



# **MECHON'15**

**MECHANICAL ENGINEERING  
MAGAZINE**

**MIET ENGINEERING COLLEGE**

**VOLUME 1  
ISSUE 1**



**Er. A. Mohamed Yunus**

**Chairman**

**M.I.E.T. Institutions**

### **CHAIRMAN MESSAGE:**

It had always been my dream to build an institution for quality, innovation and excellence that can yield success. M.I.E.T. institution was established with a primary motive of providing quality education to the budding youth under privileged as well as the minority community which in turn would translate into service to the humanity in general and to the society in particular.

M.I.E.T. edify the pupil to dream and realize the professional growth in a congenial environment with versatile faculty and facilities while enlightening them with values and characters to attain social, economical and technological growth at global level. Students must strive and create a platform to get a career not just for survival but also to excel in the field. Today is the era of privatization and globalization and we try to groom, nourish and nurture our students to fully equipped pillars of the Nation. My best wishes and blessing to all for the future endeavors.



**Dr. S. Guharaja**

**Principal**

**M.I.E.T. Engineering  
College**

### **PRINCIPAL MESSAGE:**

It is a matter of abiding joy in witnessing a gradual success of our college by tapping the latent potential and talent dormant in the students. We know that quality education is a passport to its steep rise in life and creates a platform for practical avenues.

They pursue their creative interests to attain financial gains and get golden opportunities to lead a life of dignity and prosperity. M.I.E.T Engineering College has efficient faculty members who are endeavored towards framing young and dynamic engineers who will crux of the technical workforce. Best wishes.



**Dr. A. Kumaravadivel**

**HOD**

**Department of  
Mechanical Engineering**

### **HEAD OF THE DEPARTMENT MESSAGE:**

I am pleased to know that the successful completion of the magazine MECHON for this academic year 2015-16. MECHON, the departmental magazine has the prime objective of providing aspiring engineers a wide platform to showcase their technical knowledge and to pen down innovative ideas. This magazine is intended to bring out the hidden literary talents in the students and teachers to inculcate strong technical skills among them. I congratulate and thank all the students and faculty coordinator who have made untiring efforts to bring out this magazine. I wish them all the very best for releasing more such magazines in future.

## **EDITORIAL BOARD**

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## **VISION OF THE INSTITUTION**

To be a center of excellence in Technical Education through Technical, Ethical and Professional skills for meeting the diverse needs of the Society, in particular Muslim minority community and the Nation.

## **MISSION OF THE INSTITUTION**

To impart Quality Education, Training and Research in the fields of Engineering and Technology.

To provide a conducive learning environment that enables the students to achieve professional and personal growth.

To expose the contemporary issues of society, ethical practices and to create environmental awareness.

To provide the required infrastructural facilities for developing the professional and innovative skills.



## **VISION OF THE DEPARTMENT**

Establish a globally recognized school of Excellence in the field of Mechanical engineering.

## **MISSION OF THE DEPARTMENT**

Impart quality education in Mechanical Engineering through effective teaching-learning techniques.

Provide necessary infrastructure and facilities for the student's personal and professional growth.

Expose to specialized mechanical engineering domains to harness evolving technologies.

Create awareness in ethical practices followed internationally.

## **DEPARTMENT PROGRAMS**

### **WORKSHOP**

#### **Workshops organized by Mechanical Engineering Department**

Two Days Hands on Workshop Programme In Libre Cad An open Source Computer Aided Drafting Software held on 26th and 27th Feb 2015 organized by Department of Mechanical Engineering at M.I.E.T. Engineering college.

## STUDENTS ARTICLES

### 1. Linear hydro impulse energy to torque converter device

Energy is the amount of force or power required to move one object from one position to another. Energy defines the capacity of a system to do work. Energy can have many forms Kinetic Energy, Potential Energy, Light Energy, Sound Energy, Gravitational Energy, Elastic Energy, Electromagnetic Energy and Nuclear Energy. According to the law of conservation of energy 1) Energy can be neither created and nor destroyed 2) One form of energy can be converted into another form of energy. In present world scenario the search for effective utilization of the renewable energy for producing electricity is still under process.

Renewable energy such as solar, wind, hydro energy is mainly used. Solar energy is only available in daytime and the cost of installation is high. The wind energy is seasonal and not available all through the year. On the other hand, the hydro-electric power is the renewable resource extensively used for power production. But still the hydro power plants are in hilly regions and require large catchment areas and large civil construction for power production.

Although these renewable resources are utilized for producing electricity, still the flow energy available in the perennial rivers is unexplored. An innovative type of water turbine is designed to convert the linear motion from the year round river flow into a rotary motion.

The design of turbine is unique and simple which produces the required rotary motion from the water flow in the river. The wing is designed to trap the energy supplied from the flowing water. The fabrication of this dynamic wing turbine is simple and can be implemented in all the rivers across the world. The power produced by the method is in an environmental friendly manner and can be a better alternative for future power requirements. The rotary motion produced can be used to pump the water from the river itself.



Liner hydro Impulse turbine

**By**

**Mohamed Rilwan A, Mohamed Suhail S, Natraj M, Rasheed Ahamed S**

## **2. Experimental investigation on performance combustion and emission characteristics of Castor oil biodiesel on C.I.Engine**

Bio-diesel production is a valuable process which needs a continued study and optimization process because of its environmentally advantageous attributes and its renewable nature. Bio-diesel produced from non-edible seed oils provides a good replacement for petro-diesel. Castor oil is one of the best feed stock to produce bio-diesel which will not affect the food source.

Due to its nature castor methyl ester was produced by two step process via transesterification method as the best method for production of biodiesel with low cost. Using sulphuric acid, esterification was completed followed by the base catalyst to do the transesterification process. Optimal parameters were identified to produce high yield of biodiesel.

Various catalysts such as KOH, NaOH, Sodium methoxide and potassium methoxide were used as alkaline catalyst and different catalyst's weight percentage to find the optimal value. Biodiesel properties such as density, kinematic viscosity, flash point fire point, acid value, iodine value etc. were found for suitability of fuel to match with ASTM D6751.

Engine testing was done on direct injection C.I engine with castor oil biodiesel to check the thermal efficiency, BSFC, performance, combustion and emission characteristics. Results shown that castor methyl ester could be a suitable replacement of petro diesel.





Castor seed

**By**

**Karunaharan R, Kaviyaran S, Kirubaharan J, Kolanchinathan T**

### **3. Development of Bio-degradable composites from organicwastes**

Waste is a material that no longer serves a purpose and so is thrown away. All wastes are particularly hazardous; if not carefully disposed of, it will have an impact on the environment. But some wastes are recyclable. For example, if all human, animal and solid wastes are recycled back to soil, then we do not need inorganic fertilizers to maintain the high yields of crops.

Today India produces 180 million tonnes of food grains and consumes 13 million tonnes of inorganic fertilizers at a huge cost. Therefore, time has come when we have to look at the waste not merely as an environment polluter but a recyclable material of great potential and energy saver.

We have many transformable materials around us which can serve as a better substitute for existing non-transformable materials. These materials can be utilized for fulfilling our needs. Many such materials are thrown away and or branded as waste by us. Especially organic waste occupies about fifty percentage of total solid waste. Organic waste plays a major role in causing pollution due to the human activities like land fill, fermentation, etc. In the organic waste the major portion of waste is fallen dry leaves from trees. These leaves waste are not handled properly due to lack of human ignorance and disposing is not done properly.

These are disposed in landfills cause threat to nature of the land and burning gives off major pollutants in the form of particulates, hydrocarbons and carbon monoxide. These lead to health injuries to humans and animals. So a proper method to use these waste leaves than to dispose it is to be formulated.

On this regard, a novel material is suggested to utilize those resources to develop the composites that potentially serve and quite while disposing it off. In the present work, the bio-degradable composite was prepared by dry leaves as the reinforcement and filler along with natural resin.

**By**

**Marx S, Pradeep T, Mohamed Ariff A**

#### **4. Experimental analysis on Mechanical properties of Al-ZrO<sub>2</sub>, Al<sub>2</sub>O<sub>3</sub>, 40F120 metal matrix composite by Stir casting method**

A composite is a structural material which consists of combining two or more Constituents. The constituents are combined at a microscopic level and are not Soluble in each other. Other constituents is called reinforcing phase and one in which it is embedded is called the matrix. The reinforcing material may in the form of the fibers, particles or flakes. The matrix phase's materials are generally continuous. Examples of composite system include concrete reinforcement with steel, epoxy reinforced with fused Zirconia Alumina fibers etc.

Examples include wood where the lignin matrix is reinforced with cellulose fibers. Bones in which the matrix made of minerals are reinforced with collagen fibers, are also composites. Manufacturing of aluminum alloy based composite material through stir casting is one of the prominent and economical methods. For development and processing of these materials, many processing parameters and selection of reinforcement plays a very major role. Conventional stir casting process was employed for producing ---- particle reinforced metal matrix composite for decades. In our study aluminum (Al 6061) matrix reinforced with fused alumina zirconia was fabricated at various composition to understand the influence of composition on the --- of particles. Mechanical properties like Brinell hardness, fracture toughness, impact test (Izod) and tensile tests were conducted on the prepared composite and comparative study was made.

**By**

**Hafil Hasan Y, Jamil Mohamed S, Beer Mohamed S, Sheik Mohamed A**

## FACULTY ARTICLES

### 1. Miniature Internal Combustion EngineGenerator

#### FAC LES

The company has been developing its MICE (Miniature Internal Combustion Engine) generator technology to address the need for high energy density portable electric power. The MICE generator offers energy densities that are five to ten times higher than current rechargeable batteries, and therefore is an enabling technology for powered prostheses and other high-power portable devices such as power tools.

As discussed in the MICE generator description below, the company has demonstrated the ability to achieve very low levels of acoustic emissions and vibration from a packaged system.

Full Description:

Technology Description

This innovative motor-generator consists of a miniature linear engine coupled with a linear alternator. It takes advantage of the high energy content of hydrocarbon fuels while eliminating most of the parts found in a standard internal combustion engine-generator set. The basic MICE generator design, shown in the adjacent figure, consists of a two-stroke engine, a spring, and an alternator in a linearly oscillating configuration.

MICE is inherently an electric power generator, since there is no mechanical linkage with which to extract power. Pure linear motion is ensured using a unique double helix or multiple helix spring. The pure linear oscillation provides sliding motion with no side forces.

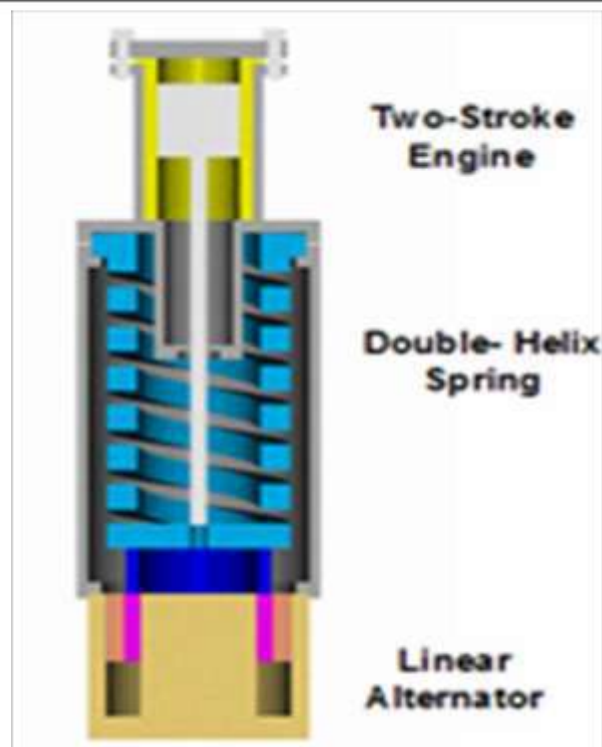
The piston does not use rings to seal the combustion chamber, using instead a close fit between the piston and cylinder to hold the leakage to a small enough level that essentially no cycle penalty is incurred. The small amount of leakage, in fact, provides a hydrostatic bearing force to center the piston in the cylinder. Thus, the MICE generator has low frictional losses since there are no bearing surfaces having a direct load.

The low friction characteristics and absence of stress generated by direct loads allow the MICE generator to operate at very high cycle speeds, leading to high energy and power density, particularly at smaller size scales. The pure linear motion, in addition to having low frictional losses, allows operation with a solid film lubricant alone – in other words, no oil – with a pressure-balanced cylinder design.

Major differences exist, between the MICE generator and conventional engines. One key difference is that MICE is a free piston design that uses a spring for energy storage. A second major difference is that the MICE two stroke engine is designed to operate with a scavenging ratio less than unity, using HCCI (Homogeneous Charge Compression Ignition) combustion with glow plug assist as the mode of combustion.

This gives the MICE generator its low emissions and high efficiency characteristics. Also, the MICE generator is a high Q system, operating at the resonant frequency of the spring-mass system with very low frictional losses.





**Miniature I.C. Engine generator**

**By**

**Mr. S. Kumaradevan, Assistant Professor**

## **2. Universal fuel-economizing engine**

Summary:

Universal fuel-economizing engine for the transport; generation of the electric power and for a general mechanical engineering

Full Description:

The concept of this Engine has been received by a method of the analysis and complete removal of all-important defects of existing traditional engines, which (defects) increase the charge of fuel of traditional engines and reduce term of their functioning.

Advantages of the system:

Noiseless

- Complete combustion of fuel => maximum pure exhaust
- Any fuel eating system - can use not only gas fuel but a- Minimum expenditure of a fuel for working => maximal profitability of the engine
- Hireliability
- There is no more any soot in cylinders
- There is no more heat damage of moving details

Iso liquid & rigid fuel with the

Summary:

Replaces the original cylinder head with no valves and springs. with Unique operating process. Unique Direct fuel injection system for any FUEL! (Liquid or Gas). minimal constructive additions.

- At use of some types of fuel (for example ethanol) the system of ignition is not necessary.

**By**

**Mr. K. Ramesh, Associate Professor**

### **3. ROTOR VALVE TUBE CYLINDERHEAD**

Full Description:

Rotary Valve Tube system for air intake and exhaust gasses on any 4-stroke internal combustion engine. One Port for Air-Intake and Exhaust That covers 85% of piston surface.

the ports opens 10 degrees before TDC and can stay open for 10 deg. after piston reaches the bottom. (The full Length of Piston Stroke). Therefore, more air in and more gasses out.

- A Unique Direct fuel injection System for any Fuel (Liquid or Gas)

More economical, more powerful and more environment friendly cylinder head for any 4 stroke internal combustion engine.



Rotor valve tube cylinder head

**By**

**Mr. M. Dhandayuthabani, Assistant Professor**

#### **4. Portable grinders for repairing the piece of engine explosion**

Summary:

The concept's novelty resides in changing mindsets about the subject of fabrication. So far, the classic procedure requires bringing the motor to a machinist center to be repaired. The heavy and bulky materials are replaced by mobile machines and therefore allowing more efficiency. The ease of use does not require a specialist worker.

### Full Description:

The inventor, a specialist in engineering precision, was constantly asked by his neighbor's garage to realize, from its own "traditional" machines, a repair of cylinder head. Thus the "cost / time" of the repairing were significantly reduced compared with ordinary grinding centers.

Thus, in 1992, the inventor created an innovative technology for repairing and carrying an initial feasibility model which will be the subject of a patent for an invention entitled "transportable device to correct engine cylinder heads", dated June 25, 1993. In 1993, the inventor began the realization of a first prototype of the portable grinder breech and in 1994, a prototype more elaborate. Character innovative of the technology

The profits recorded by the portable cylinder head resurfacing machine, compared to the traditional one are:

- Cost of maintenance reduced by 40%
- Weights and sizes reduced by 90%
- Implementation reduced by 70%
- Maintenance reduced by 60%
- portable equipment to 100%
- Complexity intervention reduced by 70%
- Level of initial training reduced by 90%
- Time intervention reduced by 70%
- Deadline waiting reduced by 99%

The concept's novelty resides in changing mindsets about the subject of mechanical fabrication. Until now, classic procedures required bringing the motor or the parts needing a machine finish to a precision machinist center to be repaired.

The heavy and bulky materials are replaced by mobile machines, adaptable and therefore allowing more efficiency. Our machines are simple to use and no longer require an expert workman for operation. To sum up, the project of portable cylinder head in its execution follows three criteria: "economy-speed-ease". The system to repair requires an important investment cost both for the final client and for the person who repairs it. Indeed, the cost of acquiring additional charges routing and shaping high to maintain.

The client and the provider have to assume these costs, but also sometimes costs paid by insurance companies. In case of emergency, damage type of a merchant ship in the middle of the ocean, the solutions are even more expensive to contemplate. Finally, a large number of faraway locations or regions of the world are not benefiting of organized structures, often these regions does not offer any solution to companies to repair the engine.

The project of portable cylinder offers immediate solutions to these three macro-markets. With a refined marketing, it will be possible to answer, to the specific needs of each target. To push the logic of mobility and optimum adaptation of this project, versatile machines can offer the products to areas very diverse. This innovation comes out with what is currently on the repaired market.

However, while the electronic motors were emerging on the European market, it was felt that the moment was not appropriate to industrialize prototypes for grinding, belonging to a sector, which after many years, knew technology boom eagerly awaited by the profession. Moreover, the advent of portable cylinder competition would awake to a new approach to the repaired.



In 2004, the idea of the commercialization of cylinder really happens. Indeed, it could be observed in some countries, a return to conventional engines due to extreme climatic conditions. The high temperatures and humidity rate too important showed a malfunction of the electronics. Failure blocks, mostly indirect and repetitive brought the mechanic, the driver of the automotive industry to forget the electronic engine and ultimately to return to more conventional engines therefore more reliable.

The consequence of this reversal technique acts as a true economic lever for portable grinders, a real starting point for a possible international industrialization of the full range of grinders.

The project is now ready to move into phase of industrialization and commercialization of portable cylinder head resurfacing machine first machine in the range of 7 different machines for the same customers.

**By**

**Mr. T. Prabakaran, Assistant Professor**

## **5. Improvedintercooler**

Summary:

Normal intercoolers use the airflow generated by the movement off the vechile or fans. Improved intercooler uses the suction off the engine to create airflow thru the outside off the intercooler core which replace vehicle movement and fans. This airflow is generated by the engine to feed oxygen to the combustion chamber.

Full Description:

Improved intercooler. The easy way to demonstrate the way the intercooler work is by placing your hand in front of the vehicles air cleaner.

The suction you feel on your hand is created by the engine to supply the combustion chamber with oxygen. I use this suction to replace the movement off the vehicle as well as the fans needed to cool the intercooler.

The intercooler is placed inside a enclose unit with a secondary coolant cooler. The coolant cooler core is placed before the intercooler core. Bypass valves direct airflow thru the intercooler. The bypass valves is control by a CPU using sensors to monitor exhaust heat and temperatures inside the system.

The same amount off oxygen can always be achieved. I will try to give a description by showing the differences. Inside the close unit there is two cooler cores. The first one is a coolant cooler core. Coolant used can be anything from aircon gas, water and even NOs gas. The second cooler core is the intercooler core. Inside the housing, bypass valves and bypass channels is control by a CPU. Normal intercoolers cool down air by using the airflow generated by the movement off the vehicle. Fans are used to cool the system when at low revs. The two types off fans are electrical and mechanical. Electrical fans do not have a greater effect. Electrical fans drain power from the alternator which in turn drain power from the engine.

Mechanical fans drain even more power from the engine than the electrical fans but is much more effective. By draining power from the engine it becomes less cost effective. The improved intercooler does not use any power draining devices to create airflow, creating more power at no extra cost. The airflow is created thru the suction off the engine for the oxygen supply to the combustion chamber. The improved intercooler can reach much lower temperatures than a normal intercooler. This will even increase the power more.

Aircon coolers: When aircon gas in a normal aircon intercooler comes in contact with the intercooler core warm air is transmitted to the gas which will influence the cooling temperatures inside the cabin.

**By**

**Mr. M. Visvam, Assistant Professor**

## **6. Vorticity rules below the surface**

Fluid dynamics describes the flow of fluids and how they interact with various forces. Earlier studies in this field revealed that when a fluid of one density propagates laterally into a stratified ambient along an intermediate height, it forms an intrusive gravity current, also referred to as an intrusion. Attempts to develop analytical models for flows with different stratifications have been ongoing for over half a century.

The first analytical model for symmetric intrusions propagating into linearly stratified ambient, based on the shallow water approach, was developed about a decade ago. Unfortunately, published studies had not yet incorporated the upstream propagating wave into their models, based on the assumption that the wave's energy is much smaller than the potential and kinetic energies associated with the mean flow.

Recently, a research group at the University of California at Santa Barbara led by Professor Eckart Meiburg from the Department of Mechanical Engineering extended the vorticity-based modelling concept to intrusive gravity currents propagating into linearly stratified ambient. Specifically, they investigated the equilibrium and non-equilibrium intrusions released from long, full-depth locks and advancing into linearly stratified ambient using the aforementioned approach.

Their work is currently published in the research journal, *Journal of Fluid Mechanics*. In brief, the research method employed focused on the upstream-propagating wave ahead of the intrusion, thereby taking the lock length to be sufficiently long so that wave reflection from the rear wall could be neglected. For this purpose, they progressed to developed vorticity models for both equilibrium and non-equilibrium intrusions. Next, they performed direct numerical simulations to test the developed models. Lastly, they compared their theoretical findings to experimental observations and theoretical predictions of other authors in order to validate their results.

The authors observed that the obtained predictions, for both thickness and propagation velocity of the intrusion as functions of the intrusion density, were in close agreement with direct numerical simulations and earlier experimental and computational observations made by other investigators. Moreover, their model was the first ever to predict the properties of top-/bottom-propagating gravity currents.

Furthermore, it confirmed the formation of equilibrium intrusions when the density of the intrusion fluid equals the mean density of the ambient fluid, and non-equilibrium intrusions otherwise. In summary, Professor Eckart Meiburg and his research team successfully presented the development of a vorticity-based modelling approach for intrusive gravity currents advancing into linearly stratified ambient, by extending earlier investigations.

Their model is considered the first to accurately capture the propagation velocity of the fastest-propagating internal gravity wave mode. Altogether, their results were consistent with those reported in related studies, and they confirm that the minimum propagation velocity occurs for equilibrium intrusions.

“This analysis highlights the central role of vorticity for the dynamics of density-stratified flows”, said Professor Eckart Meiburg.



Upstream-propagating wave

By

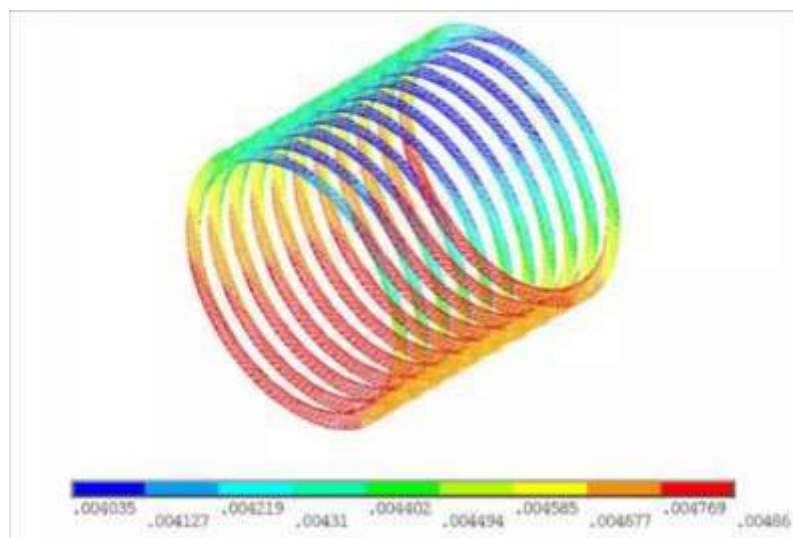
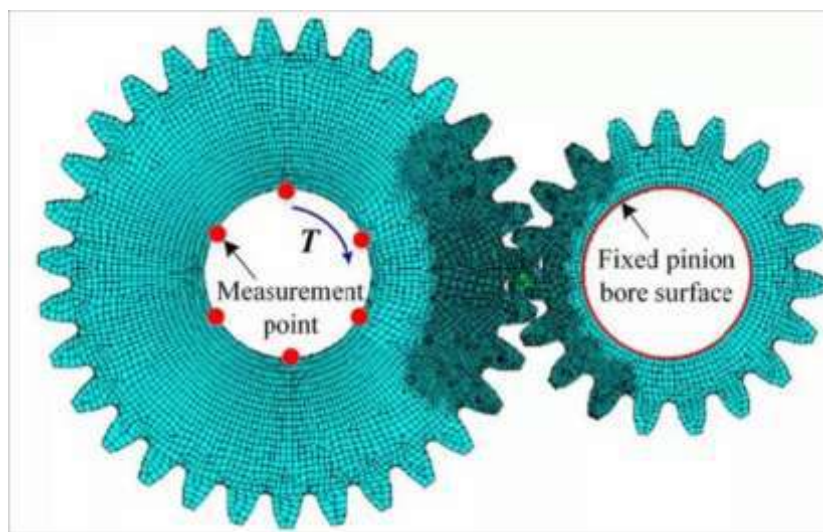
**Mr. P. Sundaram, Assistant Professor**

### **7. Three new models for evaluation of standard involute spur gear mesh stiffness**

To transfer torque and speed from a rotating power source to another device, a transmission system is usually required. The most common and widely used transmission system is the gearbox. Various types of gearboxes have been designed so as to meet various application demands. The need to minimize failure rates of gears during operation and further improve on the quality during the design process, gear dynamics have been established.



Existing literature has already established that the main internal excitation source of gear dynamics relates to time-varying mesh stiffness. Therefore, accurate evaluation of gear mesh stiffness has been deemed crucial for gear dynamic analysis. Presently, experimental approaches for analyzing gear dynamics have shown auspicious attributes. Unfortunately, no published experimental plan is easy to implement as they demand intricate measurement devices or complex mathematical derivations.



Analysis of spur gear model

Dr. Xihui Liang (currently at University of Manitoba) and Prof. Ming J. Zuo at University of Alberta in collaboration with Dr. Hongsheng Zhang at Harbin Institute of Technology and Prof. Yong Qin at Beijing Jiaotong University developed three new models for spur gear mesh stiffness evaluation. They anticipated that the proposed models would be effective in dealing with involute spur gears with tooth profile modification in the absence of tooth damage. They used the finite element analysis to evaluate the mesh stiffness of standard involute spur gears.

Their work is currently published in the research journal, Mechanical Systems and Signal Processing. The research technique used by the scientist commenced with a thorough description of the proposed model 1 for gear mesh stiffness evaluation. Next, the researchers presented the proposed model 2 which was used to evaluate the gear mesh stiffness by using angular deflections at different circumferential angles of an end surface circle of the gear bore.

They then proceeded to the proposed model 3 which required the angular deflection at an arbitrary circumferential angle of an end surface circle of the gear bore but could only be used for gears with the same tooth profile among all teeth of a gear.

Lastly, the accuracy of the proposed models was evaluated using finite element analysis. The authors observed that the proposed model 1 could cope with involute spur gears with tooth damage, like tooth crack and pitting. Additionally, they noted that the proposed model 3 could not deal with involute gears having tooth damage. Lastly, the researchers realized that the proposed model 2 had an unknown capability of dealing with tooth damage. In summary, the study presented three novel models for evaluating time-varying gear mesh stiffness.

Their main observation was that the proposed model 1 gave a very accurate mesh stiffness result when compared with other existing models, but with an underlying assumption of the gear bore surface being rigid. Furthermore, finite element analysis and comparisons demonstrated that proposed models 2 and 3 had potential to yield accurate result in gear mesh stiffness evaluation and that they were insensitive to gear bore size. Altogether, a comparison with the proposed model 1, the maximum error caused by the proposed models 2 or 3 was seen to be 3.3%, which was quite small.

**By**

**Mr. S. Renoldelsen, Assistant Professor**

## **8. Importance of smart classroom**

In this day and age, we need to do all we can to improve the quality of education; the world of old classrooms with boards replete with chalk are long over. It is time that we understood the fact that education has undergone an evolution of sorts since the days we were mandated to wipe the chalkboard clean and dust the dusters. It is essential that classrooms are outfitted with VCDs, Laptops and even projectors so that kids can get access to better information through the visual medium as well. Granted the information being provided can often be gleaned from textbooks but using the visual medium for the same ensures better retention. Here are a few reasons as to why smart classrooms are not just important but essential. Online access: Smart classrooms with online access can provide students with ready access to detailed information on any topic.

Teachers can use the same to research a particular topic in depth, set tests based on the same and even provide students with a visual lecture on the same so that they are able to understand the topic better. With internet access, students should be able to review any topic in depth and this comprehensive information should help them to perform better.

With online access, teachers should be able to curate information and even develop a presentation which makes the subject all the more interesting to students.

Online tools: Rather than repeating the same lesson ad-indefinitum is not going to help get the message across to students, especially for those seated in the back of a crowded classroom. This is why it makes more sense to use various audio-visual tools including powerpoint presentations, to convey the message to the students so that the entire class is able to cue in on the teacher's lecture and the presentation.

Various colleges and universities have started adopting smart classroom methodologies to the point that every desk comes outfitted with a pair of headphones so that they are able to hear the professor clearly.

Online modules: There are various reasons why a student may not be able to attend the class, which is where online modules come into play. Students who are not able to attend school for a week or longer can attend class through online classes, check out the various training modules, review and submit assignments and get it all done online. By doing so, teachers can ensure that their students do not miss out on important classes and will be better prepared for the exams ahead.

Interactive: Using the digital format can help make the class more interactive as it should help fuel the student's interest and get them to discuss the various subjects on length. Teachers can help keep the students engaged by devising interesting challenges that test their mental acuity, retention skills and much more. You should be able to improve the performance of your class as a whole by making it all the more interactive than before.

Go green: Another aspect of smart classes is that you would be reducing the carbon footprint; by getting your students to use less of paper and pen, you would be doing your bit for the environment. It may take a while for all classes to migrate from the traditional classroom to smart classrooms but the change is happening. With an emphasis on "less paper", the students will be forced to think more creatively rather than memorize notes and this, in turn, should help boost his understanding of most topics.

Low maintenance cost: Other than the initial investment, most smart classrooms are relatively easy to maintain. All they require is a periodical clean-up and maintenance, and compared to the traditional classrooms, are relatively inexpensive to maintain.

Creativity: Smart classrooms help the students to perform better and even push the others to be more creative. With instant access to comprehensive information on any topic, students should be able to use the same and even come up with creative concepts.

**By**

**Dr. A. Kumaravadivel, Professor**



## **9. Man Vs. Machine: Human Brain**

### **Introduction**

Human beings and machines work differently. We all know machines are the creation of Human. Machines were created to make human life easier. Humans highly depend on machines and there is a new revolution. A machine is only a motorized gadget consisting of different parts. Machines perform different functions but do not have life like humans.

### **Machines are a Creation of Mankind**

Humans are created of flesh and blood, they have a life. Humans have emotions and feelings; they express different emotions at different times.

Machines are mechanical and they work with their mechanical brain which is programmed by humans. Humans understand the situation and respond accordingly whereas machines do not have the capability of understanding.

Humans are creative and imaginative. Humans can create and invent new things but machines cannot. Machines are operated and guided by humans.

Humans are blessed with intelligence and emotions while machines have artificial intelligence. Humans have diverse abilities at several things including language abilities, pattern recognition and creative thinking. When it comes to socializing, data analysis or having opinions humans are certainly ahead of the machines.

### **Use of Machines**

There are different machines like televisions, refrigerators, music systems, home theatres, washing machines and so on for diverse uses.

Our life is become much simpler with the use of these machines. Machines are much faster when it comes to processing information and performing calculations with accuracy and speed as compared to humans. Computers obviously have better memory compared to humans and can be fed with large amount of information. Machines work effortlessly and more efficiently than humans. The products can be produced in larger quantities at much greater speed with the help of machines.

Easy communication is possible from anywhere in the world with cell phones. One can travel at super fast speed anywhere in the world with the help of transport facilities. Research and sharing opinions from anywhere in the world has become much easier. Moreover, machines are not influenced by feelings or emotions unlike humans.

### **Conclusion**

So, humans and machines both are very powerful. There are some processes where machines certainly do a better job than humans and vice versa. Humans are blessed with intelligence and power while machines possess artificial intelligence. Human intelligence is far better than artificial intelligence but the collaboration of both is the best. Humans can definitely not do without artificial intelligence in present day scenario. Both human brain and machines need to go hand in hand for development and better future.

**By**

**Mr. K. Rajasekar, Assistant Professor**

## **10. WHAT IF WE PUT THE SAME TECHNOLOGY ON THE OUTSIDE OF THE CAR?**

One advantage of outside airbags is that they disperse the forces of impact. An oncoming car about to slam into the side of your vehicle would strike with the relatively small surface area of its front bumper—and an even smaller surface if it strikes at an angle. But when a car hits an inflated airbag, the impact force is spread through the airbag and along the length of the vehicle's side structure, which reduces energy loads. ZF says its tech reduces intrusions into the passenger cabin by 30 up to percent and reduces injury levels by 20 to 30 percent.

ZF would outfit vehicles with several kinds of sensors to identify whether and when to fill the airbags, because each type has its own specialty. Radar sensors are excellent for measuring distance and are virtually immune to being tricked by funny lighting or weather conditions, SAYS Uwe Class, director of safe mobility systems at ZF. Cameras, meanwhile, are best at recognizing objects by differentiating between, say, a heavy motorcycle and a lightweight bicycle. They also typically have a wider field of view than the radar sensors, so they may see an incoming car sooner.

Lidar sensors are the final piece of the puzzle. They pulse light waves toward incoming objects and measure how the waves are reflected. In this way, they create detailed three-dimensional images of everything they see. At the point where a crash becomes unavoidable, the lidar sensors' short response latencies and fast refresh rates allow the system to quickly detect and track whatever fast-moving object is about to hit the car.

Even tiny changes in an incoming object's direction during these final milliseconds could drastically change how the airbags should engage, so lidar must be fast and accurate.



External airbag inflated

## 11. Here's Why Cars Use Both Port and Direct Injection

It might not make much sense on the surface. But there are lots of good reasons.

Lots of new car engines these days are built with both port and direct fuel injection. On the surface, that might not make much sense. Why would a carmaker use two different types of injection methods on an engine? It makes things twice as complex and adds weight to the car. Well, it turns out there are a bunch of good reasons why it's done.

Jason Fenske of Engineering Explained breaks it down in his latest video. There are lots of benefits to both methods of fuel injection, and it turns out manufacturers can use either one (or both at the same time) depending on an engine's RPM range for maximum power or efficiency. For example, using port injection means the fuel can cool down the intake air before it reaches the combustion chamber, increasing air density and allowing for more fuel to be used, and therefore more power. Port injection is used at low RPM for better air-fuel mixing, which results in a more stable, efficient combustion.

Direct injection, on the other hand, cools the air inside the cylinder, greatly reducing the probability of knock. This means the engine can advance timing and run more boost before running into issues. Direct injection is used at high RPM to cool the chamber at high loads and create the most power possible. That's just the tip of the iceberg for why manufacturers love to double-down on injection methods.

## PHOTO IMAGES OF THE EVENTS HELD



Prof. K. Balamurugan, Mechanical dept., Addressing the Gathering



Active Participants in Libre Cad Programme





Mr. S. RenoldElsen, Assistant Professor, on his presentation.



Mechanical Department Symposium Poster





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