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Visvesvaraya Technological University (VTU) is a State University, established by Govt. of Karnataka and one of the largest Technological Universities in India with 24 years of tradition of excellence in Engineering & Technical Education, Research and Innovation. It came into existence in the year 1998 to cater to the need of Indian industries for trained technical manpower with practical experience and sound theoretical knowledge. The University has very successfully achieved the tremendous task of bringing various colleges affiliated earlier to different Universities, with different syllabi, different procedures and different traditions under one umbrella. The university is currently having 208 affiliated colleges, 1 constituent college and 25 Autonomous colleges with undergraduate programs in 37 disciplines, PG programs in 96 disciplines and Ph.D. & M.Sc. (Engg.) research programs with 7 faculty, over 3 lakh Students pursue various courses in the institutes affiliated to the University. The University has 13 Quality Improvement Programme (QIP) centers in various affiliated colleges and 16 extension centers for offering PG programs. It has four regional centers across the State of Karnataka in Belagavi, Bengaluru, Kalaburagi and Mysuru respectively.

About ICETEA-2024

International Conference on Emerging Trends in Engineering and Applied Sciences (ICETEA-2024) is intended to provide a common platform to the Researchers, Academicians, Scientists, Industrial Practitioners, Engineers and Scholars in frontline evolutionary and challenging fields. The foremost objective is to create a fundamental basic knowledge for intellectuals, to exchange their ideas and findings for technological evolution to benefit society. It is expected to bring the global researcher community together for knowledge sharing, innovation and technological achievements. Authors are solicited to contribute to the conference by submitting articles that illustrate research results, projects, Experimental works and industrial experiences that describe significant advances

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PREFACE

The "**International Conference on Emerging Trends in Engineering and Applied Sciences – ICETEA 2024"** has been organized by SJC Institute of Technology, Chickballapur, Karnataka in association with Visveswaraya Technological University, Belagavi. Our main aim is to provide a common platform to the Researchers, Academicians, Scientists, Industrial Practitioners, Engineers and Scholars in frontline evolutionary and challenging fields.

The conference was held on 18th and 19th September 2024 (Wednesday and Thursday) via blended mode and was hosted by SJC Institute of Technology, BGS Campus, Chickballapur. About 70+ papers were received for the presentation and 50+ papers were selected for presentation after the Double-Blind Review process. The abstracts of these papers are prepared as the Proceedings of the Conference with ISBN Code. The conference included Two keynote sessions and Three parallel sessions for Civil /Aeronautical & Aerospace/Mechanical and Applied Sciences in which there were invaluable presentations by the authors.

We sincerely thank the Management, Principal, Registrar, HODs, Committee Members, Reviewers, Session chairs, Track coordinators, Faculty, Authors and the students who have contributed magnificently to the success of the conference. We are grateful to the authors and the participants for their thought-provoking contributions. We endeavor to ensure that the conference would be well organized. We hope that it met the expectations.

Dr. Deepa M S

On behalf of the Organizing Committee

Conference Chair-ICETEA 2024

LIST OF ABSTRACTS

CIVIL ENGINEERING

AERONAUTICAL & AEROSPACE ENGINEERING

MECHANICAL ENGINEERING

BASIC SCIENCES

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CIVIL ENGINEERING

1. DURABILITY PROPERTIES OF RIGID PAVEMENT USING MARBLE DUST & DEMOLITION WASTES

Chethan Kumar N T[1], Dr. K E Prakash[2], Dr. Rajani V Akki[3], Santhosh R[4]

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[2]Professor & Principal, Dept. of Civil Engg. Shree Devi Institute of Technology, Mangalore–574 142,

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[4]Asst. Professor, Dept. of Civil Engg. Acharya Institute of Technology, Bangalore–560 049, VTU, Belagavi – 590 018

Abstract-Rigid pavement construction has gained importance in recent decades, especially for rural roads/low-volume roads. The construction of rigid pavements creates demands for fine aggregate and coarse aggregate. This results in a scarcity of these natural resources. In this context, in the present study, Marble dust a waste material from the marble industry is used as a partial replacement for fine aggregate, and demolition waste is used as a partial replacement for coarse aggregates. Both the materials are introduced at varying percentages and results are highlighted based on compressive test results. As per the results, 20 to 30 percent of both materials can be done effectively and also, concrete cube samples were cured in seawater to determine the durability aspect. Hence, proper utilization of these waste materials results in the production of eco-friendly concrete as well as resulting in a pollution-free environment.

Key words: Marble dust, Demolition waste, Durability of concrete.

2. STRENGTH AND MICROSTRUCTURE CHARACTERISTICS OF FA-GGBS BASED GEOPOLYMER CONCRETE DEVELOPED WITH STEEL AND PPF USING M-SAND.

***Anil Kumar H.M.*[1] *Shoba M.S*[2]**

[1] *Department of Civil Engineering, Rao Bahadur Y. Mahabaleswarappa Engineering College(RYMEC)Ballary.*

[2] *Department of Civil Engineering, Ballari Institute of Technology & Management (BITM) Ballary, Visvesveraya Technological University Belagavi India*

Abstract- It's an exciting field of study because alternative environmentally conscious and sustainable construction techniques are being developed to meet the increasing need for infrastructure. To reduce Portland cement's adverse ecological impacts, alternative concrete binders must be designed. When compared to Ordinary Portland Cement (OPC)-based construction supplies, geopolymers are a very intriguing low-carbon, cement-free composite substance with superior mechanical and serviceability qualities. By using the right reinforcing components, ideally "fibres," these quasi-brittle solid composites, which use an "alkali activating solution" as a binder agent and recyclable materials with an elevated alumina and silica content as its basis material, can have their ductility increased. Fiber reinforced geopolymers concrete (FRGPC) was investigated in this paper using Flyash FA and granulated blast furnace slag (GBFS) comprising polypropylene fiber (PF) or steel fiber (SF), M-sand. The first group of 3 mix ratios was used to develop a control mixture for 8 & 10 molars without adding fibers, In the second group, 6 mixtures were used to evaluate the effect of the fibers on the compressive strength, split strength, flexural strength, Impact strength, with 1 % of steel fiber for 3 mixes & 1 % of polypropylene Fiber for remaining 3 mixes (total of 9 Mixes). Furthermore, the SEM EDX XRD investigations were also carried out to comprehend the mechanism of strength enhancement based on the micromorphology and products of reaction. The outcome of this research demonstrates the mechanical features of FRGPC, including slump, compressive strength, split tensile strength, and flexural strength, as well as its microstructural properties are improving as molarities increased and addition of fiber content. The outcomes also show that fibers improve the mechanical properties of samples. Furthermore, microscopic analysis revealed that the microstructures of FRGPC were more compact and uniform at 28 days, despite the fact that replacing PF with SF decreases mechanical strength. Another sustainable way to get rid of industrial waste involves the production of FRGPC. In the age of sustainable development, FRGPC may be considered a more cost-effective and ecologically friendly substitute for conventional Concrete materials.

Keywords: FA, GGBS, M-Sand, Fibers, Impact Strength, Microstructure.

3. INVESTIGATIONS PERTAINING TO THE DEVELOPMENT OF HIGH STRENGTH SELF COMPACTING CONCRETE

Shivaraj [1], Shreenivas Reddy Shahapur[2]

[1,2] Research Scholar, Civil Engineering, Visvesvaraya Technological University, Belagavi, Karnataka, India

Abstract- High Strength Self Compacting Concrete (HSSCC) is a specialized concrete type known for its remarkable flowability and ability to compact on its own. And preventing bleeding & segregation issues of concrete. The mix design procedure for HSSCC focuses on optimizing the proportions of materials to ensure both flowability and high strength. The selection of materials and determining the right mix proportions helps to achieve good consolidation without any vibration. The performance of fresh HSSCC evaluated using EFNARC guidelines to identify the flow, passing and filling ability of fresh HSSCC. Also, the compressive strength of harden concrete are assessed for the duration of 7, 28 & 56 days of water curing.

4. ADVANCING SUSTAINABLE CONSTRUCTION: A COMPREHENSIVE REVIEW AND CASE STUDY OF ELECTRICMACHINERYIN MODERN INFRASTRUCTURE PROJECTS

[1]Sowmyashree T, [2]Mallu HemsarathReddy, [3]Harsh

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[2]Post Graduate Student, Civil Engineering, Presidency University, Bengaluru, Karnataka, India

[3]Post Graduate Student, Civil Engineering, Presidency University, Bengaluru, Karnataka, India

Abstract-The construction industry is undergoing a transformative shift towards sustainability, driven by the urgent need to reduce environmental impacts and comply with stringent regulatory standards. This review paper delves into the advancements in sustainable machinery within the construction sector, exploring their evolution, types, benefits, challenges, and future trends. Sustainable machinery, including electric, hybrid, hydrogen fuel cell, and biofuel-powered equipment, offers significant environmental benefits by reducing emissions, decreasing energy consumption, and minimizing noise pollution. These innovations not only address environmental concerns but also provide operational advantages such as cost savings and enhanced public image. However, the adoption of sustainable machinery faces challenges, including high initial costs, limited availability, and technological limitations. The paper also highlights a current case study of Volvo Construction Equipment's electric machinery implementation in Sweden, showcasing practical applications and benefits in real-world construction projects. Future trends indicate continued advancements in battery technology, expansion of hydrogen infrastructure, and integration with smart technologies, which are expected to further

enhance the viability and efficiency of sustainable machinery. By providing a comprehensive analysis of sustainable machinery in construction, this paper aims to underscore its critical role in promoting greener construction practices and achieving long-term sustainability goals. The findings emphasize the need for collaborative efforts from industry stakeholders to overcome challenges and drive the adoption of innovative, eco-friendly construction equipment.

Keywords- Sustainable Machinery, Electric Construction equipment, Volvo Construction Equipment, Electric Machinery Performances, Innovative Technologies, Future of Construction Machinery, Environmental Impact Reduction.

5. REVIEW OF MECHANIZATION'S INFLUENCE ON THE EVOLUTION OF INDIAN RAILWAY INFRASTRUCTURE

Ms. Sowmyashree T[1], Mr. Pavan Kumar[2]

[1]Assistant Professor, Civil Engineering, Presidency University, Bengaluru, Karnataka, India.

[2]PG Student, Civil Engineering, Presidency University, Bengaluru, Karnataka, India.

Abstract: Indian Railways, a cornerstone of India's transportation infrastructure, has increasingly embraced mechanization to meet the growing demands of efficiency, safety, and expansion. This shift from manual to mechanized processes has significantly impacted track construction, maintenance, station modernization, and signaling systems. Mechanized track laying and tamping machines have accelerated construction and improved track stability, while advancements like precast technology and automated systems have streamlined station development. Modern signaling and communication systems have enhanced train operations and safety, including electronic interlocking and Automatic Train Protection. Despite challenges such as high initial costs and the need for skilled labor, mechanization has transformed Indian Railways, making it more resilient and capable of meeting future demands. This journal explores the multifaceted impact of mechanization on the infrastructure development of Indian Railways, highlighting its role in shaping a modern, efficient, and safer railway network for India's future.

Keywords- Track Laying Machines, Tamping Machines, Precast Technology, Automated Systems, Electronic Interlocking, Automatic Train Protection (ATP), Railway Safety, Sustainability, Resilience

6. STUDY ON IMPROVING THE STRENGTH CHARACTERISTICS OF STABILIZED ADOBE USING SUSTAINABLE MATERIAL

Likhithraj D R[1], K V Mahesh Chandra[2], Dr. K S Jagadish[3]

Likhithraj D R[1], Department of Civil Engineering Bangalore Institute of Technology Bengaluru, India

K V Mahesh Chandra[2], Department of Civil Engineering Bangalore Institute of Technology Bengaluru, India

Abstract-This experimental study investigates the mechanical properties of Soil Stabilized Adobe (SSAs) enhanced with Tree Resin (Gondh). SSAs are low-cost, sustainable building materials widely used in regions with limited resources. However, they often lack adequate strength and insulation properties. To overcome these limitations, Tree Resin is incorporated into the SSA mix to enhance their mechanical strength.

Keywords - Sustainable, Rural Construction Material, Low-Cost Construction.

7. ANALYSIS OF HYDRO-LIVABILITY INDEX OF BIJAPUR USING GIS AND RS

Manasa R[1], Tejas K[2]

[1,2]Dept of Civil Engineering, Acharya Institute of Technology, Soladevanahalli, Bengaluru, India

Abstract- Livability is the degree to which a particular place is good for human habitation. Livability is an objective assessment that takes into account factors such as access to amenities, safety, transportation, and environmental quality. GIS has become one of the important tools in this present generation to understand and visualize spatial data. Water is an essential component of the environment and economy of the nation. With proper levels of groundwater helps people in determining the most suitable place for human habitat or industrial developments. Thematic map is a specialized map made to visualize a particular theme or parameter about a geographic area. The collected and analyzed data are then inserted to the GIS software to generate the thematic maps of each parameter. Collection of data is done by the open source which is available on various websites and being inputted to the Arc GIS. Hydrology watershed is found out by these steps, spatial analyst tools are used to determine the hydrology flow direction, flow accumulation, basin conversion raster to polygon stream order flow directions these are the steps involved in calculation of watershed then for the groundwater potential zone. Thematic maps are generated using these calculations and data. Using weighted overlay analysis these maps are overlaid one over the other. Later these thematic maps are overlaid, analysis will be done considering the whole study area, weightage are assigned to the place according to the values of the data obtained. After the analysis of the overlaid layers is done, the complete study area classified into high, medium, average and low livable area according to their

weightages assigned. The analysis made can be further used in town planning and other construction works.

Keywords- Livability index, GIS, Spatial data, thematic maps, weighted overlay analysis, remote sensing data.

8. ANALYSIS OF ABSORBENCY OSCILLATIONS DUE TO WHITE TOPPING ROADS IN BENGALURU USING GIS

Darshan Gowda S[1], Akhilesh V[2] Marvin Sagayaraj J[3], Jayanth N A[4],Tejas K[5]

[12345] Dept of Civil Engineering, Acharya Institute of Technology, Soladevanahalli, Bengaluru, India
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Abstract-The large-scale implementation of white-topping or replacing asphalt roads with concrete, in Bengaluru has raised concerns about its potential impact on the local environment. This study aims to analyse the absorbency oscillations, or variations in heat absorption, caused by the white-topping of roads in Bengaluru using Geographic Information Systems (GIS). By integrating data from satellite imagery, surface temperature measurements, and road network information, the GIS analysis can identify spatial and temporal patterns of absorbency oscillations. This can provide insights into how the higher albedo (reflectivity) of concrete roads compared to asphalt affects the local microclimate and contributes to the urban heat island phenomenon. The findings of this study can guide future road construction and maintenance strategies in Bengaluru to mitigate the adverse environmental effects of white-topping. The analysis can also inform policymakers and urban planners on the importance of considering the thermal properties of road surfaces when implementing large-scale infrastructure projects

Keywords- GIS , absorbency oscillations , white topping.

9. A COMPREHENSIVE REVIEW ON USING ELECTRONIC WASTE AS A CONSTRUCTION MATERIAL

Gummapalli Mahaboob Basha[1], *Research Scholar, Christ (Deemed to be university) Bangalore - India*

Abstract: The study explores the use of electronic waste (E-waste) as a sustainable alternative in a variety of construction applications, addressing the rising global issue of E-waste management. E-waste, consisting of both metallic and non-metallic components, contains valuable and hazardous materials, which can lead to environmental damage, if improperly managed. The study demonstrates different methods for incorporating e-waste into bituminous mixes, high-strength concrete, and other composite materials. Research shows that, using E-waste improves the strength and durability

properties of concrete. This serves as a practical alternative for disposing of E-waste and encourages the use of sustainable building methods. Furthermore, the possibility of using E-waste in the construction of flexible pavements is reviewed, which demonstrates positive results in enhancing the mechanical characteristics of bituminous mixtures. The study also highlights how e-waste can help with sustainable building methods by cutting down on landfill waste, preserving natural resources, and lowering carbon footprints. The results indicate that the use of E-waste not only offers a more affordable option than traditional materials but also helps to lessen pollution from solid waste, which is in line with worldwide efforts to promote environmental sustainability. Overall, this research shows that e-waste is a useful material for the construction, providing a creative waste management strategy that is in line with worldwide sustainability objectives. The results indicate that e-waste can be an important source of eco-friendly building materials, reducing environmental pollution and encouraging responsible resource use, if it is treated and integrated properly.

Key words- E-waste, Sustainability, Eco-friendly, Solid waste, Waste management.

10. POUNDING EFFECT ON ADJACENT RCC BUILDINGS

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Abstract: Adjacent buildings colliding during an earthquake due to vibration differences can cause severe damage known as seismic pounding. Separated by an expansion joint, this Gap Element accommodates their lateral movements. While seismic pounding can be prevented by providing adequate safe code specified separation distances, sometimes getting of required sale separations is no possible in metropolitan areas because buildings are built very close to each other door to high land value limited availability of land space, the nood for centralized facilities under one roof and or often ignoring the likelihood of seismic pounding between adjacent buildings during deign. If building separate in metropolitan areas found to be deficient to prevent pounding, then there should the some secure and con affective methods to mitigate structural pounding. Thus highly congested building system in metropolitan cities constitutes a major apprehension for seismic pounding damage. The simplest and non appropriate way for pounding mitigation is to provide safe separation gap, but it is sometimes difficult to fulfill due to the high cost of land. An alternative to the seismic separation gap provision in the structure design is to reduce the effect of pounding through decreasing lateral displacement try introducing the stiffeners like RC walls, Bracings, dampers and providing the Gap Elements etc. The main objective and scope of the study are to evaluate the effects of structural pounding on the global response of building, Atemune the lateral peak displacement during the

earthquake ground motion, evaluating seismic gap between buildings with practical tools to mitigate the seismic pounding This only covers The effect of providing the gap element between the two adjacent RCC buildings, considering the different cases. The gap element affects displacements and drifts when Earthquake forces act in adjacent buildings with gap elements.

11. A STUDY ON STRUCTURAL INTEGRITY, REPAIR AND RETRO FITTING TECHNIQUES ON EXISTING DISTRESSED STRUCTURES

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Abstract: In present era, there are so many buildings which get distressed or even get collapse fully or partially due to lack of maintenance, improper construction method, material and design, also due to soil changing properties over the time or even due to earthquakes. Such building's needs repair and retrofitting techniques to bring the structure to safe condition. Repairs are always neglected or delayed by many people due to lack of awareness and financial ability and so it leads to major hazards. Selecting the suitable repair and retrofitting techniques plays an important role in strengthening of structures which depends upon various factors such as type of building, usage of building etc., Hence, it is needed proper repair and retrofitting application. In the present project an existing distressed hostel building is considered which requires immediate repair and retrofitting to bring back to service condition. In this regard preliminary survey including condition surveying, rapid visual inspection to notify the nature of distress and Non-Destructive testing (rebound hammer and ultrasonic pulse velocity testing) on concrete to check the concrete strength is carried out to find the stability of distress building.

Finally, this paper suggests suitable and economical repair works and retrofitting techniques to improve the strength of existing distressed building to bring back the structure to serviceability.

Key words: Structural Integrity, Repairs, Retrofitting Techniques, Distressed Structures.

12. PLANNING, SCHEDULING AND COSTING OF G+3 RESIDENTIAL BUILDING USING MICROSOFT PROJECT

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Abstract - Construction projects increasingly face delays, largely due to inadequate planning and scheduling. Despite the development of various project management tools, timely project completion remains a significant challenge in the industry. Effective planning and scheduling are essential to minimize delays and improve productivity, ultimately leading to higher quality outcomes. This study highlights the characteristics of project management software, particularly Microsoft Project (MS Project), and its role in enhancing the efficiency of construction projects. The research is conducted in two phases: data collection and the application of MS Project for planning and scheduling. The findings demonstrate that MS Project effectively aids in managing project timelines, resources, and costs. For a G+3 residential building project, the overall duration was 487 days with a total cost of approximately 7.82 million Rupees. The study concludes that using MS Project can significantly improve the management and execution of construction projects, ensuring better adherence to schedules and budgets.

13. REVIEW PAPER ON ROAD SAFETY AUDIT FOR RURAL KARNATAKA

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Abstract: This study presents a comprehensive road safety audit for rural Karnataka, addressing the unique challenges faced in this region. The audit investigates current road conditions, traffic patterns, and safety issues, using a combination of conventional methods and innovative surrogate measures. By integrating emerging technologies such as GPS tracking and community reporting systems, the study aims to enhance the accuracy and completeness of safety data. The findings highlight the need for tailored safety interventions that consider local road conditions, traffic behaviors, and socio-economic factors. The audit emphasizes the importance of collaborative efforts among government agencies, local communities, and researchers to develop and implement effective road safety measures. The study concludes with recommendations for future research to further integrate advanced technologies and improve data quality, ultimately aiming to reduce road safety risks and improve outcomes in rural Karnataka.

Key worlds: GPS tracking, Road Safety Audit

14. AN EXPERIMENTAL STUDY OF SEA WATER DESALINATION BY SOLAR PANEL

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Abstract- Desalination is a process that extracts minerals components from saline water. More generally, desalination refers to the removals of salts and minerals from a target substance as in soil desalination which is an issue for agriculture. Salt water is desalinated to produce water suitable for human consumption or irrigation. One by product of desalination is salt. Desalination is used as many sea going ships and submarines. Most of the modern interest is desalination is focused on cast-effective provision of fresh water for human use along with recycled waste water resources. Desalination of seawater or brackish water is generally accomplished using water evaporation, or by using a semi-permeable membrane to separate fresh water from concentrated saline water, or by a combination of the two as in membrane distillation. Most conventional desalination plants are large scale centralized units that typically serve urban populations. In recent years, there is considerable interest in developing decentralized desalination technologies. An environmental advantage of decentralized desalination is that the brine discharge is spread out over a large area, and thus the environmental impact is considerably less than that associated with large scale centralized desalination plants. In rural arid regions, populations are distributed over a large land surface area. For such cases, it is more economical to install and operate decentralized water production units that serve the local population in lieu of large centralized water production where water must be transported long distances. In this study the desalination process is conducted by preparing a model of solar panel. The results are obtained from the process, removal efficiency of chloride is 62.9% and 57.31%of hardness can be removed. There is an increasing demand for advancing convention Desalination technologies and developing novel solar powered desalination processes.

Keywords: Desalination, saline water, chloride, hardness.

15. EXPERIMENTAL INVESTIGATION ON THE UTILIZATION OF MANUFACTURED ALKALI-ACTIVATED COARSE AGGREGATE IN RAILWAY SLEEPERS

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Abstract: -. The depletion of natural resources due to high consumption rates, coupled with the accumulationof industrial waste, poses significant environmental challenges. This study explores the potential of manufacturing Alkali Activated Coarse Aggregate (AACA) using an ordinary concrete mixer, aiming to utilize industrial waste efficiently. AACA was produced with molarities of 6, 8, 10, and 12, and its physical properties were analyzed. Results revealed that AACA's physical characteristics are comparable to conventional aggregates, with differences noted in flakiness, elongation, and angularity number. Given the crucial role of sleepers in rail track performance, this study further investigated the application of AACA in concrete for sleeper production. It was found that using 10M AACA to replace up to 75% of natural aggregate is feasible for sleeper manufacturing. However, higher molarities and replacement percentages did not meet the standards set by the

Research Design and Standards Organization (RDSO). This research underscores the viability of AACA as a sustainable alternative in railway sleeper production, contributing to waste management and resource conservation.

Keywords: Sleepers, Molarity, Alkali Activated Coarse Aggregate, Static Bending, Electrical Resistivity

16. ANALYSIS OF SOIL STRUCTURE INTERACTION OF TWO BAY STEEL MRF WITH AND WITHOUT BRACINGS

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Abstract: -The aim is to evaluate how different structural configurations, and the incorporation of bracings affect the seismic performance and stability of steel frames. The study involves modeling the steel Moment Resisting Frame on different soil types, incorporating different soil models to simulate Soil Structure Interaction. The analysis is conducted for two bays unbraced and diagonally braced configurations to compare their behaviors under seismic loading. This work provides valuable insights into the necessity of considering SSI in the design of steel MRFs and highlights the benefits of using bracings for seismic resilience. The findings

emphasize the importance of integrated soil-structure modeling in ensuring the safety and performance of structures subjected to seismic forces.

17. ANALYSIS OF SOIL STRUCTURE INTERACTION OF ONE BAY STEEL MRF WITH AND WITHOUT BRACINGS

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Abstract: The objective is to assess how various structural arrangements and the addition of bracings impact the stability and seismic performance of steel frames. In order to simulate Soil Structure Interaction, the study models the steel Moment Resisting Frame on various soil types using various soil models. In order to compare the behaviors of the one bay unbraced and diagonally braced constructions under seismic loads, an analysis is carried out. This paper emphasizes the advantages of employing bracings for seismic resilience and offers insightful information on why SSI must be taken into account when designing steel MRFs. The results highlight how crucial integrated soil-structure modeling is to guaranteeing the performance and safety of constructions exposed to seismic pressures.

18. STUDIES OF ACCIDENT-PRONE LOCATION IN BENGALURU: A CASE STUDY

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Abstract- The road safety studies were conducted on three black spot junctions in Bengaluru, India: Chandra Layout, Nagarbhavi Circle, and Mahalakshmi Layout. The study employs questionnaire surveys, pavement inventory surveys, traffic volume counts, spot speed studies. Data was collected and analyzed for type and number of accident sate ach locations. Spot speed studies was conducted at entry and exit of junction. Traffic simulations was done using VISSIM software. Based on the questionnaire surveys, the rating, ranges from 2 to 3, indicate varying poor to satisfactory ratings. Furthermore, a linear regression model was developed to estimate queue length based on time, density, speed, and traffic volume. Positive correlations were consistently observed across all locations, with an average coefficient exceeding 0.8. Auto rickshaws and cars showed positive correlations, while cars exhibited

a moderately positive correlation with an average coefficient of 0.791. The findings indicate the need of tailor-made traffic calming measure to reduce accidents and improve road safety.

19. STUDIES ON SELF-HEALING PROPERTIES OF GLASS FIBRE REINFORCED BITUMINOUS CONCRETE MIXES

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Abstract: Nowadays, many researchers are investigating various methods of modifying asphalt concrete (AC) and are finding substitute paving materials to increase the service life of pavements. This is done in an effort to improve the performance and durability of asphalt pavements and reduce environmental pollution caused by hydrocarbon materials. Fibres are one of the successful materials used to modify AC. This work examines the self-healing capacity of asphalt incorporating glass fibres as well as the impact of the fibres on the mix. Glass fibres typically have a high tensile modulus, 100% elastic recovery, and a very high resistance to heat. The mix containing glass fibres are evaluated for Marshall Stability and the ideal glass fibre content and its corresponding binder content is identified. In this study, the performance of glass fibres in bituminous concrete is studied and the Marsh all mix design, indirect tensile strength and fatigue tests was conducted. The results obtained were positive and addition of glass fibres showed an increase in stability, tensile strength and tensile strength ratio. Overall, addition of glass fibres into BC mixes is beneficial to the pavement performance.

20. STUDIES ON WARM MIXES USING BAGASSE ASH AS A FILLER MATERIAL

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Abstract: In recent years, the durability and sustainability of flexible pavements have faced significant challenges due to the rise in higher axle loads and traffic volumes. This has resulted in the deterioration of pavements and raised concerns about increased carbon emissions. To mitigate these CO2 emissions, efforts are underway to lower the mixing and compaction temperatures without compromising mix quality, achieved through warm asphalt mixes (WMA). Among various issues affecting flexible pavements, fatigue cracking and moisture damage have emerged as prominent concerns. To address the issue of pavement cracking, researchers have explored the use of modified additives in dense graded bituminous mixes with in the frame work of warm asphalt mixes. This study focuses on evaluating the performance of Dense Bituminous Macadam (DBM)

mixes incorporating different levels (1%,2%,3%) of bagasse ash as filler material in WMA technology. The mixed sign processed employed the Marshall Method to establish the optimal bitumen content with the corresponding bagasse ash content for both hot and warm mixes. The warm mixes were enhanced with 3% sasobit by weight of bitumen. The research unfolded in two stages. Initially, Modified Marshall specimens were prepared to assess indirect tensile strength and moisture resistance. Bagasse ash (1%, 2%, 3%) with 3% sasobit was used as a WMA additive. Subsequently, Marshal specimens were developed for indirect tensile strength testing under repeated loads using the same mixture proportions. The investigation revealed that the bagasse ash (1%, 2%, 3%) content in warm mixes met established standards. Based on the Marshall test, the stability of warm mixes with 1% bagasse ash exceeded that of hot mixes. Moreover, the indirect tensile strength test demonstrated greater moisture resistance in warm mixes incorporating sasobit compared to conventional DBM-II mixes, across varying bagasse ash levels. This indicates that Hot Mix Asphalt (HMA) exhibited relatively lower retained stability, implying susceptibility to cracking and deformation under traffic loads and climate conditions. Notably, the warm mix containing sasobit and bagasse ash exhibited improved fatigue life compared to the other mix variants. Therefore, DBM mixes enhanced with 1% bagasse ash and WMA additives displayed higher resilience modulus values and better resistance against repetitive loads. In conclusion, the study suggests that integrating sugarcane bagasse ash as a filler material in DBM mixes presents a solution for waste disposal while promoting sustainable material usage. The combination of warm mix technology and bagasse ash optimization contributes to the creation of durable and sustainable pavements.

21. A STUDY ON PROPERTIES OF BLACK COTTON SOIL BY ADDING A MIXTURES FLY ASH AND QUARRY DUST

Vidyashree Deshmukh[1], Neelam Paragond[2], Poonamrani Takalki[3], Preeti Arakeri[4], Ms. Divya Motakpalli[5], Ms. Swetha[6]*, Sharnbasva University, Kalaburagi*

Abstract- The property of the black cotton soils, as a general rule, is that they are extremely hard when in a dry state, however they lose the in entire being when in a wet state. Not with standing this property of soils, these clay act issues overall that serve like a test to defeat for geotechnical engineers. In the current review, utilizing flyash got from the Raichur power plant, with different extents of this added substance i.e., 5%, 10%, and 15%, costly soils are balanced out. Since fly ash has no plastic property, the versatility list (private investigator) of mud fly debris blends shows a lessening in esteem in with

expanding flyash content. All in all, the expansion of flyash brings about a reduction in the versatility of soil and an expansion in functionality. Quarry dust is gotten from Kalaburagi modern region, quarry powder is to further develop the designing properties of the black cotton soil with fluctuating levels of 5%, 10%, and 15% and focused on compaction credits and strength qualities.

22. GENERATION OF ELECTRICITY USING MAIZE WASTE WATER BY DOUBLE CHAMBERED MICROBIAL FUEL CELL

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Abstract- The Energy Crisis is a serious problem in the present scenario. Non-renewable sources of energy are becoming extinct. Man has to think of some alternative way to generate the energy. Waste coming out of industries is polluting the water bodies. Treating polluted waste is cost-effective, but many industries can't afford it. Here is one of the best solutions to treat industrial waste and also to generate energy by using microbes. This is called microbial Fuel Cell. A Microbial Fuel Cell is a device that uses microorganisms to transform chemical energy into electric energy.

23. TRAFFIC NOISE MODELING FOR NATIONAL HIGHWAY

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Abstract: The attributes to the higher traffic noise include heavier traffic volumes, higher speeds, and greater numbers of commercial vehicles. Change in road geometry and land use, also increases in traffic noise levels. About 3.4 km of non-urban stretch of National Highway 948 , Bengaluru to Kanakapura road, Karnataka was selected. Noise was measured at different locations Viz,. college, commercial area, vegetation and intersection. The traffic volume count and spot speed are measured for these locations. The noise levels are measured using smart phone application NOISH at the varying distances at shoulder, at 5m and at 10m. Buses and trucks generates highest noise levels followed by LCV, four-wheelers, three-wheelers and two-wheelers. Noise levels have exceeded typical noise thresholds for commercial areas and college which is the range of 50-65 dB during the day. The good correlations was found for 2 Lane for all vehicle categories Viz., 2 wheelers, 3 wheeler, 4 wheelers, buses and LCVs. The good correlations was found at intersection followed by college, natural

vegetation and commercial area for all vehicle categories viz., bikes, autos, cars, buses and LCVs. Intersections experience higher noise levels due to their higher traffic volume, while the presence of lower traffic volume near college areas results in a quieter road environment. Commercial areas having moderate traffic volume falls in between college and intersection noise levels, mean while mid block areas exhibit slightly higher noise levels than college.

24. STUDY THE BEHAVIOUR OF WATER MELON SEEDS AND FERRIC CHLORIDE AS A COAGULANT TO TREAT THE DOMESTIC EFFLUENT

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Abstract- This paper reports the potential of watermelon seed as a natural coagulant for water treatment. It was aimed at identifying watermelon seed as a possible replacement for alum and other synthetic polyelectrolyte's in treating water. Laboratory scale studies using jar test experiments were performed on medium turbid water to determine the effect of dosage, pH stirring time and speed on coagulation. When used watermelon seed powder as coagulant, it caused favourable changes in the pH of the treated water and the best colour and turbidity removal at acceptable pH was obtained. The results showed that watermelon seed can be used as a natural coagulant for water treatment.

25. ROAD SAFETY ASSESSMENT USING IRAP – CASE STUDY OF NATIONAL HIGHWAY

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Abstract - Black spots with high crash frequency were identified through the recording of accidents from FIR reports or which is simply through secondary data collection before this number of accidents and number of persons (killed, grievous, minor) injured are identified for the selected study area NH44 (Devanahalli toll plaza to Bagepalli toll plaza) using FIR report data of the particular police stations under study area. Then the remedial measures are suggested based on factors contributing to road crashes that were identified on the selected concerned black spots. Remedial measures are suggested for the particularly selected black spots from identified black spots by road safety audit, audit performed for this study is the safety performance examination of an existing road

at intersections, to provide remedial measures so as to mitigate the impact of accidents through the use of IRC Codal provisions, the factors contributing accidents. Risk Maps use detailed crash data to illustrate the actual number of deaths and injuries on a road network. Star Ratings provide a simple and objective measure of the level of safety provided by a road's design. Safer Roads Investment Plans draw on approximately 90 proven road improvement options to generate affordable and economically sound infrastructure options for saving lives.

26. ANALYSIS OF RC FRAME ON RAFT FOOTING USING WINKLER AND CONTINUUM MODEL B

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Abstract : The process in which the reaction of the soil impacts the movement of the structure and the reaction of the structure impacts the movement of the soil is known as Soil Structure Interaction(SSI).In conventional method of design of raft foundation, base flexibility due to soil mass is disregarded. The purpose of this study is, to comprehend the effect of soil flexibility on the performance of the building frames resting on raft foundation by application of spring model. The SSI study is carried out on symmetrical building frame with different storey of 4, 8 and 12 on raft foundation under flexible and fixed base. The interaction an alysisis carried out to investigate the effect forces in the footing due to settlement of soil mass. The mediums oil is used for study. The analysis is carried out using ETABS. The effect of SSI on various dynamic properties i.e. Natural period and frequency, Axial force, Maximum lateral displacement and Base shear.

Keywords: Soil structure interaction (SSI) , ETABS, Winkler model, Continuum model, Raft footing, seismic analysis.

27. EVALUATION OF FLY ASH AS A PARTIAL REPLACEMENT FOR CEMENT IN CONCRETE: EFFECTS ON STRENGTH AND DURABILITY

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Abstract: The search for sustainable and cost-effective materials in concrete production has led to increased interest in using industrial by-products, such as fly ash, as partial replacements for cement. This study evaluates the impact of incorporating fly ash into concrete mixtures on the material's strength and durability. Fly ash, a by-product of coal combustion in power plants, is a widely available and environmentally friendly alternative to traditional cement. The research aims to assess how varying proportions of fly ash affect the mechanical and durability properties of concrete. Concrete samples were prepared with different levels of fly ash substitution, ranging from 10% to 30% by weight of cement. The mix designs were based on a standard reference concrete, and the fly ash was characterized for its fineness, chemical composition, and pozzolanic activity. The prepared samples underwent a series of tests, including compressive strength, tensile strength, and flexural strength, to evaluate their mechanical performance. Additionally, durability assessments were conducted through water absorption, chloride penetration, and sulfate resistance tests. The results revealed that the incorporation of fly ash up to 20% of the cement weight generally improved the workability and reduced the heat of hydration in concrete. Compressive strength increased with fly ash content up to a certain limit, beyond which further additions led to a gradual decrease in strength. The durability tests showed that fly ash-enhanced concrete exhibited improved resistance to water absorption and chloride penetration, indicating better long-term durability.

Keywords: Fly Ash, Concrete, Mechanical Properties.

AERONAUTICAL & AEROSPACE ENGINEERING

1. DRONE COMMUNICATION THROUGH MOBILE NETWORKS

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Abstract- the Drones, or UAVs (Unmanned Aerial Vehicles), serve various applications from recreational uses to professional tasks like aerial photography, surveying, and delivery services. The range of a drone, crucial in determining its operational distance from the operator, is influenced by its communication technology. Some examples of conventional drone communication signals are radio receivers and Wi-Fi direct. Radio receivers and transmitters are the simplest for implementation and can only provide line of sight communication with a restricted data rate, Wi-Fi Direct has higher data rate as compared to radio but is limited in range and prone to interferences. Thus, to surmount these drawbacks, the proposed solution lies in the use of integrated mobile network modules and cloud operating technologies, thus expanding the range far beyond conventional means, on the basis of the cellular communication network. Mobile network technology operates on the ability of the cellular network throughout the world to ensure that drones are capable of accessing the internet so that real time transfer of data and control of the drones from a distance is made possible. As the drones will be fitted with the mobile network modules and including a new responder, such a system means that data given will be sent to the cloud server then processed and sent back to the drone. Operators can then fly the drone from any location that has internet connection through a designated software application, providing real-time supervisory control over the drone over practically unlimited distances, limited only by internet connection. Beyond physical range, the extension of control range is the mobile network and cloud technology added to the drone systems; the drones can be controlled from any part of the world if the area is under the cellular network coverage. It also improves data management and control through timely upload of data to the cloud and use of the latest data techniques for processing of data such as real-time video streaming and environmental monitoring. Furthermore, it is efficient

and can also be installed on the existing drones with slight changes while the new generations of drones can come with integrated built-in cellular network and the cloud system. This constitutes a revolution in drone technology since it will allow for better and more extensive uses of drones.

Keywords: UAVs, Communication technology, Radio receivers, Wi-Fi Direct, Mobile network modules, Cloud computing technology, Real-time data transmission.

2. CASE STUDY ON NUCLEAR THERMAL PROPULSION REACTOR

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Abstract-The human fascination with space exploration has persisted since the dawn of civilization, with the desire to unravel the mysteries beyond our earthly confines. While early attempts at space exploration met with both success and failure, the dream endured. A monumental leap occurred with the Apollo 11 mission on July 21, 1969, when American astronaut Neil Armstrong became the first person to set foot on the lunar. This marked the onset of a global space race, fostering advancements in spacecraft, satellites, and space stations. Rakesh Sharma achieved a significant milestone as the first and only Indian, as of today, to venture into space as an Indian citizen during the Russian Soyuz T-11 mission in April 1984. Despite remarkable progress, a persistent challenge in space exploration been the quest for efficient propulsion fuel. Nuclear Thermal Rocket (NTR) Propulsion Systems emerge as a promising solution, utilizing controlled fission reactions for propulsion. This abstract delves into NASA's endeavours in NTR propulsion, exploring successes and setbacks. It also sheds light on India's strides in thermal rocket propulsion systems and outlines ISRO's collaboration with BARC (Baba Atomic Research Centre). The document scrutinizes the advantages, disadvantages, and potentialities of Nuclear Thermal Rocket Propulsion Systems, providing a comprehensive overview of the advancements and future plans in this critical aspect of space exploration.

Keywords: Nuclear Thermal Rocket Propulsion (NTP) Systems, NASA's endeavors in this realm, ISRO, fission reaction.

3. DESIGN AND ANALYSIS OF GAS TURBINE BLADE

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Abstract: A turbine blade is the individual component which makes up the turbine section of a gas turbine. The blades are responsible for extracting energy from the high temperature, high pressure gas produced by the combustor. The turbine blades are often the limiting component of gas turbines. Air is compressed, raising the pressure and temperature, through the compressor stages of the engine. The temperature is then greatly increased by combustion of fuel inside the combustor, which sits between the compressor stages and the turbine stage. In this project, the turbine blade is modelling in CATIA V5 software and for the analysis of the turbine blade we have used ANSYS 18.1 software determining the structure and flow analysis. The modelling is done to changing the base of the blade to increase the blade efficiency. The design of turbine blade is complex, and to improve the performance and efficiency. In this project we are doing structural analysis for turbine blade to find out maximum deformation in material and flow analysis to determine pressure, velocity contour.

Key Words: Gas Turbine blade, Flow analysis, Structural analysis.

4. NUMERICAL INVESTIGATION OF AERODYNAMIC CHARACTERISTICS OF NACA 2412 AEROFOIL USING ANSYS

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Abstract -The popularity of air travel has led to several new technologies and research efforts to build more efficient and quicker planes. An aerofoil is a curved surface structure designed to maximize lift and drag during flight. In any plane, the airfoil is critical because it provides the lift required to raise it with the least drag. It is challenging to create an airfoil with the necessary aerodynamic properties. Initially, we randomly generated the design and evaluated it in a flow section. And then there's the Wright Brothers' cambered portion. NACA has defined an airfoil properly, enabling us to build it using formulae rather than arbitrarily. Most aircraft use an aerofoil structure's curved surface as the fundamental shape for their wings and fins. The purpose of this study is to find out the lift coefficient (CL)and drag coefficient (CD) of a NACA 2412 aerofoil at the Angle of Attack from 0 to 21 degrees. We achieved this by numerically simulating the flow using the commercial software ANSYS.

Keywords: NACA 2421; Angle of attack; Lift coefficient (CL); Drag coefficient (CD).

5. OPTIMIZING FLUIDIC THRUST VECTORING TECHNIQUES FOR DUAL THROAT NOZZLES: A COMPREHENSIVE DESIGN AND ANALYSIS

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Abstract— Dual-throat Nozzle (DTN) is known as one of the most effective approaches of fluidic thrust-vectoring. It is gradually flourishing into a promising technology to implement supersonic and hypersonic thrust-vector control in aircrafts. The main objective of the present study is numerical investigation of the effects of secondary injection geometry and the cavity angles on the performance of a planar dual throat thrust-vectoring nozzle. The main contributions of the study is to consider the secondary injection slot and the convergence angle if the DTN cavity section with different angle configuration; moreover the impact of secondary convergence angle of the cavity is examined. Two-dimensional compressible reacting simulations have been conducted in order to resolve the flow field in a dual throat nozzle with Nozzle pressure ratio of 5. The Unsteady Reynolds-averaged Navier–Stokes equations (RANS), Energy equation are solved along with the standard k − ε model for the turbulence closure. Second-order upwind numerical scheme is employed to discretize and solve governing equations. Different assessment parameters such as convergence angle in the cavity of DTN & secondary injection angle, thrust-vector angle & thrust-vectoring efficiency are invoked to analyze the better thrust vectoring angle. Results reveal that a maximum vector angle of 10.96 degrees is achieved via secondary injection of air at a secondary injection rate equal to 20% of primary flow rate with a cavity convergence angle of 30 degrees. Findings suggest that the higher thrust vectoring is offered by a DTN with higher cavity convergence angle with lesser percentage of secondary inlet.

Keywords:— Dual throat nozzle; Fuel injection; Injection geometry; Cavity convergence angle; Thrust-vector angle; Thrust-vectoring efficiency

6. DESIGN AND DEVELOPMENT OF SOLAR POWERED AIRCRAFT

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Abstract- : The development of solar-powered aircraft represents a significant advancement in sustainable aviation technology, offering a promising alternative to traditional fuel-based aviation. Solar-powered aircraft utilize photovoltaic cells mounted on their wings and fuselage to capture solarenergy, converting it into electrical power for propulsion and onboard systems. High-capacity lithium-ion batteries for energy storage, allowing the aircraft to maintain operation during periods of low solarirradiance, such as night or cloudy conditions. Development of efficient electric propulsion systems, including brushless DC motors and advanced propellers designed for low power consumption.Integration of advanced energy management systems to optimize power distribution, storage, and consumption, ensuring continuous operation during variable sunlight conditions. Also discusses the challenges associated with solar-powered flight, including energy density limitations, weather dependency, and the need for advanced materials and manufacturing techniques.

Keywords: NASA, MEMS, CMOS, EPFL/ETHZ, MPPT, ANN, ISR, ESC, CFC

7. DESIGN DEVELOPMENT AND PERFORMANCE ANALYSIS OF VALVELESS PULSE JET ENGINE

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Abstract:-This paper explores the design, development, and performance analysis of valveless pulse jet engines. Pulse jet engines are a type of jet propulsion system that uses a pulsing combustion process to generate thrust. Unlike conventional pulse jet engines, valveless pulse jets eliminate the need for mechanical valves, simplifying design and potentially improving reliability. This research provides an overview of the working principles, design considerations, development techniques, and performance metrics of valveless pulse jet engines.

A valve less pulsejet engine is a novel propulsion system that utilizes a pulse combustion cycle to produce a high-speed exhaust gas, generating thrust. This engine design eliminates the need for old-style valves, instead relying on the dynamic interaction of inlet and outlet ducts to control the flow of air and fuel. The engine operates on a periodic cycle of ignition, combustion, and exhaust, creating a series of high-pressure pulses that drive the engine's operation. The valve less design simplifies the

engine's construction, reduces weight, and increases efficiency, making it an attractive option for various applications, including UAVs, drones, and potentially even spacecraft propulsion. A valve less pulsejet engine is a jet engine that uses the aerodynamic properties of the intake and exhaust to manage the airflow without mechanical valves. The design of an inlet ensures the amount of air allowed to flow towards the combustor. This engine is operated with liquefied petroleum gas to achieve the whole configuration of the engine, and the mass flow rate is calculated. Vibration, noise level, and fuel consumption of a valve less pulsejet engine are lower compared to a valved pulsejet engine.

Keywords: valve less pulse jet engine, Thrust, combustion chamber, spacecraft propulsion, atomized liquid spray.

8. DESIGN AND DEVELOPMENT OF LOW-SPEED SUBSONIC SMART WIND TUNNEL

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Abstract—Wind tunnels are essential tools in aerodynamic research, which operates by generating a controlled airflow over a test object. This project aimed to design a low-speed subsonic smart wind tunnel using internet of things which is a network of interrelated devices equipped with sensors and software. This project focuses on the smart wind tunnel for advanced testing facilities, designed a prototype to analyze data through integrating technology such as IOT sensors like differential pressure sensor, pitot static tube, infrared sensor, temperature and humidity sensor. These sensors are connected to a microcontroller (Arduino, ESP32, and ESP8266) to achieve and operate the wind tunnel through internet of things. The fan is installed in the diffuser section can be controlled using mobile through an application such as blynk IOT, Arduino remote. The airspeed is measured using Pitot tube and differential pressure sensor which is displayed in the mobile. The test model (airfoil) can be controlled (angle of attack) using through mobile application blynk using servomotors mounted in the test section. These facilities bridge the gap between conventional and smart wind tunnel after development modular design of wind tunnel components these allows for easy upgrades and expansion. In the future by integrating iot technology with wind tunnel testing enables to control and monitor the test models remotely through a mobile application (blynk IOT, Arduino remote), not enhances data but also streamlines the testing process and increases the automation of data acquisition process.

Keywords- aerodynamics, wind tunnel, IoT, sensors, Arduino, subsonic, smart wind tunnel, blynk

9. DEVELOPMENT OF IOT BASED CONTROL SURFACE FOR MANEUVERING OF AN AIRCRAFT

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Abstract-In modern industrial and domestic applications, the efficient control and maneuvering of control surfaces play a pivotal role in enhancing productivity, safety, and resource optimization. This presentation proposes a novel approach leveraging Internet of Things (IoT) technology for the dynamic control and maneuvering of surfaces, facilitating real-time monitoring, analysis, and adjustment of surface configurations. The integration of IoT devices allows for the seamless communication and coordination between sensors, actuators, and control systems, enabling precise manipulation of surface parameters, such as orientation, alignment, and shape. Through a network of interconnected sensors, data on environmental conditions, surface characteristics, and operational requirements are continuously collected, providing valuable insights into the optimal configuration for enhanced performance.

Keywords – Internet of Things(IoT), Maneuvering, Servos, Servo Motors, Monitor, Control, Aurduino Board, Bread Board, Cloud Computing, MIT Website Platform Software.

10. DESIGN AND MULTIDISCIPLINARY ANALYSIS OF COMMERCIAL AIRCRAFT

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Abstract- The modern mode of transportation air transportation is considered as the safe and finest integration of technologies. Its economic success depends on performance, low maintenance costs and high passenger appeal and design plays a vital role in summing up all these factors. Conceptual design is the first step to design of an aircraft. In this paper a commercial aircraft is designed to carry 150-180 passengers and to cover a range of 6500 km. The conceptual design consisted of initial sizing, aerodynamics and performance analysis. Through marketing studies and comparison with other commercial aircraft a final model of the aircraft was built to achieve the requirements.

The aim of this project is to design a commercial aircraft which can cater the need of emerging commercial aircraft market. This aircraft is describing a passenger aircraft, for transporting group of

passengers. This aircraft is designed for STOL (Short Takeoff and Landing) strap hanger aircraft which runs on a turbofan engine, with a billet of 150–180-seater providing the comfort and the desired appliance level that a strap hanger aircraft is expected to provide while incorporating the design specifications and performance parameters of a long- range commercial airline. This aircraft allows for the wide range transport with better efficiency and reduce fuel consumption.

Keywords-Commercial Aircraft, Design, Sizing, STOL, Aerodynamic Performance

11. MODELLING AND PERFORMANCE ANALYSIS OF WING WITH MULTIPLE WINGLETS

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ABSTRACT- Eagle is one of the most maneuverable and aerodynamically efficient bird capable of soaring for a mile, and it has high gliding ratio that can reach high velocities. aircraft used in military and civilian applications are required to loiter at significant altitude without being targeted by observers. However, the induced drag is usually held mainly at the wingtip, which affects the performance of the aircrafts in steady state condition due to wingtip vortex. Therefore, the objectives of this paper are to study the effect of multi-winglet on different configurations in the performance of lift and drag coefficients and to analyse the flow pattern of multi-winglet with difference configurations. The wing airfoil used was $NACA$ 653-218 with chord length (c) of 100 mm and wingspan (L) of 205 mm was modeled in solid works software. The multi-winglet device was simulated using ANSYS WORKBENCH software with three, four and five multi-winglet configurations at angles of attack between 0° to 15° (with increment of 3°) and at flying speed of m/s (M=0.25). This study found that five multi-winglets demonstrated better results in lift and drag coefficients compared to other models at low angles of attack. In conclusion, multi- winglets can improve the aerodynamic performance of airfoil in reducing the induced drag and increasing the lift coefficient, which is suitable to be implemented at low angles of attack due to the bluffing body of winglet at high angles of attack. The results show that certain multi- winglet configurations reduced the wing induced drag and improved L/D by 15-30% compared with the other wing. A substantial increase in lift curve slope occurs with dihedral spread of winglets set at zero incidences relative to the wing. Dihedral spread also distributes the tip vortex.

Keywords: Multiple winglets, induced drag Lift, Drag, Solid works, Optimization, Vortex.

12. IMPROVING FLOW STRUCTURE OF NITROGEN PURGING IN A VACUUM CHAMBER USING CFD METHODOLOGY

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Abstract—High vacuum chambers play a significant role in manufacturing of semiconductor devices. These chambers create a controlled environment for required processes such as thin film deposition, using Chemical Vapor Deposition (CVD) method. The purging operation of entire chamber is carried out after few cycles of operation during which Nitrogen(N_2) is injected into the chamber, which is at low pressure/ vacuum. This CFD study is aimed at predicting the process of purging of Nitrogen gas into vacuum chamber, maintained at vacuum by means of a pump. Simulations were carried out under the conditions of roughing pump operation with 1atm pressure inside chamber reduced to around 10 torr, along with N_2 injection. These simulations were performed for baseline geometry as well as modified geometry with increased suction passage diameter of pump. The present article describes simulations performed with roughing pump operation. The results indicated that modified design improved pumping speed as well as purging efficiency, that is, uniform distribution of nitrogen gas was observed across the new design.

Keywords—Computational Fluid Dynamics (CFD), Semiconductor, Vacuum chamber, Purge flow, Vacuum pump

13. CFD BASED PURGEFLOW SIMULATION THROUGH MICRO CHANNEL OF A MEDICAL DEVICE

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Abstract—This article describes a CFD based study of purge flow in a small Left Ventricular Assist Device (LVAD). This LVAD is a catheter-based device inserted into the arteries in cardiac patients and used to maintain blood flow through the heart. As blood flows into the device by means of a pump, a liquid solution is purged in opposite direction through a small clearance gap between impeller motor

shaft and bearing to prevent blood from entering the motor housing, which drives the pump.

Appropriate gap is maintained between the impeller motor shaft and bearing in order to allow the purge flow. This gap is in the order of 12-16 microns. In the present scope, CFD methodology was used to simulate a standard test condition which predicts the time taken to displace 25 ml of water in the micro channel with purge air at a pressure of 700 mm Hg. This time is referred to as “bubble time”. CFD simulations were performed to predict the flow rate of air and to study the effects of variations in shaft orientation, shaft position, varying tolerance between shaft & bearing and purge pressure on the bubble time. Trend lines representing variations in the bubble time with respect to various parameters have been plotted. The scope of present work includes simulating the test condition with purge air displacing water and hence, does not include blood flow through the impeller.

Keywords—Computational Fluid Dynamics (CFD), Left Ventricular Assist Device (LVAD), Medical devices, Catheter, Purge flow, Flow through clearance, Flow through gap, Multiphase.

14. METHOD DEVELOPMENT FOR FEA MODELING OF ELECTRONIC COMPONENTS (BULK VS EXPLICIT MODEL)

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Abstract- we’re in the midst of an electronics-centered innovation boom that has transformed the way we communicate, work, learn and entertain. Virtually no product is exempt from these improvements. Around the globe, in obvious and not-so-obvious applications, there are ultra-smart phones, fiber-optic and wireless networks, computers that fit into a pocket, LED screen displays and various automotive systems viz. Advanced driver assistance systems (ADAS),Automotive power train electronics etc. So, it becomes very important to study the behavior of the design when exposed to the operational loads. So, this paper presents the right approach to model the electronic board components and gives a comparison between the explicit modeling and the bulk (approximate) modeling of the design elements.

Keywords— Thermo mechanical Analysis, Thermal expansion due to CTE mismatch, FE analysis for thermal shock load

15. DESIGN AND DEVELOPMENT OF RC PLANE FOR CAMPUS SURVEILLANCE

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Abstract-controlled (RC) plane for campus surveillance, it aims to provide a cost-effective and efficient solution for the monitoring and ensuring the security of a campus environment. The initiative is driven by the need for enhanced surveillance capabilities that can cover large areas and provide real-time data to security personnel. RC-controlled surveillance aircraft will be a completely new concept called multipurpose drones for various surveillance. The project also focuses on the fabrication and testing of the RC plane, using lightweight and durable materials to ensure its longevity and resilience. The construction phase involves meticulous assembly and quality control to guarantee that the plane can withstand the various environmental conditions and perform reliably. Moreover, the project addresses of several challenges associated with the design and development of RC planes for surveillance purposes. These challenges include optimizing the aerodynamic design for stability, ensuring energy efficiency, and integrating advanced surveillance technology.

Keywords- surveillance, RC controlled surveillance aircraft.

16. FABRICATION OF MINIATURE WIND TUNNEL FOR SMOKE FLOW VISUALIZATION STUDIES AT LOW RENOLDS NUMBER

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Abstract-This report documents the design, fabrication, and testing of a miniature wind tunnel flow visualization studies at Reynolds numbers less than 500. The tunnel's test section measures 8.2 cm x 10 cm x 30.4 cm, with a maximum airflow velocity of 5 m/s. The facility is designed to provide a cost-effective and compact means to study low-Reynolds- number flows, which are prevalent in various engineering applications. The report covers the design considerations, fabrication process, and testing procedures employed to validate the tunnel's performance. Smoke flow visualization techniques are used to reveal complex flow patterns, including vortex shedding, recirculation zones, and boundary layer behavior. The results are consistent with theoretical predictions and provide valuable insights into fluid dynamics phenomena at low Reynolds numbers. The miniature wind tunnel offers a unique

opportunity to study flows in a regime that is challenging to model numerically or experimentally. The findings have implications for understanding and optimizing flows in various engineering applications, such as micro fluidics, biomedical devices, and small-scale aerodynamics.

17. MODELING AND ANALYSIS OF DELTA WING FOR VARIOUS ANGLES OF ATTACK

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Abstract-Analysis of the aerodynamic performance of delta wings at various angles of attack, focusing on understanding the complex flow phenomena and their implications for lift, drag, and overall stability. Delta wings, known for their efficiency at high-speed flight regimes, are analyzed using a combination of Computational Fluid Dynamics (CFD) simulations and experimental wind tunnel testing to ensure comprehensive and accurate results. The investigation encompasses a range of angles of attack, from low to high, to capture the transition from attached flow to the onset of vortex formation and eventual flow separation. Key parameters such as lift coefficient (Cl), drag coefficient (Cd), and moment coefficient (Cm) are evaluated to understand the aerodynamic behavior under different conditions. The formation and behavior of leading-edge are examined in detail. Results indicate that at low angles of attack, the flow remains largely attached, resulting in predictable and stable aerodynamic characteristics. As the angle of attack increases, the formation of leading-edge vortices significantly enhances lift, although this is accompanied by an increase in drag. At critical high angles of attack, the vortices become unstable, leading to flow separation and a sharp decline in aerodynamic performance. Furthermore, the study explores the effects of varying leading-edge sweep angles and wing aspect ratios on the aerodynamic performance across different angles of attack. Modifications such as the addition of control surfaces are also analyzed to assess their potential in mitigating adverse effects at high angles of attack. The comprehensive data provided by this analysis offers valuable insights into the design and optimization of delta wings for high-performance aircraft, highlighting the balance between achieving high lift and managing drag and stability concerns. This research contributes to the fundamental understanding of delta wing aerodynamics,

18. DESIGN AND FABRICATION OF A DRONE FOR INSPECTION OF INFRASTRUCTURES

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Abstract-This project aims to design and fabricate a miniature drone equipped with a camera for visual inspection purposes. It starts with studying the basic mechanics, propulsion & other dynamics of drone and calculating them with appropriate formulas. It also involves selecting and integrating the appropriate hardware components and software for controlling the drone. The drone will be capable of capturing images and video footage of hard-to-reach areas for visual inspection and it is expected to reduce inspection time and provide a cost effective and efficient alternative to traditional methods.

Keywords: Miniature Drone, Solid works

19.CFD ANALYSIS OF WAVE DRAG DELAY ON DIFFERENT SUPERCRITICAL AIRFOILS

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Abstract-The Aim of the project is to analyze the wave drag delay on different supercritical Airfoil using CFD and to conclude on which Airfoil the wave drag delay is better. A set of 3 super critical Airfoils and a symmetric airfoil are selected and the results are obtained using ANSYS FLUENT.

Keywords: Supercritical, Transonic, Wave drag, Shockwave, ANSYS FLUENT.

20. DESIGN AND CONSTRUCTION OF HEXACOPTER FOR PESTICIDES SPRAYING

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Abstract-Unmanned aerial vehicle (UAVs), commonly known as drones, have demonstration great potential in various applications, including environmental monitoring and safety, this project presents the development of a drone specially designed for the spraying the pesticides in the agriculture land the drones flight control system utilizes mission planner, a open source software to analyze the

collected data in real time, enabling autonomous for spraying the pesticides with in specified area. To ensure safe and efficient operation, the drone is equipped with spraying system it can pesticides across the agriculture land. It can be deployed in various scenarios, including industries sites, urban areas, and disasters-stricken regions, to quickly and safely identify and mitigate potential gas leaks etc…

Keywords: Unmanned aerial vehicle (UAVs), Pesticides, Agriculture, Spraying

21. NUMERICAL ANALYSIS OF BLENDED AND RAKED WINGLETS USING SOLID WORKS SOFTWARE

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Abstract- A Winglet is an apparatus fastened to the wings. Utilized to decrease the induced drag brought on by wingtip vortices, in future increasing aeroplane productivity. It is an extension that might be horizontal, vertical, or angled. Winglets increase a wing's useful perspective ratio without significantly increasing the structural pressure and resulting crucial load on the wing structure. Comparing aerodynamic properties such as lift coefficient (Cl), drag coefficient (Cd), lift to drag ratio (L-D), and evaluating the features of blended and raked winglets is done to achieve this. For greater accuracy, the Spalat-Allmaras turbulence model is used around the cross section of the wing wall. Using SOLIDWORKS software, the wing model and lattice are calculated. The three-dimensional aeroplane wing is created using the NACA 2415 air foil segment. Low Mach number computational simulations are run by SOLID WORKS at various angles of attack. Given that the impact of vortices is greatest during take-off and landing phases of an airplane's flight, CFD study for wings with blended and raked winglets designs is conducted during these phases. It is necessary to measure the aerodynamic characteristic of wings with blended and raked winglets before comparing them to determine which has the best aerodynamic trademark.

Keywords: Winglets, Coefficient of Lift, Coefficient of Drag, Solid works

22. COMPARATIVE STUDY OVER DIAMOND SHAPE AIRFOIL AND CONVENTIONAL AIRFOIL AT SUPERSONIC SPEED

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Abstract -For supersonic aircraft, narrow section airfoils with acute leading and trailing edges maximize aerodynamic efficiency. Although experiments show that the theoretical benefits are not always attained due to separation of the flow over the surface of the wing, this can be fixed with design factors. Swept wings with a subsonic leading edge have the advantage of reducing the wave drag component at supersonic flight speeds. The two types of airfoils that are most frequently utilized in supersonic travel are double-wedge and bi-convex. The most basic and significant source of drag in areas of supersonic flow is wave drag. In this present work the aerodynamic analysis of diamond shape airfoil and conventional airfoil is carried out at supersonic speed for varying angle of attacks and compared the co-efficient of lift & drag to analyse the behavior and characteristics of airfoils at supersonic speed.

Keywords: Supersonic, compression, expansion, oblique shock, double wedge airfoil, angle of attack, conventional airfoil Transonic, Wave drag, Shockwave, ANSYS FLUENT.

23. CONSTRUCTINGA MINI JET ENGINE FOR RC PLANES

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Abstract-The mini jet engine for RC planes is an advanced propulsion system designed specifically for small-scale remote-controlled aircraft. It incorporates cutting-edge technology in materials, manufacturing techniques, and design optimization to enhance performance, efficiency, and reliability. With a focus on miniaturization, the engine is compact, lightweight, and suitable for integration into smaller RC planes, enabling improved maneuverability and versatility.

Keywords: Jet engine, RC planes, Propulsion, Remote-controlled

24. DESIGN AND FABRICATION OF BI-COPTER DRONE

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Abstract-Micro Air Vehicle (MAV) is a current research and development project throughout the world. This paper focused on creating a remotely controlled and stabilized bi-copter that is controlled by gesture. Brushless motors rotate the propellers, which are connected to servo motors. The flight controller receives and processes signals from the transmitter. The propulsion force required to fly the drone with its cargo is calculated and analyzed. The torque, rpm, thrust co-efficient, and blade twist angles can then be calculated using the propulsion force.

Keywords*:* Bi-copter, comparison, flight control

25.ANALYSIS OF STEPPED AIRFOIL BY COMPARING WITH THE CONVENTIONAL NACA4415 AIRFOIL

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Abstract-Stepped airfoils offer certain advantages over conventional airfoil. This work was aimed to investigate the performance of stepped airfoils at low speed to explore the potential applications of such airfoils in Unmanned Aerial Vehicles. The flow is defined as two dimensional, incompressible, laminar, unsteady flows. Aerodynamic performance characteristics were studied by comparing the experimental results with previous studies related to stepped airfoils. The ANSYS Fluent is a modeling tool and simulation tool for two-dimensional stepped airfoil. At first, NACA4415 airfoil is analyzed at low Reynolds number. Later, the stepped airfoil is analyzed at same boundary conditions. Thus, the effect of step on the aerodynamic characteristics of an airfoil can be known and if the newly designed stepped airfoil generates more lift and less drag compare to conventional airfoil, then the step on airfoil helps in preventing the flow separation. This result has more advantages in the modern aviation and can be explored to the application of stepped airfoil in UAVs.

Keywords: UAVs, Stepped airfoil, Lift, Drag, ANSYS

26. DESIGN AND FABRICATION OF MICRO-UAV FOR MISSION PLANNING

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Abstract-This paper proposed the design and development of micro-(UAV) Unmanned Aerial Vehicle, quadcopter payload capacity 2000 gm with a controlled drop mechanism. Flight computer platform includes the Mission planner ground station, Pixhawk hardware, and MAVSDK for integration with compatible computers, cameras and other hardware using the MAVLink protocol. The avionics are entirely included within this design, which is meant to be small and has a maximumthrust of 4 kg. Due to its small size, this UAV can be utilized for surveillance in cities.

Keywords: Quadcopter, 3D printing, Pixhawk, ABS, ESC, GPS

27. UNMANNED AERIAL VEHICLES

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Abstract: Airframes: UAVs come in various shapes and sizes, from small quadcopters to large fixed-wing aircraft. The airframe design depends on the intended purpose, such as surveillance, reconnaissance, package delivery, or even recreational use. Power Systems: UAVs are powered by electric batteries, internal combustion engines, or hybrid systems. Advancements in battery technology have significantly improved the endurance and efficiency of electric-powered UAVs. Navigation and Control Systems: UAVs rely on sophisticated navigation systems, including GPS, inertial measurement units (IMUs), and sensors, to determine their position and orientation in flight. Autopilot systems or manual remote control enable operators to navigate and control the UAV. Communication Systems: UAVs communicate with ground control stations using radio frequencies, satellite links, or other wireless communication technologies. This enables real-time control and data transmission between the UAV and its operator. Software: Advanced software plays a crucial role in UAV technology. It includes flight control algorithms, mission planning software, and image processing tools. Artificial intelligence and machine learning may also be incorporated for autonomous decision-making and adaptive behavior. The applications of UAV technology are diverse, ranging from military and surveillance purposes to civilian applications like agriculture, filmmaking, and infrastructure

inspection. Ongoing research and development continue to push the boundaries of UAV capabilities, making them more versatile, efficient, and safer for various tasks.

Keyword: electric batteries, quadcopters, internal combustion engines, ground control.

28. DESIGN AND ANALYSIS OF FLUID SLOSHING IMPELLER ON REACTOR TANK

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Abstract: Sloshing has varied applications in different type of industries such as automotive, Aerospace and motorcycle manufacturing. The main objective of the present work is to study slip behavior in rigid tanks that undergo sudden acceleration. ANSYS was used for two different tank filling depths as (30% & 70%) for 3D transient analysis and a multi- phase model was adapted to track the free surface of the liquid through the use of Volume of Fluid (VOF). Boolean was modified for conjoining the fluid and solid domain. The dynamic meshing technique is used to simulate. This study showed the transient flow of the baffle increases by close to 55%, as a result of changing the partially filled liquid depths from 30% to 70%, whereas the magnitude of them was decreased about 10% when the tank using baffles. Thus, it can be consider and has become an important outcome in tank design. The comparison of the simulation data with the previous measurement is performed to prove the effectiveness and reality of the Finite Element Methods (FEM) along with Computational Fluid Dynamics (CFD) simulates model.

Keywords: Sloshing, Liquid Tank, Impeller, Dynamic Meshing, Fluid Structure Interaction, CFD & FEM.

29. AERODYNAMIC ANALYSIS OF TRIPURA VIMAANA – AN ANCIENT INDIAN AIRCARFT

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Abstract: The India's contribution to the world in field of science, Mathematics, Medicine and technology are unimaginable. Likewise, India also had the technology of flying machine which were called as Vimaanas. There are several examples of building new things inspired by ancient architecture and the results were found satisfying. This inspires to study ancient aircraft technologies. Therefore, we are trying to analyze an aircraft named 'Tripura Vimaana' which is mentioned in the book named "Vymanika shastra" claimed to be written by Maharshi Bharadwaj. The objective of this project is to create a 3-D model of Tripura Vimaana as mentioned in ancient texts and performing aerodynamic analysis of that model using ANSYS Workbench to know whether the aircraft is aerodynamically good or not. If not, the efforts are made to vary the geometry of the Vimaana to get desired results.

Keywords: Ancient, Tripura Vimaana, Analysis, Aerodynamics, Ansys Workbench.

30. EFFECT OF WATER ABSORPTION ON THE MECHANICAL PROPERTIES OF HYBRID REINFORCED COMPOSITE OF GLASS AND CANNABIS

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Abstract: Hybrid composites combining traditional materials with sustainable alternatives have gained prominence in recent years due to their potential for reduced environmental impact and enhanced mechanical properties. This study investigates the impact of water absorption on the mechanical characteristics of a hybrid composite material, which incorporates glass fibers andcannabis fibers as reinforcement. In this research, composite specimens with varying proportions of glass and cannabis fibers were manufactured and subjected to controlled water absorption tests. The tensile and flexural strengths of the composites tend to decrease with increasing water absorption

levels. Interestingly, the impact resistance of the composites was observed to be less affected by water absorption. SEM analysis revealed insights into the mechanisms underlying these changes, including fiber-matrix deboning and matrix swelling. This research contributes valuable insights into the potential applications and limitations of hybrid composites reinforced with cannabis fibers, particularly in environments with moisture exposure.

Keywords: Hybrid composites, Glass fibers, Cannabis fibers, Water absorption, Mechanical properties, Tensile strength, Flexural strength, Impact resistance, Microstructure, Sustainable materials.

31.DESIGN, ANALYSIS, AND DEVELOPMENT OF UNMANNED AERIAL VEHICLES FOR EMERGENCY MEDICAL SERVICE (EMS)

Arya Raj [1]. Bharath B [2]. Banu Prasad T V [3]. Aakash D[4]. Madhusudhana S V[5]. Ravi Kumar M[6]

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Abstract: The first UAV flight dates back to the 1980which was small defense purpose drones used by Israel. Ever since UAV's have taken significant development and advancement steps, today UAVs are most commonly in the defense, medical and cargo fields. Our motto comes from the concept of achieving High payload capacity and considerable flight time. We look forward to design and develop the UAV from scratch helping us in building a Unique frame. We aim to design a structure with equivalent weight of 1.2kg to 1.8kg which is lesser than the standard weight. Also, the frame is designed by taking reference of the 450mm quadcopter frame. The payload carrying capacity of our drone lies around 900gms to 1. 2kg.Note- The above data is given based on practical calculations performed on our design of rotor base of 510mm.The configuration of the components is selected based on the design [developed in Solid works2022], Simulated results [Performed in ANSYS Work Bench and MATLAB]. And thrust Required [The motors and propeller are dependent on the rotor base and they are in turn Dependent on the components].

32. STUDY ON ELECTROCHEMICAL PROPULSION TECHNIQUES

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Abstract: To increase the payload capacity of any rocket either we need to increase the number of stage or size of the rocket, which aids additional weight to the rocket. To avoid the increasing in weight, one option is to increase the thrust produced by the engine. The thrust produced by the engine can be increased by increasing the exit velocity of the hot gases. we need to expand the hot gases to a higher velocities. This can be done by increasing the temperature of the gases. But the temperature achieved due to combustion is limited. The state of hot gas is the plasma. Plasma contains charged particles, which can be accelerated by an electrostatic field and / Or magnetic field. So without increasing the temperature of the hot gases we can increase the expansion velocity. Therefore the thrust produced can also be increased without increasing the propellant mass flow rate. Therefore, for the same size and same propellant weight we can increase the payload carrying capacity of the rocket.

Here in this work, we are attempting to check the feasibility of the design by literature, theoretical calculations and simulations which proves the feasibility of this engine.

Keywords: Electrical Thrusters, Electrochemical Propulsion.

33. SIMULATION OF IDENTIFICATION OF FRIEND OR FOE

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Abstract -In modern military operations, the accurate identification of friend or foe (IFF) is critical for ensuring the effectiveness and safety of missile systems. However, there are several methods in which IFF has been used. This research investigates the performance of IFF technology in MATLAB using the available and suitable components. Through a comprehensive analysis, this study sheds light on the challenges and opportunities for improving IFF techniques effectiveness in this software addressing this as challenges, this research seeks to contribute to improved IFF effectiveness, ultimately enhancing overall mission success and minimizing the risk of friendly fire.

Keywords: Identification of friend or foe (IFF), MATLAB, Simulation.

34. DESIGN AND ANALYSIS OF SOLAR WIND TURBINE BLADES

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Abstract- Non - conventional energies are available in abundance in nature. Best utilization of these energies always increases the efficiency of any technology. In this research work, an attempt has been made to harness the solar energy as well as wind energy by designing the elliptical turbine blade to have sustainable energy generation. The method inculcated here is to make use of both material and geometrical properties of the turbine blade for utilizing the wind and solar energy to maximum extent. Due to the skin frictional loss on surface and in the bearings, traditional wind turbines experience performance issues. Elliptical shape Wind turbine blade is used for harnessing solar energy which intern generate the continuous energy. By increasing aerodynamic efficiency, the elliptical turbine design maximizes the amount of energy captured by wind currents and solar. Electromagnetic induction concept can be used to store extra electricity produced during peak production hours, guaranteeing a constant supply of power all day long. This integrated system contributes to environmental protection by providing a sustainable option of producing green energy.

Keywords-Solar, Wind, Turbine, Savonius.

35 CONCEPTUAL DESIGN OF ELECTROCHEMICAL THRUSTER FOR HIGH THRUST APPLICATIONS

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Abstract- In this paper we are presented a fictitious concept of creating electrochemical propulsion system which can produce the thrust by both thermodynamic expansion of hot gas and expansion of ions under a strong electrostatic or magnetic force. This is just a conceptual idea and possible challenges are discussed in brief. To check the feasibility of the concept or the principle we are discussed by taking an example of hydrogen and oxygen combustion process. Here the magnetic properties of elements are also considered and presented the basic parameters which makes them as paramagnet behaviour.

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MECHANICAL ENGINEERING

1. INNOVATIVE APPROACHES TO E-WASTE MANAGEMENT: MAXIMIZING METAL RECOVERY AND SUSTAINABLE REPURPOSING OF PCB WASTE

Hadiya Pritesh Dulabhai[1], Thejaraju R[2], Gowtham Sanjai S[3], Sajna S Panigrahi[4]

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Abstract- The global increase in electronic waste (e-waste) necessitates efficient recycling methods to mitigate environmental impact and recover valuable materials. This paper proposes two innovative methodologies for e-waste management, leveraging the strengths of both unorganized and organized sectors. The first method integrates collection, disassembly, and segregation by unorganized units with advanced metal recovery processes by professional recyclers, ensuring maximum yield and minimal environmental harm. The second method focuses on loosening components from PCBs using a combination of chemical and mechanical processes, followed by repurposing shredded PCB pieces into various decorative and household items. This dual approach aims to enhance sustainability, promote eco-friendly practices, and create a profitable business model for e-waste recycling.

Keywords- E-waste recycling, Metals recovery, Sustainable recycling, Hazardous materials

2. REVIEW OF THE PERFORMANCE, EMISSION, AND CHALLENGES FACED BY HYDROGEN-POWERED INTERNAL COMBUSTION ENGINES

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Abstract- Hydrogen-powered internal combustion engines (ICEs) provide an encouraging proposal to reduce vehicular emissions and improve energy efficiency. These engines are characterized by enhanced thermal efficiency and lower emissions of CO2 and NOx compared to traditional fossil fuel-powered engines, aligning them with stringent global environmental regulations. However, the

broader adoption of hydrogen ICEs is hindered by several challenges. Key areas among these are the advancement of effective hydrogen storage solutions and fuel delivery systems, along with the establishment of a robust infrastructure for hydrogen production and distribution. Additionally, technical challenges such as the risk of pre-ignition, backfiring, and maintaining consistent performance under variable engine loads present significant obstacles. Overcoming these challenges is essential for successfully integrating hydrogen ICEs into the automotive sector. Addressing these issues will enable the pervasive use of hydrogen as a sustainable vehicle fuel and significantly reduce the automotive industry's environmental footprint.

Keywords- Hydrogen-powered; emissions; developments; technical challenges; sustainable.

3. MACHINE TOOL VIBRATION CHARACTERISTICS: A CASE STUDY

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Abstract -Vibrational Analysis in machine tools helps to identify problems such as tool wear, product quality and surface roughness. Vibration beyond threshold limit, leads to lesser machine utilization and low productivity. In the present study, vibrational characteristics of vertical milling machine tool is introduced. The primary objective is to conduct an investigation into the dynamic behavior and vibrational characteristics of the milling machine tool under varying machining parameters. The data on the machine vibration signals were acquired using tri-axial accelerometers, strategically attached on the spindle bearing housing of milling machine tool. Vibrations across axial, radial and tangential directions were captured using data acquisition system and time-domain analysis was made to identify the dominant amplitudes of vibrations. Surface texture of machined surface of the part produced was determined using Mitutoyo SJ-210 roughness tester. The most significant process parameters on vibration and surface roughness were ascertained with the aid of Statistical software. Regression predictive models were developed to establish a relationship between the process parameters and measured values. The vibrational behavior and its influencing parameters of a machine tool, suggest the implementation of vibration monitoring and control strategies to mitigate adverse effects, thereby improving the quality and efficiency of the manufacturing process and the parts produced.

Keywords: Machine tool, Vibration, Surface texture, Regression predictive models.

4. BIODIESEL PRODUCTION FROM JATROPHA: A COMPUTATIONAL APPROACH BY PYTHON PROGRAMMING LANGUAGE

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Abstract- The depletion of fossil fuels and environmental concerns in the recent era has gained significant attention in the production of biodiesel from non-edible seed oils as an alternative fuel. Biodiesel is one of the renewable fuels to replace fossil fuel. The synthesis of biodiesel from the seed oils is time consuming and costly. In order to predict new seed oils in biodiesel synthesis, several studies have been conducted to suggest the advantages of artificial intelligence in the field of producing green energy. The fourth industrial revolution is thought to be fuelled by artificial intelligence (AI) and machine learning algorithms, which can understand complicated issues with non-linear correlations. In the present study attempt has been made to predict the fuel properties of Jatropha curcas seed oil using python programming language. The fatty acid composition required for calculation is derived from literature. This code can be preserved and used multiple times to analyse the fuel properties which is time saving. The values obtained are well within the range of ASTM and EN standards.

Keywords: Biodiesel, Jatropha curcas, fuel properties, python, seed oil

5. PICK AND PLACE ROBOTIC ARM WITH SMARTPHONE CONTROL

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Abstract-With the advancement of technology and innovation at its peak, fabrication of systems and designs akin to human skills are increasingly integrated into working task to cater the rapid surge of human needs. Such innovations are made with the hopes of making people's live easier. This paper concentrates on the development of a robotic arm which is functional to do a pick and place operation and controlled by using a mobile application via Android phone. Designed to work on predetermined commands, the robot arm has the ability to move in a 4 axis direction; upward, downward, left and right direction at a specified angle with 2 servo motors and according to the mobile app specifications.

Designed and realized, the robotic arm control is through the use of a mobile application, via Bluetooth module, that has been programmed through Arduino UNO microcontroller.

Keywords- Robotic arm, Arduino UNO, 4-axis Movement, Automation.

6. STRUCTURAL AND FATIGUE LIFE EVALUATION OF HIGH-PRESSURESTAGE STEAM TURBINE BLADE AND DISC

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Abstract: This study examines the structural integrity and low cycle fatigue (LCF) behaviour of High Pressure (HP) stage steam turbine blades and discs under operational conditions. It uses Finite Element Analysis (FEA) to evaluate stress distribution, temperature effects, and deformation patterns on the blade and disc assembly during start-up, steady-state operation, and shut down cycles. The study also analyses material properties, focusing on fatigue life of turbine blades under cyclic loading conditions. Experimental tests validate the numerical model, examining key parameters like strain, stress concentration areas, and crack initiation sites. The study finds that specific regions of the blade and disc are more susceptible to low cycle fatigue due to cyclic thermal and mechanical stresses. The findings offer insights into failure mechanisms, offering guidance on material selection, design optimization, and maintenance strategies. These results are crucial for enhancing performance and extending the overall life of steam turbines, improving the efficiency and reliability of power generation components.

Keywords:- Low cycle fatigue (LCF), High-Pressure (HP), Finite Element Analysis (FEA)

7. TWO BODY DRY SLIDING WEAR OF STIR-CAST AL2024 BASED COMPOSITE REINFORCEDWITH B_4C AND GR PARTICLES

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Abstract: Aluminium metal matrix composite is the most interesting engineering material that has the ability of fulfilling the demands of recent engineering applications used in sectors like automobile, defence, aerospace and marine industries. This is due to their improved mechanical properties,

formability, reducing production cost and easier production technique. Hybridization of reinforcement is adopted to develop tailor-made properties of composites for specific application. In this study, Al-B 4C-Gr hybrid composites were produced with varying graphene content (0.25, 0.50, 0.75, and 1 wt. %) and keeping boron carbide (10 wt.%) as constant, the effect of graphene proportion on the wear properties of produced composites was evaluated. Results reveals that the Al-10%B 4C-0.75%Gr composite has exhibited the lowest wear rate compared to the rest of the combinations, has showed noticeable improvement compared to base metal due to the presence and proper distribution of reinforcement in the matrix. The experiment was conducted as per the design of matrix, using Taguchi technique. Each input parameter has their influence towards the better performance characteristics of the developed composites was discussed.

Keywords: Al2024; Graphene; B4C; Tensile strength; Hardness, Taguchi Method.

8. ENHANCING MECHANICAL PROPERTIES OF POLYMER COMPOSITE THROUGH COCONUT SHELL CHARCOAL POWDER REINFORCEMENT

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Abstract: In the present study, attempt has been made to evaluate the potential of coconut shell charcoal powder (CSCP) as a reinforcing material in polymer composites to enhance mechanical properties. Fabrication of polymer composite involves varying concentrations of CSCP, were incorporated into polymer matrices using compression molding technique. Mechanical tests, including tensile, flexural, and impact strength tests were conducted to assess the effect of CSCP reinforcement. Results reveal a significant improvement in mechanical properties with increasing CSCP content, attributed to its inherent strength and fibrous nature. Structural analysis provides insights into the distribution and interfacial bonding of CSCP within the composite structure. This work proved the viability of utilizing CSCP as a sustainable and cost-effective reinforcement in polymer composites for various applications requiring enhanced mechanical performance.

Keywords: Polymer composites; coconut shell; flexural test; tensile test.

9. EXPERIMENTAL AND COMPUTATIONAL ANALYSIS OF MECHANICAL PERFORMANCE ANDFORMABILITY OF ULTRA LOW CARBON STEEL UNDER VARIOUS ANNEALING CONDITIONS

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Abstract: This research investigates the mechanical behavior of an Ultra-Low Carbon Steel subjected to tensile and Erichsen tests, with an emphasis on the effects of annealing at 650°C, 750°C, and 850°C. Experimental tensile tests were performed to evaluate changes in tensile strength, yield strength, and elongation under varying annealing conditions. Additionally, Erichsen cup tests were conducted to assess the alloy's formability and ductility. The results demonstrated that annealing temperature has a significant impact on the mechanical properties, with higher temperatures leading to increased grain growth and reduced dislocation density, which in turn improved ductility and reduced tensile strength. To further explore these findings, Finite Element Analysis (FEA) simulations were employed, modeling the material's behavior during both the tensile and Erichsen tests. The FEA simulations correlated well with experimental trends, providing a detailed understanding of stress-strain distribution and deformation mechanisms. This combination of experimental and simulation data offers a comprehensive perspective on the material's performance and provides predictive insights for optimizing annealing processes.

Keywords: Heat treatment; FEA simulation; Ultra Low Carbon Steel; Failure prediction; Erichsen cupping test; UGNX, ANSYS-2024

10. AN EXAMINATION OF THE MICROSTRUCTURE AND MECHANICAL PROPERTIES OF AN AL-30WT% ZINC ALLOY PROCESSED BY DIE AND CENTRIFUGAL CASTING METHODS.

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Abstract: Al-Zn alloys are high strength, light weight, precipitation hardening structural materials used for aircrafts, automobile and general engineering applications. The alloy is processed through die casting process reviles coarse and dendritic structure because of the slow cooling rates encountered, therefore essential mechanical properties cannot be obtained for critical applications. However the centrifugal casting is the alternative casting process to produce the metallic castings. The casting of Al-30 wt.% Zn alloy where produced through metal die casting and centrifugal die casting process. The die casting alloys are produced by melting the alloys at a temperature of 750 ^{0} After melting the melt is transformed to metallic die of size 18cm length13cm breadth and 1.5cm height. The same alloys are so produced through centrifugal casting for comparison of the results. The centrifugal casting parameters are indicated below (i) Speed of the die 900 rpm, (ii) Melt temperature 750 0 (ii) Size of the centrifugal die. The grain size and surface topography of all the samples of ascast and centrifugal casting where examined using optical microscope, the surface topography of the as cast alloy of Al-30 wt.% Zn reviled as coarse grain in all the three cases. The microstructure of centrifugal casting of Al-30 wt.% Zn alloys exhibits dendritic structures. The density of as cast Al-30 wt.% is measures as 3.38±0.0028 gm/cc, the density of centrifugal casting of Al-30 wt.% Zn are reported as 3.33±0.0049gm/cc respectively.

The micro Vickers hardness of as cast Al-30 wt.% Zn is measured as 91.3±10.4 HV1, The Vickers hardness of centrifugal cast Al-30 wt.% Zn is reported as 112.7±16.8 respectively. The ultimate tensile strength of as cast of alloy reported as229.88±1.009 MPa. Similarly ultimate tensile strength of centrifugal casting of alloy is 314.93±0.766 MPa. The wear of Al-30 wt.% Zn is found to be reported as 680 µg/Nm. The wear of centrifugal casting of Al Al-30 wt.% Zn is905 µg/Nm. The fractured surface of Al-30 wt.% Zn alloy exhibits brittle fracture.

Keywords: As cast, Taguchi method, Dendroid, porosity, X-Ray Diffraction, coefficient of friction, fracture analyses, Energy Dispersive X-ray.

11. STRUCTURAL STUDIES ON COMPOSITE FRAME SPLICING USED IN AIRCRAFT WITH CLASSICAL TECHNIQUES

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Abstract-This research explores the structural analysis and validation of frame splicing in aircraft fuselage designs, specifically focusing on the junction between the Central Wing Box (CWB) and the Upper Shell (US) from Frames 47 to 53. The study aims to address the mechanical behavior of composite and metallic materials used in modern aerospace structures under varying load conditions. Through a combination of classical methods, finite element analysis (FEA), and parametric models, the splicing behavior between critical airframe components is evaluated. A detailed examination of airframe types such as truss structures, monocoque, and semimonocoque designs is conducted, highlighting the transition towards composite materials for enhanced performance. The study places composite-to-metal junctions of the fuselage are critically analyzed, considering factors like fatigue life, bearing strength, and stress distribution. The methodology involves a multi-step validation process that includes frame analysis, bolt group evaluation, and net section analysis, with data obtainedusing Airbus-specific tools such as ISAMI and ACSA for load extraction. Various loading scenarios, including mechanical, thermal, and pressure loads, are applied to assess the structural integrity of the splicing regions. This study not only contributes to optimizing composite frame structures but also provides insights into the reliability of bolted joints under complex loading conditions, contributing to the advancement of composite material applications in aerospace engineering particular emphasis on Fiber Reinforced Polymers (FRPs) due to their increasing relevance in aerospace applications.

12. PARAMETRIC STUDIES ON PERFORMANCE ENHANCEMENT OF AXIAL FLOW TURBINE

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Abstract- The intricate details of the blades, which vary in thickness, curvature, and angle, accompanied by characteristics of the channel between the blades, which is a direct reflection of the geometry used, combined with the phenomena brought on by high-speed rotation, make up the internal flow of turbo machines. The goal of this research is to improve the performance of aeronautical turbines, a critical step towards maximizing efficiency and power, thereby paving the way for increasingly sophisticated projects. Among the various possible strategies, an engineering branch specializes in computational techniques due to the versatility they provide. Through a virtual prototype, it becomes possible to observe the phenomena involved and changes in contour and geometry conditions to compare the results. This research strives to optimize an axial turbine from a small Gas turbine motor utilizing Computational Fluid Dynamics (CFD). and Multi-Objective Optimization techniques focused on geometry changes to maximize the turbine performance. The simulation process will be done through the use of the commercial software ANSYS®. Considering the leading wedge angle, trailing wedge angle, inlet, and outlet blade angle power analysis will be carried out. For modeling blade gen software has been used, for meshing turbo grid software has been used and for analysis CFX has been used. A power output of 130 kW was obtained and validated through analytical method. Further blade angles have been changed and analysis carried out and an increase of 22% of power output obtained which has been validated analytically.

Keywords: Turbo-machinery, Optimization, CFD, ANSYS, Bladegen, Turbo grid.

13. EXPERIMENTAL AND NUMERICAL STUDIES ON BUCKLING OF JUTE FIBRE REINFORCED LAMINATES

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The study explores the buckling behavior of jute fiber-reinforced laminates, a promising alternative to synthetic fibers in composite materials due to their eco-friendliness and low cost. The research focused on the structural response of these composites under compressive forces, which is crucial for applications where buckling may pose a risk. Experimental tests were conducted on laminates with a different stacking sequences and fiber orientations, exposing them to axial compressive loads until buckling was observed. The results showed that both stacking sequence and fiber orientation significantly influence the buckling resistance of the laminates. Laminates with [0/90] stacking sequences demonstrated greater resistance to buckling than those with [±45] orientations. The numerical simulations closely matched the experimental data, providing valuable insights into stress distribution and deformation characteristics during buckling. The findings support the expanded use of natural fiber composites in lightweight structural applications, contributing to sustainable engineering materials. This research highlights the potential of jute fiber-reinforced laminates to be tailored for enhanced buckling resistance through careful laminate design. The findings support the expanded use of natural fiber composites in lightweight structural applications, contributing to the advancement of sustainable engineering materials.

14. CRITICAL ANALYSIS OF DYNAMIC RECONFIGURATION FOR ACHIEVING HIGHER CAPACITY IN DWDM OPTICAL NETWORKS

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Abstract- Reconfigurable optical network is the solution to address the need of next generation data hungry applications. Reconfiguration allows adaptation of topology and network capacity at links. Recent techniques like free space optics, dynamic provisioning of dense wavelength division multiplexing optical channels and optical circuit switches enable dynamic reconfigurations in the optical network. These reconfiguration approaches brings many benefits like higher network utilization,

increased capacity and higher bit rate. This work analyses the existing reconfiguration solutions with goal to indentify further refinements for achieving higher network capacity. The research gaps in the existing reconfiguration solutions are details and the prospective solutions to address those gaps are listed. A survey on existing reconfiguration based solutions in DWDM optical network is analyzed in this work. Critical analysis of pros and cons in each of the solutions were identified and detailed. This work identified six major open issues in the reconfiguration based solutions till date. Addressing these open issues and designing effective solutions to these issues is in scope of future work.

15. THERMAL PERFORMANCE EVALUATION OF A NEW HYBRID SYSTEM INTEGRATING PEBBLE ABSORBER SOLAR COLLECTOR WITH CONVENTIONAL ABSORBER SOLAR COLLECTOR

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Abstract– The fluid flow rate of the heat absorbing medium plays a crucial role in the performance of the collector. Studies were carried out with varying fluid flow rates of 0.01 kg/s, 0.013 kg/sec and 0.016 kg/sec respectively for different days from 8:00 hour to 18:00 hour. The input parameters considered for the computational modeling are i)Solar radiation ii) Ambient temperature (Ta) iii) Inlet water temperature (Ti) and iv)Mass flow rate(mf). Experiments carried out using coated and uncoated pebbles as absorber along with a conventional flat plate collector. The efficiency of the solar thermal collector increases with flow rate and incident radiation. The coated pebble absorber collector is more efficient than the uncoated pebble absorber collector and less efficient than the conventional metal absorber collector at above mentioned flow rates. The total average efficiency of coated absorber collector was 67.036%,51.35% for the uncoated absorber collector and 72.857% for the conventional copper absorber collector.

16. MECHANICAL, MICROSTRUCTURE AND TRIBILOGICAL PROPERTIES OF AL - 20 WT.% ZN ALLOY PROCESSED THROUGH AS-CAST AND CENTRIFUGAL CASTING

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Abstract– Al-20 wt% Zn alloy is AS-caste and centrifugal casted, the study of mechanical, microstructure and tribological properties and comparative where found. The Density of the Al-20 wt% Zn alloy has 2.80 ± 0.0684 gm/cc in centrifugal casting, where has in as cast 2.79 ± 0.0403 gm/cc. by using Spark Optical Emission Spectrometer, chemical composition in alloy are tested that Al-20 wt% Zn as 82.66% ± 0.0851% of Aluminum and 16.82% ± 0.0845% of Zinc. The hardness of alloy in centrifugal is 95.1± 6.1 HV1 wile in the as cast is 79 ± 8.3 HV1. Due to centrifugal force in centrifugal casting the grain size and porosity percentage is lower to the as cast, is found in the optical microscope, the ultimate tensile strength of alloy in as cast is 214.65 ± 7.903 MPa and in the centrifugal cast is 214.61 ± 12.402 MPa. The wear rate of the alloy in as cast is 531 µg/Nm in 40N lad, speed of 600 rpm and disc diameter of 130mm while in centrifugal casting is 507 µg/N in 40N lad, speed of 400rpm and disc diameter of 130mm. The SEM images provided the microstructural abnormalities that will contribute to the failure of alloy in tensile test and the square EDX provided the fully characterize elemental composition of alloy. X-ray diffraction technique is adopted for qualitative analysis of phases in Al-20 wt% Zn alloy for intermetallics formed during As-cast and Centrifugal Casting.

Keywords: Mechanical, Microstructure, Tribilogical Properties, Centrifugal Casting.

17. INFLUENCE OF HOT FORGING ON HARDNESS AND TENSILE PROPERTIES OF AL7075/SIC/GRAPHITE HYBRID COMPOSITES

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Abstract: The inclusion of reinforcement materials into aluminum alloys has resulted in much attention being paid to improving mechanical properties and performance in various engineering applications. In this work, the impact of hot forging was studied on the hardness and tensile properties of Al7075-based hybrid composites that were reinforced with silicon carbide (SiC) and graphite. Al7075 was chosen as the alloy due to the use of high strength aluminum alloy for excellent mechanical properties and largely used in aerospace and automotive industries. This method was chosen with the reinforcement materials selected as SiC and graphite to attain the utmost hardness of the composite with better properties concerning wear resistance and thermal stability. The hybrid composites were prepared via the stir-casting process so that SiC and graphite particles get well-distributed within the Al7075 matrix. The as-cast samples underwent hot forging at various temperatures to analyze the processing conditions' effect on mechanical properties of the composite. Hot forging was conducted at 500°C temperatures in an attempt to optimize bonding between the matrix and reinforcements and minimize porosity and other defects. Tensile testing was conducted on the forged specimens along with hardness tests to determine the effects on these properties resulting from hot forging. The tensile strength shows marked improvement due to the interaction resulting from forge forming, while a considerably increased hardness was recorded in the hydrid composite compared to their as-cast counterparts. Besides, the study highlighted the influence of reinforcement content and forging on the overall mechanical performance.

Keywords: Al7075 Hybrid Composites, Hot Forging, Silicon Carbide (SiC), Graphite Reinforcement, Mechanical Properties

18. EFFECT OF LAYER THICKNESS ON THE TENSILE AND IMPACT BEHAVIOUR OF SLA-PRINTED PARTS

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Abstract: The introduction of Stereolithography SLA printing technology into the additive manufacturing sector has revolutionized the type of applications that might be realized through 3D printing as it offers an exceptionally high level of resolution and complex geometrical capabilities to create polymer parts. The paper illustrates the influence of layer thickness in SLA printing on the mechanical properties of the printed parts. SLA printing is built through a layer-based mechanism, and the thickness of these layers can affect the final product's performance characteristics significantly. Understanding these effects is pivotal for determining the best-print parameters to achieve desired mechanical properties in specific applications. In the present study, a set of samples was prepared using SLA printing with varying layer thicknesses, ranging from 25 micrometers to 100 micrometers. The same resin and printing conditions were used to exclude any possible variation in mechanical properties except through layer thickness. Samples prepared were subjected to a series of mechanical tests following the printing process, namely tensile, flexural, and impact tests, to ascertain changes in strength, stiffness, and toughness that are involved with different layer thicknesses. Trends in performance were obtained through careful inspection of the results of the experiments relating layer thicknesses. Of course, thinner layers, generally between 25 and 50 μm, show better desirable mechanical properties-including higher tensile strength, greater flexural rigidity, and improved impact strength-more massive layers that are 75 to 100 μm thick show reduced tensile strength. These can be due to the better layer adhesion and finer resolution of the thinner layers, naturally decreasing the amount of defects in the material that always contributes to the integrity of these materials. In this case, thin layers led to longer print times and increased costs.

Keywords: Stereolithography, Layer Thickness, Mechanical Properties, Tensile Strength:

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BASIC SCIENCES

1. EFFECT OF ALUMINUM ON THERMOLUMINESCENCEOF ZnO NANOPHOSPHOR

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Abstract- Aluminium doped ZnO nanoparticles have been synthesized by solution combustion method. X-ray diffraction studies confirm the hexagonal phase with space group P63mc. Photoluminescence (PL) emission spectrum is recorded at an excitation of 325 nm. A broad PL emission in the range 400 - 600 nm with peaks at 400, 450, 468, 483, 492, 517, 553 nm are observed in both pure and Al doped nanoparticles. The violet emission corresponds to the near band edge emission of ZnO. The broad band emissions are due to surface defects [1].ZnO:Al nanoparticles are irradiated with gamma rays in the dose range 0.05 to 10kGy. TL glow curves are recorded at a linear heating rate of 5 Ks^{-1}.TL glow peak intensity is found to increase with Al concentration. A prominent and well resolved TL glow with peaks at ~ 493 K and ~590K are observed in all the irradiated samples. TL response as a function of γ-irradiation showed a linear response up to 6kGy.Kinetic parameters of TL glows are calculated by deconvolution technique [2]. Activation energy and frequency factor are found to be 1.3eV and 3.388 $\times 10^{10}$ s^{-1} respectively.

Keywords- Aluminium in ZnO improved the photo luminescence and thermo luminescence response.

2. SCHUR-HARMONIC CONVEXITY OF THE MEAN OF CONVEX FUNCTIONS FOR TWO VARIABLES

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Abstract: A quadrature rule for estimating the values of an integrals is presented, based on hybrid functions and uniform Haar wavelets. This approach & 39;s primary benefits are its effectiveness and simplicity. We provide error estimates and numerical examples to confirm the accuracy and convergence of the proposed method.

AMS subject classification: 65D30, 65D32, 65Gxx

Keywords: Numerical method, Quadrature rule, Haar wavelets, Hybrid functions.Keywords: Mean, Schur-Convex, Hadamard's Inequality;

3. ANTIFUNGAL STUDIES OF BENZIMIDAZOLE DERIVATIVES AND ITS TRANSITION METAL ACETATE COMPLEXES

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Abstract: The ligands 1,2-bis(N-Methylbenzimidazolyl)benzene (L1), p-hydroxy benzilidene phenyl benzimidazole (L4) and 1,3-bis(benzimidazolyl)benzene (L9) and its metal acetates complexes were subjected to antifungal studies. The zone of inhibition was tested against Penicillium brocaeand Aspergillus terreusfungi. The metal acetate complexes showed high zone of inhibition than ligands. The inhibition was high against Penicillium brocaecomparable to Aspergillus terreusfungi. The increased activity of metal complexes' could be related to the effect of metal ions on the cell membrane. Metal ions' polarity and non-polarity nature has contributed in chelation, which allow them to permeate into cells and tissues. The Ni-metal acetate of ligand 1 and ligand 4 showed highest zone of inhibition of 5mm compared to other metal acetates, similarly Co-metal acetate showed highest zone ofinhibition of 4mm compared to other metal acetates.

Keywords:1,2-bis(N-Methylbenzimidazolyl)benzene, p-hydroxy benzilidene phenyl benzimidazole, 1,3-bis(benzimidazolyl)benzene, Penicillium brocae, Aspergillus terreus

4. INVESTIGATION OF STRUCTURAL CHARACTERISTICS AND MAGNETIC PROPERTIES OF POLYANILINE-ZN0.5CU0.5FE2O4 NANOCOMPOSITES

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Abstract: The Zn0.5Cu0.5Fe2O4 nano ferrite were prepared by the solution combustion method using aloe Vera gel. The Polyaniline-Zn0.5Cu0.5Fe2O4 nano ferrite composites were prepared by Ex-situ polymerization method with different weight percentage ratio. The X-ray diffraction, SEM, EDAX, TEM, and VSM, were used to examine the structural, morphological, elemental analysis, and magnetic, features of the samples, respectively. The cubic spinel structure was confirmed by X-ray diffraction patterns. Zinc-copper nano ferrite exhibits distinct crystalline peaks, but these peaks shifted towards longer angle with addition of PANI The existence of spherical and clumped particles was revealed by SEM examination. The retentivity and coercivity are determined and the magnetic moment values were decreases with increase in PANI to the ferrite nano composites. The experimentalresult showed that these materials are used for electrical, magnetic and is often used for satellite communication, mobile communication, and radar applications

Keywords: Zinc Copper - Ferrite; SEM; TEM; Magnetic properties;

5. QSPR AND QSAR ANALYSIS OF HEADACHE DRUGS: RELATING TOPOLOGICAL INDICES AND EFFICACY WITH MULTILINEAR REGRESSION

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Abstract: Students commonly experience headaches and academic stress, hindering their academic performance, emotional well-being, and social life, reflecting the heightened stress of modern times. Academic evaluations, assignments, and demands contribute to student stress, a known trigger of headaches. Current research explores new medications based on existing treatments, including non-steroidal anti-inflammatory drugs (NSAIDs) like ibuprofen and naproxen. In drug discovery, QSPR

and QSAR studies use topological indices, mathematical representations of molecular structure, to analyse the physicochemical properties of potential drugs and predict their biological activity. In this study correlation and multi linear regression of nine topological indices with headache drugs are analysed. The results revealed a strong correlation, suggesting that topological descriptors can be a powerful tool for predicting the properties of potential new headache medications.

Keywords: Topological descriptors, QSPR/QSAR, Headache medications.

6. A CERTAIN SUBCLASSES OF BI-UNIVALENT FUNCTIONS RELATED TO THE k-FIBONACCI NUMBERS

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Abstract: In this paper, we introduce a novel subclass of bi-univalent functions defined using convolution and thek-Fibonacci numbers. We derive estimates for the initial two coefficients and establish the Fekete-Szego in equalities for this function class

7. RADIATION SHIELDING STUDIES OF SODIUM SILICATE POLYMERIC SUBSTRATES

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Abstract: The study describes the novel approach for synthesizing a radiation shielding polymeric substrate through a simple and cost-effective sol-gel process. Sodium silicate and acetone were fused by sol-gel technique to form the base substrate and subsequently, these compounds were doped various oxides viz., B 2 O 3 , Fe 2 O 3, SnO, and Bi 2 O 3 . The study demonstrates the Z- dependence on the shielding properties of materials and it was found that these polymeric concretes exhibit in crystalline, semi-crystalline and amorphous forms which were evident from XRD. The optical band gaps were evaluated by Kubelka- Munk method which further supports crystalline and amorphous nature of sodium silicate polymeric substrate materials.

Keywords: Polymeric Substrate, Radiation Shielding, Gamma – Ray Shielding

8. A REVIEW ON IN VITRO MICROPROPAGATION OF CHRYSANTHEMUM

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Abstract: Globally grown as a popular ornamental plant, chrysanthemum ranks second in importance among crops planted for floriculture, behind roses. Using root suckers and shoot cuttings from mother plants is the traditional growing method, which can be costly, slow, and unfeasible by today's standards. It also increases the risk of virus infection and quality degradation. The obstacle has been overcome using in vitro micro propagation, which uses smaller explants to generate newer elite species while maintaining true-to-type plant quality and increasing productivity through in vitro culture. To outperform traditional propagation techniques, there view thus focuses on recent studies of the in vitro micro propagation of Chrysanthemum, including the explant sources, tissue culture media composition, sterilization of culture media, plant growth regulators (PGRs), acclimatization, and alternative light sources. This is a worthwhile scientific endeavor and will increase the market for chrysanthemums.

Keywords: Chrysanthemum, in vitro micro propagation, true-to-type plant, explant sources,tissue culture media composition, sterilization of culture media, acclimatization, alternative light sources.

Morphological and Biological Efficiency Characterization of Pure Zinc Doped

9. COPPER OXIDE FOR ENRICHMENT OF DRINKING WATER QUALITY

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Department of Chemistry, SJCIT

Abstract: The efficient materials for water purification has brought zinc-doped copper oxide (Zn-CuO) into focus due to its promising properties. This study aims to explore the morphological and biological characteristics of Zn-CuO and evaluate its potential for improving drinking water quality. Morphological analysis, conducted through Scanning Electron Microscopy (SEM) and Transmission Electron Microscopy (TEM), reveals that Zn-CuO possesses a high surface area and a well-defined porous structure. These features are essential for enhancing contaminant adsorption and interaction, making Zn-CuO a strong candidate for water purification applications. Biological assessments examined the antimicrobial activity of Zn-CuO against common waterborne pathogens and its effects on beneficial

microorganisms. The results indicate that Zn-CuO exhibits strong antimicrobial activity, effectively inhibiting harmful pathogens while maintaining low toxicity towards beneficial microbes, ensuring minimal disruption to essential microbial ecosystems. These findings highlight Zn-CuO's potential as an efficient and eco-friendly material for advancing water purification technologies.

Keywords: Zn-CuO, Antimicrobial activity, Scanning Electron Microscopy (SEM)Transmission Electron Microscopy (TEM)

10. OPTICAL PROPERTIES OF DELIGNIFIED COCONUT AND SUGAR CANE FIBRES

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Abstract: Transparency in wood has been an exploratory part of sciences, and this work aims to understand the optical properties of the delignified wood samples which highlights particularly on the band gap tailorbaility of the delignified solutions of coconut and sugarcane fibres. There has been huge scope for the exploration in this field and thus leading pavements to understand the nature of polymer intrusion in these natural products. As time elapsed during the delignification process, it was found that there has been continuous red shift in the band gap of the solution. Furthermore, it is interesting to note that polymers like PVA have led to tune the optical properties as they are intruded into wood fibres. In case sugarcane, there has been a red shift of band gap energy, whereas for the coconut fibres the results were contrary as they led to blue shift of band gap energy.

Keywords: Optical properties of delignified wood, PVA, Transparent wood

11. MORPHOLOGICAL AND BIOLOGICAL EFFICIENCY CHARACTERIZATION OF PURE ZINC DOPED COPPER FERRITE FOR ENRICHMENT OF DRINKING WATER QUALITY

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Department of Chemistry, SJCIT

Abstract: The pursuit of effective materials for water purification has led to the investigation of inc-doped copper ferrite (Zn-$CuFe_2O_4$) due to its promising properties. This study aims to characterize the morphological, electrical, and biological efficiencies of Zn-$CuFe_2O_4$ and evaluate its potential for enriching drinking water quality. Morphological characterization was conducted using Scanning Electron Microscopy (SEM) and Transmission Electron Microscopy (TEM) Results indicate that Zn-$CuFe_2O_4$ exhibits a high surface area and a well-defined porous structure, which are advantageous for contaminant adsorption and interaction. Biological efficiency was evaluated by testing the material's antimicrobial activity against common waterborne pathogens and assessing its toxicity to beneficial microorganisms. The study reveals that Zn-$CuFe_2O_4$ possesses significant antimicrobial properties while maintaining a safety profile for non-target microorganisms, making it a viable option for water purification.

Keywords: Zn-$CuFe_2O_4$

12. GREEN SYNTHESIS OF ZnO NANOPARTICLES USING GUAVA LEAF EXTRACT AND THE INFLUENCE OF PRECURSOR MOLARITY

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Abstract- The conventional ways of creating metal oxide nanoparticles in biomedicine and Pharmaceuticals have been replaced by environmental friendly alternatives that do not require the use of chemical stabilizing and reducing agents. ZnO nanoparticles were synthesized in this study using psidium guajava, a valuable herbal plant with medicinal potential that is commonly known as guava. In pharmaceutical formulations, bioactive components derived from medicinal plants are essential because they function as capping and reducing agents for metal ions during the creation of nanoparticles. Zinc oxide nanoparticles are produced when the photochemical in guava leaf extract undergo reduction/oxidation. The experiment was repeated with different precursor concentrations (3g, 4g, 5g, and 6g) to examine the effect of precursor molarity on the physical properties of the

nanoparticles. Furthermore, a comparison was made between the average particle size of ZnO nanoparticles produced chemically and those produced through biosynthesis. X-ray diffraction (XRD), Fourier-transform infrared spectroscopy (FTIR), scanning electron microscopy with energy-dispersive X-ray spectroscopy (SEM-EDS), and ultraviolet- visible spectroscopy (UV-Vis) were used to analyze the produced nanoparticles. The crystallite size and homogeneity of the nanoparticles are dependent on the amount of precursor used. Guava leaf extract contains molecules that serve as capping, reducing, and stabilizing agents, contributing to the formation mechanism of ZnO nanoparticles. FTIR analysis confirms the Zn-O bonding in all samples, providing insight into the chemical structure. XRD results reveal hexagonal wurtzite-shaped crystalline particles with sizes ranging from 20 nm to 40 nm. For chemical synthesis, particle size ranges between 30-50 nm. Furthermore, an increase in molarity concentrations correlates with an observed growth in grain size. EDS analysis confirms the successful synthesis of ZnO nanoparticles in this study. Overall, the study showcases a sustainable and efficient approach to obtaining ZnO nanoparticles with desirable characteristics, laying the groundwork for environmentally friendly nano material synthesis. This study underscores the significant advantages of biosynthesis over chemical methods in the production of small-sized nanoparticles.

13. GREEN SYNTHESIS OF MGO NANOPARTICLES USING LEAF EXTRACT OF NEEM AND BIOMEDICAL APPLICATIONS

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Abstract- Nanotechnology plays a major role in the industrial revolution and emerged over the past decade as the vanguard of Science and Technology and it is a dominant area of scientific research. The eco-friendly synthesis of MgO nanoparticles provide an alternative solution to the use of toxic materials that are harmful to the environment. The present work focuses on the synthesis of MgO nanoparticles by azadirachta indica (neem) leaves through the green method and chemical synthesis. The azadirachta indica commonly known as neem, a widely distributed medicinal plant is safe, easily available and has great potential for biomedical applications. Here we utilizing the reducing and capping potential of neem leaf extract. Study revealed the role of various biomolecules such asnimbin, nimbinene, nimbandiol, immobile, nimicinol, quercetin, and beta-sitosterolin the formation of MgO nanoparticles. The study also compares the morphology, and nature of nanoparticles developed through different synthesis techniques. The distinctive features of biosynthesized MgO nanoparticles

such as high refractive index, outstanding optical transparency, excellent corrosion resistance and high stability are enhanced its applications in various fields. The characterization of the synthesized nanoparticles has done using X-Ray Diffraction (XRD) technique. An average particle size of 8 nm was observed for nanoparticles derived from chemical synthesize as calculated from the major peak appeared at 38.187 o . It is interestingly noted that, nanoparticles prepared by green approach, the size has reduced to 5 nm and the major peak shifts to 37.97 ^{o} , The study clearly confirms that for the production of smaller-sized nanoparticles green method is preferred. Data obtained from the XRDtechnique has compared with the standard JCPDS (Joint Committee on Powder Diffraction Standards)file, thus confirming the presence of MgO nanoparticles. The prepared MgO nanoparticles from neemleaf extract have identified suitable for seed germination applications.

14. EFFECT OF WET DEPOSITION AND GRAVITATIONAL SETTLING VELOCITIES ON ATMOSPHERIC POLLUTANTS EMITTED FROM LINE SOURCE WITH MESOSCALE WIND

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Abstract: A comprehensive mathematical model being presented for the study of advection as well as diffusion of atmospheric contaminants released by line source in an urban metropolitan city numerically in the presence of meso scale wind. The choice of meso scale is attributed simulating the usual local wind generated urban heat island. The existence of meso scale wind at the center of city reduces the concentration of atmospheric primary as well as secondary contaminants along upwind side of center of heat island also enhances in the downwind side. The direct emission of primary contaminants into the atmosphere converts them into secondary contaminants by means of reaction chemically with atmospheric contaminants. The presented article takes into account of conversion as well as removal mechanisms via chemical reaction. The removal mechanisms undertaken here are velocity of dry and wet deposition, velocity of gravitational settling. The equations of partial differentials formulated with the respect to the parameters of climate logical conditions and removal mechanisms to the physical form of the problem have been solved by implicit system of Crank-Nicolson. This finite difference method being used under the stability dependent atmospheric

parameters involved in wind speeds and vortex diffusivity profiles. Results have been explored for the dispersal of contaminant in an urban region in stable state as well as neutral atmospheric state both existence as well as non-existence of meso scale wind for various meteorological situations.

15. STRUCTURAL AND OPTICAL INVESTIGATIONS OF NANOCOMPOSITE FILMS COMPRISING POLY (VINYL ALCOHOL) AND TELLURIUM

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Abstract: In this study, the structural, and optical properties of Poly(Vinyl Alcohol) and Tellurium (PVA-Te) nanocomposite films were tested. The polymer composite film was prepared using the solution casting method. To describe the type of dispersion present and to verify the existence of functional groups, X-ray diffraction (XRD) and Fourier transmission infrared-attenuated total reflection (FTIR-ATR) spectroscopy experiments were conducted. Te can be detected in PVA films by intense X-ray diffraction peaks at 22.82˚ and 39.5˚, which correspond to crystal planes (100) and (110) correspondingly (JCPDS card 36-1452). The asymmetric stretching vibration of the C-H bond is responsible for the FTIT-ATR absorption peak that ranges from 2914 to 2941 cm-1, and the symmetric and asymmetric stretching vibrations of the C=O bond are responsible for the 1713 to 1736 cm-1 absorption peak. The ultraviolet-visible (UV) spectroscopy approach was employed in order to conduct an analysis of the direct band gaps. For the Te concentrations of 0.4% and 0.6% in the PVA composite, the broad absorption band is detected at a wavelength of 330 nm. To analyse the surface morphology, both scanning electron microscopy (SEM) and high-resolution transmission electron microscopy (HR-TEM) were employed.

Keywords— Fourier transmission infrared-attenuated total reflection, scanning electron microscopy, high-resolution transmission electron microscopy.

16. RAINBOW CHROMATIC TOPOLOGICAL INDICES OF SOME GRAPHS

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Abstract: The Zagreb index is a topological index that is defined based on the degree of vertices. In this paper, the concept of rainbow chromatic Zagreb indices and rainbow chromatic irregularity indices for graphs is discussed. Here, we consider the degree of colors/labels used. The first and secondrainbow chromatic Zagreb indices and its irregularity indices of well-known graph classes are calculated. Later,the paper conducts QSPR analysis on specific alkanes to demonstrate the practicality of the topologicalindices outlined.

Keywords: Rainbow neighbourhood coloring, first rainbow chromatic Za-greb index, second rainbow chromatic Zagreb index, rainbow chromatic ir-regularity index, rainbow chromatic totalirregularity index

17. ESTABLISHING QUADRATURE RULES FOR NUMERICAL INTEGRATION BY CONTRASTING HYBRID FUNCTIONS AND HAAR WAVELETS

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Abstract: A quadrature rule for estimating the values of an integrals is presented, based on hybrid functions and uniform Haar wavelets. This approach's primary benefits are its effectiveness and simplicity. We provide error estimates and numerical examples to confirm the accuracy and convergence of the proposed method. AMS subject classification: 65D30, 65D32, 65Gxx

Keywords: Numerical method, Quadrature rule, Haar wavelets, Hybrid functions.

18. CRITICAL ANALYSIS OF DYNAMIC RECONFIGURATION FOR ACHIEVING HIGHER CAPACITY IN DWDM OPTICAL NETWORKS

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Abstract:- Reconfigurable optical network is the solution to address the need of next generation data hungry applications. Reconfiguration allows adaptation of topology and network capacity at links. Recent techniques like free space optics, dynamic provisioning of dense wavelength division multiplexing optical channels and optical circuit switches enable dynamic reconfigurations in the optical network. These reconfiguration approaches bring many benefits like higher network utilization, increased capacity and higher bit rate. This work analyses the existing reconfiguration solutions with goal to identify further refinements for achieving higher network capacity. The research gaps in the existing reconfiguration solutions are details and the prospective solutions to address those gaps are listed.

A survey on existing reconfiguration-based solutions in DWDM optical network is analyzed in this work. Critical analysis of pros and cons in each of the solutions were identified and detailed. This work identified six major open issues in the reconfiguration-based solutions till date. Addressing these open issues and designing effective solutions to these issues is in scope of future work.

19. BIODIESEL PRODUCTION FROM JATROPHA: A COMPUTATIONAL APPROACH BY PYTHON PROGRAMMING LANGUAGE

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Abstract:- The depletion of fossil fuels and environmental concerns in the recent era has gained significant attention in the production of biodiesel from non-edible seed oils as an alternative fuel. Biodiesel is one of the renewable fuel to replace fossil fuel. The synthesis of biodiesel from the seed oils is time consuming and costly. In order to predict new seed oils in biodiesel synthesis, several studies have been conducted to suggest the advantages of artificial intelligence in the field of producing green energy. The fourth industrial

revolution is thought to be fuelled by artificial intelligence (AI) and machine learning algorithms, which can understand complicated

20. CORROSION CHARACTERIZATION OF ALUMINIUM 6013/ RED MUD METAL MATRIX COMPOSITES

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Abstract:- The paper focuses on testing metal matrix composites (MMCs) made from an Aluminium 6013 alloy reinforced with red mud particulates, specifically in alkali and salt environments. Aluminium 6013 is a commercially available alloy, while red mud is a by-product generated during the extraction of aluminium from its ore, sourced from HINDALCO in Renukoot District, Uttar Pradesh, India. The composites were produced using the liquid melt metallurgy technique, employing a vortex method. The process began by heating the Aluminium 6013 alloy slightly above its melting point in a bottom-pouring furnace. To create a vortex, an impeller coated with aluminite (to prevent ferrous ion contamination) was immersed in the molten alloy. Pre-heated, uncoated red mud particulates were then gradually added into the vortex. After thorough stirring, the molten composite was directly poured into pre-heated cast iron moulds. Metal matrix composites containing 2%, 4%, and 6% by weight of red mud were cast, alongside the matrix alloy for comparison purposes. Specimens were machined from the bar castings according to ASTM standards. Corrosion properties of the manufactured specimens were evaluated using a static weight loss method. Tests were conducted in solutions with varying concentrations of sodium hydroxide and a mixture of sodium chloride and sodium hydroxide. Results showed that the composites exhibited enhanced corrosion resistance compared to the matrix alloy in all tested corrosive environments. However, both the matrix alloy and the composites experienced more significant corrosion in sodium hydroxide alone than in the sodium chloride and sodium hydroxide mixture.

Key words: Aluminium 6013, Corrodent, Red Mud, Vortex

21. GREEN SYNTHESIS OF ZnO NANOPARTICLES USING GUAVA LEAF EXTRACT AND THE INFLUENCE OF PRECURSOR MOLARITY

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Abstract:The conventional ways of creating metal oxide nanoparticles in biomedicine and pharmaceuticals have been replaced by environmental friendly alternatives that do not require the use of chemical stabilizing and reducing agents. ZnO nanoparticles were synthesized in this study using psidium guajava, a valuable herbal plant with medicinal potential that is commonly known as guava. In pharmaceutical formulations, bioactive components derived from medicinal plants are essential because they function as capping and reducing agents for metal ions during the creation of nanoparticles. Zinc oxide nanoparticles are produced when the phytochemicals in guava leaf extract undergo reduction/oxidation. The experiment was repeated with different precursor concentrations (3g, 4g, 5g, and 6g) to examine the effect of precursor molarity on the physical properties of the nanoparticles. Furthermore, a comparison was made between the average particle size of ZnO nanoparticles produced chemically and those produced through biosynthesis. X-ray diffraction (XRD), Fourier-transform infrared spectroscopy (FTIR), scanning electron microscopy with energy-dispersive X-ray spectroscopy (SEM-EDS), and ultraviolet-visible spectroscopy (UV-Vis) were used to analyze the produced nanoparticles.

The crystallite size and homogeneity of the nanoparticles are dependent on the amount of precursor used. Guava leaf extract contains molecules that serve as capping, reducing, and stabilizing agents, contributing to the formation mechanism of ZnO nanoparticles. FTIR analysis confirms the Zn-O bonding in all samples, providing insight into the chemical structure. XRD results reveal hexagonal wurtzite-shaped crystalline particles with sizes ranging from 20 nm to 40 nm. For chemical synthesis, particle size ranges between 30-50 nm. Furthermore, an increase in molarity concentrations correlates with an observed growth in grain size. EDS analysis confirms the successful synthesis of ZnO nanoparticles in this study. Overall, the study showcases a sustainable and efficient approach to obtaining ZnO nanoparticles with desirable characteristics, laying the groundwork for environmentally friendly nanomaterial synthesis. This study underscores the significant advantages of biosynthesis over chemical methods in the production of small-sized nanoparticles.

22. GREEN SYNTHESIS OF MGO NANOPARTICLES USING LEAF EXTRACT OF NEEM AND BIOMEDICAL APPLICATIONS

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Abstract: Nanotechnology plays a major role in the industrial revolution and emerged over the past decade as the vanguard of Science and Technology and it is a dominant area of scientific research. The eco-friendly synthesis of MgO nanoparticles provide an alternative solution to the use of toxic materials that are harmful to the environment. The present work focuses on the synthesis of MgO nanoparticles by azadirachta indica (neem) leaves through the green method and chemical synthesis. The azadirachta indica commonly known as neem, a widely distributed medicinal plant is safe, easily available and has great potential for biomedical applications. Here we utilizing the reducing and capping potential of neem leaf extract. Study revealed the role of various biomolecules such asnimbin, nimbinene, nimbandiol, immobile, nimicinol, quercetin, and beta-sitosterolin the formation of MgO nanoparticles. The study also compares the morphology, and nature of nanoparticles developed through different synthesis techniques.

The distinctive features of biosynthesized MgO nanoparticles such as high refractive index, outstanding optical transparency, excellent corrosion resistance and high stability are enhanced its applications in various fields. The characterization of the synthesized nanoparticles has done using X-Ray Diffraction (XRD) technique. An average particle size of 8 nm was observed for nanoparticles derived from chemical synthesize as calculated from the major peak appeared at 38.187o. It is interestingly noted that, nanoparticles prepared by green approach, the size has reduced to 5 nm and the major peak shifts to 37.97o. The study clearly confirms that for the production of smaller-sized nanoparticles green method is preferred. Data obtained from the XRD technique has compared with the standard JCPDS (Joint Committee on Powder Diffraction Standards) file, thus confirming the presence of MgO nanoparticles. The prepared MgO nanoparticles from neem leaf extract have identified suitable for seed germination applications.

23. THE EFFECTIVENESS OF REDUCING NOISE IN DIGITAL IMAGES USING INVARIANT-POWER-EXPONENTIAL-MEAN FILTER

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Abstract: This paper employs the invariant-power-exponential mean filter to get rid of noise in digitalized images while preserving essential details. The filter's effectiveness was evaluated by filter criteria quality assessment after noise reduction. A subjective analysis of filter's performance, compared to existing mean filters, shows its efficacy. The results demonstrate a favourable conclusion about the filter's performance.

Keywords: PSNR, MSE, CoC, MAE, Filters, Nise, Invariant power exponential mean, mean filters

24. THE EFFICACY OF POWER-EXPONENTIAL-MEAN FILTER FOR REDUCING NISE IN DIGITALIZED IMAGES

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Abstract: This paper employs the power-exponential-mean filter to minimize noise in digitalized images while preserving essential details. The filter's performance is evaluated by filter criteria quality assessment after noise reduction. The filtering and segmentation are the two levels of system block-diagram is divided into two phases: A comparison with existing mean filters is conducted and the study concluded with a discussion of the results and a fruitful conclusion.

Keywords: PSNR, MSE, CoC, MAE, Filters, Nise, Invariant power exponential mean, mean filters