

Following report contents information about A National Level Conference on “Innovative Trends in Mechanical Engineering”(February 12-13, 2016)

**Date: February 12, 2016**

**MINUTES OF EVENT**

**Record of events held on February 12, 2016.**

**Venue: Christ University Faculty of Engineering, Kengeri Campus**

**Time: 9.00-9.30 am**

**Event: Registration**

On day one registration counter was set up by students and lecturers. Once the registration were over guests were escorted to seminar hall.

**Time: 9.15 am**

**Event: Lighting of Lamp following with various events.**

Event started at seminar hall on 9.15 am following with department promotional video following by lighting of the lamp by Mr.Mathwe Chacko, Dr.Madhusoodhan, Fr. Antony, Dr.Iven Jose, Dr. Hebbar and Mr.Niranjan for the occasion.



**Dr.G.S.Hebbar**

Welcome speech to guests and students were given by Dr.G.S.Hebbar following by introductory speech by Dr.G.S.Hebbar. Later Dr.Iven Jose addressed guests, students and faculties of CUFE.



**Dr. Iven Jose**

**Time: 10.00 – 11.00**

**Event: Address by the chief guest**

**Speaker: Sri. Mathew Chacko,**

**Associate Vice President,**

**Tech Mahindra Limited,**

**Bangalore.**

[Mathwe.chacko@techmahindra.com](mailto:Mathwe.chacko@techmahindra.com)

Keynote address was given by Sri. Mathew Chacko. He enlightened students, guests and faculty members with current trends in industries and place of composite material in day to day life. He also encouraged students to pursue a career in a field of research field. Vote of thanks for the Mr. Mathew Chaco was given by Prof. Niranjan following by memento given to Mr. Mathew Chaco by Fr. Antony.



**Sri. Mathew Chacko**



**Group photo before begging of sessions**

## **Session 1**

**Time: 11.00-12.00 am**

**Topic: Innovations in Mechanical Engineering through advancement of Materials.**

**Speaker: Dr.C.D.Madhusoodana**

**Additional General Manager – CTI,**

**BHEL, Bangalore.**

[madhusoodana@yahoo.com](mailto:madhusoodana@yahoo.com)

Dr.C.D.Madhusoodana is working as additional general manager at BHEL, Bangalore. He has many number of paper published in a field of Engineering. His topics of discussion were as below.

- Innovation in Engineering such as RO drinking water, Transport, Clean air, Health and sanitation and infrastructure.
- Introduction of BHEL and their day to day work.
- Up-scaling of technology from lab to pilot plan.
- Areas of research: Ceramic for wear, abrasion and high temperature application in plants.
- Vehicular pollution control.
- Quality of Bangalore air and its content.
- Cause of pollution.
- Importance of pollution norms and its effect on lifestyle.
- Need of fuel quality improvement.
- After treatment devices.
- Exhaust treatment devices.
- Catalytic converters for petrol vehicles.



**Dr.C.D.Madhusoodana**

**Time: 11.00 - 13.00**

**Event: Paper presentations (Ceramic, Composite, Materials) by participants.**

- **Topic:** Engineering surface architecture of biocidal silver nanoparticles assembly on thiolated PVDF membranes for water purification  
**Author:** Sanjay Remanan<sup>1</sup>, Maya Sharma<sup>2</sup>, Nagarajan Padmavathy<sup>1</sup> and Suryasarathi Bose<sup>1</sup><sup>1</sup>Department of Materials Engineering, <sup>2</sup>Center for Nano Science and Engineering, Indian Institute of Science, Bangalore-560012, India  
**Abstract:** Biofouling, due to bacterial growth and colonization, is a significant obstacle in water treatment that severely affects the membrane performance. Nanofiltration effectively removes viruses and other pathogens but is an energy intensive process. Thus, there is an urgent need to design and develop low pressure membranes with antimicrobial and antibiofouling properties. Under this framework, biocidal silver nanoparticles based polymeric membranes with high content of silver on the membrane surface can control bacterial colonization. However, leaching of silver during water treatment may also lead to toxicity. In the present work, a unique strategy resulting in distinct surface assembly of silver nanoparticles was established on thiol functionalized PVDF membranes. Nanocluster assembly of silver nanoparticles on the PVDF membrane was obtained by esterification reaction between thioglycolic acid (TGA) and alkaline treated PVDF membrane (TGA-PVDF). On the other hand, by introducing thiol-ene chemistry between pentaerythritol tetrakis (3-mercaptopropionate) (PETMP) and alkaline treated PVDF, well dispersed silver nanoparticles can be tailored on the membrane surface. The silver Nano cluster assembly on TGA-PVDF membranes results in control leaching as confirmed by inductively coupled plasma atomic emission spectroscopy (ICP) and X-Ray photon spectroscopy (XPS) analysis in striking contrast to PETMP-PVDF. These results have important implications in designing membranes for water purification and reveal the importance of the surface assembly of biocidal nanoparticles towards antibacterial properties.

- **Topic:** Effect of particulate additions on wear behavior of Woven glass fabric reinforced epoxy composite systems  
**Author:** Ravichandran G <sup>\*1</sup>, Raju K <sup>2</sup> <sup>1</sup>Department of Mechanical Engineering, Christ University, Bengaluru-560029, India, <sup>2</sup>Department of Mechanical Engineering, St Joseph Engineering College, Mangaluru-575028, India  
**Abstract:** The objective of this research article is to evaluate the Wear behavior of woven glass fabric reinforced epoxy (G-E), graphite filled G-E (Gr-G-E), alumina filled (Al<sub>2</sub>O<sub>3</sub> -G-E) composites. The amount of fillers was varied from 0, 5, 7.5 and 10 wt% in G-E composite. All composites were fabricated using hand lay-up technique followed by compression molding. The dry sliding wear characteristics were investigated in accordance with ASTM standards by varying parameters such as load, time and sliding speeds. Optical micrographs were used to analyze the fractured morphologies. From the experimental investigation, it was found that the wear behaviour of particulate filled composite shows better performance compared to neat or plain and graphite filled G-E composites registered lowest coefficient of friction value of 0.2 for weight percentage of 10.
- **Topic:** An experimental study of the effect of thermal treatments & Charpy impact test parameters on impact toughness of en 31 steel  
**Author:** Anna Garima William, Christ University.  
**Abstract:** Engineering materials, mostly steel and their alloys are heat treated to alter their mechanical and physical properties so as to meet the engineering applications. The objective of the research was to maximize the impact toughness by selecting various combinations of Charpy Impact test parameters, thermal treatments and their appropriate levels based on the three-level (L9) Orthogonal Arrays (OAs) with four factors to provide an efficient and effective method for determining the most significant factors and interactions in the given design problem.
- **Topic:** Electromagnetic stirring effect on metal inert gas welding (MIG)  
**Author:** Rajesh Raj, Christ University.  
**Abstract:** Electromagnetic stirring (EMS) has been demonstrated to have significant effect on molten metal in terms of crystal orientation, grain refinement and macro appearance of solidified structures by making use of Lorentz force. In the present study, MIG welding process of 2 MM carbon steel with and without the external magnetic field applied has been experimentally investigated. Rockwell hardness and microstructure have been systematically discussed. Results of the metallographic tests showed that, compared with the traditional MIG welding, within the EMS-MIG weld, crystal orientation along the faying surface of work pieces was less directional and the grains were refined. Slightly higher uniformity in the fusion zone and more notable hardening in the heat affected zone of the EMS-MIG weld were observed by micro hardness tests. With regard to the mechanical properties, impact of the EMS-MIG welds exhibited higher ultimate failure loads and longer elongations at the failure points than that of the traditional MIG welds. The EMS-MIG welds also showed higher hardness and strength in the welded zone. It can be concluded that the external magnetic field during MIG process could improve weld performance of carbon steel by enhancing weld strength.
- **Topic:** Design of integrated manufacturing system of coal preparation plant based on multi-agent  
**Author:** M. Vignesh Kumar 1 C. Selvaraj 2, 1 PG Student, Department of Mechanical Engineering, Sri Ram Engineering College, Thiruvallur, Chennai. PG Student, Department of Mechanical Engineering, Gojan School of Business and Technology, Redhills, Chennai.  
E-mail: vickymechat@gmail.com

**Abstract:** Production process of coal preparation plant is a complicated process of multi-layer, which is determined by the production characteristics. The emphasis of information construction in coal preparation plant is the automatic data collection and data analysis. This paper constructs the integrated manufacturing system of coal preparation plant based on multi-agent, including the system analysis, module division, module construction, Agent construction, and software implementation. The production automation system has been successfully integrated with the information management, providing a useful auxiliary decision support to the production management in practice.

- **Topic:** Enhancement of the pressure sensing ability of polyvinylidene fluoride films by doping with nickel chloride hexahydrate

**Author:** Baijayanti Ghosh<sup>1</sup>, R Suresh<sup>1</sup>, G Shireesha<sup>2</sup>, A.R Phani<sup>1,3</sup>, <sup>1</sup>Department of Chemical Engineering, R V College of Engineering, Bangalore-560059, India, <sup>2</sup>Department of Physics, R V College of Engineering, Bangalore -560059, India, <sup>3</sup>Innovative Nano and Micro Technologie, Pvt Ltd Bangalore – 560059, India

**Abstract:** The piezoelectric properties of Polyvinylidene Fluoride (PVDF) along with its high chemical resistance, ease of processing at low temperatures and high pressure sensitivity make PVDF an ideal material to be used in conversion of mechanical signal to electrical output and vice versa. These films have widespread application in robotics and ultrasonic devices. Polyvinylidene Fluoride films were prepared with varying concentrations of NiCl<sub>2</sub>·6H<sub>2</sub>O using spin coater technique. The effect of concentration of dopants was found on the functional, morphological, thermal, optical, mechanical and electrical properties of PVDF. The Fourier Transform Infrared Spectroscopy (FTIR) of the films indicated that addition of NiCl<sub>2</sub>·6H<sub>2</sub>O from increased the beta phase from 69% in plain PVDF to 89% in composite films. The thermograms obtained from Differential Scanning Calorimetry (DSC) showed that the addition of the metal halide resulted in a marginal increase in melting point and an increase in degree of crystallinity of PVDF. The Tauc plots of the films showed that addition of the dopant resulted in a reduction in the optical band gap of PVDF by 16%. The electrical resistance of the films was found to reduce on addition of dopants, the maximum reduction in the order 10<sup>5</sup> was achieved on doping with 15% of NiCl<sub>2</sub>·6H<sub>2</sub>O, this film when tested as a pressure sensor was found to produce higher voltage under increasing pressure inputs.

## Session 2

**Time: 14.00 – 15.00**

**Topic: Exploring recent trends of composite application for Aerospace & Defense.**

**Speaker: Mr. Naresh Chandra Sharma,**

**Tata Advance Materials Limited (TAML)**

[Nc.sharma@tamindia.com](mailto:Nc.sharma@tamindia.com)

Mr. Naresh Chandra Sharma is working as head of Domestic Aerospace and Defense at TAML, Bangalore. He has many number of paper published in a field of Engineering. His topics of discussion were as below.

- Types of composites materials used in Aerospace industries.
- Composite materials used in Automotive industry
- Panchtantras of composite productions.
- Problems faced during the production of the composite materials.
- Methods adopted to improve the quality of final product.
- Financial perks aerospace industry enjoys by using composite instead of metal parts.
- Problems associated with production such as use of waste material.



**Mr. Naresh Chandra Sharma**

**Time: 15.00 - 17.00**

**Event: Paper presentations (Composite, Design, Materials) by participants**

- **Title:** Experimental Investigation and Fatigue life Analysis of an anodized Aluminium Alloy (2024)  
**Author:** M.SaiRaghuVamshi ,Post Graduation in Christ University, Kengeri  
**Abstract:** As many aircraft, automobile and miniatures industries use 2024Aluminium Alloy, as it has the low density and high tensile properties. In these aggressive environment metals always reacts with oxides and metals get corroded easily and material imperfections usually plays a substantial role , in order to overcome such problems anodization is the best corrosion prevention method for the metals. However, this project is to characterize the ductile fracture of 1.6mm thickness of Aluminium Alloy, experiment was done on a classical dog-bone specimen. The experiment was closely followed on the standard fatigue testing methods. Based on the experiment results and the specimen values are compared in finite element Analysis (FEA) and other software's
- **Topic:** MR-Fluid Technology, Elastomers, Polymers and its applications.  
**Author:** Md. Arif Siddiqui, Bishnu Sarkar, James Sathya Kumar, Department of Mechanical Engineering, Faculty of Engineering, Christ University, Bangalore.  
**Abstract:** Magneto Rheological Fluid (MRF) technology have the advantages of simplicity and amenable to building intelligence in functionality, which places them amongst important smart materials. This technology for multiple applications is advancing rapidly in terms of research and commercial applications. The devices based on MR fluids, such as dampers, brakes, clutches, polishing devices and hydraulic valves, have a very promising potential future; many of them have been used commercially in engineering applications. Traditional approaches to vibration alleviation using spring- mass & conventional damper as well as electromagnetically actuated system face limitation in terms of addressing only fixed frequency or tuned method of alleviation and saturation or response speed limitations, respectively. To overcome this limitations smart material technology offers tremendous advantages as they can be designed with inbuilt sensing, control, computation and actuating capabilities. A magneto rheological fluid consists of three key components including, pure Ferro-magnetic particles, carrier liquids and additives. This paper covers the characteristics, composition, and rheology of magneto rheological fluids, working principle of magneto rheological fluid devices, and their applications in several engineering applications. The review is intended to

provide a basic understanding of applications of magneto-rheological fluid, elastomers and polymers.

- **Topic:** Investigation of self-cleaning hydrophilic coatings for outdoor applications  
**Author:** Omkumar V U and Shilpa.Hiremat, Department of Chemical Engineering, R.V. College of Engineering, Bangaluru, Baijayanti. G, C.V.S.Naveen and A.R.Phani\*, Department of Coating Materials, INM Technologies, Bengaluru  
**Abstract:** Self-cleaning coatings in automobile industry have played a vital role in keeping the components free from dirt and grim. These coatings have acquired market at global level. Coatings are broadly classified into hydrophilic and hydrophobic. Former attracts water or likes water and the latter repels water or hates water. Hydrophilic coatings have been studied and experimented extensively in the present study. Materials included in the hydrophilic coatings are mainly from silicon sources. Titanium dioxide is also a material of concern. These materials are coated onto a glass and the contact angle has been measured. Sols of Titanium dioxide and silicon dioxide have been prepared by using titanium and silicon precursors respectively, by simple and cost effective sol-gel process. The sol was then coated to on to a glass substrate. Contact angle for single, double and triple coat have been carried out using dip coating techniques. The contact angle of single, double and triple coat of  $\text{SiO}_2$  sol using dip coatings were found to be  $2.7^\circ$ ,  $3.0^\circ$  and  $18.1^\circ$  and  $\text{TiO}_2$  were found to be  $9.5^\circ$ ,  $7.5^\circ$  and  $9.6^\circ$ . On the close look, single dip  $\text{SiO}_2$  sol has found to have a lowest contact angle. This sol has been coated on different substrates namely, SS 360, Cu and Al the results are discussed in detailed in the present work.
- **Topic:** Design, Analysis and Optimization of Vertical Pressure Vessel using ASME Section VIII, Division 2  
**Author:** Tejas, Christ University, Bangalore  
**Abstract:** This practical paper presents design, analysis and optimization of pressure vessel. Great pressure growth is developed in the pressure vessel and pressure vessel has to bear severe forces. In the design of pressure vessel safety is the primary concern, due the potential influence of possible accident. This work is in focus to experimentally evaluate longitudinal and hoops stresses based on working pressure as well as maximum the safety parameter for allowable working pressure. Allowable working pressures are calculated by using Pressure Vessel Design Manual by Eugene F. Magueys, twelfth edition. [1] Fatigue analysis including stress analysis. And seismic loading effects on the pressure vessel.
- **Topic:** Design and Analysis of an automotive bumper beam in low-speed frontal crashes.  
**Author:** Kartik Naidu, Christ University, Bangalore.  
**Abstract:** Bumper beams are one of the key structures in passenger cars for which careful design and manufacturing should be considered in order to achieve good impact behavior. A good design of bumper beam must be prepared for the safety of passengers; meanwhile, should have low weight. Beside the role of safety, fuel efficiency and emission gas regulations are being more important in recent years that encourage manufacturer to reduce the weight of passenger cars. Automotive bumper system is one of the key systems in passenger cars. Bumper systems are designed to prevent or reduce physical damage to the front or rear ends of passenger motor vehicles in collision condition. They protect the hood, trunk, grill, fuel tank, exhaust and cooling system as well as safety related equipment such as parking lights, headlamps and taillights, etc. The purpose of this project is to design a bumper which is to improve crashworthiness of the bumper beam. Crashworthiness is the ability of the bumper beam to prevent occupant injuries in the event of an accident and this is achieved by minimizing the impact force during the collision.

**Date: February 13<sup>th</sup>, 2016**

**MINUTES OF EVENT**

**Record of events held on February 13<sup>th</sup>, 2016.**

**Venue: Christ University Faculty of Engineering, Kengeri Campus**

Day 2 begin with welcome speech by Prof. Darshan.



**Prof. Darshan giving welcome speech**

**Session3:**

**Time: 09:00-10:00 am**

**Topic: Nano indentation- A Potential and Powerful Technique for Evaluation of Nano mechanical Properties**

**Speaker: Dr.Arjun Day,  
Project Manager,  
ISRO Satellite Center,  
Bangalore**

[Arjun\\_dey@reddifmail.com](mailto:Arjun_dey@reddifmail.com)

Dr. Arjun is working with ISRO Satellite Center, Bangalore. He has around 120 journals and 2 books publications. He gave presentation topic was Nano indentation- A Potential and Powerful Technique for Evaluation of Nano mechanical Properties His lecture covered following topics.

- Present R&D activities at ISRO, Bangalore.
- NANOINDENTATION LAB, CGCRI.
- Importance of Mechanical properties of NANO materials.
- Importance of NanoIndentation.
- Instruments required for Indentation of the material
- Application of the method in different material manufacturing.
- Impact of NanoIndentation material on contact.
- Structural ceramic of alumina.
- Different method of plasma spray coating.

- Various test to measure the toughness of the material.
- Present R&D activities and collaboration with companies and research field regarding subject were discussed.



**Dr. Arjun Dey**

**Time: 10.00 - 11.00**

**Event: Paper presentations (Composite, Design, Materials) by participants**

- **Topic:** Optimization of CO<sub>2</sub> laser cutting of glass based rigid optical solar reflector for spacecraft thermal application

**Author:** Shubham Mishra<sup>1,2</sup>, N. Sridhara<sup>1</sup>, Sanjay Agarwal<sup>2</sup> and Arjun Dey<sup>1\*</sup>, <sup>1</sup>Thermal Systems Group, ISRO Satellite Centre, Bangalore, Karnataka, 560017, India, <sup>2</sup>Bundelkhand Institute of Engineering and Technology, Jhansi, U.P., 284001, India, \*Corresponding author. Tel.: +91 80 2508 3214; fax: +91 80 2508 3203.

E-mail addresses: arjundey@isac.gov.in, arjun\_dey@rediffmail.com (A. Dey).

**Abstract:** Satellites operating in earth orbit are subjected to harsh space environment. To ensure the payloads and the electronic equipments performs to its intended mission life, satellites need to be protected from harsh fluctuating environment and achieve thermal balance by implementing passive thermal control elements like multilayer insulation (MLI), thermal radiators usually bonded with optical solar reflector. An optical solar reflector (OSR) is a second-surface mirror used on the outer radiator surface and serves for (i) reflecting solar energy incident on the spacecraft (solar reflection), and (ii) radiating heat energy produced in the spacecraft (IR emission). OSR is borosilicate or quartz glass based second surface mirror with multilayer functional ceramic coatings such as indium tin oxide/indium oxide (ITO/IO) (i.e. for electrostatic discharge) and HfO<sub>2</sub> (i.e. for UV protective) at front surface and reflective silver with a protected layer at rear side. In the spacecraft bus layout and panels, there are many locations with irregular geometry and it is difficult to populate these areas with the standard rectangular or square shaped OSR. These remaining areas are covered with tape type flexible OSR (FOSR). However FOSR shows degradation [i.e. poor 'end of life' (EOL)] of its thermo-optical properties. Thus, it was proposed to cut the rigid OSRs to the required irregular geometry or specific shape. As OSR is highly fragile or brittle, the conventional contact cutting method is not a feasible option. Alternately, the non-contact method, laser cutting, found to be the feasible solution, for getting smooth edge cuts, without breakage, and yield is nearly 100%. There are several literature reports available about the laser cutting of brittle glass and ceramics. The main challenge to laser cut of such materials is due to low thermal shock resistance,

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**DEPARTMENT OF MECHANICAL ENGINEERING**

poor thermal conductivity and low toughness. The literature summary confirms that the thin micron thick solids yet not reported for the laser cutting purpose. In the present study, laser cutting of glass substrate based OSR of 75  $\mu$  m with multilayer functional oxide coatings at front and rear side with metallic layer is attempted. Here, we report optimized cutting parameters such as laser power, cutting speed and number of passes and their effect on cutting edge quality. Further systematic and in-detail microstructural characterizations with elemental analysis of cut OSRs edge have been carried out to study laser affected zone (LAZ) during cutting.

- **Topic:** Real time application of MEMS  
**Author:** Deeleia. S, Department of Electronics and Communication, Bangalore Institute of Technology, Bangalore-560004  
Email: deeleia@gmail.com  
**Abstract:**The Primitive key of an industrial product is to be intelligent, robust, multi-functional, low cost, high performance and consume less power. The solution which comply all these criteria is miniaturization. These drives to the evolution of Micro-Electro-Mechanical Systems (MEMS) technology. The outcome of this research is the design of products with the one-tenth of human hair size using materials like Silicon, Lead Zirconate Titanate (PZT), Ceramics, Polymers, etc. Although several limitations are in its design, fabrication and packaging processes but its applications are huge. Its extreme small and complex size requires multi-disciplinary knowledge from Electronics, Optics and Mechanical fields of engineering. The objective of this paper is to focus on MEMS applications in various fields like the Bio-Medical, RF wave and Microwave Environment, Automobiles, Optical Fiber Communication (OFC) and Space.
- **Topic:** Measurement of dynamic stress and strength of centrifugal compressor impeller by unsteady CFD  
**Author:** D.Gowtham Prasad <sup>1</sup> S.GowthamSanjai<sup>2</sup>, <sup>1</sup> PG Student, Department of Mechanical Engineering, Sri Ram Engineering College, Thiruvallur, Chennai. <sup>2</sup> Assistant Professor, Department of Mechanical Engineering, Christ University, Bengaluru, Karnataka.  
E-mail:gowthamprasad14@gmail.com<sup>1</sup> gowthamsanjai17@gmail.com<sup>2</sup>  
**Abstract:** Based on the development of numerical analysis techniques over the past decade, the engineer can easily model the internal flow conditions and vibration characteristics of turbo machinery. When focusing on vibration response of rotating blades, it is easy to predict the resonance frequency; however difficulty remains in the prediction of vibrational stress. In this paper, a unique stress measurement technique for rotating blades at full load by specially designing flexible, high response impellers to emphasize the vibration stress has been introduced. In order to estimate vibrational stress on the blades, the unsteady CFD analysis is applied for calculation of the external excitation force and the vibration response is analyzed. The analyzed detail results are compared with the actual measured vibration stress and vibration response systematically. Through this paper, the resonance with the inlet guide vanes (IGV) and a unique blade/stator cascade interaction phenomena are found. Subsequently, the cause of these phenomena is investigated, and explained. Finally, based on the correlation between the measured and analyzed vibration stresses over the entire whole flow path, the strength criterion is studied as a guideline, by comparing application experience.
- **Topic:** Effects of processing parameters on microstructure and mechanical properties of squeeze-cast Al-Cu hybrid composite  
**Author:** G.N.Lokesh<sup>1\*</sup>, M.Ramachandra<sup>2</sup>, K.V.Mahendra<sup>3 1\*</sup> Department of Mechanical Engineering, Acharya Institute of Technology, Bangalore-560107, <sup>2</sup>Mechanical Department, BMS College of

Engineering, Bangalore-560019, <sup>3</sup>Mechanical Department, Jyothy Institute of Technology, Kanakapura Road, Bangalore-560062

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**Abstract**

In this paper, an Al-Cu alloy/fly ash/SiC hybrid composite was prepared by both gravity and squeeze casting. The effects of processing parameters including applied pressure, pouring temperature and dwell time on the microstructure and mechanical properties of squeeze-cast hybrid composite were investigated. It was found that squeeze-cast exhibited finer microstructure and much better mechanical properties than gravity cast composite. Increasing the applied pressure led to significant cast densification and a certain extent of grain refinement in the microstructure, along with obvious promotion in mechanical properties. Lowering the pouring temperature refined the microstructure, but deteriorated the cast densification, resulting in that the mechanical properties firstly increased and then decreased. Increasing the dwell time promoted cast densification and mechanical properties just before the solidification process ended. A combination of highest applied pressure (120 MPa), medium pouring temperature (680°C) and dwell time (25 s) brought the highest mechanical properties, under which the ultimate tensile strength (UTS), yield strength (YS) and elongation to failure ( $E_f$ ) of the composite reached 276 MPa, 124 MPa and 7.2% at room temperature.

**Session 4:**

**Time: 12:00-13:00**

**Topic: Technologies of Manufacture for MAV'S**

**Speaker: Dr. Gopal Krishna,**  
**Jain University,**  
**Bangalore,**  
[Kg.krishna@jainuniversity.ac.in](mailto:Kg.krishna@jainuniversity.ac.in)

Dr. Gopal Krishna is working with Jain University, Bangalore. He gave presentation on topic was of Technologies of Manufacturing for MAV's. His lecture covered following topics.

- Research projects at Jain University.
- Use of DRONE in various fields.
- Pros and Cons of Drone.
- Use of composite material for manufacturing of the same.
- Challenges in manufacturing of MAV's
- Potential application in a field of defense activities.
- Material used for manufacturing of the MAV's
- Recent trends in Industry and research component related to it.
- Concept and physics related to it were discussed in detailed.



**Dr.Gopal Krishna**

**Time: 12.00 - 13.00**

**Event: Paper presentations (Composite, Design, Materials) by participants**

- **Topic:** Design of integrated manufacturing system of coal preparation plant based on multi-agent  
**Author:** M.Vignesh Kumar <sup>1</sup>,C.Selvaraj<sup>2</sup>PG Student, Department of Mechanical Engineering, Sri Ram Engineering College, Thiruvallur,Chennai. <sup>2</sup> PG Student, Department of Mechanical Engineering, Gojan School of Business and Technology, Redhills,Chennai.  
E-mail: vickymechat@gmail.com <sup>1,2</sup>  
**Abstract:**Production process of coal preparation plant is a complicated process of multi-layer, which is determined by the production characteristics. The emphasis of information construction in coal preparation plant is the automatic data collection and data analysis. This paper constructs the integrated manufacturing system of coal preparation plant based on multi-agent, including the system analysis, module division, module construction, Agent construction, and software implementation. The production automation system has been successfully integrated with the information management, providing a useful auxiliary decision support to the production management in practice.
- **Topic:** Preliminary studies on mathematical modelling of diesel cycle using MATLAB  
**Author:** Shankar.V<sup>1</sup>, Ganesan .V<sup>2</sup>, Vivek K.S.<sup>3</sup>, Venkata swamy.R<sup>4</sup> and M. Nikhil Mathew<sup>5,1,2,3,4</sup>,Dept. of Mechanical Engineering, Christ University Faculty of Engineering, Bangalore, Karnataka, India. <sup>2</sup>Dept. of Mechanical Engineering.  
**Author:** Diesel engine R&D is in active progress as a part of the Major Research Project and experimental results of base line 65 HP class Four stroke four cylinder diesel engine have been obtained in a 100 HP eddy current dynamometer in house built test rig. In order to understand working of the engine from the first principles, mathematical modelling work is initiated. A typical diesel engine cycle comprises of intake compression, combustion, expansion, and exhaust processes. The detailed studies are in progress and this paper represents the preliminary studies of the basic thermodynamic cycle of both ideal and real using MATLAB. The simulated real cycle is then compared with the real-time values of the 65HP Diesel engine. Compression and expansion strokes are modelled as polytropic processes and the progressive combustion model is used to study the effect of heat addition. MATLAB plots are used to plot the P-V, P- $\theta$ , V- $\theta$  and T- $\theta$  plots. Due to heat addition there is a temperature rise and gamma values decrease slightly for which the results are

obtained for three values of 1.35, 1.375 and 1.4. The generated P- $\theta$  diagram is compared with experimental results. The p-v diagram is compared with the results available in the literature.

- **Topic:** Study of axle quenching bath to control the quenchant temperature.  
**Author:** C GuruPrasad Praveen M P, M.Tech 4th sem, PDM Assistant Professor, Acharya Institute Of Technology Acharya Institute of Technology  
**Abstract:** This paper presents the study of Quenching bath and controlling the quenchant temperature through heat exchanger. Quenching is done for diesel axles in a quenching bath of 80,000 liters capacity (for five axles) which contains a quenchant (water and 10% polymer oil). Stirrers are used to maintain uniform quenchant temperature throughout and a heat exchanger is used to keep the quenchant under its working temperature range. During this quenching process, five red hot axles with temperature around 860°C each are suddenly immersed in a quenching bath for 20 minutes which increases the temperature of the quenchant to ~85°C. It is observed that the polymer oil used, holds its property only in the temperature of 20°C-55°C and is suitable for effective quenching.

### **Session 5:**

**Time: 14:00-15:00**

**Topic: Materials and coating for gas turbine engine application.**

**Speaker: Dr. Aruna Reddy,**

**Scientist-NAL,  
Bangalore**

[Staruna194@yahoo.com](mailto:Staruna194@yahoo.com)

Dr. Aruna Reddy is working as Scientist with National Aerospace Laboratory, Bangalore. Her presentation topic was Material and coating for gas turbine engine application. Her lecture covered following topics.

- Vision and Mission of National Aerospace Laboratory (NAL).
- Various types of coating used in gas turbine.
- Role of coating
- Significance, history and application of TBC coating.
- Structure of TBC coating
- Pros and cons of TBC coating and fabrication techniques.
- Fabrication process for developing TBC coating material
- Mechanical and thermal properties of the same.
- Various test results such as failure, erosion, and thermal sock test result were discussed.
- Finally probable solution for the problem were discussed.



**Dr. Aruna Reddy**

**Time: 15:00 - 16:00**

**Valedictory and Certificate Distribution**

Conference ended with price distribution for the best paper presented. Mr. Gokulnath won price for the best paper at conference. Price was distributed by Dr. Iven to participant.

At the end of the conference Group photo was taken.



**Dr. Iven Jose handing over prize to winner of the event Mr. Gokulnath**



**Group Photo of 2<sup>nd</sup> day session end**