

PANIMALAR ENGINEERING COLLEGE

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Approved by All India Council For Technical Education, New Delhi

POONAMALLEE, CHENNAI- 600 123.



DEPARTMENT OF MECHANICAL ENGINEERING

NEWSLETTER – THE TORQUE

.... Ready to be driven

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VISION

The Department of Mechanical Engineering will be globally recognized as a pioneer in Under Graduate Engineering Programs through its excellence in teaching and research, catering to the significant and evolving societal needs.

MISSION

Mission 1: To serve the society by developing competent engineers with outstanding leadership qualities and ethical values.
Mission 2: To address the progressive needs of the society and industry using modern engineering tools and cutting edge technologies.
Mission 3: To inculcate the importance of professional development within budding engineers through sustained learning.

PROGRAMME EDUCATIONAL OBJECTIVES

PEO 1: Graduates will contribute to the industrial and societal needs as per the recent developments using knowledge acquired through basic engineering education and training.

PEO 2: Graduates will be able to demonstrate technical knowledge and skills in their career with systems perspective, analyze, design, develop, optimize, and implement complex mechanical systems.

PEO 3: Graduates will be able to work in multidisciplinary environment developing complex mechanical systems.

PEO 4: Graduates will work as a team or as an individual with utmost commitment towards the completion of assigned task using apt communication, technical and management skills.

PEO 5: Graduate will recognize the importance of professional development by pursuing higher studies in various specializations.

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articles visit

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PROGRAMME OUTCOMES

Engineering Graduates will be able to:

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions

11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

"Invention is the most important product of man's creative brain. The ultimate purpose is the complete mastery of mind over the material world, the harnessing of human nature to human needs"

– Nikola Tesla

Microbial Enhanced Oil Recovery

Microbial enhanced oil recovery (MEOR) is motivated by the fact that numerous core scale experiments have shown an increased oil production due to microbial activity. In some cases the increased oil production has been extremely high while in some cases very low (see Bryant and Lockhart (2000)). The experimental evidences are convincing that something is going on inside the core which increases the oil production.

The interpretation of core scale experiments is complicated due to one simple reason that when oil is released, one never really knows what kind of mechanism is responsible for the increased oil production. Even if the microbes or product produced by the microbes was responsible for the extra oil produced, one does not know precisely what they did. The core acts as a black box. In order to do a field trial or pilot one needs to understand in detail what the microbes are doing. As an example core scale experiments are often performed on water wet cores. If the mechanism for extra oil production is wettability change towards more oil wet behaviour, then one needs to take into account that the reservoir is probably not water wet, but mixed wet.

Biofilms can grow on the surface of the porous rock, which may lead to a change of surface properties and/or a decrease in permeability. Permeability reduction cannot explain increased oil production from water wet cores. The properties of the biofilm will be different from the rock properties. The change in surface properties inside the porous rock can thus lead to a change in the wetting properties. If the microbes locally change the wettability close to a trapped oil cluster, this oil cluster can be mobilized when the receding contact angle is reduced sufficiently

Smart Materials

In this Smart Materials A view towards Shape Memory Alloy Mech Paper a comparative study between SMA's and other generally used materials or alloys is made , with the help of live examples (aircraft maneuverating, robotic muscles and human bone plates).

Smart materials are one among those unique materials, which can change its shape or size simply by adding a little bit of heat, or can change from a liquid to a solid almost instantly when near a magnet. These materials include piezoelectric materials, magneto-rheostatic materials, electro-rheostatic materials, and shape memory alloys (SMA's).

Shape memory alloys (SMA's) are metals, which exhibit two very unique properties, pseudo-elasticity (an almost rubber-like flexibility, under-loading), and the shape memory effect (ability to be severely deformed and then return to its original shape simply by heating).

Ship with Wind Mills

The Ship with Wind Mills Mechanical Engineering Seminar aims at bulding Ship With Wind Mill to use its energyu and generate power out of it at a very economical price.Wind energy,one of the non-conventional sources of energy can be utilized to run wind mills to produce electricity. The latest technologies of wind mills say that the offshore wind mills have high out put. This is because offshore is free from obstacles and full of non-stop high speed winds. The power developed by the wind mills is said to be depend on the cube of velocity of air that passes through the turbine. Offshore wind mills have only for the 97% of time, which means the technology is yet to develop to be more efficient.

Electricity Generation from Speed Breaker

The Electricity Generation from Speed Breaker Final Year mechanical project describes the new automobile gear level indicator which is composed of digital gear level indicator with power generation. It refers to the location of vehicle gear stage and engine over heating. The gear level circuit includes components.

They are over heat indicating circuit, LCD display, sensing elements, gear box, and engine. The proposed mechanical system gathers the necessary components and materials.

The main aim of this projects is to generate electrical energy from waste & useless energy (Mechanical energy). The common question is how to generate power from the speed breaker, It is so simple by using electro-kinetic road ramp generators & springs.

Emissions Reduction Using Hydrogen from Plasmatron Fuel Converters

Today, pollution is a major danger to the Environment. Vehicular exhaust is responsible for the pollution. PLASMATRON fuel converter technology is the new technique that reduces the concentration levels of emissions. Engineers have added hydrogen to gasoline to make an engine run cleaner and efficiently. It is suitable for fuel pretreatment and for exhaust after-treatment applications. The Emission control methods are Fuel pre-treatment and Exhaust after-treatment. The Plasmatron fuel converters are Thermal type and Low current type.

This emissions reduction using hydrogen from plasmatron fuel converters project describes a block diagram of Diesel Engine Emissions Aftertreatment Concept which is explained in two ways, normal operation and regeneration. In normal operation, the oxygen rich is exhausted from engine which is absorbed by the catalyst and that cleans the exhaust. But in regeneration, there is a plasmatron reformer which is a diesel fuel. It is rich with hydrogen gas to have clean exhaust.

The energy given by the plasma facilitates partial oxidation reactions with negligible soot production. Under ideal stoichiometric conditions, the partial oxidation reaction is given by $C_nH_m + n/2 O_2 \rightarrow nCO + m/2 H_2$. It gives continuous ignition at the entrance of the fuel in the gasification of fuel.

It increases gasoline engine efficiency by 20 to 25%. It potentially reduces U.S. oil imports by 1.5 million barrels per day. It also reduces diesel engine which exhaust emissions by 90%. It needs modest engine modifications with no major redesign of the vehicle.

Anti Collision Devices

The ACD Network is a Train Collision prevention system designed, developed and patented by Konkan Railway Corporation Limited (A Public Sector Undertaking of Ministry of Railways, Government of India). Its concept was first proposed by the former chairman of Konkan railways Mr. B raja ram in the 90s. Its patent was filed in the sept 1999 and the patent was granted in the year 2005. It is a self-acting microprocessor-based data communication device which when installed on locomotives (along with an auto-braking

guard vans, stations and level-crossing gates (both manned and unmanned), prevents high-speed collisions in mid-sections, station areas and at level-crossing gates.

The ACD uses both radio frequency and Global Positioning System (GPS) through satellites, whereby a train is automatically brought to a halt if the track ahead is not clear. The train starts braking 3 kms ahead of a blockade. The Anti-Collision Device (ACD), also called 'RakshaKavach,' envisages setting up a network of "self-acting" micro-processor based communication devices which automatically apply brakes on trains that are unknowingly getting into a "collision-like situation," including before stations and at mid-sections. "At the mid-sections, where neither the protection of signals nor guidance is available to the driver, the ACD makes the loco intelligent and extends its capability to detect any collision-like situations in a range of 3 km, which the driver cannot detect on his own. Situations like collision between two approaching trains or between a derailed train on one track and an approaching train on the adjacent track can thus be prevented, according to the KRCL official.

Head and Neck Support (HANS)

Only recently has the racing industry acknowledged that the number one cause of racing-related fatalities is basilar skull fractures from excessive head motions and neck loading. Racing legend Dale Earnhardt's death proved to the racing world and the general public that what appears to be a low impact crash can be fatal.

reduce the risk of serious injury or even death to the driver in such a crash. It is the Head and Neck Support (HANS). The HANS, head and neck support was invented by Dr. Robert Hubbard, a biomechanical engineering Professor at Michigan State University. Many debilitating or fatal head and neck injuries could be prevented using this system.

The latest example of the engineers' efforts to make Grand Prix racing as safe as possible is the new Head And Neck Support (HANS). The system is easy to use and extremely effective. It prevents over-extension of the driver's neck region in the event of extreme deceleration. It is designed to 'complete' driver head protection, covering the one aspect to be still exposed.

Forward movement of the head and neck has, until now, been the only unrestrained area in driver impact safety. Extensive research and testing has resulted in what experts now believe to be a practical solution to the issue.

HANS features a carbon fibre collar connected securely to the upper body, with straps attaching it to the helmet. The four main parts of the system are:

1. Support brace- rests on shoulders.
2. Padding- is 'fine tuned' for both comfort and fit.
3. Tethers-high strength Nomex tethers secure helmet to support brace.
4. Anchoring- complete system is secured by standard 75mm shoulder straps.

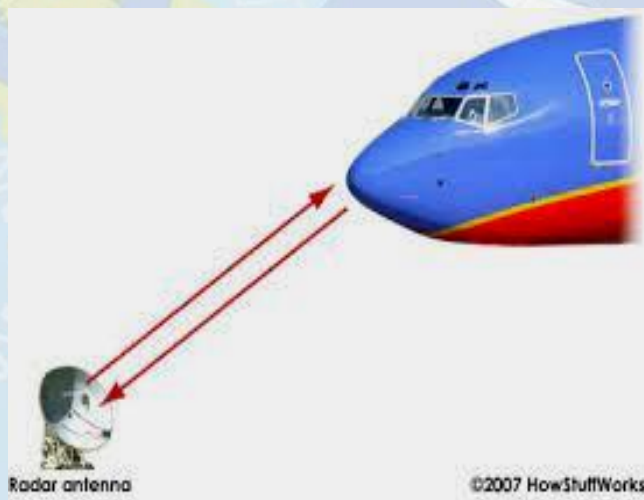
By purposely directing the loads experienced following impact, the driver's helmet is able to assist in dissipating the loads.

HANS is intended to prevent driver's head from being thrown forward in an accident, a common 'whiplash' situation which could lead to an over extension of the spinal column.

Drivers face theoretical deceleration stresses of up to 80 times the force of gravity in an accident. In such a situation, the weight of the head and helmet increases quickly from 7kg to as much as 560kg. HANS would help to absorb this strain, as well as prevent the driver's head from hitting the steering wheel or front edge of the cockpit.

STEALTH TECHNOLOGY:

The concept behind stealth technology is that the radar antenna sends out a burst of radio energy, which is then reflected back by any object it happens to encounter. The radar antenna measures the time it takes for the reflection to arrive, and with that information can tell how far away the object is.



The goal of stealth technology is to make an airplane invisible to radar. There are two different ways to create invisibility:

The airplane can be shaped so that any radar signals it reflects are reflected away from the radar equipment. The airplane can be covered in materials that absorb radar signals.

Most conventional aircraft have a rounded shape. This shape makes them aerodynamic, but it also creates a very efficient radar reflector. The round shape means that no matter where the radar signal hits the plane, some of the signal gets reflected back:

"Time is the most valuable thing a man can spend".