MECHANICUS

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DEPARTMENT OF MECHANICAL ENGINEERING

K. E. Society's
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From the HOD's Desk

Greetings; while presenting this maiden issue I extend my best wishes to all its readers. It is with a sense of responsibility & gratitude that I introduce this maiden issue. The purpose of this effort and articulation is to convey my department's Article of Faith not only in letters but in spirit too.

We, as R.I.T.'ians are committed to deliver the mandate of M.S.B.T.E. & to strive rigorously to manifest the vision of Loknete Shri. Rajarambapu Patil. Technology is the ultimate panacea to unemployment and rural upliftment; to realize its full potential it is essential that Diploma Institutes, which are centers for radiating and proliferating technology, work in coordination with all stake holders. Coordination can only be ensured if the organization is bound by some common framework. Having realized this, in this maiden issue, I intend to present my Department's Article of Faith.

On this note I handover and dedicate this issue to all its readers who are tomorrow's leaders in the making.

Prof. V. B. Choudhari
(HOD, Mechanical Engg.)
(Diploma 2nd Shift)

Department Vision

To become a center of excellence in the field of Mechanical Engineering, producing innovative and creative Mechanical Engineers to meet the ever changing industrial demands and social needs.

Department Mission

To transform the students and faculty of the department into highly motivated and cultured engineers, technologist and entrepreneurs who will contribute to uplift the society in collaboration with industry and academia.

Department Details

Year of Establishment	2014
Head of Department	Prof. V. B. Choudhari
Email	vinay.choudhari@ritindia.edu
Total number of Classrooms	02
Total number of Laboratories	10
Total Faculty	06
Supporting Technical staff	02
Supporting Non Technical staff	01

Article of Faith

Programme Educational Objectives (PEOs)

PEO 1. Provide socially responsible, environment friendly solutions to Mechanical engineering related broad-based problems adapting professional ethics.

PEO 2. Adapt state-of-the-art Mechanical engineering broad-based technologies to work in multidisciplinary work environments.

PEO 3. Solve broad-based problems individually and as a team member communicating effectively in the world of work.

Program Outcomes (POs)

PO 1. Basic knowledge: Apply knowledge of basic mathematics, sciences and basic engineering to solve the broad-based Mechanical engineering problems.

PO 2. Discipline knowledge: Apply Mechanical engineering knowledge to solve broad-based mechanical engineering related problems.

PO 3. Experiments and practice: Plan to perform experiments and practices to use the results to solve broad-based Mechanical engineering problems.

PO 4. Engineering tools: Apply relevant Mechanical technologies and tools with an understanding of the limitations.

PO 5. The engineer and society: Assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to practice in field of Mechanical engineering.

PO 6. Environment and sustainability: Apply Mechanical engineering solutions also for sustainable development practices in societal and environmental contexts.

PO 7. Ethics: Apply ethical principles for commitment to professional ethics, responsibilities and norms of the practice also in the field of Mechanical engineering.

PO 8. Individual and team work: Function effectively as a leader and team member in diverse/ multidisciplinary teams.

PO 9. Communication: Communicate effectively in oral and written form.

PO 10. Life-long learning: Engage in independent and life-long learning activities in the context of technological changes also in the Mechanical engineering and allied industry.

Program Specific Outcomes (PSOs)

PSO 1. Modern Software Usage: Use latest Mechanical engineering related softwares for simple design, drafting, manufacturing, maintenance and documentation of mechanical engineering components and processes.

PSO 2. Equipment and Instruments: Maintain equipment and instruments related to Mechanical Engineering.

Student's Corner

Advanced Composite Materials in Aircrafts

Sourabh U. Patil
S.Y. Mechanical
Roll no 4228

THE USAGE OF COMPOSITE MATERIALS IN AEROSPACE INDUSTRY:

Composite materials can provide a much better strength-to-weight ratio than metals: sometimes by as much as 20% better. The lower weight results in lower fuel consumption and emissions and, because plastic structures need fewer riveted joints, enhanced aerodynamic efficiencies and lower manufacturing costs. The aviation industry was, naturally, attracted by such benefits when composites first made an appearance, but it was the manufacturers of military aircraft who initially seized the opportunity to exploit their use to improve the speed and maneuverability of their products. Weight is everything when it comes to heavier-than-air machines, and designers have striven continuously to improve lift to weight ratios since man first took to the air. Composites materials played a major part in weight reduction.

Today there are 3 main types in use: carbon fiber, glass and aramid – reinforced epoxy. There are others, such as boron-reinforced. Composites are versatile, used for both structural applications and components, in all aircraft and spacecraft, from hot air gondolas and gliders, to passenger airliners or fighter planes. The types have different mechanical properties and are used in different areas of aircraft construction. Carbon fiber for example, has unique fatigue behavior and is brittle, as Rolls Royce discovered in the 1960's when the innovative RB211 jet engine with carbon fiber compressor blades failed catastrophically due to bird strikes. Overall, carbon fiber is the most widely used composite fiber in aerospace applications.

Student's Corner

Mechanical Engineering Innovations

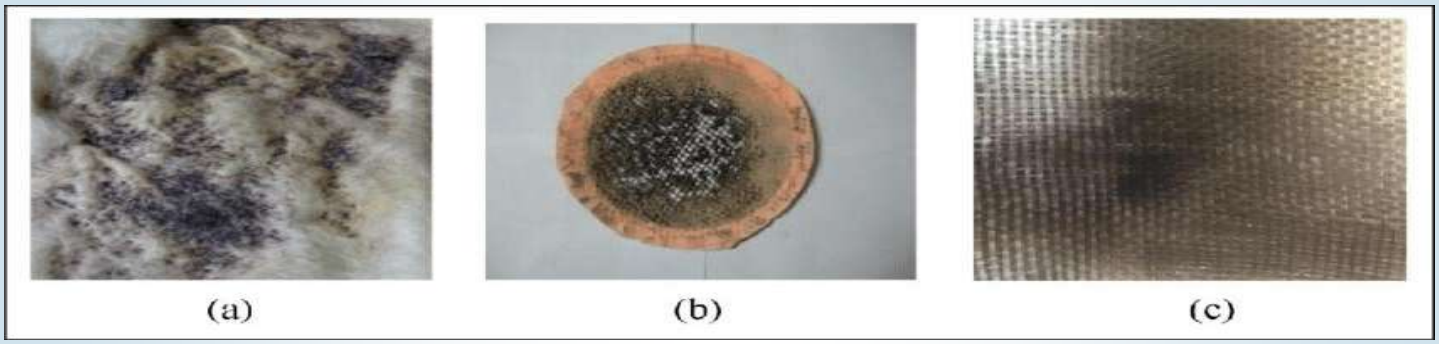
Akshay S. Mane
S.Y. Mechanical
Roll no 4216

Windows Double as Solar Panels: fully transparent solar-power-generating windows

These windows have solar cells installed in the edges at a specific angle, which allows the incoming solar light to be efficiently transformed into electricity. The windows could generate 8 to 10 watts of power, according to Grapperhaus."Right now, we are looking for iconic projects all over the world to show that a large glass building can be made energy neutral in an aesthetic way."

Experimental investigation on the performance of non-metallic flexible fire-resistance materials in flameproof diesel engine locomotive

Three kinds of flexible refractory fiber materials were used to verify the performance of fire resistance, according to explosion-proof principle and test methods of flame arrests. Then, a comparison of transmission efficiency between flexible refractory fiber arresters and general arresters was given. The aim of this is to verify the properties of non-metallic flexible fiber materials in fire resistance and transmission efficiency so that we can apply it to the flameproof diesel engine locomotive.



Theoretically, refractory fibers have good performances of air permeability and complex internal space, so it can provide with absorption area. First, irregular porous structure increases the cooling area. The temperature of the flame can decrease under the ignition point and quench after the heat exchange. Tiny pores of the porous materials, moreover, increases the probability of absorbing free radicals during chain reaction so as to prevent the combination of free radicals and premixed gas. Then, the chain reaction will slow down and even terminate.

Biodiesel Production from Waste Cooking Oil by Using an Ultrasonic Tubular Reactor

The aim of this research is to find an optimum synthesis biodiesel from waste cooking oil (WCO) using an ultrasonic tubular reactor. The experimental studies explored the variations in reaction time, molar ratio WCO to methanol (MeOH), amount of catalyst, the frequency of ultrasonic and output power ultrasonic on the ester contents. Comparisons of type ultrasonic and also the mechanical stirring method based on time reaction were investigated.

The optimum results of the biodiesel process is the reaction time of 5 minute, NaOH catalyst 1%wt of WCO, molar ratio WCO to MeOH of 1:6, frequency ultrasonic of 20 kHz and output power ultrasonic of 650 W. The reaction time reduced 12-24 times compared to both of method and the yield of ester contents was obtained at 96.54%wt

Acoustic Wave Separation

Flo Design Sonics, with funding from the National Science Foundation, has developed a uniquely effective patented technology called Acoustic Wave Separation (AWS) that separates or cleans water or other liquids from other contaminants. Acoustic waves were the secret behind this breakthrough technology that divorced all foreign substances such as radioactive material, hydrocarbons, bacteria, chemical additives, salt, and more, without the use of chemicals or filters.

Their immediate goal was to be able to process 100,000 gallons a day for the gas and oil industry. This same technology could also be used to cleanse blood during surgery, to reclaim proteins from the cells of mammals, as well as many uses in gene and cell therapies. This groundbreaking AWS technology will have innumerable potential uses in the future

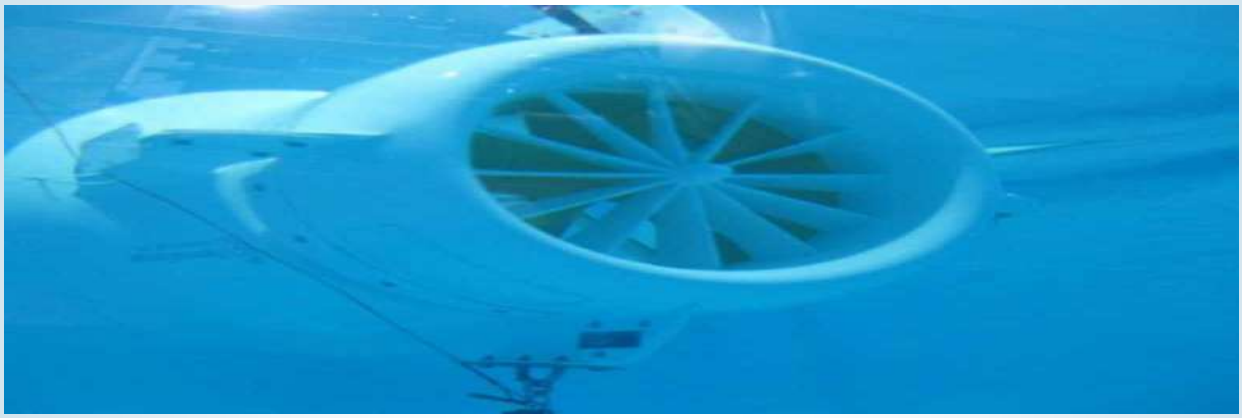
Student's Corner

UNDER WATER TURBINE

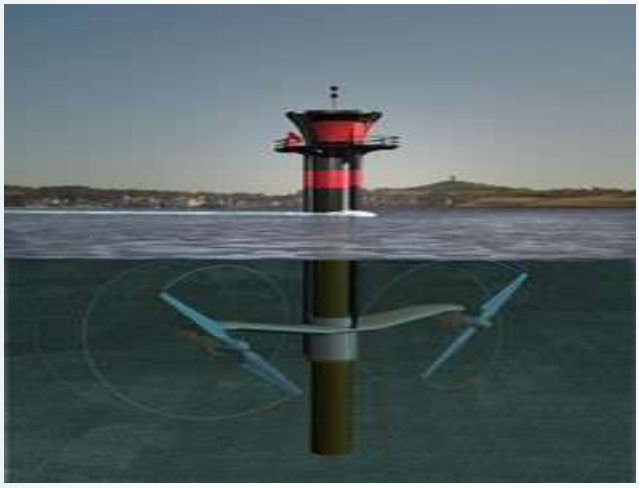
Arati A. Mahadik
S.Y. Mechanical
Roll no 4270

Tidal stream turbines are often described as underwater windmills. They are driven by the kinetic energy of moving water in a similar way that wind turbines use moving air. The generator is placed into a marine current that typically results when water being moved by tidal forces comes up against, or moves around, an obstacle or through a constriction such as a passage between two masses of land. There are sufficient numbers of such fast-flowing underwater currents around the world to make this form of marine renewable energy worth pursuing.

Tidal flows have the advantage of being as predictable as the tides that cause them; both in terms of timing and in judging their maximum velocity. This long-term pre dictability helps greatly in electricity generation, enabling efficient grid manage ment. The tidal turbine is bolted to the floor of the Kvalsund channel and is connected to the nearby town of Ham-merfest's power grid on September 20th. This is the first time in the world that electricity directly from a tidal current has been feed into a power grid.



The gravitational tug of the moon produces a swift tidal current there that cause though the channel at about 8 feet (2.5 meters) per second and spins the 33-foot (10 meters) long blades of the turbine. The blades automatically turn and rotate at a pace of seven revolutions per minute, which is sufficient to produce 700,000 kilowatt hours of non-polluting energy per year- enough to power about 35 Norwegian homes



The company Marine Current Turbines was longlisted for the MacRobert Award in 2010. Their innovation, the SeaGen tidal turbine located in Northern Ireland's Strangford Lough, had become the world's first official tidal stream power station, accredited as such by OFGEM the UK regulator, and has fed power into the UK grid since 2008. The company's co-founder, Peter Fraenkel, talked to Ingenia about how tidal stream generators can become a significant source of renewable energy.

Before the 1990s, few had given much attention to the use of the kinetic energy in marine currents to generate electricity. The Watt Committee report, *Renewable Energy Sources*, published in 1991, discussed tidal ranges and the barrages that might make use of them at length, but made only the briefest of mentions of marine currents, observing that in spite of a number of technical papers, the resource had only been investigated at a very small scale, for lighting navigation buoys.

Twenty years on, and marine currents are the focus of intense research and implementation. There are a number of significant tidal stream technologies under development in the UK, Europe, North America and the Far East that could see tidal energy making an important contribution to the world's renewable enegy mix. Other than Marine Current Turbines, which has pioneered this development, technology developers involved include Hammerfest Stroem, Tidal Generation Limited and Voith.

Now, the world's highest tides and strongest currents situated in the Bay of Fundy in Nova Scotia are to be harnessed using the tidal stream technology. Bristol's Marine Current Turbines (MCT) is part of one of the consortia that is working to make this happen. It is also is partnering RWE npower renewables to develop a 10 MW tidal farm in waters off Anglesey, north Wales.

MCT's technical director, Peter Fraenkel, has played a key part in this rapid transition, not least because he has been working on the resource and the problems of its development since the 1970s – longer perhaps than anyone else. He received a Lifetime Achievement Award from his peers at the 2010 International Tidal Energy Summit and his company is now looking to deploy its tidal technology in arrays that will generate hundreds of MW worldwide

Various Student Centred Activities


Guest Lecture to Students by Prof. Mohit Bansal
(Extencore Solution Pvt. Ltd. Pune) and Prof. Ramesh Patil (Volvo Engineering Pvt. Ltd.)


Industrial Visit SY Mechanical (Diploma) Students at Ashta Liners, Ashta

Tree Plantation

Poster Presentation Competition

ShramDan

Blood Donation Camp

Training/ Workshop/ Seminar / Conference Attended by Faculty

Faculty Name	Module Description	Duration	Resource
Prof. R. S. Mali	Dynamometers & I. C. Engine Testing" at SAJ test plant pvt. ltd, Pune	21/12/2015 to 23/12/2015	M/S.SAJ Test Plant Pvt. Ltd. Pune
Ms. S. M. Waghmare	Two days workshop on " Work-Life balance and health of working women"	16/01/2015 to 17/01/2015	Shivaji university, Kolhapur
	Induction Training Program Phase - I at New polytechnic, Kolhapur	28/05/2015 to 10/06/2015	NITTTR, Bhopal
	Educational technology for engineering teachers (online course)	07/01/2016 to 07/03/2016	IIT Bombay
Ms. K. S. Kulkarni	Educational technology for engineering teachers (online course)	07/01/2016 to 07/03/2016	IIT Bombay
	Workshop on 'Research Methodology	12/03/2016	R.I.T, Rajaramnagar
	Workshop on 'Computational Fluid Dynamics'	09/03/2016 to 11/03/2016	R.I.T, Rajaramnagar
Prof. S. H. Patil	Dynamometers & I. C. Engine Testing	21/12/2015 to 23/12/2015	MSBTE

OUR TOPPERS

A.Y 2015-16

1st	**MANE AKSHAY SHIVAJI**	**84.11 %**
2nd	**PATIL SOURABH UTTAM**	**83.89 %**
3rd	**PARDESHI SHUBHAM J**	**79.33 %**