation map and surroundings uses its sensor to alert the passenger with an automatic voice updates. Advanced control systems with help of AI dinterpret sensory information to identify appropriate paths, as well as obstacles and relevant signs to safely navigate in real world.

Keywords: Driverless car, robotic car, sensor, navigation, AI .

Design and Development of Arduino Based Metal Detector Robot

Chappa Lokesh¹, K. Archana^{2*}, Kedari Saiteja³, Pakala Sai Pavan Reddy⁴, and Parija Dipak⁵

^{1,3,4,5} UG Scholar, Department of Mechanical Engineering, St. Martin’s Engineering College,
Dhulapally, Secunderabad, Telangana, India.

² Assistant Professor, Department of Mechanical Engineering, St. Martin’s Engineering College,
Dhulapally, Secunderabad, Telangana, India.

* Corresponding Author

E-mail: sunilme@smec.ac.in

ABSTRACT

Metal Detector robot is an instrument controlled by an Android based smartphone that detects the presence of metals, especially landmines on a designated location. The old method of landmine detecting such as direct sweeping is very risky for stepping the landmine unintentionally. In this Research, the robot system is equipped with a metal detector useful to detect the metal presence based on coil induction when it is approaching the metal. LCD works as an interface showing frequencies of detected metals. The robot movement is controlled by DC's current motor programmed using Arduino UNO. When the robot detects the metal presence, the buzzer sound will be triggered, and the LCD shows the detected metal frequency.

Keywords: Arduino UNO, Metal detector, Buzzer, Android smartphone, DC motor.

Design of Hydrogen Fuel Cell Drone

L.J. Jensen Joseph¹, A. Ranjith^{2*}, M. Sai Krishna³, N.C. Anudeep Sai⁴, Peddi Manish Reddy⁵

^{1,3,4,5} UG Scholar, Department of Mechanical Engineering, St. Martin’s Engineering College,
Dhulapally, Secunderabad, Telangana, India.

² Assistant Professor, Department of Mechanical Engineering, St. Martin’s Engineering College,
Dhulapally, Secunderabad, Telangana, India.

* Corresponding Author

E-mail: ranjithme@smec.ac.in

ABSTRACT

The long endurance unmanned aerial vehicle (UAV) has significant value as a low-cost, autonomous and remote sensing platform for research, commercial and military missions. The hydrogen fuel-cell drones are most common now-a-days and there are different types of drones, it’s quite common to imagine Zeppelins, weather balloons and similar uses of hydrogen in lighter-than-aircraft to lift stuff of the ground. But with smaller and more efficient fuel cells, hydrogen is gaining its place in the drone field. Drones are definitely getting more diverse and innovative as they play a more relevant role in our everyday life. The most significant problem with drones today is that they have a remarkably limited range. Most commercially available options can only fly for 25 minutes or less due to issues with battery capacity. Fuel cells provide greater energy density, so they can give drones longer ranges. Fuel cells require hydrogen to produce power, and the air provides a ready supply of the latter. As a result, fuel cell-powered vehicles only need to carry half of their fuel, reducing weight and extending their range. Hydrogen is also less dense than air, so fuel cell-powered drones could be far lighter than battery- powered alternatives. With less weight to carry, these drones could travel farther with less energy.

Keywords: UAV, Hydrogen fuel-cell, drones, remote sensing.

Organized by Department of Mechanical Engineering, St. Martin's Engineering College, Secunderabad, India

Design Of Smart Vacuum Cleaner Robot

M.A Raif¹, Dhanaraj Savary Nasan^{2*}, B. S.Sayanna³, J. Swamynathan⁴, N. Lohith⁵

^{1,3,4,5} UG Scholar, Department of Mechanical Engineering, St. Martin’s Engineering College,
Dhulapally, Secunderabad, Telangana, India.

² Associate Professor, Department of Mechanical Engineering, St. Martin’s Engineering College,
Dhulapally, Secunderabad, Telangana, India.

* Corresponding Author

E-mail: ranjithme@smec.ac.in

ABSTRACT

Today household’s devices are becoming smarter and more automated. Home automation delivers convenience and creates more time for people. Domestic robots are entering homes and people’s daily lives, but it is yet a relatively new and immature market. However, growth is predicted, and the adoption of domestic robots is evolving. This work can be very useful in improving life style of mankind. Our aim is to design the automatic vacuum cleaner that will help to make household work convenient and much easier. It operates in automatic mode as well as in manual mode along with additional features like scheduling for specific time and dirt container with auto dirt disposal mechanism. The flexibility, time saving, and efficiency make the robot a good choice for cleaning the floor. Automatic vacuum cleaners use open cv (Image based processing), raspberry pi camera, dc motor and control driver and node MCU, ultrasonic sensor. It also contains mop for wet cleaning, autonomously vacuuming and wet mopping a floor in one pass (sweep and mop combo). By using image processing technique our vacuum cleaner is able to detect obstacle and able to find correct path for proper cleaning of floor. Vacuum cleaner is of truncated shape. It uses image processing which has several criteria that makes it user-friendly.

Keywords: Home automation, domestic robots, vacuum cleaners, robot.

Organized by Department of Mechanical Engineering, St. Martin's Engineering College, Secunderabad, India

Upgradation of Human-Robot

Yara Mahipal¹, Ravinaik Banoth^{2*}, B.S Kiran³, A. Chanakya⁴, G.Vinay Kumar⁵

^{1,3,4,5} UG Scholar, Department of Mechanical Engineering, St. Martin’s Engineering College,
Dhulapally, Secunderabad, Telangana, India.

² Professor, Department of Mechanical Engineering, St. Martin’s Engineering College, Dhulapally,
Secunderabad, Telangana, India.

* Corresponding Author

E-mail: dravinaikme@smec.ac.in

ABSTRACT

Robots represent some of the most effective forms of hospitality technology, and their presence will help the ensure superior levels of guest satisfaction. As a growing number of properties are employing these autonomous “smart” services, it only stands to reason that we examine these robots in greater detail. From a financial point of view, hospitality technology is becoming cheaper to implement. This signifies that even smaller properties such as boutique hotels can leverage the associated advantages. However, we also need to keep in mind the fact that the requirements of the guests themselves are beginning to change. Thanks to wireless connectivity and the nearly ubiquitous presence of smartphones, customers have come to expect second-to-none levels of service during their stay. From a financial point of view, hospitality technology is becoming cheaper to implement. This signifies that even smaller properties such as boutique hotels can leverage the associated advantages. However, we also need to keep in mind the fact that the requirements of the guests themselves are beginning to change. This obviously involves the presence of technology to a certain degree. Hotel robots are able to offer such a competitive advantage, so it only stands to reason that managers are choosing to take advantage of such opportunities.

Keywords: Robot, smart services, hospitality technology, wireless connectivity.

Design of Automatic Solar Grass Cutter

Artham Rahul¹, L. Nagamani^{2*}, Vijay Chowdary³, Y. Ashutosh⁴, Bokka Divya⁵

^{1,3,4,5} UG Scholar, Department of Mechanical Engineering, St. Martin’s Engineering College,
Dhulapally, Secunderabad, Telangana, India.

² Assistant Professor, Department of Mechanical Engineering, St. Martin’s Engineering College,
Dhulapally, Secunderabad, Telangana, India.

* Corresponding Author

E-mail: lnagamani@smec.ac.in

ABSTRACT

The project aims at fabricating a grass cutting machine system which makes the grass cutter motor running through solar energy. The “Solar Powered Grass Cutting Machine” is a robotic vehicle powered by solar energy that also avoids obstacles and is capable of automated grass cutting. The system uses 12V battery to power the vehicle movement motors as well as the grass cutter motor. A solar panel is used to charge the battery so that there is no need of charging it externally. The grass cutter and vehicle motors are interfaced to a microcontroller that controls the working of all the motors. It is also interfaced to an ultrasonic sensor for obstacle detection. The microcontroller moves the vehicle motors in forward direction in case no obstacle is detected. On obstacle detection the ultrasonic sensor monitors it and the microcontroller thus stops the grass cutter motor to avoid any damage to the object/human/animal whatever it is and it also provides an alarm. Microcontroller then turns the vehicle as long as it gets clear of the object and then moves the grass cutter in forward direction again otherwise it changes the direction.

Keywords: Solar Panel, Relay, DC motor, Blades, Ultra sonic sensor, Micro controller Battery

Design of power generation using E-bike

T.K.S. Sastry¹, C.Rohith², G. V. Mahendra Reddy³, S.Laxminarayana^{4*}, D.V. Sreekanth⁵

^{1,3,4,5} UG Scholar, Department of Mechanical Engineering, St. Martin’s Engineering College, Dhulapally, Secunderabad, Telangana, India.

⁵ Professor, Department of Mechanical Engineering, St. Martin’s Engineering College, Dhulapally, Secunderabad, Telangana, India.

* Corresponding Author

E-mail: Laxminarayana@smec.ac.in

ABSTRACT

Now day’s bike or vehicle is very important our fast life for travelling and this is also play very important role in growth of economy. Self-power generating electrical bike is nothing but e-bike that generates its own power supply by using some arrangement of equipment and drive the bike without any external energy. This type of bike no need to any external energy just like fuel or charging of battery by externally. This is charge internally without any effect on operation of self-power generating electrical bike. an electric bike is attracting more people’s attention around the world because it is one of the environmentally friendly vehicles as well as zero emissions from the vehicle. Main components of this bicycle are Dynamometer, Battery. The main use of Dynamometer is to absorb the power generated. Regenerative dynamometers, in which the prime mover drives a DC motor as a generator to create load, make excess DC power. When the bicycle starts running then the energy through chain and sprocket given to dynamometer and then to the battery which stores the energy. This stored energy is used to drive the bicycle which reduces the human efforts & increases the comfort level of human.

Keywords: Electrical bike, Regenerative dynamometers, DC motor , battery.

Analysis and Experimental Investigation of Weld Characteristics for a TIG Welding with SS304&410L

Chinthala Sagar¹, Dhanaraj Savary Nasan², C. Pranay³, Nune Sachin⁴, Y. Pavan Kumar⁵

^{1,3,4,5} UG Scholar, Department of Mechanical Engineering, St. Martin’s Engineering College,
Dhulapally, Secunderabad, Telangana, India.

² Associate Professor, Department of Mechanical Engineering, St. Martin’s Engineering College,
Dhulapally, Secunderabad, Telangana, India.

* Corresponding Author

E-mail: drdhanarjame@smec.ac.in

ABSTRACT

The objective of this research work is to perform TIG welding operation on SS304&410L and testing the weld characteristics of SS304&410L. Austenitic stainless steel is widely used materials in the current industrial area including higher and lower temperature applications such as storage tanks, pressure cups, furnace equipment etc. Using ratio of those materials are increasing constantly due to having superior corrosion resistance and mechanical properties. Every material possess various weld characteristics depending upon its composition and various elements like selection of shielding gas and filler material is crucial parameter for the quality, the microstructure and properties of weldments. The weldments properties strongly depended on the shielding gas, since it dominates the mode of metal transfer.

Keywords: TIG welding, austenitic steel, SS304&410L, weldments, metal transfer.

Design of Sweep Rider

C. Uday Teja¹, Hemalatha^{2*}, Mosangi Stalin³, Vadla Rajesh⁴, Karra Revanth⁵

^{1,3,4,5} UG Scholar, Department of Mechanical Engineering, St. Martin’s Engineering College,
Dhulapally, Secunderabad, Telangana, India.

² Assistant Professor, Department of Mechanical Engineering, St. Martin’s Engineering College,
Dhulapally, Secunderabad, Telangana, India.

* Corresponding Author

E-mail: hemame@smec.ac.in

ABSTRACT

The Motive is to design of sweep rider. Sweep rider collects the wastage, dust particles by using broom with automatic dust collecting pit. Achieving World Health Organization(WHO) goal in combating Covid pandemic infers an imperative to urgently increase our level of personal hygiene and social distancing have not kept pace with increase in the number of infected people. A sweeping machine was developed from locally sourced raw materials to sweep and clean public places like markets, parks gardens etc. As a part of the measures to prevent further spread of diseases in public places. This machine simulates the traditional method of sweeping public places using brooms and parker Teflon and subjected to Cast-iron, stainless-steel & aluminums various manufacturing processes and techniques.

Keywords: Sweep machine, broom, stainless-steel, clean public places.

Design of Solar Powered E-bike

D. Akhil Kumar¹ A. Uday Kumar², B. Vinay Kumar^{3*}, M. Sampat⁴, K. Mallikarjun⁵

^{1,3,4,5} UG Scholar, Department of Mechanical Engineering, St. Martin's Engineering College,
Dhulapally, Secunderabad, Telangana, India.

² Assistant Professor, Department of Mechanical Engineering, St. Martin's Engineering College,
Dhulapally, Secunderabad, Telangana, India.

* Corresponding Author

E-mail: vinaykumarb@smec.ac.in

ABSTRACT

The objective of this project is to design the solar powered E-bike by using Catia v5 software. Since the fuel prices not only in India but throughout the world increasing day by day thus there is a tremendous need to search for an alternative to conserve these natural resources. Thus, a solar E-bike is an electric vehicle that provides that alternative by harnessing solar energy to charge the battery and thus provide required voltage to run the motor. Since India is blessed with the nine months of sunny climate thus concept of solar E-bike is very friendly in India. Hybrid cycle combines the use of solar energy as well as the dynamo that runs through pedal to charge the battery to run the E-bike. Thus, solar hybrid E-bike can become a vital alternative to the fueled automobile thus its manufacturing is essential.

Keywords: Solar E-bike, Catia v5, Dynamo, Hybrid bike

Designing of Pneumatic Intelligent Breaking System

Sukkala Ajay Teja¹, L. Sunil^{2*}, M. Venkatesh³, Vadde Sandeep⁴, Rachabanti Naveen⁵

^{1,3,4,5} UG Scholar, Department of Mechanical Engineering, St. Martin’s Engineering College,
Dhulapally, Secunderabad, Telangana, India.

² Assistant Professor, Department of Mechanical Engineering, St. Martin’s Engineering College,
Dhulapally, Secunderabad, Telangana, India.

* Corresponding Author

E-mail: lsunilme@smec.ac.in

ABSTRACT

The brake to avoid front collision of the vehicle. The technology of pneumatics plays a serious Role within the field of automation and modern machine Shops and space robots. The aim is to style and develop a Sway system based intelligent electronically controlled Ultrasonic sensor Provided on the forepart of the vehicle detects the presence of the obstacle. The utilization of pneumatic system can Encourage be useful in automation thanks to its simplicity and easy operation. So, the aim is to Design a System supported automatic control of car.

Keywords: Pneumatics, Break robots, sway system

UGC AUTONOMOUS

Designing and Fabrication of Fire Fighting Robot

Kadari Prasanna¹, S. Pavan Kalyan^{2*}, Kaveti Sudharani³, A.Geethika⁴, P. Krishnaveni⁵

^{1,3,4,5} UG Scholar, Department of Mechanical Engineering, St. Martin’s Engineering College,
Dhulapally, Secunderabad, Telangana, India.

² Assistant Professor, Department of Mechanical Engineering, St. Martin’s Engineering College,
Dhulapally, Secunderabad, Telangana, India.

* Corresponding Author

E-mail: lsunilme@smec.ac.in

ABSTRACT

The main aim of this project is to develop an android-controlled firefighting robot that can be used to extinguish fire through mobile handling. By implementing a firefighting robot capable of detecting and extinguishing flames, disasters can be avoided with minimal risk to human life. The implementation of an autonomous firefighting robot that can automatically sense the smoke fire and start to spray water over the flames. The robot is consisting of some elements like hardware, electronics, and programming. Various sensors are also interfaced, with fire incidents a disaster that can potentially cause the loss of life, property damage, and permanent disability to the affected victim. Major fire accidents do occur in industries like nuclear power plants, and gas tanks. Therefore, this project is enhanced to control fire through a robotic vehicle. By the use of this robot, it reduces a much higher rate with an equally minimum amount of damage caused.

Keywords: Flame sensor, Bluetooth module, DC motors, Arduino UNO, Android smart phone, Buzzer.

Hydraulic Paper Cup making Machine

M. Rehmathullah¹, P. Vikram^{2*}, B. Dilip Kumar³, M. Jayaprakash Reddy⁴, K.Akhil Das⁵

^{1,3,4,5} UG Scholar, Department of Mechanical Engineering, St. Martin’s Engineering College,
Dhulapally, Secunderabad, Telangana, India.

² Assistant Professor, Department of Mechanical Engineering, St. Martin’s Engineering College,
Dhulapally, Secunderabad, Telangana, India.

* Corresponding Author

E-mail: vikramme@smec.ac.in

ABSTRACT

This project is based on fabrication of hydraulic operated paper cup machine. The project is basically developed by considering the current problem of expensive computer controlled paper cup making machines. Punch and die arrangement is used for manufacturing of paper cups. hydraulic cylinder supplies the fluid to the actuator by using direction control valve and flow control valve. Punch is operated with the help of direction control valve to control fluid pressure and by supplying fluid to the actuator, due to this punch will move down and exerts pressure on the paper. Paper gains the shape of the die and formation of paper cup takes place.

Keywords: Hydraulics, punch, die, paper cup, actuator.

Authorized Person Fingerprint Based Bike Engine Start-Stop

Penumala Praveen Kumar¹, P.Uday Kumar^{2*}, G.V. Kumar³, Thogita Raju⁴, and P.Sandeep⁵

^{1,3,4,5} UG Scholar, Department of Mechanical Engineering, St. Martin’s Engineering College,
Dhulapally, Secunderabad, Telangana, India.

² Assistant Professor, Department of Mechanical Engineering, St. Martin’s Engineering College,
Dhulapally, Secunderabad, Telangana, India.

* Corresponding Author

E-mail: pudaykumarme@smec.ac.in

ABSTRACT

Automated vehicle security system plays an important role now days. One of the methods which can be applied for a security system is based on biometric identification system. In this work, fingerprint recognition system to start the motorcycle engine is developed. The fingerprint of the owner and authorized persons will be stored into the database, then while the time of starting the engine of the vehicle, the finger print will be validated with the data base. The minutiae extraction method is applied to find the difference of fingerprint each other after turn the image into gray scale and thinning. After the extraction, the next step is finding the ridge edge and bifurcation. The result of the image will be used as input to the database in Arduino software to recognize authorized person only. The experiment of recognition system results in automatic start of Engine.

Keywords: Vehicle security system, Arduino software, biometric identification.

Development of Ultra Filtration Process to Purify Water

Badhavath Jaypal^{1*}, Nayak Srigaddhe², Chandra Kumar³, S Venkataramana⁴, Pippera Rakesh⁵

^{1,3,4,5} UG Scholar, Department of Mechanical Engineering, St. Martin’s Engineering College, Dhulapally, Secunderabad, Telangana, India.

* Corresponding Author

E-mail: bjayapal49@smec.ac.in

ABSTRACT

This project is based on fabrication of hydraulic operated paper cup machine. The project is basically developed by considering the current problem of expensive computer-controlled paper cup making machines. Punch and die arrangement is used for manufacturing of paper cups. hydraulic cylinder supplies the fluid to the actuator by using direction control valve and flow control valve. Punch is operated with the help of direction control valve to control fluid pressure and by supplying fluid to the actuator, due to this punch will move down and exerts pressure on the paper. Paper gains the shape of the die and formation of paper cup takes place.

Keywords: Hydraulics, punch, die, paper cup, actuator.

UGC AUTONOMOUS

Experimental & Optimization of Incremental Forming on CNC milling Machine with Dynamometer

S Vinay Kumar¹, Prem Kumar^{2*}, T. Saketh³, T. Nitin⁴, E. Rajashekar⁵

^{1,3,4,5} UG Scholar, Department of Mechanical Engineering, St. Martin’s Engineering College,
Dhulapally, Secunderabad, Telangana, India.

² Assistant Professor, Department of Mechanical Engineering, St. Martin’s Engineering College,
Dhulapally, Secunderabad, Telangana, India.

* Corresponding Author

E-mail: premem@smec.ac.in

ABSTRACT

Single Point (SPIF) is steel sheet forming process in three dimensional shapes. It is likely to be used for prototyping rapidly and minimum volume production of metal sheet parts. The recompenes of SPIF process is low cost tooling, less product lead time, and high flexibility. While abundant research have been conceded out to fit the method for industrial function, still they still stumble upon insufficient forming qualities in the sheet metal products. Since the major research are mainly done only on the hemispherical tool. This research mainly focuses on the development of single point incremental forming process using roller ball tool at room temperature. Previous researches were done on the conical shape, but square geometry has been attempted for the study. In evaluating the early formability, the Erichsen cupping test is performed for all materials. Moreover, Forming Limit Diagram (FLD) for materials in single point incrementally forming is performed experimentally to identify the forming limit of individual materials. The results obtained are deliberated with dissimilar process parameters and the belongings are identified as (i) Process formability (ii) Forming forces (iii) Microstructure analysis and (iv) Surface roughness. It improves the process formability and obtains maximum uniform thickness distribution of the formed parts. This gives a considerate into supplementary progress and the purpose of single point incremental forming technology in the production.

Keywords: Incremental Forming, Process formability, Microstructure analysis, cupping test.

Organized by Department of Mechanical Engineering, St. Martin's Engineering College, Secunderabad, India

Design of spring less car Suspension using Bevel Gears

Akula Pradeep¹, L. Nagamani², N.V. Ram³, P.Saiteja⁴, T. Pramod⁵

^{1,3,4,5} UG Scholar, Department of Mechanical Engineering, St. Martin’s Engineering College,
Dhulapally, Secunderabad, Telangana, India.

² Assistant Professor, Department of Mechanical Engineering, St. Martin’s Engineering College,
Dhulapally, Secunderabad, Telangana, India.

* Corresponding Author

E-mail: prememe@smec.ac.in

ABSTRACT

The main aim of our project is to design a spring less car suspension using bevel gears. We are replacing the spring suspension by bevel gears. This spring less Suspension System Combines a differential mechanism and an oscillating system. The oscillating property makes sure that the vehicle is moving forward even in rough terrain. A differential is a gear train with three drive shafts that has a property such that the rotational speed of one shaft is the average speeds of the others, or a fixed multiple of that average and Oscillation is the repetitive or periodic variation of an object. A motor is connected to a gear in the differential mechanism, thereby making it the driving gear.

Keywords: Car Suspension, differential mechanism, Bevel gears, terrain.

Analysis and Experimental Investigation of Weld Characteristics for a Tig Welding with SS304&410L

CH. Pranay¹, S.Pavan Kalyan^{2*}, N. Sachin³, CH. Sagar⁴, Y.Pavan⁵

^{1,3,4,5} UG Scholar, Department of Mechanical Engineering, St. Martin’s Engineering College,
Dhulapally, Secunderabad, Telangana, India.

² Assistant Professor, Department of Mechanical Engineering, St. Martin’s Engineering College,
Dhulapally, Secunderabad, Telangana, India.

* Corresponding Author

E-mail: pavanme@smec.ac.in

ABSTRACT

The Aim of the project is to perform TIG welding operation on SS304&410L and testing the weld characteristics of SS304&410L. Austenitic stainless steel is widely used materials in the current industrial area including higher and lower temperature applications such as storage tanks, pressure cups, furnace equipment’s etc. Using ratio of those materials are increasing constantly due to having superior corrosion resistance and mechanical properties. Every material possesses various weld characteristics depending upon its composition and various elements like selection of shielding gas and filler material is crucial parameter for the quality, the microstructure and properties of weldments. The weldment properties strongly depended on the shielding gas, since it dominates the mode of metal transfer.

Keywords: TIG welding, SS304&410L, Austenitic stainless steel, shielding gas.

Design and Performance Analysis of Hobbing Milling Cutter

P. Sharath Chandra¹, Y.Chandrasaker Yadav^{2*}, B. Akash³, Ch. Nagaraj⁴, D. Vineeth reddy⁵

^{1,3,4,5} UG Scholar, Department of Mechanical Engineering, St. Martin’s Engineering College,
Dhulapally, Secunderabad, Telangana, India.

² Assistant Professor, Department of Mechanical Engineering, St. Martin’s Engineering College,
Dhulapally, Secunderabad, Telangana, India.

* Corresponding Author

E-mail: chandrasekharme@smec.ac.in

ABSTRACT

Hobbing milling is a machining technique for cutting gears, splines, and sprockets on a hobbing machine, which is a sort of milling machine. A sequence of cuts produced by a cutting tool called a hob gradually cut the teeth or splines into the work piece. It is very affordable compared to other gear forming techniques, but it is still highly precise, therefore it is utilized for a wide variety of components and numbers. Hobbing is the most frequently used gear cutting procedure for manufacturing spur and helical gears, and it cuts more gears than any other method due to its speed and low cost. Internal gear cutters can be cut using a skiving technique similar to that used for hobbing exterior gears. This research aims to investigate the material behavior and structural analysis of hobbing milling cutters, including total solid body deformation, external loads and impact loads, stress and strain. On the Ansys software, mesh. Kevlar/ epoxy, aluminum silicon carbide are the materials used. Using the Catia programme, create a hobbing milling cutter. After that, an analysis is carried out, with each material being compared, and a decision is made as to which material will provide the best performance in the future.

Keywords: Hobbing milling, gear cutter Ansys.

Development of Battery Charging from Wind Turbine

Y. Venu¹, Y. Chandrasakeryadav^{2*}, P. Arun Reddy³, D. Ravi Teja⁴, M. Rajesh⁵

^{1,3,4,5} UG Scholar, Department of Mechanical Engineering, St. Martin’s Engineering College, Dhulapally,
Secunderabad, Telangana, India.

² Assistant Professor, Department of Mechanical Engineering, St. Martin’s Engineering College,
Dhulapally, Secunderabad, Telangana, India.

* Corresponding Author

E-mail: chandraskharme@smec.ac.in

ABSTRACT

Global energy needs have risen in recent years, and traditional energy sources such as fossil fuels are no longer available. To meet the growing electricity demand, attention has moved to renewable energy sources such as solar and wind energy. Advantage of wind turbine is that it works without any consumption of fossil fuel and works efficiently in appropriate weather conditions without being closely monitored and the battery charges automatically without any harmful emissions or drawback. When the wind strikes blades of windmill, kinetic energy of wind is utilized by blades and blades rotates. These blades are connected to a generator. The generator converts mechanical energy into electrical energy. The produced electrical energy is used to charge the battery.

Keywords: Wind energy, Turbine, Battery, Energy storage.

Design and Fabrication of Portable Thermoelectric Refrigerator

K. Jay Sai charan¹, V. Sripal^{2*}, Y. Bhargav³, A. Srinivas⁴, K. Uday Teja⁵

^{1,3,4,5} UG Scholar, Department of Mechanical Engineering, St. Martin’s Engineering College,
Dhulapally, Secunderabad, Telangana, India.

² Assistant Professor, Department of Mechanical Engineering, St. Martin’s Engineering College,
Dhulapally, Secunderabad, Telangana, India.

* Corresponding Author

E-mail: sripalme@smec.ac.in

ABSTRACT

The Objective of this project is to Design and Fabricate a portable thermoelectric refrigerator whose casing and components are designed using CATIA Software and Fabricate the product. This refrigerator consists of a thermoelectric module as cooling generator along with an insulated cabin, thermostat and charging unit. Thermoelectric elements perform the same cooling function as Freon-based vapor compression or absorption refrigerators. The design of the refrigeration is based on the principle of thermoelectric module (i.e., Peltier effect) to create a hot side and a cold side. The cold side of the thermoelectric module is used for refrigeration purposes. On the other hand, the heat from the hot side of the module is rejected to the surroundings with the help of heat sinks and fans. So, the aim is to Design and Fabricate the Portable Thermoelectric Refrigerator with high efficiency.

Keywords: Peltier Effect, Heat sink, Thermoelectric module, Refrigeration, etc.

Development of Rocker Bogie Mechanism

Palaki Venkatesh¹, R.Hanumanaik^{2*}, Uthla Shrivankumar³, Chowki Rajesh⁴, Mamidala Shivakumar⁵

^{1,3,4,5} UG Scholar, Department of Mechanical Engineering, St. Martin’s Engineering College,
Dhulapally, Secunderabad, Telangana, India.

² Assistant Professor, Department of Mechanical Engineering, St. Martin’s Engineering College,
Dhulapally, Secunderabad, Telangana, India.

* Corresponding Author

E-mail: hanumanaikme@smec.ac.in

ABSTRACT

The Rocker bogie mechanism is a mechanism primarily used in Mars’s rovers to overcome the rough terrains while maintaining stability. The rocker-bogie mechanism is just like a climbing robot-type mechanism. It is NASA's important mechanism for space vehicles & rovers. Rocker bogie has the simplest design and the number of wheels is also less. This enables to have a suspension-based mechanism that distributes the vehicle load evenly not only on regular but also on irregular surfaces. The design consists of a spring-free suspension-based differential drive system that allows the bogie to move over rocks, pebbles, and some obstacles. As the tank’s main gun mechanism rotates 360°, so it becomes very easy to throw the ball at any degree angle, and as the project will move on a rough surface like a military tank so it will give military application (Defense Purpose).

Keywords: Rocker bogie, Suspension, military application.

Design And Development of Multi Nozzle Pesticides Sprayer Machine

M. Naveen Reddy¹, V.Sripal^{2*}, G. Mahesh reddy³, G. Surendra⁴, P. Anandh⁵

^{1,3,4,5} UG Scholar, Department of Mechanical Engineering, St. Martin’s Engineering College,
Dhulapally, Secunderabad, Telangana, India.

² Assistant Professor, Department of Mechanical Engineering, St. Martin’s Engineering College,
Dhulapally, Secunderabad, Telangana, India.

*

Corresponding Author

E-mail: sripalme@smec.ac.in

ABSTRACT

The increasing population day by day the focus on effective and agricultural methods is getting more attention. The technological advancements are used to required scale in industrial sector, but agricultural sector still uses obsolete methods. Thus, with this as a major area of concern, this project deals with the development of wireless dual control solar powered smart insecticide and fertilizer spraying machine to help Farmers. The proposed machine should be able to spray insecticides pesticides and fertilizers using a tank provided onto the machine. The dual mode control permits the control of machine using remote controller. In addition, the proposed machine should have the ability to adjust the height of spraying for different crops.

Keywords: Agriculture application, Spray mechanics, Solar.

Development of Headlight Tilting Mechanism Depends on Steering Direction

N. Nagendra¹, J.Premkumar^{2*}, P. Nikhil³, D. Pavan kumar⁴, J. Sai kumar⁵

^{1,3,4,5} UG Scholar, Department of Mechanical Engineering, St. Martin’s Engineering College,
Dhulapally, Secunderabad, Telangana, India.

² Assistant Professor, Department of Mechanical Engineering, St. Martin’s Engineering College,
Dhulapally, Secunderabad, Telangana, India.

*

Corresponding Author

E-mail: jpremkumarme@smec.ac.in

ABSTRACT

Now a days cars don’t have effective lighting system. Due to this many accidents are taking place during night times especially in ghat sections. To avoid this fabrication of headlight tilting mechanism should be used. This device is related to a headlight arrangement to vehicles, and more particularly headlight is connected to a steering mechanism of the vehicle for illuminating the proposed path of travel including support brackets operable to support headlight members thereon connectable to a frame portion of the vehicle , interconnecting the brackets for conjoint movement thereof and means interconnecting one of the bracket to the connecting rod of the vehicle where upon the brackets and headlight members are moved in relation to the direction of vehicle travel. This device relates to a head light arrangement operably connected to steering and front wheel assembly of an automobile to maintain headlight members and front wheels pointed in the same direction at all times.

Keywords: Automobile, Steering, Tilting head lights, etc.

Development and Fabrication of Solar Water Pump

G. Yashwanth¹, Ravinaik Banoth^{2*}, G. Pavan Kalyan³, M. Vamshi⁴, A.K.Anthony Karthik⁵

^{1,3,4,5} UG Scholar, Department of Mechanical Engineering, St. Martin’s Engineering College,
Dhulapally, Secunderabad, Telangana, India.

² Professor, Department of Mechanical Engineering, St. Martin’s Engineering College, Dhulapally,
Secunderabad, Telangana, India.

* Corresponding Author

E-mail: ravinaikme@smec.ac.in

ABSTRACT

This project aims to fabricate a solar-powered water pumping system for saving electricity. A solar pump is a type of solar-powered water pump; that runs on Electric Motor. It is made on a smaller scale and is made to give an efficient supply and is driven for irrigation and domestic purposes. These pumps are usually used as a low-cost and relatively safe way to introduce them. The pump is made with a capacity of 45W. This project describes the process and methodology at a low cost and we primarily focus on building an eco-friendly solar pump. As one of the front runners in the area of renewable energy resources, today is solar power; So, we are planning to use this energy as our source of fuel, which would be stored and divulged to a DC motor which would run the pump by using the energy stored in the battery of capacity of 12V. This project is proposed to study various types of solar cells and storage devices (batteries) and build a water pump that effectively runs on solar energy.

Keywords: Eco-Friendly use, water pump, solar power.

Development of Obstacle Detection and Avoidance Robot

P.Saivamsi¹, R.Hanumanaik^{2*}, D.Sairaj³, P.Shanmukha⁴, K.Rakesh⁵

^{1,3,4,5} UG Scholar, Department of Mechanical Engineering, St. Martin’s Engineering College,
Dhulapally, Secunderabad, Telangana, India.

² Assistant Professor, Department of Mechanical Engineering, St. Martin’s Engineering College,
Dhulapally, Secunderabad, Telangana, India.

* Corresponding Author

E-mail: hanumanaikme@smec.ac.in

ABSTRACT

The main scope of project is to automatically be changing the direction of Robotic vehicle as required whenever any obstacle comes on its way. This technology provides the robots with senses which it can use to traverse in unfamiliar environments without damaging itself. In this paper an Obstacle Avoiding Robot is designed which can detect obstacles in its path and man ever around them without making any collision. Here an ultrasonic sensor is used which detects the presence of any obstacle and sends the signal to microcontroller which changes the directions of the robot. The integration of ultrasonic distance sensors provides higher accuracy in detecting surrounding obstacles. Being a fully autonomous robot, it successfully man Evered in unknown environments without any collision, which is a primary requirement for any autonomous mobile robot. The application of the Obstacle Avoiding robot is not limited and it is used in most of the military organizations now which helps carry out many risky jobs that cannot be done by any soldiers.

Keywords: AI, Robot, Ultrasonic sensor etc.

Design of Multi-Purpose Agriculture Robot

Chandrupatla Sai Varun¹, L.Sunil^{2*}, Deshabathini Sai Kumar³, Pattnam Shahid⁴, Kudupudi Suhash⁵

^{1,3,4,5} UG Scholar, Department of Mechanical Engineering, St. Martin’s Engineering College, Dhulapally,
Secunderabad, Telangana, India.

² Assistant Professor, Department of Mechanical Engineering, St. Martin’s Engineering College,
Dhulapally, Secunderabad, Telangana, India.

* Corresponding Author

E-mail: sunilme@smec.ac.in

ABSTRACT

Our project presents about multiple agriculture tasks performed by a single robot. To effectively develop agricultural tasks, we must find the new ways. The special features of this agricultural robot system lie in its multitasking abilities like to plough the land, dig a seed pit, fertilizers spraying and sowing seeds. The aim of the project is to design a robot that can plough the soil, dig a seed pit, fertilizers spraying, and sowing seeds at a simultaneously. The entire robot system is battery operated and solar powered. This vehicle moves through the crop lines and performs tasks, reducing the need for manual intervention. Now-a-days, ploughing operations are carried out by tractors replacing the traditional method of “OX” based ploughing. Both traditional and tractor-based require human labor, the work that replaces human labor with robotic vehicles. The motto of this project is that agriculture is more profitable by reducing human labors. This vehicle will be very useful for agricultural purposes.

Keywords: Agriculture robot, Seed plough, Optimization.

Development of Metal Detecting Robot

N. Sainithin¹, Subhankar Saha^{2*}, P. Saikumar³, P. Sada Shiva⁴, P. Mallikarjun⁵

^{1,3,4,5} UG Scholar, Department of Mechanical Engineering, St. Martin’s Engineering College, Dhulapally,
Secunderabad, Telangana, India.

² Assistant Professor, Department of Mechanical Engineering, St. Martin’s Engineering College, Dhulapally,
Secunderabad, Telangana, India.

* Corresponding Author E-mail: sunilme@smec.ac.in

ABSTRACT

The project aims at developing RF remote controlled intelligent bomb detection and alerting robot using PIC microcontroller. The project makes a use of PIC microcontroller it is a main controlling device of the project. RF transmitter and receiver module is uses for wireless controlling of robot. Metal detector is used to detect the bombs in its path. Buzzer is used to gives the audible alerts to the surrounding people. DC motors along with l293d motor driver is used to moves the robot. A transmitting device is used in your hand which also contains a RF Transmitter and a RF Encoder. This transmitter part will transmit command to robot so that it can do the required task like moving forward, reverse, turning left, turning right and stop. All these tasks will perform by using four push buttons that are placed on RF transmitter. The controlling device of the whole system is done using PIC Microcontroller. The robot can be controlled through RF transmitter over wireless RF communication. The RF receiver module in our system gets the input from RF transmitter and gives the same input to the microcontroller then microcontroller control the robot accordingly. When the robot detect the metal through metal detection sensor it will processes to PIC microcontroller then microcontroller gives the buzzer alarm for alerts. The PIC Microcontroller used in the project is programmed using Embedded C language.

Keywords: Robot, metal detection, RF communication.

Organized by Department of Mechanical Engineering, St. Martin's Engineering College, Secunderabad, India

Design of Soil Tiller

S Anjani Prasad Reddy¹, Subhankar Saha^{2*}, A Shashi Vadan³, T Sudhakar⁴

^{1,3,4,5} UG Scholar, Department of Mechanical Engineering, St. Martin’s Engineering College,
Dhulapally, Secunderabad, Telangana, India.

² Assistant Professor, Department of Mechanical Engineering, St. Martin’s Engineering College,
Dhulapally, Secunderabad, Telangana, India.

* Corresponding Author

E-mail: subhankarme@smec.ac.in

ABSTRACT

The Aim of Project is related to Agriculture industry. The soil tiller which is used to break the soil into small pieces which improves the aeration of soil and which prevents weed from growing additionally tiller loosen the ground under the top soil to help crop roots. the multipurpose agricultural tiller has been fabricated on a rigid chassis frame . Tiller are usually either self-propelled We had designed 3.5HP tiller with an additional attachment of Tiller blades, Single Plough and Cultivator blades. it can also perform multiple operations like Ploughing ,Tilling ,Weeding. To overcome this problem modern agricultural methods and equipment’s has been used in the field of agriculture. So, in present study we aim to design cost effective tiller for the multipurpose use such as ploughing, weeding in the agricultural field. Mini tillers are new type of small agricultural tillers/cultivators used by farmers. These are also known as power tillers or Garden Tillers compact powerful and more importantly inexpensive this agricultural Rotary tillers providing alternatives to four wheel tractors and in small farmer's field in developing countries are more economical than four-wheel tractors. The tillers are smaller than full sized ones, that doesn't mean they don't work as hard. Most of the smaller tillers have enough horsepower to cut through tough weeds and even sod. The prototype we made helps in preparing field by breaking the soil bed with less human effort. Since, it has a single cage wheel which helps in making lines or rows in the field for sowing of crops and ploughing the land. Also, its smaller width provides sufficient weed in operation between plants.

Keywords: Agriculture industry, tiller, soil bed.

Organized by Department of Mechanical Engineering, St. Martin's Engineering College, Secunderabad, India

Design of Mini Crane

V. Venkatesh¹, K. Hemalatha^{2*}, G. Subhash³, P. Chandu Goud⁴, B. Hari Prasad⁵

^{1,3,4,5} UG Scholar, Department of Mechanical Engineering, St. Martin’s Engineering College, Dhulapally,
Secunderabad, Telangana, India.

² Assistant Professor, Department of Mechanical Engineering, St. Martin’s Engineering College,
Dhulapally, Secunderabad, Telangana, India

* Corresponding Author
E-mail: hename@smec.ac.in

ABSTRACT

The design represents and analyze of a semi-automatic mini-crane mechanism. The main objective of the work is to help load and unload heavy weights . The mini crane consists of load lifting motor, servo motor, hook . The vertical beam is called supported arm is connected to base plate and load lifting motor touching the hook and supported arm is connected to the servo motor to rotate the arm in 360 degree. The crane has the capacity of lifting 50-60 kg spread application in the shop floor . Thus the mini crane would serve as a safe and versatile model for minimum weight of material handling. First, a basic CAD model is designed using Catia to obtain the necessary requirements. Then, selection of material is carried out based on attainment of maximum possible factor of safety, minimum displacement and minimum stress developed in the component by performing parametric analysis.

Keywords: Mini-crane. Catia, parametric analysis.

Design of Three Degree Freedom Robot

K. Vishal Goud¹, K.Archana^{2*}, T.Lokesh³, S.Sai Roshan⁴, V. Pavankumar⁵

^{1,3,4,5} UG Scholar, Department of Mechanical Engineering, St. Martin’s Engineering College,
Dhulapally, Secunderabad, Telangana, India.

² Assistant Professor, Department of Mechanical Engineering, St. Martin’s Engineering College,
Dhulapally, Secunderabad, Telangana, India.

* Corresponding Author

E-mail: karchaname@smec.ac.in

ABSTRACT

This paper concerns with the design of a three degrees of freedom robotic arm, which is intended to pick and place objects. Transfer function models that can provide physical insight into the dynamic behavior of manipulators and establish a foundation for control system analysis and design are identified. Emphasis is directed toward increasing the computational efficiency of the manipulator dynamic equations of motion. A conceptual three-degrees-of-freedom manipulator, which represents state-of-the-art configurations, is designed and simulated on a digital computer. The simulation model includes the dynamic interactions of the centrifugal, Coriolis, inertial, and gravitational generalized forces along with the kinematic coupling, and it can accommodate load variations. The simulation model is interfaced to the identification algorithm to extract, from the complete nonlinear model, simplified linear models that characterize the arm in various regions of the workspace. The simplified linear models are second-order discrete-time (input-output) transfer functions.

Keywords: Robotic arm, centrifugal, Coriolis, inertial.

Development of Bluetooth Controlled Robot by Using Android Device

Dasannagari Sai Vamshi¹, P.Uday Kumar^{2*}, Badugu Sathvik Kumar³, Cheemala Ganesh⁴, Sanka Dhanush⁵

^{1,3,4,5} UG Scholar, Department of Mechanical Engineering, St. Martin’s Engineering College,
Dhulapally, Secunderabad, Telangana, India.

² Assistant Professor, Department of Mechanical Engineering, St. Martin’s Engineering College,
Dhulapally, Secunderabad, Telangana, India.

* Corresponding Author
E-mail: pudaykumarme@smec.ac.in

ABSTRACT

The Aim of the project is a Bluetooth and android controlled robot car. For this the android mobile user has to install an application on her/his mobile. Then user needs to turn on the Bluetooth. in the mobile. The wireless communication techniques used to control the robot is Bluetooth technology. User can use various commands like move forward, reverse, stop, move left, and move right. These commands are sent from the Android mobile to the Bluetooth receiver. Android based robot has a Bluetooth receiver unit which receives the commands and give it to the microcontroller circuit to control the motors. The microcontroller then transmits the signal to the motor driver ICs to operate the motors and even detects the obstacle and gives us a buzzer to stop the robot.

Keywords: Bluetooth, robot car, Android, mobile.

Development of Solar DC Induction Stove

Teja Prakash¹, P.Vikram^{2*}, Pranith³, Ganapathi Varaprasad Reddy⁴, Sohel Baba⁵

^{1,3,4,5} UG Scholar, Department of Mechanical Engineering, St. Martin’s Engineering College,
Dhulapally, Secunderabad, Telangana, India.

² Assistant Professor, Department of Mechanical Engineering, St. Martin’s Engineering College,
Dhulapally, Secunderabad, Telangana, India.

* Corresponding Author

E-mail: pvikramme@smec.ac.in

ABSTRACT

A solar DC induction stove is a type of cooking appliance that uses solar energy to generate DC (direct current) electricity, which is then used to power an induction cooktop. Induction cooking is a highly energy-efficient method of cooking that uses magnetic fields to directly heat the cooking vessel, rather than heating the air around it. This makes it a perfect match for solar power, which is also a highly efficient and renewable energy source. to create a highly efficient and sustainable cooking appliance that is perfect for off-grid living, camping, or other outdoor activities.

Keywords: Induction cooktop, method of cooking, off-grid living, camping.

Development of Automatic Indication System in Vehicles

Manne Nagarjun¹, Y.Chandrasakeryadav^{2*}, Katla Saiteja³, Bagam Praneeth⁴, Morampudi Anilkumar⁵

^{1,3,4,5} UG Scholar, Department of Mechanical Engineering, St. Martin’s Engineering College,
Dhulapally, Secunderabad, Telangana, India.

² Assistant Professor, Department of Mechanical Engineering, St. Martin’s Engineering College,
Dhulapally, Secunderabad, Telangana, India.

* Corresponding Author

E-mail: chandrasekharme@smec.ac.in

ABSTRACT

This invention is related to automatic turn signal ON/OFF based on the steering angle of the vehicle. When the driver/ rider fails to put the indicator, based on the steering angle, respective indicator light automatically gets ON/OFF. This automatic signal will be useful when the driver/rider fails to put the indicator while moving on the road. The indication system works according to steering direction. As the vehicle takes right turn, the respected right side turn signals get ON and vice versa. It prevents the vehicle from unnecessary accidents. It is quite useful when the driver/rider is unable to put the indication during sudden turn.

Keywords: Induction system, steering angle, ON/OFF

DESIGN OF SOLAR BICYCLE

Arshad Ahmed¹, D. Mahesh², Mudassir Hussain³, D.V.Sreekanth^{4*}

^{1,2,3} UG Scholar, Department of Mechanical Engineering, St. Martin’s Engineering College,
Dhulapally, Secunderabad, Telangana, India.

⁴ Professor, Department of Mechanical Engineering, St. Martin’s Engineering College, Dhulapally,
Secunderabad, Telangana, India.

* Corresponding Author

E-mail: hodmech@smec.ac.in

ABSTRACT

There are many types of bicycles in the world such as normal bicycle that people need to paddle for it to move, motorized bicycle that uses fuel as its prime power and electric bicycle that can only be sufficient for an hour. Because of some weaknesses in the existence system, the idea of a solar bicycle came in mind. The idea is to make the bicycle last longer and can be automatically recharge when the bicycle is not in use by the renewable solar energy. The concept of the solar energy is that a high torque motor will be put on the bicycle which will be generated by the solar energy. The solar energy will be absorbed by the portable solar panel to generate the power. The power that had been absorbed by the panel can be used directly by the motor if the power matches the power requirement. If not, the motor will use the power from a battery. When the bicycle was not in use during the day, the solar panel will charge the battery. The system will make bicycle operate more efficiently.

Keywords: E-bike, Solar power, DC motor.

Experimental and Numerical Validation in Metal Cutting of Steel C-45 Using Al₂O₃ Coated Tungsten Carbide Tool

M. Sivaramakrishnaiah^{1*}, Dhanaraj Savary Nasan²

¹ Associate Professor, Department of Mechanical Engineering, SVR Engineering
College, Nandyal-518501.

² Associate Professor, Department of Mechanical Engineering, St. Martin's Engineering College,
Dhulapally, Secunderabad, Telangana, India.

* Corresponding Author

E-mail: malayathisiva@gmail.com

ABSTRACT

The primary objective of the current work is to validate the Experimental and Numerical results of the temperature and force distributions in the Al₂O₃ Coated and Uncoated Tungsten Carbide Tool for Turning of Steel C-45 workpiece for optimal machining parameters which is done by using Finite elementation method through simulations by MSC Marc Mentat software to compute the temperature and force distribution in both X and Z direction (2D) at the cutting tool for different speed, feed and depth of cut. Further classical laboratory physical experiment was also carried out for the same parameters to measure temperature and forces at various spatial points of cutting tool and so the validation confirms that the temperature and forces solution results obtained from the present numerical FE simulation agrees with the physical experimental data with approximation.

Keywords: Turning, Steel C-45, Al₂O₃ Coated Tungsten Carbide Tool, Temperature distribution, Cutting forces.

Effect of Boron and Carbon Addition on Microstructure and Tribological Properties of Metastable Beta Titanium Alloy, Ti-15V-3Cr-3Al-3Sn.

Ravinaik Banoth¹, D.V.Srikanth^{2*}

^{1,2} Professor, Department of Mechanical Engineering, St. Martin's Engineering College,
Dhulapally, Secunderabad, Telangana, India.

* Corresponding Author

E-mail: hodmech@smec.ac.in

ABSTRACT

Wear properties of a metastable beta titanium alloy, Ti-15V-3cr-3Al-3Sn, with and without boron and carbon were examined in two different heat treatment conditions. The analysis of wear tracks and debris clearly indicated that the underlying wear mechanism was one of delamination. At a constant load, the wear rate as a function of sliding speed exhibited a maximum at an intermediate speed of 1 m/s. Wear rate increased with increasing load at a constant sliding speed. These trends were explained in terms of coefficient of friction and maximum temperature attained. For the same heat treatment, boron plus carbon containing alloy exhibited higher wear rate as compared to the base alloy. This was attributed to lesser ductility of the bulk alloys that influenced the formation and characteristics of the mechanically mixed layers.

Keywords: Non-ferrous metals, Hardness, Wear testing, Siding wear.

Thermo-Hydraulic Performance Comparison of a Straight and Wavy Liquid Cooled Microchannel Heat Sink

Uday Kumar. A^{1*}, Dhanaraj Savary Nasan²

¹ Assistant Professor, Department of Mechanical Engineering, St. Martin’s Engineering College,
Dhulapally, Secunderabad, Telangana, India.

² Associate Professor, Department of Mechanical Engineering, St. Martin’s Engineering College,
Dhulapally, Secunderabad, Telangana, India.

*Corresponding Author

E-mail: draudaykumarme@smec.ac.in

ABSTRACT

A microchannel heat sink is a type of heat sink that is commonly used in electronics and other heat-generating devices to dissipate heat. It is designed with a series of small channels that allow for efficient heat transfer by increasing the surface area of the heat sink. The channels in a microchannel heat sink are typically only a few hundred microns in size, which allows for high heat transfer rates due to the increased surface area-to-volume ratio. The channels are often arranged in a parallel or serpentine pattern to maximize the contact area with the cooling fluid. By using a wavy design of the microchannel heat sink a larger surface area for heat transfer is created compared to a straight channel design. This increased surface area allows for greater contact between the fluid and the channel walls, which enhances the heat transfer process. Additionally, the turbulence created by the wavy design helps to prevent the formation of boundary layers, which can impede heat transfer.

Keywords: Microchannel heat sink, COMOSOL, Heat transfer, Conjugate heat transfer, CFD.

The Effect of Capillary Tube Length on The Performance of Vapour Compression Refrigeration System

Y. Chandrasekhar Yadav ^{1*}, B.Nagasiva Prasad Reddy², D.V Sreekanth³

^{1,2} Assistant Professor, Department of Mechanical Engineering, St. Martin’s Engineering College,
Dhulapally, Secunderabad, Telangana, India.

² Professor, Department of Mechanical Engineering, St. Martin’s Engineering College, Dhulapally,
Secunderabad, Telangana, India.

* Corresponding Author

E-mail: chandrasekharme@smec.ac.in

ABSTRACT

The design of capillary tube plays a very important role in the performance of a vapour compression refrigeration system. Optimized design is possible through theoretical calculations, however may fail due to the reason that the uncertainties in the formulation of pressure drop inside the capillary tubes. Hence experimental investigations are the best in terms of optimization of certain design parameters. Components of the vapour compression refrigeration system never work in isolation, change in performance of one component affect the performance of the other components and in turn overall performance of the system. Performance of the system also depends on the type, quantity of the refrigerant charged. In the present work, an attempt is made to optimize Length of capillary tube for refrigeration unit of capacity 30 lts, with R-134a as refrigerant and hermetic sealed compressor of capacity 0.14H.P.and this study examined the effects of lengths capillary tubes on the performance of a vapor compression refrigeration system. It is found that 4.5feet Length of capillary tube gave a better performance. Both inlet and outlet pressure and temperature of the test section (capillary tube) were measured and used to estimate the coefficient of performance (COP) of the system The parameters stated above can be further optimized in order to enhance the performance of the refrigeration system.

Keywords: COP, Capillary tube, R-134a.

Organized by Department of Mechanical Engineering, St. Martin's Engineering College, Secunderabad, India

Mechanical and Wear Behavior of LM25 Aluminium Matrix Hybrid Composite Reinforced with Boron Carbide, Graphite, and Iron Oxide

P. Vikram^{1*}

¹ Assistant Professor, Department of Mechanical Engineering, St. Martin's Engineering College,
Dhulapally, Secunderabad, Telangana, India.

* Corresponding Author

E-mail: pvikramme@smec.ac.in

ABSTRACT

The wear behaviors of selected Aluminium (LM25) based hybrid composites manufactured by stir casting are evaluated in this study. The reinforcement particles include boron carbide (B_4C), graphite (Gr) and iron oxide (Fe_3O_4). The tribological and mechanical properties of these composite materials were investigated. A microstructural investigation of this composite shows a uniform distribution of reinforcing particles in the matrix. Wear experiments were conducted by a pin-on-disc technique. Load, sliding velocity, and sliding distance were varied. Each were varied for at least three levels i.e. load 10, 20, 30 and 40 N, ; velocity 2, 4 and 6 m/s and distance 1000, 2000 and 3000 m to investigate the wear behavior of the composite. The results indicate that with an increase in the reinforcement content, the wear loss reduced monotonically and that both the hardness and ultimate tensile strength increases. Worn surfaces of the composite specimen were analyzed by SEM for predicting the wear mechanism. This study revealed that the addition of reinforcement significantly improves the wear resistance of aluminium composites. These results show that hybrid aluminium composites should be considered as an excellent material where high strength, ultimate tensile strength and wear-resistant are of primary importance specifically in the aerospace and automotive engineering sectors.

Keywords: Metal matrix composites; aluminium alloy LM25; tensile strength; B_4C ; Gr; Fe_3O_4 ; SEM; stir casting; micro-structure; hardness; wear; density; porosity.

Fabrication of Aluminium Metal Matrix by Stir Casting

Vijayagiri Sripal^{1*}

¹ Assistant Professor, Department of Mechanical Engineering, St. Martin’s Engineering College,
Dhulapally, Secunderabad, Telangana, India.

* Corresponding Author

E-mail: sripalme@smec.ac.in

ABSTRACT

Advancement of Metal Matrix Composites (AMMCs) with improved tribological property has been one among the principal necessities inside the field of texture science and innovation. These days, 7075 composite with carbide (SiC) as support is replacement the overall parts that square measure manufacturing plant mad with alumina support on account of their higher wear opposition and creep obstruction applications. As we as a whole realize that in creating areas gears assumes a significant part in sending power from one shaft to an alternate shaft, along these lines the current work focussed on the delivering of substances with AMMC material exploitation mix projecting strategy. the different tests are led on AMMC material to comprehend the properties (Tensile strength and hardness) and it had been learned that there’s an ascent in strength and hardness by ten % contrasted with Al6061. Mix projecting strategy used in the grid planning is best affordable method to give the network. Al 7075-SiC network has been world class for the production since its likely applications in art and zone businesses because of higher solidarity to weight size connection, high wear obstruction and creep opposition.

Keywords: Al 7075 alloy, SiC-p, Stir Casting.

Intend and Investigation of Normal Convective Heat Relocate from Two Adjacent Narrow Plates

Ranjith Aavula ^{1*}, S.Pavan Kalayan ², L.Sunil ³, K.Hemalatha ⁴, K.Archana⁵

^{1,2,3,4,5} Assistant Professor, Department of Mechanical Engineering, St. Martin’s Engineering College,
Dhulapally, Secunderabad, Telangana, India.

* Corresponding Author

E-mail: aranjitme@smec.ac.in

ABSTRACT

Natural Convection flow in a vertical channel with internal objects is encountered in several technological applications of particular interest of heat dissipation from electronic circuits, refrigerators, heat exchangers, nuclear reactors fuel elements, dry cooling towers, and home ventilation etc. In this paper the air flow through vertical narrow plates is modeled using CREO design software. We will focus on thermal and CFD analysis with different Reynolds number (2×10^6 & 4×10^6) and different angles (00, 300, 450) of the vertical narrow plates. Thermal analysis done for the vertical narrow plates by steel, aluminum & copper at different heat transfer coefficient values. Finally, we observed which material is best for heat transfer coefficient and which angle is best for heat transfer.

Keywords: Laminar flow, Reynolds no, Heat flux, Temperature

Development of Dual Piston Potato Fries Cutter Machine

Ponnam Uday Kumar^{1*}

¹Assistant Professor, Department of Mechanical Engineering, St. Martin’s Engineering College, Dhulapally,
Secunderabad, Telangana, India.

* Corresponding Author

E-mail: pudaykumarme@smec.ac.in

ABSTRACT

French fries are the most widely made recipe using potatoes. Fries are served individually as well as sides with a number of food dishes. Well preparation of French fries involves a complicated process of cutting potatoes into rectangular stick shaped fries before frying. This task if done manually, requires a lot of human effort and time. When using a semi-automatic machine too requires human strength to push the lever for every potato cutting. Considering the huge quantity of fries required in restaurants, food outlets, mega kitchens etc. we need a mechanism that requires least human effort, provides consistent output on demand and is very easy to use. Well, we here fulfil this requirement using a dual side French fries maker machine. This machine uses a scotch yoke mechanism to achieve dual side potato cutting. The system makes use of an AC motor mounted with a reduction gearbox to achieve the power needed for cutting. This gearbox shaft is now mounted with a handle to power a scotch yoke piston in horizontal direction motion. This way we can utilize the motor power consumed in both direction for double speed cutting. The Pistons are attached with a pusher head with rectangular cubes pushing out through the cutting mesh.

Keywords: AC motor, Piston, Potato Fries Cutter.

Computational Fluid Dynamic Analysis of Convergent-Divergent Nozzle

Lamani Sunil^{1*}

¹Assistant Professor, Department of Mechanical Engineering, St. Martin’s Engineering College, Dhulapally,
Secunderabad, Telangana, India.

* Corresponding Author

E-mail: sunilme@smec.ac.in

ABSTRACT

The convergent-divergent nozzle finds application in many areas of industry and technology. The present work focuses on the CFD simulation of a convergent-divergent nozzle undergoing compressible flow, as there exist a few works on this topic. The work performed using a standard geometry to capture the normal shock under different exit pressure conditions. Finite volume method is to be utilized for the numerical simulations using ANSYS FLUENT. The results are to be analyzed using pressure plot, Mach number plot, different contour plots for pressure, temperature, density, velocity, flow. The study is performed to contribute towards the fundamental knowledge and practical applications.

Keywords: Pressure, Temperature, Density, Velocity and Flow.

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Modeling and Thermal Analysis of 3D Printer Extruder Infused Deposition

R. Hanuma Naik^{1*}

¹Assistant Professor, Department of Mechanical Engineering, St. Martin’s Engineering College, Dhulapally, Secunderabad, Telangana, India.

* Corresponding Author

E-mail: hanuma09321@gmail.com

ABSTRACT

Fused Deposition modeling is the prime method of Additive manufacturing process used for the polymer manufacturing. As in this process the polymer filament enter into heat sink through feed filament where it gets melts and extruded from nozzle and deposited layer by layer to build the component. So to extrude the PLA melt, the feed polymer in solid form is used as plunger. In order to remain feed filament in solid state it is necessary to remain the temperature of the heat sink much below the melting temperature of polymer. Therefore, fins are provided on the heat sink to increase the surface area. Here in this way thermal behavior of heat sink is analyzed, in this analysis heat sink having circular, elliptical and rectangular having fins are analyzed for working material that is poly – Lactic – acid.

Keywords: 3D printing, PLA, Heat transfer.

Study of Couple Field Analysis of Automotive Fins with Variation of Geometry to Increase the Life

K. Hemalatha^{1*}

¹Assistant Professor, Department of Mechanical Engineering, St. Martin’s Engineering College, Dhulapally, Secunderabad, Telangana, India.

* Corresponding Author

E-mail: hename@smec.ac.in

ABSTRACT

The Engine cylinder is one of the major automobile components which is subjected to high temperature variations and thermal stresses. High thermal and structural stresses inside the cylinder due to combustion of fuels results in expansion in the cylinder material and will indirectly decrease the life of engine. In order to cool the cylinder, fins are provided on the surface of the cylinder to increase the rate of heat transfer. By doing thermal analysis on the engine cylinder fins, it is helpful to know the heat dissipation inside the cylinder. We know that, by increasing the surface area we can increase the heat dissipation rate, so designing such a large complex engine is very difficult. Various researches done in recent years show that heat transfer by fins depend upon on variety of fins, fin pitch, fin layout, wind velocity The main aim of the present study is to analyze the thermal properties by varying geometry of cylinder fins. The 3D model of the geometries is created, and its thermal, structural properties are analyzed. The variation of temperature distribution over time is of interest in many applications such as in cooling. The accurate thermal simulation could permit critical design.

Keywords: Thermal stresses, Structural stresses, Heat transfer and Thermal simulation.

Design of Magnetron Sputtering Cathodes for Optimum Breakdown Voltage by Using Solid Works and Coating Trails

Archana Kondaparthi^{1*}

¹Assistant Professor, Department of Mechanical Engineering, St. Martin’s Engineering College, Dhulapally, Secunderabad, Telangana, India.

* Corresponding Author

E-mail: archanak873@gmail.com

ABSTRACT

The most of physical vapour deposition (PVD) processes, magnetron sputtering has been proved to have high deposition rates compared to sputtering. The aim of the present work is to design a cathode with 3-inch target/ source and optimizing the design to obtain lower breakdown voltage using solid works software. As a part of this work initially cathode-1 was designed with a maximum magnetic field (MF) strength of 480 G, which has resulted in breakdown voltage (VB) of 483 V. As the VB is very high for the obtained MF strength, modifications have been done in cathode-2 to further decrease the VB by ~ 70 V. After cathode designing Cu is used as cathode/ target and coatings have been generated with modified cathode and that coating properties like thickness and adhesion strengths were optimized.

Keywords: Breakdown voltage, magnetron sputtering, cathode design, magnetic field, sputtering properties.

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Design and Thermal Analysis of Two-Wheeler Cylinder Head

S. Pavan Kalyan^{1*}

¹Assistant Professor, Department of Mechanical Engineering, St. Martin’s Engineering College, Dhulapally,
Secunderabad, Telangana, India.

* Corresponding Author

E-mail: pavanme@smec.ac.in

ABSTRACT

The cylinder head is the linchpin of vehicles that run on internal combustion, providing the powerhouse for the vehicle. It is called a “block”; because it is usually a solid cast vehicle part, housing the cylinders and their components inside a cooled and lubricated crankcase. This part is designed to be extremely strong and sturdy, because its failure results in failure of the vehicle, which will not function until the cylinder head is replaced or repaired. Most cylinder heads are made of cast iron, although in the late 1990s, some made from plastic and other experimental materials were being used in prototype cars with the hope of developing more lightweight, efficient vehicles. Cylinder heads undergoes high thermal and structural loads. The main objective of the project is to study design cylinder heads. The cylinder head design is done in CATIA simulation.

Keywords: CFD, CATIA, Heat transfer, Automobile.

Manufacturing of Drone Components Using 3D Printing Technology

L. Nagamani^{1*}

¹Assistant Professor, Department of Mechanical Engineering, St. Martin’s Engineering College, Dhulapally,
Secunderabad, Telangana, India.

* Corresponding Author

E-mail: lnagamanime@smec.ac.in

ABSTRACT

The objective of this project was to design and manufacture the components of drone using additive manufacturing (3D printing technology). By using the following method light weight drone components of different effective designs can be made, assembling which various drones of different required shape and sizes can be made. The body, arms, and legs were designed using two design software’s Catia and Hyper mesh. These parts were printed using two 3D printers: The Flashforge guider V was used to print the arms using CFRP (Carbon fiber reinforced material) material and the Flashforge Creator Pro printed the body and legs using Carbon fiber reinforced material (CFRP) material. These components should be realistic such that, they can be further used in manufacturing a 3D printed drone.

Keywords: 3D printing, Drone, Flash forge, CATIA, Hyper mesh.

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360⁰ Turning Steering Mechanism

J. Prem Kumar^{1*}

¹Assistant Professor, Department of Mechanical Engineering, St. Martin’s Engineering College, Dhulapally,
Secunderabad, Telangana, India.

* Corresponding Author

E-mail: chandraskharme@smec.ac.in

ABSTRACT

This paper explains 360 degrees turning steering mechanism through which the vehicle can be turned around 360⁰. This mechanism consists of arrangement of the various kinematic links and rack and pinion arrangement. With this steering mechanism, vehicle can rotate in all directions. In this system at first vehicle is stopped and then turned to the required direction, then again started. This system is very suitable for four-wheeler electric vehicles. This type of steering mechanism is useful to drive on narrow roads. It is suitable for transport vehicles inside the industries. This system can be useful in better parking, escape from traffic jams, back turning on narrow roads.

Keywords: Steering mechanism, EV vehicle, Rack and pinion arrangement.

UGC AUTONOMOUS

A Critical Review on Wire Lag Issue and Its Prevention Strategies In WEDM

Subhankar Saha^{1*}

¹Assistant Professor, Department of Mechanical Engineering, St. Martin’s Engineering College, Dhulapally,
Secunderabad, Telangana, India.

* Corresponding Author

E-mail: sahamech90@gmail.com

ABSTRACT

WEDM has gained great interest due to its potential to create complex profiles and ease in machining exotic materials. Wire lag is the phenomena whereby the wire lags behind the wire guides due to the exposure of the wire to different process forces. These forces include the pressure forces induced due to the gas bubbles that are formed because of material erosion with the plasma, the axial force that tends to hold the wire in the straight position, dielectric flushing induced hydraulic forces, the electrostatic forces, and the electrodynamic forces. The inherent problem of wire lag, however, has a significant impact on the accuracy and precision of complex profiles in WEDM. The present paper aims to review the efforts put forth by the scientific community to mitigate the effects of wire lag and also stated the future avenues for research in this area.

Keywords: WEDM, Wire lag, Prevention strategies, etc.

Design and Printing of Foldable Helmet Using 3D Printer

R Sanjeev Kumar^{1*}, A Gopichand², B Mahesh Krishna³, P Satyanarayana Raju⁴, Rakesh Eda⁵

^{1,2,3,4,5} Dept. of Mechanical Department, Swarnandhra College of Engineering & Technology,
Narsapur, Andhra Pradesh.

* Corresponding Author

E-mail: sanjeev.rvs@gmail.com

ABSTRACT

For riding a bike, wearing a helmet is an important safety precaution, but some people do not wear a helmet because it is too big and bulky. It is very difficult to wear on a long drive and not easy to carry anywhere. To overcome this problem, foldable helmets is manufactured using 3D printing. The objective of this project is to produce a weightless and foldable helmet for ease of carrying. The helmet is designed using CATIA and a prototype foldable helmet is successfully fabricated using a 3D printer.

Keywords: Helmet; CATIA design; 3D printer; Foldable helmet.

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Computational Fluid Dynamic Analysis on Rocket Nozzle Using Ansys

V John Bunyan^{1*}, M Francis Luther King², A Gopichand³, D Bhanu Prakash⁴, JNVV Ramaganesh⁵

¹Assistant Professor, Dept. of Mechanical Engineering, Swarnandhra College of Engg. & Technology

²Associate Professor, Dept. of Mechanical Engineering, Swarnandhra College of Engg. & Technology

^{3,4}Professor, Dept. of Mechanical Engineering, Swarnandhra College of Engg. & Technology.

⁵Student, Dept. of Mechanical Engineering, Swarnandhra College of Engg. & Technology.

* Corresponding Author

E-mail: johnmescet@gmail.com

ABSTRACT

A nozzle is used to give the direction to the gases coming out of the rocket engine combustion chamber. A rocket engine uses a nozzle to accelerate hot exhaust to produce thrust. Amount of thrust produced by the engine depends on the mass flow rate of the engine, the exit velocity of the flow, and the pressure at the exit of the engine. The present study is carried out using software ANSYS for analyzing the flows in the nozzle and to get desired result. The flow parameters are defined prior to the simulation. The result shows the variation in the Mach number, pressure and temperature distribution.

Keyword: ANSYS, Nozzle, CFD, Flow analysis, etc.

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Evaluation of Glucose Concentration in Blood Stream and Effects of Psychological Stress on Diabetes Management Using Data Science

V. Anjana Devi^{1*}, E. Bhuvaneshwari², P. Karthikeyan³, Rama Krishna Tummala⁴

¹ Professor, Dept. of Computer Science and Engineering, Rajalakshmi Institute of Technology Chennai

^{2,3} Associate Professor, Dept. of Computer Science and Engineering, Rajalakshmi Institute of Technology

⁴ Associate Manager, Accenture Solutions Pvt. Ltd, Chennai, India.

* Corresponding Author

E-mail: anjanadevi.abby06@gmail.com

ABSTRACT

Diabetes is a condition that affects the way your body converts food into energy. When the sugar level increases, it indicates that the pancreas is releasing insulin. The first glucose speculation model was developed that combined physical activity measurements with severe mental stress to improve GC predictive accuracy. The effects of physical activity and severe stress on glucose levels will improve diabetes management and empower knowledgeable diet, function, and insulin dose decisions. Glucose concentration levels are influenced by a variety of physical and metabolic variables, such as physical activity (PA) and severe stress (APS), in addition to diet and insulin. Today machine learning model is used in the health care system where there is a possibility to predict the disease at the earliest. A key requirement of Artificial intelligence is data processing. The previous database is collected and is used to create a machine learning model. The required pre-processing techniques are used to make constant analysis and bivariate analysis. The data is displayed to understand the features and is since the division model is constructed using a machine learning algorithm and comparisons of algorithms are made based on their performance metrics such as accuracy, F1 score memory etc.

Keyword: Artificial Intelligence, Natural Language Processing, Machine Learning, Diabetes Mellitus (DM), Artificial Neural Network.

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Ride Sharing with Privacy and Security Using Hashed Time Contract and Trust Fair Payment Harnessing Block-Chain Technology

V. Anjana Devi^{1*}, N. Kanagavalli², E. Bhuvaneshwari³, A.G. Noorul Julaiha⁴

^{1,2,3,4} Department of CSE, Rajalakshmi Institute of Technology, Chennai, Tamil Nadu, India.

* Corresponding Author

E-mail: anjanadevi.abby06@gmail.com

ABSTRACT

Most of the available ride sharing services relies on an outside company to set up the service, making them less than one point of failure and worry and privacy data are disclosed by both internal and external attackers. In addition to that there is a possibility for other attacks such as Distributed Denial of service (DDoS) and Sybil attacks introduced by malicious users and external attackers. In addition, fees charged by the ride-sharing service provider will be very high. This system proposing a distributed sharing service based on the Community Block series, called Ride sharing DApp. This system does not rely on any trusted third party. From the travel data, including boarding / landing, departure / arrival date and departure value, the passengers and drivers can learn easily whether they can share a ride or not. Sharing a ride DApp solves this problem by introducing a long-term closed sharing ride using smart contract and proof of uninformed membership. Later, the driver must show up on the block chain at the agreed time to pick up / arrive at the pick-up point. In order to maintain the privacy of the passenger / driver by encrypting the exact location to be retrieved, the proof is made using the proof of membership of an empty set of information. This system also ensures the fair payment for the distance during the ride. Ethereum test network has been used for implementing the proposed system. Test result shows the performance of the proposed system is better than the existing system.

Keyword: Distributed Denial of service (DDoS), Greedy algorithm, Ethereum, Decentralized Application (DApp), Block chain, Attacks and disclosure.

Secure Online Pre-Medical Diagnosis Using Attribute Based Encryption

V. Anjana Devi^{1*}, E. Bhuvanewari², P. Karthikeyan³, Rama Krishna Tummala⁴

¹ Professor, Dept. of Computer Science and Engineering, Rajalakshmi Institute of Technology Chennai

^{2,3} Associate Professor, Dept. of Computer Science and Engineering, Rajalakshmi Institute of Technology

⁴ Associate Manager, Accenture Solutions Pvt. Ltd, Chennai, India.

* Corresponding Author

E-mail: anjanadevi.abby06@gmail.com

ABSTRACT

Electronic Health Record (EHR) collects electronic health information to pertaining health of an individual or health care provided to an individual and it can support of efficient processes for health care delivery. The decision tree table stores the encrypted data of the patient’s medical detail through symmetric key encryption which is accessible easily without any security standards. To overcome this issue and to keep the medical documents in a more preserved way, we introduce a system that stores the data in a more secure way and provides the necessary information to the doctor only with the authorization of the patient. In our project, we make use of Attribute Based Encryption (ABE) and Hierarchical Attribute Set Based Encryption (HASBE) method to encrypt the patient’s medical record, details and view them in hierarchical manner based on the patient’s authorization to ensure data confidentiality.

Keywords: Attribute Based Encryption (ABE), Hierarchical Attribute Set Based Encryption (HASBE), Cryptography, Cloud computing and Data Access Control.

Design of Solar Electric Scooter Using Fusion 360

A. Mahesh Krishna^{1*}, A Gopichand², Ch Harish Kumar³, R Lalith Narayana⁴, R Bala Sai Avinash⁵

^{1,2,3,4,5}Department of Mechanical Engineering, Swarnandhra College of Engineering and Technology,
Seetharampuram, Narsapur-534 280.

*

Corresponding Author

E-mail: b.maheshkrishna@gmail.com

ABSTRACT

The main concept our project is to design and assembly of a solar electric scooter. Solar electric scooter is recharged from external source of electricity, and it is stored in rechargeable battery. Designing of a solar electric scooter is very complicated process which involves serious of other processes that are hard designed it take a very long time of thinking of proper dimensions and even the proper shape of all different parts. The designing is done through fusion 360 software and the assembly also done in the fusion 360. The speed of the solar electric scooter is limited, and electricity is generated using a solar panel. But when energy converted using solar energy and a battery it becomes more easy and helpful in the propulsion of E-scooter.

Keywords: Solar electric scooter, Fusion 360.

Particle Swarm Optimization for Hole Circularity and HAZ in Laser Micro Drilling of Ti6AL4V

P.P.S.Keerthi^{1,2*}, M.S.Rao³

1. Research Scholar, Department of Mechanical Engineering, JNTU, India, Telangana, India
2. Assistant Professor, Department of Mechanical Engineering, GVP College of Engineering(A),
Visakhapatnam, Andhra Pradesh, India
3. Professor, Department of Mechanical Engineering, JNTU, India, Telangana, India

* Corresponding Author

E-mail: Keerthi.rajaneesh@gmail.com

ABSTRACT

Laser micromachining (LMM) is an unconventional machining process that removes material by ablation. LMM finds its usage mainly in aerospace, automobile, biomedical applications etc. Ti6AL4V is an alloy of titanium, known for its biocompatibility. The properties of this alloy make it one of the difficult to machine materials by conventional means. In this work, LMM on Ti6Al4V is performed using spot diameter, feed rate and sheet thickness as the process parameters. The hole characteristics Heat Affected Zone (HAZ) and Hole circularity for the drilled holes are investigated. Regression Analysis is also performed to obtain the relation between the parameters and the performance measures. The developed equation is further optimized using Particle Swarm Optimization Techniques.

Keywords: Ti6AL4V, Laser micro-drilling, Circularity, Heat Affected Zone (HAZ), Regression Analysis, Particle Swarm optimization (PSO).

A Review on Pancreatic Ductal Adenocarcinoma Disease by Using Machine Learning Techniques

Rewati Rane^{1*}, Dnyaneshwari Patil²

^{1,2} Dept. of Computer Science & IT, MGM's Dr. G. Y. Pathrikar College, Aurangabad, India

* Corresponding Author

E-mail: dnyaneshwari03patil@gmail.com

ABSTRACT

Amongst all kind of cancers, Pancreatic ductal adenocarcinoma (PDAC) is becoming one of the deadliest cancer type with 5-year survival rate. It makes crucial to identify high-risk patients due to lack of reliable screening tool & dependency on inadequate resource of highly experienced technicians. Mostly used medical techniques for detection are ultrasonography (US), computed tomography (CT), magnetic resonance imaging (MRI), positron emission tomography (PET), and endoscopic ultrasonography (EUS), Multi-detector row computed tomography (MDCT). Role of clinicians becomes vital considering the advantages and disadvantages of the various pancreatic imaging modalities for diagnosis, optimal treatment & disease control management. Asymptomatic nature of PDAC in the early stages is another challenge making it dangerous when exposed at later stage increases severity. To reduce the death rate and enhance the survival rate, early identification of the disease is highly essential. In the literature, there are many studies about diagnosis and prediction of PDAC using machine learning techniques including Artificial Neural Network (ANN), Bayesian network (BN), support vector machine (SVM), and decision tree (DT), Adaptive Neuro-Fuzzy Inference System (ANFIS), k-nearest neighbors (K-NN). Enhancement in precision & performance is added on with use of above techniques.

Keywords: Pancreatic Ductal Adenocarcinoma (PDAC), Machine learning techniques.

Experimental Investigation of Passive Solar Still with Coated Copper Fins

R. Lalitha Narayana^{1*}, A. Gopichand², D. Bhanu Prakash³, PSN Raju⁴, G. Robert Singh⁵ & R. Sanjeev Kumar⁶

^{1,2,3,4,5,6} Department of Mechanical Engineering, Swarnandhra College of Engineering and Technology, Narsapur, Andhra Pradesh, India.

* Corresponding Author

E-mail: lalith.narayana75@gmail.com

ABSTRACT

Solar still provides potable water in remote and coastal areas in an economical and simple way. Various methods such as coated fins and uncoated fins have been proposed earlier for an improved performance of the solar still. The influence of coated and uncoated fins on the performance of solar still has been determined experimentally. Three different types of solar stills that make use of coated and uncoated copper fins, and conventional solar still were considered for the study. A single slope solar still with condensing cover of 30° inclination has been used to conduct the experiments on. During the experiments water depth 5cm, fin size 30×3×0.3 cm³ and number of fins 30 are constant for both uncoated copper fins solar still and coated fins solar still. The study was performed for 24 hours in Indian coastal climatic conditions. The overall distillate yield and efficiency of the still were measured with and without black coated fins in the experimental study. Owing to the higher thermal conductivity and absorber surface area, higher distillate yield and efficiency were observed by solar stills with coated copper fins, than uncoated and conventional solar stills. The method afforded 18.61% & 42.23% more yields and 3.41% & 6.67% higher distillation efficiency with coated copper fins solar still as compared to uncoated and conventional solar stills respectively.

Keywords: Distillation efficiency - Solar still - Heat transfer coefficient - Copper fins.

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