

## About The Institution

The Kammavari Sangham, established in the year 1952, is a non-profit oriented voluntary service organization. The organization was created with the objective of providing charitable service to the community and society. The Sangham has diversified its activities since its establishment over seven decades ago. Now it has expanded its horizons to include community- strengthening ventures, providing education and financial support to the society. With a firm belief that quality education only can lay a strong foundation for bringing about economic and social changes to the lives of millions, the Sangham established educational institutions, starting with K.S. Polytechnic in 1992. Enthused with this success of its foray into technical education, the Sangham then started the K.S Institute of Technology (KSIT), its first Engineering College in the year 1999. In the following years both these institutions have carved an enviable niche through academic excellence achieved in a very short span of time. Following the success of KSIT, the Sangham ventured to start yet another technical institution, oriented towards advanced studies and research, and thus, the K S School of Engineering & Management was born in 2010. K S School of Architecture was established in the year 2015. K S Pre-University College was recently established in 2022.



## About the Department

The Department of Civil Engineering is committed towards excellence and innovation in education and research. Presently the Dept. of civil engineering has 6 research students who are encouraged to build a firm foundation by opting core courses & progress towards specialized topics like Building performance studies, Earthquake resistance structures, Structural health monitoring etc. The R&D also encourages writing research proposals, scientific papers leading to publications & also filing patents.

Department of Civil Engineering helps to facilitate the overall development of students and faculty by organizing Seminars, Workshops and Industrial tours to upgrade with recent trends and developments. The department also offers Consultancy services in testing of materials, Non-destructive testing & Soil-testing.

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1. Sri. R Rajagopal Naidu, President, Kammavari Sangham
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5. Dr. B K Raghu Prasad, Formerly Professor, IISc

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Dr. Vijayalakshmi Akella

Professor & Head, Dept. of Civil Engg., KSSEM, Bengaluru

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## Department of Civil Engineering

Organizes

## A One Day National Conference

on

## Emerging Trends in Sustainable Built Environment (NCESBE)

03-02-2023

In Collaboration with



Journal for Recent Advances  
In Built Environment (JRABE)

ISSN - 2583 - 3901



## About Conference

The objective of this conference is to create a platform for collaborative links between academicians and professional practitioners for the dissemination of knowledge, innovative ideas, and experiences in the various fields of Sustainable Built Environment. The conference seeks contributions from all the stake holders in planning and securing a sustainable built environment for the future. Prospective authors are kindly encouraged to contribute and support the conference through submission of their research papers.

## Call for Papers

It is indeed a pleasure for us to invite you to submit original and unpublished research outcomes in the form of technical paper to present and publish in NCSBE-2023. Authors are requested to submit only full length papers through e-mail to [ncesbe2023@kssem.edu.in](mailto:ncesbe2023@kssem.edu.in)

**Note** - Selected papers will be published in the peer reviewed Journal for Recent Advances in Built Environment (JRABE) with ISSN 2583-3901.

## About the Journal

Journal for Recent advances in Built Environment (JRABE) is a new peer-reviewed journal. JRABE publishes original papers resulting from research in Civil and Architectural engineering in the built environment.

JRABE will strive to offer you the fastest possible speed of publication, without compromising on the quality of our peer-review process. The eminent persons on editorial board are from reputed institutions, IIT's, CSIR Labs etc. It is a publication of TRISHNAAH Group.

## Important Dates

Last Date for Submission of Abstract	05-11-2022
Abstract Acceptance	20-11-2022
Full Paper Submission along With Registration Fee	15-12-2022
Submission of Camera Ready Full Length Paper	10-01-2023
Conference Date	03-02-2023

## ★ Awards ★

- ★ Certificate of Appreciation for Best Paper presented in each track
- ★ Certificate of Participation for all Registered Participants

## Main Theme

Emerging Trends in Sustainable Built Environment

## Sub Themes

- ❖ Sustainable Materials and Constructions
- ❖ Analysis and Design of Structural Elements
- ❖ Structural Health Monitoring
- ❖ Fracture Mechanics
- ❖ Climatic Responsive Buildings
- ❖ Construction Management, Information modelling in BIM
- ❖ Disaster Risk Management
- ❖ Virtual and Augmented Reality
- ❖ Computational Methods
- ❖ Geotechnical Applications
- ❖ Water Resources Management
- ❖ Environmental Pollution and Waste Management
- ❖ Remote Sensing and GIS Application
- ❖ Urban and Regional Planning
- ❖ Transportation Systems

## Registration

Delegates should complete the registration form and send soft copy by email along with the transaction receipt to [ncesbe2023@kssem.edu.in](mailto:ncesbe2023@kssem.edu.in)

## Registration Fee

Category	Students / Research Scholar	Academician / Researcher	Industry
Conference Registration + Publication in JRABE	Rs.1500/-	Rs.2500/-	Rs.3500/-

## Payment

Registration fee to be paid through online mode



SCAN & PAY WITH ANY UPI APP

For registration, template, author guidelines and further details access the following link

<https://journals.trishnaah.com/conference-ncesbe-2023/>

## Contact Details

Prof. Sushma M - 9740775417  
Prof. Manjunath B - 8217828727

## Venue

Architecture Seminar Hall,  
KSSEM, Bengaluru -109.

A  
Report of  
ONE DAY  
NATIONAL CONFERENCE  
on

**“EMERGING TRENDS IN  
SUSTAINABLE BUILT ENVIRONMENT”  
(NCESBE)**

**03<sup>RD</sup> FEBRUARY 2023**

**IN ASSOCIATION WITH**

**Journal for Recent Advances in Built  
Environment (JRABE)  
ISSN 2583 – 3901**

Organized by

**Department of Civil Engineering**

**K.S.SCHOOL OF ENGINEERING AND  
MANAGEMENT**

**#15, Near Vajrahalli, Mallasandra, Kanakapura road,  
Bengaluru-560109**

## **Summary of the Conference:**

The one day “National Conference on Emerging Trends in Sustainable Built Environment” (NCESBE 2023) with the theme “Emerging trends in Sustainable Built Environment” was organized by the Department of Civil Engineering, K. S. School of Engineering and Management (KSSEM), Bengaluru on February 03<sup>rd</sup> 2023 in association with Journal for Recent Advances in Built Environment (JRABE) with the aim of creating a platform for collaborative links between academicians and professional practitioners for the dissemination of knowledge, innovative ideas and experiences in the various fields of Sustainable Built Environment. Prospective authors were encouraged to contribute and support the conference through submission of their research papers.

There were twenty technical presentations in various themes related to sustainability and built environment. The Chief Guest for NCESBE 2023 was Shri. R. Sundaram, Chairman and Managing Director, Sundaram Architects Pvt. Ltd., who is renowned in the field of shell structures. The Conference was presided by Sri. R. Rajagopal Naidu, President, Kammavari Sangham. Honorable Secretary of Kammavari Sangham Sri. R. Leela Shankar Rao; Treasurer Sri. T. Neerajakshulu Naidu; Dr. K V A Balaji, CEO, KSGI, Dr. K Rama Narasimha, Principal, KSSEM CEO, KSGI; Prof. B K Raghu Prasad, Formerly Professor, IISc; Department Heads, KSGI; Prof. Suresh K, Principal, KS Polytechnic, Dr. Sangappa, Director, Admissions and Public Relations; Dr. Harish R, Training and Placement Officer; Ar. Thrivikram N.B., Principal, K. S. School of Architecture were present for the inaugural function after which the technical sessions were continued for the day.

The book of abstracts unveiled contained the abstracts of peer-reviewed papers presented at NCESBE 2023 under various themes namely sustainable materials and construction, structural health monitoring climatic responsive building, construction management, disaster risk management, environmental pollution, waste management and urban and regional planning.

The process of building a structure has a substantial impact on the environment. It accounts for almost half of the global energy use, about a third of greenhouse gas emissions and about a tenth of our water use. With increased urbanization, these environmental impacts are expected to increase globally. Therefore, there is an urgent need for construction industry to follow a sustainable trajectory so that a balance is maintained between Environment and Performance of buildings. This conference provided a platform for researchers to share their insights, experiences and exchange ideas related to sustainable built environment. Emerging technologies and scientific advancements in various themes related to sustainable built environment were discussed.

Dr. G. Narayana, Professor & Head, Civil Engineering Department, SJC Institute of Technology and Dr. N. S. Kumar, Professor & Head, Civil Engineering Department, Ghousia College of Engineering were invited as the Session Chairs for the Conference.

Valedictory session was held after the end of the technical sessions, for which the Dr. K. V. A Balaji, Chief Executive Officer, K. S. Group of Institutions, Dr. Vijayalakshmi Akella, Prof. and Head of Civil Dept. and Dr. Arekal Vijay, KSSEM were present to address the gathering and issue certificates for the best paper as well as to all the participants of the conference. A few participants volunteered to express their gratitude to the organizers for conducting this Conference and thanked all the fellow participants for their valuable contributions.

### **PHOTOS OF NCESBE 2023**



INAUGURATION



UNVEILING OF BOOK OF ABSTRACTS



PAPER PRESENTATION



GROUP PHOTO WITH PARTICIPANTS

*M. Kelle*

Professor & Head  
Dept. of Civil Engineering  
K.S. Group of Institutions  
K.S. School of Engineering & Management  
Bangalore-560 062

**(Convener Signature)**

KAMMAVARI SANGHAM (R) - 1952



**NCESBE - 23**

**KSSEM**  
K S SCHOOL OF ENGINEERING AND MANAGEMENT

**K. S. SCHOOL OF ENGINEERING & MANAGEMENT**

(Approved by AICTE, Affiliated to VTU & Accredited by NAAC)

**DEPARTMENT OF CIVIL ENGINEERING**

**A One Day National Conference**

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**ISSN 2583 – 3901**

**BOOK OF ABSTRACTS**

**03 FEBRUARY 2023**

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### VISION

- To emerge as one of the leading Civil Engineering Department by producing competent and quality ethical engineers with strong foot hold in the areas of Infrastructure development and research.

### MISSION

- Provide industry oriented academic training with strong fundamentals and applied skills.
- Engage in research activities in Civil Engineering and allied fields and Inculcate the desired perception and





## MESSAGE FROM PRESIDENT



I am extremely delighted by the activities from the Civil Engineering Department of our Institution headed by Dr. Vijayalakshmi Akella for organizing a one day “National Conference on Emerging Trends in Sustainable Built Environment” (NCESBE 2023). In today’s world with rapid changes in the climate at global level due to carbon footage, it is the appropriate moment for implementing the practices of sustainable built environment which help in reducing the carbon footage. I hope that the conference NCESBE 2023 will advance in this path and commence the implementation of sustainable practices for reducing the carbon footage, thereby making this National Conference a fruitful and worthwhile event. I convey my best wishes to all the participants of this National Conference.

**Sri. R. Rajagopal Naidu**  
**President,**  
**K. S. Group of Institutions, Bengaluru**

## **MESSAGE FROM HON. SECRETARY**



I am extremely overwhelmed by the activities conducted by the Civil Engineering Department of K. S. School of Engineering and Management, headed by Dr. Vijayalakshmi Akella. I am happy to know that a one day “National Conference on Emerging Trends in Sustainable Built Environment” (NCESBE 2023) has been organized by the Department. In today’s world, with continuous depletion of natural resources, it is always important to think and implement the practices of sustainable built environment which helps in conserving the natural resources for our future generations. I hope that this conference will progress in this direction and initiate the inculcation of sustainable practices such as designing for longevity, flexibility, assembly, disassembly, reuse and recoverability and considers future climate risks for the society at large, thereby rendering this National Conference as a successful and meaningful event. I convey my best wishes to all the participating delegates and the organizers of this National Conference.

**Sri. R. Leela Shankar Rao**  
**Hon. Secretary,**  
**K. S. Group of Institutions, Bengaluru**

## **MESSAGE FROM TREASURER**



I am very happy to know that the Department of Civil Engineering, KSSEM, Bengaluru headed by Dr. Vijayalakshmi Akella has taken an initiative in hosting NCESSBE 2023 with the main theme of “Emerging Trends in Sustainable Built Environment”. The conference will bring together Industry Professionals, Academicians & Researchers for dissemination of knowledge, innovative ideas, and experiences in the various fields of Sustainable Built Environment. My best wishes to all the delegates and the organizing committee. I am sure this conference will be a great platform for learning, exchange of knowledge, research ideas and networking.

**Sri. T. Neerajakshulu Naidu**  
**Treasurer,**  
**K. S. Group of Institutions, Bengaluru**

## MESSAGE FROM CEO



I am glad that the Department of Civil Engineering is hosting, “National Conference on Emerging Trends in Sustainable Built Environment” (NCESBE 2023). Sustainable development is said to be the greatest learning challenge that mankind has ever faced. It is high time we work towards sustainable development. The theme of the conference is apt for today’s global scenario with regards to Sustainability in built environment. Sustainability is the process of maintaining change in a balanced environment, in which the use of resources, the direction of investments, the orientation of technological development and institutional change are all in harmony, and enhance both current and future potential to meet human needs and aspirations. With rapidly dwindling resources in the world and limited ability to absorb waste, sustainable development aims towards improvising the quality of life for all. There are several associated built environment goals. Projects must be designed with an aim to minimize energy and water consumption, as well as production of wastes. Principles incorporating sustainable design must be adopted. Shifting

towards sustainable operations will have a major impact on our ability to achieve a sustainable future.

This conference will provide a common platform for Researchers, Academicians and Industry Professionals to share their thoughts, ideas and collaborate towards the common goal of achieving Sustainable Built Environment. I wish the delegates all the very best.

My good wishes to Dr. Vijayalakshmi Akella and her team for NCESBE 2023 and future endeavors.

**Dr. K. V. A. Balaji**  
**CEO & Member Secretary,**  
**K. S. Group of Institutions, Bengaluru**

## MESSAGE FROM PRINCIPAL



I congratulate Dr. Vijayalakshmi Akella, Head of the Department, Civil Engineering, KSSEM and her team for having organized the “National Conference on Emerging Trends in Sustainable Built Environment” (NCESBE 2023) on February 03<sup>rd</sup> 2023. Sustainable Built Environment is of utmost importance in today’s world and there is an urgent need to address issues of concern, related to sustainability, climate change and built Environment. To welcome future space demands and limit global warming, we need to accelerate the shift toward a net-zero emissions, circular, healthy, inclusive and resilient built environment. It is therefore very important to understand sustainability issues and progress towards it for ensuring a green and efficient built environment.

I convey my best wishes to the organizing team and all the participants for the conference and I hope there will be a lot of learning and exchange of research ideas during the conference.

**Dr. K. Rama Narasimha**  
**Principal/Director,**  
**K. S. School of Engineering &**  
**Management, Bengaluru**

## MESSAGE FROM PROF. B. K. RAGHUPRASAD



Sustainability has been the key word at least for the last three decades. It was realized during the previous decades that carbon footprint has to be decreased to save the planet from total destruction. It has been tried in various ways in different walks of human existence. It has also been understood beyond all doubts that construction sector is one of the major contributors to carbon footprint. Therefore, researchers in Civil Engineering who also have turned as environmentalists have concluded that, if the use of cement as well as steel is optimized, it will be possible to control the carbon emissions into the atmosphere. Thus the concept of sustaining the environment or in other words ourselves, emerged successfully. While materials such as cement, soil and mud blocks were in use, mostly in housing, a new concrete emerged to replace the existing cement concrete. That is Geopolymer concrete. It has no cement but has only fly ash with sodium hydroxide and sodium silicate. Even river sand is being replaced by manufactured sand. Fortunately, quarrying river sand is highly discouraged these days to save rivers from changing their course and drying up. We need to

explore further and work towards creating a sustainable environment in all respects.

With further advancement, use of stabilized mud blocks became popular over the years. Off late, rammed earth is being considered as another wing to sustainability. We all need to explore the entry of Geopolymer concrete into construction. Having been used to Reinforced concrete and structural steel all these years, we cannot suddenly switch to non-usage of the same, particularly for large constructions, industrial structures, flyovers, bridges, tall buildings, nuclear structures, and the like. The nearest material which can replace Reinforced concrete is Geopolymer concrete. But we are yet to go a long way! For housing and other lighter structures, we can think of timber. We should make use of species which grow very fast after replanting. We cannot afford to deforest! With all the above in view, we need to meet often to review the situation. The current meet is one such!

My best wishes to Dr. Vijayalakshmi Akella and her team for NCESBE 2023.

**Dr. B. K. Raghuprasad**  
**Formerly Professor, IISc**  
**Faculty Advisor,**  
**Dept. of Civil Engineering, KSSSEM**



# PREFACE

The “National Conference on Emerging Trends in Sustainable Built Environment” (NCESBE 2023) with the theme “Emerging trends in Sustainable Built Environment” is organized by the Department of Civil Engineering, K. S. School of Engineering and Management (KSSEM), Bengaluru on February 03<sup>rd</sup> 2023.

There are twenty technical presentations in various themes related to sustainability and built environment. The Chief Guest for NCESBE 2023 is Shri. R. Sundaram, Chairman and Managing Director, Sundaram Architects Pvt. Ltd., who is renowned in the field of shell structures. The process of building a structure has a substantial impact on the environment. It accounts for almost half of global energy use, about a third of greenhouse gas emissions and about a tenth of our water use. With increased urbanization, these environmental impacts are expected to increase globally. There is therefore, an urgent need for construction industry to follow a sustainable trajectory so that a balance is maintained between Environment and Performance of buildings. The conference provides a platform for researchers to share their insights, experiences and exchange ideas related to sustainable built environment. It allows researchers to discuss the emerging technologies and scientific advancements in various themes during the conference. This book of abstracts contains the abstracts of peer-reviewed papers under various themes namely Sustainable Materials and Constructions, Structural Health Monitoring, Climatic Responsive Building, Construction Management, Disaster Risk Management,

Environmental Pollution, Waste Management and Urban & Regional Planning presented at NCESBE 2023.

I am immensely grateful to the organizers and members of the Program Committee for their diligent work ensuring quality publications. We highly appreciate the guidance and continuous support provided by the Management of KSGI, the Academic Advisory Board, the CEO Dr. K. V. A. Balaji and our Principal, Dr. K. Rama Narasimha. We extend our heartfelt thanks to Prof. B. K. Raghu Prasad, Former Professor, IISc for sharing his knowledge and keeping us motivated at all times. The efforts of all the faculty, staff and students in organizing the NCESBE 2023 are greatly appreciated. The Department of Civil Engineering sincerely thanks all individuals who provided help and support to conduct the conference successfully.

We are thankful to all our sponsors for the support extended. We also express our gratitude to all the Session Chairs for having accepted our invitation. We are grateful to Journal for Recent Advances in Built Environment (JRABE), a Journal published by TRISHNAAH, for having reviewed papers meticulously to ensure good quality publications during the preparation of the Proceedings. Our special thanks to all the authors for their contributions and timely revisions by incorporating the suggestions and comments by the reviewers.

We sincerely hope that all the readers will find the contents of this book of abstracts to be useful and productive.

**Dr. Vijayalakshmi Akella**  
**Convener**  
**NCESBE 2023**

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## Alternatives in Masonry Foundations

Yogananda M R<sup>1</sup>, Pramod A V<sup>2\*</sup>

<sup>1,2\*</sup> *Consulting Structural Engineer, Mrinmayee Consultants*

\* *Corresponding Author. E-mail address: mahijaa13@gmail.com*

**Abstract:** Foundations form a very important part of any structure. In today's context, type of foundation cannot be generalized. It is dependent on the site soil condition. It is very important to understand the soil strata on which the foundation is rested and design the foundation according to the soil strata available.

Masonry foundations using size stone masonry is generally adopted for masonry structures. Depending on the soil strata condition, suitable alternative foundation types have to be suggested. This presentation focuses on such alternatives in masonry foundation available for structural design engineers.

Foundations on different soil strata conditions like soft soil strata, rocky strata, expansive soil strata and filled up soil strata are discussed in the presentation.

**Keywords:** *Foundations, Soil strata, Masonry structures*

\*\*\*\*

## **Application of Controlled Low-Strength Materials for Stabilizing Black Cotton Soils**

B N Skanda Kumar<sup>1\*</sup>, Chandregowda C<sup>2</sup>, K S Sreekesava<sup>3</sup>

*\* Assistant Professor, CIIRC, Jyothy Institute of Technology, Bengaluru*

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**Abstract:** In developing countries like India, urbanization and rapid development of infrastructure have resulted in the use of lands with soft and weak soils for various Civil Engineering applications. The mechanical behavior of these soils should be improved by stabilization and other reinforcement techniques to make it suitable for construction activities. Black Cotton (BC) soils when exposed to variations in moisture content undergo high swelling and shrinkage making it more complicated. The present study investigates the feasibility of controlled low-strength materials for stabilizing BC soils. ACI-229R report describes controlled low-strength materials (CLSM) as cementitious materials having compressive strength less than 8.3 MPa (28 days). After hardening, CLSM provides an adequate strength in bearing capacity. For the present study, a new greener CLSM comprising Class-F flyash, Cement, Common effluent treatment plant (CETP) Sludge, and water were used and optimum mix is designed. The fresh and hardened properties of CLSM are found. Experiments were carried out by mixing CLSM with black cotton soil in different proportions and the results are found to be satisfactory. CBR test was conducted to assess the strength gain of BC soil with different proportions of CLSM. Taguchi models are generated using wide range of experimental data and validated with experimental data, to encourage production of CLSM using fly ash and sludge instead of conventional trial and error process.

**Keywords:** *Controlled low strength materials, CETP sludge, BC soils, CBR*

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## Taguchi based Optimization of Bond Strength in CFST Columns using Grey Relational Analysis

Chethan Kumar S<sup>1\*</sup>, N S Kumar<sup>2</sup>

<sup>1\*</sup>Assistant Professor, <sup>2</sup>Professor, Ghousia College of Engineering, Ramanagaram

\* Corresponding Author. E-mail address: chethans0504@gmail.com

**Abstract** – Concrete filled steel tubes are extensively used in high rise structures and bridges. The characteristics such as ease of construction, maintenance, resistance to corrosion makes the concrete filled steel tubes a potential application in many structures to satisfy the durability criteria. Extensive research was carried out in the past decades on the behavior of CFST columns. The studies on bond strength were conducted by Virdi and Dowling. Experimental investigations were carried out on concrete filled steel tube columns with concrete using glass fibers of different lengths and diameters. Taguchi’s approach of Design of Experiment (DOE) is adopted to save the time and cost of the experiments. The push-out tests were performed to investigate the effects of parametric variations. The optimization of parameters considering the bond strength in CFST columns using grey relational analysis is presented. The diameter, L/D ratio and percentage of glass fibers are considered for evaluating the bond strength. These process parameters closely correlate with the selected performance characteristics in this study. The normalized experimental results of the performance characteristics are then introduced to calculate the coefficient and grades according to Grey Relational analysis.

**Keywords:** CFST, DOE, Pushout Test, Grey Relational analysis

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## **Retrofitting With Basalt Fiber is Greener than Ever - A Review**

Kavyashree R R<sup>1\*</sup>, K N Vishwanth<sup>2</sup>, H N Jagannatha Reddy<sup>3</sup>,  
Hrithik R<sup>4</sup>

*<sup>1\*</sup>Assistant Professor, <sup>3</sup>Professor, <sup>4</sup>PG Student, Department of Civil Engineering, BIT, K R Road, Bengaluru*

*<sup>2</sup>Professor, Department of Civil Engineering, DSAT&M, Bengaluru*

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**Abstract** – Maintenance, repair and rehabilitation of Civil Engineering structures is an important aspect post construction. The industry often looks for optimal solutions in terms of finance as well as eco-friendliness of the materials and processes used. There is an augmented scope for the usage of green materials in the structural health monitoring system which causes less harm to the environment. The word green retrofit aims at reducing the emissions of carbon and usage of other harmful materials to the environment. One such naturally occurring eco-friendly material is Basalt Fiber. The Basalt fiber reinforced polymer performs on par with contemporary materials. This paper presents a short review on potential characteristics of Basalt fibers as a retrofitting material for various civil engineering structures. The increased trend of using greener materials for a sustainable environment led to this research. Repair & retrofitting is looked into, by investigating basalt fiber’s mechanical behavior under various conditions and explore the possibilities of using it as an efficient & Sustainable material.

**Keywords:** *Basalt fiber, Eco-friendly, Retrofitting*

\*\*\*\*



## Seismic Analysis of Multi Storeyed Building with Shear Walls at Different Locations

Naveen J<sup>1\*</sup>, Shashi Prasad N<sup>2</sup>, Vijayalakshmi Akella<sup>3</sup>

<sup>1</sup>PG Student,

<sup>2</sup>Assistant Professor,

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**Abstract** –In multi-storey buildings, shear walls are employed as a horizontal load-resisting element. These walls are structural walls that are incorporated in the structures to resist lateral stresses brought on by wind, earthquakes, and other factors. They also have a high degree of stiffness and strength. A shear wall has a major axis that is stiffer than its other axis. It offers stiff resistance to forces acting in its plane from the vertical and horizontal directions. A shear wall experiences axial, shear, torsional, and flexural strains, under the combined loading, leading to a complex internal stress distribution. Loads are transferred vertically to the foundation from the building in this manner.

In this paper, the effectiveness of shear wall is checked by changing the location. Two cases are considered such as bare frame and in-filled frame with and without shear walls. Ten different models are considered. The structural elements for multi-story buildings with G+9 are designed for seismic zone V with soft soil and are analyzed as per the code IS 1893:2016 by using ETABS. The different models are modelled and analyzed using equivalent static and response spectrum methods for earthquake loads by providing the shear walls at different locations with mass irregularities.

**Keywords:** Shear wall, Earthquake, Response spectrum method

\*\*\*\*

## Comparative Studies and Decision making for Formwork Techniques on a Construction Site

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**Abstract:** Indian construction industry has grown by leaps and bounds in the past few decades. With the advent of multinational companies in India for construction activities, it has become imperative to have precise & speedy construction. Conventional construction methods are not able to cope up with the demand of infrastructural facilities with high degree of quality control & assurance. Formwork is an important part of construction and it takes 25-30 % of the total cost of construction. New technologies in formwork and casting of larger elements in a single pour reduces time and labor requirement as compared to the conventional methods.

New systems are promised to be economical faster assuring high quality construction. In this paper, an attempt is made to compare established conventional formwork with a set of new formwork techniques, which are currently not very popular in Indian construction industry. The paper also discusses merits and demerits of each of these technologies. It can be concluded that Plastech formwork is the best feasible solution for the project. Although Doka, Peri, Required Minimum Distribution (RMD) and other techniques consume less time, their overall cost is large. There are many uncertainties involved in a project causing delays which lead to a huge impact on the cost of the project. These methods namely Doka, Peri and RMD need additional equipment but Plastech functions the same as conventional timber and does not require any additional equipment for installing. For this study, MIVAN formwork technique was not taken under consideration as its initial cost is very high.

**Keywords:** *Formwork, Infrastructure, Construction Industry*

\*\*\*\*

## **Assessment of Damaged Buildings by using Retrofitting Techniques - A Case Study**

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**Abstract:** Huge capital is invested in construction, planning and maintaining the quality of a building. With time, old structures lose their strength and quality and thus they require retrofitting. Retrofitting helps in restraining old structures by assessing and restoring their existing condition and enhance the structural capability. Proper assessment of the damaged building is necessary to effectively implement retrofitting techniques that may help in restoring the strength and quality of old structures with low cost. This study focusses on assessing of failures and damages in the buildings and adopting suitable retrofitting techniques.

Two case studies taken up are that of a school building in which the ground floor required more retrofitting than the first floor and a Chemical factory which was damaged more due to chemical attacks. This paper discusses the assessment techniques and retrofitting measures taken for the two buildings.

**Keywords:** *Retrofitting, Construction, Structural capabilities*

\*\*\*\*

## Planning Strategies for Peri-Urban Area Development near Pimpri-Chinchwad Municipal Corporation

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**Abstract:** The increase in urbanization, emerging economical activities and land speculation has led to the formation of peri-urban settlements around the Indian Megacities. The characteristics of these settlements are changes in land use and occupation pattern, reduced farm activities, growth of built structures, land agglomeration, etc. There is an inadequate planning and governance by the local government in these peri-urban regions. This brief calls on the Indian government to formulate a broad policy for planned spatial growth of megacities to ensure the sustainable development of the country’s peri-urban areas. The study area forms a part of the Pune district in the state of Maharashtra (India). Pimpri-Chinchwad is a relatively newly developed urban area of Pune city. The basic idea behind the creation of these twin cities was to reduce pressure on the resources located in the Pune core area. The transformation of urban fringe areas of the city in an unsustainable manner is a special challenge for urban planning. The paper focuses on facts and figures of peri urban areas around Pimpri-Chinchwad, the reasons behind its formation, the issues of these fringe areas and approaches to overcome them. Environmental planning and management of the peri-urban areas cannot be based on conventional planning approaches in urban and rural areas but also on an approach that responds to the specific environment, social, economic and institutional aspects of the peri-urban interface.

**Keywords:** *Peri urbanization, Fringe zone development, Land use, Socio-economic development*

\*\*\*\*

## Parametric Study on Behavior of Post-Tensioned Rectangular and Trapezoidal Box Girder Bridge using Finite Element and Classical Method

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**Abstract:** The present study focuses on the behavior of a typical single-cell simply supported post-tensioned concrete rectangular and trapezoidal box-girder section of 40 m span. Preliminary dimensioning is carried out as per IRC 18 and the vehicular live loading is considered for the analysis that includes IRC class A loading and IRC class 70R loading as per IRC-6. The range of permissible stresses in concrete is as per IS 1343. The prestress force is transferred by providing straight tendons in the bottom flange and parabolic tendons with different eccentricity in web so that the resultant stresses obtained are within the permissible limits at both transfer and service load stages. The limit state of collapse in flexure, shear and torsion, limit state of serviceability for deflection is carried out for the load case DL+LL, DL+PS, DL+LL+PS. FEM analysis is carried out by using CSI Bridge software and results are compared with the classical methods. The investigation shows that the resultant compressive stress and tensile stress are 13% and 3% greater than the rectangular box-girder for DL+LL, 4% and 13% for DL+PS and 1% to 3% for DL+LL+PS respectively. Based on the work it is found that the deflection of trapezoidal box-girder is 2% more than the rectangular box-girder. The stress at the transfer stage of rectangular box-girder is 12% greater than the trapezoidal box-girder. The prestress loss in rectangular box-girder is 5% greater than trapezoidal box-girder.

**Keywords:** Post tensioned, Girder, Bridge

\*\*\*\*

## **An Influence of Industrial and Agricultural by- Products on Self- Curing Concrete – A Review**

Rashmi H R<sup>1\*</sup>, Preethi P<sup>2</sup>, Salman Bashir<sup>3</sup>,  
Siddanna Gouda<sup>4</sup>, SuhailAltaf Dar<sup>5</sup>

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**Abstract** – Concrete is the most commonly used construction material of the twenty-first century. Concrete's mechanical characteristics are influenced by its curing state. According to the ACI- 308 (2014) Code, internal curing describes the process through which cement is hydrated due to the availability of additional internal water that is not included in the mix design. Concrete's strength and durability will be hampered by carelessness in the curing process. Shrinkage-reducing chemicals and lightweight aggregates like Leca, Polyethylene-glycol, Silica fume and stone chips are used, to achieve effective curing results. This paper explains self-curing concrete techniques and earlier works carried out by the researchers on the subject. Super absorbent polymers, polyethylene glycol, and lightweight particles are among the components most frequently used to make self-curing concrete.

**Keywords:** *Self-Curing Concrete, PEG400, Rice husk, Pumice, Polymers*

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## Developing Strategies for Energy-Efficient Residential Buildings in India

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**Abstract:** Urbanization in India increased the stress on towns and cities. This has put immense demand on buildings to work and to live. Increase in the number of buildings increases the electricity demand. India is the fourth largest energy consumer of electricity after China, the USA, and Russia.

In India, the building sector consumes about 33% of the total energy produced in the country. The building sector includes three major categories –residential, commercial and industries. 24% of the energy is consumed by the residential sector and 9% by commercial buildings. A lot of effort is being made to switch to renewable energy. There is a need to develop strategies to bring down the energy consumption. This paper focuses on identifying the active and passive energy-efficient design strategies for residential units in India. The paper includes a detailed analysis of energy-saving measures and identifying the parameters which contribute to energy efficiency in buildings.

**Keywords:** Energy consumption, Energy efficiency, Energy-efficient design Construction parameters, Energy saving

\*\*\*\*

## Utilization of Silico-Manganese Slag as Coarse Aggregate in Concrete

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**Abstract:** Coarse aggregates play a very important role in the construction and transportation industries; it is a non-renewable natural resource whose excessive use may lead to its depletion. Hence it is feasible to look for alternatives to replace aggregates. This project focuses on the use of Silico Manganese Slag as an alternative for Coarse aggregates in concrete and the main aim is to test the compatibility of this slag aggregate with fine aggregate and cement and its effect on the properties of fresh and hardened concrete. Utilization of Silico-Manganese slag for construction, not only decreases the consumption of natural coarse aggregates, but also reduces the land which is being used for open disposal/dumping of this slag.

In this project, the conventional coarse aggregate is replaced with silico-manganese slag aggregate in various proportions of 0%, 25%, 50%, 75% and 100% in M30 grade concrete. The fresh concrete tests showed that concrete has medium to high workability. This concrete was casted into specimens and were cured for 7 and 28 days, which were tested for compressive strength, flexural strength, and split tensile strength. The compressive strength was decreasing with increase in percentage of replacement of natural coarse aggregate with slag aggregate, and at 75%, the strength obtained at 28 days curing was half of control specimen. In the case of flexural strength, strength obtained at 50% replacement was same as the control specimen. For split tensile strength, the strengths at 25%, 75% and 100% are comparable to control specimen.

**Keywords:** *Silico-manganese slag, Natural coarse aggregates, Compressive strength, Flexural strength, Split Tensile strength*

\*\*\*\*



## Size Effect of Recycled Aggregates on Properties of Self Compacted Concrete

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**Abstract:** Self-compacting concrete (SCC) is a flowing concrete that contains super-plasticizers and stabilizers to significantly increase the ease and rate of flow and does not require vibration. Recycled aggregates play an important step towards sustainable development in the industry and management of construction waste. Recycled aggregates (RA) are a viable alternative to natural aggregates. One of the critical parameters that affect the use of recycled aggregate is the variable size and shape of the aggregates. The present study focuses on the experimental work and examines the influence of Recycled Aggregates on fresh and hardened properties of self-compacting concrete as a substitute to natural coarse aggregates. A total 45 concrete mixes with partial replacement (0% 25% 50%75% and 100%) of natural aggregates were designed. Fresh properties of SCC were evaluated through Slump flow, U Box, V funnel tests. Compressive Strength and Bond strength was determined at 28 days of curing. From the laboratory tests, the maximum slump and flow were observed when 10 mm recycled aggregates are used and a maximum compressive strength was observed when 12.5 mm recycled aggregate are used in the mix as a partial replacement to natural aggregate.

**Key words:** *Self compacting concrete, slump, Recycled aggregate*

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## Shortfalls and Strategies to Create an Effective sustainable Disaster Management Cycle

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**Abstract:** Disaster has been a common phenomenon across the globe, with countries facing varied types of disasters which are influenced by its contextual conditions. This again is a direct impact of the climate change phenomenon triggered by adverse human interference with the complexly woven ecosystem rather than being integrated into the system. This has resulted in an imbalance in the eco-system with nature taking its own course of resettlement with making the transition more evident in the form of Meteorological (extreme high or low temperatures, tornadoes, hurricanes, forest fires), Hydrological (Heavy rainfalls, floods, melting of glaciers) and Geological (Earthquakes, Tsunamis, landslides), which the humans call as Natural Disasters.

Every year about 10,000 to 20,000 people lose their lives globally to disasters, along with economical losses. India alone during 2022 lost 2,755 lives, affected 1.8 million hectares of crop area, destroyed over 416,667 houses and killed close to 70,000 livestock. Madhya Pradesh saw the highest number of days with extreme weather events, but Himachal Pradesh saw the highest number of human fatalities. Every year the repetitive sequence of destruction and rebuilding cycle happens. There is a process of rescue and rebuild after a disaster, carried out by adopting various strategies towards a sustainable disaster management cycle.

This paper discusses the concept of a sustainable management of recurring disasters causing loss of life and assets, by inducing integrating strategies like Capacity building and preparedness to help communities brace the disasters.

**Keywords:** *Sustainable disaster management cycle, Capacity building*

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## **An Investigation on the Mechanical Properties of Concrete Structures with Low Carbon Steel – Industrial Waste**

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**Abstract:** The paper focuses on the use of low carbon steel as a partial replacement of coarse aggregate in concrete. The waste material produced during the production of low carbon steel components leads to major economic and environmental problems. This annual production increases the pressure on the landfills and pollutes the soil due to the leachate which contains various alloys. Two series of concrete mixtures were prepared with 0% and 20% replacement of coarse aggregates with low carbon steel. Initially mix is designed for M40 grade of concrete. The water cement ratio for this grade of concrete is varied between 0.40 to 0.44 and the dosage of super plasticizer is fixed at 0.75% to achieve the required workability of 75-100mm by conducting various trials. Mechanical properties like compressive strength, tensile strength and flexure are investigated. This work suggests that 20% replacement of coarse aggregates with low carbon steel gave a good increase in the mechanical properties.

**Keywords:** Concrete, Low carbon steel, Mechanical properties, M40 grade

\*\*\*\*

## **Time Impact Analysis Using MS Project – A Case Study**

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**Abstract:** The Time Impact Analysis (TIA) is one of the techniques used to understand the effect of an unplanned event. This method is popular and is adopted in the industry. TIA helps to understand the Potential Acceleration and Delays occurring in a project. TIA should be performed on the most updated schedule of the Project, i.e., the schedule before the occurrence of delays. In this paper, a real time project is taken up for analysis. The sequence of various activities is listed and then this technique is applied.

Performing TIA on a Project enables the Project Manager to understand the impact of extra work, the number of additional resources required, and the new completion date of the Project. The results of TIA can be communicated to the client at the earliest.

**Keywords:** *Time impact analysis, Project management, Delays*

\*\*\*\*

## **A Review on Wider Application of Supplementary Cementitious Materials on the Development of High-Performance Concrete**

Naphisa Labianglin Khongjee<sup>1</sup>, Yashwant Reddy<sup>2</sup>, Praveen Kumar NV<sup>3</sup>, Geetanjali H L<sup>4</sup>, G Narayana<sup>5\*</sup>

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**Abstract:** The CO<sub>2</sub> emissions in generating cement and in turn concrete can be significantly reduced by the partial substitution of Portland cement with Supplementary cementing materials (SCMs). Durability issues of normal cement concrete can be addressed by water/binder (w/b) ratios. High-Performance Concrete (HPC) that has a w/b ratio in the range of 0.25 to 0.35 is usually more durable than ordinary concrete. SCMs in HPC increase the durability of concrete. The rate of hydration of Portland cement supplemented with SCMs is enhanced due to the physical phenomena or chemical reactions like nucleation effect and pozzolanic activity. The composition of SiO<sub>2</sub>-Al<sub>2</sub>O<sub>3</sub>-CaO of SCMs at even large cement substitution ratios can lead to good durability of concrete. Wider application of additives in concrete is reported due to the properties of hardened and fresh concrete. This paper reviews the works carried out related to HPC and effects of several mineral admixtures on properties of such concrete.

**Keywords:** *High Performance Concrete, Durability, Supplementary cementing materials*

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## Impact of Microplastic Pollution in Fresh Water Sources

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**Abstract:** Plastic is everywhere and a large portion of it is found in water bodies. Most plastics in water degrade it further into extremely small particles, known as "Microplastics". Microplastics are everywhere either in the drinking water or the air we breathe in. Research is being conducted extensively but much remains unanswered. As one examines the issue of microplastics in freshwater systems, the preliminary freshwater studies assist in understanding microplastics, identifying knowledge gaps, and proposing future research goals. Evidence suggests that freshwater systems may be similar to marine systems in terms of the forces that transport microplastics.

This paper focusses on defining microplastics, methods of detecting and monitoring methods and the factors affecting the quality of environment due to the presence of microplastics. This paper also reviews the potential impacts and health risks involved due to the presence of the microplastics.

**Keywords:** *Microplastics, Freshwater, Human health, Drinking water*

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## Smart Water Management using IoT in New Horizon College Campus: A Case Study

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**Abstract:** Water management system allows for reduced water and sewer costs, better irrigation control during summer, and less energy waste. Good water management also ensures that water is clean and potable, and protects public health. Advanced technologies make efficient water management systems. Treatment of water, quality control checks by sensors periodically, leakage detectors causing minimum loss of water are important parts of this system.

Inflow and outflow, behavioral patterns data collected and stored in cloud storage improvises the water management system. IoT is one the most promising technologies in tackling problems of this type by creating a massive world-wide network of interconnected physical objects embedded with electronics, software, sensors, and network connectivity. A design of prototype of an affordable water level checking is explained in this paper to avoid water overflow and wastage of water in institutions, colleges, etc.

**Keywords:** *Internet of Things, Cloud server storage, Sensors, Water level measurement*

\*\*\*\*

## **Comparative Analysis of Compressive Strength of Masonry units with Geopolymer Blocks and Concrete Blocks with and without Horizontal Reinforcement**

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**Abstract** – Reinforced masonry combines the advantage of masonry and reinforcement. The literature review clearly shows that compressive strength of normal block masonry without horizontal reinforcement is less when compared to masonry with horizontal reinforcement. In this work, blocks were cast of size 400mm x 200mm x 150mm and tested for compression. The results show that the compressive strength of Geopolymer blocks is more compared to Normal blocks with an increase of 26% for 7 days and 30% for 28 days. Geopolymer prisms and normal block prisms were casted with and without horizontal mesh reinforcement and were tested for compression. From the experimental results, it was observed that Geopolymer blocks with horizontal mesh gave 33% higher compressive strength than the normal blocks with horizontal mesh. It can be concluded that the Geopolymer block prisms with reinforcement yield better compressive strength than the normal block prisms without reinforcement.

**Keywords:** *Geopolymer, Horizontal reinforcement, Compressive strength*

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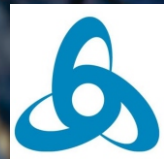
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A ONE DAY NATIONAL CONFERENCE ON EMERGING TRENDS IN SUSTAINABLE BUILT  
ENVIRONMENT (NCESBE-2023) ON 3RD FEBRUARY 2023  
DETAILS OF DELEGATES

SL.NO	NAME OF THE DELEGATES IN CAPITAL LETTERS	TITLE OF THE PAPER	INSITUTION/ COMPANY	Signature
1	BHAVAN KASHYAP.K.	An Investigation on the mechanical Properties of Concrete Structures with Low Carbon Steel Industrial waste	KSIT	
2	SUSHMITHA A. (Bant) DHANUSH.M.K. TANUSH.P. SHESHA DRI	Utilization of Silica -Manganese Slag as Coarse Aggregate in Concrete	PES University	
3	THEJA S.M	Size effects of Recycled Aggregates on properties of SCC	RVITM	
4	NANDANA.P.	Parametric Study on Behaviour of Rectangular and trapezoidal box girder bridge using FEM & Classical method.	Government Polytechnic Ramanagara	

5	AJAY DAS	FORUM WORK PRESENTATION	SOBHA DEVELOPERS	AS
6	Dr Rashmi. H. R. SALMAN BASHIR (P) SUHAIL ALTAF DAR.	Studies on early age characteristics of Self cured coconut shell ash based concrete mixes.	KSSEM	B
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10	NAPHISA L. K HONGJEE Geethanjali. H. L., praveen Kumar. N. V., Yashwanth reddy	REVIEW ON SUPPLEMENTAR MATERIALS ON THE DEVELOPMENT OF HIGH PERFORMANCE CONCRETE	STCIT	AP

11	Ar. Deepali Patil	Planning strategies for peri urban area development near PCMC. Energy efficient strategies for midrise bldg	Dayanandsagar college of Architecture.
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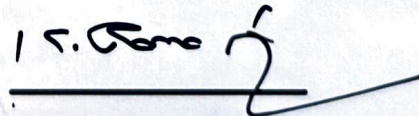
## DEPARTMENT OF CIVIL ENGINEERING

This is to certify that

Mr/Ms/Dr..... **AMRUTHA DHIRAJ** .....has  
participated in a One-Day National Conference on  
"Emerging Trends in Sustainable Built Environment" (NCEESBE)  
held on 3rd of February 2023



CONVENER



PRINCIPAL



CHIEF EXECUTIVE OFFICER