TECHNICAL TALKS ORGANIZED BY THE DEPARTMENT OF MECHANICAL ENGG. IN THE ODD SEMESTER – 2014

Sl.No	Date	Technical Talk/Seminar Title	Name of Resource Person
01.	19th August 2014	How to be a professional Engineer	**Dr. Umesh M Bhushi** Principal, Sahyadri College of Engineering and Management
02	26th August, 2014	Computational Fluid Dynamics and its Applications in Inverse Heat Transfer	**Dr. Gnanasekaran** Assistant Professor, Dept.of MechanicalEngg, National Institute of Technology Karanataka, Surathkal
03	23rd September 2014	Use of electron microscope in understanding the materials	**Dr. RajendraUdupa** Professor, Dept.of Metallurgical and Materials Engg, National Institute of Technology Karanataka, Surathkal
04	7th October 2014	Turbulence-combustion and Emission Characteristics of bio-diesel fuelled C.I.Engine	**Dr. C. R Rajashekar** Vice Principal & Head Dept.of Mechanical Engg, Mangalore Institute of Engg&Technolgy, Mangalore

How to be a Professional Engineer

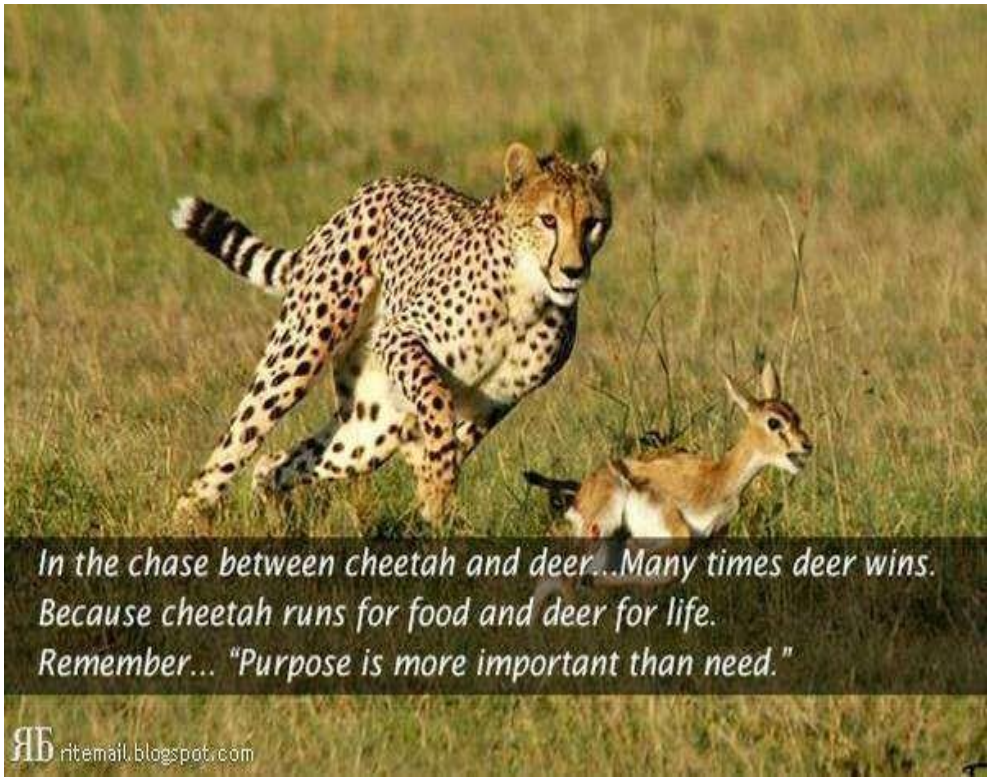
Dr. Umesh M Bhushi
Principal, Sahyadri College of Engineering and Management

Talk by **Dr. Umesh M Bhushi**

A talk on the topic "*How to be a Professional Engineer*" was delivered by **Dr. Umesh M Bhushi,** Principal, Sahyadri College of Engineering and Management on 19thAugust 2014 after inaugurating the Departmental Forum Activity MECH MAESTROS.

In the talk it was highlighted that, becoming a professional engineer is more than a title, it is a profession that benefits the environment and the community. Professional engineering is any act of planning, designing, composing, evaluating, advising, reporting, directing or supervising; that requires the application of engineering principles; and concerns the safeguarding of life, health, property, economic interests, the public welfare or the environment.

He said, students should have aims in their life and they should be optimistic and passivity because 'purpose is more important than need'.



Best example for purpose is more important than need.

He said, do not compare yourself with anyone in this world, if you compare, you are insulting yourself. He mentioned about some qualities of professional engineer, like Stay in Touch with Friends, Be a Team Player, Have FUN @ Work, Find time for loved ones, Quarrel @ Times, But PATCHUP Soon, and finally, sport a smile and stay happy always!!

The talk was motivated and inspired all the students and faculty members of the department. All the students and faculty members appreciated the title of the talk. At the end as a token of gratitude a memento is given to speaker by our beloved HOD, Prof. K. V Suresh.

Presenting a memento to chief guest and invited speaker by Prof. K V Suresh

Computational Fluid Dynamics and its Applications In Inverse Heat Transfer

Dr. Gnanasekaran
Assistant Professor, Dept. of Mechanical Engineering
National Institute of Technology Karanataka, Surathkal

Talk by **Dr.Gnanasekaran**

A technical talk on the topic "*Computational Fluid Dynamics and its Applicationsin Inverse Heat Transfer*" was delivered by ***Dr. Gnanasekaran****, Assistant*, Professor, Department of Mechanical Engg, NITK Surathkal on 26thAugust 2014.

He said, historically Analytical Fluid Dynamics (AFD) and EFD (Experimental Fluid Dynamics) was used. However now a days *Computational Fluid Dynamics (*CFD) has become feasible due to the advent of high speed digital computers. Since, CFD is more cost effective and more rapid than with experiments. Moreover, it provides high-fidelity database for interrogation of flow field. He indicated the following steps to considered while using the CFD

- Geometry description
- Specification of flow conditions and properties

- Selection of models
- Specification of initial and boundary conditions
- Grid generation and transformation
- Specification of numerical parameters
- Flow solution
- Post processing: Analysis, and visualization

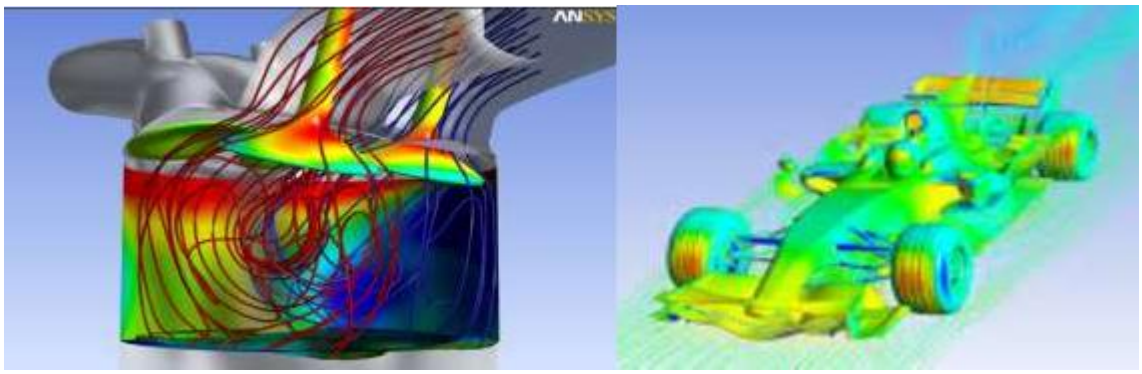


Figure: Specific examples of use of CFD

He expressed there are many applications of CFD. However, use of CFD in Inverse Heat Transfer is special and innovative one.

In the talk it was expressed that, inverse method is used to obtain optimal estimates of the unknown parameters. He specifically spoke on a central heat generating volume placed in the centre of a solid Teflon cylinder. In that case he used CFD as a simulation tool.

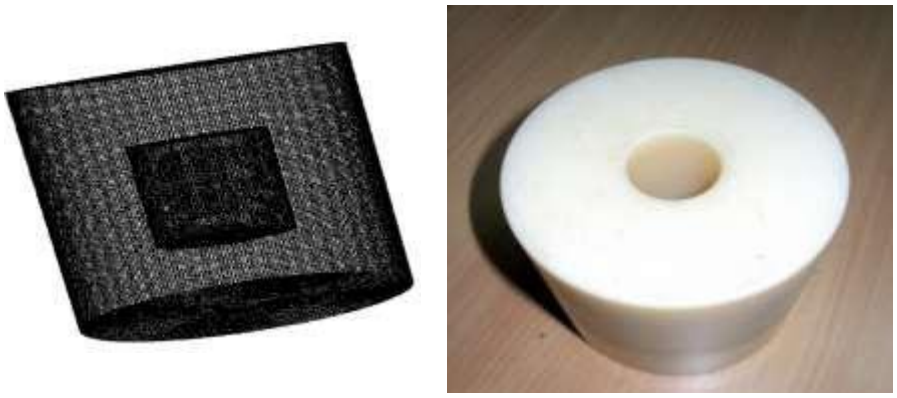


Figure :solid Teflon cylinder

The main benefits of this talk are: students having better problem solving skills. Students have a stronger understanding of modelling concepts. Students have the tools that enable them to solve more difficult problems. The talk was specially appreciated by M. Tech students since the talk was specific to their subject. In conclusion the talk was benefited for U.G, P.G and faculty members of the department.

Use of Electron Microscope in Understanding the Materials

Dr. K. Rajendra Udupa
Professor, Dept. of Metallurgical and Materials Engg,
National Institute of Technology Karanataka, Surathkal

Talk by **Dr. K. Rajendra Udupa**

A technical talk on the topic "***Use of Electron Microscope in Understanding the Materials***" was delivered by ***Dr. K. Rajendra Udupa,*** Professor, Dept. of Metallurgical and Materials Engg, NITK Surathkal on 23rd September 2014.

He said, *Scanning Electron Microscopy* (SEM) is a powerful technique in the examination of materials. It is used widely in *metallurgy, geology, biology, medicine* and even in many fields. He also explained about the working principle of SEM which operates at a high vacuum. The basic principle is that a beam of electrons is generated by a tungsten filament or a field emission gun is accelerated

through a high voltage and pass through a system of apertures and electromagnetic lenses to produce a thin beam of electrons. The beam scans the surface of the specimen by means of scan coils.

Electrons are emitted from the specimen by the action of the scanning beam and collected by a suitably-positioned detector. Then image can be seen on a screen.

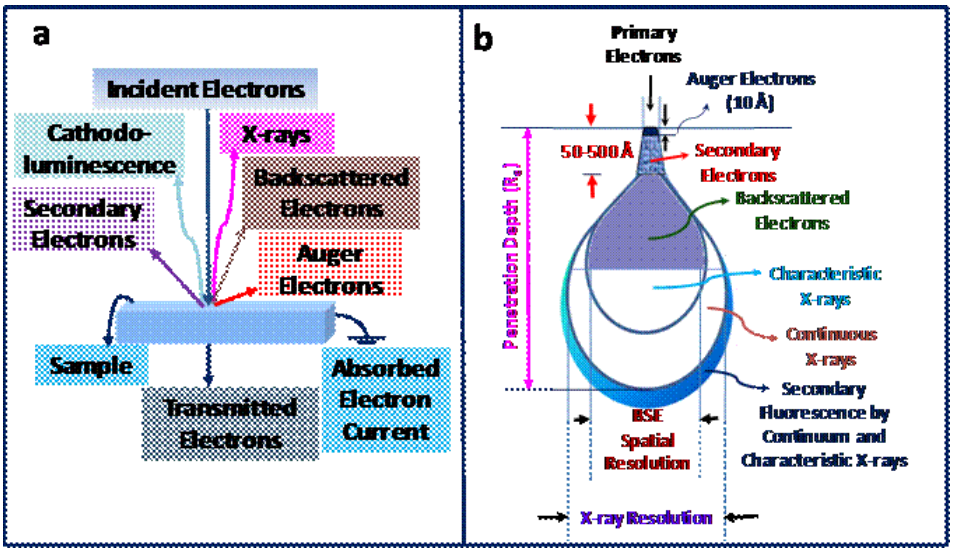
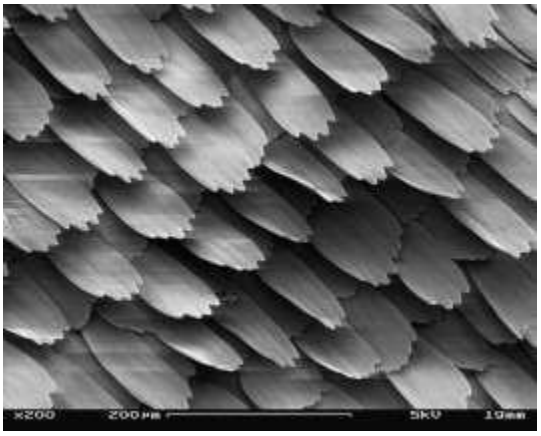


Fig : Working principle of SEM

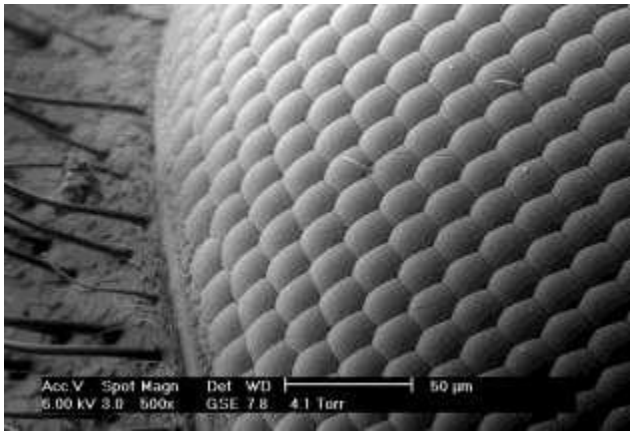
Fig: SEM facility at NITK Surathkal

Magnification in a SEM can be controlled over a range of up to 6 orders of magnitude from about 10 to 500,000 times. Some types of detectors used in SEM have analytical capabilities, and can provide several items of data at each pixel. Examples are the Energy-dispersive X-ray spectroscopy (EDS) detectors used in elemental analysis and Cathodo luminescence microscope (CL) systems that analyse the intensity and spectrum of electron-induced luminescence in (for example) geological specimens.

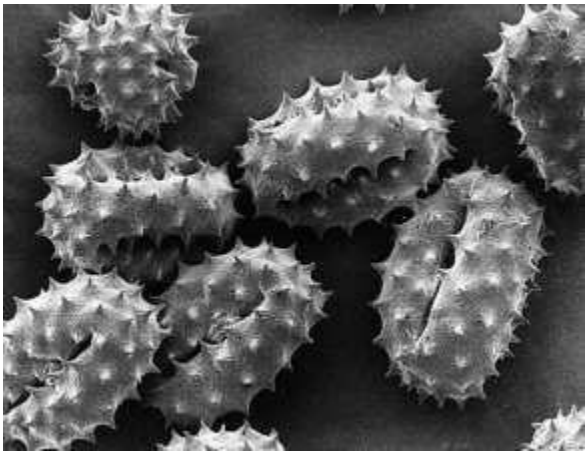
In his presentation he showed some specific SEM images which were captured by researchers at NITK Surathkal. Few of them are wings of butter fly, eye of an insect, cineraria plant, copper tracks on printed circuit board, and steel representing the formation of martensite etc.

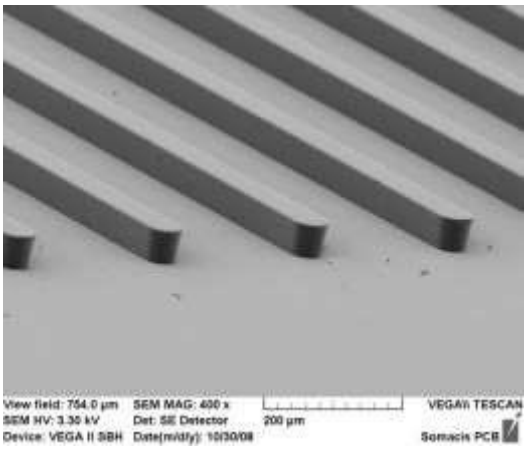


A. wings of butter fly

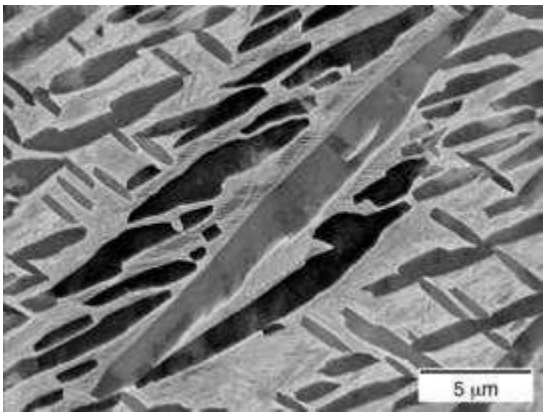


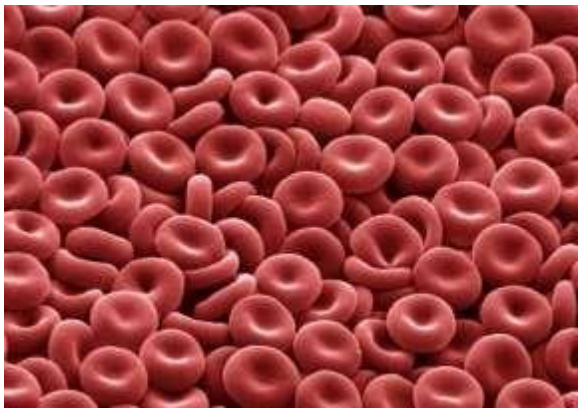
B. Eye of an insect





C. cineraria plant with spiny bumps D. Copper tracks in SEM





E. Alpha laths in a matrix of martensite F. Red blood cells,

The main benefits of this talk are students (U.G and P.G sections) and faculty members of the department got exposure to understanding the use of SEM and characterisation of materials using the same. The talk was specially appreciated by faculty members who have registered for Ph.D course since the talk was specific to their subject. In conclusion the talk was benefited for U.G, P.G and faculty members of the department.

Turbulence-combustion and Emission Characteristics of bio-diesel fuelled C.I.Engine

Dr. C. R Rajashekar
Vice Principal & Head Dept.of Mechanical Engg,
Mangalore Institute of Engg&Technolgy, Mangalore

Dr. C. R Rajashekar

A technical talk on the topic "*Turbulence-combustion and Emission Characteristics of bio- diesel fuelled C.I.Engine*" was delivered by ***Dr. C. R Rajashekar,*** Vice Principal & Head Dept.of Mechanical Engg, Mangalore Institute of Engg&Technolgy, Mangalore on 7th October 2014.

He said, Biodiesel is nontoxic, degrades four rime faster than diesel. Blending of bio-diesel with diesel fuel increases engine efficiency. 90% reduction in cancer risks, according to Ames mutagenicity tests. Biodiesel does not produce greenhouse effects, because the balance between the CO2 emissions and CO2 absorbed by the plants producing vegetable oil is equal. The high flash point makes the storage safer.

He also expressed that , Air motion plays a significant role in fuel — air mixing, combustion and emission processes. Along with air motion, spray characteristics, spray angle, injection pressure and injection timing also have a significant role in diesel engine combustion. Swirl, squish and tumble are the important flow pattern of air motion. These patterns not only affect the fuel-air mixing and combustion process in diesel engines, but also have significant impact on combustion quality.

Dr. C. R Rajashekar talk was related to engine design modification to induce turbulence by enhancing squish and tumble of charge during combustion. He focused mainly on research topic to study the effect of injection pressure on performance and emission characteristics of multi-chambered piston CI engine. The experiments have been carried out at constant speed of 1500 rpm and compression ratio of 17.5 at different injection pressure. The performance parameters such as SFC, brake thermal efficiency, carbon monoxide, NOx and UBHC have been studied.

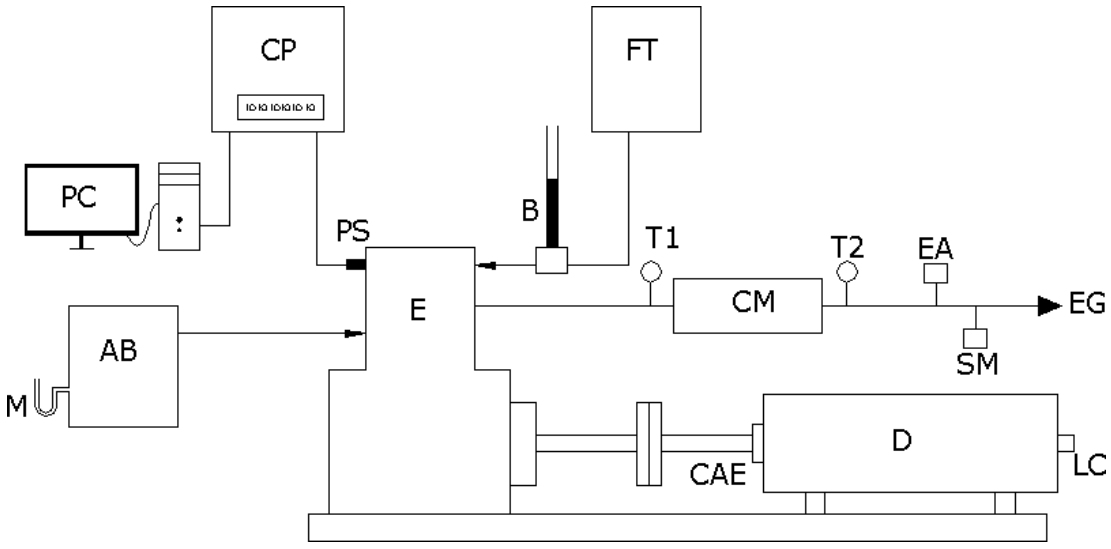


Figure: Schematic diagram of experimental set up.

The major conclusions observed from the experiments as well as talk presented by Dr. C. R Rajashekar were

• A comparison of the results obtained on the standard and a modified piston engine have been made with reference to the performance and emission characteristics and is generally observed that the modified piston gives enhanced performance and lower emissions compared to the standard piston.

• Specific fuel consumption has shown reduction with increase in injection pressure. The optimum injection pressure was observed at 200 bar for J20 blend fuel for the experimental engine.

• Brake thermal efficiency has improved with increase in injection pressure up to 200 bar and with further increase in injection pressure the brake thermal efficiency has reduced.

• The UBHC emission has improved with increased injection pressure. The optimum injection pressure was 200 bar for the modified piston engine.

• The % CO emission is clearly showing a reduced trend with increased injection pressure for the tested engine with modified piston.

The talk was specially appreciated by HOD, Faculty and M. Tech students since the talk was specific to their subject, because many of our faculty including our HOD and P.G students pursuing research based on the above topics.