



International Conference on Advanced Material Science

06th MAY 2023

Book of Proceedings

ICAMS 2K23



Theni Melapettai Hindu Nadargal Uravinmurai

**NADAR SARASWATHI COLLEGE OF
ENGINEERING & TECHNOLOGY**

Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai
Vadapudupatti, Annanji(po), Theni - 625531.

International Conference on Advanced Material Science

**“ICAMS 2K23”
06.05.2023**

**organized by
Department of Civil & Mechanical
Engineering**



BOOK OF PROCEEDINGS

Theni Melapettai Hinud Nadargal Uravinmurai

NADAR SARASWATHI COLLEGE OF ENGINEERING & TECHNOLOGY

Vadapudupatti, Annanji (Post), Theni – 625531.

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Office Bearers Message

T.Rajamohan, B.Sc.,
President, TMHNU.

First and foremost, I want to thank the organizers of ICAMS - 2K23 for inviting me to address and officiate this conference. This ICAMS-2K23 provides a platform to bring together researchers, postgraduate and undergraduate students, and industrial people. With this platform, ICAMS will embark on a process of making discoveries.

With Regards,



P.P.Ganesh, B.Sc.,
Vice President, TMHNU.

I am delighted to welcome you to the "ICAMS - 2K23" conference at Nadar Saraswathi College of Engineering and Technology, Theni, 6th May 2023. This international meeting will assemble the world leaders in the expanding fields related to the innovation, research and development of technologies. I happily welcome you to this conference and look forward to your participation.

With Regards,



Office Bearers Message



M.M.Anandhavel
General Secretary, TMHNU.

I welcome you to the "ICAMS - 2K23" conference at Nadar Saraswathi College of Engineering and Technology, Theni, on 6th May 2023. This meeting will assemble the Academician, Researchers and Industrialists in the expanding fields related to the engineering and development of technologies. I happily welcome you to this conference and look forward to your participation.

With Regards,

A handwritten signature in blue ink, appearing to be 'M.M. Anandhavel'.



M.Palaniappan
Treasurer, TMHNU.

It is my great pleasure to welcome you to the ICAMS - 2K23 in NSCET, Theni, on 6th May 2023. We look forward to an exciting, insightful presentation, discussions, and sharing of technical ideas with colleagues worldwide. Again, we thank you for attending the conference, and we hope you enjoy your visit to the NSCET.

With Regards,

A handwritten signature in blue ink, appearing to be 'M. Palaniappan'.

Secretary's Message

A.Rajkumar, B.B.A.,

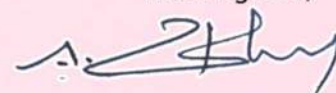
Secretary, NSCET.



I am delighted that our college Nadar Saraswathi College of Engineering and Technology is hoisting International Conference on Advanced Material Science – ICAMS - 2K23 on 6th May 2023.


My hearty congratulations to the organizers of this conference and best wishes to all the participants for an enjoyable stay in Nadar Saraswathi College of Engineering and Technology and thought provoking deliberations on this International Conference.

With Regards.,



A.S.R.Maheshwaran, B.Sc.,

Secretary, NSCET.



We are glad that our college Nadar Saraswathi College of Engineering and Technology is hoisting International Conference on Advanced Material Science – ICAMS - 2K23 on 6th May 2023.

The Chief Guest of this conference Dr. Pradeep Kumar Krishnan from Oman a clear indication of the importance of this conference. This will be a great opportunity for the students not only to learn knowledge from papers presented during the conference and also interaction with the experts from other institutions. My hearty congratulations to all.

With Regards.,



Joint Secretary's Message

Er.S.Naveen Ram, B.E., MBA.,

Joint Secretary, NSCET.

We are pleased to welcome you all to the International Conference on ICAMS - 2K23 conducted by Nadar Saraswathi College of Engineering and Technology, Theni, which brings out and encourages the development of Research-based learning. With this effective collaboration, I hope this conference will seek to create the best engineering scholars who are the nation's future citizens. Best Wishes.

With Regards.,

Principal's Message

Dr. C.Mathalai Sundaram, M.E., MBA., Ph.D., MISTE
Principal, NSCET.

On behalf of the Nadar Saraswathi College of Engineering and Technology, I am pleased to welcome all the participants to the International Conference on Advanced Material Science ICAMS-2K23" on 6th May 2023. For more effective use of innovations and advances in all engineering disciplines, it is, therefore, necessary that all researchers and scientists across the world exchange various concepts of advancement in all Engineering disciplines as the output of their research.

I am sure that the ICAMS - 2K23 will be a platform for the students and researchers to meet and share their research findings.

I wish all participants a fruitful, enjoyable, memorable stay at Nadar Saraswathi College of Engineering and Technology.

With Regards.,

INTERNATIONAL CONFERENCE ON
ADVANCE MATERIAL SCIENCE
ICAMS – 2K23

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Mr. **T.Rajamohan**, B.Sc., President, TMHNU.

Mr. **P.P.Ganesh**, B.Sc., Vice-President, TMHNU.

Mr. **M.M.Anandavel**, General Secretary, TMHNU.

Mr. **M.Palaniappan**, Treasurer, TMHNU.

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CHIEF GUEST & KEYNOTE SPEAKER'S MESSAGE



Dr. Pradeep Kumar Krishnan

**Assistant Professor,
Mechanical and Industrial
Engineering Department,
National University of Science
and Technology (NUST),
College of Engineering (CoE), Muscat,
Sultanate of Oman**

It gives me immense pleasure to know that the International Conference on Advance Material Science (ICAMS - 2K23) will be held at Nadar Saraswathi College of Engineering & Technology, Vadapudupatti, Theni-625531, Tamilnadu on 6th May 2023.

I will provide an excellent platform to exchange ideas, views and information on the latest developments and innovations in Engineering & Technology and other related fields among the participants. This conference will enhance the relationship between industry, academia and policymakers, which is the thriving force for development to meet that demand.

It is my honour to be invited to the conference. First, I would like to congratulate the organizer, speakers, authors, participants and other associated persons for their excellent initiative, contribution and support in making this conference memorable and educationally fulfilling.

I look forward to seeing a successful conclusion of the conference.

Dr. Pradeep Kumar Krishnan

ICAMS 2K23

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ICAMS 2K23
DEPARTMENT OF
CIVIL AND STRUCTURAL
ENGINEERING

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**A CONCEPTUAL COST-BENEFIT ANALYSIS IN CONSTRUCTION
INDUSTRY USING PROJECT MANAGER SOFTWARE**

Kibsho Sharifa.K.S^[1],

^[1]PG student, M.E., Construction Engineering and Management,

Arunachala College of Engineering for Women, Manavilai.

Abstract

A cost-benefit analysis (CBA) is a tool to evaluate the costs vs. Benefits in an important business proposal. A formal CBA lists all project expenses and tangible benefits, then calculates the return on investment (ROI), internal rate of return (IRR), net present value (NPV), and payback period. Keeping track of all these figures is made easier with project management software. The purpose of this paper is to develop a resilient and dynamic CBA framework for construction projects. After analysing more than 25 journals, there is a great variation in the cost-benefits due to the differing methodologies used in the estimation. This study aims at presenting a literature review of cost-benefit prediction methods emphasising data collection and analytical approach. The analysis is made with Projectmanager software which is an awardwinning project management software that has the tools you need to realize the potential of your project. Projectmanager is a cloud-based project management software with tools, such as a real-time dashboard, that can collect, filter and share your results in easy-to-understand graphs and charts. By using the software techniques, the real-time cost tracking and resource management can be achieved.

**EXPERIMENTAL INVESTIGATION OF CONCRETE ATTRIBUTES
BY ADDING GLASS SHARD, BALLAST AND ADDITION OF
DISACCHARIDE AS AN ADMIXTURE**

Abisha P M^[1], Bright Singh^[2],

^[1] PG Scholar, ^[2]Assistant Professor,

ME structural engineering,

Maria college of engineering and technology, Attoor.

Abstract

The main aim of this research is to provide an enhancement in the strength of concrete with the influence of certain non biodegradable minerals that are easily available, but may be a threat for pollution in earth. Also the cement manufacturing industry, on an average emits 7% of greenhouse gases to earth's atmosphere which leads to a great threat for environment. In order to address these environmental effects, extensive research is on going into the use of cement replacements, using many waste materials and industry's byproducts to form a composite & economical concrete mixture. The report deals with the concrete, with the mixture of non biodegradable minerals and certain easily available minerals of the earth. These findings indicate that some non biodegradable wastes can used as an alternative of aggregate that may pave the way for the disposal of hazardous waste. Being amorphous, crystalline and containing relatively large quantities of silicon and calcium, glass is, in theory, pozzolanic or even cementitious in nature when it is finely ground. Also the Disaccharide admixture when makes it's contribution with the concrete mix, it enhance the properties of the concrete after hardening, leading to a heavy strengthen concrete with the mixture of ballast. The findings of those mix proportions and the strength details on PCC and RCC specimens were investigated.

CONSTRUCTION SAFETY SCHEDULING AT JOB SITES USING BIM

Sharinika R ^[1]; Sree Vidhya C ^[2],

^[1] PG Scholar, ^[2] Assistant Professor,

M.E., Construction Engineering and Management,

Arunachala College of Engineering for Women, Manavilai.

Abstract

A key factor in safety planning and management is to properly identify any possible hazards before they occur. A building information modelling allows constructors to visually assess jobsite conditions and recognize hazards. It provides them sufficient time to develop adequate hazard mitigation plans well before the start of the construction activities. Currently few researchers have explored the feasibility of BIM for construction safety planning and management. However, most of these studies were either conceptual in nature or based on hypothetical simplified building models. This paper reports an in progress research project where BIM technology is utilized to perform safety planning and management for an construction project located at the campus of Auburn University. BIM models and 4D simulations are used to communicate the following safety plans: (1) Crane management; (2) Excavation risk management; (3) Fall protection for leading edges; (4) Fall protection for roofers; and an (5) Emergency response plan. 4D phasing simulations, 3D walk-throughs and 3D renderings are utilized to identify various hazards and communicate safety management plans to the workers at the jobsite. The paper highlights key research tasks and main findings, and depicts plans for the remaining part of this project.

**ANALYSIS OF COST OVERRUN AND TIME DELAY IN
CONSTRUCTION PROJECT USING MS PROJECT AND SPSS
SOFTWARE**

Gokhula Brindha.R^[1],

*^[1]PG student, M.E., Construction Engineering and Management,
Arunachala College of Engineering for Women, Manavilai.*

Abstract

Cost overrun and delay in projects is a foremost challenge associated with nearly all projects in the construction industry involves incurred costs and late delivery of projects. The aim of this project is to explore the extent of cost overrun and time delays in buildings across the construction industry. Various data analysis were employed to investigate the critical causes of cost overrun and delays in construction projects. A successful project means that the project is completed on time, within the agreed budget and according to the contract specifications. Scheduling is very important in construction industry for reducing and controlling the delay of the project. Data were collected through questionnaire administration on professionals in the industry. These factors are related with owner, contractor, consultant, and management, material, equipment, labor and external. A significant effort was spent in collecting data on cost overruns and delays in construction projects. In this the collected data has analyzed using MS Project and the priority of the delay has predict using SPSS software on ranking basis. The finding of the paper will help the project manager to act on critical causes and further try to reduce cost overrun and time delay of project.

RISK ANALYSIS OF TIME MANAGEMENT USING BIM

Farzana M^[1],

*^[1]PG student, M.E., Construction Engineering and Management,
Arunachala College of Engineering for Women, Manavilai.*

Abstract

Implementing Risk Analysis effectively in construction projects and organizations has long been recognised as key to ensuring successful project performance. Therefore, it has become increasingly vital for construction organizations to have Risk Analysis as an integral part of their project management practice. Such necessity has driven significant increase in research on Risk Management practice in the construction industry. Risks always exist in the construction industry but with the use of new construction methods, the collaboration becomes more complicated and the risks are also increased. Risk Management helps in limiting cost overruns, managing time and increasing the quality. This paper proposed a tool that allows visualizing different time and cost risks during the design and construction process by presenting a map of colors based on the impact of the risks related to different elements of the BIM model. The risks in the construction tasks for residential building are identified and analysed using Failure Mode Effect Analysis in MS Excel where each risk will receive a risk colour and it is categorized based on their importance. The risk colours are then transferred to 3D and 4D model. The 3D BIM tool used here is REVIT and 4D model is created by NAVISWORKS. This helps in better visualization and helps to identify risks in a clear and efficient way

**CORE CAPABILITIES FOR ACHIEVING SUSTAINABLE
CONSTRUCTION PROJECT MANAGEMENT**

Annie. K. R^[1],

*^[1]PG student, M.E., Construction Engineering and Management,
Arunachala College of Engineering for Women, Manavilai.*

Abstract

Sustainability in construction is become a key factor for the successful completion of construction projects. The aim of the project to determine the various factors affecting sustainability and the techniques used to makes the building sustainable and also determine the importance of sustainability in present building construction industry by using SPSS software. The statistical package for social sciences (SPSS) gives fast and reliable answers, effective data management and it was used to analyze the data collected from the questionnaire survey. For the collection of the data are to be synthesized, and a proper conclusion is done after encompasses throughout the information. In this phase the various literature synthesis are to be done and the importance of sustainability in construction management project is to be analyzed and also collect the various details using the statistical package for the social sciences(SPSS) software However, sustainable construction does not only refer the design of the building, but also in each phase of the construction, use, maintenance and deconstruction. Sustainability influence the each phase of construction project can be analyzed by a questionnaire survey using SPSS software. It encompasses the each phase of the construction and ensure the sustainability of the construction project management. A project requires the concept of sustainability for its successful completion. It described as the endeavor to ensure the achievement of economic growth without unreasonably exploit construction.

**EXPERIMENTAL INVESTIGATION ON CHARACTERISTICS AND
PROPERTIES OF CONCRETE BY ADDING COCONUT SHELL WITH
SILICA FUME, FLY ASH AND SUPER PLASTICISER IN CONCRETE
SLAB**

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Abstract

Coconut shell (CS) is an agricultural waste originating from oil industry. In developing countries where abundant agricultural and industrial wastes are discharged, these wastes can be used as potential material in construction industry. The objective of this project is to study the possibility use of crushed coconut shell as coarse aggregate in reinforced lightweight coconut shell concrete slab. The coarse aggregate is fully replaced with crushed coconut shell aggregate. In this regard physical properties of cement, sand and coconut shell aggregate like specific gravity, sieve analysis, bulk density, bulking of sand, water absorption, moisture content test, finess of cement, cement consistency, initial and final setting time of cement were tested. The mineral admixtures such as 10% silicafume and 10% flyash are used as cement replacement material. Mechanical properties like aggregate impact value and abrasion value of coconut shell aggregate were carried out. Lightweight coconut shell aggregate has different texture, size and properties than normal aggregate. The coconut shell aggregate passed through 12.5 mm sieve and retained on 4.75mm sieve were used for this study. The mechanical properties of lightweight coconut shell concrete with 10% silica fume and 10% of fly ash such as compressive strength and split tensile strength at 28 days has to be tested. To study the shrinkage characteristics and deflection characters of coconut shell concrete slab 7 numbers of 500 x 800 x 40 mm one way slab were casted and tested, and the results are compared with conventional concrete slab. The effect of mineral admixtures on coconut shell concrete slab is tested.

**EXPERIMENTAL STUDY ON FLEXURAL BEHAVIOUR OF
CONCRETE WITH WASTE CERAMIC TILES AND CALCINED CLAY
AND SIKA VISCOCRETE**

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Abstract

The main aim of this project is to test the flexural behaviour of concrete. To study the effect and use of optimum replacement of cement and coarse aggregate by waste ceramic tiles and silica fume and sika viscocrete. Compare the flexural and tensile strength between without the use of ceramic tiles and calcined clay and with ceramic tiles and calcined clay. M50 concrete and Fe415 steel are used in this research. The materials should be replaced by 0%, 5%, and 10%. Ceramic tiles are passed through 4.75mm sieve to use as partial replacement. This will reduce the construction cost and this will maintain the properties of concrete. Test and analysis of concrete by optimum replacement of cement by calcined clay and coarse aggregate by waste ceramic tiles. This calcined clay will improve the stability of fresh mortar and concrete. By adding sika viscocrete as superplasticizer.

**CONSTRUCTION RESOURCE OPTIMIZATION USING LINEAR
PROGRAMMING AND WITH SYSTEM APPROACH**

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Abstract

Resource optimization is an important factor of the construction project management in today's economy. Cost and time factors purely depends on the how the resources are effectively used in the construction project. When managing large projects, the project manager faces lots of difficulties in resource planning and allocation. To overcome these difficulties, this project demonstrates the use of linear programming method as applicable in the construction company. Many construction companies are still established to derive financial profit. In this regard the main aim of such establishment is to maximize the profit. This paper focuses on applying linear programming techniques and Primavera P6 software to maximize profit from construction resource management. Also it will find out the scope for resource management in construction industry in future.

**EXPERIMENTAL INVESTIGATION ON GRAPHITE REINFORCED
CONCRETE BEAM WITH KENAF FIBER AND ALUMINIUM
POWDER**

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Abstract

This project describes the experimental method that can be used to determine the deflection, load carrying capacity and stress in graphite reinforced beam with kenaf fiber. Kenaf fiber has light weight and could help ease the construction of the building. The modulus ratio of normal reinforcement concrete is 20. It is demonstrated that standard transformed section modulus fails to provide accurate result when the elastic modulus ratio exceeds 20. So, an alternate approach is formulated by using graphite reinforced beam with kenaf fiber. The graphite coating on reinforcement protects the reinforcement from corrosion. This coating increases the service without affecting physical properties. Aluminium Powder is added in the percentage of 1.5% and 2.5% are adding as an admixture. Tensile tests are conducted on the sample to verify this approach and this experimental investigation which is carried out to characterize the load carrying capacity, stresses and deflection of the beams.

BRIDGE CRACK DETECTION USING MULTI SVM CLASSIFIER

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Abstract

Traditional bridge crack detection methods are of high cost and high risk. Crack detection in concrete structures is an important task in the inspection of buildings to ensure their safety and serviceability. Previous studies relating to crack detection via image-processing and machine learning techniques generally involve the complex modelling of cracks and the extraction of hand crafted crack features. This approach often fails to apply to images from a real environment. In this project we propose a new image-based crack detection system using a combined model of classifiers, namely a Support Vector Machine (SVM), which was proven to perform better than the methods involving the handcrafted features. In the proposed technique we propose a method, which takes the advantage of a machine learning (ML)-based algorithm, namely, support vector machine (SVM), in order to produce the results more efficiently. An SVM classifier is used to enhance classification ability. This extracts features and determines whether or not an image patch belongs to a crack class. Compared with existing bridge crack detection methods, the proposed method showed better accuracy. With the obtained accurate output using multi SVM classifier, the type of crack was determined and effective preventive technique was given based upon its retrieved properties of crack such as length, width, depths and orientation. This project is implemented using MATLAB Software.

**RESOURCE CONSTRAINTS AND CONCEPTUAL COST MODELING
IN CONSTRUCTION PROJECT**

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Abstract

The main objective of this paper is to develop a systematic neural network model to estimate the conceptual cost and resource constraints of a construction projects. A wide range of influencing factors on micro and macro level has been considered. The proposed engineering approach is pragmatic to model resource and material cost incurred in different stages of construction using the Artificial Neural Network (ANN) technique. The results will indicate an acceptable convergence with reasonable generalization capabilities and the results obtained from the neural network model will be more accurate and credible. This study contributes to the construction professionals by providing insight for using different ANN activation and transfer functions along with a wide range of influencing factors to benchmark the project manager's conceptual cost predicting capabilities. Moreover, the systematic engineering approach guides the project managers how a readily available practical database can help optimize several objectives. In this artificial neural network there will be 3 layers input layer, hidden and output layer. In input layer there will be 2 datas test data and trained data. According to the client desire the data can be analysed from the trained data using artificial neural network. If the client desired project idea is not in the trained data then new project design with the client specification has to implement.

TRAFFIC LOAD ANALYSIS USING MONTE CARLO SIMULATION

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Abstract

In developing country like India, transportation play a vital role in its development since there is a need to analyse traffic volume and develop alternative to minimize its intensity. In this project, traffic flow in Nagercoil town is analysed and suggestion of fly over throughout the respective town and connecting that with the proposed four lane network. Thus, this project will be helpful in making decisions for the improvement of road transport in achieving its standard equal to a metropolitan city. Monte Carlo simulation is a technique used to simulate the random sampling to obtain numerical results considering the future flaws. When the traffic size increases to infinity this method helps in improving the distribution of traffic so that the statistical interaction between the vehicles vanishes. In this project, probability distribution function, in particular, psi square distribution function is used to determine future traffic for short period in research area. Due to urbanization, the life standard of people increase which mainly contributes the use of motor vehicles. Thus the traffic in town increases along with these the proposal of smart city also contributes a greater percentage increase of traffic in the upcoming years. This project enables the use of various prediction techniques including the fluctuations and helps in making decision to the improvement of highways considering various constraints in its applicability. This also ensures the use of proposed four lane network with the new alternative for its effectiveness. Use of sensors or video cameras minimizes the human errors in data collection by manual method. This act as an advancement of similar research done in Bangladesh and also as an evidence for the need for construction of Flyover Bridge in considering the welfare of future generation.

**OPTIMIZATION OF RESOURCES USING PRIMAVERA AND ERP
SOFTWARE IN CONSTRUCTION INDUSTRY**

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Abstract

Resources play vital role in construction project. Planning, scheduling and cost analysis are important process in construction industry. Due to increase in workload and shrinking resources the construction work department found new technology which help to manage the project easily. With the help of Primavera P6 software proper planning and scheduling can be done and ERP software comes into use in cost estimate. Primavera and ERP software is effective planning software which should be applied us the project to get quality work within The constraints of money , resources and time These software will help in resource management process of the project and avoids cost time over run . By using software techniques applying resource dependency, rescheduling of the project by crashing and fast tracking of critical activities overcome the delay duration. It is the best solution for them as it would result in optimization of resources, savings of time, money and energy

**EFFECTIVE COST MANAGEMENT IN CONSTRUCTION INDUSTRY
BY USING PRIMAVERA AND APPLICATION OF RESOURCE
OPTIMIZATION BY MICROSOFT PROJECT**

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Abstract

Delay and cost overrun are inherent part of most projects despite the much acquired knowledge in project management. Effective cost and time management plays an important role to achieve the success of project in the construction industry. Effective cost management is highlighted here by using the Primavera, whereas the resource optimization is carried out by the Microsoft Project. In this study G+5 project is considered. Cost management and the Resource allocation will be carried out for the further execution of the project. One of the important problem is cost overrun. Cost overrun is referred as a budget overrun of the project. Cost management was calculated by earned value method using the Primavera software. EVM method incorporates the project possibility and budget to promote the project management to measure the project performance from beginning to the end of the project. However resource allocation was also the major problem which occurred in the construction project. Therefore we need to allocate them carefully to obtain the desired results. So here MS Project software is preferred to do the work by utilizing the the success of project in the construction industry. Effective cost management is planned resources of manpower, materials, machinery, money and time. In large scale projects preparing an accurate and workable plan is very difficult. Resources are required to carry out specific task in a project, but the availability of resources within a given firm is always limited. This project shows how the project manager could resolve such conflicts in resource balancing. And finally it shows which software is efficient while comparing the effective cost estimation by both the software's using EVM method.

IMPROVING CONSTRUCTION MANAGEMENT SCHEDULING OF BRIDGES USING EVM TECHNIQUE

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Abstract

Earned Value Management (EVM) is a technique of performance measurement focused on project physical, financial and time progress, indicating planned and actual performance, variations of them and forecasts on final project duration and cost. It takes a step further traditional measurement tools like PERT/Cost and C/SCSC. One of the most important functions of project management is the monitoring and control of the project process. To perform it, Earned Value Management (EVM) in project management is a well-known management system to be applicable. This analysis is a very significant technique to measure and control the performance and progress of a project and is used in various sectors. It allows the calculation of cost and timing variances and performance indicates and predicts project cost and project duration estimation. In addition, the usage of the correlation between the schedule performance index and cost performance index and the meaning of indices such as budgeted cost of work scheduled, budget cost of work performed, and the actual cost of work performed is illustrated in detail to analyse the performance of EVM application in the project management. Thereby, in this study, some of the work items of a sample project using Microsoft Office Excel were evaluated according to the Earned Value Analysis and the result implies that the analysis helped the project perform better through the cost and schedule indices.

**ANALYSIS OF CASH FLOW IN CONSTRUCTION PROJECT
MANAGEMENT AND ITS CONTROL THROUGH BIM AND
RESOURCE INTEGRATED SIMULATION**

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Abstract

Cash flow analysis is a major part of construction project management to improve project success metrics. The building information models (BIM), construction schedules, and financial parameters to generate cash flow for more accurate project cash flow, but evaluating detailed project alternatives that improve project cash flow while satisfying project constraints and considering scenarios for project financials is difficult. Because financial inflows and outflows are generated using standard cash flow characteristics with a contractual focus, cash flow alternatives can be easily obtained by changing payment terms, activity sequences, and resource allocations. In this thesis GSimX, a BIM and resource-integrated 3D simulation platform are used to establish a structured way to analyzing project cash flows. It also includes an Excel-based prototype for project cash flow generation that can be verified and compared to the simulation platform. The thesis also explains how to evaluate and control generated cash flow alternatives in order to improve financial decisionmaking and minimize financial hurdles during project execution.

THREE REALMS OF WAREHOUSE USING BIM SOFTWARE

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Abstract

Tekla structural software is a tool for structural engineering in detailing, modeling, and reporting. It integrated model- based 3D solution for warehouse structures. It can be automatically produce drawing and reports from the 3D model at any time. Improvements of drawing creation , steel cost – set up, underlying designing plan and cooperation. The stability of structures can largely be analysed through construction and design. The manufacturing of steel and precast steel structures can be done easily. After studying many journals building information models (BIM) you can rise above the competition with smooth workflows, precise planning and clear communication. Constructible data gives all the information. Produce error free estimates, execute your construction project effectively and ensure profitability. Constructible detailing empowers project teams to rise above errors, conflicts and miscommunication. In this thesis TEKLA Tedds a BIM to reduce the manual steps and eliminate errors with accurate production data that drives workshop. Streamline your work by interfacing with leading software for analysis and design, fabrication management and more best results.

**OPTIMAL PLANNING, SCHEDULING AND TRACKING OF A
CONSTRUCTION BUILDING USING MS PROJECT AND CLICK-UP
SOFTWARE**

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Abstract

Planning and tracking of development projects has turned into a significant piece of any venture for the ideal and efficient achievement of the task. A decent development plan is the reason for fostering the financial plan and the timetable for work. It is additionally important to settle on authoritative choices of the connections between project members and even which associations to remember for a task. Projects with better planning, sufficient flow of resources and adequate machines cannot achieve good results on its own. There has to be some alerting mechanism, which can alarm the association about its success and failures, on and off. This paper will provide how to do planning and scheduling for a building with Microsoft project software by observing the site conditions, labour productivity and available resources with paper utilization of time and resources. Tracking of this scheduled work is completely carried out by click-up software. Click-up is a cloud-based collaboration and project management tool suitable for businesses of all sizes and industries.

**DETECTION OF CLASHES IN 3D BIM MODEL USING SOLIBRI
MODEL CHECKER SOFTWARE**

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Abstract

Clash detection is one of the important concepts in construction industry. Clashes are major drawback in the construction phase of the project. It causes change orders, cost overruns and timeline extensions. The main objective of this study is to conduct clash detection on 3D building model created on Revit Architecture using Solibri Model Checker software so as to detect the clashes in design stage itself. BIM based soft wares like Revit architecture and Solibri model checker have a major role in construction industry. They are essential for coordination among various stakeholders involved in a construction project. The methodology of this study involves creating a BIM 3D model of a school building using Revit architecture and then importing that into solibri model checker software to detect any clashes that has been occurred during the design phase. This will help in preventing future reworks and also reduce the cost considerably. The result of this study showed that there are various hard and soft clashes detected among the structural and architectural elements of the building model. It also emphasized the potential use of BIM software like Revit and solibri model checker in clash detection process of a project.

APPLICATION OF VIRTUAL SIMULATION TECHNIQUES IN CONSTRUCTION MANAGEMENT

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Abstract

The construction industry is huge and it involves a large number of activities. Various traditional techniques for scheduling and controlling are still being used in the construction industry which fail to provide the spatial (layouts, drawings) and non-spatial (specification, cost estimates etc.) aspects of information in a construction project. In particular civil engineering facilities such as large construction projects over 50% were reported to have been delayed over two years by frequent design changes.

These problems are originated from the dynamic and uncertain characteristics of construction projects are complex and require a thorough construction planning, because construction management often find it difficult to have the construction process under full control. For the purpose of comprehensive construction planning Virtual Simulation Process (3D) modeling can be utilized. Through the Virtual Simulation process modeling to solutions for potential problems.

Virtual Simulation Techniques offers digital construction solution to support construction management activities these are three dimensional (3D) model design validation, planning and schedule integration, human solutions also perform by virtual simulation techniques these are cost analysis, progress monitoring, effective communication, time mitigation and overall effective supervision of construction projects. Create more powerful visualizations that give stakeholders an opportunity to better envisage the project before it is built. Virtual Simulation techniques provides significant efficiencies during project planning and the critical tools to project managers, administrators, owners, coordinators, site engineer, client and general contractors to plan and coordinate construction activities thereby minimizing delays and rework.

The Integrated Virtual simulation in construction Management system would help all the parties involved in the construction project (for decision making) as they would be able to see all the spatial aspects of project in one system.

**QUALITY MANAGEMENT IN HIGH-RISE BUILDINGS AND
ANALYSIS USING SPSS SOFTWARE**

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Abstract

The purpose of the project is to meet the quality standards and customer satisfaction. Construction industry plays an important role in the development of any country. The development of construction industry depends on the quality of construction projects. Quality is one of the critical factors in the success of construction projects. Improvement in the quality of construction projects is linked with quality management in the project life cycle. Although quality management at every stage of project life cycle is important but the quality management at the execution (construction) stage contributes significantly on final quality outcome of construction projects. This project mainly focuses the importance and factors that affects the quality management in the execution (construction) phase. The project also includes visiting of some construction companies and conducts the questionnaire survey and Data's are collected from the respondents and by using SPSS Software the collected data's are analyzed. Then analyze the difficulties (major factors) and the cost variance due to quality defect in quality management and suggests some proactive measures for the improvement of quality in the execution phase of construction projects.

**RISK ANALYSIS OF CONSTRUCTION PROJECT SCHEDULING
USING MONTE-CARLO SIMULATION**

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Abstract

Construction Industry is one of the booming industries of today that has a great impact on the economy of any nation. Large and complex construction project always confront with risk, thus risk should be considered in determining construction project duration. Large construction projects if delayed can cause increase overall cost of the project. Hence risks and uncertainties must be considered for overall duration of the project. To organize and complete the projects in a timely, quality and financially responsible manner, it is need to schedule projects carefully. Effective project scheduling plays a crucial role in ensuring project success. This study focuses on risk identification, qualitative analysis and quantitative analysis. The objectives are to identify the key risk factors that affect the project schedule, and to determine the probability of completing the project within due date. Qualitative analysis is done by probability impact (PI) matrix and quantitative analysis is done by PERT and Monte Carlo simulation. A schedule risk analysis is performed using Monte Carlo simulation with crystal ball software.

**ASSESSING PLANNING AND SCHEDULING SOFTWARE FOR
MIDSIZ CONSTRUCTION FIRM**

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Abstract

Planning and scheduling is very important in construction project. Proper planning, scheduling and tracking are the major parameter in construction industry. The systematic flow of work is adopted by using Critical Path Method and Programme Evaluation and Review Technique. Without proper controlling and scheduling will cause cost overrun and consequently increases project duration. In order to minimize the complexity in manual calculation Project Management Software can be preferred. Oracle Primavera P6 is one of the best software in construction management. Planning and Scheduling are very essential in the large infrastructure projects like road and bridge construction. These projects have numerous stakeholders and large amount of money, resources are invested. Improper planning and scheduling leads to loss of resources, increase in project cost and unpleasant delays. But with computer and software evolution, it is now possible to plan these projects using software like Primavera P6 and Microsoft office project. This paper deals with presentation of AwasYojna project in New Market Bhopal comparing the two different blocks namely Block A and Block B. The project framed stated the advantage and added benefits of web based primavera P6 for planning and scheduling of structures under construction under the government scheme of “AwasYojna” framing the issues and complications faced in the time frame of construction and availability of resources.

**ANALYSING THE USE OF MOBILE APPLICATIONS IN
CONSTRUCTION INDUSTRY**

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Abstract

Integration of mobile technology like a smartphone with mobile apps can assist the real working environment, for example provide the mobile inspection, real-time environmental data streamlining and problem-solving within time-frame which enhance the mobility in the jobsite operation. Most of the construction professionals are aware that the existence of construction apps but the usage of construction apps is almost silent. Therefore, there is exist incomplete picture about the usage level of construction-related mobile apps in construction industry. Hence, this project aims to determine the current level of usage as well as the factors affecting the usage of construction apps among the main contractors and the changes happening due to the usage and not usage of these mobile applications in the construction industry. Based on the findings, the usage level in terms of utilization was low, however in terms of frequency was at medium level. The factors affect the usage of construction-related mobile apps among the main contractors in the construction industry are convenience, internet connectivity as well as app rating and review. In nutshell, the construction companies, government and app developers had obtained a complete picture and overview of the existing issues regarding the usage level as well as the factors affecting the usage of the construction apps. Thus, the improvement and proper actions should be carried out for sustainable development of the Information and Communication Technology in the construction industry.

**STRENGTH BEHAVIOUR OF GLASS FIBER REINFORCED FERRO
CEMENT CONCRETE SLABS WITH VARYING DEPTH AND WIRE
MESH LAYERS**

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Abstract

This project describes the ferrocement panels reinforced with of different types of meshes. The main objective of the study was to investigate the effect of different types of meshes as reinforcement in thin mortar specimen and select the best suitable mesh for further work. Ferrocement composites were widely used in the structures for strengthening of concrete. Thus ferrocement was an ideal material for repairing and strengthening of old or new structures. The flat ferrocement panels are reinforced with different numbers of wire mesh layers. The use of wire mesh layers has the ability to arrest the cracking in structure. The main objective is to study the effect of using number of mesh layers on the flexural strength of flat ferrocement panels and to compare the effect of varying the number of mesh layers and use of polypropylene fibre on the ultimate strength of ferrocement slab panels. Types of meshes were used expanded metal mesh, galvanized woven mesh and welded mesh has a diameter of 1.58 mm. Size of openings are 20x35 mm, 10x10 mm and 15x15 mm. Panels of a size of 560x150x35 mm were reinforced with three layers of wire mesh. Panels were casted with mortar of mix proportion 1:2 and water cement ratio 0.40. The four specimen were tested under four point loading system on universal testing machine after curing period of 7 days and eight specimen after curing period of 28 days. the flexural strength of the specimen with welded mesh exhibits greater flexural strength than other two types of meshes.

**EXPERIMENTAL INVESTIGATION OF PAPERCRETE WITH
PARTIAL REPLACEMENT OF CEMENT BY GGBS**

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Abstract

Concrete is the most widely used construction material in civil engineering because of its high structural strength and stability. The concrete industry is looking for partial replacement of cementitious material or industrial by product with an objective of reducing the level of carbon dioxide. Ground granulated blast furnace slag (GGBS) is the solid waste generated by industry are used as a partial replacement of cement. On the other hand the majority of abandoned paper waste is accumulated from the countries all over the world causes serious environmental effects. Waste paper pulp are used as good binder for the concrete. Our project is aimed to use the waste paper and GGBS in production of environmentally sustainable and cost effective concrete. Waste paper is made into pulp and used as an effective binder. The cement has been partially replaced by GGBS in the range of 20%, 30% and 40% by the weight of cement for M25 grade mix. The paper pulp was added by 10%, 20% and 30% into the concrete. Different trial mixes were produced. Then the results are compared with those of conventional concrete. All physical and mechanical properties are found. The strength and solidness of concrete composites containing waste paper, GGBS have been concentrated exhaustively. The mixture proportion, the durability, the basic physical and chemical properties and the structural performance of papercrete are mainly investigated.

Keywords: Papercrete, Binder, Waste paper, GGBS, Compressive strength.

**REPLACEMENT OF FINE AGGREGATES BY WASTE GLASS AND
COARSE AGGREGATES BY WASTE PLASTIC**

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Abstract

Solid waste management is one of the major environment concerns in the world. Replacement of aggregate in concrete at different percentages has been done in the past. There is possibility of partial replacement of fine aggregate and coarse aggregate by waste glass and waste plastic (HDPE) respectively. This will help in producing light weight concrete as well as will be effective in utilizing waste products. Different tests will be conducted to find out appropriate replacement percentage of waste glass and plastic to maintain the strength of concrete. As pozzolanic activity increase strength in concrete due to glass replacement and plastic helps in producing light weight concrete.

Keywords: concrete; waste glass; plastic; strength; light weight concrete

DESIGN AND ANALYSIS OF SKEW BRIDGE

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Abstract

Bridges are very special type of structures. They are characterized by their simplicity in geometry and loading conditions. The reinforced concrete bridges usually carried uniformly distributed dead load, vehicular live load to its surface and transfers same to the support by flexure, shear and torsion. Newly designed bridges are often skew. This is due to space constraints in congested urban areas. It can be also needed due to geographical constraints such as mountainous terrains. However, force flow in skew bridges is much more complicated than straight bridges. Therefore, careful investigation and numerical analysis needs to be performed, in which a skew bridge can be modeled in several ways. Skewed slab bridges were modeled using finite-element methods using skew bridge computer software to study their behavior under uniform and moving loads with to determine the most appropriate force response for design.

Keywords: Structures, Reinforced concrete, Bridges, Skew bridges, Finite-element methods

**DESIGN AND ANALYSIS OF PRE ENGINEERED BUILDING USING
STAAD PRO**

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Abstract

Pre Engineered Buildings (PEBs) are the building components that are manufactured at a factory and assembled on site. Usually, PEBs are steel structures and can be an alternative to conventional structural steel buildings. PEB structural components are fabricated at the factory to the exact size, transported to the site, and assembled at the site, usually with bolted connections. The objective of current research is to structurally investigate the Pre Engineered Buildings (PEB) using Staad pro software. The seismic load analysis is to be conducted using IS 875 code.

Keywords : PEB , steel structure , stability

**DESIGN OF CONCRETE LINING FOR HEAD RACE TUNNEL USING
STAAD PRO**

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Abstract

Tunnels are enclosed underground passage way except for entrance and exit, dug through the surrounding rock/soil/earth. So, head race tunnel is under ground excavated tunnel used to carry water to the powerhouse from the reservoir. Lining of the tunnel is done to minimize the headloss, limit the seepage flow in addition to increase the stability of tunnel and avoiding rock particles to enter the turbine and prevent it from damage. Therefore, its careful design is important.

Keywords-Head Race Tunnel, Concrete Lining, Induced tensile stress, Induced compressive stress, maximum permissible tensile stress, maximum permissible compressive stress, radial and tangential spring stiffness's.

**EXPERIMENTAL INVESTIGATION ON PERVIOUS PLASTIC
CONCRETE MODERN ROAD PANEL**

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Abstract

Pervious concrete is a special type of concrete with high porosity. It is used for concrete flatworks applications that allow the water to pass through it, thereby reducing the runoff from a site and allow in ground water recharge. The high porosity is attained by a highly inter connected void content. Typically pervious concrete has water to cementations material ratio of 0.28 to 0.4. The mixture is composed of cementations materials, coarse aggregates and water with little or no fine aggregate. Addition of a small amount of fine aggregates will generally reduce the void content and increase the strength. The present report deals with the study and comparison of mechanical properties, workability density and permeability of different grades of pervious concrete (M-20,M-25)

Keywords: Pervious Concrete, Fine Aggregate, Workability, Grades M20 M25.

**ANALYTICAL INVESTIGATION ON SEISMIC LOAD RESISTING
SYSTEM**

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Abstract

In this paper, study has carried to know the importance of seismic load resisting system in multistorey buildings and various types of seismic load resisting system with their mode of failure in structures, also to know the problems occurs in analysis, design and execution of structure by viewing literatures.

These literatures helps to solve the problems, software used and code provision for design. The detailed study on the seismic load resisting system to solve the failure of shear wall in multistorey building in future analysis and design.

Keywords: Seismic load resisting system, Analytical investigation.

**EXPERIMENTAL INVESTIGATION ON ENGINEERED
CEMENTITIOUS COMPOSITE**

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Abstract

New trend in fiber reinforced concrete which has an improved strain hardening capacity is called engineered cementitious composite (ECC). Research determined that Polyvinyl Alcohol ECC with low volume fraction of fiber has tensile strain capability of concerning 3-5% in direct tension, 300 times more durability than normal deformability than the normal concrete which makes concrete bendable. A flexible concrete is strengthened with micromechanically designed chemical compound fibers. The results of Flexural strength of assorted ECC combine with completely different proportion of fibers area unit compare with standard Concrete style in step with Indian customary. The Poly Vinyl Alcohol Fiber is employed therefore on scale back the cement content and to reinforce flexibility. It has high ratio, high ultimate tensile strength, relatively high modulus of elasticity, good chemical compatibility with Portland cement, good affinity with water and no health risks. To increase the workability of concrete super plasticizer is used. The compressive strength and flexural strength of cubes and slabs (two totally different thicknesses) is decided and conjointly the flexibleness characteristics of the concrete square measure checked throughout flexural strength check.

Key words : ECC,PVA,

**ANALYTICAL AND EXPERIMENTAL INVESTIGATION OF RCC
TRANSMISSION LINE USING GEOSYNTHETIC REINFORCEMENT**

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Abstract

Power transmission is generally carried out through electric cables supported by transmission pole (utility pole) of various materials and cross sections. However, their utilization depends on climatic conditions and external loads acting on them. These loads include various stresses in the pole bending, shear, crushing etc., These loads are majorly resisted by the reinforcement in the utility pole. The objective of the project is in reinforcements synergistic improvement of a total system strength created by the introduction of geogrid into disjointed or separate material. In this project geogrid will be used as the lateral reinforcement (ties) of the utility pole. The properties of geogrid and the behaviour of M40 grade self- compacting concrete is studied in this project.

Keywords: Power transmission, Reinforcement, Geogrid

**EXPERIMENTAL INVESTIGATION OF STEEL FIBRE REINFORCED
CONCRETE SLAB WITH PARTIAL REPLACEMENT OF RECYCLED
COARSE AGGREGATE**

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Abstract

Concrete is a composite material consisting of mortar and coarse aggregate. A structure consists of many elements made of concrete. The main elements of the structure are beams, columns and slabs. An existing problem of RC slab is formation of cracks. In this study steel fibres are added in concrete to control the crack formation and development in RC slabs. From various previous literatures it was found that 1% of steel fibre added to volume of concrete provides more efficient results than others. Therefore 1% added steel fibre reinforced concrete is taken into study. In addition to that to overcome the scarcity of conventional coarse aggregate now-a-days usage of Re-Cycled Aggregate (RCA) is highly recommended. An efficient method is proposed by using RCA partial replacement of coarse aggregate to its weight with addition of one percentage of steel fibre to the volume of concrete. One-way slab of size 1350 x 500 x 100 mm is casted and tested, which is designed according to Indian standard codes. The behaviour of Steel Fibre Reinforced Concrete Slab are compared between control specimen and partial replaced re-cycled aggregate specimen and the test results are compared analytically using Finite Element Software ANSYS.

Keywords: Fibre Reinforced Concrete, FRP Rebars, Flyash, Recycled Aggregates, Crackpattern

**GREEN POROUS CONCRETE PAVER BLOCKS FOR RAIN WATER
HARVESTING AND URBAN PAVEMENTS**

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Abstract

Pervious concrete also called porous concrete, permeable concrete is a special type of concrete with a high porosity which allows water from precipitation and other sources to pass directly through, thereby reducing the runoff and allowing groundwater recharge. Pervious concrete is made using large aggregates with little to no fine aggregates. The concrete paste then coats the aggregates and allows water to pass through the gap between coarse aggregates. Pervious concrete is traditionally used in parking areas, areas with light traffic, residential streets, pedestrian walkways and greenhouse. It is an important application for sustainable construction and is one of many low impact development techniques used by builders to protect water quality. Pervious concrete pavement is a unique and effective means to meet growing environmental demands. It is instrumental in recharging groundwater and in reducing storm water runoff. Keywords: Super plasticizer, Low water cement ratio, No usage of fine aggregate

**MICRO AND MECHANICAL CHARACTERISTICS OF CONCRETE
INCORPORATING WITH CALCINED KAOLIN AND USED
FOUNDRY SAND**

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Abstract

The possibility of substituting cement and natural fine aggregate with industrial by-products such as Calcined Kaolin (CK) and Used Foundry Sand (UFS) offers technical, economic and environmental advantages which are of great importance in the present context of sustainability in the construction sector. Cement was replaced with three percentages (10%, 20%, 30%) of CK weight, and fine aggregates were replaced with 30% UFS. Tests were conducted for Compressive Strength at the ages of 07, 28, 56 and 90 days, Flexural Strength, Modulus of Elasticity, Splitting Tensile Strength, Rebound. Hammer at the ages of 28 and 90 days, Scanning Electron Microscope at the age of 28 days. Test results revealed that the strength properties of the concrete mixture containing CK and UFS up to 20% and 30% respectively were relatively close to the strength of control mix. From the test results obtained it was concluded that a substitution rate up to 20% of CK and 30% of UFS can be effectively used in good concrete production without affecting concrete standards. The inclusion of CK and UFS as cement and fine aggregate, respectively does not affect the strength properties negatively as the strength remains within limits.

Keywords: Calcined Kaolin, Used Foundry Sand, UFS

**EXPERIMENTAL INVESTIGATION OF COPPER SLAG
REINFORCED CONCRETE WITH PARTIAL REPLACEMENT OF
FINE AGGREGATE**

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Abstract

Worldwide the average consumption of sand for construction increases 40 billion tones annually as sand is used as a conventional construction material. The large scale of extraction lead to cause impact in marine and biodiversity, so there is an immediate attention to be taken in construction industry to find an alternative construction material. The main objective of this investigation is to compare the strength parameter and behavior of fresh and hardened concrete with conventional concrete and copper slag incorporated concrete in various percentages as replacement of fine aggregate. Approximately 24.6 million tones of copper slag generated at every year of copper production in worldwide. The strength characteristics of copper slag incorporated concrete was found out by replacement of 20%, 40%, 60%, 80% and 100 %, out of this 40% replacement gives highest compression strength at 28 days, more than 37.55 % higher in Compression Strength and 5.3% higher in Split Tensile Strength and 40.72% in Flexural Strength compare to conventional mix.

Keywords: Sand, Construction Material, Copper slag

**EXPERIMENTAL INVESTIGATION OF PARTIAL REPLACEMENT
OF GROUND GRANULATED BLAST FURNACE SLAG IN SELF
COMPACTING CONCRETE**

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Abstract

This project involves experimental study on flexural behaviour of self compacting concrete beams and cubes for the partial replacement of cement with ground granulated blast furnace slag. Ground granulated blast furnace slag (GGBS), due to its pozzolanic nature, could be a great asset for the modern construction needs, because slag concretes can be of high performance, if appropriately designed. SCC is concrete that can be placed and compacted under its own weight without any vibration effort, assuring complete filling of formwork even when access is hindered by narrow gaps between reinforcement bars. The percentages of replacements are 10% to 50%. The dimensions of cube and casted are $100 \times 100 \times 100\text{mm}$ and $150 \times 200 \times 1200\text{mm}$ respectively. GGBS with self compacting concrete of grade M30 were tested for 56 days along with the replacements. Six full size beams were tested under the ultimate load. Ultimate load carrying capacity of the beam (Without GGBS) is 11.5T. Ultimate load carrying capacity of the beams (With GGBS) are 12T, 12.5T, 14.5T, 11.5T, 11T for 10%, 20%, 30%, 40%, 50% respectively. This method is simpler, easier for implementation and less time - consuming, requires a smaller amount of binders and saves cost.

Key words : SCC -Self compacting concrete, GGBS - Ground Granulated Blast furnace Slag, Ultimate load Carrying Capacity of beam (UTM).

**DESIGN AND ANALYSIS OF RUBBERISED CONCRETE USING
WASTE VEHICLE TYRES PARTIAL REPLACEMENT OF COARSE
AGGREGATE TO INCREASE STRENGTH OF CONCRETE**

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Abstract

The use of recycled rubber as partial aggregate in concrete has great potential to positively affect the properties of concrete in a wide spectrum. Concrete is one of the most popular construction materials. Due to this fact, the construction industry is always trying to increase its uses and applications and improving its properties, while reducing cost. In general, concrete has low tensile strength, low ductility, and low energy absorption. Concrete also tends to shrink and crack during the hardening and curing process. These limitations are constantly being tested with hopes of improvement by the introduction of new admixtures and aggregates used in the mix. One such method may be the introduction of rubber to the concrete mix. It is a perfect way to modify the properties of concrete and recycle rubber tires flaps at the same time..

Keywords: Reducing cost , modify the properties of concrete ,recycle rubber tires flaps,Increased bonding strength.

GREEN BUILDING – CIRCULAR BUILDING

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Abstract

Over the past 20 years, a variety of fields have seen the emergence of a number of ecofriendly building concepts that are abstract. But each sort of green building material has become considerably far more costly when compared to what is currently on the market at the moment. As well as to being substantially a bit more costly than conventional materials for construction, making use of modern building materials does not significantly lower the total quantity of material required to complete construction. Circular building techniques must be adopted to deal with this concern

**AN INVESTIGATION OF HEAVY METALS IN AND AROUND THE
TUTICORIN INDUSTRIAL ZONE**

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Abstract

One of the most essential assets for the continued existence of people, plants, and other living things is ground water. It is a big issue that heavy metals have harmful adverse impacts on the environment and the health of society. One of the most significant environmental issues facing nations is the presence of heavy metals in water resources. This study examines the possibility of heavy metal contamination in the underground waters of Tuticorin's industrial zone. The majority of the area's sources of drinking water are made up of wet that are 10-15 metre beneath the surface in the majority of taken apart houses. The purpose of the research project is to evaluate the characteristics of potable water's heavy metals characteristics. When the groundwater sample results were compared to those from the WHO, it was discovered that the majority of the samples were very dangerous and contaminated with substances including Ar, Se, Pb, Al, Ze, Hg, etc. In 61.5% of the test region, the selenium level was more than 0.01 mg/l, while in 35% of the region; the arsenic level was 0.01 mg/l

**EXPERIMENTAL INVESTIGATION ON REINFORCEMENT
CONCRETE USING GGBS**

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Abstract

The ceramic industry is known to generate large amount of calcinated-clay wastes each year. So far a huge part is used in landfills. Reusing these wastes in concrete could be a win-win solution. It will lead to avoid the environmental problems related to land filled wastes. Concrete is most used material, which required large quantities of portlandcement production is the major generator of CO₂ which polluted the atmosphere. Hence it is inevitable to find an alternative material. Flyash is byproduct of coal obtained from the thermal power plant, which is an excellent alternative construction material to the existing plain cement concrete. Flyash shall be produced without using any amount of ordinary portlandcement. This study aims at reviewing the past research work on the use of ceramic waste aggregate as possible partial substitute for conventional coarse aggregate in flyash. The main objective of this paper is to experimentally investigate the strength and durability of the flyash concrete by partially replacing coarse aggregate using ceramic tile waste with alkaline activator. Through this research the optimum percentage of ceramic tile waste. The optimum ratio of alkaline activator, the strength & durability characteristics of flyash concrete by adding ceramic tile waste was experimentally investigated

**EXPERIMENTAL STUDY ON MECHANICAL PROPERTIES AND
CORROSION RESISTANCE OF BASALT REINFORCED CONCRETE**

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Abstract

Composite reinforcement is an interesting and attractive alternative to conventional steel reinforcement since it significantly increases the structural durability due to its high corrosion resistance. Basalt fibre is the material of choice. It is an inorganic fibre with extremely good elastic modulus, high strength, improved strain to failure, high temperature resistance and good chemical resistance. Flexural strength of basalt reinforced slabs and corrosion resistance behavior of basalt reinforcement is studied. Slabs were cast using basalt bars as reinforcement and the results were compared with conventional slabs. Basalt reinforced slabs have a mean 14% decrease in deformation. Accelerated corrosion test was conducted on both basalt and steel bars and it was found that basalt bars have non corrosive nature. Hence it can be recommended for marine conditions.

**EXPERIMENTAL STUDY ON CONCRETE BY ADDING
PHOSPHOGYPSUM AND HEMATITE ORE**

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Abstract

Concrete is the world's second most consumed Material after water and it's widespread use is the basis for urban development. It is estimated that 25 billion tonnes of concrete is manufactured every year. India being a developing country that is nearing the path of developed nation is the second largest consumer of aggregates in Asia after China and fifth largest consumer in the world. Most of the aggregate demand in India comes from the construction industries and rest from the transportation field which includes road construction.

In this thesis, concrete was prepared by replacing cement with different percentage of Phosphogypsum and fine aggregate is replaced by different percentage of hematite ore. The optimum of Phosphogypsum and optimum of hematite ore determined using experimental investigation, then flexure and shear behaviour of beams with optimum of both Hematite Ore and Phosphogypsum are determined. The study reveals that the replacement of cement and fine aggregate by Phosphogypsum and Hematite Ore improves the strength and performance of Concrete.

The Experimental investigation on compressive, tensile and flexural strength characteristics of partially cement and fine aggregate replaced with Phosphogypsum and Hematite Ore Concrete using 0%,2%,4%,6%,8% and 10%. The strength characteristics are studied by casting and testing specimens for 7 and 28 days. Cubes, cylinders and beams are cast for concrete. The study reveals that the replacement of cement and fine aggregate by Phosphogypsum and Hematite Ore improves the strength and performance of Concrete.

**SEISMIC FRAGILITY AND VULNERABILITY ASSESSMENT IF RCC
STRUCTURE RESTING ON SLOPING TERRAIN**

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Abstract

Building damage from recent earthquakes has highlighted the necessity of seismic evaluation, which is used to estimate the likelihood that a building would sustain damage. The study focuses on the investigation of RCC constructions' fragility when they are supported on sloping ground and subject to setbacks. Fragility curves are employed to explain the likelihood of exceeding a specific damage condition. In ETABS 2018, the structure is modelled. RCC buildings are analysed using a non-linear dynamic time history analysis approach. Each model is subjected to a time history analysis using ten ground motion indices with variable peak ground accelerations. Plotting fragility curves uses results from time history analysis. Each building has its own set of fragility curves that describe the various levels of deterioration. Plotting the fragility curves takes into account spectral displacement as an indicator of intensity. The inter-storey drift ratio percentages are used to evaluate each building's susceptibility to different ground vibrations. The results demonstrate that setback equipped buildings become more fragile than setback-free structures. The performance levels indicate that buildings with setbacks and resting on higher sloping terrain are more susceptible to earthquakes

**EXPERIMENTAL STUDY OF CONCRETE USING
CORRUGATED STEEL FIBRE**

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Abstract

Concrete is characterized by brittle failure thus nearly complete loss of loading capacity, once the failure is initiated. This characteristic, which limits the application of the material, can be overcome by the incorporation of steel fibre. Steel fibers in concrete are mostly used for resisting cracks and increase the strength of concrete moreover steel fibre also helps in enhancing toughness, ductility and damage tolerance. This performance enhancement makes steel fibre- reinforced concrete (SFRC) an ideal material as a sustainable building construction material. In this project, the effect of corrugated steel fibre on concrete is observed with partial incorporation of steel fibre as a percentage of the total volume of concrete. Strength tests are done on standard-sized specimen of cubes, cylinders and beams. Three age level 7days, 14 days and 28 days tests are done for compressive strength test, split tensile strength test and flexural strength test. The test parameter includes preparing mix of M25 grade of control mix as well as steel fibre reinforced concrete (SFRC) with steel fibre content of 0.25%, 0.5%, 0.75% (by volume of concrete) for each grade.

**RETROFITTING OF RC BEAM BY USING POLYPROPYLENE
SHEET**

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Abstract

This paper presents an experimental study on reinforced concrete beams retrofitted with polypropylene sheet using epoxy agent as a binding agent. retrofitting is done by wrapping the polypropylene sheet. Ten beams are casted in that four conventional beams and four beams are retrofitted partially than two beams are full retrofitted. Specimens are tested for 7,14,21,28 days, then the conventional and retrofitted beams results are compared in strength. From the result, it is concluded that retrofitting using epoxy binder increase the ultimate load. Therefore epoxy can be efficiently used as a binder in retrofitting of concrete members

**COMPARATIVE STUDY ON STRENGTH AND POROSITY OF
CONCRETE USING CHEMICAL ADMIXTURES AND POLYMERS**

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Abstract

Concrete is a widely used construction material due to its durability, versatility, and low cost. To improve the properties of concrete, various admixtures and polymers can be added to the mix. Chemical admixtures and polymers are two common types of concrete modifiers that can improve the strength, durability, and workability of concrete. Chemical admixtures are materials that are added to concrete during mixing to modify its properties. They can improve the workability, setting time, strength, durability, and other properties of concrete. Superplasticizers, water reducers, and air-entraining agents are examples of chemical admixtures that can enhance the performance of concrete. Polymers are materials composed of long chains of repeating units. They can be added to concrete as an admixture or applied as a coating to improve the properties of the concrete. Polymer-modified concrete has a higher tensile strength, improved durability, and better resistance to cracking and chemical attack. The main difference between chemical admixtures and polymers is their chemical composition and mode of action. Chemical admixtures work by modifying the physical and chemical properties of the concrete mix, while polymers physically reinforce the concrete matrix. Both chemical admixtures and polymers have their advantages and disadvantages. Chemical admixtures are cost-effective, easy to use, and can be added directly to the concrete mix. Polymers, on the other hand, require special equipment and application techniques and can be more expensive. However, polymers offer higher strength and durability than chemical admixtures and can be more effective in specific applications, such as repairing damaged concrete. In conclusion, both chemical admixtures and polymers can be used to improve the performance of concrete. The selection of the appropriate concrete modifier depends on the specific requirements of the project, including the desired strength, durability, and workability of the concrete.

**AN EXPERIMENTAL INVESTIGATION OF PARTIAL
REPLACEMENT OF CEMENT BY METAKAOLIN**

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Abstract

Concrete is that pourable mix of cement, water, fine aggregate and coarse aggregate that hardens into a super strong building material. Concrete is the most important construction material which is widely used throughout the world. Concrete is relatively strong in compression but it is weak in tension. To improve the tensile strength of concrete by addition of mineral called Metakaolin. In this project we have to dry the concrete by Hot Air Oven before the compression test.

Effect of thermal curing condition on mechanical and micro structural development was researched and found that unsuitable curing conditions may lead to speedy carbonation and concomitantly lower pH levels in the system, in turn occasioning significant declines in the rate of ash activation and mechanical strength development. Examination of compressive strength and electrical properties of concrete with white Portland cement and blast furnace slag was done. They tested the compressive strength of concrete cylinders and the electrical conductivity of the pore solution and found that larger amounts of slag resulted in increased electrical resistivity and decreases in the electrical conductivity of the pore solution, when compared to the controlled concretes which indicates that white Portland cement can be partially substituted by blast furnace slag.

Keywords: Cement, Metakaolin, Compression test, Curing, Hot Air Oven.

**EXPERIMENTAL STUDY ON THE STRENGTH OF A CONCRETE
BEAM BY EXTERNALLY BONDED PULTRUDED CARBON FIBRE
PLATES**

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Abstract

This project report presents experimental and analytical research to study the shear and flexural performance of Reinforced Concrete (RC) beams strengthened using externally bonded pultruded carbon fibre plates. It was noticed that in most of the studies and most of the researchers conducted their experimental work on RC beams cast with the same compressive strength of concrete. Therefore in this study, the effective strengthening configurations that showed the most improvement in the load-carrying capacities based on the literature were adopted, along with two variable concrete compressive strengths in an effort to evaluate the performance of the CFRP-strengthened beams when different concrete properties are involved. A total of 12 full-scale RC beams will be tested up to failure. Concrete compressive strengths of 15 and 20 MPa will be used, with and without carbon laminates externally bonded. Results are expected to show that externally bonded pultruded carbon fibre plates will considerably improve both the shear and flexural strengths of the beams. Expecting also, the strength of the carbon laminate bonded beams will vary inversely proportional to the concrete compressive strength. Literatures show that there will be significant improvement of the shear strength ranging from 14.4% to 23.8% in beams with laminate strips and the compressive strength will increase from 17 to 35 MPa. Finally, theoretical predictions using the ACI 440.2R-14 guidelines will be compared to experimental results.

**STRENGTH EVALUATION OF HIGH STRENGTH CONCRETE BY
PARTIAL REPLACEMENT OF COARSE AGGREGATE WITH WASTE
PLASTIC FIBRE**

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Abstract

This study is aimed at investigating the shear strength and workability characteristics of Fiber Reinforced High Strength Concrete which use recycled coarse aggregates that have originated from demolished construction wastes. Different mixes were taken with 20%, 40% replacement of natural coarse aggregate with recycled coarse aggregate. To improve the ductility and performance, 1% steel fiber is also added to the concrete. The concrete has main advantage that it has a better compressive strength. The compressive strength of concrete can be represented as cube or cylinder compressive strength. The compressive strength of concrete is depending on size and shape of the test specimens. In this study, the conventional concrete was reinforced by the plastic fibers obtained from waste plastic fibre. The cube and cylinder compressive strength of conventional concrete and plastic fibers reinforced concrete were determined in the laboratory. The M30 grades of concrete and two fiber geometry at volume fractions 0.0% to 3.0% were used in the experimentations. All specimens were tested after curing age 28 days. In this paper the relationship between cube and cylinder compressive strength for conventional and plastic fibers reinforced concrete were established and compared with standards. Keywords: Waste Plastic Fibre, Coarse Aggregate, Compressive Test.

**IMPROVEMENT OF MECHANICAL AND DURABILITY
PROPERTIES OF GFRG ENHANCED WITH NANO-SILICA**

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Abstract

This paper experimentally investigates the influence of Nano Silica (NS) and Alkali Resistant Glass Fiber (ARGF) on mechanical properties and durability strength of concrete. In this study, nano silica is to be added with the variation of 1%, 2%, 3%, 4% and 5% by the weight of cement and 0.65% of alkali resistant glass fiber by the volume of concrete mixture. The effect of different dosage of nano silica on the strength of concrete is to be investigated and the constant addition of alkali resistant glass fiber will enhances the mechanical properties of the concrete. As a part of durability study, the combined effect of chloride environment and optimum level of pH on the ultimate strength retention of nano silica added alkali resistant glass fiber reinforced concrete is also to be studied. Durability studies are to be carried out by exposing the 28-days cured specimens into chloride environment. The specimens are to be immersed in HCl acid for a period of 30 days, 60 days and 90 days. Therefore, the main objective of this study to find the optimum content of nano silica, in which the mechanical properties and durability strength are enhanced. Keywords: nano silica. alkali resistant glass fiber reinforced.

**DESIGNING AND ANALYSIS OF A CABLE STAYED BRIDGE IN
HIGHLY TRAFFIC AREAS AND TRENCHABLE AREAS**

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Abstract

A cable bridge is a type of bridge that uses cables to support the roadway or bridge deck. The cables are typically anchored to tower or pylons and provide tension to hold up the bridge deck. Cable bridge are often used to span long distance, such as over rivers or valleys, and can be designed in a variety of shapes and sizes to meet the needs of the location and transportation requirements. Cable stayed bridge are designed to span long distance, typically ranging from 200 to 1,000 meters, and provide a safe and reliable means of crossing over bodies of water, valleys, or other types of terrain. Cable stayed bridge is analyzed in SAP 2000 software for various structural properties. Cable stayed bridges are engineered to withstand various environmental loads, including wind, earthquakes, and traffic, while maintaining stability and safety for users.

DRIFT ANALYSIS OF IRREGULAR HIGHRISE BUILDING

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Abstract

Drift can be defined as the lateral displacement of a building due to lateral forces such as seismic force, wind force or movement of sub soil structure. Lateral displacement plays vital role in high-rise building. Lateral displacement increases with increase in the height of the building. These lateral displacements will leads to catastrophic failure of the building. Such type of failures can be avoided by providing desired bracing systems or shear walls wherever required in the building. In this paper the lateral displacement of irregular high-rise building with bracing system and shear walls have been discussed. The G+35 stories irregular building has taken into account for drift analysis. ETABS known as Established Three Dimensional Analysis for Building System software has been chosen for analyze the lateral displacement of irregular high-rise building with bracing system and shear walls effectively.

Key words: Drift analysis, lateral displacement, irregular high-rise building, ETABS

**EXPERIMENTAL STUDY ON THERMAL RESISTANT
GEOPOLYMER CONCRETE WITH ALUMINIUM OXIDE**

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Abstract

During the high temperature in OPC concrete occur the permanent damages and spalling. And concrete loses the compressive strength 50 to 75 % of the original strength determined most of the research work. When the high grade of concrete leads to uneconomic and emits the CO₂ emission. This factor is considered to develop thermal resistant geopolymer concrete. Geopolymer is an emerging class of silica alumina binders which possesses a potential for high-temperature resistance. Generally geopolymer concrete (GPC) is having good strength and durable properties. In this paper to develop the heat resistance performance and strength factors by adding aluminium oxide as admixture dosage varied 1% and 2% by weight of fly ash. Thermal resistant GPC were prepared as industrial by-product waste like fly ash, fine aggregate and coarse aggregate, sodium hydroxide and silicate were used as alkali activators. The molarity of NaOH solution 12 and 14. The specimens were cast and oven cured at 60°C for 24 hours. The specimens were tested to determine mechanical, permeability, durability, electrochemical and thermal studies of thermal resistant geopolymer concrete. Based on these studies, the satisfactory and unsatisfactory results were done the microstructural study by using Thermogravimetry (TG) and differential scanning calorimetry (DSC) analysis.

Keywords: Geopolymer, Thermogravimetry, calorimetry

**SIMPLE TRUSS EVALUATION WITH LINEAR AND NON-LINEAR
CHORDS**

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Abstract

The objective of the study is to compare the steel truss's ability to support loads when it is equipped with linear and non-linear truss chords. The comparison is carried out to see whether non-linear truss chords can generate the most effective truss section. In accordance to the test results, the truss can support a lot more weight than conventional linear truss chords. However, since non-linear truss chords carry the same weight as linear truss, it is necessary to optimise steel usage when using them at all times. So using non-linear truss chords might improve the steel truss's the capacity to withstand a greater amount of load.

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IMPLEMENTATION OF SMART PASSIVE SAFETY TECHNOLOGIES IN CARS

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ABSTRACT

In today's world, road safety is a top priority given the ever-increasing traffic and the risks associated with it. To enhance road safety, continuous efforts are being made to introduce new and effective safety systems in automobiles, such as airbags, ABS, EBD, and automatic braking. This project designed an alert system that observed vehicle's condition on travel and provide immediate assistance in an accident's event. This method is designed to detect abrupt vibrations from an accident using the in-built vibration sensor in the Airbag Electronic Control Unit. The system comprises of an airbag system, GSM modem and microcontroller respectively. The microcontroller processes the signals from the sensor and sends an alert message to the emergency services via the GSM modem. Additionally, the system is designed to automatically unlock the doors of the vehicle, enabling faster and easier access for emergency personnel. This innovative safety system provides an effective and immediate response in the event of an accident, potentially saving lives and minimizing injuries. The system's use of technology, such as the airbag sensor and GSM modem, makes it an efficient and cost-effective solution for enhancing road safety. This project introduces a novel safety system for automobiles that can detect and respond to accidents, ultimately making travel safer and more secure for all.

Keywords: automobiles, GSM , airbag and embedded system

SMART BICYCLE

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ABSTRACT

Electric bicycles(e-bikes)have become increasingly popular as a sustainable and efficient mode of transportation. They are powered by an electricmotor and rechargeable battery, which assist the rider in pedaling, allowing for longer and faster journeys. One crucial component of an e-bike is its battery, and lithium Ferro phosphate(LiFePO₄) technology has emerged as a popular choice due to its energy density,cyclelife, and safety. This paper will provide an in-depth examination of the benefits and limitations of using LiFePO₄ batteries in e-bikes.We will explore the key advantages of using these batteries,including their high energy density,long cycle life,and safety.They can store more energy in a smaller and lighter package, making them idealfor use in e- bikes, where reducing weight and size is crucial.Additionally, they can be recharged and discharged many times without losing significant capacity, making them reliable for daily use. They are also less prone to overheating and thermal run away,making them a safer option for e-bike users. However, there are some drawbacks to using LiFePO₄ batteries in e-bikes. They are more expensive than othertypes of batteries, and their energy density is lower, resulting in shorter range comparedto other battery types. Nevertheless, the advantages of LiFePO₄ batteries make them an attractive option for e-bikes.

In our project the previous scenario the cycle will used as a traditional pedaling method, now we upgrade it in to a electric bicycle with range of 30kms.

DEVELOPMENT OF DRIVING PATTERN RECOGNITION SYSTEM AND APPLICATION FOR SMARTPHONE BASED ON MATLAB

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ABSTRACT

In recent times, over-speeding and aggressive driving have been responsible for 84% of recorded incidents, which necessitates the need for monitoring and correcting driver behaviour. With the advancement in Information and Communication Technology (ICT), there is an urgent need to develop intelligent and efficient transportation systems. This study proposes the development of a driving pattern recognition system and application for smartphones based on MATLAB to monitor and improve drivers' behaviour. The individual driving behaviour model is generated using Support Vector Machine (SVM), a machine learning approach. The data is collected using mobile apps called MATLAB and Phyphox, which collect data such as speed, acceleration, fuel consumption, and direction. The system uses an integrated platform that combines machine and deep learning techniques with open-source-based technologies to collect, store, process, analyze, and correlate various data flows coming from cars. The system analyzes the data graph and separates the severe driving behavior from the regular driving pattern using SVM. The detected data values are utilized to guide driver behavior and lower the likelihood of accidents. The developed application provides real-time feedback on the driving pattern and suggests improvements, such as reducing speed or braking earlier. The system can be integrated into existing transportation infrastructure to monitor and improve drivers' behavior, leading to safer and more efficient transportation.

Keywords— Driving pattern recognition, Support Vector Machine (SVM), machine learning, smartphone application, MATLAB, intelligent transportation systems, driver behavior, data collection, data analysis, real-time feedback, transportation infrastructure.

DESIGN AND ANALYSIS OF ROTOR BRAKE DISC FOR LIGHT MOVING VEHICLE WITH STAINLESS STEEL AND ALUMINIUM METAL MATRIX COMPOSITE

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ABSTRACT

Brake is one of the most important safety component in vehicles. It is used to slow down or halt the vehicle by pressing the brake pad against the rotor brake disc that create friction. Mostly brake disc are made up of grey cast iron because of its availability. But grey castiron brake discs have drawbacks such as scoring, cracking, rusting. These problem can be minimized if better material than grey castiron is used in rotor brake disc. In this project, stainless steel and aluminium metal matrix composite material are used in rotor brake disc for light moving vehicles. Modelling of rotor brake disc is done using soildworks 2015. Analysis of rotor bake disc is done with grey cast iron, stainless steel and aluminium metal matrix in ANSYS workbench

18.1. These results are compared to get best performance material for rotor brake disc.

Keywords: Rotor brake disc, modelling, grey cast iron, metal matrix composite, stainless steel.

MULTI-OBJECTIVE PARAMETRIC OPTIMIZATION ON FDM PRINTED PLA USING DFA TECHNIQUE

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ABSTRACT

PLA is a relatively simple material to deal with, needing little effort to make excellent parts, particularly on an FDM 3D printer. PLA is favored for its sustainability, being biodegradable and numerous additional benefits with its wider applications, and so on due to its outstanding formability, toughness, and chemical resistivity. The goal of this study is to examine the mechanical strength of PLA because it is relatively easy to experiment with and requires little effort to make good pieces. To that objective, nine sets of flexural specimens are made in accordance with standards. Pattern, layer thickness, and shell count were chosen as input parameters for 3D printing the specimen. The results of flexural and surface roughness tests are optimized for multi-objective optimization in a L9 OA using Taguchi and the Desirability Function Approach. Finally, ANOVA is performed on each input process variable to investigate its impact. This study found that the most acceptable output machining parameters namely Triangle infill pattern, 180 microns layer thickness, and 4 shells.

DESIGN AND FABRICATION OF HYDRO TURBINE FOR POWER GENERATION

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ABSTRACT

The main aim of the project is to produce energy from renewable energy sources. In this project, the rainwater flowing from high-rise building through pipeline is utilized for power generation. For this, a hydro turbine is designed, fabricated and installed inside the pipeline of high-rise building. The turbine is mounted on a shaft which is connected to machine type motor and 12V battery. The rainwater from the high-rise building passes through the vertical pipeline drives the hydro turbine in which kinetic energy of the water is converted to mechanical energy. As the speed of the water flow increases, the rotation of the turbine increases by which more power is generated and stored in the battery. Thus, water flowrate is directly proportional to speed of the turbine. Hence, the wastewater collected from high-rise building could be used effectively for power generation as a sustainable energy resource.

Keywords: Hydro turbine, Power generation, Rainwater, Renewable energy.

ANALYSIS ON IMPROVING PROPERTIES OF BIOMASS GASIFIER – A REVIEW

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ABSTRACT

Gasification is a chemical process that converts biomass into useful gaseous fuels or chemical feedstock. It has shown promise as a technique that might significantly reduce the quantity of biomass waste produced in emerging cultures and meet the world's rising energy demands. The effects of various operating parameters and conversion in proportions of producer gas are reviewed in this paper with respect to different feed materials, along with expansion in biomass gasification. With numerous potential uses, gasification is an effective method for producing valuable products from biomass that has gained more attention in recent years. For the advancement of gasification technology, gasifiers producing syngas with high efficiencies are required. This study discusses many traditional biomass gasification mechanisms as well as cutting-edge technologies. Because of the GHG emissions brought on by the extensive use of conventional fossil fuels, which are the real cause of climate change, biomass gasification is seen as a potentially sustainable and environmentally benign technique. To ensure the sustainable use of biomass, social and environmental considerations should also be included while constructing such facilities. The life cycle assessment (LCA) studies of biomass gasification that took into account different methods and different feedstock are also reviewed in this study.

Keywords-bio mass; gasification; process intensification; process combination; polygeneration

EXPERIMENTAL ANALYSIS OF GRAPHENE BASED TOOL ELECTRODES FOR MACHINING OHNS AND MILD STEEL IN ELECTRICAL DISCHARGE MACHINE

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ABSTRACT

Development of new composite tool electrode for machining the hardest materials through Electric Discharge Machine is the keen interest of Researchers in Engineering Industries. A novel material Graphene having high thermal and electrical conductivity is the new focused material which is reinforced with base materials for making the tool electrodes of EDM Process. In the work, two EDM tool electrodes are prepared and used for machining the hardest materials Oil Hardening Non Shrinking Steel (OHNS) and Mild Steel (MS). The EDM tool electrodes are made up of Copper reinforced with Carbide particles and Graphene as an another reinforced material. The carbide particles added with the base material Copper are Silicon Carbide (SiC) and Titanium Carbide (TiC) to increase the hardness of the base material Copper. With the mixture, Graphene is added to increase the conductivity of the tool electrode. The weight proportion of the tool electrodes are Copper (95%), SiC (2%), Graphene (3%) and Copper (95%), TiC (2%), Graphene (3%). The tool electrodes are developed through Powder Metallurgy Process. The tool dimensions are 12 mm in diameter and 40 mm in length. The workpieces are OHNS and MS. The depth and diameter of the cut are 2 mm and 12 mm. The OHNS work is machined with Cu+SiC+Graphene tool electrode and MS workpiece is machined with Cu+TiC+Graphene tool electrode. The input parameters given are Current I (A), Pulse On Time (T_{on}) and Voltage V. The output parameters measured are Material Removal Rate (MRR) and Surface Roughness (SR). Nine different input parameters are considered to machine the workpiece. The output results are tabulated and analyzed. From the results obtained, for machining OHNS workpiece, the Material Removal Rate and Surface Roughness increase with Current (I) and Pulse On Time (T_{on}). The highest MRR value obtained is 5.281 g/min at Current 17 Amps, Voltage 40 V and Pulse On Time 300 μ s. For machining MS workpiece, the Material Removal Rate and Surface Roughness increase with Current (I) and Pulse On Time (T_{on}). The highest MRR value obtained is 0.00261 g/min at Current 20 Amps, Voltage 45 V and Pulse On Time 200 μ s.

Keywords: Graphene, EDM, SiC, TiC, OHNS, Powder Metallurgy

COMPARATIVE EVALUATION OF CARBURETION AND INJECTION TECHNIQUES UNDER FULL THROTTLE IN LPG FUELLED LEAN BURN SPARK IGNITION ENGINE

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ABSTRACT

The following research work investigates the lean combustion characteristics of LPG fuelled SI engine covering a comparative study of fuel intake modifications including electronically controlled LPG gaseous manifold injection and carburetion technique. Experiments were carried out in a single cylinder diesel engine altered to run as SI engine at a constant speed of 1500rpm at 100% throttle opening condition. The results showed that there was an increase in brake power output and brake thermal efficiency with LPG gas phase injection and substantial expansion in the lean misfire limit about 10% signifying lesser fuel consumption compared to carburetion system. Injection technique significantly improves combustion stability variations thereby reducing hydrocarbon (HC) and carbon monoxide (CO) emissions but with significant nitric oxide (NO) emissions. Considerable pressure variations were seen over the lean operating range due to advanced spark timing and minimized combustion duration which was more prevalent in the injection system.

Keywords: LPG; Lean burn; Manifold Injection; Carburetion; Cyclic variations.

NUMERICALLY INVESTIGATE THE THERMAL PERFORMANCE OF HEAT PIPE POSITIONED VARIOUS ANGLE IN LAPTOP

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ABSTRACT

A 2D simulation study was performed in a heat pipe that inclined at an angle such as $\alpha = 30^\circ$, 45° , and 60° . The design is specifically for laptop applications to transmit heat energy from the motherboard to the environment. Air is considered a working fluid to augment the heat transfer rate from the bottom portion of the laptop to the back portion of the screen at various Reynolds numbers ranging from Re 15,000 to 20,000. Temperature distribution and flow characterization in different angles of the heat pipe were observed by contour results such as velocity, temperature, and pressure. The RNG k- ϵ turbulent model has been chosen for the investigation. The Nusselt number was employed to account for significant thermal performances. The numerical results were compared with the existing model for validation and it reveals angle $\alpha = 60^\circ$ produced a greater thermal performance and enhanced heat transfer rate at a higher Reynolds number than others. Furthermore, this design model will aid in the development of the finest alternative solutions for transferring more heat energy to the atmosphere than the current structure.

Keywords: Heat transfer, CFD, flexible heat pipe, Nusselt Number.

INVESTIGATIONS ON EFFECT OF WALL THICKNESS ON CRASHWORTHINESS OF SINGLE CELL THIN-WALLED STRUCTURES UNDER QUASI STATIC LOADING CONDITION

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Thin-walled tubular structures are widely used as key components in the automotive and aerospace industries to improve vehicle impact resistance and safety. Particularly, they are employed in energy-absorbing systems in vehicle structures since they have the ability to dissipate the kinetic energy at the point of impact in a controlled manner to avoid impact damage. Hence they are utilized as one of the most effective energy absorbing component to reduce the impact of a frontal collision, prevent major damage during a crash and to improve the passive safety. The main objective of this research paper is to investigate the effect of wall thickness on the energy absorption behaviour of thin-walled 304 stainless steel tubes under quasi-static axial compression load conditions. The non-linear finite element software LS Dyna is used for simulating the energy absorbing behaviour and the results are analysed to study influence of wall thickness on the crashworthiness indices such as SEA, TEA, PCF & MCF.

Key words: *crashworthiness, thin-walled structures, quasi-static loading, SEA, TEA, PCF & MCF*

**INFLUENCE OF FUEL INJECTION PRESSURE VARIATIONS ON
LEAN COMBUSTION CHARACTERISTICS OF LPG FUELLED
LEAN BURN SPARK IGNITION ENGINE**

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ABSTRACT

The following research work investigates the lean performance and combustion characteristics of Liquefied Petroleum Gas (LPG) manifold injected spark ignition (SI) engine at varying fuel injection pressures. Experiments were done on a single cylinder diesel engine altered to run as SI engine at an optimised compression ratio of 10.5:1 and a constant speed of 1500rpm from rich mixture to leanest possible limit at injection pressures of 1.2, 1.4 and 1.6 bar. The results showed that there was an increase in brake power output and brake thermal efficiency with LPG gas phase injection and substantial expansion in the lean misfire limit at 1.2 bar injection pressure compared to carburetion system and other injection pressures. Also increasing fuel injection pressures result in combustion stability and reduced pressure cyclic variations to an extent. However, LPG injection at 1.2 bar significantly reduces hydrocarbon (HC) and Nitric oxide (NO_x) emissions. Even though considerable pressure variations were seen over the lean operating range, based on the efficient usage of fuel energy, maximum efficiency and lower emissions it is satisfactory to affirm that manifold injection of gaseous LPG at 1.2 bar injection pressure is best suited for LPG lean burn SI engine.

Keywords: LPG, Lean burn, Injection, Carburetion, Emissions.

ALOE VERA EXTRACT AS GREEN CORROSION INHIBITOR FOR CARBON STEEL IN WELL WATER

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ABSTRACT

The plant extracts are environmentally friendly, non- toxic and readily available. The inhibiting action of aloe vera gel extract as a green corrosion inhibitor in controlling corrosion of carbon steel in well water was studied by adding to sodium molybdate (SM) and Zn^{2+} at low concentrations. The inhibition efficiency (IE) of an aqueous extract of Aloe vera in controlling corrosion of carbon steel in well water in the absence and presence of Zn^{2+} and SM has been evaluated by weight loss method. . The formulation consisting of 100ppm sodium molybdate (SM), 25 ppm Zn^{2+} and 10ml Aloe vera extract (AV) offers 87% IE to carbon steel immersed in well water. Synergistic effect exists between sodium molybdate, Zn^{2+} and Aloe vera extract. The IE of SM- Zn^{2+} -AV system decreases with increase in immersion period. FTIR spectra reveal that the protective film consists of Fe^{2+} -AV complex and $Zn(OH)_2$.

KEYWORDS: Corrosion inhibition, Carbon steel, Sodium molybdate, Aloe vera, Synergistic effect.

EVALUATING THE OPTIMAL PARAMETER FOR TENSILE STRENGTH OF 3-D PRINTED PLA

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ABSTRACT

Additive Manufacturing technologies have nearly limitless potential, and the number of applications has increased substantially in modern existence. As an outcome of this process, setup costs and time are lowered. Besides that, components can be produced on trend, which cuts down the supply network, minimizes storage requirements, nullifies operational expenses, and reduces lead-time. PLA is a very simple material to deal with and can be made from natural or recycled materials which have led to its widespread acceptance. The purpose of this investigation is to investigate the Tensile strength. In order to accomplish this goal, nine different sets of tensile specimens are manufactured in accordance with the ASTM standard through 3D printing technique. The outcome of testing's improved for single response through use of Taguchi, ANOVA and a technique for evaluation based on Artificial Neural Network in a L9 orthogonal array. In the end, an individual ANOVA and over all ANOVA is carried out in order to evaluate the contribution of the input process parameter. The most desirable machine parameters that have come out in this research are Square infill pattern, 150 microns layer thickness and 6 shells (A3B1C3) through Taguchi. Furthermore ANOVAs findings described that shell count is the most influential parameters when compared to the other two input parameters. ANN evaluated that the errors are within the range of minimal.

DESIGN AND FABRICATION OF HYDRO TURBINE FOR POWER GENERATION

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ABSTRACT

The main aim of the project is to produce energy from renewable energy sources. In this project, the rainwater flowing from high-rise building through pipeline is utilized for power generation. For this, a hydro turbine is designed, fabricated and installed inside the pipeline of high-rise building. The turbine is mounted on a shaft which is connected to machine type motor and 12V battery. The rainwater from the high-rise building passes through the vertical pipeline drives the hydro turbine in which kinetic energy of the water is converted to mechanical energy. As the speed of the water flow increases, the rotation of the turbine increases by which more power is generated and stored in the battery. Thus, water flowrate is directly proportional to speed of the turbine. Hence, the wastewater collected from high-rise building could be used effectively for power generation as a sustainable energy resource.

Keywords: Hydro turbine, Power generation, Rainwater, Renewable energy.

ANALYSING REAL TIME BATTERY CONDITION USING MACHINE LEARNING FOR ELECTRIC VEHICLES

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ABSTRACT

Batteries are essential electrochemical cells that deliver energy to a variety of electrical devices. These cells must be routinely maintained in order to operate properly. Battery management systems control charge and temperature, lowering possible safety, health, & property issues. To regulate battery performance, these systems use merit measures. Since current approaches over data-driven fault prediction produce good results on the specific processes on which they were trained, they frequently lack the ability to adapt to changes, To address this issue, this research presents a continuous learning neural network strategy that uses a data-driven approach to monitor these parameters. To estimate these values, the machine learning algorithm used in this work finds relevant characteristics from the discharge curves. The efficiency of the suggested technique was assessed using extensive simulations at various voltage as well as temperature levels.

KEYWORDS: Electric vehicle; Battery; Machine Learning; parameters

OPTIMIZATION OF METAL MATRIX COMPOSITES BY USING RECYCLED SECONDARY RAW MATERIALS FROM ALUMINUM WASTES - A CASE STUDY

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ABSTRACT

In general, because of its lower cost and lower energy consumption, recycling of aluminum has significant advantages over primary aluminum production. It has become increasingly important in terms of overall aluminum supply. Scrap aluminum recycling produces nearly 20% of the world's aluminum. The main objective of this study is to use aluminum from scrap and produce the aluminum based metal matrix composites and evaluate suitable parameters to obtain appropriate properties like tensile strength. The parameters which are used for producing recycled aluminum based metal matrix process are flux temperature, percentage of flux, reinforcement preheating temperature, silicon carbide (SiC) addition percentage, stirrer speed, pouring speed and pouring temperature. A regression model is assessed using response surface methods, and the regression equation is employed as the objective function, with the aim of optimizing the tensile strength. Further the revolutionary optimization method known as the particle swarm optimization (PSO) algorithm is used to solve a more extensive optimization model.

KEYWORDS: Metal matrix composites, aluminum, recycling, response surface methodology, regression model, particle swarm optimization, stir- casting method, Ultimate Tensile strength.

A CRITICAL REVIEW ON CHALLENGES OF HOMOGENEOUS CHARGE COMPRESSION IGNITION ENGINE (HCCI)

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In this paper, a precise review on Homogeneous charge compression ignition engine have been studied. Stringent emission standards and better fuel economy demand are forced to find advanced combustion technology instead of conventional compression ignition and spark ignition technology. The HCCI engine is an alternative solution, since it attains low particulate matter and NO_x emission with high efficiency than compression ignition and spark ignition engines. Combustion of HCCI engine is based on Low Temperature Combustion which were controlled by proper mixture of air&fuel, fuel injection timing and chemical kinetics and it uses no spark plugs and fuel injectors to initiate combustion. But, the HCCI engine suffers from combustion phasing control and high unburnt hydrocarbon and carbon monoxide emissions. The study focuses on the working principle of HCCI engine, advantages, challenges & its solutions.

Keywords: HCCI, Low Temperature Combustion (LTC), Fuel injection timing and Combustion phasing control

EVALUATION OF MECHANICAL CHARACTERIZATION ON BASALT-FLAX-KENAF FIBER REINFORCED WITH EPOXY HYBRID COMPOSITE

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ABSTRACT

This paper investigates the mechanical properties of a hybrid composite material of basalt, flax, and kenaf fibers reinforced with epoxy resin. The composite was fabricated using the hand-layup method and subjected to mechanical tests, including compression and hardness tests. Scanning electron microscopy (SEM) was used to analyze the fiber-matrix interface and identify the failure mechanisms in the composite. The study aims to evaluate the potential of using natural fibers to fabricate automobile parts. The results showed that the hybrid composite had compressive strength while still maintaining a relatively low weight. The SEM analysis revealed that the fibers had good adhesion to the matrix and broke cleanly, indicating a good fiber-matrix interface. These results suggest that natural fiber composites could be a promising alternative to synthetic fiber composites in the automotive industry, offering a combination of high strength and low weight.

ENHANCING PRODUCTIVITY AND SAFETY USING KAIZEN

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ABSTRACT

Due to globalization, many manufacturing companies are trying to find a way to compete with each other's to remain competitive in the market. One of the best methods to improve their business in this competitive world is by applying the concept of continuous improvement popularly known as KAIZEN. KAIZEN is one of the powerful tools of lean manufacturing. There are 6 categories in kaizen to identify and improve the manufacturing process and they are productivity, safety, maintenance, delivery, cost, and morale. The purpose of this project is to use KAIZEN to help the parts manufacturing industry to enhance productivity with quality and safety along with efficiency. Currently, many manufacturing industries are facing problems in quality, high cycle time, high cost of production, and labour safety. Therefore, in this project, areas to be improved in the manufacturing process were identified and necessary modifications have been done to increase productivity. Besides to that workers' safety also significantly increased. KAIZEN sheets comparing utilization of time, rate of rejection, the strain on employees, and work environment before and after implementation were used to validate the success of KAIZEN.

Keywords: KAIZEN manufacturing, continuous improvement, production, quality, safety, KAIZEN sheets.

CUSTOMER SATISFACTION ABOUT HONDA COMPANY

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ABSTRACT

Marketers are driven to develop strategies for advertising and pricing in order to draw customers towards the purchase of two-wheelers by understanding how customers behave towards information sources. Every buyer sets aside a varied amount of time to look for information about buying a two-wheeler, especially when looking for price breaks. This paper's primary goal is to evaluate the influence of various customer information sources on their degree of satisfaction with their two-wheeler purchase. To gather the 375 valid replies, the researcher utilised a convenience sample technique. To systematically validate the goals and evaluate the hypotheses, the researchers utilised the t-test, one-way analysis of variance, exploratory factor analysis, confirmatory factor analysis, linear multiple regression analysis, and structural equation model. It has been discovered that a customer's decision to make a purchase in the future and their degree of satisfaction are influenced by the availability of many information sources. Customers of diverse durable goods, including those who purchase two-wheelers, are extremely diligent in their research of the features, benefits, and technology of the products.

KEYWORDS- Customer satisfaction, Multiple Informational Sources, Comfort, Technology, Price, Manufacturer, Mileage.

**QUALITY OF ONLINE EDUCATION IN ENGINEERING
STUDIESTOWARDS STUDENT SATISFACTION AND
LOYALTY IN THE CONTEXT OF THE COVID-19
PANDEMIC – CASE STUDY APPROACH**

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ABSTRACT

The study seeks to evaluate the online training quality scale and investigate the connection between training quality, student loyalty, and satisfaction. the findings of a PLS study of 273 online students from public and private universities in India. The five elements of the online training quality scale are as follows: (1) quality of information systems (2) the calibre of the instructor, (3) the efficiency of online learning, (4) the degree of student happiness, and (5) the steadfastness of the students. Furthermore, the results of SEM analysis show that the quality of the information system, the quality of the lecturers, and the effectiveness of online learning all have an indirect relationship to loyalty, and directly for satisfaction, and anthropological factors are time and place of residence affect learners' satisfaction.

Keywords: Training quality, Online, Satisfaction, Loyalty, Covid-19

DE-BOTTLENECKING COMPACT AXLE HOUSING

ASSY (LH/RH)

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ABSTRACT

The process of subassembly in axle housing for compact model tractors takes more time and only less pair of (LH/RH) are completed in the workstation. The required demand is not met which, so the improvement of the assembly line for axle housing is required and the subassembly time should be reduced to meet the demand in the market. So to improve the process the analysis is done on the sub assembly workstation, video study is done and the time taken for each components in the subassembly is taken done by single operator for both(LH&RH).Then for visual representation the graph is given to identify where the time is consumed in the process and it shall be reduced. To reduce the assembly time the line balancing concept is followed for this subassembly. It has various methods and algorithms to be followed to sequence and develop the process. For this process we used precedence diagram method to design and assign the work for the operator and also an addition of operator is required as of now only one operator is working. Also to reduce the assembly operation and simplify it, a trolley is suggested to the operation which has a capability of rotating the axle housing and has component holder. The subassembly is done on the trolley itself. The trolley is called as base machine trolley. The trolley consist of a TOD (turn over device) to rotate the axle housing to insert the components. A assembly line is also suggested for the operation, the assembly line consist of hydraulic press with minimum pressure press as the requirement and a TOD to turn the housing.

THE IMPACT OF TEACHING METHODS ON PERCEIVED SERVICE QUALITY AND STUDENTS' SATISFACTION

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ABSTRACT

This research's primary objective was to examine the connection between perceived quality (PQ) and satisfaction in higher education, particularly to determine whether these between groups of students exposed to various teaching techniques, variables may vary. Through a survey given to a final sample of 293 students, a quantitative study was carried out across the entire state of Tamil Nadu. Through the use of a structural equation model and the PLS method, data analysis was carried out. Results show that PQ and satisfaction are considerably different when students are exposed to various teaching philosophies, and that PQ and satisfaction are positively correlated with one another in the setting of higher education institutions. Despite the fact that there is a sizable body of research on teaching strategies in higher education institutions, to our knowledge there has never been a trustworthy prior study that specifically addressed how alternative teaching strategies affect students' satisfaction and perceptions of service quality.

Keywords: Higher Education, Perceived Quality, Satisfaction, Teaching Methods.

STUDY OF PERFORMANCE CHARACTERISTICS & EMISSION ANALYSIS USING MICRO ALGAE OIL AS BIODIESEL

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ABSTRACT

The ever-increasing demand for global energy and the disadvantages related to the use of fossil fuels, mainly due to gas emissions during their combustion, are the main driving forces behind the development of renewable energy sources. In this regard, biodiesel is an interesting alternative, and its use could lead to a reduction in greenhouse gas emissions and their release to the atmosphere. The use of biodiesel as fuel for compression ignition engines is gaining more interest. Using Micro Algae oil as bio diesel in mixture with diesel as B30 Fuel, This project presents an analysis on the use of new as well as waste oil as source for biodiesel fuel for compression ignition engine. The engine performance and emission characteristics were studied and compared with pure diesel fuel. Analysis on biodiesel in the world and its characteristics are studied and detailed in the paper. Drawbacks considering the current situation of diesel is also discussed. The Biodiesel extraction and its various methods like chemical extraction, mechanical extraction, combined extraction and transesterification are discussed. The process of blend preparation and its method has also been mentioned in the report. The outputs of the project i.e. emissions of various gases like CO, CO₂, HC, NO_x and the performance of engine in terms of BSFC & BTE is analysed.

EFFECT OF FUEL INJECTION PRESSURE ON ENGINE CHARACTERISTICS WITH MICROALGAE BIODIESEL BLENDS

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ABSTRACT

The use of microalgae biodiesel blends as an alternative fuel source in internal combustion engines has gained interest due to their potential to reduce greenhouse gas emissions and improve energy security. The results showed that increasing the injection pressure of microalgae biodiesel blends led to improvements in engine performance, including increased brake thermal efficiency, reduced fuel consumption, and reduced emissions of carbon monoxide (CO), hydrocarbons (HC), and particulate matter (PM). The use of algae oil as a fuel source for internal combustion engines (IC engines) has gained attention as a potential sustainable alternative to conventional petroleum-based fuels. Algae oil is a renewable and carbon-neutral biofuel that can be produced using a variety of methods, including open ponds, photobioreactors, and wastewater treatment systems. The performance of an IC engine using algae oil would depend on factors such as the engine design, the specific type of algae oil used, and the blending ratio of algae oil to conventional fuels. Algae oil has a higher energy content than most other biofuels, which could potentially result in higher power and fuel efficiency. However, the quality and consistency of algae oil can vary, which can affect engine performance and may require optimization. Overall, algae oil has the potential to be a sustainable and viable fuel source for IC engines, but further research and development are needed to optimize engine performance and scalability of algae oil production. In conclusion, the effect of fuel injection pressure on engine characteristics with microalgae biodiesel blends has shown that varying injection pressures and loads can significantly impact engine performance. The results indicate that increasing the fuel injection pressure from 500 to 750bar improves engine characteristics such as brake thermal efficiency, brake-specific fuel consumption, and exhaust gas temperature. Additionally, blending microalgae biodiesel with diesel has shown potential as a renewable fuel source for diesel engines, as it produced similar engine characteristics to those obtained with diesel.

ACCIDENT PREVENTION SYSTEM USING EYE BLINK SENSOR

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ABSTRACT

This paper aims to create a framework to keep the car safe and secure through critical activity. When we run in Ignorance we cannot take care of our own. If we make all vehicles with an automatic safety system that gives the driver a high level of protection, an alarm will also be issued. The device has an installed an eye blink sensor. Once the driver has started the engine, the sensors automatically detect the blink of eye. On this device the output of the sensor is provided for comparison with ESP32C3. When the value reaches the set level, The buzzer automatically vibrates, the LED glows, and the car stops automatically when eye blink sensor receives a signal from the transmission module. Keywords: ESP32C3, eye blink sensor, automatic braking system

DESIGN AND OPTIMIZATION EXHAUST THROTTLE VALVE

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ABSTRACT

The performance of the current ETV can be improved by providing improve actuator flap closure tolerance to the exhaust flow. The project's main objective is to Change the shape of the flap to improve the performance (achieve same back pressure at less closure) Find alternate materials for a better thermal performance of the flap. A butterfly valve is a type of flow control device widely used to regulate a fluid flowing through a section of pipe. Currently, analyses and optimization are of special importance in designing and using butterfly valves. For the analysis finite element method (FEM) is often used to predict the valve disc and computational fluid dynamics (CFD) is commonly used to study the flow characteristics of the valve.



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