

DEPARTMENT OF MECHANICAL ENGINEERING

MOMENTUM

NEWSLETTER

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MANGALAM COLLEGE OF ENGINEERING

Hybrid Cycle



Albin K Shajan, Rahul C Babu, Blesson Sunny and Noel Binoy, the final year mechanical engineering students of Mangalam College of Engineering with the hybrid cycle along with guide Assistant Professor Harikrishnan A.R.



A hybrid bicycle is an effective vehicle for a commuter. This vehicle will not run out of fuel for any reason. The rear wheel of the bicycle is powered by the petrol engine and the front wheels help the cycle in case of running out of fuel. The front wheel is powered by an electric hub motor. The batteries for this vehicle help us for that. In the event that the battery runs out of energy, the solar panels on both sides of this bike help to recharge the batteries. This vehicle can travel at a speed of 45 kmph. Environment friendly and less pollution.

The main features are

- No Fuel Worries
- Solar Charging
- Speed and Efficiency
- Eco-Friendly

The hybrid bicycle was built by Albin K Shajan, Rahul C Babu, Blesson Sunny and Noel Binoy, final year students of Mangalam College of Engineering under the guidance of Assistant Professor Harikrishnan AR in the Department of Mechanical Engineering.

Puncture grief on the journey is over!

TWO WHEELER PUNCTURE ASSISTING TROLLEY

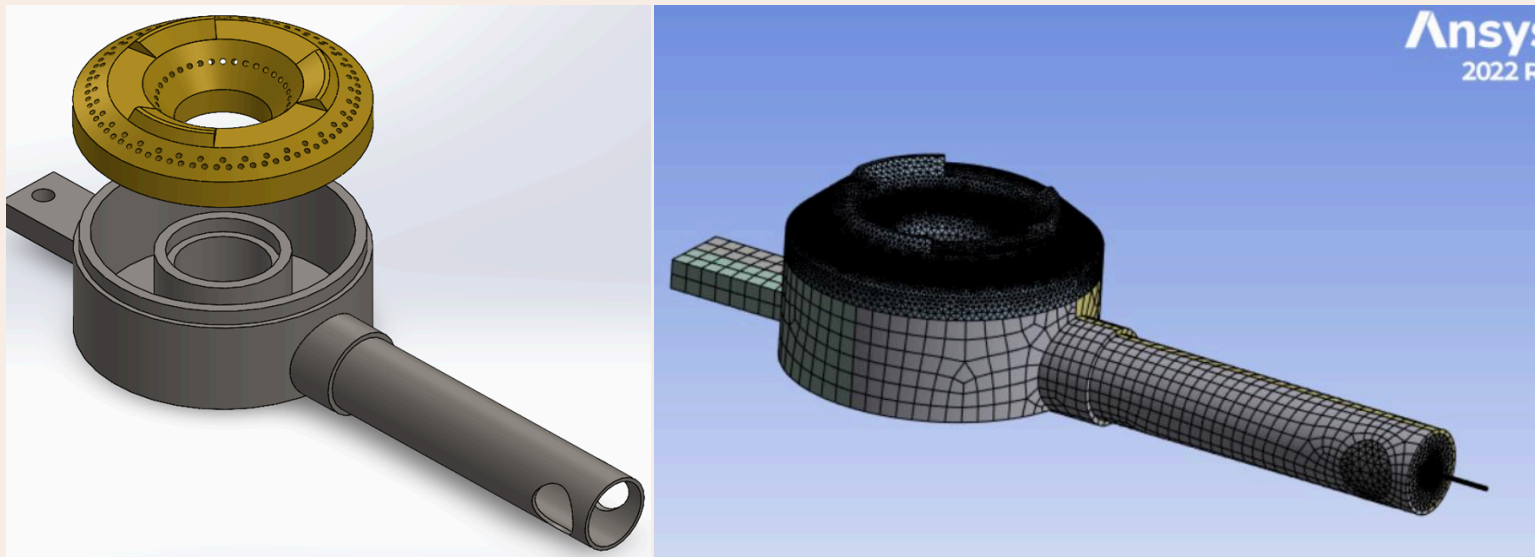


Mangalam College of Engineering final year Mechanical Engineering students Amaldev H, Gopikrishnan G, Gowrisankar A and T Muhammad Tanzeer with two wheeler puncture assisting trolley guided by Assistant Professor Santhu Varghese Thomas.



One of the biggest problems faced by two-wheeler users in our society is getting a flat tyre on the road. Amaldev H, Gopikrishnan G, Gowrisankar A and T Mohammad Tanzeer, final year Mechanical Engineering students studying at Mangalam College of Engineering, have found a solution to this situation which is causing a lot of trouble for two-wheeler commuters. As part of their final year project, under the guidance of Assistant Professor Santhu Varghese Thomas, Department of Mechanical Engineering, the "Two Wheeler Puncture Assisting Trolley" made by them helps the passenger to easily drive the punctured two-wheeler to the nearest workshop. Although there is such a trolley which can be attached to the front wheel, this trolley which can be used on both wheels can be considered as a new invention in the field of automobile. Its design patent has been published.

Why are the basic designs of domestic burners the same? An investigation.



Different phases of Burner design

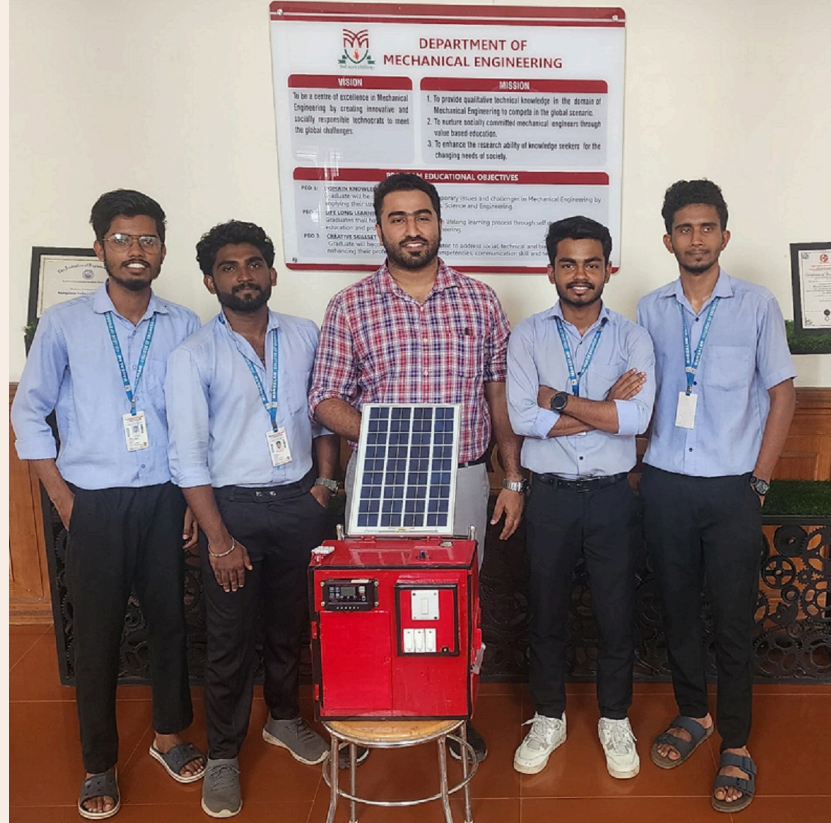
The design of domestic burners in India has remained relatively unchanged over the decades. Such an investigation aims to objectively understand the effectiveness of these long-term designs.

The performance of domestic burners was investigated and the standard burner design was analyzed with the help of ANSYS software based on CFD (Computational Fluid Dynamics). The thermal efficiency, performance and incomplete combustion of the existing burner design were investigated. Subsequently, the shape of the burner hole was redesigned from a cylindrical design to a tapered configuration. This change resulted in a significant change in the geometry of the burner orifice, and the resulting advantages and disadvantages were evaluated. Finally, the performance of the standard burner was compared with the redesigned models. The existing burner was found to be more efficient than the redesigned one due to its uniform heat distribution.

The analysis was carried out by Abhimanyu Biju, Manish S, Soni Antony and Jacob Binoy, final year students of Mechanical Engineering at Mangalam College of Engineering under the guidance of Amal R, Assistant Professor, Department of Mechanical Engineering.

Technology Meets Culinary Creativity

Smart Kitchen Assistant



Karthik Jeevan, Kannan Biju, Vishal Sasidharan and Ashwin PB, the final year Mechanical Engineering students of Mangalam College of Engineering with smart kitchen assistant, guided by assistant professor Johan George Cherian. ➔

A major problem we face on long trips is the lapses in meal preparation, as well as spending time in the kitchen preparing meals. To easily avoid these problems, an invention developed by Karthik Jeevan, Kannan Biju, Vishal Sasidharan and Ashwin PB, final year Mechanical students of Mangalam College of Engineering in their final year project "Smart Kitchen Assistant". They have designed this device with the guidance of Assistant Professor Johan George Cherian of the College's Mechanical Engineering Department. It includes essential facilities such as vegetable chopping, water purification and storage of cooking utensils. It also includes light and mobile charging slots that can be used in emergency situations. These are operated in this device with the help of solar energy. Also, its light weight and compact size are helpful for a long distance traveller. With this, they are proving that the kitchen can now be kept under the handle.

A solution for healthcare

Automatic Medical Waste Packing Bin

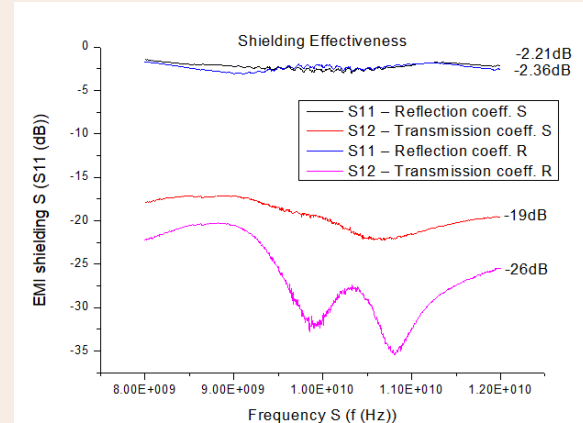
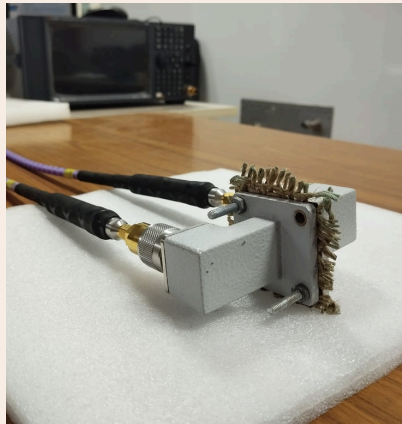


An automatic medical waste packing bin made by final year students Mahesh Narayanan, Amalnath G, Ananthu Gopal and Abhirami R under the guidance of Assistant Professor Navish Kumar, Department of Mechanical Engineering, Mangalam College of Engineering.

Bio-waste management is always a big challenge in hospitals and clinics. Improper disposal of contaminated waste is a major health hazard. A solution to this problem has been found with a project called Automatic Medical Waste Packing Bin, which was built by final year students Mahesh Narayanan, Amalnath G, Ananthu Gopal and Abhirami R under the guidance of Navish Kumar, Assistant Professor of Mechanical Department at Mangalam College of Engineering. It is a technique used to pack and treat hospital waste. Medical waste such as gloves, masks, IV sets and syringes can be deposited in the bin when the top door is opened using the sensor. The door will close automatically after the waste is filled. When the waste is full, the packing mechanism in the bin will work and the packed waste will be delivered to a safe place by the robot car and disposed of.

Scientific implementation of waste collection and treatment will ensure the safety and health of health workers and avoid environmental problems. Its design patent has been published.

Development of Graphene Cobalt Nickel Ferrites for Electromagnetic Shield & Capacitance Application



Vector network analysis and VNA results showing the protective effectiveness of sample R and S, R-NiFe204-rGO-0.5gm+0.5gm SCF and S-CoFe204-rGO-0.25gm+0.5gm SC. Under the leadership of Associate Professor of Mechanical Department Dr. Manuel George, final year students Sijin Varghese, Ajay TS, Ashwin KS and Jomin Roy

Vector network analysis, VNA helps develop new materials and designs for radio frequency, RF, and microwave technologies. Such measurements are critical to designing RF components to ensure they operate efficiently within their designated frequency range. Regular testing ensures that manufactured components meet their specifications and perform reliably in real-world applications. The CoFe204-graphene composite exhibits relatively low reflectance across the frequency range, indicating efficient operation with minimal signal loss due to reflection. NiFe204-graphene exhibits efficient signal transmission. Low input reflection across the frequency range, S11 values indicate effective impedance matching and low signal reflection, critical to maintaining signal integrity and performance in RF and microwave applications. Dielectric impedance spectroscopy is a technique used to study the electrical properties of functional materials. This method provides valuable insights into the electrical behavior of insulating materials and their properties including capacitance, resistance, and dielectric constant. The NiFe graphene sample shows high capacitance and low electrical loss, while the CoFe-graphene sample shows high efficiency. These differences will guide the choice of materials depending on the specific requirements of the application, for example, a CoFe-graphene composite designed for higher storage capacity or greater efficiency is critical. Cobalt ferrite and nickel ferrite with graphene achieved a shielding effectiveness in the range of 20 to 30 dB and are therefore considered very good shielding materials with a shielding between 99.0% and 99.9% of electromagnetic waves.

Automatic Belt Transfer System



Mangalam College of Engineering final year Mechanical Engineering students Akhil Suresh, Akshay PB and Emin Joseph guided by Assistant Professor Premjith S. with Automatic Belt Transfer System Technology to Streamline Grain Processing

An automatic belt transfer system in a grain processing machine is a system designed to efficiently move grain from one point to another within the processing line. Automatic belt transfer systems revolutionize grain processing by streamlining workflow and increasing efficiency. The system incorporates advanced technology including electric motors, automatic change over belt pulleys, power transfer switches, crushers, rice mills and servo motors. The automatic belt transfer system optimizes labor utilization, ensures continuous operation and maximizes productivity.

The system was developed by Akhil Suresh, Akshay PB and Emin Joseph, final year Mechanical Engineering students of Mangalam College of Engineering under the guidance of Assistant Professor Premjith S. Its design patent has been published.

Semi-Automated Solar Incubator



Anand Prasad, Anujith S, Tobin Joseph and Denimon Davidson, final year Mechanical students of Mangalam College of Engineering, have developed a decay detecting technology that detects non-hatching eggs in an incubator. with Associate Professor Dr. Rabi Johnson

Hatching eggs that are not likely to hatch is a challenge faced by poultry farms and other small farmers. This technology using color sensor is a solution for this. The objective of this research was to develop an easy to use, modern incubator at a low cost. This machine continuously moves the eggs through an inclined tray, just as eggs are turned frequently in a natural hen house. This ensures a suitable environment for the development of the embryo. This helps in getting air inside the egg and keeping the yolk in proper position. The tilting of the tray is automatically controlled at certain time intervals. This technique helps identify rotten eggs by changing their color. A color sensor checks the color of the egg and detects unhealthy changes. By removing such eggs from the incubator, the health of other eggs is ensured. Successful hatching is ensured by maintaining the right temperature and humidity for egg hatching.

Final year Mechanical students Anand Prasad, Anujith S, Tobin Joseph and Denimon Davidson, This system was developed under the leadership of Associate Professor Dr. Rabi Johnson. Its design patent has been published.

Automated Multi-Crop Dryer and Grinder



Anil Joseph, Anandu S, KS Aghaneshkrishna, Shine K Shaji, Final Year Mechanical Students of Mangalam College of Engineering guided by Associate Professor Rajeev K Mohan, with Automated Multi-Crop Dryer and Grinder

This project aims to design and develop a self-powered drying grinding system for home and small scale farming purposes. This machinery ensures energy efficiency and high quality products by making crop drying and grinding more effective using modern sensor technology and microcontroller. Another feature is the smart control system that enables remote monitoring and control. Difficulties in processing very small quantities of crops and issues of poor quality due to climate change, this system provides a comprehensive answer by integrating state-of-the-art technology. Also, this project is a big step in the right direction to bring together ancient farming methods and contemporary technologies. Automated multicrop dryers and grinders with smart control systems have a lot of potential to completely transform small household agricultural processing.

The system was developed by final year mechanical students Anil Joseph, Anandu S, K S Aghaneshkrishna and Shine K Shaji under the guidance of Associate Professor Rajeev K Mohan. Its design patent has been published.

A Revolutionary Change in Bulletproof Clothing.



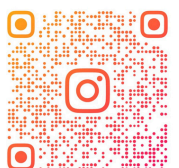
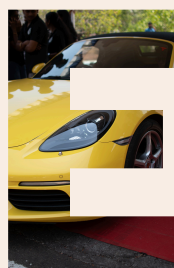
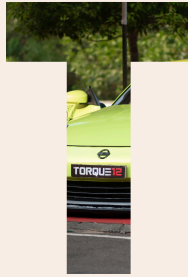
Mechanical Engineering students Akash T, Rex Jeemon, Rishikesh J and Jeswin James with the material of bulletproof vests developed under the guidance of Professor Dr. Manikandan H

Final year Mechanical Engineering students of Mangalam College of Engineering are revolutionizing the technology of bulletproof clothing using advanced composite materials. They ushered in a new era of personal protection with easy-to-wear bulletproof clothing made from composites such as felt, M-Sand, and silicone rubber sealants that could provide high ballistic resistance at low cost.

M-Sand, a micro-fine aggregate in the construction sector, provides high density for bulletproof vests. This material resists penetration and adds security, making it a low-cost solution to traditional options.

Mechanical Engineering students Akash T, Rex Jeemon, Rishikesh J and Jeswin James, under the guidance of Professor Dr Manikandan H, initiated this innovative idea as part of their final year project. Then the quality of the bulletproof clothing was ensured through various tests like impact test, bullet firing test and mechanical test. Research and development efforts aimed at further improving and nurturing their performance in real-life environments are on-going, promising to represent a major advance in the field of personal protection.

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