

MACHINEDGE

A NEWSLETTER PUBLISHED BY DEPARTMENT OF MECHANICAL ENGINEERING, CMRIT

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Message from Principal

MachinEdge reflects the passion of the students and faculty of Department of Mechanical Engineering by elaborating on various curricular and co –curricular activities and reflects upon their various achievements. This helps in the overall development of our students. I am delighted to present the seventh edition of MachinEdge and would like to take this opportunity to thank the Editorial Team, faculty, trustees and all the other contributors of this edition of MachinEdge.

-Dr. Sanjay Jain

Message from HOD

Greetings from the department of Mechanical Engineering, CMR Institute of Technology, Bengaluru. With close to ten years of its existence, the department has evinced continuous and successful growth in terms of adaptation and gaining competency in handling the new enhanced B.E. curriculum; in initiating new research avenues out of the two centers of excellences coming under its folds; and in its efforts to boost innovation and entrepreneurship activities primarily driven by the students. The department has done well through publication of research articles in international journals of repute, and bagging a funding for research (approximately 34 Lakhs) from the prestigious Naval Research Board, DRDO, Ministry of Defense has helped us to maintain and modernize our research infrastructure.

As always, our faculty have walked an extra mile by extending every possible academic assistance to students to ensure that each student emerges with flying colors in the forthcoming VTU exams. The mentors have done well in motivating their mentees in excelling in their studies, mini-projects and in various club and sport activities.

Come July, the department is excited about hosting the forthcoming faculty development program in Additive Manufacturing, which is fully sponsored by AICTE, New Delhi. This event will enable fruitful interaction between scientists from research laboratories and institutes; the user community of this novel manufacturing method; and the faculty participants hailing from all over India.

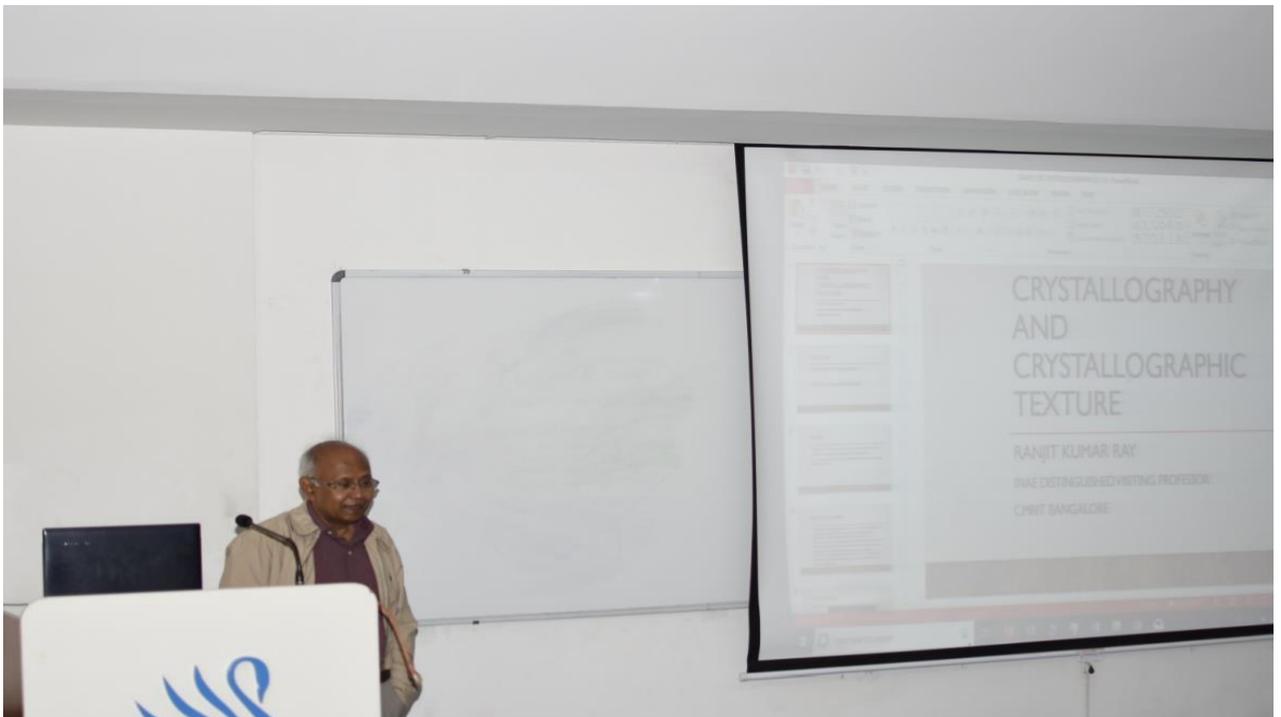
-Dr. Vijayananda Kaup

1.

Industry Connect & Guest Lectures

MATERIAL STRUCTURES

SPEAKER: Mr.R.K.RAY Professor, “Distinguished visiting faculty” by AICTE



Professor, Dr. Ranjith Kumar Ray introducing his presentation.



The faculty that attended the 3-day program

The guest lecture series for the even semester of the Academic session of 2019-2020 was off to a brilliant start with a 3-day certification course on "CRYSTALLOGRAPHY AND CRYSTALLOGRAPHIC TEXTURE" by Professor, Dr.Ranjith Kumar Ray.

The event was organized by the Centre of Excellence for Metallurgical Engineering, Department of Mechanical Engineering, CMR Institute of Technology, Bengaluru from 22/01/2020 to 24/01/2020. More than 35 faculty and research scholars from various engineering colleges participated in the course. Professor Ray, who is a world renowned metallurgist introduced the students to the world of material science. He discussed everything from the building blocks of a crystal structure to the various ways in which a material can deform. He impressed upon the students the need for the study of materials by a mechanical engineer. The participants had very informative and interactive 3-day program. The participants learned about the application of texture in engineering components.

ENTREPRENEUR SKILLS

SPEAKER: Mr. Anand Raja, Managing partner, Mew Thetis



Mr. Anand Raja's entrepreneurship talk

Mr. Anand Raja who was once a student of CMRIT explains how he went up with a simple idea of developing a atomiser and became a successful entrepreneur.

The main objective of the talk was how our alumni underwent design thinking methods to come with such an innovative idea. He was supported by AICTE Samrudhi grant from the government of India. He told the students on how the government supports building entrepreneurs by providing funds and supporting them to take different initiatives. His

product, water atomiser, is a special aerator with minimal flow-rate (water saving). The atomisation is achieved by dispersing water into tiny droplets. By contrast, with very small amount of water used, the wetted surface is huge. He explained how CMRIT, I & E cell and SC/ST cell of CMRIT helped him enormously to attain this position and thanks to the faculty for their constant support.

TECHNIQUES IN 3-D PRINTING

SPEAKER: Mr. Vamshi Kadiyala, WOL3D

In order to produce anything, you need 3 elements: an idea, the means to execute the idea, and the money to pay all concerned. For these reasons it comes as no surprise that the entrepreneurial explosion of the early 2000's has focused on software. There's a change afoot in the world of atom wrangling, and its name is 3-D printing.

The seminar was successful in providing students an exposure to the concepts of latest printing technology in the world. Mr. Vamshi from WOL 3D printing introduced the students about the latest trends of 3D printing technology. He discussed in details the difference between the ordinary printing and the new 3D printing, also known as additive manufacturing (AM), refers to processes used to create a 3D object in which layers of material are formed under computer control to create an object. Objects can be of almost any shape or geometry and are produced using digital model data from a 3D model or another electronic data source such as an Additive Manufacturing File (AMF). He also demonstrated a model before the students on an actual printer. STL is one of the most common file types that 3D printers can read. Generally, STLs that have been produced from a model obtained through scanning often have more of these errors. He also discussed the present scenario of 3D printing technology in the world market and how important it is for young engineers to master the latest technology.

2.

Journal Publication

Title: Structural simulation and optimization of diesel engine piston material using Ansys

Faculty Participated: Prof. Prashant S Hatti

Name of conference/journal: International Journal of Innovative Technology and Exploring Engineering (IJITEE)

Date: 2019-12-13

Abstract: During the combustion of fuel in diesel engine, high temperature and pressure will be created as engine runs at high speeds and loads. This results in the development of high thermal and structural stresses in the piston and if these stresses exceed the design value, failure of piston may take place. To avoid these failures, intensity of stresses should be avoided. In this work, an attempt is made to reduce the intensity of stresses by replacing conventional aluminum alloy material of piston with aluminum silicon carbide composite by commercial analysis software package ANSYS.

Title: Abrasive Wear Behaviour of Plasma Sprayed Al₂O₃ / TiO₂ Coatings

Faculty Participated: Prof. Arunkumar T

Name of conference/journal: International Journal of Innovative Technology and Exploring Engineering (IJITEE)

Date: 2019-12-15

Abstract: Premature failure due to abrasive wear is observed in high powered engine in recent decades, despite of stringent maintenance procedures comparative to older engine. Plasma spray coatings are recurrently used to circumvent the abrasive wear in aerospace, defense and certain automotive applications like piston pump, cylinder bore etc. This work is to identify the most influencing wear parameters namely sliding speed (SS), applied load (AL) and sliding distance (SD) of the composite coated steel. Initially the surface morphology and elemental analysis was carried out to analyze the surface roughness and homogeneous distribution of the composites. Furthermore wear analyzes results indicates that the composite coating has high wear resistance and specific wear rates are ranging from $0.52346 \times 10^{-5} \text{ m}^3 / \text{N-m}$ to $3.25711 \times 10^{-5} \text{ m}^3 / \text{N-m}$.

Title: Effect of flame-retardant additive with polyurea for explosive environment.

Faculty Participated: Prof. Arunkumar T

Name of conference/journal: Materials Research Innovations

Date: 2020-01-03

Abstract: The demand for improved damage control materials to address fire mitigation has led to an interest in polyurea (PU). The main problem with PU is poor burning properties which produce smoke to the environment and threaten public health. In order to improve its fire characteristics, PU may be mixed with flame-retardant (FR) additives. Melamine polyphosphate (MPP) is an FR additive which is a halogen-free compound and possesses high thermal stability. In this work, FR and thermal property of PU, with and without the addition of MPP (0%, 5%, 10% and 15% by weight), was studied using flammability, limiting oxygen index, smoke density and thermogravimetric analysis as per American Society for Testing and Materials standards. The results indicate that 10% and above quantities of MPP with PU have excellent FR, low heat release rate and smoke suppression efficiency

Title: Fixture for slot milling keyways on an industrial gear shaft.

Faculty Participated: Prof. Puneeth Kumar N

Name of conference/journal: International Journal of Mechanical and Production Engineering Research and Development (IJMPERD)

Date: 2019-12-26

Abstract: The objective of this paper is to develop a fixture that locates the component precisely and proficiently. The system follows 3-2-1 procedure of clamping, which provides the component the capacity to be immobile under various cutting forces while machine in a vertical milling machine. The purpose of the system is to eliminate individual marking, positioning and frequent checking. The proposed system of fixture provides the manufacturer uniform quality of manufacturing and also facilitates error free mass production of the component. The clamping position of the fixtures, the kinematic constraint balance and the cutting forces are taken into account for the design of the fixture. This fixture is first of its kind. The fixture not only holds the component efficiently and stable but also reduces the setup time.

Title: Effect of variation of sulphur and phosphorus on the machining characteristics of C45 carbon steel.

Faculty Participated: Prof. Puneeth Kumar N

Name of conference/journal: International Journal of Mechanical and Production Engineering Research and Development (IJMPERD)

Date: 2019-12-26

Abstract: The effects of increase in trace elements like sulphur and phosphorus in C45 medium carbon steel on the machining characteristics have been investigated. C45 steel is categorised as medium carbon steel having 0.40% to 0.50% of carbon and trace amounts of elements like Sulphur, Phosphorus, Nickel and Molybdenum in it. This particular steel is used to manufacture tools, shafts, nuts and bolts, connecting rods and rollers etc. In this work, comparison was made between two different samples of specific varying percentages of Sulphur and Phosphorus. The round bars were machined with different cutting speed (11.0m/min, 15.58m/min and 19.47m/min), varying feed rate (0.125mm/min, 0.175mm/min and 0.225mm/min) and depth of cut (0.5mm, 1mm and 1.5mm) using uncoated tungsten carbide tool inserts. Surface finish, tool flank wear, forces acting while cutting, material removal rate and temperature of tool tip were analysed and compared with two different samples of specific varying percentages of sulphur and phosphorus. Results showed that material with higher percentage of trace elements of sulphur and phosphorous has better machining properties and hence these traces within a minimum quantity give better results. In additional, tool and work sample were analysed using SEM & Energy Dispersive X-Ray Analysis for material behaviour and effect on its properties.

Title: Microstructure and hardness behaviour study of carbon nanotubes in aluminium nanocomposites.

Faculty Participated: Prof. Prashant S Hatti

Date: 2020-02-15

Abstract: In this study, the effect of carbon nanotube (CNT) amount in Aluminium (Al)-CNT composites produced by adding CNT to Al alloy in various amounts on microstructure and hardness of CNT reinforced aluminium metal matrix composites was investigated. CNT was added to Al matrix different weight percentages. Two different ball materials namely tungsten ball and aluminium oxide ball was used for same composition of Al-CNT composites. The milled powders were compacted inside the compaction die and then sintered using Microwave sintering process. The Microstructural analysis of CNT reinforced aluminium nanocomposites ball milled powder is sintered and scanned using SEM. The Brinell hardness test is conducted for Al-CNT nanocomposite samples both 60 Kgf and 100 Kgf loads, it can be observed that the highest enhancement in hardness value has occurred in CNT 1.3 wt% reinforced into aluminium composites for both 60 Kgf and 100 Kgf load. Hence it can be understood that the alumina ball milled samples have slightly higher improvement in hardness than compared to tungsten ball milled samples.

Title: Performance, combustion and emission characteristics of a diesel engine fuelled with Schizochytrium micro-algae biodiesel and its blends.

Faculty Participated: Prof. Rajendra Prasad Reddy

Name of conference/journal: International Journal of Ambient Energy

Date: 2020-02-18

Abstract: The use of the third-generation feedstock for biodiesel production has become increasingly popular over the past decade. Among the various third-generation feedstock identified, biodiesel synthesised from the microalgae attracted the attention of researchers throughout the world. The present research includes a study on the suitability of Schizochytrium microalgae biodiesel as an alternative fuel for the diesel engine. The investigation was carried out on the production, characterisation of Schizochytrium microalgae biodiesel through the transesterification process followed by performance, combustion and emission characteristics of a diesel engine fuelled with Schizochytrium microalgae biodiesel and its blends. The study revealed that the properties of biodiesel were obtained to meet the specified ASTM D6751 standards. The engine performance, combustion and emission characteristics were found to be satisfactory than those of fossil diesel.

Title: An experimental study on the influence of an oxygenated additive in diesel engine fuelled with neat papaya seed biodiesel/diesel blends.

Faculty Participated: Prof. Arunkumar T

Name of conference/journal: Journal of fuel

Date: 2020-03-19

Abstract: Poor physical properties of biodiesel (BD100) namely high viscosity and density causes atomization problems leading to higher smoke, HC and CO emissions. The purpose of this work is to enhance the performance aspects and to limit emissions from Papaya seed biodiesel operation. This research paves a way of investigating the impact of decanol (n-D) and DTBP on biodiesel/diesel blends on the research engine. Fuel blends employed in these investigations were prepared by altering the volume percentage of Diesel with Papaya seed biodiesel, DTBP, and n-Decanol respectively to prepare three tertiary blends. Diesel is referred to as base fuel with no alteration. Diesel at 50% volume is blended with 50% volume of Papaya seed biodiesel and termed as BD50 (Modified fuel). The modified fuel (BD50) is blended with 10% volume of DTBP and referred as DTBP + BD50 (45% Diesel, 45% BD and 10% DTBP on volume basis). In addition, the modified fuel (BD50) is blended with 10% volume of n-Decanol and referred as n-D + BD50 (45% Diesel, 45% BD and 10% n-D on a volume basis). This work revealed that the performance aspects such as fuel consumption reduced (1.5–2.3%) and thermal efficiency enhanced drastically (0.5–0.8%) with the inclusion of decanol (n-D) and DTBP to BD50. Smoke, HC and CO level decreased for DTBP + BD50, n-D + BD50, and BD50 with a penalty of marginal higher NOX emissions than diesel. Combustion fronts, namely Heat release rate (HRR) and peak pressure increased for BD50 with decanol (n-D).

Title: Determining Mechanical properties and vibration analysis of Aluminium 319 alloy reinforced with SiC and fly-ash

Faculty Participated: Prof. Srinivas Reddy Mungara

Date: 2020-04-28

Abstract: The Research paper involves the study of certain mechanical properties of Aluminium 319 alloy before and after the addition of reinforcement. The reinforcing materials used in this experiment are silicon carbide and fly ash. It was observed that the least hardness of about 97.81 BHN was exhibited by the composition with 5 percentage of reinforcement and after annealing the hardness has further reduced to 87.19 BHN. The tensile strength of the composite has decreased from 17.52GPa to 8.912GPa by addition of reinforcements and has increased 14.32GPa when the reinforcement percentage exceeds 4; a similar trend was obtained after annealing. Composite with 3, 4 and 5percent reinforcement have found to possess density 1.04 present greater than the parent material. The damping ratios of the annealed composites obtained are lesser than that of parent material but was found to increase by 0.5% as percentage reinforcement was increased.

Title: Value stream mapping & Manufacturing process design for elements in an auto-ancillary unit – A case study

Faculty Participated: Prof. Gopi Sampangi Ramaiah

Name of conference/journal: ICMMM 2019

Date: 2020-04-14

Abstract: The objective of this paper is to identify and eliminate waste, reduce process lead time, establish continuous flow to improve manufacturing velocity and to reduce work in process inventory (WIP) for component known as 'Element' which consists of 'Barrel' and 'Plunger', Data collected for two months in a well known auto ancillary unit on various processes was analysed and current state value stream mapping was drawn. The future state value stream was designed to determine the ideal state design for eliminating waste in the process. The velocity ratio for current state and future state value stream were also identified. Velocity ratio will be improved from the present 6.66% to 10.48% in 3 years and the target is set for First Pass Yield to be > 95%.

Title: Characterization and Feasibility Study of Potential Energy for Biogas Yield from Co-Digestion of Silkworm Larval Litter and Cashew Nut Fruit.

Faculty Participated: Prof. Narendra Narayanaswamy, Prof. Sagar M Baligheid, Prof. Arunkumar T

Name of conference/journal: International Journal of Ambient Energy

Date: 2020-05-29

Abstract: Increased demand for the utilization of waste from agricultural, dairy, food and animals to produce biogas as an alternative energy source. In most of the cases, farmers are not focusing more on the utilization of waste produced. Sericulture and cashew nut fruit waste is falling in line with energy production. Rich availability and cheaper cost make it suitable for biogas production. The effect of silkworm larval litter-screening on the biogas yield was evaluated at mesophilic conditions (35 °C). Moreover, studies examined that biogas yield and potentiality of Methane from different blends of silkworm larval litter, cashew nut fruit and dairy manure were recorded throughout the processes. Anaerobic co-digestion of a silkworm larval litter and the cashew nut fruit of blend C5 showed a rich biogas and methane yield. The higher methane content is significantly enhanced and more effective compared to other combinations by the higher methane content of C5 blend. Keywords: Anaerobic digestion, Biogas, Mesophilic, energy generation, biodegradability.

3.

Club Activities

“Lathe-The Way”

Club: SME

Date:13-02-2020



Students of the Mechanical department working on the lathe.

The SME Club, of the mechanical department organised an event known as "Lathe -The Way" on the 13th of February 2020, this activity was held by the SME club to provide a platform for students from all the branches to display their machining skills with the help of a lathe machine. The task given to each team comprising of two students and 3 hours to organise thoughts, design, implement and to machine a metal log. The students left no stones unturned to exhibit their talent of creating models with the help of the lathe. The selection of the best model was based on various parameters like the profile, complexity of the model and the time taken to machine it. The judges for this event were Prof. Prashant S. Hatti and Prof. Harisha P.

The winners and the runners up were awarded cash prizes. The first place went to Rajesh Ankam and Akshay G Raj from 6th semester mechanical department, the second place was awarded to Pavith SD and Srilatha MN from 6th and 8th semester mechanical department and finally the third place was awarded to Nishchay and Manoranjan from 6th semester mechanical department.

"Paper Clip Challenge"

Club: Prolab

Date: 19-02-2020

The Prolab club of the mechanical department organised an event on the 19th of February 2020 called "Paper Clip Challenge". The paper clips were designed around the 1890s and haven't changed since then. Gem clip is widely considered as the most popular style paper clip in the world. But like many features of engineering, reducing the paper clip to such a simple design was very tricky because the Gem clip uses the least amount of wire, requires basic machines to create the loops and refuses to get tangled with other paper clips when stowed. The United Kingdom's gem manufacturing company had to ensure the wire was elastic enough to wrap around multiple sheets of paper, but featured enough torsion -the application of torque -between the twisting wires to keep the paper in place. It also had to be done without creating too much friction that it tore the paper.

The main objective of conducting this activity was to encourage students of various branches to come up with creative ideas so that they could redesign the simple yet so complex paper clip. The students were told to design and 3D print their paper clip model using a CAD software and a 3D printer. This event was organised by The Department Of Mechanical Engineering on the 19th of February 2020 and it was open to students from all the branches. There were around 20 participants from various branches and the Prolab student co-ordinators did a wonderful job in executing this event successfully.

Technical Talk on “3D Printing And It’s Importance In Present Day Scenario”

Resource Person: Mr Vamshi Kadiyala,
WOL3d

Date: 20-02-2020

The main objective of this talk was to provide students with an exposure to the concepts of the latest 3D printing technology in the world. Mr. Vamshi from WOL 3D printing, introduced the students to the latest trends of 3D printing technology and he discussed the differences between ordinary printing and 3D printing. 3D printing, also known as additive manufacturing (AM), refers to the processes used to create a Three-Dimensional object in which layers of material are formed under computer control. Objects created can be of any shape or dimension and are produced using digital model data from a 3D model or other electronic data source such as an additive manufacturing file (AMF). STL is one of the most common file type that 3D printers can read. Thus unlike material removed from a stock, in the conventional machine process

3D printing or AM builds a three-dimensional object from a computer-aided design (CAD) model or AMF file by successively adding material layer by layer. He also demonstrated the working of 3D printer before the students. Before printing a 3D model from an STL file, it must be examined for errors. Most CAD applications produce errors in output STL files like holes, faces, self-intersections, noise shells or manifold errors. A step in the STL generation known as “repair” fixes such problems in the original mode. Generally STL’s that have been produced from a model obtained through 3D scanning often contain more errors. He also discussed the present scenario of 3D printing technology in the world market and how it is important to budding engineer to learn the latest technology.

This event was organised by the co-ordinators of the SME club on the 20th of February, 2020 and the talk given by Mr. Vamshi Kadiyala was open to members from all branches and it was held in The Mechanical Department.

"Technical Quiz"

Club: SME

Date: 23-03-2020

The SME club of the mechanical department conducted their first online event called the "Technical Quiz" and it was held on the 23rd of March, 2020 between 2:00pm and 3:00pm with the help of the Google forms. This Quiz required students to make the best use of time and the pre-requisite knowledge of their known subjects.

The event was attended by a total of 45 students and it began exactly at 2:25. The students began solving various questions the quiz had to offer. The main objective of the competition was to educate the students and to let them realise the various skill sets that one ought to possess for them to clear such quizzes and competitive exams. Students soon realised the difficulty in the quiz. Prof. Chetan and the co-ordinators of the SME club had prepared a very challenging and interesting quiz for the students.

The event successfully ended at 3:00 pm. The students utilised their time in an extremely efficient matter and completed their task in the allotted time span. Akshay Madhusudan of the 6th semester Mechanical branch topped the quiz by scoring a phenomenal of 80% on this difficult quiz.

"CROSSJAM V1.0"

Club: SME

Date: 11:05:2020

The SME club of the mechanical department hosted an event called Crossjam V1.0 on 11th of May between 12:00 pm and 01:00 pm on an online platform. The crossword puzzle required students to make the best use of the allotted time and the pre-requisite knowledge of mechanical behaviour of metals, as the crossword was based on that.

The event was attended by a total of 40 students and it began at 12:00 pm. The students began solving the various tricky questions that were mentioned in the crossword puzzle. The main objective of conducting this event was to educate the students and let them realize the different conceptual analysis on mechanical behaviour of materials through the crossword puzzle.

The students soon realised that it was a tricky task to solve all the crossword question in the allotted time. Prof. Prashant S Hatti and the co-ordinators of the SME club had prepared a very challenging and yet interesting crossword puzzle to tease the mind of their students during the lockdown.

"Auto-Pictionary"

Club: SME

Date: 15-05-2020

The SME club of the mechanical department organised a picture quiz known as "Auto-Pictionary" on 15th May, 2020, between 12:00 pm and 01:00 pm on an online platform. This picture based quiz required students to make the best use of the given time and their pre-requisite knowledge of basic mechanical parts of an automobile as the quiz was based on that.

This event was attended by a total of 35 students from the 2nd, 6th and 8th semester of the mechanical department. The quiz began at 12:00 pm and the students began solving the various questions the picture quiz had to offer. The main objective of conducting this competition was to educate the students and let them realize the different pictorial analysis of various parts of an automobile through the quiz.

This event was conducted by the co-ordinators of the SME club and they were assisted by prof. Prashant S Hatti which made the quiz even more trickier and challenging.

"Mechanix V1.0"

Club: SME

Date: 20-05-2020

The SME club of the mechanical department organised a mechanical reasoning test called "Mechanix V1.0" on 20th May, 2020 between 12pm and 1pm on an online platform. This reasoning required students to make the better use of the time allotted and their knowledge of mechanical concepts as the test was based on that. The students that attended the event belonged to the 2nd, 6th, 8th semester of the mechanical department.

The aim of conducting the event was to measure the participants previous knowledge of physical and mechanical concepts and to evaluate their roles in various departments. The test required some foundational understanding of basic principles in mechanics and physics. Previous specialized knowledge isn't required to participate. These test are typically used to assist how well and individual can apply their reasoning skills in an practical environment.

The candidates will be required to answer questions based on a variety of topics such as electric circuits, pulleys, levers, springs, tools, gears and maps. It is important to have good knowledge about these areas and their basic principles. It is highly unlikely for a candidate to reach the stage of recruitment without the knowledge or experience of these aspects.

This event was attended by a total of 20 students .it commenced exactly at 12 pm and the students began solving various complex questions the test had to offer. The Activity was prepared by Prof. Prashant S Hatti and the co-ordinators of the SME club.

"Crossjam V2.0"

Club: SME

Date: 23-05-2020

The SME club follows up with their previously held activity and comes up with "Crossjam V2.0". This event was held on the 23rd of May, 2020, between 12 pm and 1 pm on an online platform. The crossword puzzle required students to implement their knowledge of engine theory as the crossword was based on that. Students from the 2nd, 6th and 8th semester from various departments participated in this event.

The event was attended by a total of 30 students and it commenced at 12 pm and the students began solving various questions the puzzle had to offer. The main objective of conducting this event was to educate the students and to help them realize the different terms used in engine theory through the crossword puzzle. The puzzle only consisted of questions that they had studied in engine theory.

The students then quickly started solving the puzzle that Prof. Prashant S Hatti and the club Co-ordinators had prepared for them. The puzzle made by them just like the previous one was challenging and interesting and blew the minds of the participants.

4.

Tech Talks

Current state of Friction stirrs welding of Cu-Al alloys

- **Prof. Harisha P**

Date: 13-02-2020

INTRODUCTION:

FSW was invented by Wayne Thomas at TWI(The Welding Institute) Ltd in 1991. It overcomes many of the problems associated with conventional joining techniques. FSW is low energy input, capable of producing very high strength welds in wide range of materials at lower cost. FSW process takes place in the solid phase below melting point of the materials to be joined.

Art of Value Investing for Mechanical Engineers

- **Gopi Sampangi Ramaiah**

Date: 13-02-2020

Value investing is a simple strategy at its core. Value investors select stocks that the market is underestimating for their intrinsic value. Have you ever wanted to buy a new product, but waited for a promotional sale to get it at a discount that's all value investing is buying good stocks at bargain prices. The art of value investing believes that the market sometimes overreacts to bad and good news, resulting in price movements that don't correspond to the long-term fundamentals of a company. Such overreaction from the market opens up opportunities for investors to buy discounted stocks and profit from them in the long run. To find the book valuation of stocks, investors use various metrics such as financial performance, earnings, revenue, cash flow, and company profit. They also consider some fundamental factors like the company's business model, competitiveness, target market, and brand awareness. Whether it's your first time to get your feet wet in the stock market or you've been investing for some time, it pays to learn value investing and enjoy solid returns that this strategy brings. One has to become familiar with the benefits of value investing to make the most out of it. Below are some practical reasons why you should try this approach.

Anyone Can Be Successful

In Value Investing You can be successful in value investing regardless of your financial income and educational background. Since you're buying discounted stocks, you don't need a significant amount of capital to start using this strategy. All you need is hard work, time, and a lot of patience. Yes, you heard it right patience is the most vital factor for your success in value investing. It's an approach wherein you are waiting out short-term fluctuations in the market to enjoy long-term returns. Value investing doesn't require you to be an "active trader", so being an expert in various trading platforms and styles is not a requirement. You don't need the genius of Warren Buffet in order to succeed in this strategy. Sure, you're

going to make mistakes along the way, but since you've already set your own "margin of safety" losing money is less likely even if stocks underperform.

Removes the Investor's Emotions from the Equation

One of the common weaknesses of investors is getting emotional when the market fluctuates. The fear of experiencing losses forces them to withdraw money without taking advantage of stocks that rebound and outperform the market over time. With value investing you can make smarter decisions. A 10% jump in the market will not get you too excited to sell. Stocks going down 3% from its previous value will not make you run for the hills either. Value investing lets you focus more on the long-term growth of your investment.

Lets You Take Advantage of Compounding

Value investing allows you to reinvest a dividend for a higher profit potential over time. Compounding at, say 3%, can significantly impact your wealth as you retire. Compounding will result in more earnings in a shorter period without the need for extra work on your part. If you do the math, your money will double in about 33 years, even if you're pocketing a 3% dividend from your investment. What happens if you invest it back to buy more shares? Your investment would double 10 years earlier. Remember that even the smallest amount of money can significantly increase over the long term.

Lesser Risk and Volatility

Unlike short-term investment strategies, value investing is subject to far lesser risk and volatility. Price fluctuations in the market are less likely to affect you since you're not buying and selling stocks within short intervals. As already mentioned investors tend to get emotional and can be poor market timers, which result in investor loss. With value investing, you don't have to frequently make profitable buying and selling of stocks, thus avoiding losses due to timing mistakes.

Enjoy Lower Tax Rates

Value investing requires you to pay far less taxes when compared to short-term investments. If you're an active trader and own stocks in a year or less only before selling them again, you'll pay tax at the top of your marginal tax rate. The charge for short-term investments can reach up to 39%. In value investing, on the other hand, fees are only 20% at the highest.

Some value investors even experience 0% tax for their long-term gains.

Final Thoughts

Value investing is all about finding secret sales on stocks and buying them at lower prices. You're investing in these stocks because you know their real value even if the market underestimates them. In the end, you get handsome rewards that contribute to your long term success.

Detonation of Coal

- Prof. T S Sheshadri

Date: 20-02-2020

Direct detonation of coal particles in the presence of plasma is believed to enhance the combustion and thermodynamic cycle efficiencies of the combustion process. The sudden exposure of coal particles to high temperature detonation/plasma shock waves are known to trigger spontaneous pulverization of coal particles. Such pulverization can result in higher burning rates and hence becomes a subject of real interest while literature on the subject is still very limited. Direct initiation of detonation is brought about by an electric plasma cartridge at one end of the detonation tube.

Coal particles, when subjected to a detonation wave, experience a relatively highly stressed inner and outer region. As the coal particle is subjected to temperature shock, three different regimes emerge based on particle sizes. The largest particles possibly simply explode into smaller fragments as break up develops throughout the coal particle. The medium particles first fragment in the outer region and thereafter the surviving ones might fragment in the interior. The smallest particles are likely to fragment in the interior. The entire process rapidly speeds up at higher Mach numbers. This suggests that detonation combustion of coal is qualitatively different from conventional coal combustion. There is also a possible scope for reconciliation with fragmentation predicted by other failure theories.

Experimental and Numerical simulations of heat transfer process in integrated safety vessel with thermal insulation and reactor vault

- **Prof. S Ramachandran**

Date: 20-02-2020

INTRODUCTION:

Commercial Fast Breeder Reactor (CFBR) is a 500 MWe sodium cooled pool type reactor. It has three main heat transport circuits viz, primary sodium, secondary sodium and steam water system. All reactor internals including core and primary sodium circuit are contained in a single vessel called Main Vessel. It was proposed to reduce the thickness of the safety vessel from 20 mm to 6 mm. The constructability of this arrangement needs to be demonstrated. Prior to undertaking full scale model, it was proposed to conduct heat transfer studies on a reactor vault of size 1 m x 1 m x 1800 mm with integrated safety vessel. To simulate this heat transfer to safety vessel, a heater plate simulating main vessel along with embedded heaters was fabricated and erected with a gap of 250mm. The reactor vault temperature was maintained by cooling water circulation system.

OBJECTIVES:

To construct the experimental set up of size 1 m x 1 m x 1800 mm with Heater plate, safety vessel with insulation panels, liner plate with cooling pipes followed by concrete vault. To fill nitrogen gas in the gap between heater plate and safety vessel and in the gap between insulation panels. To carry out the heat transfer study. To study the temperature variations at different locations under various conditions. To conduct experiments and compare the experimental results with numerical results.

Natural-Fiber-Reinforced Polymer Composites and its Applications

- Prof. Venkatesh Naik

Date: 27-02-2020

Over the past decade, the concept of utilizing green materials has become more mainstream. With considerable awareness of preserving the environment, sincere efforts across the globe can be cited in looking for bio-degradable and bio-based sources. Applications of bio-based materials from renewable and bio-degradable sources for preparation of higher valued green chemicals and bio-based products have forced many scientists to investigate the potential use of natural fibers as reinforcement materials for green bio-composites. Cellulosic fibers are becoming very interesting for bio-based material development as they possess advantages with their mechanical properties, low density, environmental benefits, renewability, and economic feasibility. Recently, natural- fiber polymer composites have received much attention for different industrial applications because of their low density and renewability. The bio-composites with natural fiber components are derivatives of depleting resources and can be considered to have substantial environmental and economic benefits. This chapter addresses the potential utilization of natural fiber for the development of green polymer composite materials, with the objective to elucidate the possibility of using these bio-based materials for various industrial applications.

Bio-composite materials are defined as composite materials in which at least one of the constituents is derived from natural resources. Generally, the term bio-composites cover composite materials made from the combination of:

- Bio-polymers-reinforced synthetic fibers such as carbon fibers, glass, Kevlar, etc.
- Natural fibers–reinforced petroleum-derived polymers such as polyethylene (PE), polypropylene (PP), epoxy, unsaturated polyester (UPE), vinyl ester (VE); and;
- Bio-polymers reinforced by natural fibers.

The advantages of natural fiber over synthetic fiber in terms of its relatively renewable resources are its abundance, less damage to processing equipment, low weight, low cost,

good relative mechanical properties such as tensile modulus and flexural modulus and improved surface finish of molded parts composite. The bio-composite materials made from the combination of natural fibers–reinforced petroleum-derived polymers and bio-polymers–reinforced synthetic fibers such as glass and carbon are not biodegradable and are not fully environmentally friendly.

Natural fiber bio-composites have many advantages; they are relatively cost effective, exhibit good thermal and dimensional stability, low coefficient of friction, and low density and are more environmentally friendly. For these reasons, the popularity of these bio-composites is increasing, and a significant amount of scientific knowledge is already generated. To facilitate the utilization and applications of the bio-composites, all aspects must be present in society:

- (a) Concept development, one of the steps in new bio-composite materials development to better address the future needs of applications
- (b) Material design, select the bio composites for applications and to model designs to ensure that a material has the necessary performance capabilities
- (c) Material fabrication, select the right fabrication methods for the designed bio composite materials
- (d) Product manufacturing, improve the way bio-composites, components, and systems are manufactured, as well as the final appearance and functionality of the product
- (e) Market, understand the market's need and size, and (f) regulations act to promote the utilization of the bio-composites.

5. Phd

-Dr. Gopi Sampangi Ramaiah



Thesis Title: "Quality Management through quality circles, six sigma, value analysis & CMM-A

Study on Indian Manufacturing & IT Industry".

In this era of intense competition, Quality has become the key slogan in organizations as they strive for a competitive advantage in an atmosphere characterized by liberalization, globalization and knowledgeable customers. Quality revolution spreading to all business sectors all over the world has made quality management a potential area of research. The research works on quality management in manufacturing & IT industries do not appear to be comprehensive and is in the budding stage. Due to the high costs associated with the software defect removal and due to the precise control of modern systems with the use of software, the software quality is very much important and is to be concentrated also by the researchers. This underscores the need of research on Quality management in manufacturing & IT industries. Indian manufacturing & software industry is growing at an accelerated rate in software development and services due to its cost effectiveness, quality and reliability. The survey of literature on Quality Management reveals the application of Quality circles, Six

Sigma, value analysis and CMM to improve the business performance, profitability, decreased defect rate and increased customer satisfaction, which leads to the application in IT industries as well. A clear understanding of Critical Success Factors (CSF) of Quality circles, Six Sigma, value analysis and CMM would help the implementation procedures. It appears that the relationship between the Quality circles, Six Sigma, value analysis and CMM and the operational outcome in IT industry has not been examined rigorously so far. Hence the present study explores above mentioned issues in Manufacturing and IT industries.

6.

Special Mentions

Material/Product manufactured/Developed (e.g. Mask, sanitizer, ventilator, etc.) by the institute to fight against COVID-19.

Development of IR thermometer

The CoE – Additive Manufacturing (CMRIT) has developed a hand-held digital IR thermometer, which is an important component to mitigate COVID-19.

Go Free IR Thermometer is designed to measure body temperature quickly and accurately without any physical contact. In recent days, IR Thermometers play an important role to contain viral outbreaks. Mobile phone or power banks can be used as a power source.

The principle of operation of IR thermometer is simple; all bodies at a temperature above 0 Kelvin (absolute zero) emit an infrared energy which can be detected by the infrared thermometer sensor. The design includes a lens that focuses the infrared energy being emitted by the object in front of a detector. The detector converts the energy into an electrical signal which is then passed to a microcontroller to interpret and display in units of temperature after compensating for the variation in ambient temperature.



Faculty involved

1). Dr. Sagar M Baligheid

Head_COE-Additive Manufacturing, CMRIT.

Materials/Product distributed by the institution (e.g. Mask, sanitizer, soaps, food, clothes, medicine, study material, etc.) to the nearby locality or to the needy people.

Project 1: COVID-19: CMRIT develops PPE face shield specially for CORONA WARRIORS

A face shield is a protective gear with a transparent visor attached to a headband

CoE – Additive Manufacturing (CMRIT) has fabricated a low-cost face shield costing ₹30 only to protect frontline medical personnel from contracting COVID-19 while treating patients.

Professor Dr. Sagar M Baligheid and Mr. Anjan Kumar N were involved in the design and production of the face shield. They were intended to be worn over regular masks, and are meant to protect frontline staffers from catching any kind of infection while moving among crowds and corona virus patients. These face shields have to be made rapidly and at low cost because they are disposable. The product development effort combines use of low-cost materials with a high-rate manufacturing method that has the potential of meeting the need for face shields nationwide.

Face shield is developed by 'Stopdrop', using readily available inexpensive materials and is fabricated by a group of five students and faculty of the CMRIT at its technical facility named

'MAKERSPACE', which encourages innovations, experiments and prototype development by the students.

Priced at Rs. 30 each face shield is made by using MDF, OHP sheet, plastic tube and elastic bands which are low in cost. Laser cutting and CNC router machines are used to make MDF frame, and OHP sheets are used to act as protective film cover over the frame. 5000 face shields are produced and are distributed to the Bangalore Police and to medical personnel.



Faculty involved

1). Dr. Sagar M Baligheid
Head_COE-Additive Manufacturing, CMRIT.

Students involved

1. Anirban Bhattacharjee (6SEM) – 1CR15ME009

Hands free Sanitizer dispenser machine



The Department of Mechanical engineering fabricated multiple Hands free Sanitizer Dispenser machine to be deployed in the CMRIT campus as part of the post COVID lockdown measures. The fabrication of the unit was carried out by Mr. Murali and Mr. Krishnappa and is in use on a day to day basis.



7.

Result Reports

DEPARTMENT OF MECHANICAL ENGINEERING
RESULTS ANALYSIS FOR III SEM BE (MECH), 2020-2021(ODD SEM)

Total appeared	127	Failures	46	WH	-	Pass	81	Pass %	64
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DEPARTMENT OF MECHANICAL ENGINEERING
RESULTS ANALYSIS FOR V SEM BE (MECH), 2019-2020(ODD SEM)

Total appeared	106	FCD	30	FC	23	SC	8	Failures	45	WH	-	Pass	61	Pass %	58
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DEPARTMENT OF MECHANICAL ENGINEERING
RESULT ANALYSIS FOR VII SEM BE (MECH), 2019-2020 (ODD SEM)

Total appeared	103	FCD	53	FC	41	SC	5	Failures	4	WH	-	Pass	99	Pass %	96
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Editorial Committee

Students:

Deeptha Sabarish: 1CR17ME023

“Happiness can be found in the darkest of places. As long as one remembers to seek out the light. “

-Albus Dumbledore

Dhruva K Gowda: 1CR18ME024

"Shadows have been a light upon our faces"

Hruthik S Mushigeri: 1CR18ME029

“The higher we soar, the smaller we appear to those who cannot fly.”

- Friedrich Nietzsche

Kurt Pinto: 1CR18ME033

“Ideas are far more powerful weapon than guns.”

-Joseph Stalin

Manoj Shivakumar, 1CR18ME042

“Success is not the key to happiness. Happiness is the key to success. If you love what you are doing, you will be successful.”

-Herman Cain

Faculty:

Dr. Vijayanand Kaup

Dr. Rajendra Prasad Reddy

Professor. Chidhananda. R. S

CMR Institute of Technology
Department of Mechanical Engineering