Proceedings of the International Conference

# GLOBAL ENVIRONMENTAL CHANGES AND SUSTAINABLE DEVELOPMENT - ICGECSD'19

April 4th & 5th 2019


Organized by
Department of Civil Engineering
School of Mechanical and Construction

Vel Tech
Rangarajan Dr. Sagunthala
R&D Institute of Science and Technology
(Deemed to be University Estd. u/s 3 of UGC Act, 1956)

Proceedings of International Conference

on

**Global Environmental Changes and Sustainable Development**

**ICGECSD'19**

**on**

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PROCEEDINGS OF THE INTERNATIONAL CONFERENCE ON GLOBAL ENVIRONMENTAL CHANGES AND SUSTAINABLE DEVELOPMENT.



April 2019

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**ABOUT INSTITUTE**

Vel Tech is well-known for its renowned educational practices, which has been recognized and endowed with several awards. The founders of the Institution, Col. Prof. Vel .Dr. R. Rangarajan, Founder Chancellor & President and Dr. Sagunthala Rangarajan Foundress President believe in Education is for All despite their financial means which will promote and uplift the society. In accord to their vision, Vel Tech Mahatma Gandhi Scholarship scheme was started and has supported students since the inception. Vel Tech has bestowed 9500 scholarships worth approximately Rs.30 Crore until 2017.

## We are Passionate. Doers in Innovative Engineering Education

Global Alliances of Vel Tech has working International Relations with more than 390 Institution across 30 countries and has entered in the Memorandum of Understanding (MoU) with 120 Institutions for various Academic and Research exchange activities. Students, Faculty members, and Researchers get the collaborative platform for Academic projects, explore leading best practices and Research work with International Universities. Vel Tech believes that there are no boundaries in the pursuit of knowledge. Through these strategic alliances with International Universities, the standard of education at Vel Tech would be on par with the best in the world.

## ABOUT DEPARTMENT

The Department of Civil Engineering was established in 2009 with an aim of promoting high quality education in the field of Civil Engineering. The academic activities of the department emphasize deep understanding of fundamental principles, development of creative ability to handle the challenges of Civil Engineering and the analytical ability to solve the problems which are interdisciplinary in nature. The Department currently offers two B. Tech programmes in Civil Engineering (collaborated with National Ilan University, Taiwan) andCivionics, and three M. Tech programme in Structural Engineering, Construction Engineering and Management and Environmental Engineering. The department also offers Ph. D programmes in all areas. The department has well experienced faculty members with Ph. Ds who are young and dynamic, belonging to various field of Civil Engineering. They are also members in various professional societies. The department is doing many consultancy works and research works. Many students have participated in technical event and won prizes in reputed engineering colleges including IIT Madras and Anna University.

## ABOUT THE CONFERENCE

ICGECSD-19 offers a unique opportunity to all students, researchers and practicing engineers to share the advances and knowledge in global environmental changes and sustainable development in Civil Engineering. ICGECSD-19 provides an excellent platform for academicians, researchers and industrialist to discuss various issues in civil engineering. This conference will facilitate in fostering close relationship among researchers and facilitate for strengthening their domain knowledge and field of research.

We have received 150 technical papers from various institutions including national and international universities and colleges among those 100 papers have been shortlisted related to the theme of the conference and quality of the paper.

Best papers will be published in Scopus indexed journal and all the selected papers for conference will be published in journals.

# MESSAGES FROM OUR CHIEF PATRONS AND PATRONS

**Col.Prof. Vel. Dr. R. Rangarajan**
**Founder Chancellor & President**

In my two decades of journey in the education field, I have experienced that just classroom learning alone is not enough for shaping the career of students. Exposure to various Seminars, Conferences, workshops etc plays a vital role in the learning process and often becomes an unforgettable experience. I am immensely happy to note that the Department of Civil Engineering has organized this International Conference on Global Environmental Changes and Sustainable Development ICGECSD '19. This conference aims at bridging the gap between the natural chance in the environment and technological compatibility to face these changes.

I wish the organizers of the conference a great success.

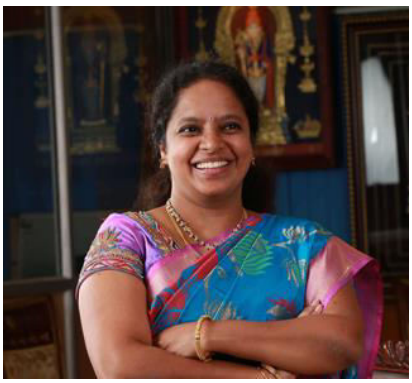
**Dr Sagunthala Rangarajan**
**Chancellor**

It gives me great pleasure to know that the Department of Civil Engineering has organized the International Conference on the topic GLOBAL ENVIRONMENTAL CHANGES AND SUSTAINABLE DEVELOPMENT, ICGECSD '19 on 04. 04. 2019 & 05.04.2019. I whole heartedly congratulate the Department, the organizers and all the delegates.

It is the responsibility of the institute not only to impart education but also to create awareness on relative topics. The conference intends to focus on how global changes can be challenged with sustainable development. I hope that this conference will definitely pave way for such developments that are highly essential at this point of time.

I wish the staff of the department of Civil Engineering to make this into a grand success.

**Mrs. Rangarajan Mahalakshmi Kishore**
**Chairperson & Managing Trustee**



Change alone is unchangeable. Changes are a common and continuous phenomenon in today's world. Changes either natural or manmade have to be faced efficiently. As technical experts, it is the duty of the engineers to face changes and develop systems which help us to adapt to the changes.

I congratulate the department of Civil Engineering for organizing the International Conference on "GLOBAL ENVIRONMENTAL CHANGES AND SUSTAINABLE DEVELOPMENT" ICGECSD'19. The conference will enlighten all the participants to understand the changing situations in the globe and develop the brainpower of the fraternity.

I wish all the members magnificent success in their endeavors.

**Mr.K.V.D. Kishore Kumar**
**Vice - President.**

Dear Delegates,

I have great pleasure in receiving you all to the International Conference on "GLOBAL ENVIRONMENTAL CHANGES AND SUSTAINABLE DEVELOPMENT" ICGECSD'19 on 04.04.19 organized by the Department of Civil Engineering of Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology.

I congratulate the department of Civil Engineering on the apt theme chosen. The conference will definitely succour all the delegates to understand the changing dimensions in the ever-changing globalized scenario better. I do hope that you all will contribute your might for the superfast growth of our motherland.

**Prof. Beela Satyanarayana B.E. ( Mech), M.E. (MD), M.E. (IE), M.Tech. (CSE), Ph.D. (IIT, Delhi)**
**Chancellor**

It gives me immense pleasure to note that the Department of Civil Engineering is conducting an International Conference on "Global Environmental Changes and Sustainable Development" ICGECSD 2018 on 4th and 5th April in association with ASDF international, CI, ICI, IRJMRS and CCS societies. Global Environmental Changes integrates environmental considerations into development plans and strategies, to manage and sustainably use natural resources; ensure that natural wealth is used to promote economic recovery and livelihoods, and effectively target policies to reduce poverty pass on social protection for those in need. Arranging six keynote lectures on relevant topics in this conference will provide with ample knowledge to the participants which in turn develop research culture in this discipline. I wish all the participants to utilize this opportunity to interact, share their ideas and impart innovative directions to the student community for creating a safe environment and solutions to avoid disastrous atmospheric situations.

I am sure that this conference will play a humble role in bringing together researchers, younger scientists, and students in an informal environment for discussing the latest advances

I congratulate the Head, Faculty & organizers for choosing an advanced topic of societal relevance and global importance.

I wish the International Conference a grand success.

**Dr.V. S. S. Kumar**
**Vice Chancellor**

I congratulate the School of Mechanical and Construction Engineering for organizing a conference on GLOBAL ENVIRONMENTAL CHANGES AND SUSTAINABLE DEVELOPMENT at our campus on 04.4.2019 & 05.04.2019. I take extreme pleasure in welcoming the participants across the nation and I wish it serves as a unified platform of innovation and development for our students and faculty members.

My best wishes for successful organization of the conference.

**Dr. E. Kannan**
**Registrar**

I have great pleasure to welcome you all to the International Conference on Global Environmental Changes and Sustainable Development (ICGECSD '19).

Globalization has brought many benefits, yet there is growing contention over how these benefits are shared and increasing recognition that globalized markets require greatly improved global governance. Globalization is creating intense business pressure. Worldwide competition is fierce among organizations and the recession is making it even harder for many organizations to sustain their competitive advantage. To combat this challenge, organizations worldwide have been forced to look for innovation in their business practices. Innovation is the specific tool of entrepreneurs, the means by which they exploit change as an opportunity for a different business or service. It is capable of being presented as a discipline, capable of being learned, capable of being practiced. This conference aims to bring together the national practitioners in the fields of Global Environmental Changes and Sustainable Development to exchange knowledge and understanding of the "need for change" with members of their own profession and members of the professional team. This conference is designed to maximize the development of collaborative links and provide an opportunity for informal discussions and recreation.

I am grateful to our Founder Chancellor & President Prof. Dr. Vel. R. Rangarajan, Foundress Chancellor Dr. Sagunthala Rangarajan and Management of Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology, Chennai for all their help and support without which this event could not have taken place. I thank all the Keynote speakers, moderators and delegates whose contributions made ICGECSD '18a successful event. My special thanks go to the members of the conference committee whose involvement and their supports are greatly appreciated.

**Dr. E. B. Perumal Pillai,**
**Director – HRDC &**
**HOD / Civil**

The “International Conference on Global Environmental Changes and Sustainable Development” (ICGECSD-2019) is organized by the Department of Civil Engineering, Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology. The prime objective of this conference is to bring together the researchers, Scientists, Engineers, student scholars and Professionals to acknowledge the latest research, exchange and share new ideas face to face, and to explore and share innovative research work carried out by the individuals in the areas of Advanced Engineering and Environmental Engineering for the sustainable development. The Conference focuses on the identification of practical challenges encountered in these fields and their possible solutions through presentations and discussions. The conference intends to encourage inventions, scientific investigations and research for promoting their applications in these sectors and to appraise various aspects of sustainability. The department has received an overwhelming response from the date of announcement of the conference. 180 research papers, from various areas of Civil, Structural and Environmental Engineering are received from the researchers of the premier institutes across the country. These papers are reviewed by an elite review committee.150 research papers are suggested acceptable after the peer review by minimum two reviewers. Their meticulous job has enabled the enhancement of quality of research papers and is profusely thanked. This bound volume of the conference proceedings would not have been possible without the technical contributions from the authors of these papers and the editors are thankful to them. We would also like to express our thanks to the colleagues, research scholars, and the Post Graduate students, who have helped us in different ways to bring out the bound volume of this conference proceedings.

I congratulate the faculty of Civil Engineering for organizing this wonderful conference and wish all the best for all the delegates.

**Prof. Dr A T Ravichandran**
**Dean : School of Mechanical and Construction**

## MESSAGE

I am extremely delighted to learn that the Department of Civil Engineering is organizing a International Conference on "**Global Environmental Changes and Sustainable Development**" **(ICGECSD '19)** on 4th& 5th April 2019 to bring out the research works done by the Faculty, Research Scholars and Students of Civil Engineering**.**

With increased change in lifestyle and advent of industrialization, the environmental pollution has increased to an alarming level. This pollution has changed the climatic condition and leads to many associated problems. As a responsible engineers, we need to find the viable solutions for this. In the technology driven world, one has to be updated with the latest technology to keep himself stay a head of others. Participating, Listening and exchanging the ideas & sharing the knowledge in conference is one of the best way to update oneself.

I am sure that, this conference will be platform for the researchers, faculty & students to share their views and progress further.

I, wholeheartedly, congratulate the members of Organizing Committee of the Conference and wish the conference a grand success.

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# CONFERENCE PAPERS



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# GEOTECHNICAL ENGINEERING



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Ref No : ICGESCD/GE/01

# EFFECT OF NON-PLASTIC SILT ON INTERGRANULAR VOID RATIO OF SAND

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## ABSTRACT

When granular soil contains fines, the global void ratio (e) of the soil can no longer be used to describe the behaviour of the soil. In this aim, the use of intergranular void ratio has been suggested. The concept of the intergranular void ratio suggests that the fines fill the voids formed between the sand grains and thus the behaviour of sand with a moderate amount of fines should be governed by the intergranular void ratio instead of the natural void ratio. However, when the intergranular void ratio exceeds the maximum void ratio of the clean sand, there are sufficient fines to prevent grain-to-grain contact of the sand particles. In this case, the fines constitute the dominant structure and carry the shear forces while the coarse grains may act as reinforcing elements. In this study, the effect of non-plastic silt on intergranular void ratio is studied, by adding non-plastic silt to sand in various proportions. And effect of it on sand is concluded by using some relationships

*Index Terms:* Non-plastic Silt, Intergranular void ratio, Global Void Ratio



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# DESIGN AND CONSTRUCTION OF BRIDGE EMBANKMENT USING R.E. WALL PANELS

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## ABSTRACT

In this paper the analyses and design for the bridge embankment have been made and the study of its construction techniques is also explained. Excel and Plaxis 2D software are used for analysis of stabilities and response of the structure. The bridge embankment consists of skin, fill and soil reinforcement. The stability of embankment depends on surcharge load, soil fill and soil reinforcement. Para-web technology is a modern method for soil reinforcement in embankment to replace Geo-grid. Mechanically Stabilized Earth method is adopted for construction of artificial embankment and Precast RE wall panels are used as skin. Different types of filling materials can be used of which fly ash is found to have higher strength than other alternative materials. This paper can help the future to construct artificial bridge embankment in a simple and faster ways where less skilled labours are required.



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# INFLUENCE OF GEOTECHNICAL CHARACTERISTICS ON CRACKS IN BUILDINGS: A CASE STUDY

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## ABSTRACT

Expansive soils are considered as problematic soils as they cause serious problems to Civil Engineering structures founded on them. Till recently the focus of investigations world over is on understanding the effect of swell-shrink on the swelling behavior of such soils and their control. However, in recent years, focus of research is in understanding the influence of Geotechnical characteristics of such soils on the distress of buildings / structures founded on them. Only a few studies have been reported in the Indian context. Hence, in this study six recent buildings covering the entire Pondicherry region, wherein distress in the form of cracks have appeared, are selected and soil samples were collected and various Geotechnical characteristics were determined. It is found that the expansive natures of the soil in the selected area are responsible for causing distress in the forms of cracks in the buildings.

Key words: Expansive soil, swelling, shrinkage, cracks.

*Index Terms:* Embankment, Mechanically Stabilized Earth, Soil reinforcement, Geo-grid.



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# ASSESSMENT OF LIQUEFACTION POTENTIAL USING SOFTWARE PACKAGES

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## ABSTRACT

Two disastrous earthquakes of 1964, namely the Good Friday event in Alaska and the closely followed Niigata (Japan) tremor have lead to improved techniques of designing against liquefaction related failures. These techniques involve the simplified method proposed by Seed-Idriss based on in-situ tests to sophisticated features employing computer programs. In the present study the liquefaction potential of three sites, predominantly consisting of sand, based on in-situ tests have been evaluated employing the simplified method and two computer programs, namely NovoLiq and LiqSVs based on NCEER method. In all these methods, the Cyclic Stress Ratio (CSR) and Cyclic Resistant Ratio (CRR) have been evaluated to assess the liquefaction potential. The results obtained based on the computer programs predict variation of the order of 30 to 40 percent when compared with the simplified method. The Factor of Safety (FS) values achieved show that the computer programs results in conservative values (i. e. lower) leading to escalation of cost, if designed to resist liquefaction associated failures. It has been observed that a linear dependence exists between the factor of safety values obtained by different methods and more research work is recommended.

*Index Terms:* Liquefaction, Seed-Idriss, NovoLiq, LiqSVs, CSR, CRR, Factor of Safety.



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# EFFECT OF COPPER SLAG IN CLAY AND GROUND WATER

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## ABSTRACT

Soil stabilization is a fundamental method of improvement used for nearly all construction projects, ranging from commercial construction to environmental restoration. Most areas in India consist of clay soils with high plasticity. In order to meet the technical requirements, the soil needs improvement. Clays that have low shear strength need to be stabilized in order to meet the needs to serve as construction site .This work focuses on the usage of copper slag as Stabilizing agent. Copper Slag is a waste material obtained during extraction of copper from smelting and refining of copper. It is converted in micro size and is used in various proportions (1%,2%,4%,8%,12%) in clay soil. Unconfined compression strength of the soil attains maximum strength at 4% of copper slag. It is also observed that there is a decrease in liquid limit and plastic limit with increasing in percentage of copper slag due to the particulate nature of copper slag. So the conclusion of the Project is that this by-product is an economical and good soil stabilizing agent.

*Index Terms:* Soil stabilization, Copper slag, Liquid limit, Plastic limit, Unconfined compression strength.



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# INFLUENCE OF PARTICLE SHAPE ON SHEAR STRENGTH

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## ABSTRACT

Grain size distribution is one of the basic Property of soil which gives an idea about Engineering Properties of soil. Particle size is used to predict the Soil behaviour. The Shape of particles significantly affects the grain size distribution and Engineering behaviour of the soils. Round grains are more likely to slip and roll than angular fragments. Natural sand and crushed sand are difference in shape. Natural sand has the roundness and roughness. The shape of natural sand is altered during transportation or weathering. On the other hand, crushed quartz sand tends to be equidimensional or elongated in shape. This is because quartz has no cleavage. Particle rotation is a basic component of deformation during compressibility of granular materials which is affected by the shape of the grains. In shear behaviour, the friction angle can be affected by the gradation of sand, such as sands with the lowest friction angle tend to be medium-fine, well-rounded, and poorly graded sands and sands with the highest friction angle tend to be coarser grained, well-graded, and/or angular sands. Shear Strength of Natural Sand and the Crushed quartz was determined using Direct Shear test and the Strength is compared. Shape Parameters like Sphericity and Roundness of both Natural Sand and Crushed quartz is analysed using ImageJ analysis and the values are compared. From various tests it is found that Crushed Quartz particles has more Angular and Semi Rounded Particles which significantly increases its Shear strength 15 to 40% more than the Natural Sand.

*Index Terms:* Natural River Sand, Crushed Quartz, Shear Strength, Direct Shear Test and ImageJ Software, Shape Parameters.



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# BEHAVIOUR OF CEMENT- NATURAL RUBBER GROUT IN MARINE DEPOSIT

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## ABSTRACT

Marine deposits are generally clay and sand which are rich in alkalinity. Around the world 6,20,000 kilometres of costal lines are made of marine deposits. These marine sand deposits are fine to very fine grade sand with poor strength, corrosive due to presence of alkali minerals and are highly permeable. These deposits are stabilized by generally deep mixing and grouting with cement, sodium silicate and sodium bentonite. Stabilization can increase the strength and decrease the permeability of these deposits. This phenomenon helps binding of Natural rubber solids in sand. In this paper Stabilization is studied using various proportion of cement, sand and Natural rubber respectively 1:3:0, 1:3:0.01, 1:3:0.02..., 1:3:0.25. Plasticizer was added in the mix to decrease the coagulation process in grout. This work mainly focuses on improving strength and analysis of stress strain behaviour, failure pattern of Cement-Natural rubber grout by conducting UCC and direct shear tests on marine sand deposits and stabilized sand. It is found that on addition of Natural rubber to sand from 10%-25% the stress strain behaviour changes from linear to elasto- plastic. From various tests it is found that significant shear strength of marine deposit reaches 11% on addition of 10% of natural rubber in the grout and the stress-strain behaviour changes from linear to elastoplastic.

*Index Terms:* Marine Sand Deposits, Grouting, Natural Rubber, Plasticizer, Linear and Elasto-Plastic Behaviour.



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# INFLUENCE OF INDUSTRIAL BYPRODUCTS AS ADDITIVES ON PERMEABILITY OF SAND

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## ABSTRACT

The permeability of a soil is a critical parameter. Efforts have been made to reduce the permeability of soil formations and this process is used extensively in the construction of hydraulic structures. The technology for reducing permeability plays an important role in all the fields of foundation engineering such as seepage control in rock and soil under dams, advancing tunnels, cut off walls etc. in the evaluation of safety of any dam, problems connected with excessive leaching and seepage. When transit or utility tunnels are to be placed beneath the water table and the soils encountered may have permeability around 1 x $10^{-5}$ m/s. Remedial and rehabilitation measures for arresting excess leaching and seepage mainly involve controlling the permeability of the soil strata. In such cases, it is necessary alter the geotechnical properties of the local non-productive soils or by adding additives to suit the requirements. The use of Nanotechnology in some talented fields such as soil improvement, seepage and grouting will offer great advantages in geotechnics. In this work the permeability of sand is varied by adding additives like Nano silica and Aluminium dross. In all the cases the additive proportion was kept constant as 3:1 (i.e., 2/3$^{rd}$ of sand and 1/3$^{rd}$ of additive). From the test results, it is found that on adding Aluminium dross at 90% relative density gives the least value of coefficient of permeability. Thus from this work it could be concluded that adding 25% Aluminum dross to the sand sample will reduce the permeability by 5.52%.

Key Words: Coefficient of permeability, Nano silica, Aluminum dross



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# SOIL STABILIZATION USING COMPOSITE MATERIALS (BAGASSE ASH POLYPROPYLENE FIBRE, & JUTE FIBRE)

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## ABSTRACT

Soil stabilization has become a major matter in construction engineering and the studies regarding the effectiveness of using natural wastes are rapidly increasing. The Soil stabilization is an effective and reliable technique for improving strength and stability of soils. The objective of this study is to examine the usage of waste fibre materials in geotechnical applications and to appraise the effects of waste polypropylene fibres, Bagasse ash and JUTE fibre. Bagasse ash, polypropylene and jute fibre are versatile materials with attractive characteristics and advantages, as a result of this polypropylene is now being used abundantly all over the world. Waste jute fibres have high strength, less cost, long life and also, they are biodegradable, therefore, may be used for the enhancement of engineering properties of soil and may also be used for control of seepage. The use of waste fibres will result in decreasing the requirement of valuable land for the disposal of wastes and it will also reduce the environmental impacts. The bagasse ash with 1.5%, jute are added from 0.5%, 0.75% with by dry weight of soil and Polypropylene is added with 0.5%, 0.75%.

*Index Terms:* Clay Soil, Bagasse Ash, Polypropylene Fibres, Jute Fibres



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# SOIL STABILIZATION USING COMPOSITE MATERIALS

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## ABSTRACT

Soil stabilization has become a major matter in construction engineering and the studies regarding the effectiveness of using natural wastes are rapidly increasing. The Soil stabilization is an effective and reliable technique for improving strength and stability of soils. The objective of this study is to examine the usage of waste fibre materials in geotechnical applications and to appraise the effects of waste polypropylene fibres, Bagasse ash and JUTE fibre. Bagasse ash, polypropylene and jute fibre are versatile materials with attractive characteristics and advantages, as a result of this polypropylene is now being used abundantly all over the world. Waste jute fibres have high strength, less cost, long life and also, they are biodegradable, therefore, may be used for the enhancement of engineering properties of soil and may also be used for control of seepage. The use of waste fibres will result in decreasing the requirement of valuable land for the disposal of wastes and it will also reduce the environmental impacts. The bagasse ash with 1.5%, jute are added from 0.5%, 0.75% with by dry weight of soil and Polypropylene is added with 0.5%, 0.75%.

*Index Terms:* Clay Soil, bagasse ash, polypropylene fibres, jute Fibres



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# INFLUENCE OF NAIL SHAPE ON SLOPE STABILITY

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## ABSTRACT

This paper is the State – of – the – art of studies that were conducted on the influence of nail shape for stability of slope. The soil nailing is one of the soil stabilization technique which is used as a remedial measure to treat the unstable natural or artificial slopes. Nailing is a technique used to achieve the stability of the slope by introducing a nail into the slope. Nail is a fundamental element in soil nailing. Generally every mass of soil which is bounded by a slopping surface is subjected to shearing stresses on nearly all its internal surfaces because of the gravitational forces which tend to pull the upper portions of the mass downward towards a more nearly level surface. The slope stability is generally effected by strength of soil, type of soil and stratification, discontinuities and planes of weakness, presence of ground water table and seepage through the slope, external loading and the geometry of the slope. All the various parameters that effects the factor of safety of slope is studied but the nail shape with nail inclination is never studied before.

Index Terms: Soil nailing, soil nail and nail shape.



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# RECYCLING OF DOMESTIC GRAY WATER USING SMALL SCALE CONSTRUCTED WETLANDS

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## ABSTRACT

India is facing water crisis and by 2025, it is estimated that India's population will be suffering from severe water scarcity. As the cities in general lack a perennial water source, catering the water requirements of the population has remained an arduous task. Many cities rely on annual monsoon rains to replenish its water reservoirs since the rivers are polluted with sewage. Pollution caused by sewage including gray water is one of the major reasons for depletion of water resources. At present, the sewage generation in India is about 29000 litres per day whereas the treatment capacity is only 6000 litres per day. Hence there is a dire need for efficient treatment of sewage with alternative approaches to ensure water availability. It is possible to intercept gray water, at the household level, treat it so that it can be recycled for gardening, washing and flushing purposes. It is now widely accepted that grey water recycling is feasible and can contribute to sustainable water management. The use of low-cost and low-maintenance technologies is preferred for economic reasons. In constructed wetlands, the plants use contaminants of gray water, such as food particles, as nutrients for their growth. The project was carried out to determine the efficiency of COD and phosphate removal from gray water by constructed wetland treatment (horizontal flow). The plant species used is Canna indica. The removal efficiency is checked with samples collected at various time intervals and the minimum retention period is found.

*Index Terms:* Gray water- Constructed wetland- Canna indica – COD and phosphate removal



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# EFFECT OF STEPPED GEOGRID IN SLOPPED STABILITY

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## ABSTRACT

In the stabilization of embankment geo synthetic materials are widely used specificallygeogrids. Geogrids are laid horizontally to increase the stabilization of the slope. Geogrids are used to control the stability and settlement of embankment. Nowadays, soil enforcement of geogrids in conventional pattern is trustable and efficient way for increasing soil strength and stability. To increase the stability of embankment reinforcement are used,in stepped pattern. Usage of reinforcement is the less than the conventional pattern. In trapezoidal embankment the triangular area is weak to the load, so reinforcement is introduce. To achieve this embankment at a tank (70cmx40cmx50cm).It is used to analyze the effect of stepped geogrid under loading on Universal Testing Machine. The dimensions of the embankment is 25cm height, 20cm top length 50cm bottom length, width 40cm and slope failure of embankment with virgin soil at a distance of approximately dip 6cm to the slope. This failure plane was interrupted byproviding conventional and stepped pattern. It is aimed to compare the various pattern and percentage of reduction is material usage by introducing reinforcement at predetermined failure using Universal Testing Machine. It is observed that stepped pattern has reduction in material usage then conventional pattern.

Keywords: Slope stabilization, geogrid, geosynthetic, dip, conventional pattern, stepped pattern.



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# CLAY MODIFIED WITH CHICKEN FEATHER FIBRE

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## ABSTRACT

Chicken feathers are the waste products of poultry,restaurants, residential and food supplying units of organizations. These feathers present a disposal problem and are usually dumped in landfill. Hence in this project an eco-friendly approach has been made to use these wastes as a potential source of usable fibers of stabilizing soil. Some research works carried out using chicken feather fibers (CFF) in expansive soils proofs to be effective. An attempt has been made to study the variation in engineering properties of clay modified with keratin structures obtained from chicken feathers at different proportions. From the experimental results, the optimum percentage of CFF for clay is 5% and the strength has increased to 42%.

Keywords—Soilstabilization,clay,Chickenfeathers, Keratin, Strength characteristics.



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# STRUCTURAL ENGINEERING



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# AN EXPERIMENTAL STUDY ON MORTAR CHARACTERISTICS AS A PARTIAL REPLACEMENT OF CEMENT BY QUARTZ POWDER UNDER THE EFFECT OF ELEVATED TEMPERATURE

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## ABSTRACT

Growth of Population based, construction industry is increasing rapidly for past two decades. So, requirement of raw materials also increased to fulfil the demand. Most of the structures depend on one important raw material that is cement which is manufactured in Industry. But the process of cement manufacturing is severely affecting our environment. So Address of this issue we have to reduce the usage of cement in future development. In this context we are introducing quartz powder in cement mortar for some percentage for sustainable Environment. The replacement of Quartz Powder was carried out in various Percentages start from 0,5,10,15,20,25 upto 30% by weight in cement mortar. Various Hardened pastes are exposed to Elevated temperature of various degree in different time duration and analyze the various characteristics like strength, fire resistance, durability etc. of mortar. The results are interpreted and discussed in all various aspects for effective performance of mortar. The experimental test result shows that the QP is shows the better resistance to the Elevated temperature of the Hardened pastes.

*Index Terms:* Quartz Powder, Mortar, Elevated Temperature

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# EXPERIMENTAL STUDY ON EFFECTIVE EXPLOITATION OF HYPO SLUDGE AS A REPLACEMENT FOR FINE AGGREGATE IN CEMENT MORTAR

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## ABSTRACT

This paper presents the experimental study of partial replacement of fine aggregate by hypo sludge (From paper industry) in cement mortar. Nowadays construction cost and Industrial waste are increasing rapidly. In this context we must reuse the waste for reduce the cost of construction. So, this study deals with the effectiveness of partial replacing by hypo sludge in place of sand to reduce the construction cost. In this study four types of replacement instead of fine aggregate by hypo sludge by 5%, 10%, 15%, 20% in cement mortar. Initially we noticed that the strength is decreased while increasing the replacement percentage of sludge. So resolve this issue we selected GGBS (Ground Granulated Blast Furnace Slag) which is waste product from steel industry for better performance of cement mortar. Add GGBS in constant proportion of 10% in all replacement ratios. The Final results are interpreted based on conventional mortar strength.

*Index Terms:* GGBS, Hypo Sludge, Cement Mortar, fine Aggregate



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# AN EXPERIMENTAL STUDY ON USAGE OF FLY ASH AND SYNTHETIC FIBRES IN CONCRETE PAVEMENT

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## ABSTRACT

Rigid pavements which are made of concrete is broadly used in construction world due to its compressive strength, sustainability and economy. There are several advantages of cement concrete pavement over bituminous pavements. The rigid pavement is strong in compression but weak in tension and flexure. The cost of construction of rigid pavements is more when compared to the flexible pavement. So cement is partially replaced by fly ash to reduce the cost of construction .This project deals with the partial replacement of cement by fly ash and addition of different synthetic fibres in the concrete. The fly ash is replaced by 30% and the fibres are added in the dosage of 1%. M40 grade concrete has been designed for the paver blocks for the medium traffic. Comparative analysis had been carried out for conventional concrete to that of the fibre reinforced in relation to various material test conducted. The optimum dosage of each fibre and their durability properties was also examined. Synthetic fibre reinforced concrete proved to be used advantageously over normal concrete pavement. Each type of fibre has its characteristics properties and limitations. The aim of the project is to reduce the environmental impacts of the cement and to develop the properties of the paver block.

*Index Terms:* Rigid pavements, polypropylene, polystyrene, glass fibre, steel fibre, conventional concrete.



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# AN EXPERIMENTAL STUDY ON COMPRESSED EARTH BLOCKS USING AGRICULTURAL AND INDUSTRIAL WASTE

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## ABSTRACT

Soil as a natural available building material. In developing countries like India mud technology is economical and most efficient sustainable technology for low cost affordable housing. Compressed Stabilized Earth block(CSEB) is an emerging technology which dates back towards the traditional building materials. CSEBs are compressed manually or hydraulically by using some mud block making machines. The present study is intended to analyze the feasibility of improving the properties of CSEB by using low cost stabilizers and industrial waste which are non-hazardous to the environment. The main objective of this study is to find suitable low cost stabilizers used for preparation of CSEBs with regard to strength, durability, economy and availability of materials. The soil chosen for preparing compressed block was the Red soil available locally. Stabilizers used for the study include Cement, GGBS, Rice husk ash were added in different proportions for the preparation of compressed blocks 240x240x90 mm size. The compaction technique for the preparation of CSEB using the Auram Press 3000. The blocks prepared with other stabilizers cured in ambient temperature. After conducting tests on compressed blocks with different proportion it was to found that the best proportion in terms of strength, durability, water absorption and economy.

*Index Terms:* CSEB, low cost stabilizers, industrial waste.



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# NANO TECHNOLOGY IN CIVIL ENGINEERING - GRAPHENE USE IN CONCRETE

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## ABSTRACT

In this paper, I have discussed about the use on Nano Technology in civil engineering. Under Nano Technology, Graphene and its oxides are being used as a game changer in the field of civil Engineering . Graphene and its derivatives when being used in the cement, improvs the mechanical as well various other property of fresh concrete as well as harden concrete. It has been found by the researchers that cement mixed with graphene and its derivatives such as graphene oxide, graphenenanoplatelets, and reduced graphene oxide show a rapid increase in its flexural, compressive and tensile strength. This special type of cement also shows its excellence in hydration rate, setting time, heat of hydration, workability, strain and damage sensing, Electromagnetic Interference (EMI) shielding, thermal and chloride diffusivity and crack repairmen. In this review how this modified cement brings changes in various property of concrete being discussed .This modification brought a desirable change in compressive strenght, flexural strength on harden concrete as well as the increment in the workability of fresh concrete.

*Index Terms:* Graphene as game changer; Graphene modified cement; Electromagnetic Interference (EMI), Hydration rate.



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# STRENGTH AND THERMAL ANALYSIS OF CEMENT MORTAR CONTAINING PERLITE AND MK

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## ABSTRACT

This project deals with the strength and thermal analysis of cement mortar containing perlite and metakaolin(MK). Generally mortar is a workable paste used to bind building blocks together(stone, bricks and concrete masontry units) mortar is a mixture of sand, a binder such as cement or lime and water. Mortar fill and seal the irregular gaps between the building blocks. Also, scientists are involved in finding new alternatives for cement that cement can be used effectively and also reduce the unit weight. during cement manufacturing the large volumes of co2 emitted. In this paper study was conducted on perlite and metakaolin as a replacement for cement. Perlite is come from glassy volcanic rocks, is a low density material, metakaolin is the most effective pozzolanic material is increase the binding property. The percentage of replacements were adopted for 5%,10%,15%,20%,25%.the specimens were casted and cured for 7 and 28 days. After this process the specimens were subjected to compressive strength, split tensile strength, durability tests and also carried the thermal analysis. Finally the above test results were compared with normal mix mortars.



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# ALLOCATION AND NAVIGATION OF SMART CAR PARKING SLOT USING IOT

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## ABSTRACT

Smart parking is one of the most growing technologies in current world. In our day today life as the population increased vehicles also increased .people prefer private vehicle than public transports increasing vehicle causes parking problems in peak hours. The smart parking system continue to become more efficient as increasing number of vehicles struggle with traffic jam and lesser amount of parking availability. While the deployment of sensor technologies continued to be core to the development of smart parking, a wide variety of technology are also introduced more adaptable system including cameras wireless communication, data analysis induction loops smart parking meters and advanced technology. The existing system is slot allocation for slot reservation process. Now the proposed system is wireless sensor communication and navigation

*Index Terms:* Smart parking, traffic, android application, parking space, IR-SENSOR, Navigation, RFID, Slot allocation.



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# STRENGTH STUDY ON SELF-COMPACTING CONCRETE USING MICRO AND NANO SILICA AS A CEMENTITIOUS MATERIALS

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## ABSTRACT

Concrete is the important construction material. The major component of concrete is cement which produces huge amount of carbon di oxide at the manufacturing stage of cement. The cement can be replaced partially by various by-products like fly ash, nano silica, micro silica, etc. The fly ash has been replaced to cement by 20%, in M40 grade of SCC. The micro silica and nano silica are replaced at 5%, 10%, 15%, 20 and 1%, 2%, 3% and 4% respectively. The flowability of fresh concrete as suggested by the European Federation of National Association Representing for Concrete guidelines was tested on slump flow, V-funnel, Orimet and L-box. The influence of micro and nano silica on the flow characteristics was evaluated. For the present study, the SCC mix was prepared for M40 concrete and the fresh concrete test was performed on control SCC, micro-silica and nano-silica replaced Self-compacting concrete. The compressive strength as mechanical property of SCC has been tested.

*Index Terms:* Micro-silica, Nano-silica, Flow-ability, Compressive Strength



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# PERFORMANCE OF RCC FRAMED BUILDINGS UNDER LATERAL LOAD BASED ON EURO CODE 8

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## ABSTRACT

Lateral loads are random in nature and unpredictable, the static and dynamic analysis of the structures have become the primary concern of structural Engineering. The feature of the regularity and symmetry in the overall shape of the building in plan affects the response of the building under lateral loading. Therefore these types of structures should be well analyzed under lateral loading accounting the specified seismic design philosophies and seismic codes so that they can sustain moderate to maximum lateral loading. In recent years number of studies has been made in the performance of RCC framed regular and irregular buildings separately under static and dynamic analysis method with the help of civil engineering software based on different standards. In this study the performance of regular and irregular RCC framed buildings under both static and dynamic analysis method with the help of ANSYS software are studied. The objective of this work is to study the performance of RCC regular and irregular framed buildings under lateral and normal loads using static and dynamic analysis. Various structural responses like shear force, bending moment, stress and lateral displacement are obtained. From the analyzed results it has been found that these parameters are high for irregular building in both static and dynamic analysis method compared to regular building.

*Index Terms:* static Analysis, dynamic analysis, Regular building, Irregular building, Structural Response

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# STUDY AND ANALYSIS OF GREEN BUILDING

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## ABSTRACT

This study mainly focuses on the various factors influencing the faster growth of green construction in Tamil Nadu. The factors influencing the growth are identified based on Social, Financial, Environmental, Physical and Governmental factors and the questionnaire is designed based on these factors. Questionnaires were administered on selected building professionals (Project managers, Engineers and Contractors) who were directly involved in construction work sites in the Green building and Conventional building constructions. The data obtained were analyzed using the spreadsheets, and the results were presented by the use of statistical tools such as frequency tables and pie charts. Based on these analysis the factors which the faster growth as well as the factor which impacts the growth of green buildings are determined and based on these the suggestions to improve the growth of green buildings are suggested. Further the analysis is carried out by creation of a building model in AUTODESK REVIT and using the INSIGHT plugin the lighting analysis and energy consumption of the structure are determined. The data obtained using the INSIGHT are used to identify the best orientation of the model in Chennai based on the weather data. The orientation is chosen based on the cost of the energy consumption of the structure which is determined using the heating and cooling loads distribution across the created model.

*Index Terms:* Green Construction, Infrastructure Growth, Growth of Green Buildings, Heating and Cooling loads, Lighting Analysis



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# IMPROVED IMAGE PROCESSING TECHNIQUE FORDETECTION OF CRACKS IN CONCRETE STRUCTURES USING HSV COLOUR SPACE

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## ABSTRACT

Concrete is one of the most commonly used materials for structural construction. Safety inspection of concrete structures should be strictly carried out since it is closely related with the structural health and stability. Surface cracks on concrete are one of the earliest indications of degradation in a structure. This paper presents one of the eminent methods to detect cracks on the concrete structure using the Hue Saturation Value (HSV) Colour space. The reliability and consistency of each of these parameters in effective detection of cracks are discussed. In scenes of significantly varying lighting conditions, the captured images could be under and overexposed. The regions of such images can suffer from a loss of information. To overcome this High Dynamic Range (HDR) imaging techniques are used for better accuracy of results. The present work proposes to adopt the HDR imaging for detecting of cracks in concrete structures in the HSV space.

*Index Terms:* Crack detection, Digital Image processing, High Dynamic Range Images, Hue, Saturation and Value.



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# APPLICATION OF BIOCEMENTATION TO STRENGTHEN CEMENT MORTAR

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## ABSTRACT

Biocementation is a green technology which involves the deposition of calcium carbonate assisted by peculiar action of some bacteria. These depositions are found to be a good binder for protection of building materials. This study focuses on the application of this clean and green technology for enhancement of mechanical properties of mortar with sustainable principles. Conventionally, chemicals like peptone and glucose are used as a protein source and carbon source which are expensive. In this study lentil seeds as protein source and sugar as carbon source were used, this makes the entire process techno economically viable. Moreover, rhizospheric soil is used as a source of ureolytic bacteria, which secrete urease enzyme which hydrolyses urea. For 28 days curing period, an enhancement in compressive strength by 23.36% and reduction in water absorption by 18.02% were observed in experimental specimen compared to control specimen.

*Index Terms:* Biocementation, Rhizospheric soil, calcium carbonate Ureolytic bacteria.



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# DEVELOPMENT OF AMBIENT AIR CURED GEOPOLYMER CONCRETE

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## ABSTRACT

The use of supplementary cementitious materials as partial replacements of the cement in concrete will play a significant role with respect to the environmental control of greenhouse effects and global temperature reduction. The development of geopolymer concrete (GPC), in which all of the

Portland cement is replaced with fly ash (in combination withsodium hydroxide and sodium silicate solutions), offers a promising alternative to ordinary Portland cement concrete. It has been estimated that the manufacture of geopolymeric cement emits about 80% less CO2 than the manufacture of OPC primarily because the limestone does not need to becalcined to produce the geopolymeric binder. In the present study class F fly ash and ground granulated blast furnace slag has been used as source material to produce geopolymer concrete. Considerable research has been conducted on the mechanical properties of fly ash based geopolymer concrete. Geopolymer concrete exhibits superior mechanical properties than ordinary concrete.

*Index Terms:* geopolymer, fly ash, slag



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# EXPERIMENTAL INVESTIGATION ON HOLLOW CORE RIGID PAVEMENTS

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## ABSTRACT

In developing nations like India , the construction and improvement of high quality roads play an important role. This project is focused on the comparative study on behavior of RC pavements and Hollow core rigid pavements. Since the rigid pavement is a solid slab, the major limitation is that in case of any drainage problem the movement of water could not be directed to another shoulders in the pavement. This can be rectified by implementing hollow cores instead of solid slab rigid pavement. The main use of hollow cores in the rigid pavement is to reduce the self weight of the pavement and utilizing the drainage facilities provided in it. In reference to the hollow cores provided in the railway track, we have planned to provide hollow cores in the rigid pavement. The use of PVC pipes in rigid pavement is concerned with more economical construction, due to rapid assembly construction, low self weight, slippery inner surface, so that the drain off water can move very easily through it. The grade of concrete is $M_{30}$ and zone II aggregates were used. Two slabs were casted for testing, former is conventional rigid slab and later is hollow core rigid slab. These slabs were tested under proving ring loading frame and the values of initial crack load and ultimate crack load were taken. It is observed that the flexural strength of hollow core rigid slab is 1.64 times higher than the conventional rigid slab.

*Index Terms:* Rigid pavements, PVC pipes, Hollow cores, flexural strength, drainage utility.



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# DETECTION OF DAMAGES IN CONCRETE STRUCTURES USING HDR BASED IMAGE PROCESSING TECHNIQUE

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## ABSTRACT

Engineering structures are degrading by the effect of pollution, aging, fatigue, mechanical stresses and environmental factors. These factors are leading to deterioration and failure of the structures before their designed life. So, structures are to be monitored for damages and carry out repair or rehabilitation. Real time structural health monitoring of these structures are to done at regular intervals of time. Digital image processing plays an vital role in damage assessment of engineering structures. They help in detecting the superficial damages and provide information on the extent of damage caused to the structure. In order to have better quality images for processing, High Dynamic Range (HDR) images can be effectively used. HDR images are generated by merging Low Dynamic Range (LDR) images of different exposures. The first step in image processing is the image enhancement and noise removal as it is difficult to process an image with more noise and unwanted structural data. Since, edge detection is the main process for object detection, investigation on various available edge detection techniques becomes essential. The present work proposes to use HDR images for the detection of different types of damages on concrete structures by simultaneously investigating the applicability of different popular edge detection algorithms.

*Index Terms:* Digital image processing, high dynamic range images, damage assessment, concrete structures, edge detection techniques.

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# ANALYTICAL INVESTIGATIONS ON SEISMIC BEHAVIOUR OF OPEN GROUND STOREY BUILDING RETROFITTED WITH SHEAR WALL BY PUSHOVER METHOD

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## ABSTRACT

In urban India, the construction of apartments is becoming more common. For functional requirements like car parking, the ground storeys are constructed without having any infills (made of either masonry or concrete). Nonlinear static analysis helps in predicting the weak areas in the structure and demonstrates the progressive failure in building. A three storey half scale bare frame building was previously tested on shake table. The seismically damaged test building was locally retrofitted using geopolymer concrete in the beam- column joints of the ground store. The infills are then added to the upper floors of the building in the X-direction and the ground floor is kept open to make it represent as open ground storey (OGS) building. The building was then globally retrofitted using reinforced concrete shear wall throughout the height of the building which was designed as per IS 13920- 1993. The building was then tested under monotonically increasing lateral pushover loads, in a parabolic pattern. The comparison between experimental and analytical pushover curves is carried out for the open ground storey building globally retrofitted with shear wall.

*Index Terms:* Open ground storey buildings, Nonlinear static analysis, Pushover curve, Geopolymer concrete, Shear wall

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# EXPERIMENTAL INVESTIGATION ON PAVER BLOCK BY PLASTIC WASTE

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## ABSTRACT

The aim of this project is to replace cement with plastic waste in paver block and to reduce the cost of paver block when compared to that of convention concrete paver blocks. At present nearly 56 lakhs tones of plastic waste is produced in India per year. The degradation rate of plastic waste is also a very slow process. Hence the project is helpful in reducing plastic waste in a useful way. In this project we have used plastic waste in different proportions with waste plastic, Fine aggregate and cement. The paver blocks were prepared and tested and the results were discussed.

*Index Terms:* Paver block, Plastic waste, Cement.



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# STUDY ON THE GGBS CONCRETE STRENGTH -PARTIAL REPLACEMENT

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## ABSTRACT

In present years, concrete is the indispensable product in variedcategories of structural constructions.Its properties considerably depend on the measures and properties of its major constituents.Because of the emerging activeness and recognition of the world regarding the conservation and dangerous consequences of utilizingcement. Cement replaced with GGBS has coming out as a crucialsubstitute to ordinary cement concrete and has made noticeable more quickly by the concrete producers due to the cement availability, energy savings, cost savings, environmental benefits.The efficiency of GGBS is calculated experimentally by various test on concrete,Portland Pozzolana Cement is replaced to desired amount with Ground Granulated Blast furnace Slag of about 30% to 45%and complete replacement of crushed stone sand at varied number of ages.

*Index Terms:* Portland Pozzolana Cement, crushed stone sand, , ground granulated blast-furnace slag.



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# STUDY ON STEEL FIBRE REINFORCED GEOPOLYMER CONCRETE

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## ABSTRACT

Geopolymer concrete is a new type of concrete in which there is no use of cement in it as well as it is an eco-friendly concrete. In this project we are using hooked end steel fibre, coarse aggregate, fine aggregate along with Class-F fly ash. Sodium Hydroxide and Sodium Silicate are mixed together and alkaline solution is made and they are used as binding agent. Use of carbon dioxide is harmful for environment so we use geopolymer concrete. In this project we are testing the compressive, flexural and tensile strength of geopolymer concrete. M-40 grade of concrete is used in this project. We are taking three different ratios of steel fibre for testing. Percentage of steel fibre used is- 0%, 0.5%, and 0.75%. The testing of the concrete is done into three intervals that is for 7 days, 14 days, and 28 days. The end result is shown after 28 days and the optimum percentage of steel fibre is determined.

*Index Terms:* Sodium silicate, Sodium hydroxide, Hooked end steel fibre, and Fly ash (Class F).



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# NANO COMPOSITE MATERIALS IN CONCRETE

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## ABSTRACT

The experimentation work has been carried out on new sustainable concrete to overcome the major pollution member carbon-di-oxide on construction industries done by conventional concrete, according to various organization such as world health organization has benchmark for the reduction of pollution upto 45% by 2030. In this experiment the mineral admixture used are Nano-silica which were used to increase the strength of concrete and natural polymer substances such as cactus solution is used to increase the workability of concrete. For the binding material cement was replaced with the fly-ash at 60%, Cactus solution at 2.5% and Nano silica at 2.5%. The result of compressive strength for conventional and the concrete with nano materials were compared. The main objective of this investigation is to achieve the economic and eco-friendly concrete for nature.



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# EVALUATION OF EFFECT OF CHEMICAL TREATMENT ON TENSILE STRENGTH OF RATTAN CANE

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## ABSTRACT

In order to design any structural component efficiently, it is necessary to know in advance the strength capability of the material to be used. Rattan cane presents a problem in this respect since the quality cannot be controlled as they are naturally occurring materials. All the other materials that are used structurally are manmade and therefore some form of quality control can be exercised during their productions, this has led to some research work on the structural properties of rattan cane. This project work will focus on one of the characteristics of rattan cane through assessing effect of moisture content in the rattan cane in its untreated or unmodified phase of and after modifications or treatments using liquid chemicals to be painted on the surface of rattan cane in its performance structurally in mechanical parameters like tensile strength.



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Ref No : ICGESCD/SE/22

# PERFORMANCE OF LIGHT WEIGHT CONCRETE FRAMES COMPOSED OF HYBRID FIBRE WITH RECTANGULAR SPIRAL REINFORCEMENT

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## ABSTRACT

The structural form of portal frame are the most commonly used structural forms for single and multi-storey structures. The construction defects or service loads or due to insufficient structural strength damage the structures. Compared with the Normal Weight Concrete (NWC), Light Weight Concrete (LWC) can significantly reduce the dead load of Structural elements. The Hybrid Fibre to improve performance of frame against lateral loading and spiral reinforcement improve the ultimate lateral resistance, ductility and energy dissipation capacity. In this study three specimen, RC portal frames Sp1C (Specimen 1- Control), Sp2LF (Specimen2- Light Weight Concrete composed of Hybrid Fibre) and Sp3LFS (Specimen 3- Light Weight Concrete composed of Hybrid Fibre along with Spiral Reinforcement) were casted with Light weight aggregate of coconut shell and the hybrid fibrecombination of Steel and Polypropylene (70% and 30%) fibre along with rectangular spiral reinforcement. Experimental results are to be compared the behaviour of three specimens and thereby attempts to predict the Lateral load response of RC portal Frame with the use of LWC and Hybrid Fibre along with spiral reinforcement.



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# EXPERIMENTAL STUDIES ON NON EXPLOSIVE DEMOLITION CHEMICALS

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## ABSTRACT

Day by day dirt particles in the air is on the rise and most of the contributions are made in the field of construction. To construct houses, we need raw materials like stone, sand, cement. To make those materials (rocks) to the standard size hydraulic machines, explosive are used which would result in air and noise pollution in surrounding areas. To avoid those damages to public, Soundless Chemical demolition chemicals also known as non-explosive demolition chemicals are employed. Later on, this applicability shifted towards demolition of the concrete components. To make this chemical work, drill holes are made up to reasonable depth in the concrete specimen and the chemical mix is poured by mixing it with water. After some time concrete cracks without any pollution. The purpose of this project is to vary theparameters like depth of bore, number of bores, etc. and to find out how the changes in parameters could possibly affect the time needed to crack the concrete specimen. Knowledge about this kind of demolition technique is not widely employed in Indian states but there is lot of scope available to employ this technique for demolition of concrete specimens. This technique could be a boon to lot of people who want to demolish the concrete structures without any disturbance.

*Index Terms:* Demolition, chemical agent, pollution, bore holes



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# EFFECT OF GLASS FIBER REINFORCED POLYMER ON CORRODED REINFORCED CONCRETE BEAM USING SEA WATER

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## ABSTRACT

Most of the reinforced structures are vulnerable to corrosion. In this study, corrosion were initiated using sea water has ionic solution and stainless steel metal has electrode. Six beams of 150mmx150mm size were casted by wiring at the bottom reinforcement for the supply of volts. Those joints are prevented from water contact using an adhesive material araldite. Constant voltage maintained for two different electrodes, reinforcement and stainless steel respectively. Corroded beams were taken for retrofitting using glass fiber reinforced polymer. Coupons are used for stress strain analysis and to determine physical properties. Corrosion initiation is observed based on intrinsic change of color and deposition. Cracks occurred parallel to reinforcement are measured with the help of crack detection microscope. European code is used to determine effective thickness of glass fiber reinforced polymer. Cracks shall be arrested and bilinear directional placing of glass fiber reinforced polymer was used. Beams are tested with and without GFRP, which gives effective thickness and placement of GFRP against tensile lose.

*Index Terms:* Corrosion, Retrofitting, Glass fiber reinforced Polymer, Flexural behavior



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# EXPERIMENTAL INVESTIGATION OF HIGH STRENGTH GEOPOLYMER CONCRETE

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## ABSTRACT

Globally there has been a growing demand for new construction materials that have low greenhouse gas emissions and effect sustainability during the past few decades. The boom in the industrial sectors has paved the way for the consumption of cement and other natural resources in a massive manner. Depletion of these natural resources at such an alarming rate could affect sustainability with nothing to be conserved for our future generations. The main objective of any research is to discover a new or environmentally friendly product. All Geopolymer concrete mixes were prepared for different molarity and cured in direct sunlight. Geopolymer concrete specimens are a study for workability, compressive strength, split tensile strength, and flexure strength. The cost savings in the production of G60 over M60 is 11.25% and 7.8% for molality of NaOH 16M and 18M respectively. The average compressive strength developed by geopolymer concrete (GPC) at 7 days is about 80% - 86% of the 28 days strength. The average splitting tensile strength developed by GPC at 7 days is about 50% - 60% of the 28 days strength. The average flexural strength developed by GPC at 7 days is about 62% -74% of the 28 days strength. In general,for both 16M and 18M concentration of NaOH in GPC attains higher early strength when compared to the corresponding ordinary Portland cement concrete.



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# SIZE EFFECT STUDIES ON GEOPOLYMER CONCRETE

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## ABSTRACT

The continuous exponential growth in civil infrastructure and industrialization has led towards rising in two global problems. One is the tremendous rise in consumption of natural aggregates and other is thedisposal of industrial wastes. In view of this, research has led towards the development of Geopolymer concrete(GPC) which utilizes industrial by-products such as flyash or silica fume as a complete replacement for cement.GPC has a huge potential to become a revolutionary material for the construction industry. However, the lack of codes and standards created an interesting challenge and neither the owner nor designer wanted the liability of using GPC without an applicable design standard. Widely accepted, simple and rational design provisions need to be developed for GPC (reinforced and non-reinforced) in order to provide confidence to the design engineer for effectively utilizing the high strength and other unique properties of GPC. One of the areas in which our knowledge is still lacking on GPC is size effect behaviour under compression. In the current paper investigations related to size effect properties of GPC is presented. The experimental results are further validated by the proposed size effect law.

*Index Terms:* Geopolymer, Size effect, Compressive strength, size independent strength.



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# AN EXPERIMENTAL INVESTIGATION ON THE STRENGTH OF M20 GRADE CONCRETE FOR OPTIMUM REPLACEMENT OF RECYCLED AGGREGATE WITH NATURAL AGGREGATES

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## ABSTRACT

Concrete is the main construction material across the world and the mostly used in all types of civil engineering works .The crushed Hardened concrete which will be used as aggregate is known as recycled concrete. Aggregates represents about 70%-80% of concrete components. Hence it is beneficial to recycle the aggregates for construction works and also to solve the scarcity of aggregates. To minimize the problem of scarcity of the materials it is a wise move to utilize the recycled aggregates in the concrete, if it attains the required standards. The present work is to study the behavior of the compressive strength of the concrete with partial replacement of recycled concrete aggregates in M20 grade of concrete. The used concrete shall be crushed in such a way that, to obtain fine and coarse aggregate sizes. By proper sieving and batching, Fine and Coarse aggregates are classified. The recycled fine and coarse aggregates are replaced up to 25% with respect to fine and coarse aggregates of fresh concrete. The replacement is done in both coarse and fine aggregate alternatively from 0-25% at an increment of 5%. With the obtained results a correlation graph is plotted between the partial replacements of recycled coarse aggregate and conventional concrete to the strength parameter and also to have a clear optimum percentage of recycled aggregate to be used.

*Index Terms:* M20 grade concrete, Scarcity of aggregates, sieving and batching, optimum replacement.



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# STUDIES ON THE INFLUENCE OF USING COATED RECYCLED AGGREGATE ON THE MECHANICAL PROPERTIES OF CONCRETE

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## ABSTRACT

The use of recycled aggregate obtained from crushed concrete rubbles in building industry as a construction material has become increasingly widespread. Scarcity of natural resources and to reduce the landfill space put together brings a renewed interest in using of recycled aggregate. The quality of recycled aggregate is predominantly affected by the cement mortar that remains on the surface of the recycled aggregate. This attached mortar results in high porosity than natural aggregate, which decline the physical properties of RA and mechanical performance of concrete made from recycled aggregate. This paper aims is to modify the surface structure of recycled aggregate by surface coating of RA with micro silica slurry under a controlled laboratory environment. A natural aggregate concrete mixture was also prepared to serve as control mixture. The effect of water absorption of recycled aggregate, mechanical properties including compressive strength, modulus of rupture of the resulting RAC was investigate.

*Index Terms:* Recycled aggregate, Recycled aggregate concrete (RAC), surface



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# COMPARATIVE STUDY OF LIGHT GAUGE STEEL FRAMED CONSTRUCTION VS ORDINARY STEEL FRAMED CONSTRUCTION

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## ABSTRACT

The paper mainly focuses on the advantages of light gauge steel structures over conventionally designed steel buildings. The different fields of comparison mainly constitute its cost effectiveness, time saving, future scope, subtleness and economy of light gauge steel structures over conventionally engineered buildings and its importance in developing nations like India. It's a case study for Industry Shed based on the review and various case studies which shows their experimental and analytical studies carried out in this field. The result shows that these structures are economical, energy efficient and flexible in design. Cold-formed steel (CFS) members have been used in buildings, bridges, storage racks, grain bins, car bodies, railway coaches, highway products, transmission towers, transmission poles, drainage facilities, various types of equipment and others. These types of sections are cold-formed from steel sheet, strip, and plate or flat bar in roll forming machines or by press brakes (machine press) or bending operations. This project will focus on implementation of light gauge steel frame throughout the construction industry and to reduce the energy consumption in buildings. The literatures are reviewed based on identifying light gauge steel framed system in respective literature and the reviews are grouped accordingly. In past literatures were observed are Cold-formed steel members can be assembled in various combinations to provide cost-efficient and safe light gauge floor system for buildings. In generally, it will be performed by under seismic response recommendation.

*Index Terms:* Industrial Building, Light Gauge Steel Structure, Cold-formed steel members.



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# REHABILITATION OF R.C.C SLAB USING FERRO CEMENT

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## ABSTRACT

Reinforced concrete slabs are designed as per limit state of serviceability to ensure its performance not degrading till it's service life. However, the durability of the structure is not ensured with design, it largely depends on quality of materials and work. The aim of this paper is to address those serviceability issues like cracking, excessive deflections, concrete spelling, etc. In this paper, RCC slabs of dimension 35cmx35cm is casted with M25 grade of concrete and are retrofitted with two types of wire meshes viz. Chicken wire mesh and sieve wire mesh. The prepared specimen is tested in universal testing machine, supports are given by I beams and point load is applied at the centroid of top surface. Similarly, retrofitted slabs are tested in the Same set up. The results showed that slab retrofitted with chicken wire mesh and sieve wire mesh showed good performance.



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# RETROFITTING RCC BEAMS USING WOVEN ROVING FIBRES

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## ABSTRACT

It is hereby proposed to overcome the impact of damaged RCC elements by applying latest technology. For this in this project the sample of RCC element taken is BEAMS THREE samples is going to be casted and the same will be tested for its strength After encased by woven roving fibres one of the sample will also be tested. The main objective of this project is to give a brief comparison between RCC (Reinforced Cement Concrete) and Steel Designs for Industrial. Generally we use RCC (or) Structural Steel for most of the Structures. The material selected (or) the design procedure opted will depend on various factors like Functional aspects, Compatibility, Load cases, Span, Economical aspects and other local conditions. In this Article, design and analysis aspects like Bending Moment, Axial Load etc., related to Industrial Structures in Steel and RCC are presented. A comparison is made between these two cases and the most economical and safe one for the Industrial Structures is suggested here. In this Article, Industrial Structures having Ground floor with working Space 25m x 46m and height 24m subjected to Crane Load are analyzed in detail .



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# FLEXURAL BEHAVIOUR OF E-WASTE AND COCONUT FIBRE REINFORCED CONCRETE BEAM

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## ABSTRACT

The purpose of this experimental investigation is to study the behaviour of Beams with E-Waste & Coconut Fibre. Several researches have been done in concrete beams, columns and piles using E-Waste. The concrete used in this investigation was proportioned to target a mean strength of 30 MPa. Specimens such as cubes, cylinders and prism beams were used for this work. For casting the Beams Reinforcement Fe500 is used. The Mix was used with E-Waste of 0%, 5%, 10% and 15% for coarse aggregate and Coconut fibre content of 1% (by weight of Fine aggregate). The use of coconut fibres will also lead to better management of these waste fibres. The addition of coconut fibres improved the flexural strength of concrete by about 12%, they also formed good bonding in the concrete. The mechanical properties such as cube compressive strength, cylinder split tensile strength, prism flexural strength and reinforcement beam will be determined on the conventional Concrete and compared with non-conventional concrete.



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# COMPARATIVE STUDY OF AN INDUSTRIAL BUILDING WITH RCC AND STEEL STRUCTURE

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## ABSTRACT

First designed industrial building made of fully RCC framed structure. In this all the structural components of column, beam, slab and foundation designed as per codel provision and the performance of structure is analysed. The twin column concept is used to increase the stability of the structure and inclined frame is provided to resist large span structures. The manual calculations of the components are proved to be safe.This building is used for casting and storage of casted bins in ISRO, SDSC SHAR. The main objective of this project is to give a brief comparison between RCC (Reinforced Cement Concrete) and Steel Designs for Industrial. Generally we use RCC (or) Structural Steel for most of the Structures. The material selected (or) the design procedure opted will depend on various factors like Functional aspects, Compatibility, Load cases, Span, Economical aspects and other local conditions. In this Article, design and analysis aspects like Bending Moment, Axial Load etc., related to Industrial Structures in Steel and RCC are presented. A comparison is made between these two cases and the most economical and safe one for the Industrial Structures is suggested here. In this Article, Industrial Structures having Ground floor with working Space 25m x 46m and height 24m subjected to Crane Load are analyzed in detail .



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# ANALYTICAL STUDY FIBRE REINFORCED CONCRETE UNDER DYNAMIC LOADING TEST

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## ABSTRACT

Many of our ancestors' buildings especially masonry buildings are damaged often due to various natural calamities such as tsunami, earthquake, flood etc. Hence to avoid such damages especially that cause due to, earthquake we came out with an idea of implementing Fibre Reinforced Concrete(FRC).This paper mainly involves about the retrofitting technique. The reason for such implementation is, it does not add any additional weight to the existing structure.When used for retrofitting in heritage buildings, this provides a higher compatibility with substrate and vapour permeability. Three different fibres such as carbon fibre, glass fibre and basalt fibre are used and tested under cyclic load testing. The software used is LabView from which the results are obtained. This paper involves about the Comparative study of three different fibres and their performance. The tensile behaviour is studied and determined in this paper.

Index Terms: Fibre, Retrofitting, carbon, glass, basalt



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# EXPERIMENTAL INVESTIGATION OF PRESTRESSED CONCRETE POSTTENSIONED BEAM OVER AN RCC BEAM

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## ABSTRACT

This Project is to work on the economic and reduction in reinforcement between RCC Beam and Post-tensioned beam. This work includes the design &estimate of 1.5m span beam and M40 grade of concrete RCC beam with post-tensioned Beam and comparing the results. The idea is to reach a definite conclusion regarding the superiority of the two technique Over one another.

*Index Terms:* Post-tensioning , RCC Beam, universal testing machine



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# SEISMIC ANALYSIS AND DESIGN OF RAJIV GANDHI INTERNTIONAL AIRPORT (WEST PROCESSOR) - HYDERABAD

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## ABSTRACT

Seismic analysis of any type of structure is an important consideration while working in high earthquake prone areas. With the help of seismic analysis, the structure can be designed and constructed to withstand the high lateral movement of earth's crust during an earthquake. With the advancement of finite element tools the analysis and design of huge and special structure is possible nowadays. In this paper the seismic analysis and design of airport integrated building has been carried using finite element software ETABS. It has new features surpassed its predecessors and compotators with its data sharing capabilities with other major software like AutoCAD, and MS Excel. So we recommend that ETABS is a very powerful tool which can save much time and is very accurate in Designs. So the entire structure is analyzed using response structure method as per IS 1893 using ETABS and the dynamic response are obtained.

*Index Terms:* Airport building, Modelling, Seismic analysis, Dynamic Response



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# CODAL COMPARISION BETWEEN EUROPEAN CODE AND INDIAN CODE FOR THE DESIGN OF COMPOSITE SLABS

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## ABSTRACT

The aim of this paper is to understand the analytical design of composite slabs of different codal provisions. The paper focused mainly the guidelines of European code and Indian code. In this paper, the m-k method and the partial interaction method has been discussed. In general the composites structures are failed due to shear and the shear resistance are predicted by m-k method with respect to European codal provisions. The strength of the shear depends on many factors such as Profiling of steel sheet which act as main reinforcement, type and frequency of embossments and shear studs, thickness of steel sheet profiling, loading arrangement, length of the shear span, slenderness ration of the span, the stress ratio of composite section equivalent to concrete core area and types of end anchorage. The Indian codal provision provides only the prediction of shear carrying capacity of the composite sections. The complete guidelines for the analysis and design of composite sections are available in the European standards and the British Standards and the Indian standards are incorporated upto the guidelines for shear connectors and its design.



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# DYNAMIC RESPONSE OF RC STRUCTURES WITH DAMPERS

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## ABSTRACT

Earthquakes are potentially devasting natural events which threaten lives, destroy property and disturpt life-sustaining services. There are various conventional seismic design measures available but situations do exist at which the conventional design approach is not applicable. Especially when a structure must function after an earthquake occurs in case of important structures like hospitals. In such cases energy dissipating devices are used within the structural system and prevents the development of damage to the structure. Energy dissipative devices range from passive devices to fully and semi-active systems. Passive control devices like Dampers are incorporated into structures to dissipate energy and reduce excessive structural vibration and prevent catastrophic structural failure due to strong earthquakes. Dampers are largely applied due to their advantages such as low cost, no external power and low maintenance. Also the number and position of dampers play a vital role in structural vibration control. This paper focus on review of the performance, effect of position and effect of number of dampers such as friction damper and viscous damper when incorporated to the structure.

Keywords: Energy dissipating devices, Passive control devices, Friction damper, Viscous damper.



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# STRENGTH STUDIES ON SILICA FUME BASED GEOPOLYMER CONCRETE WITH PLASTIC FIBRE

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## ABSTRACT

This research work determines the investigation on possibility of geopolymer concrete using silica fume and plastic fibre. Geo-polymer concrete reduces carbon dioxide emission by reducing use of cement. In this study, fly-ash is blended with Silica fume which is the byproduct from silicon and plastic fiber which is obtained from plastic waste. Silica fume enhances the durability and plastic fiber improves the shear property of geo-polymer concrete. Silica fume 10% and plastic fiber 1% is added and cube specimen casted. .After the curing process, the strength of sample is to be tested at 7, 14 and 28 days. Comparisons to be prepared with conventional concrete.

eywords: - Geopolymer, silica fume, plastic fibre



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# AN EXPERIMENTAL STUDY ON OPTIMUM REPLACEMENT OF FINE AGGREGATE BY MARBLE POWDER AND MORINGA OLEIFORA IN CONCRETE

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## ABSTRACT

Concrete is the most important component used in the construction industry throughout the world, where the fine aggregate is generally natural sand. The use of sand in construction activities results in the excessive mining. Due to excessive mining, natural resources are getting exhausted, it is becoming inevitable to use alternative material in concrete.Marble powder is produced from processing plants during the sawing and polishing of marble blocks and about 20 - 25% of the processed marble is turn into powder form.concrete was getting stronger and harder because of very good bonding mechanism contributed by Moringa oleifera. In this study, the experimental investigation was carried out to study the properties of concrete by partial replacement of fine aggregate with different percentage of marble powder (0%-50%) and Moringa oleiferafor M20 grade concrete. The strength test namely compressive strength, split tensile strength, flexural strength were conducted and the results are concluded.

Key Word: Marble powder , M20 grade, Strength, Moringa oleifera etc.,

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# Strength Analysis on Concrete with Partial Replacement of Fine Aggregate by M Sand and Steel Slag

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## ABSTRACT

Now a day's huge quantity of concrete consumption is increased. The availability of natural sand is low and also use of large amount of natural sand, affect the environment. So we have to choose alternative material for fine aggregate for this paper. Study about the partial replacement of fine aggregate by using Steel slag and M- sand. The main objective of this investigation is to study experimentally the effect of partial replacement of fine aggregate by Steel slag and M-sand on the various strength properties of concrete by using the mix design of M30 grade. Test specimen with 0%, 10%, 20%, 30%, 40%, & 50% of partial replacement of fine aggregate by steel slag and similarly using M-Sand specimen is 0%, 10%, 20%, 30%, 40%, & 50% were cast and tested for compressive strength after curing period of 7 14 & 28 days. Steel slag and M-Sand is available at free of cost, the cost of concrete decreases, when the percentage of replacement increases. So, more the percentage of replacement, higher will be the reduction in cost.

Keywords: M-sand, Steel Slag, RCPT TEST,



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# ENVIRONMENTAL ENGINEERING



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# BIOREMEDIATION AND BIOELECTRICITY GENERATION: MICROBIAL FUEL CELL

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## ABSTRACT

To meet the requirement of a growing population, the energy demand are continuously increasing in the world, alternative sources are needed. Microbial Fuel Cell (MFC) is a sustainable technology that converts organic matter in wastewater into electricity, thus it can be a potential alternative source for water and energy. Microbial biofuel cells convert energy obtained from biochemical reactions into electrical energy in presence of different types of biological catalysts (living microorganisms, organelles or enzymes). One of the major differences between each type of fuel cell is the type of biocatalyst used at the anode of the fuel cell. Microbial fuel cells (MFCs) utilize whole living microorganisms that act as micro reactors and allow multiple substrates to be oxidized deeply or completely. Although significant advances in MFC research have been accomplished in the last few years, improvement in power generation and decrease in material cost are still necessary to bring MFC into practical application. Most of the previous studies used MFC as batch reactor for reducing single compound and using simulated wastewater for the treatment and power generation. This project focused to produce electrical power generation and to reduce pollutants in a sugarcane industry wastewater using Microbial Fuel Cell (MFC).



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# ADSORPTION STUDIES OF ACTIVATED CARBON PREPARED FROM RICE HUSK FOR REMOVAL OF METHYLENE BLUE DYE FROM AQUEOUS SOLUTION

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## ABSTRACT

Dyes are an important class of pollutants which are extensively used in various industries. The presence of dyes in water largely affect the photosynthetic activities of aquatic plants by reducing the transmission of sunlight into the water bodies, toxic and even carcinogenicaffecting the aquatic biota and human health. Due to their complex chemical structure of dye, the removal techniques are often expensive, in this study Adsorption techniques is preferred over other processes due to it is such an easy operation, simple design, avoidance of secondary pollution, low cost, economic feasibility, In this study, activated carbons, prepared from low-cost rice husk by Thermal and Acid activation, were used as the adsorbent for the removal of methylene blue, from aqueous solutions. Over 99.9% removal efficiency were achieved for the given dosage, with respect pH increasing of basicity of solution will increases removal efficiency.Equilibrium adsorption and Kinetic data were studied using Langmuir, Freundlich Isotherms and by pseudo-first, second-order rate respectively

*Index terms:* Activated carbon, Rice Husk, Adsorption, Dye, Methylene blue



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# TOXICITY PRESENCE IN MARINE SPECIES AND ITS HEALTH EFFECTS ON HUMAN BEINGS

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## ABSTRACT

The aim of the study is to investigate the toxicity level and the effects of Ammonia, Formalin, Sodium Benzoate, Sulphite, and Methyl Mercury on the selected species, which frequently enters in to the aquatic environment and renders the potential treat to human beings.The evaluation of toxicity level was done by HPLC, ICP-MS, and Monier-Willams methods by using the FASSAI, AOAC lab manuals and which is under the laboratory condition. The following species are Ayila, Vanjaram, and Nethili. The strongest effects was exerted by Methyl Mercury as 1mg/kg, sodium benzoate as 26.005 mg/kg, sulphite as in the range of 15-25 mg/kg and the presence of ammonia and formalin were analyzed.The preservatives had no significant effect on the changes in mean weight, color, and mean length. The significant effect of the chemicals was only on humans by consuming the huge amount of fish was recognized and some effects having proper treatment and some of the effects are not having the proper treatment.



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# CHARACTERIZATION AND APPLICATION OF POWDER ACTIVATED CARBON FROM WATER HYACINTH AS ADSORBENT FOR REMOVAL OF CR (VI) FROM AQUEOUS SOLUTION

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## ABSTRACT

Hexavalent chromium, Cr(VI), is a toxic metal present in industrial effluents. The present study focuses on adsorption of Cr (VI) from aqueous solution on activated carbon prepared from water hyacinth shoot. The shoots taken from hyacinth was washed with distilled water and then it was dried. The dried sample were crushed into powder form in a circular saw mill. The powder thus obtained was activated with 10% of $H_2SO_4$ and carbonized at 500 °C for 30minutes in an electric furnace. The characteristics such as functional groups and surface morphology of activated carbon were analyzed using FTIR spectroscopyand SEM analysis respectively. From the characterization studies WHAC was assigned to the O–H stretching mode of hydroxyl groups and from the SEM studies it was observed that surface was highly porous and acidic. The Cr (VI) concentrationwas measured using UV-Visspectrophotometry.Batch adsorption experiments were performed to examine the effects of contact time, adsorbent dose, pH of the simulated solution, Cr (VI)concentration, agitation speed and temperature. Results show the maximum adsorption capacity of Cr(VI) was found to be 23.75 mg/gat pH 2, 1hr contact time, 40 mg/L Cr (VI) initial concentration, 1.4g/L adsorbent dose and temperature 30 °C.The Langmuir and Freundlich adsorptionisotherm models were used to fit the experimental data..Therefore, the activated carbon of water hyacinth shoot (WHAC) can be an effective adsorbent forCr(VI) from the aqueous solution.

*Index terms:-* Activated carbon, Adsorption,low cost adsorbent, hexavalent chromium, Adsorption isotherm and Adsorption kinetics.



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# AN EXPERIMENTAL INVESTIGATION ON DEGRADATION OF MANGROVE ECOSYSTEM IN PICHAVARAM

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## ABSTRACT

The Pichavaram Mangrove forest near Chidambaram, South India is the Second largest mangrove forest in the world with area of about 2400acres. It is a special type of ecosystem seen along the coastal areas which has a high value for biodiversity and scenic beauty. It served as an ecotourism spots in South India. The Pichavaram mangroves are considered among the healthiest mangrove occurrence in the world. It supports the existence of many rare varieties of economically important shell and finfishes. But mangrove ecosystem located in coastal areas, their high productivity and the services they offer, they are subjected to ecological pressure due to natural processes and human interventions and such pressure causes changes in these critical habitats leading to deterioration and/or loss of these areas over the years and now slowly degrading due to various activities includes domestic waste dumping, shrimp farming, decline of fisheries, degradation of clean water supplies and salinization of coastal soils and erosion. The present study is to map the mangrove ecosystem in and around the Pichavaram using ArcGIS Software and that provides time series changes in the total area. The nutrient enrichment and hot spot pollution area will be assessed via water quality parameters and the effects of productivity will be determined. A conservation and management plan need to be implemented to control the degradation of mangrove ecosystem.

*Index terms:* Mangroves, Degradation, Conservation and Ecosystem



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# A STUDY ON INTEGRATED WASTE WATER TREATMENT IN WETLAND CONSTRUCTION USING TYPHA LATIOFOLIA AT DMICE

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## ABSTRACT

Water has increasingly become a scarce essential commodity and should be used judiciously. Tamilnadu is having a severe drought and the whole country is having problems in meeting the demands of clean accessible water. Therefore, the only pragmatic approach to combat this situation of drought is water treatment. A constructed wetland is an artificial wetland that are engineered systems that use natural functions vegetation , soil , and organisms to treat wastewater and act as a biofilter to remove a range of pollutants (such as organic matter, nutrients , pathogens , heavy metals ) from the water. This root zone waste water treatment system makes use of biological and physical-treatment processes to remove pollutants from wastewater Constructed wetlands is a natural alternative to the commonly used technical methods of wastewater treatment .A horizontal surface flow constructed wetland (HSF) has been designed to study the removal of nutrients and trace elements by treating urban sewage and passing through selected aquatic plants / aquatic macrophytes i.e., Typha latifolia,. Samples collected from inlet and outlet of the constructed wetland were analyzed for trace elements and physio-chemical characteristics This study is conducted to prove that Constructed wetlands are suitable eco-technology for remediation of urban wastes containing trace elements and high nutrients, before entering Rivers and other water bodies as well as for reusing.

*Index Terms:* Constructed Wetland, Vetiver, Typha Latifolia, Domestic wastewater, Filtration, Multimedia filter.



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# BIODEGRADING BACTERIA FROM SOIL

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## ABSTRACT

In day to day human activities people are producing goods and services. These processes result in the production of by-products. These by-products are said to be wastes. They are no longer part of the main product. These include solid, liquid and gaseous wastes. Plastics are part of the solid waste. They are dumped into the environment continuously at high rate compared to other wastes. Due to this fact it is causing a crucial challenge in an ecosystem. Most of them are not easily degraded in soil. They took more than 500 years in some cases. Polystyrene is a preferably used plastic in many aspects of human life in industries as it has useful characteristics of cheap cost, lightness, easily manufacturable, versatility, thermal efficiency, durability, and moisture resistance. However, polystyrene is very stable and extremely hard to degrade in the environment after disposal. Polystyrene can be used as a carbon source for microorganisms similar to many other hydrocarbons. The ability of microorganisms to use polystyrene as a carbon source has been recently established. However, the high molecular weight of polystyrene limits its use as a substrate for enzymatic reactions to take place. This study was mainly aimed at isolating the most effective polystyrene degrading bacterial agent from five different soil samples collected from filed farm, garden area, park area, waste water area and sludge areasoil. In this study, the biodegradation of plastic material within 45 days in selected soil samples was studied by carrying out an in-situ degradation. Laboratory degradation of the agent under study was also studied using solid culture media method. The microbial species found associated with the degrading materials were identified as three Gram positive and two Gram negative bacteria. The microbial species associated with the polystyrene materials were identified as Bacillus amylolyticus, Bacillus firmus, Pseudomonas putida, Pseudomonas fluroscence, Bacillus subtilis. The isolation, identification, characterization of bacteria and the microbial activity on substrate plastic sample was analysed by gram staining, Fourier transform infrared spectroscopy, scanning electron microscopy and polymerase chain reaction techniques.

*Index terms:* Biodegradation, plastics, bacterial species, gram staining, scanning electron microscopy and polymerase chain reaction techniques.



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# BIOSORPTION OF DYE EFFLUENT ON SACCHAROMYCES CEREVISIAE

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## ABSTRACT

Disposal of dyes into the environment causes serious damage and they may be toxic to some aquatic organisms due to their breakdown products. The coloring pigments in the effluent may cause serious effects to living organism due to the presence of aromatic chemicals. Biosorption and bioaugmentation are effective biological process for the removal of pollutants with the help of microorganisms. In the present study an attempt was made to examine the potential of Saccharomyces cerevisiae, decolorization of Congo red dye. The influence of different variables namely concentration of dye solution, time, dosage and initial pH on maximum color removal were performed. The UV Spectrum shows the maximum wavelength of 496.93 nm for congo red solution. At room temperature, the maximum decolorization of 90.7% was achieved for 18 h using dye solution concentration of 40 ppm. The suitable initial pH and dosage for removal of color was found to be 4 and 0.1 g with maximum color removal. Finally, the screening of carbon source for the cultivation of yeast cells on decolorization was performed. Based on the previous study, response surface design of experiments was employed in order to maximize the removal of color. The polynomial regression equation was obtained from regression analysis. FTIR spectra was performed in order to conform the biosorption of dye effluent on to viable yeast cells and compared.

*Index terms:* Dye Degradation, Bioaugmentation, Yeast, Saccharomyces cerevisiae.



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# A STUDY ON CALCIUM BASED NANO PARTICLES AS AN ADSORBENTS FOR THE REMOVAL OF NICKEL AND MERCURY FROM AQUEOUS SOLUTION

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## ABSTRACT

The toxic heavy metals such as cadmium, copper, lead, nickel, mercury, and zinc from aqueous environment has received considerable attention in recent years due to their toxicity and carcinogenicity. This paper focuses mainly on Nickel & Mercury which may cause damage to various systems of the human body. Mercury and Nickel ions are non-biodegradable toxic heavy metals and may cause dermatitis and allergic sensitization. The major sources of Nickel & Mercury contamination to water comes from industrial process such as electroplating, batteries manufacturing, mine, metal finishing and forging. Different methods were investigated and applied to remove nickel and mercury ions from water such as adsorption, chemical precipitation, ion exchange, filtration, membrane separation, and reverse osmosis. In this paper a detailed insight has been given on adsorption with an eye on removal of mercury and nickel using different adsorbents.

*Index terms*: Nickel, mercury, adsorption, adsorbents.



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# ASSESMENT OF SURFACE WATER QUALITY ON ENNORE TO PULICAT (BAY OF BENGAL)

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## ABSTRACT

The quality of surface water is of paramount importance for drinking water purposes especially in and around North Chennai regions (Ennore to Palaverkadu) 40 Kms. The objective of this study was to evaluate the impact of surface water quality on soil properties. Pulicat Lake formerly Palaverkaadu Eri is the second largest brackish water lake or lagoon in India, after Chilika Lake. Pulicat Lagoon is considered to be the second largest brackish water body in India measuring 759 km2.Kosasthalaiyar is 136-kilometre (85 mi) long and originates near pallipet in thiruvallur District and drains into the Bay of Bengal. The Kosasthalaiyar river water fully contaminated on industry waste water fully mixing to discharge to Kosasthalaiyar River. And also Hydrocarbon project near Ennore area ground water fully contaminated and finally mixing with ocean water through Palaverkadu lake water. The conclusion is to inform industry to treat waste water properly after that will discharge to proper outlet. The water used for drinking differs greatly in its quality, depending on the concentration and composition of the dissolved salts. Water is one of the most important natural resources and is a key element in the socio economic development of an India.Chennai can never dream of clean air as long as it considers the city's edges – be it Ennore and Manali in the north or Alathur to the south – to be industrial sacrifice zones.To understand the socio economic profile of fishing community and to identify various factors that affect the coastal environmental health and the livelihood of the fishing community a survey has been planned. The broad objective of the study is to examine the socio-economic conditions of the stakeholders in Ennore Creek; while the supplementary objectives centered on the analysis of the impact of water pollution & the creek environment on the health and income of stakeholders of Ennore Creek.To analyse the properties of surface water like physical, chemical and biological. To analyse water quality parameters like temperature, pH, salinity, total hardness COD & BOD. To evaluate the impact of surface water quality on Ennore creek.

*Index terms:* Pulicat Lagoon, Ennore Creek, Water Quality, salinity, total hardness COD & BOD.



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# EXPERIMENTAL INVESTIGATIONS ON THE EFFECT OF RICE HUSK ASH ON THE LANDFILL SOIL PROPERTIES

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## ABSTRACT

Major cities in India, have been facing problems due to old municipal solid waste landfill sites situated close to the expanding cities as they are in the expansion zone of growing cities. These landfills release leachate into the soil which creates surface and subsurface contamination which is a major problem to the people living nearby the landfill sites. These landfill sites needs to be reclaimed for infrastructure development such as roads, buildings and other needs. To reclaim the old landfill sites, it is necessary to know the characteristics of solid waste, more particularly the geotechnical properties. The characteristics of landfill soils are not generally suitable for foundations of most types of structures constructed on them and hence their properties need to be improved. Also their characteristics vary with aging due to their degradation.

In the present study, experimental investigations, landfill soils from two different dumping yards with ages nineteen years and nine years respectively from Hyderabad city in Telangana. Index and Engineering properties have been evaluated on these two samples. Based on test data of soils, Rice Husk Ash (RHA) is used to improve their properties and recommended its suitability as foundation material. It was found that, at 30% of RHA addition improves the shear strength and CBR values of soil.

*Index Terms:* CBR, Index Properties, Shear Strength, Land fill, Rice Husk Ash.



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# IMMEDIACY EFFECTS OF EXTRA HIGH VOLTAGE TRANSMISSION LINES ON HUMAN BEINGS

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***Abstract :*** Exactly when new overhead transmission lines are worked close live lines, they ought to be impacted by the incited power created by the contiguous lines. Existing industry checks have stipulated such conditions and proposed the prosperity detachment that should be kept up in the midst of improvement. In any case, there are so far various occasions of prosperity accidents or covered dangers outside the ensured detachment. The article separates and contemplates the improvement of human body under different live voltages with different sorts of towers (400kV circuit Towers, 765 KV, Lines, 800kV Lines). The unequivocal condition of electric field twisting, joined with the 25kV/m DC electric field quality point of confinement and the 10kV/m AC electric field quality cutoff set by the International Non-Ionizing Radiation Protection Committee, are resolved to give the security alerted partition of the human body in the district of the live line.

**Keywords**: high voltage, AC Transmission, DC Transmission, health effects of high voltage, line shielding, grounding, Human Safety



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# GIS APPLICATIONS IN SHORE LINE CHANGE ANALYSIS

## A CASE STUDY ON KAKINADA BAY, EAST COAST OF INDIA

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## ABSTRACT

High level of soil erosion is going in Uppada region which is being deposited in the sand spit thus increasing the Hope Island (spit).The 15-km-long stretch of the beach road along the coast between the city of Uppada and Kothapalli has got damaged in less than two months of its renovation, due to this erosion phenomena The impact of the soil erosion is not just on the road, it has claimed about 1,000 habitations, more than 800 acres of agriculture land. This paper shows the amount land eroded in Uppada region and the deposition of Mangroves at Uppada region from decades by the table and graphical representation including maps by using ARCGIS



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# IMPACTS ON GROUNDWATER DYNA,MCIS DUE TO CLIMATE VARIABILITY

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## ABSTRACT

In the Research carried out an Impacts on Groundwater Dynamics due to climate variability(SLBC). Groundwater is invisible resource due to depletion in various sectors. Climate variability is rainfall deficiency and Directly impacts to identify the increasing pumping wells. The climate variability analysis two methods. There compare to SPI (standardized precipitation index) using Drinc software and IMD (Indian Meteorological Department). The positive value indicates wet period and negative value is dry period. Then classified their respectives values are,No drought, normal, severe, extreme. The classification is used for drought vulnerability mapping. During dry periods more usage of groundwater in the sathanur command area. The groundwater flow of dry periods to find out using VISUAL MODFLOW softwares. Finally to predict the groundwater flows and over extraction of groundwater area.

Key words: climate variability, SPI, IMD, Drought class, boundary conditions, aquifer

properties..

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# CLIMATIZATION PROCESS IN RESIDENTIAL BUILDING USING GEO-EXCHANGE SYSTEM

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Geothermal is the Earth's thermal energy. In recent years geothermal energy has been utilized for generation of electricity, heating and air conditioning (HVAC). Geothermal HVAC systems are cost effective, energy efficient, and environmentally friendly way of heating and cooling buildings. So, we planned to prepare a model structure of geothermal heat exchange system which is the combination of horizontal and pond loop system. Lower operating and maintenance costs, durability, and energy conservation make geothermal a great alternative to conventional HVAC systems. This paper gives the step-by-step procedure of model preparation and real field conversion of geothermal heating and air conditioning system for residential buildings. A comparison between the actual air- conditioner and the geo-exchange cooling system is provided to demonstrate their advantages. This project focuses geo energy-based cooling of building in rural areas where temperature rises in daytime and goes beyond to a comfortable limit and need to reduce temperature inside the building. Aluminium pipes are considered as high thermal conductivity material. But for model purpose, copper pipe is used as conductivity material.



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# ECO FRIENDLY BIO - ELECTROCHEMICAL TREATMENT METHODS FOR REMOVING TOXIC ORGANIC POLLUTANTS FROM PHARMACEUTICAL WASTE WATER

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## ABSTRACT

Persistent Organic pollutants getting accommodated in nearby aquatic environment of which Pharmaceutical origin from unused medicines or pharmaceutical industries or clinics are common. Although nature has strength to digest these Non-degradable Organic pollutants, an in-depth study developing as a technology or processes is the need of the day. As such it is proposed in current work to investigate the feasibility for application of electrochemical methods supported by microbial methods so that the efficiency is improvised and also the cost of treatment is reduced considerably. Electrochemical methods involve Electro-coagulation techniques modified and conditions with respect to physical, chemical and electrochemical environment is optimised. Target pollutants are pure hydrophilic pollutants antibiotics, other pharmaceuticals followed by pharma effluents. This phase of work is essential to streamline procedures for maximum removal. Second part of work is microbial methods ie utilization of common microbes for degradation of electrochemically treated pollutants/ effluents. Optimization of conditions with respect to nutrient quality and quantity, seed culture etc. Sustainable microbes that get adjusted to the effluents will be selected for post electrochemical methods. In next phase of work, we propose to utilize developed methods for pharmaceutical effluents (Synthetic and real). The removal of these pollutants will be analysed in terms of COD, individual chemicals, using Uv-Vis/fluorescent spectrophotometer, TOC on regular basis. The date will be validated taking the help of other instruments like FT-IR, NMR, EPR, HPLC, GC/LS-MS etc. Microbial culturing, utilization of the methods will be carried out using standard methods.



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# A STUDY ON EFFECTS OF INTRUSION OF LEACHATE INTO GROUND WATER IN & AROUND KODUNGAIYUR DUMPSITE

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## ABSTRACT

The groundwater is contaminated greatly with acidity, alkalinity, noxiousness, heavy minerals, and microorganisms throughout the world due to population growth, urbanization and industrial development. Henceforth, evaluation of water quality of groundwater and surface water is extremely important to prepare for remedial measures. The slice of research was carried out to study the ground water as well as surface water quality, and physico-chemical characteristics of Kodungaiyur Marsh Area, Chennai, India. The study area is situated between latitudes 13.135683, 80.265260. Various parameters like pH, Total Dissolved Solids, Chlorides, Sulphates, Total Alkalinity, Biochemical Oxygen Demand, Chemical Oxygen Demand,etc.. give a picture of quality parameter of the town. If the water quality exceeds the pollution level for groundwater which shows that the water is not safe for the use of various purposes like domestic, aquatic life, agricultural, industrial etc



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# CONSTRUCTION ENGINEERING AND MANAGEMENT



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# EXPERIMENTAL INVESTIGATION ON FIBER REINFORCED SELF CURING CONCRETE USING ALOE VERA GEL

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## ABSTRACT

High performance concrete is not only characterized by its high strength, workability and durability but also by its smartness in performance without human care since the first day. In this paper, an attempt is made on the performance study of internally cured concrete using biomaterial, named Aloe barbadensis (Aloe vera gel) as self-curing agent, and the admixtures polypropylene fiber and Kikar tree resin are used to increase the compressive strength of the concrete and it is compared with the performance of conventional concrete. The present paper focuses on workability and strength study on M50 grade of concrete replacing the M-sand for river sand. The dosage of Aloe barbadensis gel was taken as 2.5%, 3% and 3.5% by weight of cement from the earlier research studies. From the slump test performed, it was found that there is a minimum variation between the conventional concrete and self-cured concrete. The strength activity index is determined by keeping compressive strength of conventionally cured concrete and self-cured concrete which is observed for 7 days, 14 days and 28 days.

*Index Terms:* High performance concrete, Aloe barbadensis, Polypropylene fibre and Kikar resin.



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# EXPERIMENTAL AND INVESTIGATION ON BRICK WITH PARTIALLY REPLACEMENT OF CEMENT BY "CORN COB ASH"

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## ABSTRACT

This study aims to reduce the cement content using in cement brick, and replace the cement by using corn cob ash in bricks to achieve the normal strength. Corn cob ash mixed with sand with various proportions (50%, 60%, 70%) to achieve the strength of the nominal bricks and also to posses thermal and sound insulation. The result in increase the strength of structure and weight reduction of bricks was tested for compressive strength. Based on the comparison of conventional and corn cob ash brick, optimum strength was analyzed. The results are clearly shows that corn cob ash used in the production of brick.

*Index Terms:* Corn Cob Ash(CCA), Cement, Compressive Strength.



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# EXPERIMENTAL INVESTIGATION ON SELF CURING CONCRETE USING POLYELECTROLYTE

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## ABSTRACT

High performance concrete is not only characterised by its high strength, workability and durability but also by its smartness in performance without human care since the first day. If the concrete can cure on its own without external curing without compromising its strength and durability, then it is said to be high performance self-curing concrete. In this paper, an attempt is made on the performance study of internally cured concrete by using polyelectrolyte as self-curing agent, and it is compared with the performance of conventional concrete. The present paper focuses on workability and strength study on M30 grade of concrete. The dosage of polyelectrolyte was taken as 0.5%, 1% and 1.5% by weight of cement. From the slump test performed, it was found that there is a minimum variation between the conventional concrete and self-cured concrete. The strength activity index is determined by keeping compressive strength of conventionally cured concrete and self-cured concrete which is observed for 7 days, 14 days and 28 days.

*Index Terms:* High Performance Concrete, Polyelectrolyte, Self-Curing Concrete.



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# BIM USAGE IN CONSTRUCTION MANAGEMENT:AN APPLICATION OF A CLASH DETECTION TOOL IN BUILDING DESIGN

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## ABSTRACT

BIM (Building Information and Modeling) is one of the most popular application in modern construction industries. BIM is used to manipulate and facilitates coordination among project managers and stake holders, and also to make better time efficient and economic of the projects. In this paper we mainly focus on modal integration and clash detection of a residential building. Without the integration of basic architecture plan, Structural plan, and MEP(Mechanical, Electrical, Piping) planning it 's unable to find the clash detection here we are going to explain how the clash detection occurs in planning before being construction started, if there is no proper planning( like integration of architecture plan ,Mechanical, Electrical, Piping (MEP) planning there may get clashes, if we constructed without the integration of the plans in projects that may leads to destruction at the clashes site or rearrange of the construction parts and also time consuming process. The software's that we use for BIM application are Auto Cad 2019, Revit2017, Navisworks Manage 2018 (BIM 360).

*Index Terms:* BIM, Modal Integration, Clash Detection, Revit, Navisworks manage, Auto Cad.



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# COMPREHENSIVE STUDY OF CEMENT MORTAR USING MANUFACTURED SAND

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## ABSTRACT

Now-a-days, curing process is not mostly done while constructing a building and, use of cement mortar is very high in bonding the bricks. Curing process need more time, days, and weeks to set the cement mortar bonding between the bricks and to obtain its strength. There arises a need of alternative material in the cement mortar for its internal curing. Selected size of manufactured sand is added and tested for its self-curing process. After finding the self-curing of the manufactured sand it is added to the cement mortar. To attain its strength and the curing process is lower in necessary by adding the manufactured sand and the hydration process takes place in the cement by its self-curing process. It gives good compressive strength to the cement mortar. By adding the manufactured sand it may reduce the self-weight to 1.2 times the weight of ordinary cement mortar. The main objectives of this project are (1) to investigate and test the cement mortar for increasing the strength cement mortar, (2) to utilize waste materials obtained from construction industry, (3) it reduce the curing process, (4) to do various tasks like sieve analysis, water absorption, specific gravity, compressive strength for manufactured sand using in cement mortar, and (5) it reduce the self-weight of cement mortar.



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# EXPERIMENTAL INVESTIGATIONS ON LIGHTWEIGHT CONCRETE USINGWASTE PLASTIC FIBER

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## ABSTRACT

Lightweight Concrete (LWC) is the most common material for human beings to use in construction. In this study, the effect of the waste plastic fiber on the strength and durability of lightweight concrete has been investigated. Lightweight concrete contains polyethylene terephthalate (PET) plastic fiber obtained from a waste plastic bottle. The reason for choosing PET bottles is to solve environmental pollution as a result of dumping the tons of plastic waste by developing a novel method of transferring it into a valuable product. The main objective of this investigation is, therefore, to compare the strength of hardened lightweight concrete containing plastic fiber with control mix of lightweight concrete. In this investigation, the strength of M30 lightweight concrete has been taken. In addition, workability tests such as slump test, compaction factor test and vee-bee consistency tests were conducted on the fresh concrete. Moreover, compressive strength, tensile strength, flexural strength and water absorption tests were evaluated to determine the strength properties of hardened lightweight concrete. A finding of the study shows that workability, compressive strength and water absorption has increased by addition of waste plastic fiber. To improve strength performance, the weight of plastic fiber added to the lightweight concrete is 1% of the weight of the cement the results are compared and conclusions are made.

*Index Terms:* LWC, Waste plastic fiber, Compressive strength, Perlite aggregate, Durability.



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# VISCOSITY MODIFYING AGENT IN SELF COMPACTING CONCRETE

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## ABSTRACT

Self Compacting Concrete (SSC) is a flowing concrete mixture that is able to consolidate under its own weight. The highly fluid nature of SSC makes it suitable for placing in difficult conditions and in section with congested reinforcement. Use of SSC can also help in minimize hearing related damage on the work site that is induced by vibration of concrete. In this experiment Xanthan gum is used as Viscosity modifying agent (VMA) which were used to enhance stability of the concrete and naturalpolymer substances such as Aloevera gel which increase the workability of concrete and also improves curing property of the concrete. For the binding material cement was replaced with the GGBS and Metakaolin at 10%, Aloevera at 1.5% and Xanthan gumat0.6%.Theresultofcompressivestrength, Split tensile strength and Flextural strengthforconventional and theconcretewith Viscosity Modifying Agent were compared. The main objective of this investigation is to achieve the economic and eco-friendly concrete fornature

*Index Terms:* Xanthan gum, Viscosity modifying agent and SCC.



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# STUDIES ON THE EFFECT OF STEEL FIBRE IN NON-CONVENTIONAL SELF COMPACTING CONCRETE

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## ABSTRACT

Self-compacting concrete (SCC) is a concrete with enhanced fresh properties that allows pouring without external compaction. Its advantages also are extended to good segregation resistance, higher homogeneity, lower permeability, which among others, lead to a product with higher durability. In this study self-Compacting-Concrete containing steel fiber offer improvements on strength parameters of self-compacting concrete for M-30 grade of concrete using steel fiber. The main objective of this project has to find out the effect of steel fiber on fresh and harden properties of Non-conventional self-compacting concrete. The use of fibers extends its possibilities since fibers arrest cracks and retard their propagation. In this investigation Mix proportion of concrete was 1:1.67:1.31 and maintaining water cement ratio of 0.6 in order to study the compressive strength, Split tensile strength, flexural strength, of steel fiber reinforced concrete (SFRC) containing fibers of 1%, by volume of cement.The flexural and split tensile strength of becomes higher compared with the conventional concrete. The non-conventional SCC with demolished aggregate is less costly than the conventional concrete.

*Index Terms:* SCC, compressive strength, split tensile strength, demolished aggregate, steel fiber.



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# NON DESTRUCTIVE STUDIES ON GEOPOLYMER CONCRETE

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## ABSTRACT

In the present study an attempt been made on concrete and also an experimental investigation on the concrete using by replacing cement with flyash and GGBS to decrease the usage of cement as well as emission of carbon di oxide. Also alternative binders like geopolymers are said to enable a significant reduction of the environmental impact. The experimental program for this investigation also included tests on concrete cylinders under compression and split tension, and on concrete beams under flexure. A comparative analysis has been carried out for concrete to the Geopolymer concrete and conventional concrete in relation to their compressive strength, split tensile strength and water absorption.The concrete made with fly ash performed well in terms of compressive strength and water absorption and showed higher performance at the age of 7,14, 21 and 28 days than conventional concrete. Non Destructive studies has been made to understand the behaviour of materials used in this study and it results shows the better results when compared with conventional concrete.

*Index Terms:* Geopolymer, compressive strength, split tensile strength, flexure, Non Destructive Test.



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# FLY ASH BASED GEOPOLYMERIZED LIGHT WEIGHT CONCRETE USING FOAMING AGENT

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## ABSTRACT

This research work determines the investigation on possibility on foam concrete by using a geopolymer system. Fly ash was mixed with alkaline activator solution (a mixture of sodium silicate and NaOH and foam was added to the geopolymeric mixture to produce a light weight concrete. The reactive was mixed to produce a homogeneous mixture placed into a 70 mm mould cured at two different temperature(100 degree celcius and room temperature) for 24 hours. After the curing process, the strength of the sample is to be tested at 7, 14 and 28 days. The chemical composition analysis is studied.

*Index Terms:* fly ash, geopolymer, alkali activator, foaming agent, curing temperature.



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# ALUMINIUM FORMWORK – NEW REVOLUTION IN CONSTRUCTION TECHNOLOGY

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## ABSTRACT

Construction is one of the major part in development which every country is adopting. As this is having a biggest role in economy development of a particular country. But now with respect to construction there is a high demand of speedy construction and cost efficient, as this is not possible with the old form of construction. New methods and technology has been adopted i.e., "Aluminium Formwork" also known as MIVAN. In this type of construction (using aluminium formwork) the work is complete at a fast rate and the cost is low as compared to normal mode of construction. As this method is adopted worldwide at a faster rate and is one of the best method of construction. Now days most projects are required by the client to be completed within minimum duration at minimal cost. In this paper it has been discussed about the aluminium formwork, its advantages, disadvantages and usefulness and benefits etc.



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# EXPERIMENTAL INVESTIGATION ON PARTIAL REPLACEMENT OF ARTIFICIAL COARSE AGGREGATE IN CONCRETE

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## ABSTRACT

The main aim of this investigation is to manufacture an artificial coarse aggregate and then use it for concrete manufacturing. In the current situation the use of plastic is increasing day by day, although many steps were taken to reduce its consumption. These plastic takes up to 1000 yrs. to get decomposed. Disposal of large quantity of plastic bags may cause pollution of land, water bodies and air (especially when they are burned). In this project we have manufactured artificial coarse aggregate and use it in concrete and performed various tests for fresh and hard concrete. This artificial coarse aggregate is made from plastic, broken tiles and vermiculites. After the manufacturing of artificial coarse aggregate cubes are casted and the results are compared with conventional concrete.



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# AN EXPERIMENTAL INVESTIGATION OF PERVIOUS CONCRETE BY USING CEMENT, GGBS, MICROSILICA NATURAL & COARSE AGGREGATE

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## ABSTRACT

Pervious Concrete differs from the conventional concrete since it usually contains no or smaller amount of fine aggregate. When pervious concrete is used for paving, the open cell structure allows storm water to filter through the pavement and into the soils. In this study, the experimental investigation was carried out to study the properties of pervious concrete by replacing cement with different percentage of GGBS and partial replacement of natural and recycled coarse aggregate with addition to micro silica for M40 grade concrete. Due to the critical shortage of natural aggregate the availability of demolished concrete was used as recycled coarse aggregate. The strength test namely compressive strength, split tensile strength, flexural strength, Infiltration test and density test were conducted and the results are concluded.

*Index Terms:* Pervious Concrete, M40 grade, Strength.



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# EXPERIMENTAL STUDIES ON STRENGTH AND DURABILITY CHARACTERITICS OF VERY HIGH VOLUME FLY ASH CONCRETE

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## ABSTRACT

The demand for concrete as a construction material has increased due to its durability and low cost, the growth of the world's population and the rapid development of the construction industry. The increased usage of concrete consequently increases the use of Portland cement and leads to high emissions and energy consumption. In consideration of the environmental concerns, the reduction of the use of Portland cement by replacing part of it with supplementary cementitious materials such as fly ash has become extremely important. The research presented here aims to replace 65% of cement with fly ash in the production of very high volume fly ash concrete.The experimental results showed that the compressive strength and split tensile strength were significantly improved when 3g of lime water added. However, after adding of lime water (6g and 12g) the compressive strength and split tensile strength is not increased significantly. But higher than that of reference concrete.The durability aspect of investigation showed that the water absorption and sorptivity values significantly reduced when 3g of lime water added to concrete. In further adding of lime water (6g and12g) there is no reduction. However it shows that the lower value when compare with reference concrete.

*Index Terms:* VeryHigh volume fly ash concrete · Strength · Water absorption · Sorptivity.



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# STUDY OF QUALITY MANAGEMENT IN CONSTRUCTION INDUSTRY

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## ABSTRACT

Quality of the construction project indeed represents the success of the project.A significant amount of budget is spent towards the infrastructure development of our country. When the quality of the project is not according to standards, faulty construction takes place, where huge amount is being spend to rectify the defects. Inthis project the factors which affect the construction is studied and the critical factor isfound. This includes of personal interviews in various construction companies andconducting questionnaire survey and analysis of the obtained data. Preliminary surveyhas been carried out and the major factors are found to be Design, Material, Equipment,Sub Contractor, Financial Issues and Owner. The data are analysed using SPSSSoftware. The Relative Importance Index (RII) for various factors are found from whichthe most critical factor has been identified. The suggestions are given as a proactivemeasure to improvement of the quality of construction by visiting various constructionsites. The quality control and quality assurance measures for the critical factor are to besuggested.

*Index Terms:* Quality Management, Relative Importance Index, Quality Control, Quality assurance



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# FLOW AND MECHANICAL CHARACTERISTICS OF SELF COMPACTING CONCRETE BY PARTIAL REPLACEMENT WITH BRICK BAT

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## ABSTRACT

Self-compacting concrete (SCC) is an innovative concrete that does not require vibration forplacing and compaction. It is able to flow under its own weight, completely fillingformwork and achieving full compaction, even in the presence of congested reinforcement.This experimental investigation study on the flow and mechanical characteristic of self-compacting concrete (SCC) obtained by replacing stone aggregate varying percentage ofcrushed clay-brick bat while other materials are kept unchanged. The variable considered inthis study was by the weight of partial replacement of crushed stone aggregate by crushedbrick aggregate varying proportion mixes of 0%,10%,20%,30% and 40% in SCC. Thisstudy is mainly focused on the flow and mechanical characteristics of SCC by varyingpercentage of partial replacement of crushed clay brick bats with crushed stone coarseaggregate are determined and this also the investigation is an attempt to examine theinfluence of clay bricks bat course aggregate, GGBS and super plasticizer on the flow andmechanical characteristic of SCC. In the study, the replacement of crushed stone coarseaggregate with bricks resulted the flow characteristic of fresh SCC for passing ability andfilling ability of the concrete values were found within the given standardvalue and quiteclose to each other. With respect to mechanical properties of hardened concrete ofCompressive strength, Splitting tensile strength and Flexural Strength tests of SCC valueswere found under the range values of the conventional concrete mix ratioand the strength is become reduced.

*Index Terms:* Compressive Strength, Brickbats, Self-Compacting Concrete(SCC), Splitting Tensile Strength.



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# DENTIFYING AND QUANTIFICATION OF RISK IN BOT PROJECTS

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## ABSTRACT

As of today, the total length of road network in India is 70,548 km. Agencies like National Highway Authority of India (NHAI) and Public Works Department (PWD) carry out the road projects. NHAI executes most of the road projects and these projects are carried out through Build Operate Transfer (BOT) type of contract. Every construction project is greatly affected by various risk factors that will greatly influence the project cost and duration of the project. So, this study is mainly to counteract the cost overrun due to several uncertainties. Various risks such as acquisition of land, securing necessary clearances, project funding; resource availability, etc are studied as a part and parcel of this research. This research involves study of Model Concessionaire Agreement (MCA) in BOT projects followed by risk identification and quantification. A questionnaire survey is conducted among industrial experts to know the cost percentage involved in a project due to uncertainties. The reliability of the questionnaire is tested using IBM SPSS software package. To quantify the risk, Monte Carlo Simulation techniques were used. As a result of this research, various types of risk can be identified, quantified and minimized in BOT road projects to improve the quality, performance, and avoid cost overrun, delays etc.

*Index Terms:* BOT Projects, Model Concessionaire Agreement, Monte Carlo Simulation, Cost overrun.



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# STRENGTH AND DURABILITY STUDY OF GEOPOLYMER CONCRETE WITH 100% REPLACEMENT OF SAND USING COPPER SLAG

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## ABSTRACT

One of the regularly used man made building material in the word is concrete. This concrete is comprising of sand and gravel. They are chemically inert and very hard. It is blended together by the addition of cement and water. Among these components, cement and sand are correlated with some issue which is considered as the drawback of the concrete. Requirements of the huge amount of energy, emission of carbon dioxide, increasing demand of river sand, overpriced of river sandare some of the problems have been confronted by construction industries during the use of conventional concrete. On the other hand, industrial by products are producing in huge amount which is not used properly by our country. Hence it is mandatory to find out the substitute solution to control these problems. Many alternatives have been founded by researchers. Geopolymer concrete is renowned among many alternatives. It consumes an alkaline solution along with industrial by-products and aggregates. The Alkaline solution is prepared by combining sodium hydroxide with sodium silicate. This alkaline solution reacts with silica and alumina present in the source material to produce an alumino silicate gel which is act as a bonding agent in geopolymer concrete. In this work, sand and cement were completely replaced by copper slag and fly ash respectively. Sodium silicate to sodium hydroxide ratio was taken as 2.0. Three different molarities i.e. 8M, 12M, and 16M were taken as test variables. Mechanical properties of this concrete were determined by conducting the tests. The compressive and split tensile strength of this geopolymer concrete was more or less similar or slightly greater than the normal geopolymer concrete. The maximum compressive strength obtained by copper slag based geopolymer concrete was38 N/mm2and 4.77 N/mm$^2$ was the maximum tensile strength after 28 days of the oven curing. Production cost of copper slag based GPC is less when compared to normal geopolymer concrete. From the durability aspects view it shows good resistance to chemicals attack.



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# EFFECTS OF RESOURCE CONSTRAINTS IN TIME OVERRUN OF CONSTRUCTION SITE

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## ABSTRACT

Time Overrun is one of the significant issues being faced by the construction industrytill now. It has an adverse effect on project success in terms of time, cost, quality, andsafety. The main reason of Time Overrun was resource constraints. It has beenconsidered as a source of disputes. In this paper Factors that affect the success of aproject and estimate their impacts and implementing it to upcoming projects.Completing projects on time is an indicator of efficiency, but the construction processinvolves many unpredictable factors, which result from many sources. The time overrundefinitely create negative impacts on the project performance.Therefore, time overrun is an important problem in the construction industry. Thechallenge is to measure the net impact of the construction time overrun accurately.Learn from past experiences and to avoid time overrun in future projects. This paperfocus on recommendations may be given to construction professionals to minimize thedelay in the construction project.

*Index Terms:* Time overrun, construction site, resource constraints



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# DURABILITY STUDIES ON SELF COMPACTING CONCRETE BY USING NON CONVENTIONAL MATERIALS

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## ABSTRACT

Self-compacting concrete (SCC) is a concrete with enhanced fresh properties that allows pouring without external compaction. Its advantages also are extended to good segregation resistance, higher homogeneity, lower permeability, which among others, lead to a product with higher durability. In this study self-Compacting-Concrete containing Recycled Aggregates offer improvements on strength parameters of self-compacting concrete for M-30 grade of concrete. The main objective of this project has to find out the effect of Recycled Aggregates on fresh and harden properties of Non-conventional self-compacting concrete. In this investigation Mix proportion of concrete was 1:3.3:2.6 and maintaining water cement ratio of 0.69 in order to study the compressive strength, durability tests such as Water and Air Permeability Test, Water Absorption Test, Resistance to Sea water and Acidic Solution. An experiment will be performed to examine the effect of reinforcing SCC with recycled aggregates, on its Durability characteristics as well as fresh and mechanical properties.



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# EFFECT OF MAGNETIZED WATER ON GPC WITH RECYCLED TYRE STEEL FIBRE AS A CONSTITUENT

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## ABSTRACT

Cement which is widely consumed for construction as a main constituent of conventional concrete is a major contributing element for nearly, 7% of global carbon dioxide and carbon monoxide emission. "Green Concrete" which results from the reaction of a source material that is rich in silica and alumina with alkaline solution, is used over conventional concrete and in this study, it is attempted to focus on producing Ground Granulated Blast Furnace Slag (GGBS) based GPC which ensures 100% replacement of cement. To attain economic viability and environmentally contributing actions, apart from using "Green Concrete", study has made an approach to develop a new application by using the concept of tyre recycling which will use tyre- by- products, main focus on embedded steel wires inside the tyre as a constituent of GPC. Following this, a new attempt has been made by the incorporation of Magnetized water over Normal water in the GPC mix which expects to exhibit changes in GPC mix and its properties due to the influence of magnetism on the structure of magnetized water over normal water. Paper describes experimental study conducted on GPC samples prepared with magnetized water incorporating RTSF. To conduct a comparative analysis between the control GPC, magnetized GPC and RTSF magnetized GPC (hybrid GPC) in terms of workability, compressive and split tensile strength and durability. Water is passed through 1.2T permanent magnet for a duration of 4,6 and 8hrs with constant discharge. RTSF is added in a range of 0.25%-0.75% to the optimum magnetized GPC mix. Magnetized water has significantly improved the workability, durability, compressive and split tensile strength compared to control GPC. The optimum magnetization is obtained when water is magnetized for 6hrs. Optimum range of RTSF is 0.5%. Addition of RTSF reduces the workability but increases strength and durability. Magnetization increases the pH and reduces the hardness of water. This study proves to enhance the properties of hybrid mix compared to the controlled mix which open a new scope for this research in the construction sector.

*Index Terms:* Geopolymer Concrete, GGBS, Magnetized water, Permanent Magnet, Recycled Tyre Steel Fibre.



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# PARTIAL REPLACEMENT OF CEMENT IN CONCRETE USING METAKOLIN

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## ABSTRACT

Since the infrastructure is developing tremendously day by day, the use of cement is highly used. India is developing as a major hub for service industry, automobile industry and for which the infrastructure development plays an important role. So the necessity of high strength concrete is increasing. In all construction work concrete is mostly used and it is costly which governs the total cost of the project. Some of the most commonly used material to enhance the property of concrete are metakaolin, silica fumes, fly ash etc. Cement is replaced to reduce its consumption to avoid the environmental pollution and save nature. It makes the cost efficient and enhances the compressibility and durability of MK concrete. Metakaolin is a unique in its very own form as it is not the by-product of an industrial process nor it is entirely natural. It is derived from naturally occurring minerals, and is manufactured specifically for cementing applications. This clay is usually found at the bank of certain rivers. The metakaolin is manufactured by heating cretaceous clay under the temperature of 500 – 800 $^0$C for 3-5 hours by the process of calcination. This results in change of kaolin into metakaolin. The resultant metakaolin has high pozzolanic characters and it increases durability and stability (mainly physical properties) when partially replaced with Ordinary Portland Cement. This Project deals the study of effect of Calcined kaolinite clay when partially replaced with cement with different percentage (0%, 5%, 10%, 15%, 20% and 25%). The compressibility and flexural strength of the concrete is studied.

*Index Terms:* Metakaolin, Calcined Kaolinite.



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# EXPERIMENTAL STUDY ON EFFECT OF COW DUNG ASH AND SILICA FUME ASH ON STRENGTH PROPERTIES OF CONCRETE

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## ABSTRACT

This research project presents the result on the study for the use of cow dung ash (CDA) and silica fume ash (SFA) as partial replacement in production of concrete. The experiment is designed to study the effect of adding cow dung ash and silica fume ash in various percentages by weight (15%,25%35%)of cement curing for the period of 7 and 28 days respectively before testing compressive strength, tensile and flexural strength. it also involves determination of setting time and workability of cow dung ash in various percentages by mixing with portland cement The micro structural composition is also analysed by conducting (XRD)



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# AN EXPERIMENTAL INVESTIGATION OF PERVIOUS CONCRETE BY USINGGGBS, MICROSILICA AND ARTIFICIAL FIBRES

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## ABSTRACT

Pervious concrete is a light-weight concrete which is prepared byeliminating the fine aggregate from conventional concrete, also known as 'no fineconcrete' or 'porous concrete'. It is combination of graded coarse aggregates,cement materials, water. Now-A-days we are very much interested in sustainableand eco-Friendly means of construction. The experimental investigation wascarried out to study the properties of concrete with artificial fibers (Polypropylenefibre & Steel fibre) to increase the strength of the concrete with differentpercentage of GGBS & micro silica. The strength test namely compressivestrength, split tensile strength and flexural strength test were conducted and theresults are concluded.

Key Words:- Pervious, Polypropylene fibre, Steel fibre, M40 grade, GGBS & micro silica.



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# EXPERIMENTAL INVESTIGATION OF HYBRID MINERALS ADMIXTURES

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## ABSTRACT

The main objective of this project is to give a brief comparison between RCC (Reinforced Cement Concrete) and Steel Designs for Industrial. Generally we use RCC (or) Structural Steel for most of the Structures. The material selected (or) the design procedure opted will depend on various factors like Functional aspects, Compatibility, Load cases, Span, Economical aspects and other local conditions. In this Article, design and analysis aspects like Bending Moment, Axial Load etc., related to Industrial Structures in Steel and RCC are presented. A comparison is made between these two cases and the most economical and safe one for the Industrial Structures is suggested here. In this Article, Industrial Structures having Ground floor with working Space 25m x 46m and height 24m subjected to Crane Load are analyzed in detail .



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# EVALUATION AND IMPROVEMENT OF MATERIALS MANAGEMENTS MANAGEMENT IN UNDERGROUND METRO CONSTRUCTION PROJECTS.

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## ABSTRACT



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# COMPARATIVE STUDY OF LIGHT WEIGHT GAUGE STEEL FRAMED CONSTRUCTION VS ORDINARY STEEL FRAMED CONSTRUCTION

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## ABSTRACT

The paper mainly focuses on the advantages of light gauge steel structures over conventionally designed steel buildings. The different fields of comparison mainly constitute its cost effectiveness, time saving, future scope, subtleness and economy of light gauge steel structures over conventionally engineered buildings and its importance in developing nations like India. It's a case study for Industry Shed based on the review and various case studies which shows their experimental and analytical studies carried out in this field. The result shows that these structures are economical, energy efficient and flexible in design. Cold- formed steel (CFS) members have been used in buildings, bridges, storage racks, grain bins, car bodies, railway coaches, highway products, transmission towers, transmission poles, drainage facilities, various types of equipment and others. These types of sections are cold- formed from steel sheet, strip, and plate or flat bar in roll forming machines or by press brakes (machine press) or bending operations. This project will focus on implementation of light gauge steel frame throughout the construction industry and to reduce the energy consumption in buildings. The literatures are reviewed based on identifying light gauge steel framed system in respective literature and the reviews are grouped accordingly. In past literatures were observed are Cold-formed steel members can be assembled in various combinations to provide cost-efficient and safe light gauge floor system for buildings. In generally, it will be performed by under seismic response recommendation.

Keywords: Industrial Building, Light Gauge Steel Structure, Cold-formed steel members



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# Experimental Investigation on the Strength Behaviour of Artificial Coarse Aggregate in Cocrete

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**ABSTRACT**

Now a day's waste management is one of the major environmental concerns in India. Globally 3500 million tone of plastic waste and 200 million tone of ceramic waste are produced annually in environment. This investigation aims to manufacture an artificial coarse aggregate with waste plastic, vermiculite, copper slag, sisal fiber and ceramic waste. The manufactured artificial coarse aggregate is compared with conventional aggregate.Waste plastic as an aggregate in concrete gives a good approach to reduce the cost of materials and solve some of the solid waste problems posed by plastics (Zainab et al, 2008). Copper slag is a by-product obtained during matte smelting and refining of copper and Vermiculate is a hydrous phyllosilicate mineral. Hence to rectify this demand and to reduce the waste production. Plastic aggregates can be produced and can be replace in concrete in construction with replacement of 30%, 60%,90% of artificial aggregate in concrete.

Keywords: Artificial Aggregate, Conventional Aggregate, Strength Behaviour



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# REMOTE SENSING AND GIS



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# URBANIZATION AND ITS IMPACT ON GROUNDWATER USING REMOTE SENSING AND GIS-BASED TECHNIQUES

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## ABSTRACT

Land is a prime natural resource and the mapping of land use/land cover is essential for planning and development of land and water resources. But anthropogenic and natural forces modify the landscape & water quality. So it is important to monitor and assess these alterations to avoid the misuse of usable land into wastelands. Timely and accurate information on the existing water quality, land use/land cover pattern and its spatial distribution and changes is a prerequisite for planning, utilisation and formulation of policies and programmes for making any micro and macro-level developmental plan. Remote sensing technology along with GIS is cost-effective and best utilised solutions for integration of various data sets for both macro and micro level analysis which helps in identifying the problem areas and suggest conservation measures. The aim of investigation is to identify the water quality which was occurred due to land use changes in noyyal river basin between 1995 to 2012.So the present analysis is to compare resource assessment and monitoring of noyyal river basin by assessing the present status of groundwater quality using GIS overlaying and compare with rainfall, water level, land/ use and land/cover area

*Index Terms:* Urbanization, Groundwater, Noyyal River Basin, Land use/land cover, GIS



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# TRANSPORTATION ENGINEERING

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# ROAD TRAFFIC NOISE PREDICTION MODEL

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## ABSTRACT

Noise pollution is the unwanted or excessive sound that can have deleterious effects on human health, animals and environmental quality. Traffic noise is the collective sound energy emanating from motor vehicle. It consists chiefly of road surface, engine/transmission, tire, aerodynamic and braking elements. India is the developing nation where transportation sector is growing rapidly at over 7.50% per annum and level of pollution by vehicles on Indian roads is growing at a very fast rate. Country having a population of 1.3 billion which let to overcrowded roads and increase in traffic noise level. The aim of this study is to build a traffic noise prediction model for the areas to predict noise levels due to road traffic. The prediction model is prepared by conducting a survey on volume count, noise levels and spot speed in the study area for achieving the objective of study. As observed when the noise generated the vehicle are normally in linear form along the roads. Hence roads were taken for the study purpose. The study data are collected by fixing three study locations. Prediction model is developed for each road stretch separately. The study shows noise level between 60dB to 85 dB along the road side and level of sound in that specific area has good range until noise level goes above 80dB is heard. The significant steps should be taken to overcome the growing traffic noise pollution.

*Index Terms:* Noise pollution, Vehicle, Prediction model, Survey



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# TRAFFIC MANAGEMENT STUDY AT KOMMADI JUNCTION

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## ABSTRACT

Kommadi is one of the well developing area of the district Visakhapatnam known for its well-planned and wide road network. However with increase in population, number of vehicle, growing educational institutes and industrial importance of the kommadi village. The traffic is getting increased very much over the years leading to a lot of traffic congestion, occurrence of accidents at intersection. Therefore we can find alternatives to regulate the traffic, minimize the delays and provide continuous flow of traffic. The present study deals with signal design and under pass or over pass.

Through under pass or over pass road user benefits in terms of money (less fuel consumption), comfort (since delay time decreases), Time of travel can be reduced and more no. Of trips can be generated. Pollution less environment (level of pollutants will be less).



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# IRRIGATION AND WATER RESOURCE ENGINEERING

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# NATURAL VARIATION IN ABIOTIC STRESS AND CLIMATE CHANGE RESPONSES IN ARABIDOPSIS: IMPLICATIONS FOR TWENTY-FIRST-CENTURY

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## ABSTRACT

Twenty-first-century agriculture faces the challenges of providing sufficient calories and nutrients to feed a growing human population despite climate change, increasing competition for freshwater from human and industrial use, and limited arable land. This review summarizes current knowledge concerning quantitative trait loci (QTL) and natural allelic variants in Arabidopsis that regulate tolerance of abiotic stresses associated with population pressure and climate change, including rising temperatures and atmospheric CO2 concentrations, drought, salinity, and mineral ion limitation and toxicity. Examples of genetic variation underlying phenotypic plasticity of abiotic stress responses are also discussed. Given the extensive resources available in Arabidopsis for QTL analysis and genome-wide association studies, along with unparalleled information on gene/gene product functions and interactions, this reference plant species provides powerful resources for translational biology approaches to improve stress tolerance and yield in crop species.

*Index Terms:* Crop Spices, QTL, Fresh Water



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Ref No : ICGESCD/IWE/02

# THE ROLE OF AGRICULTURAL BIODIVERSITY IN STRENGTHENING RESILIENCE TO CLIMATE CHANGE: TOWARDS AN ANALYTICAL FRAMEWORK

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## ABSTRACT

Traditional agricultural communities manage biodiversity at various scales, creating dynamic landscape mosaics of fields, gardens, orchards, pastures and ecosystem patches. Agricultural biodiversity and associated traditional knowledge are essential to the climate change resilience of these landscapes, but their roles are largely overlooked by researchers and policy makers. A review of 172 case studies and project reports from around the world shows that agricultural biodiversity contributes to resilience through a number of, often combined, strategies: the protection and restoration of ecosystems, the sustainable use of soil and water resources, agro-forestry, diversification of farming systems, various adjustments in cultivation practices and the use of stress-tolerant crops and crop improvement. Using social–ecological systems theory as a conceptual framework, these practices are examined to identify indicators of resilience in agricultural landscapes. The indicators are a first step in the development of a framework for assessing and building climate change resilience, intended both for local communities and for the scientists and organizations working closely with them.

*Index Terms:* Climate Change Resilience, Agricultural Communities and Agricultural Biodiversity



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# AGENT-BASED MODELLING OF CLIMATE ADAPTATION AND MITIGATION OPTIONS IN AGRICULTURE

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## ABSTRACT

Computer simulation models can provide valuable insights for climate-related analysis and help streamline policy interventions for improved adaptation and mitigation in agriculture. Computable general equilibrium (CGE) and partial equilibrium (PE) models are currently being expanded to include land-use change and energy markets so that the effects of various policy measures on agricultural production can be assessed. Agent-based modelling (ABM) or multi-agent systems (MAS) have been suggested as a complementary tool for assessing farmer responses to climate change in agriculture and how these are affected by policies. MAS applied to agricultural systems draw on techniques used for Recursive Farm Programming, but include models of all individual farms, their spatial interactions and the natural environment. In this article, we discuss the specific insights MAS provide for developing robust policies and land-use strategies in response to climate change. We show that MAS are well-suited for uncertainty analysis and can thereby complement existing simulation approaches to advance the understanding and implementation of effective climate-related policies in agriculture.

*Index Terms:* Computable General Equilibrium, Agent-Based Modeling and MAS



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# INCREASING THE RESILIENCE OF DRYLAND AGRO-ECOSYSTEMS TO CLIMATE CHANGE

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## ABSTRACT

The current debate on climate change, its impacts on socio-ecological systems and the role of agriculture has shifted from an emphasis on how to mitigate the effects of increasing greenhouse gas (GHG) emissions to how to prepare and adapt to the expected adverse impacts. This follows the recognition that the climate is already changing as a result of mankind's activities and there is little that can be done to prevent further increases in atmospheric concentrations of GHG in the short term (Henson, 2006). There is much debate on what are the likely tipping points where irreversible changes will occur in the earth's ecosystems (Schellnhuber et al., 2006; Stern 2007). In addition the linkages between climate change, land degradation and loss of biodiversity are increasingly viewed as highly interactive, requiring more holistic frameworks and approaches in order to solve common problems (MEA, 2005). These converging viewpoints lead to an increased focus on sustainable land management and development whereby incomes of the poor can be increased but not at the expense of the natural resource base and the environmental services they provide. and the principles of physical, human, social, financial and natural capitals (Bebbington, 1999).

*Index Terms:* Agriculture, Financial and Natural Capitals



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# TRANSCENDING POVERTY ALLEVIATION TO CLIMATE CHANGE MITIGATION AND ADAPTATION

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## ABSTRACT

A range of published and grey literature over the last three decades has underlined the importance of urban and peri-urban agriculture and forestry (UPAF) in cities of developing regions. The focus in the published literature is on livelihoods, poverty reduction and ecosystems services at multiple city scales. Cities of developing regions, particularly in Africa, are searching for ways of addressing the unavoidable impacts of climate change and UPAF has demonstrated scalable adaptation and mitigation potential. However, evidence of UPAF's role in mitigating and adaptation to climate change is scattered in various reports and has not been synthesized for its potential role in developing urban adaptation strategies. Building on the earlier poverty reduction focus of UPAF research, this paper contributes to UPAF knowledge regarding mitigating and adapting to climate change in urban and peri-urban areas in East and West Africa. The paper reports a synthesis based on a systematic review of the available literature on these regions, and selected sources on other parts of sub-Saharan Africa.

*Index Terms:* Climate Change, Agriculture and Forestry



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# BUILDING RESILIENCE FOR AN UNPREDICTABLE FUTURE: HOW ORGANIC AGRICULTURE CAN HELP FARMERS ADAPT TO CLIMATE CHANGE

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## ABSTRACT

The impacts of climate change on the global hydrological cycle are expected to vary the patterns of demand and supply of water for agriculture–the dominant user of freshwater. The extent and productivity of both irrigated and rainfed agriculture can be expected to change. As a result, the livelihoods of rural communities and the food security of a predominantly urban population are at risk from water-related impacts linked primarily to climate variability. The rural poor, who are the most vulnerable, are likely to be disproportionately affected. Adaptation measures that build upon improved land and water management practices will be fundamental in boosting overall resilience to climate change. And this is not just to maintain food security: the continued integrity of land and water systems is essential for all economic uses of water. This report summarizes current knowledge of the anticipated impacts of climate change on water availability for agriculture and examines the implications for local and national food security.

*Index Terms*: Rural Communities, Irrigated and Rain-fed Agriculture



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# CROP PRODUCTION UNDER DROUGHT AND HEAT STRESS: PLANT RESPONSES AND MANAGEMENT OPTIONS

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## ABSTRACT

Abiotic stresses are one of the major constraints to crop production and food security worldwide. The situation has aggravated due to the drastic and rapid changes in global climate. Heat and drought are undoubtedly the two most important stresses having huge impact on growth and productivity of the crops. It is very important to understand the physiological, biochemical, and ecological interventions related to these stresses for better management. A wide range of plant responses to these stresses could be generalized into morphological, physiological, and biochemical responses. Interestingly, this review provides a detailed account of plant responses to heat and drought stresses with special focus on highlighting the commonalities and differences. Crop growth and yields are negatively affected by sub-optimal water supply and abnormal temperatures due to physical damages, physiological disruptions, and biochemical changes. Both these stresses have multi-lateral impacts and therefore, complex in mechanistic action. A better understanding of plant responses to these stresses has pragmatic implication for remedies and management.

*Index Terms:* Crop Growth, Physiological and Biochemical Responses



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# INTEGRATED PHYSIOLOGICAL AND MOLECULAR APPROACHES TO IMPROVEMENT OF ABIOTIC STRESS TOLERANCE IN TWO PULSE CROPS OF THE SEMI-ARID TROPICS

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## ABSTRACT

Chickpea (Cicerarietinum L.) and pigeonpea [Cajanuscajan L. (Millsp.)] play an important role in mitigating protein malnutrition for millions of poor vegetarians living in regions of the semi-arid tropics. Abiotic stresses such as excess and limited soil moisture (water-logging and drought), heat and chilling (high and low temperature stresses), soil salinity, and acidity are major yield constraints, as these two crops are grown mostly under rainfed conditions in risk-prone marginal and degraded lands with few or no inputs. Losses due to such stresses vary from 30% to 100% depending on their severity. The literature abounds in basic information concerning screening techniques, physiological mechanisms, and genetics of traits associated with resistance/tolerance to abiotic stresses in these two crops. However, the final outcome in terms of resistant/tolerant varieties has been far from satisfactory.

*Index Terms:* Crop Growth, Physiological and Biochemical Responses



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# MORPHOMETRIC BASED PRIORITISATION OF KODAVANAR SUB WATERSHED BASIN USING ANALYTICAL HIERARCHIAL PROCESS

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## ABSTRACT

A Drainage basin or watershed is an area of land where surface water from rain, snow, ice converges to a single point at a lower elevation usually the exit of the basin, where the water join another water body, such as a river, lake, reservoir, estuary, wetland, sea or ocean. Morphometry is the measurement and mathematical analysis of the configuration of the earth's surface, shape and dimension of its landforms. Morphometrical analysis of a drainage basin provides quantitative description of the drainage system. Dindigul is inland district with an extensive hilly and rocky areas and the according to the recent studies ground water in this region is heavily exploited for domestic, agriculture and industrial purpose. Kodavanar is a major river flowing in the district, Using geospatial tools such as Remote Sensing and GIS for extraction of Kodavanar watershed. The data from Shuttle Radar Topography Mission is used for drainage morphometry and evaluating various morphometric parameters such as linear, areal and relief parameters. These parameters were analysed used Analytical Hierarchical Process(AHP) and sub watersheds were ranked. This study will be helpful for effective management of Kodavanar watershed.

*Index Terms:* Remote Sensing , GIS, SRTM Data, Morphometry and AHP



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# FLOW ROUTING THROUGH A TANK CASCADE SYSTEM IN A SEMI ARID CATCHMENT USING A PHYSICALLY BASED MODEL

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## ABSTRACT

Among the most basic challenges of hydrology are the quantitative understanding of the processes of runoff generation and prediction of the flow hydrographs and their transmission to the outlet. Traditional techniques have been widely applied for the estimation of runoff hydrographs at the outlets of gauged watersheds using historical rainfall-runoff data and unit hydrographs derived from them. Such procedures are questioned for their reliability due to the climatic and physical changes in the watershed and their application to semiarid catchments and hence modelling of the area becomes necessary. Hydrology constitutes a fundamental study component, known as Rainfall Runoff Modelling. These models are applied universally for various catchments, micro to macro levels. Reliable estimates of stream flow generated from catchments are required as part of the information sets that help policy makers make informed decisions on water planning and management. The characteristics of the stream flow time series that influence water resources system modelling and planning can include the sequencing of flows on daily and longer time steps, spatial and temporal variability of flows, seasonal distribution and characteristics of high and low flows.

*Index Terms:* Rainfall-runoff Modelling, Hydrographs, Spatial, Temporal Variation



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# ASSESSMENT OF HYDROCHEMICAL CHARACTERISTICS OF GROUND WATER QUALITY ALONG THE PONDICHERRY COASTAL STRETCH

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## ABSTRACT

Nowadays, huge anthropogenic activity and serious urbanization reflects the drastic environmental effects especially in the coastal areas. The major problem which was identified in coastal areas are intrusion of seawater in and around that areas which lead to serious contamination by mixing of dissolved salts to available fresh water resources such as coastal aquifers which further demands sophisticated treatment processes and cost many life of living beings. The aim of the present study is to collect water samples with respect to various seasonal variations from differing kinds of aquifers which have different formation and analyzed for various geo-hydro-chemistry and physico-chemical water quality parameters by acceptable procedures. It has been found from the obtained results that there were presence of dominant cations and anions in the bottom layer of majority of aquifers in and around coastal areas of Pondicherry region. The presences of ions in coastal aquifers of Pondicherry region have been given in an increasing order such as: Na>Ca>Mg>K and $HCO_3$>CL>$SO_4$.



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# WATER BUDGET AND PROJECTION OF WATER CONSUMPTION LEVELS FOR ILLALUR

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## ABSTRACT

Water, as we all know is very essential for the survival of all living beings. Hence, it is very essential for us as human beings to conserve and use water efficiently rather than sufficiently for preserving enough sustenance for the future generations. The main objective of this paper is to project or forecast the existing ground water levels through extrapolation forecasting of rainfall to determine the time period in which the village may run out of ground water viz. their only source of consumption water. The reason for selection of this village is due to the fact that almost 70% of the watersupply for the stretch of Old Mahabalipuram Road (OMR) in Chennai is supplied through water tankers by extraction of ground water from this village which lies near the vicinity of Thiruporur. Earlier supply of water to this stretch was from Injambakkam in East coast road (ECR) but due to overconsumption of groundwater from this area caused seawater to seep in at a faster rate. This study aims to generate a safe period i.e beyond which the water tankers must be prevented from extracting water or to restrict their extraction to a certain limit. It enables the village of Illalur from reaching the same fate as of that of Injambakkam. The output of this estimate was submitted to the village Panchayat and clear precautionary steps and instructions was explained to its members.



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