October, 2005

AMEN

The Association of Mechanical Engineers

NEWSLETTER

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"It is the mark of an educated mind to be able to entertain a thought without accepting it"

FROM THE DEPARTMENT

The AME organized an interactive session regarding summer internship opportunities and procedures of applying for the same on 23rd September, 2005. The venue was L1.The session started at about half past eight and went on for almost an hour.
The session was mainly for the third year students but second yearites were also invited. The session covered issues like making a resume, writing a cover letter, the procedure of applying, important areas of research softwares that one should know. The speakers urged the audience to do the work given during internships sincerely and keep the flag of IITK and India flying high.
It may be noted that this summer over 30 final year UG students from the department went abroad for internships.

A new AME PG Council has been appointed. The council members are Adamvallli Mangapatnam (President), Y.Vams Krishna (Secretary) and T.Sharad Tiwari (Treasurer).With this we can look forward to greater contributions from the PG students.

Coming Up: Mr. Rakesh Pandey, Bose Corporation, USA, an alumnus of the Mechanical Engineering department (B.Tech, 1978) has provided financial support for instituting a distinguished lecture series. Dr. Gangan Prathap, Director, CMMACS (CSIR-Centre for Mathematical Modelling and Computer Simulation), Bangalore, will deliver the inaugural lecture of this distinguished lecture series on October 4 at 6 PM in L15.
The topic of the talk is "Management-by-Stress Model of Finite element computations".

HONOURED

Dr.Kalyanmoy Deb, a faculty member in the Mechanical Engineering department, has received the prestigious Shanti Swarup Bhatnagar Prize, in engineering sciences.
The award was handed over to him by the Prime Minister on 28th September at Vigyan Bhawan, New Delhi. He becomes the first person from the department to receive this honour.
He is one of the vanguards in the area of Genetic and Evolutionary Algorithms and has been working in this field for more than 14 years. Professor Deb's research is primarily focused on developing new and efficient algorithms and applying them to optimization problems in engineering design. He is one of the pioneers in the field of Multi-Objective Evolutionary algorithms. Some of his contributions to this area have been Non-Dominated Sorting Genetic Algorithm (NSGA) and the recently proposed design procedure by which innovative design principles can be obtained by performing a multi-objective optimization and by making a post-optimality analysis. His works on constraint handling approaches, robust optimization, liability optimization and large-scale optimization are well-known and well-cited.

RECENT LAUNCH

CarSim, TruckSim and BikeSim by Mechanical Simulation Corporation, USA, launched recently in India, are an easy-to-use integrated set of computer tools for simulating and analyzing the dynamic braking and handling behavior of vehicles under a variety of simulated test conditions. It performs virtual tests, replacing the test vehicle with a mathematical computer model. It solves the equations of motion numerically to predict 3D motions of a vehicle in response to braking and steering inputs. CarSim animates simulated tests and generates about 600 output variables to plot and analyze, or export to other software such as MATLAB, Excel, or optimization tools. The software allows for complete asymmetry of the vehicle and includes comprehensive representation of aerodynamic interactions as functions of wind angle and vehicle trim. CarSim even includes example race tracks, vehicles, chassis components and development tests. Racing game freaks may try this one out! (*Further details at www.carsim.com*)

EXTREME MACHINES

Yesterday was the first time I ever played a computer game - NEED FOR SPEED .Having spent more than six hours on the virtual tracks, I was thinking about the real formula one (F1) cars -are they really so fast, so safe?

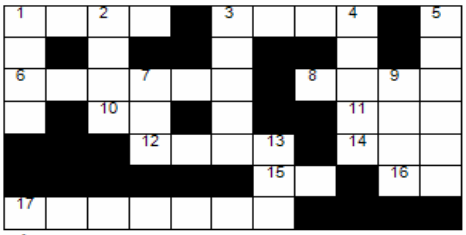
The most fascinating thing is the power of engines that surprisingly differs it from other cars. Revving to over 18,000 RPM a modern formula engine will consume a phenomenal 650 litres of air every second .Revving at such massive speeds equates to an accelerative forces on pistons nearly about 9000 times gravity. So it should be as hard as any thing can be but a conflicting demand is that it should be light and compact with it's mass in as low position as possible to lower down the car's central of gravity

For an engineer designing F1 cars considering aerodynamics has two primary concerns, the creation of down force to help and push the car tyres on to the track and to improve concerning forces i.e. sufficient friction force to get a better acceleration, and minimizing the drag that gets caused by turbulence and acts to car slow down. Recently most F1 teams have been trying to emulate Ferrari's "Narrow Waist" design, where the rear of the car is made as narrow and low as possible this reduces the drag and maximizes the amount of air available to the rear wing. The barge boards increasingly fitted to the sides of car also help to shape the flow of air and minimize the amount of turbulence.

Now comes the most important part of the F1 car –the safety system. HANS (Head and neck support), the safety suit essential for this sport, invented by Dr.Robert Hubbard, professor of Michigan state university, aims at protecting the head and neck of the driver that are unsupported in the event of a disaster. A race car driver's helmet actually increases the weight of the head, and the pendulum momentum of the head that has to be absorbed by neck muscles is the major cause of neck fracture. HANS system consist of a carbon fibre collar worn by the driver around his neck and fitted under the shoulder belts of safety harness, while the collar is locked in place of tightening safety harness. By this energy absorbed by driver's neck drastically decreased while the helmet loading is also transferred from the base of skull to the forehead –which is far better suited to taking the force.

One FIA member rightly says" You know, 20 years ago, the last people who would leave the pits were the mechanics. The reality is that today the last people to leave the pits are the software engineers and the hardware engineers and this journey would not end." **Abhishek Kothari**

CRYPTIC CROSSINGS



Across

1) Multi-lined Incisive Tool (4)
3) Apparel, tool, combination of wheel (4)
6) Alloy used in manufacturing engines mainly consisting of a non ferrous metal (6)
8) Eager, greedy (4)
10) The sixth tone of the diatonic scale in solfeggio (2)
11) Before, sooner than (3)
12) Known for creating fear amongst students, What's common b/w Morse, Leibnitz and Cauchy-condensation (4)
14) Measure of weight, fashion (3)
15) The name of sun God of the place where one of the earliest civilizations took place (2)
16) A family of operating systems produced by Microsoft (2)
17) Always increasing (7)

Down

1) Dirt – Remover (4)
2) Sloping Bar (4)
3) Closable openings with barriers (5)
4) A nail or a bolt used in fastening together (5)
5) To cut or tear (6)
7) Type of a laboratory which can do mathematical calculations (3)
9) $3d^6\ 4s^2$ (4)
13) To test, attempt, prove by experiment (3)

Mayur Dixit & Shubham Goel

IMAGINE.....

Eric K. Drexler, one of the founders of nanotechnology, envisioned in the 1980s that it could be possible to assemble certain atoms and molecules, which resemble components commonly used in macro machine design. For Drexler, the ultimate goal of nanomachine technology is the production of the 'assembler' which will be able to rearrange atoms from raw material in order to produce useful items. Such a machine would also be able to build copies of itself. If this goal is achieved, products produced by nanomachines will be extremely inexpensive. This is because the technology (once perfected) will be self-replicating and will not require specific materials, which might be rare and therefore cost money. With the ability to manipulate human cells at the atomic level, medical science will rapidly devise treatments for most human illnesses. And since nanomachines will be designed to make copies of themselves, these treatments will be inexpensive. Food shortages and starvation will be a thing of the past. Environmental problems such as ozone depletion and global warming could be solved by releasing swarms of nanomachines that could destroy CFCs and build new ozone molecules.

DID YOU KNOW?

A Tristar air-to-air refueling aircraft can dispense up to 70 tonnes of fuel on a single sortie. This is approximately 18,800 gallons (or 85,465 litres). This would be enough for a car running at 50 mpg to drive about 94,000 miles (or 151,246 km) - 3 times round the world or just over 1/3 of the way to the moon.

This newsletter gives you the opportunity and space to express yourself. Contributions are invited from all UG and PG students. Please send your write-ups at amber@iitk.ac.in.

Crossword solutions will be posted on our website on 5th October

'Best of Luck for the Mid-Sems'

ASME