International Conference on "Revolutionary Technology in Civil Engineering"

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Ranked 2nd by 'Wikipedia'

108 MOUs

Ranked TOP by Competition Success Review

228 patents

Department of ***Civil Engineering*** Presents

International conference on

"Revolutionary Technology in Civil Engineering"

on 24th & 25th February 2023

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Dr.P.Santosh Kumar Patra

(ICRTCE-23)

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Department of Civil Engineering

2nd International Conference on "Revolutionary Technology inCivil Engineering" (ICRTCE–2023)

24th & 25th February 2023

Patron, Program Chair & Editor in Chief

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Principal, SMEC

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Asst. Professor, Dept. of CE, SMEC

ISBN: 978-93-91420-15-4

Sri Marri Laxman Reddy Garu

Chairman

MESSAGE

I am extremely pleased to know that the Department of Civil Engineering, of SMEC is organizing Online & Offline "2nd International Conference on Revolutionary Technology in Civil Engineering" organized by the Departments of Civil Engineering on 24th and 25th Feb 2023.I understand that the large number of researchers have submitted their research papers for presentation in the conference and also for publication. The response to this conference from all over India and Foreign countries is most encouraging. I am sure all the participants will be benefitted by their interaction with their fellow researchers and engineers which will help for their research work and subsequently to the society at large.

I wish the conference meets its objective and confident that it will be a grand success.

M. Laxman Reddy

Sri Marri Laxman Reddy Garu
Chairman

Sri Chandrashekar Yadav Garu

Executive Director

MESSAGE

I am pleased to state that **"2nd International Conference on Revolutionary Technology in Civil Engineering"** organized by the Departments of Civil Engineering on 24th and 25th Feb 2023. For strengthening the "MAKE IN INDIA" concept many innovations need to be translated into workable product. Concept to commissioning is a long route. The academicians can play a major role in bringing out new products through innovations.

I am delighted to know that large number of researchers have submitted the papers on Interdisciplinary streams. I wish all the best to the participants of the conference additional insight to their subjects of interest.

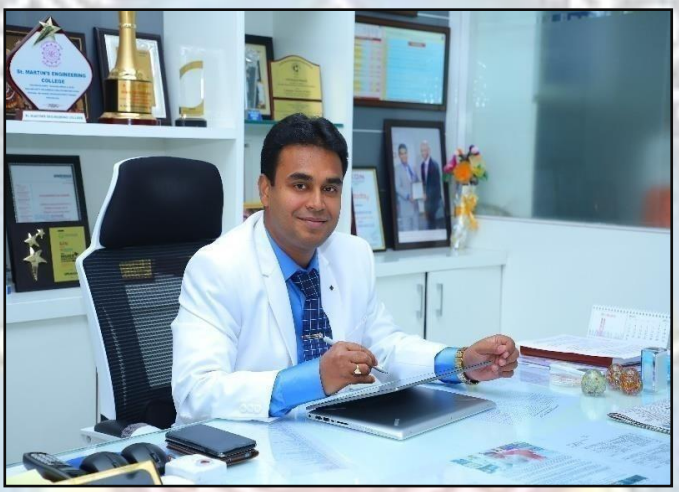
I wish the organizers of the conference to have great success.

Sri Chandrashekar Yadav Garu

Executive Director

Dr. P. Santosh Kumar Patra

Principal



MESSAGE

I am delighted to be the Patron & Program Chair for the Online & Offline **"2nd International Conference on Revolutionary Technology in Civil Engineering"** organized by the Departments of Civil Engineering on 24th and 25th Feb 2023. I wish with strong desire that the conference to unfold new domains of research among the Civil Engineering fraternity and will boost the knowledge level of many participating budding scholars throughout the world by opening up plethora of future developments in the field of Civil Engineering.

The Conference aims to bring different ideologies under roof and provide opportunities to exchange ideas, to establish research relations and to find many more global partners for future collaboration. About 100 research papers have been submitted to this conference and this itself is a great achievement and I wish the conference a grand success.

I appreciate the faculties, coordinators and Department Heads of Civil Engineering for their continuous untiring contribution in making the conference a reality.

Dr. P. Santosh Kumar Patra
Principal

Dr. Sanjay Kumar Suman

Dean R&D

MESSAGE

Research, curiosity and discovery has been in existence ever since man's presence on this planet millions of years ago, civilization has been characterized by curiosity and discovery. Therefore, the curiosity to explore what will happen, how it happens, is there a better way to do it, has been the driving force behind all research efforts. During the past few decades, the engineering faculties have taken a number of initiatives to reorient the engineering machinery to play leading roles in the industrial development process.

I am delighted to acknowledge the **"2nd International conference on Revolutionary Technology in Civil Engineering"** organized by the Department of Civil engineering. I appreciate organizing team for showing their keen interest in organizing a successful conference to provide a platform for contributors to explore new ideas and exchange research findings among researchers. I thank the support of all students, authors, reviewers, conference team, faculty members, and conference Convenor for making the conference a grand success.

Best Wishes

Dr. Sanjay Kumar Suman

Dean R&D

Dr. S V S Rama Krishnam Raju

Dean Academics

MESSAGE

It gives me immense pleasure to know that St. Martin's Engineering College, Department of Civil Engineering is organizing 2nd International Conference on Revolutionary Technology in Civil Engineering ICRTCE-2023. I am sure that this conference will provide a forum to national and international students, academicians, researchers and industrialists to interact and involve in Research and Innovation. Such academic events benefit the students, teachers and researchers immensely and widen the horizons of their knowledge and work experience in the field of Building Materials, Water Resource Engineering, Geotechnical Engineering and Innovation.

I sincerely appreciate the humble efforts of the Institute in providing a platform for students, academicians, researchers and industrialists to share their ideas and research outcome through the forum of this Conference.

I give my best wishes to all delegates and organizing committee to make this event a grand success.

Best Wishes

Dr. S V S Rama Krishnam Raju

Dean Academics

Dr. D V Sreekanth

Dean Administration

MESSAGE

The 2nd International Conference on Revolutionary Technology in Civil Engineering ICRTCE-2023 has concluded its work successfully on 24th & 25th Feb, 2023 in St. Martin's Engineering College (SMEC), Hyderabad, India. The ICRTCE-2023 was organized online by the Department of Civil Engineering, and the objective of this conference was to bring together experts from academic institutions, industries, research organizations for sharing of knowledge and experience in the recent trends and revolutionary technologies in civil engineering. The conference programme featured a wide variety of invited and contributed lectures from national and international speakers with expertise in their respective fields. The ICRTCE-2023 has become one of the most extensive, spectacular international events hosted by St. Martin's Engineering College (SMEC), for its high-level quality and the large size of participation. W ell- known international and national invited speakers addressed the audience, shared knowledge, and rich experiences on Revolutionary Technology in Civil Engineering.

I am sure that this conference will provide a forum to national and international students, academicians, researchers and industrialists to interact and involve in Research and Innovation. Such academic events benefit the students, teachers and researchers immensely and widen the horizons of their knowledge.

Best Wishes

Head of the Department
Department of Mechanical Engineering
St. Martin's Engineering College

Dr. D V Sreekanth

Dean Administration

Prof. Sandhya Kiran J K

Convener and Head of the Department

MESSAGE

The world is always poised to move towards new and progressive engineering solutions that results in cleaner, safer and sustainable quality products for the use of mankind. India too is emerging as a big production center for world class. Civil Engineering plays a vital role in this endeavor.

The aim of the online**"2nd International Conference on Revolutionary Technology in Civil Engineering"** being conducted by the Departments of Civil Engineering of SMEC, is to create a platform for academicians and researchers to exchange their innovative ideas and interact with researchers of the same field of interest. This will enable to accelerate the work to progress faster to achieve the individuals end goals, which will ultimately benefit the larger society of India.

We, the organizers of the conference are glad to note that 100 papers have been received for presentation during the online conference. After scrutiny by editorial board 70 papers have been selected, and the authors have been informed to be there at the online platform for presentations. Steps have been taken to publish these papers with ISBN number in the Conference Proceedings and all the selected papers will be published in Scopus/ UGC recognized reputed journals.

The editorial Committee and the organizers express their sincere thank to all authors who have shown interest and contributed their knowledge in the form of technical papers. We are delighted and happy to state that the conference has moved towards a grand success with the untiring effort of faculties and staff members of SMEC and with the blessing of the Principal and Management of SMEC.

Prof. Sandhya Kiran J K
Convener and Head of the Department

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Design of Strategic Street Water Filters for Rocky Terrain Communities

*K. Ravi Chandra[1], N. Anil Kumar[2], D. Swetha[3], V. Sevika[4], C. Madhusudan[5], K. Ravi Kumar[6],

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ABSTRACT

Water is the basic need of every one. Without water, not even a day can go ahead in human community. Costly projects are commissioned to supply water for increasing daily demand usages in urban settlements even from sources which are located at long distances. Still, the permanent solution is to yet to come because present projects are limited when future demands are imagined. In this study, authors attempts to provide solution to support the present water supply infrastructure so that some alleviation of the water problem is achieved. Rain Water Harvesting (RWH) is the traditional method but proven solution to solve local water scarcity problems. RWH on roof of building and on the ground are well known universal methods. Primary method is having its own economical limitations whereas later method is suitable only if land can absorb the in filtering rain water into the deep level to recharge the ground water. Apart from these two methods, street water tapping unknown at all as it contains lot of turbidity and unfair quality. Strategic Gravity Filters are designed for filtering high turbid street water to obtain clean and clear water. These filters help the certain communities where land is either partially or fully covered by rocky formations and making the land not suitable for RWH. This study aims at measuring the performance of filter under time delay effect and filter is repeatedly subjected to same raw water sample to check its clogging time which indicates the cleaning of filter or replacing of filter. Out of three filters experimented, one filter is decreasing the turbidity from >90 NTU to <10 NTU in two scenarios: (i) having time delay in collection of filtered water when poured synthetic raw water sample and (ii) repeated pouring of same synthetic raw water sample on different dates.

***Key words**:* Rain Water Harvesting, Street water filtration, Gravity Filter, Water Treatment and Turbidity.

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Paper ID: ICRTCE-23-0068

An Investigation into the Compression Stress Block of Concrete in Flexural Bending UndersizeEffect

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ABSTRACT

In flexural bending, the compression stress blocks of concrete plays a significant role in determining the behavior of a reinforced concrete structure. However, under size effect, the shape and size of the compression stress block may change, leading to changes in the ultimate capacity and stiffness of the structure. In the present study the authors have undertaken a C-section specimen and preformed experiment to analyze the size effect in concrete and its effect on the compression stress block. The authors introduced a dynamic parameter "α" to carry out the compressive stress analysis. By multiplying the coefficient α with the maximum compressive stress the analysis is done. The value of α varies between 0.1 to 1.

Keywords: *Flood analysis software*

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Paper ID: ICRTCE-23-0069

Fabrication and Testing of Solar DesalinationDevice

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ABSTRACT

Desalination is the procedure used to turn saltwater water into drinkable water. Since so much electricity is used to vaporise salt water, almost all desalination techniques are less cost- effective. This desalination apparatus is made with solar energy to remove the drawbacks of membrane desalination. The desalination device is created in a way that allows it to be positioned anywhere that has enough sunshine. The solar-powered desalination system is intended to produce distilled water ethically from seawater. Filtration is the main method used to treat the sea water. With the aid of the proper lens, sunlight is focused onto the filtered water to make distillate, which is then condensed. In many locations where water scarcity is a problem. Moreover, it is a cost-effective method, making the final product portable water and less expensive. This process uses no fuel to evaporate the salt water, and the raw salt is released instead, protecting the equipment from damage.

Keywords: *fabrication, solar desalination device*

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Paper ID: ICRTCE-23-0070

Experimental Study on Concrete by Partial Replacement of Phosphogypsum, Incinerated SolidWaste Ash in Cement

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ABSTRACT

A solid byproduct of the manufacturing of phosphoric acid, a key component of many fertilizers and chemical industrial products, is phosphogypsum. To create a good, hardened concrete and to limit the production of cement and phosphogypsum from landfills, Portland cement can be substituted with the latter. Ash from solid waste that had been burned was tested for suitability as a replacement in the manufacturing of cement. The study covered a cutting-edge technological approach for creating new, equivalent cement that includes bottom ash from solid waste that has been burned. In this experiment, the cement is replaced with phosphogypsum and solid ash from burning waste in various ratios (10%, 20%, and 30%), and the various qualities of the concrete are tested to determine the ideal replacement level at which the concrete reaches its maximum strength.

Keywords: *phosphogypsum, incinerated solid waste ash, cement*

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Paper ID: ICRTCE-23-0071

A Systematic Review and Meta-Analysis of DigitalEye Strain

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ABSTRACT

Computers have become a vital part of our workplaces. Millions of computer users spend at least more than two hours in front of a computer screen daily. This excessive use of computers leads to a disorder known as "Computer Vision Syndrome". Most of the computer users suffer from CVS. CVS causes irritation, redness of the user's eye. A real time method to detect the redness of eye and to prevent Computer Vision Syndrome (CVS). In these days nearly 8 to 9 people in 10 forgot to blink their eyes while watching laptops, smartphones, tablets, etc. Improper blinking cause's dryness in eyes and also long term viewing of screens without any proper eye exercises and precautions causes eye strain. Computer Vision Syndrome or Digital Eye Syndrome is caused due to the usage of screens. Symptoms of CVS are eye strain, itching of eyes, pain around eyes, redness of eyes, tiredness of eyes . The main idea of this method is to detect blink count of a person using SVM(Support Vector Machine) is a supervised machine learning model or classifier which is a trained model used to predict whether the person is blinking or not. Blink count or blink ratio data is used to ensure whether the person is blinking at a proper rate or not . CNN (Convolution Neural Network) is used to find the redness in eyes . The CNN model is pretrained with datasets in which a person image is given to the model and the eye of that person is separated and the redness is detected in the white area of the eye (selera) by separating into pixels. With the help of these data's, we can predict or tell whether a person has CVS or to prevent from CVS.

Keywords: *Eye detection, Face detection, Landmark Plotting, Blink detection, detection accuracy, support vector machine*

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Paper ID: ICRTCE-23-0010

Marine Litter and Plastic Waste Detection in Any Water Bodies Using Artificial Intelligence

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ABSTRACT

The increasing level of marine plastic pollution poses severe threats to the marine ecosystem and biodiversity. Need is to address the marine pollution and control if not it may lead adverse effects on marine ecosystem and effects on even human environment. The MOT (Multiple Object Tracking) is an important tool in the modern world. It has various uses like object detection, counting objects, security tools, etc. The Object tracking is a prominent technology in image processing which has a large future scope. The MOT has made significant growth in a few years due to deep learning, computer vision, machine learning, etc. By using YOLO "You Only Look Once" Technology with the help of Pytorch, the system aims in object detection, tracking and counting. Also unlike the general yolo object detection tool which detects all objects at the same time, this MOT system also detects only objects which are needed to be detected by the user and thus helps in improving the performance of the system. The quantification of positively buoyant marine plastic debris is critical to understanding how plastic litter accumulates across the world's oceans and is also crucial to identifying hotspots for targeted cleanup efforts. Currently, the most common method to quantify marine plastic is using manta trawls for manual sampling. However, this method is cost-intensive and requires human labor. This study removes the need for manual sampling by using an autonomous method using neural networks and computer vision models, which trained on images captured from various layers of the ocean column to perform real-time plastic quantification. The best performing model has a Mean Average Precision of 92% and an F1-Score of 0.92 while maintaining near real-time processing speeds 2 ms/img.

Key words: *Marine Debris, Deep Learning, Computer Vision, Climate Change.*

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Paper ID: ICRTCE-23-0018

Waste Water to Hydrogen and Hydrogen to Fuel

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ABSTRACT

Hydrogen gas is an attractive alternative sustainable energy due to its high energy density and zero greenhouse gas emission after combustion. Biological production of hydrogen by bacteria or algae operates under mild conditions and does not rely on fossil fuels or electricity. This chapter focuses on discussing the principles of hydrogen production by biological processes, including dark fermentation, bio photolysis by both algae and cyanobacteria, photo fermentation, microbial electrolysis cell (MEC), cell-free enzymatic systems, as well as metabolic engineering strategies to improve hydrogen production. Additionally, the authors compare the available techniques using the most representative production indicators such as rate and efficiency. Due to the vast heterogeneity in resources available around the world, there is no absolute judgment on which technique is superior to another. The most appropriate technique should always be chosen based on whether it fits the local circumstances. Hydrogen gas has tremendous potential as an environmentally acceptable energy carrier for vehicles. A cutting edge technology called a microbial electrolysis cell (MEC) can achieve sustainable and clean hydrogen production from a wide range of renewable biomass and wastewaters. Enhancing the hydrogen production rate and lowering the energy input are the main challenges of MEC technology. MEC reactor design is one of the crucial factors which directly influence on hydrogen and current production rate in MECs. The rector design is also a key factor to upscaling. Traditional MEC designs incorporated membranes, but it was recently shown that membrane-free designs can lead to both high hydrogen recoveries and production rates. Since then, multiple studies have developed reactors that operate without membranes. This review provides a brief overview of recent advances in research on scalable MEC reactor design and configurations.

Key words: *Microbial electrolysis cell (MEC), Reactor design, Hydrogen production rate,Membrane, Anode, Cathode.*

ISBN: 978-93- 91420-15-4

Paper ID: ICRTCE-23-0053

Exploration on Green Construction Materials

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ABSTRACT

Green building or sustainable building, is a structure which is designed, constructed, operated, or reused in an ecological and energy-efficient manner. The concept of Green building integrates a variety of strategies during the period of Design, Construction, Maintenance and Operation of buildings. Construction is an element of the civilisation which is increasing continuously and thereby requires lots of natural or manmade materials to fulfil the demand. Manufacturing of construction materials like Cement, Conventional brick, steel etc. material produces large amount of Co2 and other greenhouse gases which is hazardous or toxic in nature which cause environmental and health related problems. So it is todays demand to acquire good construction practice and energy efficient material which helps in less production of greenhouse gases and save energy. Based on the promising vision of future needs for sustainable development this paper presents a comparative study between conventional and eco-friendly building materials using sustainability measures. A prototype of two storeys was constructed using eco- friendly building materials (integrated bricks, rice straw bales, M2 system, plain concrete, and Rockwool sandwich panels). A sustainable decision support system (SDSS) was used to compare between the structural building materials of the two structural systems. The results showed that the eco-friendly system had better sustainability rank (67%) than the conventional system (56%). This will prevent the earth from becoming dumpy yard the coming year.

Keywords: *Civilization, Hazardous, Conventional, Prototype.*

ISBN: 978-93- 91420-15-4

Paper ID: ICRTCE-23-00014

Properties of ECC Produced Using Fly Ash and Fine Aggregate and Hybrid Fibre (Poly Propylene +Banana Fibre)

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ABSTRACT

Normal concrete is brittle in nature while ECC is ductile in nature, due to this property; it has wide applications & wide future scope in various fields. ECC elongates without fracturing, due to the interaction between fibre, sand, and cement working in a matrix that binds everything together within the material. In addition to reinforcing the concrete with fibre that act as ligaments to bond it more tightly. The design of the cement matrix with special ingredients to make it more compatible with the fibers and to increase flexibility. Basic components of ECC are Portland cement, water, fine aggregate, plasticizer, and fibre. Polypropylene fibre and banana fibre are typically used for ECC because these fibre provide the higher and more consistent ductility improvement than other types of fibre. Coarse aggregate is not used in ECC mixtures, and in some cases, fly ash is added to reduce the amount of Portland cement. Because of the lack of coarse aggregate, the initial cost of ECC is higher than the regular concrete, and this has been one of the barriers to the widespread use of ECC. Lack of information and previous experience of using ECC are another barrier of using ECC. Some investigators have shown that the life-cycle cost and environmental impact of ECC can be lower than conventional concrete because of the extended service life and lower maintenance required. The properties and structural applications of ECC have been actively investigated by various engineers during the last two decades.

Keywords: *ECC, flexibility, fly ash, polypropylene and banana fibre*

ISBN: 978-93- 91420-15-4

Paper ID: ICRTCE-23-0017

A Study on Existing Prestressed Concrete Bridge Maintenance using LCA Approach

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ABSTRACT

Prestressed concrete is an obvious use for a high strength, high stiffness material like Parafil. Various attempts have been made to prestress concrete externally (with steel tendons) although such structures show significant economic advantages, widespread adoption of the ideas has not taken place because of worries about corrosion of the tendon expensive exercises (to protect steel) virtually negate the cost benefit of steel over Parafil, for which there would be no need to provide such protection. The use of external prestressing in new construction requires a change in thinking by designers, to take advantage of a new material. One field where engineers are being forced to look at new materials is in the field of repair of existing structures. Many existing structures are in need of repair for a variety of reasons. They may have been inadequately prestressed or reinforced to begin with, or there may have been corrosion of the steel subsequently. Some structures have to be reinforced to cope with larger loads, or because of settlement of foundation. Many of these structures can best be repaired by prestressing, since this usually enhances the integrity of the existing structure, without adding to the weight. In most structures, unless deliberately built with a view to the provision of additional prestress, spare ducts are not available and the structure must be externally prestressed. The findings of this study demonstrate how scholars have focused their research on the basic design of bridges using a primarily economic strategy, whereas worldwide attention is focused on the quest for sustainable alternatives. It has been discovered that decision-making methodologies and life cycle impact assessment enable bridge managers to make better decisions, particularly toward the end of the life cycle of composite bridges.

***Key words**: prestress losses; maintenance; prestressed concrete; life cycle assessment;*

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Experimental Study on Floating Concrete by Using Soap Solution, Plywood Dust, Theromocol Chunks

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ABSTRACT

Floating concrete is a unique sort of inventive solid whose thickness is under 1000 kg/m³. In view of its low thickness and moderate scope of compressive quality, it tends to be utilized in non-basic applications starting at now. This Project research the properties of the Floating concrete by utilizing an EPS Beads. Extended Polystyrene (EPS) is a lightweight material that has been utilized in designing application since 1950s.This research contains an alternative compound including thermocoal as binding material in place of the fine aggregates of floating concrete, pumice stones and aluminum powder used to make floating concrete, assess the mechanical features of fresh concrete, and hardened floating concrete through tests like slum tests (for workability), density tests, compressive strength test and water absorption test. In this study the floating concrete is made of pumice stone and thermocoal. Fine powder of aluminum is used as a admixture for the formation of gas. The study includes casting and testing the compressive strength, density tests, and water absorption tests for floating concrete and traditional concrete specimens at 7 and 28 days of age respectively. In this study, therefore, fine aggregate is replaced in different proportions by thermocoal which is 0% EPS, 5% EPS, 10% EPS, 15% EPS and 20% EPS in floating concrete, and its feasibility study is to be conducted.

Keywords: *Floating concrete, light weigh materials, Extended Polystyrene Beads, Light Weight concrete, Thermocoal, Thermal Insulation Property.*

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Paper ID: ICRTCE-23-0004

Experimental Study on Recycled Aggregates

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ABSTRACT

Construction and demolition waste constitute one of the major components of waste generated worldwide. Very large quantities of aggregates are used in construction. When the useful life of the structure is over it will be demolished, and all the demolished wastes just find their way to landfills. Finding large areas for landfills is becoming very difficult. On the other hand, continuous extraction and quarrying of natural aggregates for construction is causing depletion of natural resources. The recycling of demolished construction waste aggregates to be used in new engineering application provides a promising solution to both problems. So, in order to reduce construction cost and resolving housing problems faced by the low-income communities of India. This project/research includes an experimental study on concrete by taking partial replacement of coarse and fine aggregate with demolished waste to determine the compressive strength and flexural strength and results are compared with normal concrete.

Key words: *Slump cone, Compressive strength, Flexural strength, demolished waste.*

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Paper ID: ICRTCE-23-0007

Soil Stabilization Using Micro Synthetic Fibre Materials

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ABSTRACT

In India, the modern era of soil stabilization began in early 1970's, with a general shortage of petroleum and aggregates, it became necessary for the engineers to look at means to improve soil other than replacing the poor soil at the building site. Soil stabilization was used but due to the use of obsolete methods and also due to the absence of proper technique, soil stabilization lost favor. In recent times, with the increase in the demand for infrastructure, raw materials and fuel, soil stabilization has started to take a new shape. With the availability of better research, materials and equipment, it is emerging as a popular and cost-effective method for soil improvement The main objective of this study is to investigate the use of fiber materials in geo technical applications and to evaluate the effects of polypropylene fibers on shear strength of unsaturated soil by carrying out direct shear tests and unconfined compression tests on two different soil samples. The results obtained are compared for the two samples and inferences are drawn towards the usability and effectiveness of fiber reinforcement as a replacement for deep foundation or raft foundation, as a cost-effective approach. Here, in this project, soil stabilization has been done with the help of randomly distributed polypropylene fibers obtained from materials. The improvement in the shear strength parameters has been stressed upon and comparative studies have been carried out using different methods of shear resistance measurement.

Key words: *Stabilization, Reniforcement, shear strength.*

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Paper ID: ICRTCE-23-0009

Experimental Analysis of Waste Rubber Material inBituminous Road

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ABSTRACT

Use of Crumb Rubber i.e. the rubber obtained from the waste tires of vehicles in the construction of flexible pavement is gaining importance. It is also worth mentioning that the modifier raw material has been sourced from disposed crumb rubber. This not only allows us to collect modifier raw material at low cost, but also provides a solution towards ecological menace posed by increased use of rubber. In the present study, an attempt has been made to use Crumb Rubber, blended using wet process. The martial method of bituminous mix design was carried out for varying percentages of Crumb Rubber to determine the different mix design characteristics. Marshall's mix design was carried out by changing the modified bitumen content to constant optimum rubber content and subsequent tests have been performed to determine the different mix design characteristics and for conventional bitumen (VG-30). This has resulted in much improved characteristics when compared with straight run bitumen and improve the strength of pavement Modified Bitumen is one of the important construction materials for flexible pavements.

Key words: *Crumb rubber, modified bitumen, marshall's stability, flexible pavements, waste tyre rubber, environmental issues.*

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Paper ID: ICRTCE-23-0011

Permeability Studies on Anthropogenic Stratified Soils

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ABSTRACT

This Permeability of porous media is an important property which depends upon various properties of soil mass such as porosity, size and shape of soil particles, initial moisture content and compaction etc. As in natural condition, the soil mass exists in layers/ strata, thus represents a stratified soil. The flow through stratified soil may be perpendicular, inclined or parallel to the bedding plane. In this project an attempt has been made to study the behaviour of Anthropogenic stratified soil samples subjected to a flow perpendicular and parallel to the bedding plane and in terms of its permeability. The materials used in the study were industrial waste, garbage waste, construction demolished, sand. The observed values of permeability under several arrangements of layers were determined. In all the considered arrangements, observed permeability was found to be less than the corresponding theoretical values by 20 to 50 percent. A comparison was also made between the results obtained in the present study and that available in literature, a good agreement has been observed. It was further noticed that if exit layer is less pervious than the top layer, the observed permeability of the stratified soil has been found to be more as compared to the permeability of isolated exit layer by 33% to 54%. If exit layer is more pervious than the top layer. The soil permeability is a fundamental property of the soil required to understand the flow of water in the soil. The majority of environmental problems are derived from water flow in unsaturated soil. This paper aims to review the methods for predicting the coefficient of permeability (CP) in unsaturated soils both theoretically and experimentally. Firstly, the differences between the CP in saturated and unsaturated soils are discussed. Secondly, the discussion has been developed to indirectly measure the CP from soil-water characteristic curves (SWCC). In conclusion, both theoretical and experimental methods have been verified and it was obtained that the coefficient of permeability of unsaturated soils before air entry value is close to hydraulic conductivity of saturated soils. It was also concluded that the direct method for measuring coefficient of permeability is time consuming and expensive.

Key words: *Anthropogenic soils, Soil water characteristics curves.*

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Paper ID: ICRTCE-23-0012

Microstructural Study on Hydration Process of SelfCompacting Concrete Using Mineral Admixtures

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ABSTRACT

This research work focuses on the study about Micro-Structural properties of Self Compacting Concrete by the use of mineral admixtures such as glass powder and limestone powder. The compressive strength of the specimens obtained can be analysed by means of microscopic analysis methods such as XRD and SEM. On use of different mineral admixtures, the mechanical properties of concrete varied. The early sample strength development with GP was very slow, but it rapidly grew at later stages. The micro aggregate effect and pozzolanic reaction mutually occurred in the mineral admixture. In the early stage, the micro aggregate effect reduced paste porosity and the small particles connected with the cement hydration products to enhance its strength. In the later stage, the pozzolanic reaction of some components in the complex powder occurred and consumed part of the calcium hydroxide to form C-S-H gel, thus improving the hydration environment. Also, the produced C-S-H gel made the structure more compact, which improved the structure's strength.

***Key words**: Rice husk ash, Sugarcane Bagasse Ash, Super plasticizer, Self-Compacting concrete, Mix design*

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Paper ID: ICRTCE-23-0003

Modern Air Pollution Control Technologies

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ABSTRACT

Plastics are the non-biodegradable materials and so a means to degrade our environment. Plastic wastes have proved to be a source of health hazard as it is toxic in nature. Plastic waste is a big nuisance in today's world. So, this plastic waste should be reused to eliminate the threat to the surroundings. One such reuse can be in the construction of flexible pavements. Plastic coated aggregates have proved to offer better resistance to abrasion and wear and tear. Moreover the bond between these plastic coated aggregates and the bitumen is also very strong due to increased contact area between plastic and bitumen. Such roads show better performance and have increased life spans. The plastic wastes could be used in road construction and the field tests withstood the stress and proved that plastic wastes used after proper processing as an additive would enhance the life of the roads and also solve environmental problems. Plastic use in road construction is not new. It is already in use as PVC or HDPE pipe mat crossings built by cabling together PVC (polyvinyl chloride) or HDPE (high-density poly-ethylene) pipes to form plastic mats. Waste plastic is ground and made into powder; 3 to 4 % plastic is mixed with the bitumen.

Key words: *Plastic waste, aggregates, bitumen, PVC, HDPE.*

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Paper ID: ICRTCE-23-0005

A Study on Recycled Aggregate Concrete with PartialReplacement of Fine Aggregate with GGBFS

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ABSTRACT

From the past few years, there have been many investigations about usage of natural fibres in reinforced concrete because of their abundant availability in local premises. Several factors like low cost, low environmental impact, improved strength serve as the main reasons for this prolonged research. This project mainly concentrates on the effects and importance of using fibre reinforced concrete. Concrete is one of the most widely recognized development material for the most part delivered by utilizing locally accessible ingredients. The present trend in concrete technology is towards increasing the strength and durability of concrete to meet the demands of the modern construction. In this experimental study, we will investigate the strength parameters like i.e., flexural strength, compressive strength and spilt tensile strength which can be achieved by the usage of natural fibres. The comparison of performance of conventional concrete with fibre reinforced concrete is studied and observed experimentally by performing required laboratory and field tests. By using cubes of size (150*150*150) in mm with M25 grade of conventional concrete and fibre reinforced concrete. Using natural fibres like coconut coir, banana which are easily available.

Key words: *GGBFS, recycled coarse aggregate slump cone, compressive strength, flexural strength, demolished waste.*

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Paper ID: ICRTCE-23-0006

Use of Geosynthetics in Road Construction

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ABSTRACT

Geotextiles, which is now an effective engineering technology, has acquired wide spread applications in pavement construction. Geotextiles are most widely used under paved and unpaved roadways, and this is referred to as the application of separation / stabilization. In addition, geotextiles used in paved and unpaved roads provide many advantages: separation, stabilization, strengthening and filtration. In many cases, geotextiles replace or decrease the need to use natural gate building materials which provide economic and environmental benefits. Typical pain issues that are overviewed in the present study arise in road construction due to various factors. The current scenario in India requires maximum transit facilities to build in the shortest feasible time at a low cost. Analysis done on most of the failed roads owes them to the founding soil on which those roads were constructed. Jute geo-textiles developed abundantly in this subcontinent can be used for the stabilization of such poor sub-grades in a beneficial and economic way with great efficacy.

Key words: *Geotextiles, paved and unpaved roads, stabilization*

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Study on Partial Replacement of Coarse Aggregate with Demolished Concrete

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ABSTRACT

Construction and demolition waste constitute one of the major components of waste generated worldwide. Very large quantities of aggregates are used in construction. When the useful life of the structure is over it will be demolished, and all the demolished wastes just find their way to landfills. Finding large areas for landfills is becoming very difficult. On the other hand, continuous extraction and quarrying of natural aggregates for construction is causing depletion of natural resources. The recycling of demolished construction waste aggregates to be used in new engineering application provides a promising solution to both problems. So, in order to reduce construction cost and resolving housing problems faced by the low income communities of the India. This project includes an experimental study on concrete by taking partial replacement of coarse and fine aggregate with demolished waste to determine the compressive strength and flexural strength and results are compared with normal concrete

Key words: *Slump cone, Compressive strength, Flexural strength, demolished waste.*

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Paper ID: ICRTCE-23-0023

Micro-Structural Study on Hydration Process of Self Compacting Concrete by Adding Mineral Admixtures, Exposed To Acid Environment

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ABSTRACT

Self-compacting concrete, also referred to as self-consolidating concrete, is in a position to go with the flow and consolidate under its personal weight and is de-aerated almost definitely whilst flowing in the formwork. SCC has an advantage it can be easily placed without vibration or mechanical consolidation. This Project work focuses on the experimental investigation on Mechanical Properties and micro-structural property of Self-Compacting Concrete (SCC) of various mix proportion of Rice husk ash (RHA) and Sugarcane bagasse ash (SCBA). Initially, optimization is done using compressive strength as parameter to finalize the proportion of RHA and SCBA for micro-structural analysis, subjected to Scanning Electron and Microscope (SEM), X-Ray Diffraction (XRD) Analysis. The images were interpreted and the result from micro-structural analysis was compared with their compression strength. Rice husk ash (RHA) and Sugarcane bagasse ash (SCBA) was added to the cement in stepped concentration of 0%, 5%, 15%,20% and acids (sulphuric acid solution (H2S04) are used for the curing of normal water in the concentration of 1%,2%,3%,4%,5% in different ages (7 days, 14and 28 days) were determined. The outcomes of excessive extent RHA and SCBA at 0% to 20% cement substitute degrees on the extent of degradation to sulphuric acid will be assessed in this study. Trial mixes with the various water cement ratio, substitute percentage, have been equipped and tested. The test results for self –compacting concrete such as flow table and slump cone are presented.

Key words: *Sugarcane bagasse ash, Rice husk ash, Scanning Electron Microscope,*

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Paper ID: ICRTCE-23-0024

Recycled Asphalt Pavement Mixtures for RoadConstructions

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ABSTRACT

The tremendous usage of virgin asphalt and aggregates is leading to their exploitation as a resource. There is a great importance to use the ruined pavement materials which causes various environment hazards and creates disposal problems. The main purpose of this study is to use the higher proportion of recycled asphalt pavement mixtures for road construction in a national highway project. The percentage of Recycled Asphalt Pavement (RAP) is taken at a range of 10% to 50% and then doingvarious tests related to strength and check the best one percentage of Recycled Asphaltto be used in road construction. The main scope ofthis study is to reduction in material cost, energy cost and also total job cost. This is done as RAP involves reuse of materials so the above all cost reduces. Through this the amount of bitumen content present in the RAP is calculated. Today the reduction on the dumping of reusable materials is increasing. So in future there is very high possibility of ban on their disposal into landfills. So that isthe reusingof bituminous material show to sustainable development.

Key words: *Recycled asphalt pavement, virgin asphalt, bitumen content.*

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Paper ID: ICRTCE-23-0025

SEM Analysis of Nominal Concrete by Adding Mineral Admixtures

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ABSTRACT

Reducing the percentage of cement in concrete makes it more economical and environmentally friendly. The optimum dosage of cement with mineral admixture is more useful to find out the strength. But it increases the heat of hydration and reactivity then it produces bogue's compounds. The total analysis was done for finding out the desirable strengths and performing various tests like chemical & mechanical properties, proving that nominal concrete is more efficient for construction than compared to the other modes. We must conclude that by adding admixtures like rice husk ash and fly ash as 0%,5%,10%,15%,20% admixture to durability and other parameters of the structure. Here we are adding admixtures to make the concrete as high-performance concrete. Here in this study, we mainly focus on the sem analysis and xrd analysis of the normal concrete to know how much quantity of chemical in which proportions there are present in the specified powder of the specimen we have taken for the analysis. We will be knowing the constituents present in the specimen and we will be easily analysis the durability, strength and other characteristics using sem analysis.

Key words: *Heat of hydration, bogue's compounds, sem analysis, xrd analysis*

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Paper ID: ICRTCE-23-0026

Detailed Study on Concrete Using Nano Materials inPowder Form

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ABSTRACT

Concrete is the most widely used construction material it is prepared together mixing cementing materials, aggregates, water and sometimes admixtures, in required proportions Portland cement is the most important ingredient of concrete and is versatile. The use of cement is becoming common in these days owing to the attempts made by the researchers in the direction of utilization of materials, which area in nature abundantly. The new admixture Nano Silica are used in the present work while Nano Silica is a mineral admixture. The properties of these admixtures help in improving various characteristics of concrete which are presently used in concrete to modify its strength properties. In the present study strength properties such as compressive strength, split tensile strength and flexural strength of M20 grade of concrete with the use of nano silica (2%, 4%, 6%, 8%, 10%) of cement were studied. It was found from the experimental study that concrete composites with superior properties can be produced using nano silica.

Key words: *Concrete, Portland cement, Nano silica, Compressive Strength, Tensile strength, Flexural strength.*

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Paper ID: ICRTCE-23-0008

Experimental Study of Pervious Concrete with GlassFibre

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ABSTRACT

Conventional Portland cement Concrete is commonly used for pavement construction. The impervious nature of the concrete pavements contributes to the increased water runoff into the drainage system, over-burdening the infrastructure and causing excessive flooding in built-up areas. Pervious concrete is a special type of concrete with a high porosity used for concrete pavement applications that allows water from precipitation and other sources to pass directly through, thereby reducing the runoff from a site and allowing ground water recharge. The glass fibre can be the effective material to improve the properties of the pervious concrete. It will explore the use of glass fibre which is environmentally detrimental. The presence of glass fibre with cement content strengthens the concrete in greater extent. The tests to be carried out to analyze the properties of pervious concrete are void ratio, compressive strength, flexural strength and split tensile strength. Pervious concrete is a mixture of cement coarse aggregate and water. Pervious concrete is also known as zero slump concrete. Pervious concrete have less compressive strength so cannot be used for heavy traffic roads. In this thesis, glass fibre is used as a addition of cement to increase the strength of pervious concrete. The cement is addition of glassfibre in the volume of 1%, 1.5%, 2%, 2.5%, 3%, 4%. A large number of trail mixes are required to select the desired optimum addition of cement by glass fibre.

Key words: *Pervious concrete, pavements, compressive strength, flexural strength and split test tensile strength.*

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Paper ID: ICRTCE-23-0029

Preparation of Concrete Using Sewage Sludge Ash

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ABSTRACT

The recent environmental concerns have made the concrete technologists think of alternatives to cement or by partially or completely replacing it with pozzolonas. There is developing concern all over the world about the raw materials assets utilized in the creation of concrete, and most of them are limited and exhaustible. Use of recycled solid/liquid waste is in practice from a prolonged period in civil engineering application. The solid waste from wastewater treatment plant can be utilized as fillers or supplementary cementing material for the production of ecofriendly green concrete. Sewage sludge is a by-product of a sewage treatment plant. The amount of sewage sludge is used in this experiment is 15%. This paper reviews the properties of, sewage sludge ash and its application as a binder material in concrete. State of the art review on the available literature pertaining to sewage sludge and sewage sludge ash is presented. Since the property of the sludge depends on the source of wastewater, a detailed report on variation in the properties reported in the literature is presented. Particle size analysis, specific surface area, chemical composition of SSA reported in various sources are discussed. Properties are discussed on the probability to be used as a potential binder for concrete making is also discussed. Physical and chemical properties in comparison with that of OPC are discussed.

Key words: *Binder, Concrete, Sewage sludge, Sewage sludge ash.*

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Paper ID: ICRTCE-23-0030

Recycling Of PCB and Electronics Waste to Reduce the Impact on the Environment

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ABSTRACT

As the foundation for almost all electronic products, the printed circuit board (PCB) recycling issue has received much attention from the government, enterprises, and communities. In order to develop environmentally friendly recycling processes of PCB, the advantages and disadvantages of the existing PCB recycling process are analyzed first. Aimed to the disadvantages of the existing recycling processes, the physical recycling process is selected and improved as the solution to PCB recycling. In the improved process, a spray water process is superimposed on the shredding and smashing process and the industrial dust and irritant odor can be eliminated effectively. In order to reduce the noise impacts, the equipments are insulated within a cabin mounted sound-absorbing materials and it makes operators expose the noise under 80 dB (A). The aim of this project is to be a reference for research and implementation for PCB recycling process. Original information is collected from the companies engaged in PCB recycling industry and articles published after 1990. The paper gives an overview of PCB structure, material composition and different recycling processes.

Key words: *Environmental impact assessment, Printed circuit board, PCB recycling, De manufacturing,Electronic product disassembly, End-of-life, Printed circuit boards (PCB) recycling.*

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Paper ID: ICRTCE-23-0031

Experimental Analysis Using Nano Material in Concrete

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ABSTRACT

In the present era, concrete is mixed, transported, placed, compacted, and finished. In spite of all the activities done through checking with high standard quality with tight schedule of work, there occur marginal errors, such as honey combing, voids in concrete, and could not achieve desired values. So the traditional concrete is replaced with the new technique Concrete. The workability properties of Concrete show significant increase in strength and workability properties. Concrete has segregation resistance evaluated using workability tests, the present work deals with addition of Nano-silica to concrete as partial replacement to cement in dosages of 1%, 1.5%, and 2% by weight of cement. Based on early research, M20 grade concrete has been chosen for this work. The mix design was prepared using IS: 10262-2009 guidelines for concrete mix design proportioning. In the present work, 24 numbers of cube moulds and 12 numbers of cylinder moulds were casted with addition of Nano-silica with different proportions, which are tested for compressive strength. Addition of Nano-silica to normal cement concrete show increase in compressive strength and decrease strength. The compressive strength of cement concrete can be increased considerably by the addition of Nano-silica. Based on the experimental results, use of Nano-Silica as partial replacement of cement in small quantities is advantageous on the performance of concrete. Nano-Silica added in small quantities can improve the compressive strength.

Key words: *Concrete, Flow ability, Passing Ability, Nano Silica, Super Plasticizer.*

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Paper ID: ICRTCE-23-0032

Estimation of Passenger Car Units By UsingHeterogeneous Methods

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ABSTRACT

Passenger Car Unit (PCU) can also be termed as passenger Car Equivalent (PCE). PCU is a unit used in Transportation Engineering. To study the rate of traffic flow on any intersection or road we must have studied PCU value of various categories of vehicles. Passenger Car Equivalent of any type of vehicle is the effect of vehicle on traffic variable as compared with a Standard Passenger Car. Transportation plays an important role in the growth of any country. In developing country like India, Road Transportation plays very crucial role in the development. Nature of the traffic on developing countries like India is heterogeneous in nature. As we all know, India has second largest network in the world. Roads are the most common and used mode of transportation. Various categories of vehicles which differ in dimension are available on the roads. So any set of values of PCU is not suitable for that particular location or condition. This means that we cannot simply depend upon the static PCU values provided in the manuals, we need to calculate dynamic values of PCU varying with respect to location or condition. Two Methods are used for determining the PCU values at unsignalized intersections. In first method the PCUs are estimated as per Highway Capacity Manual considered at unsignalized intersections. In HCM the PCU values are calculated using occupancy time method. In second method, the method proposed by Chandra & Kumar for estimation of PCUs is used. It is most popular method used for estimation of PCUs which is used in various countries of the world. Data was collected at unsignalized intersections. There was not obstruction in observation of traffic due to roadside construction, bus stop, market etc.

Key words: *Unsignalized, Expressways, Inconsistency Homogeneous.*

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Paper ID: ICRTCE-23-0037

Barriers in the Green Building PracticesAdoption: A Stakeholder's Perception

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ABSTRACT

India has become the world fourth largest market for Green building construction. The reasons for this demand are obvious: these structures are designed to save energy, waste, emissions, and water while also prioritizing occupant health and wellness through the use of eco-friendly construction materials and improved air movement. People are becoming more conscious of the importance of utilizing green solutions that do not hurt the environment, and the building industry is heading the same way. The research focuses on numerous literatures and attempts to assess the Green building adoption or implementation barriers in the residential construction. The goal is to find and assess obstacles by questionnaire survey using ranking based on individual stakeholder's perception from developing countries like India. The findings revealed that there is a need for a shift in stakeholder perceptions and attitudes toward green building development. This article will assist construction professionals in their decision-making and raise awareness about the advantages of using green buildings.

Keywords: *Green buildings, Awareness, Adoption, Barriers, Stakeholders perception, ANOVA.*

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Paper ID: ICRTCE-23-0049

A Systematic Literature Review on DelayFactors In Construction Projects

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ABSTRACT

During the construction, delays because of numerous reasons are very common in nature. While the delay problems have been researched through decades, the complexity and methodologies are also been developing. An updated literature review is required as delays are unique and complex in nature. The paper focuses on the various literature and tries to analyze the factors of the delay using the content analysis process. The purpose is to study research articles published by various researchers from different countries and identify delay factors in the construction. The categorization of delay factors is divided into nine group's particularly project-related, consultant-related, contractor-related, owner-related, design-related, material-related, labor-related, equipment-related, and external factors relying on their nature and mode of occurrence and visualized using the Ishikawa (fishbone) diagram. This article will assist to guide the construction professionals to recognize the significance of causes of delays.

Keywords: *Delay categories, content analysis, time cost overruns, statistical measures, relative importance index, and construction process.*

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Paper ID: ICRTCE-23-0051

Analysis of Barriers for Implementation ofBIM Adopting The LPS For The Construction Projects

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ABSTRACT

The integration of Building Information Modeling (BIM) and lean principles is seen as a potential strategy that can reduces waste in the construction process workflow. Improving the quality of design and construction phases through Lean implementation and BIM practices towards waste minimization. Various projects in construction has optimize the workflow, rapid learning and improve productivity by adopting the Last Planner System (LPS) for project management design. Implementing BIM is challenging as well as opportunistic for the Architectural, Engineering and Construction (AEC). The barriers for BIM are seen as a cultural problem, legal barriers, lack of skill-sets and competence, economic and management problems. The main objective of this paper is to identify the barriers in implementing BIM and the adoption process of last planner system in the construction process workflow. In this study, thorough literature review is carried out to achieve the research objective. The distribution of these barriers differs from one region to another, hence, the need to identify the challenges and benefits realization of BIM as well as LPS adoption for efficient planning process, effective timing in workflow and increases productivity.

Keywords: *Building information modeling, Last planner system, lean construction, productivity.*

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Paper ID: ICRTCE-23-0041

Determination of Critical Offsite Construction Adoption Factors Using MachineLearning Approach

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ABSTRACT

In an attempt to address a broad range of productivity concerns that cut across organizational, technological, and strategic domains, new offsite building approaches are emerging in the construction sector. Offsite building continues to encounter significant resistance from both the construction industry and the built-environment market, despite all its advantages from a sustainable and economic standpoint. Off-site construction (OSC) is a well-known effective construction technique that could reduce resource waste, save time and money, and boost a project's overall productivity. OSC can provide greater productivity and safety when combined with digital technology related to the Industry 4.0 concept. This essay aims to assess recent research on OSC's use of digital technologies. This research seeks to comprehend how the offsite construction business has evolved through time while also examining the industry's viewpoint on the use of offsite strategies. This evaluation provides a comprehensive picture of how these digital technologies are being used and explains the key uses and restrictions of each technology when applied to OSC. The assessment also highlights their potential and outcomes with the goal of assisting construction firms in developing a roadmap for their future strategic development and understanding the potential advantages of off-site construction.

***Key words**: Machine learning, Building information modelling, barriers, implementation,*

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Paper ID: ICRTCE-23-0039

Understanding the Critical Barriers InPractical Implementation of Building Information Modeling

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ABSTRACT

One of the most important technology developments in the building design and construction sector to date is building information modelling (BIM). Over the preceding ten years, there has been a considerable increase in the use of BIM. It provides prospects for data sharing and consumption reduction while fostering improved collaboration between the many project stakeholders. However, a number of obstacles mean that BIM implementation falls far short of its potential. This study's goal is to identify and evaluate the hurdles to building information modelling deployment that construction industry professionals believe exist (BIM). Construction professionals and other industry stakeholders would benefit from the identification and assessment of the major implementation challenges to BIM in order to advance BIM adoption. This study examined the adoption of BIM in the construction sector across various nations and demonstrated the benefits of BIM throughout the phases of the building lifecycle. This study provides data on BIM adoption in the construction sector and serves as the foundation for additional inquiry.

***Key words**: Building information modelling, barriers, implementation, Construction industry, Virtual design and construction.*

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Recent Trends Advances and Researches on NonDestructive Test

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ABSTRACT

Here provides the recent trends advances and researches about non-destructive testing (NDT) methods for defect characterization in engineering materials and composites. The paper covers the review on the capabilities of NDT applications such as Visual Testing (VT), Ultrasonic Testing (UT), Thermography, Radiographic Testing (RT), Electromagnetic Testing (ET), Acoustic Emission (AE) and shearography testing with respect to advantages and disadvantages of these methods. Further methods are classified on basis of their intrinsic characteristics and their applications. Mostly, an NDT evaluator uses only one non-destructive test method to perform the evaluation. If the scope of work is straight forward, using a single test method is acceptable. However, there are times when a single test method does not provide enough information about the material integrity and thereby combination of different methods is essential. Non destructive testing is widely applied in power plants, aerospace, nuclear industry, military and defence, storage tank inspection, pipe and tube inspection and composite defects characterization. This paper mainly focuses on the scope of NDT application for composite materials.

Keywords: *Eye detection, Face detection, Landmark Plotting, Blink detection, detection accuracy, support vector machine*

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A Study on Green Buildings in India

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ABSTRACT

The term & quot;green building" is used to describe buildings that are designed, constructed, and operated, to have a minimum impact on the environment, both indoor and outdoor. Most discussions of green buildings refer to the importance of providing an acceptable, if not exceptional, indoor environment for the building occupants. However, these discussions of indoor environment quality have not included many specific recommendations or criteria for building design, construction, or operation. Building projects described as green building demonstrations often refer to indoor air quality, but these references are often general and qualitative. In addition, rating systems that have been developed to assess the "greenness" of a building are based largely on design features and are not particularly specific with respect to indoor air quality. This paper reviews the features of indoor air quality that are considered in green building discussions, demonstration projects, and rating systems. These green building features are discussed in terms of their completeness and specificity, and are compared to other guidance on building design, construction, and operation for good indoor air quality. A case study of indoor air quality performance in a green building is presented. This study includes a description of the indoor air quality features of the building and the results of a short-term indoor air quality evaluation of the building involving ventilation and contaminant concentration measurements

Keywords: *Green Buiding, India, Sustainability,*

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Impacts of Civil Engineering Infrastructureson Environmental Sustainability

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ABSTRACT

Civil engineers, human activity, construction projects, and national development must all strive for sustainability. This paper examines various infrastructure impacts, with a particular emphasis on the planning, maintenance, and implementation of civil infrastructures that protect the natural environment. Interaction with professionals, a review of literature, and a reconnaissance survey of housing units using Ado-Ekiti as a case study are all part of the research methodology for this study. The information gathered was used to gain an overview of the current environment. According to the study, civil engineering infrastructure development projects had a significant environmental impact, particularly in the areas of flooding, dilapidated roads, noise pollution, water pollution, erosion, ecological disorder, decrease in available land size, and natural hazards. In the study area, 11.0% of residents live in compound buildings, 4.5% live in duplexes, and a significant number of residents in the study area live in rooming houses with low monthly incomes and are thus denied the benefits of well-furnished and high-quality buildings. Conclusions are provided in relation to both engineering sustainability pathways and the broader ultimate goal of sustainability. Civil engineering interventions can prevent flooding and improve housing units. Based on the findings, recommendations for mitigating negative effects and achieving sustainable construction, innovative civil engineering infrastructure, national and socioeconomic development were made.

Key words: *Concrete, Industrial by-products, Mechanical properties, partial replacement.*

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Study on Different Compressive Strength Fibre Rein-Forced Concrete

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ABSTRACT

Concrete is one of the most widely recognized development material for the most part delivered by utilizing the locally accessible ingredients. The development of concrete has brought about the essential need for additives both chemical and mineral to improve the performance of concrete. Hence varieties of admixtures such as fly ash, coconut fibre have been used so far. Hence an attempt has been made in the present investigation to study the behaviour of glass fibre in concrete. Plain concrete possesses very low tensile strength, limited ductility and little resistance to cracking. Internal micro cracks are inherently presenting concrete and its poor tensile strength is due to propagation of such micro cracks. Fibre, when added in certain percentage in the concrete improves the strain properties as well as crack resistance, ductility, flexural strength and toughness. Mainly the studies and research in fibre reinforced concrete has been devoted to Steel fibres. In recent times, glass fibres have also become available, which are free from corrosion problem associated with steel fibre. Modern technology has made it possible to extract fibres economically from various plants such as jute and bamboo. The present trend in concrete technology is towards increasing the strength and durability of concrete to meet the demands of the modern constructions. The main aim of the study is used to study the effect of glass fibre, steel fibre and natural fibre in the concrete. Glass fibre has the high tensile fire resistant properties thus reducing the loss of damage during fire accidents.

Keywords: *Glass Fibre Reinforced Concrete (GFRC), Natural Fibre Reinforced Concrete (NFRC),Steel Fibre Reinforced Concrete (SFRC),High Strength Concrete*

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An Experimental Study of Strength of Plastic Fiber Reinforced Concrete

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ABSTRACT

From past few years, we are facing a lot of problems regarding environmental safety. Manythings which are invented for our luxurious life are responsible for polluting environment due to improper waste management technique. One of them is a plastic fiber. This project mainly concentrates on the evaluation of different strength properties of plastic reinforced concrete when compared to the normal conventional concrete. In this experimental study, we will use plastic fiber and investigate the strength parameters like i.e., flexural strength, compressive strength and spilt tensile strength. The comparison of performance of conventional concrete with plastic fiber reinforced concrete is studied and observed experimentally by performing required laboratory and field tests. By using cubes of size (150*150*150) in mm with M20grade of conventional concrete and fiber reinforced concrete using plastic fiber to find out the strength characteristics. The aspect ratios used were 30, 50, 70, 90 and 110 and the various volume fractions of fibres adopted were 0.25, 0.50, 0.75, 1.00, 1.25 and 1.5. All the results were compared with reference specimens of plainconcrete.M25 grade of concrete was designed as per IS10262-2009 code of practice which was adopted for all experimentation. Strengths wastested by compression test, splittensilete stand flexural strength test.

Keywords: *Plastic fibers, Flexural Strength, Comparison*

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Soil Stabilization Of Black Cotton Soil Using Flyash

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ABSTRACT

Nearly 51.8 million hectares of land area in India are covered with Expansive soil (mainly Black Cotton soil). The property of these expansive soils, in general, is that they are very hard when in dry state, but they lose all of their strength when in wet state. In light of this property of expansive soils, these soils pose problems worldwide that serve as challenge to overcome for the Geotechnical engineers. One of the most important aspects for constructionpurposesissoilstabilization,whichisusedwidelyinfoundationandroadpavementcon structions; this is because such a stabilization regime improves engineering properties ofthesoil,suchasvolumestability,strengthanddurability.Thismainlyincludesthestabilizationof black cotton soil with the admixture fly ash. It is very important to know the behavior of black cotton soil and its problems so that construction could be done efficiently. This research paper examine the behavior of black cotton soil stabilized with different proportion 15%, 20% and 25% of fly ash added to the black cotton soil. The admixtures used in this are easily available and are economical beneficial. The various tests on black cotton soil with addition of fly ash are performed after developing the samples. The main aim of this research was to find the optimum percentage of mixing fly ash with the black cotton soil. The results obtained from the experiments are compared to the black cotton soil with the admixture fly ash. The results will obtain in terms of liquid limit, plastic limit, shrinkage limit, plastic index, maximum dry density and optimum moisture content.

Key words: *Black cotton soil, stabilization techniques, fly ash stabilization, hydration of fly ash*

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A Mechanical Study on Self Compacting Concrete Using Nano Silica

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ABSTRACT

The Making concrete structure without compaction has been done in the past. Like placement of concrete in critical section without compaction. Inaccessible areas were concert is pumped using such techniques. The production of such mixes often used expensive admixtures and very large quantity of cement and admixture. But such concrete techniques shows lower strength values and difficult to obtain, this lead to the development of Self Compacting Concrete (SCC). The workability properties of SCC show significant increase in strength and workability properties. Self-Compacting Concrete has segregation resistance are evaluated using workability tests such as slump flow, V funnel and L-Box tests. The present work deals with addition of nano-silica to concrete as partial replacement to cement in dosages of 1%, 1.5% and 2% by weight of cement. Based on early research M25 grade concrete has been chosen for this work. The mix design was prepared using IS: 10262-2009 Guidelines for concrete mix design proportioning. In the present work 24 numbers of cube moulds and 12 numbers of cylinder moulds were casted with addition of nano-silica with different proportions which are tested for compressive strength and split tensile strength. Addition of nano-silica to normal cement concrete show increase in compressive strength and decrease in splitting tensile strength.

Keywords: *Self Compacting Concrete, flow ability, passing ability, Nano silica, super plasticizer.*

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Analysis and Cooling of Hyperbolic CoolingTower

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ABSTRACT

Cooling tower are the biggest heat and mass transfer devices that are in wide spread use. Itworksonthetemperaturedifferencebetweentheairinsidethetowerandoutsidethetower.In this study cooling tower in analyzed under the effect of earthquake forces using STAADpro software. The parameters considered are top diameter and height of cooling with constant thickness under different zones of India. It is observed from the analysis that maximum displacement, support reactions support moments stresses and bending moments in plates due to seismic loading on a hyperbolic cooling tower is continuous function of geometry. Based on these results, salient conclusions are drawn. Hyperbolic cooling towers are large, thin shell reinforced concrete structures which contribute to environmental protection and to power generation efficiency and reliability. Inlet water temperature and mass flow rate of water and air are having main influence on the performance of counter flow induced draftcooling tower. In cooling tower water is made to trickle down drop by drop, or form a thin layer overflat surface so that it comes into direct contact with air moving upwards in opposite direction. The heat transfer from the water to the air steam raises the air's temperature and its relative humidity to 100% and this air is discharged to the atmosphere. In this study we will perform dynamic analysis of a tall tower considering thermal effect over the inner layer of the tower and wind pressure to determine its stability in terms of temperature, cracks, stability, resistivity, forces and displacement.

Keywords: *Cooling tower, Modelling, Earthquake, Stresses, Temperature,*

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Bonding Properties of GFRP Rebars & Engineered Cementitious Composites

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ABSTRACT

Any The goal of this study is to look into the binding properties between GFRP (glass fibre reinforced polymers) and ECC (engineered cementitious composites) rebars. The bond-slip characteristics of steel and GFRP rebars in ECC that were reinforced with Polyvinyl Alcohol (PVA) fibres were investigated through an experimental study. The RILEM guidelines were followed when designing a total of 8 beam specimens, which were then tested in accordance with those guidelines. The primary goal was to assess how the characteristics of concrete type (Normal concrete and fibre reinforced concrete), bar diameter and type, and load against displacement and load versus slip behaviour and bond strength affected the results. According to the test results, the steel-reinforced concrete and ECC specimens behaved similarly. GFRPO reinforced samples, however, demonstrate.The bond-slip characteristics of steel and GFRP rebars in ECC that were reinforced with Polyvinyl Alcohol (PVA) fibres were investigated through an experimental study. The RILEM guidelines were followed when designing a total of 8 beam specimens, which were then tested in accordance with those guidelines. The primary goal was to assess how the characteristics of concrete type (Normal concrete and fibre reinforced concrete), bar diameter and type, and load against displacement and load versus slip behaviour and bond strength affected the results. According to the test results, the steel-reinforced concrete and ECC specimens behaved similarly. GFRPO reinforced specimens, however, exhibit distinct behaviour in relation to that. A comparison of the MC90 test and equations was done, and the bond was predicted by the code.

Keywords: *Bond Strength, ECC, PVA fibers*

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Low Cost Roofing Tiles Prepared By Using Waste Tetra Packs & Milk Sachets

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ABSTRACT

The scenario of living in huts in slum areas is becoming very difficult day by day due to vast change in climate. Replacing the ordinary huts and conventional poor class roofs with much efficient alternate roof cover is being the most required. On the other side, proper and efficient disposal of tetra pack is being the key factor in solid waste management in most of the Indian States. Having both the problems in a single line, in this project we to have prepare and evaluate the performance of low cost roofing tiles by used tetra pack as raw material. Based on the results, it is suggested that we can efficiently replace significant quantity of river sand in making roofing tiles with the tetra pack in appropriate propositions which gave compressive strength as similar as before replacement. Predicted application as temporary shelters in flooding areas low-cost pipelines as partition boards and sun shades. By replacing the river sand in making roofing tiles would reduce its manufacturing cost as well as selling price and makes it more affordable .Thus preparation of such sand replaced roof tiles will significantly reflect healthy environmental and economic benefits.

Keywords: *Roofing tiles, Partial sand replacement, Compressive strength, sun shades, partition boards.*

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Thirsty Roads Design Composition With Recycled Aggregates

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ABSTRACT

Top mix Permeable is a fast-draining concrete pavement solution that has been described as 'THIRSTY CONCRETE' because of the rate it is able to absorb surface water. Traditional concrete must be permeable enough to allow water through to ground level at a minimum rate. This innovative new material system, manufactured by Tarmac, offers much potential for the design of sustainable urban drainage systems (SUDS), in terms of being able to provide a practical answer to the perennial problems of surface water flooding. Whereas conventional concrete is sand-based, Tarmac uses tiny pieces of crushed granite packed together. Known as 'NO-FINES CONCRETE ', allows surface water to drain through and dissipate naturally. This helps reduce the risk of surface water flooding and watercourse contamination. Tarmac's invention is a porous concrete called Top mix Permeable that absorbs water at a staggering rate. The concrete can absorb many gallons of water in one minute. Compared to traditional concrete that only absorbs approximately one thousandth of a gallon every minute. The thirsty concrete doesn't actually"absorb"water, but rather drains it into the ground. The material is made up of tiny pieces of granite that are packed together.

Keywords: *Conventional, Tarmac, Contamination, Porous concrete.*

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Investigation on Terracotta Air Conditioning System In Indian Climate

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ABSTRACT

In India, heat waves are common throughout the summer and in much of the nation, going outside in the sun will result in sunburn. It is common for temperatures to reach 40 degrees Celsius. Because of this, it is challenging for people to tolerate the intense heat. If the heat from the sun is insufferable, picture getting fried during the hottest month of the year. So our project Terracotta air conditioning is an economical solution for such a crisis. The beehive's structure served as the basis for this design. Beehive's structure developed a method that is both practical and aesthetically pleasing at the same time by using eco-friendly materials to build an artistic work of art. The cone structures are arranged in a desired pattern to fulfill bee hive structure for a greater surface area and a greater cooling effect, cylindrical cones are used. In addition to being creative and environmentally friendly, the solution uses traditional artisan techniques. Using porous terracotta and its innate cooling capabilities it enables a low maintenance, affordable and sustainable option by transforming the hot air from the generator set into a nice breeze. This installation not only provides the solution in the simplest possible way, but it also offers a scalable and practical alternative that may be viewed as artwork. The installation can also be made into a zero-energy prototype. It is a versatile and scalable module. It can be altered to fit specific requirements as an art installation. There are several factories all around the nation that have comparable DG set problems and need such homegrown, environmentally friendly solutions.

***Keywords**: Beehive's structure, is eco-friendly, porous terracotta.*

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The Implementation Of Custard Apple Seed Shell Ash As A Partial To Cement ReplacementMaterial In Concrete

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ABSTRACT

Concrete ingredients is different material like binding material (cement+ custard apple seed shell ash), fine aggregate, coarse aggregate and water. Today construction cost is very high with using conventional materials due to unavailability of natural materials. This problem can be solved by total replacement of concrete with different material which is not convenient in terms of required properties. Due to this limitation of unavailability of material which plays the vital role of concrete we have only choice of partial replacement of concrete ingredients by waste materials. Overv4.2 billion tons of cement was consumed globally in 2018 based on survey of world coal association and also cement production emits CO2 in to the atmosphere which is harmful to the nature. If we can partially replace the cement with the material with desirable properties then we can save natural material and reduce emission of CO2 in to the atmosphere. This industrial waste dumping to the nearest site which spoils the land and atmosphere as well as it also affects aesthetics of urban environment so use of this waste material in concrete is cost effective as well as environment friendly way to disposal of waste. The primary objective of this study is to select the waste material which gives desirable properties with concrete. This study includes previous investigation done on the mechanical and chemical properties of concrete produced using partial replacement of cement by waste materials.

Keywords: *custard apple seed sheel ash, partial replacement, concrete,*

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Production of Brick Materials From Municipal Solid Waste Study

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ABSTRACT

A lot of research is currently being done recycling, into how to reuse the waste we produce in our daily lives. This paper presents some of the results from a continuous study of recycling municipal solid waste ash (MSW-ash) into brick materials. In present study, the mixture of municipal solid waste ash and clay are used to make standard bricks fired at 900C & 950C. Physical characteristics including density, firing shrinkage, compressive strength and water absorption test of brick materials are reported and discussed. The results of test indicated that the municipal solid waste ash proportion and firing temperature were the two key factors determining the quality of bricks.

Keywords: *Properties; Bricks, Municipal solid waste ash, Firing temperature, Recycling.*

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Study on Strength Properties of Autoclaved Aerated Concrete Block

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ABSTRACT

Autoclaved aerate concrete is a light weight precast, foam concrete building material suitable for producing Concrete Masonry Unit(CMU) like block. Autoclaved aerated concrete (AAC) is made with fine aggregates, cement, and an expansion agent that causes the fresh mixture to rise like bread dough. In fact, this type of concrete contains 80 percent air. In the factory where it is made, the material is molded and cut into precisely dimensioned units. It is now gaining its importance in construction industry replacing all the conventional methods. This cellular structure gives AAC a number of exceptional physical characteristics. It weighs as little as 1/5 as much as ordinary concrete because of its distinct cellular structure which possess millions of tiny pockets of entrapped air. AAC consists of basic materials that are widely available. These include sand, cement, lime, fly ash, gypsum, aluminum powder paste, water and an expansion agent. Silica sand, the raw material used in the greatest volume in AAC, is one of the world's most abundant natural resources. The finished product is up to five times the volume of the raw materials used, with an air content of 70% to 80% (depending on the required strength and density). In the last decade, construction industry has been conducting various researches on the utilization of easily available raw materials in construction. AAC is one of the materials which can cope up with the shortage of building raw materials and can produce a light weight, energy efficient and environmentally friendly concrete. This study deals with the introduction to the process of the autoclaved aerated concrete and its advantages compared to the normal concrete.

Keywords: *Autoclave aerated concrete blocks, Aluminum powder paste, Fly ash, Light weight, Silica sand.*

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Analysis for Improving The Properties of Expansive Soils

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ABSTRACT

Expansive soils exhibit swell potential, compressibility, and low strength, especially in water. These soils, if used in highways and railroads earthworks where it's unavoidable, can cause several damage to the structure of these major transportation facilities. Therefore, improvement of this type of soil is necessary. Using commercial admixtures in improvement encounter supplementary cost. Therefore, using by-product material is an economic and effective alternative. Cement kiln dust (CKD) is generated in huge quantities as a by-product material in Portland cement plants. Therefore, this study aims to use CKD to improve expansive soil properties. This study involved a series of laboratory tests on sets of untreated samples and samples treated with different doses of CKD to investigate their effects on the properties of expansive soil. The investigation includes classification tests, compaction tests, permeability tests, compressibility tests, shear strength tests, swelling tests, and California Bearing Ration (CBR) tests. In addition, chemical tests were performed to determine the changes in pH values of control and treated soils. Furthermore, SEM and XRD tests were performed to explore the mineralogical and morphological properties of the original and the soil treated with 14% CKD and investigate new product generation.

Keywords: *Portland cement, Soil, Calcium Silicate Hydrate, Calcite.*

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An Investigation Study of Low Cost Housing Scheme in India

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ABSTRACT

A real time project should be like giving a solution to long time problems. So, our main motto is to decrease the cost of building a house without compromise in quality and following all safety precautions. Here we just targeted to minimize the cost of building by nearly 30% and increase life of building 3 times more than traditional building cost. We think that for a person water, air, food &medicines are only essential things to survive but reality is having a town house is also essential thing for a middle class person. So, we think this project can help all the middle class men's dream to have an own house with low cost and high quality. In this paper an attempt is made to review all the popular meds of low-cost housing scheme. Low Cost Housing is a different concept which deals with effective costing and following of techniques which help in reducing the cost construction through the use of faraway available materials beside with and technology improved skills without losing the power, performance and life of the structure. There is huge misconception that low cost housing is suitable for only subnormal works and they are built by using cheap building materials of low quality. The fact is that Low cost housing is done by proper management of resources. Economy is also achieved by postponing finishing works or implementing them in phases. Cost of reduction is achieved by selection of more efficient material or by an improved design. Construction of low cost housing by using the low cost construction materials increases the access to buildings by low income group peoples.

Keywords: *Public-Sector, Market-Rate, Low and Middle Income, Economical Housing.*

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Flexural Performance of Hybrid Engineered Cementitious Composite Layered Reinforced Concrete Beams

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ABSTRACT

This paper presents the experimental investigation to evaluate the flexural performance of the newly developed hybrid Engineered Cementitious Composite (ECC) layer at the tension zone around the main reinforcement of the beam. Four different ECC mixes are used in the beam to evaluate the flexural performance, hybrid ECC based on the low modulus polyvinyl alcohol (PVA) and high modulus steel short random fiber reinforcement. The aim of hybridization is to improve the flexural, energy absorption, and ductility performance of reinforced concrete beams. In addition to the compressive strength, young's modulus, uniaxial tensile strength, and bond strength of ECC mixes are determined. ECC with PVA fiber with 2.0% volume fraction mix is kept as reference mix, hybridization is made with PVA (1.35%) and steel (0.65%), PVA (1.00%) and steel (1.00%), and finally with PVA (0.65%) and steel (1.35%). This hybridization has remarkable achievements in mechanical properties and in the flexural behavior in ECC layered RC beams. The results show that mono fiber ECC reinforced with a PVA of 2.0% and hybrid fiber ECC reinforced with 1.35 % of PVA fiber and 0.65% steel fiber have reasonable flexural characteristics than the conventional beam.

***Keywords**: Engineered Cementitious Composite, direct tensile, flexural strength, bond strength, energy absorption.*

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A Study on Strength Properties of Transparent Concrete

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ABSTRACT

Transparent concrete is the new type of concrete introduced in modern era which carries special property of light transmitting due to presence of glass rods & is also known as translucent concrete or light transmitting concrete. It is lighter than conventional concrete having special features such as low density and thermal conductivity with main advantage of reduction in dead weight, faster building rate in construction, lower haulage & handling cost. Light is transmitted from one surface of the brick wall to the other due to glass rods along the overall width of the wall which allows light to pass through. An optical glass fibre (or optical fibre) is a flexible, transparent fibre made of glass (silica)or plastic, slightly thicker than a human hair & can function as wave guide, or "light pipe" to transmit light between the two ends. Main aim of the study is to design translucent concrete blocks with the use of glass rods with sand & cement then analyse their various physical & engineering properties with respect to conventional concrete blocks by adding glass rods of 1%, 2 %, 3 % 4 % 5% at 1.5 cm s spacing respectively.From the study, it can be concluded that there is 5% to 10% increase in initial compressive strength for 7 days & also10% to 15% increase in initial compressive strength for 28 days to a glass rod mix of up to 3% Whereas the initial &final characteristic compressive strength gradually decreases with an increase in glass rods in the concrete mix.

Keywords: *Transparent concrete, Work-ability, Compressive strength, Tensile strength, Flexural strength.*

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Design And Analysis of (G+5) Commercial Building Using Staad Pro Software

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ABSTRACT

The multistoried commercial building having mixed stories with shopping complex and office space. shopping is a routine activity of each and everyone. but they have a short of time.so they need a shopping complex and office space under one roof to save the valuable time. This project will help to build buildings within the limited area satisfying each and every need of people and it is designed in a way that it would be economical and time saving. This project work involves planning, analysis and drawing of a typical (G+5) commercial building using STAAD Pro. & it involves analysis various load cases & load combinations are included, RCC framed structure is used for commercial multi- storied buildings, structure design is to be done using limit state method and comparing it with manual calculations.

Keywords: *Visualization tools & STAAD, analysis,*

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Study on Light Weight Concrete

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ABSTRACT

Light weight concrete is a mixture made with light weight coarse aggregates which gives it characteristic low density. This project work focuses on experimental work deals with the investigation on the development of light weight concrete by combining two types of light weight aggregates of which, one is naturally occurring and the other is artificially occurring. Light expandable clay aggregates (LECA) are natural aggregate and Cinder is the artificial aggregate. This experimental work carried out aims to study on the strength properties of structural light weight concrete produced replacing coarse aggregate by blending light weight aggregates such as Cinder and LECA for M20 grade of concrete. The light weight aggregates Cinder and LECA were blended in various percentage proportions 0:100, 10:90, 20:80; 30:70; 40:60, 50:50 and vice-versa by volume of concrete to prepare light weight concrete. The properties such as compressive strength, split tensile strength and density are studied by casting plain cube specimens of size 150 x150 x150mm and cylindrical moulds of 150 x 300mm. light weight concrete with 60% Cinder and LECA 40% have given the better results with high strength, less weight and low density. Addition of Ground Granulated Blast Furnace Slag (GGBS) is used by replacing 20% of cement which enhanced the compressive strength of concrete.

Keywords: *LECA, Cinder, Compressive strength, Split tensile Strength, Density, GGBS*

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Effect of Rebar Embedment on the Compressive Strength of Low-Strength Concrete

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ABSTRACT

Low-strength concrete (LSC) elements are prone to several seismic and static loads and are one of the priorities to be considered for FRP strengthening. However, certain provisions should be taken into account according to provisions, as elements with considerably low compressive strength are not eligible for FRP confinement. This experimental study investigates (1) the effect of rebar planting on increasing the initial compressive strength of LSC to achieve allowable compressive strength for FRP strengthening, and (2) the effect of CFRP confinement on increasing the strength of rebar-embedded specimens and determining the most effective factor for strength improvement. For this purpose, 38 standard concrete cylinders were tested under compressive load. The variables of this study were rebar length and diameter, the compressive strength of concrete, and the number of CFRP sheets. Two initial compressive strengths below the designated compressive strength of 17 MPa (12.5 and 14.5 MPa) were selected. After determining rebar-reinforced specimens with compressive strength of more than 17 MPa, CFRP confinement and compressive tests of these cylinders were utilized. A statistical single-factor ANOVA analysis is performed to determine the most effective variable for ultimate strength and strain, individually. In the end, available models in the literature were utilized to predict experimental data. The results indicated the effectiveness of rebar planting for strength enhancement up to 53%, also showing that specimens with initial compressive strength of 14.77 MPa were suitable for CFRP confinement after rebar planting. The experimental and statistical ANOVA results demonstrated the CFRP confinement and its interaction with rebar embedment as the most effective factors with respect to increasing the load-bearing capacity of LSC concrete.

Keywords: *CFRP, ANOVA, LSC concrete, load-bearing capacity*

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Failure Mechanism of Fiber-Reinforced Polymer-Confined Concrete Column With Initial Defects

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ABSTRACT

The effect of initial defect size on the mechanical behavior and failure mode of carbon fiber-reinforced polymer- confined concrete column was investigated through theoretical analysis, finite element software simulation and experiment validation. Qualitative theoretical analysis was firstly explored to study the effect of initial defect size on the mechanical behavior of confined concrete column from macro to micro perspective. Numerical simulations and experimental investigation were then carried out and compared to investigate the mechanical behavior of carbon fiber-reinforced polymer-confined concrete column with initial defects under axial compression and eccentric compression. The variation of defect criticality was investigated by varying the layer number of carbon fiber-reinforced polymer and cross-section size of concrete columns. The effect of initial defect size on the failure mode of carbon fiber-reinforced polymer- confined concrete column was finally demonstrated.

Keywords: *fiber-reinforced polymer, confined concrete, mechanical behavior, failure,*

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A Study on Recycled Aggregate Concrete With Partial Replacement of Fine Aggregate With GGBFS

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ABSTRACT

From the past few years, there have been many investigations about usage of natural fibres inreinforced concrete because of their abundant availability in local premises. Several factorslike low cost, low environmental impact, improved strength serve as the main reasons for thisprolonged research. This project mainly concentrates on the effects and importance of usingfibrereinforcedconcrete.Concreteisoneofthemostwidelyrecognizeddevelopmentmaterial for the most part delivered by utilizing locally accessible ingredients. The present trend in concrete technology is towards increasing the strength and durability of concrete to meet the demands of the modern construction. In this experimental study, we will investigate the strength parameters like i.e., flexural strength, compressive strength and spilt tensile strength which can be achieved bythe usage of natural fibres. The comparison of performance of conventional concrete with fibre reinforced concrete is studied and observed experimentally by performing required laboratory and field tests. By using cubes of size (150*150*150) in mm with M25 grade of conventional concrete and fibre in forced concrete. Using natural fibres like coconut coir, banana which are easily available.

Keywords: *GGBFS, recycled coarse aggregate slump cone, compressive strength, flexural strength, demolished waste.*

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Novel Design of Bubble Deck Slab

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ABSTRACT

The Bubble Deck slab is a revolutionary biaxial concrete floor system. High density polyethylene hollow spheres replace the ineffective concrete in the center of the slab, thus decreasing the dead weight and increasing the efficiency of the floor. These biaxial slabs have many advantages over a conventional solid concrete slab: lower total cost, reduced material use, enhanced structural efficiency, decreased construction time, and is a green technology. Through tests, models and analysis from a variety of institutions, Bubble Deck was proven to be superior to the traditional solid concrete slab. The reduced dead load makes the long-term response more economical for the building while offsetting the slightly increased deflection of the slab. However, the shear and punching shear resistance of the Bubble Deck floor is significantly less than a solid deck since resistance is directly related to the depth of concrete. Design reduction factors have been suggested to compensate for these differences in strength.

Keywords: *Biaxial hollow core slabs, Bubble deck slab, Hollow spheres.*

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Experimental Analysis of Waste Rubber Material in Bituminous Road

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ABSTRACT

Use of Crumb Rubber i.e. the rubber obtained from the waste tires of vehicles in the construction of flexible pavement is gaining importance. It is also worth mentioning that the modifier raw material has been sourced from disposed crumb rubber. This not only allows us to collect modifier raw material at low cost, but also provides a solution towards ecological menace posed by increased use of rubber. In the present study, an attempt has been made to use Crumb Rubber, blended using wet process. The martial method of bituminous mix design was carried out for varying percentages of Crumb Rubber to determine the different mix design characteristics. Marshall's mix design was carried out by changing the modified bitumen content to constant optimum rubber content and subsequent tests have been performed to determine the different mix design characteristics and for conventional bitumen (VG-30). This has resulted in much improved characteristics when compared with straight run bitumen and improve the strength of pavement Modified Bitumen is one of the important construction materials for flexible pavements.

Keywords: *Crumb rubber, modified bitumen, marshall's stability, flexible pavements, waste tyre rubber, environmental issues*

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Experimental Study and Stabilization of Expansive Soil with Electrolytes

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ABSTRACT

Stabilization is a technique used to improve the expansive soil properties. In this regard, an attempt has been made to evaluate the influence of Calcium Chloride (CaCl2), Ferric chloride (FeCl3), Potassium Chloride (KCl) stabilizer on the engineering properties of expansive soil. A series of laboratory experiments including consistency limits, free swell, compaction, and shear strength tests were performed to investigate the effect of CaCl2, Fecl3, KCl Additive with various percentages 0%, 2%, 5%, 10% and 15% respectively for improving expansive soil. The results obtained shows that the increase in the percentage of decreased CaCl2 the liquid limit and plasticity index leading to significant reduction in the engineering properties vice versa free swell index. This, in turn, increased the maximum dry density and decreased the optimum moisture content which results in greater strength. The unconfined compressive strength of soil stabilized with 5% CaCl2 increased approximately by 50% as compared to virgin soil. It can be concluded that CaCl2 had shown promising influence on the strength and swelling properties of expansive soil, thereby giving an advantage in improving problematic expansive soil.

Key words: *Expansion soil, liquid limit, Potassium Chloride, Calcium Chloride, Ferric Chloride*

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Prediction Method for Fine Particle Loss Rate of Sandy Soil Under Suffusion

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ABSTRACT

In the process of seepage, the internally unstable fine particles of sandy soil are easy to be lost and form suffusion, which has a negative effect on the geotechnical building or foundation. The loss rate of fine particles is a key parameter for soil mechanical property degradation and stability analysis. In order to predict the loss rate of fine particles in sandy soil under suffusion, the internal stability evaluation criteria for determining whether soil will undergo suffusion is discussed first. Second this paper gives critical hydraulic gradient for erosion initiation and introduces the stress reduction factor. And then considering the difference of soil particles' forces, the stress reduction factor is modified, meanwhile the "erosion initiation probability of fine particles" is introduced to quantify the erosion initiation of fine particles. Next the migration process of fine particles in the pore network of soil is analyzed, and the probability of fine particles through constriction and the migration distance are given. Finally, the law of fine particle erosion and deposition are given according to the law of fine particle erosion initiation and migration, and the prediction method of fine particle loss rate was formed based on the law of mass conservation. The calculated results of fine particle loss by this prediction method are in good agreement with the numerical results, and the error is basically within 15%.

Keywords: *sandy soil, suffusion, Manual calculations.*

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Mechanical Properties of Concrete

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ABSTRACT

The main aim of the research is to study the mechanical properties of concrete and heir effects in concrete stability and failure. He fractures mechanical properties in particular uniaxial tensile strength Ft, young's modules Eo and fractures energy Gf as sell as the shape of the stress strain and the stress- deformation relation were investigated for high strength and normal strength concrete. In order to analyzed failure mechanism of the entire fracture cement pasture and cement paste aggregative inferface were calculated on the basis of the optical measurement an meso and micro level, respectively. These data showed a clear correlation with fracture properties of the concretes investigated. The researcher that the mechanical properties of concrete is dependent on the quality of the individual ingredients size, shape, texture and grading of aggregate affect the mechanical properties of concrete. Rough textured and irregular shape- aggregated produced concrete with good mechanical properties. The use of moist aggregates enhance internal curing which promotes the hydration of cement and there by, enhancing the properties of the concrete.

Key words: *Meso, Enhance, Correlation,*

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Paper ID: ICRTCE-23-0044

A Study on Improvement of Expansive Soils withElectrolytes

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ABSTRACT

Chemical stabilization is a technique used to improve the expansive soil properties. In this regard, an attempt has been made to evaluate the influence of Calcium Chloride (CaCl2) stabilizer on the engineering properties of expansive soil. A series of laboratory experiments including consistency limits, free swell, compaction, and shear strength tests were performed to investigate the effect of CaCl2.Additive with various percentages 0%, 0.5%, 1%, 1.5% and 2% respectively for improving expansive soil. The results obtained shows that the increase in the percentage of decreased CaCl2 the liquid limit and plasticity index leading to significant reduction in the engineering properties vice versa free swell index. This, in turn, increased the maximum dry density and decreased the optimum moisture content which results in greater strength. The unconfined compressive strength of soil stabilized with 5% CaCl2 increased approximately by 50% as compared to virgin soil. It can be concluded that CaCl2 had shown promising influence on the strength and swelling properties of expansive soil, thereby giving an advantage in improving problematic expansive soil. Fecl3canincrease the immediate precautionary measure distance reduce the soil microbial activity.

Keywords: *Chemical stabilization, compressive strength, optimum moisture content*

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Experimental Study on Fiber Modified Bitumen in Pavement

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ABSTRACT

This investigation examines fibers' physical properties, reinforcing effects and mechanisms for stabilizing and reinforcing asphalt binder. Laboratory tests of water absorption, mesh-basket drain down, and oven heating were designed and performed on five fiber types (two polyesters, one polyacrylonitrile, one lignin and one asbestos), to evaluate their wettability, asphalt absorption and stabilization, and thermo stability, respectively. The cone sink experiment was designed to study fiber modified asphalt's resistance to flow, and the standard dynamic shear rheometer test was conducted to evaluate fiber modified asphalt's rheological properties and rutting resistance. Fibers' microstructures and spatial network formed in asphalt binder were observed using Scanning Electron Microscopy (SEM). Results indicate that fibers can effectively improve asphalt binder's resistance to rutting and flow, and dynamic shear modulus. Fiber reinforces asphalt matrix through its functions of spatial networking, adhesion and stabilization of asphalt binder. Polyester and polyacrylonitrile fibers seem to have greater network effect than the lignin and asbestos fibers, and their antenna features at fibers' ends further strengthens this effect. The lignin fiber has the highest water absorption while lowest thermo stability. The lignin and asbestos fibers pose greater effects of asphalt absorption and stabilization than do polymer fibers.

Keywords: *effects, asphalt absorption, stabilization, polymer fibers.*

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A Formalism for Utilization of Sensor Systemsand Integrated Project Models For Active Construction Quality Control

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ABSTRACT

Defects experienced during construction are costly and preventable. However, inspection programs employed today cannot adequately detect and manage defects that occur on construction sites, as they are based on measurements at specific locations and times, and are not integrated into complete electronic models. Emerging sensing technologies and project modeling capabilities motivate the development of a formalism that can be used for active quality control on construction sites. In this paper, we outline a process of acquiring and updating detailed design information, identifying inspection goals, inspection planning, as-built data acquisition and analysis, and defect detection and management. We discuss the validation of this formalism based on four case studies.

Keywords: *Sensor Systems, Project Models, Construction, Quality Control,*

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Paper ID: ICRTCE-23-0064

Traffic Volume Studies and Congestion Solutions

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ABSTRACT

Traffic congestion is a condition in transport that is characterized by slower speeds, longer trip times, and increased vehicular queuing. Traffic congestion on urban road networks has increased substantially, since the 1950s. When traffic demand is great enough that the interaction between vehicles slows the speed of the traffic stream, this results in some congestion. While congestion is a possibility for any mode of transportation, this article will focus on automobile congestion on public roads. Traffic volume studies are conducted to determine the volume of traffic moving on the roads and classifications of roadway vehicles at a particular section during a particular time. As demand approaches the capacity of a road (or of the intersections along the road), extreme traffic congestion sets in. When vehicles are fully stopped for periods of time, this is known as a traffic jam or (informally) a traffic snarl-up. Traffic congestion can lead to drivers becoming frustrated and engaging in road rage. Traffic Volume survey is the determination of the number, movement and classifications of roadway vehicles at a given location.

Keywords: *Traffic, Congestion,*

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Soil Stabilization Using Waste Material Copper Slag

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ABSTRACT

Soil stabilization is used to improve the strength of weak soil, bearing capacity and its engineering properties. For stabilization various types of materials are used like wood ash, fly ash, many fiber polymers, lime etc.., In this study the waste material copper slag is extracted by smelting the copper ore is used. It reduces the quantity of waste material disposal without affecting the environment. Copper slag is a glassy granular and the specific gravity is high. The increase in the percentage of copper slag increases the dry density of the soil and the plasticity decreases. By this we can avoid the shrinkage of expansive soil and swelling. The more utilization of copper slag in the road construction will reduces the disposal problem of the industries. The various experiments to be conducted are direct shear test, unconfined compressive strength, Sieve analysis, and Specific gravity and Proctor compaction test.

Keywords: *Copper slag, Copper ore, Soil stabilization, Strength properties*

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Design of RCC Columns With Internal WWMReinforcement Under Concentric And Eccentric Compression

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ABSTRACT

Recently, various types of steel meshes were used as additional internal reinforcement for improving the confinement, ductility, and strength of the reinforced concrete (RC) columns. In this experimental study, a welded wire mesh (WWM) layer was used as an internal reinforcement in addition to the traditional steel reinforcement (longitudinal bars and transverse ties) for short and long RC columns under concentric and eccentric compression. Thirty-six square RC columns with two slenderness ratios λ (height to width ratio) of 9 and 18 were tested under compression with eccentricity ratios e/t (eccentricity to section thickness ratio) of 0, 0.13, and 0.26. The reference columns were traditionally reinforced with longitudinal steel bars and transverse ties with a reference volumetric ratio ρ r of 0.44%. The other columns comprised a WWM layer wrapped outside the ties whose volumetric ratio ranged from 0.22% to 0.44%. The results demonstrated that the columns reinforced with a WWM layer in addition to traditional reinforcement showed an improvement in ductility and strength compared to those reinforced with longitudinal bars and transverse ties only. A WWM layer increased the ultimate load of the columns comprising ρ r ties by approximately 16% and 9% for short and long columns, respectively. These improvements were proportional to the ties volumetric ratio.

Keywords: *Gravity load, welded wire mesh, building design*

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Execution of Box Drain work to Dispose of Sewarage And Excess Storm Water

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ABSTRACT

Box drain is a closed chamber consists of various parts like raft, drain wall and slab which are laid on PCC (Plain Cement Concrete) constructed below the ground level. The infrastructure of box drain is designed to dispose of sewage and excess storm water as quickly as possible from permeable and impermeable surfaces. The importance of box drains is having lesser chances of spreading diseases like malaria and dengue. Also, it will increase the life span of the infrastructure and protect road deterioration from water. The box drain carrying sewage and excess storm water is connected to main culvert or cross drainage structure at the end. Box drains are commonly used both as cross-drains to relieve drainage of ditches at the roadside, and to pass water under a road at natural drainage and stream crossings. The box drain selection is based on several factors including requirements for hydraulic performance, limitations on upstream water surface elevation, and roadway embankment height. This experimental study will provide good infrastructure to the society and to introduce the modern technology to the sewerage system. The climate change has become more critical issue, particularly in low lying coastal areas, exposed to sea level rise, increase in rainfall and temperature, storm surges, and more frequent and intense storm events. The climatic change adaptation into the drainage is important in formulating appropriate management and mitigation solutions to remove or reduce climate risks. This has direct bearing on the success and sustainability of the drainage network.

Keywords: *Box drain, storm water, sewerage system, Plain cement concrete*

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Abstract Proceedings of online "2nd International Conference on Revolutionary Technology in Civil Engineering (ICRTCE-2-2023)" organized on 24th and 25th Feb, 2023

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Designing and Detailing of Roof Slabs

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ABSTRACT

Most concrete design codes agree that it is important for punching shear reinforcement stirrups in slabs to engage the tensile longitudinal reinforcement bars. However, due to the practical difficulties that this anchorage detail entails, it has been common construction practice in some countries (including Spain) to place closed stirrups without encircling the main tensile reinforcement. The Structural Concrete Research Group at the Polytechnic University of Madrid tested eight slabs with four different shear reinforcement dispositions and the results show that slabs with the shear reinforcement disposition that matches Spanish practice show punching shear strength that is quite similar to the one shown by slabs with the transverse reinforcement disposition specified in the codes. The results also show a significant reduction in punching shear strength when longitudinal reinforcement does not pass through the slab–column connection.

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Design & Analysis of Elevated Water Tank UsingStaad Pro

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ABSTRACT

Elevated water tanks are one of the most important lifeline structures in earthquake prone regions and also in rural areas. The elevated water tank is an integral part of water supply scheme, these structures have large mass concentrated at the top of slender supporting structures are especially vulnerable to horizontal forces due to earthquake. All over the world, the elevated water tanks were collapsed or heavily damaged during the earthquake because of unsuitable design of supporting system or wrong selection of supporting system underestimated demand or strength. So it is very important to select proper supporting system and also need to study the response of elevated water tank to dynamic forces by both equivalent static or dynamic method and to find out the design parameters for seismic analysis. It is also necessary to consider the sloshing effect on container roof slab. This sloshing of water considerably different the parametric value used in design and economical in construction. This paper present the study of seismic performance of the elevated water tank for various seismic zones of India for same heights and capacity of elevated water tanks for the same soil condition on earthquake forces.

Keywords: *Autocad, Staad Pro, Ms.Office*

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Paper ID: ICRTCE-23-0035

Analysis Of Barriers For Implementation Of BIM Adopting The LPS For The Construction Projects

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ABSTRACT

India has become the world fourth largest market for Green building construction. The reasons for this demand are obvious: these structures are designed to save energy, waste, emissions, and water while also prioritizing occupant health and wellness through the use of eco-friendly construction materials and improved air movement. People are becoming more conscious of the importance of utilizing green solutions that do not hurt the environment, and the building industry is heading the same way. The research focuses on numerous literatures and attempts to assess the Green building adoption or implementation barriers in the residential construction. The goal is to find and assess obstacles by questionnaire survey using ranking based on individual stakeholder's perception from developing countries like India. The findings revealed that there is a need for a shift in stakeholder perceptions and attitudes toward green building development. This article will assist construction professionals in their decision-making and raise awareness about the advantages of using green buildings.

Keywords: *Green buildings, Awareness, Adoption, Barriers, Stakeholders perception, ANOVA.*

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