IRICE-2017

IFERP - IRICE

IRICE-2017

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IRICE- 2018

International Conference on

Innovative Realms In Civil Engineering

24th - 25th January 2018 Nagpur

Organized By
KDK College of Engineering, Nagpur
and
Institute For Engineering Research and Publication (IFERP)

In Association with
The Institution of Engineers(I), Nagpur Local Centre
and
Indian Concrete Institute, Nagpur Chapter

IRICE – 18

INTERNATIONAL CONFERENCE ON INNOVATIVE REALMS IN CIVIL ENGINEERING

Nagpur, Maharashtra

24th & 25th January, 2018

Organized by:

KDK College of Engineering, Nagpur

and

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in association with

The Institution of Engineers(I), Nagpur Local Centre

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Indian Concrete Institute, Nagpur Chapter

From Director's Desk ….

Rudra Bhanu Satpathy.,
Director,
Institute For Engineering Research and Publication.

We are extremely glad to welcome researchers as well as scholars from academics and Industries to International Conference on **"Innovative Realms in Civil Engineering-2018** organized by **KDK College of Engineering, Nagpur, Maharashtra** in association with **Institute for Engineering Research and Publication (IFERP).**

Nagpur the winter capital, a sprawling metropolis is being proposed to be one among the smart cities of India. Very often known as "Orange City" it has been the commercial and technical center of Vidarbha region of Maharashtra and 20th cleanest city in India and the top mover in the western zone as per Swachh Sarvekshan 2016 . Established in 1703 by Gonds king Bakht Buland Shah of Deogarh Nagpur has emerged as a major hub of education with four state university and well-built infrastructure for scientific advancement.

Our continuous and dedicated effort to bring scientific and academic transformation in India makes us organize world glass scientific events and conferences at educational institute of our country. As Scalar waves (superpower) that travel faster than speed of Light can be generated by resonating our DNA with Pineal Gland, we believe integrated effort to organize international conference like **IRICE** at a very short span will be a grand success. We are highly grateful to patron, convener, organizing committee and all the technical staffs of the **KDK College of Engineering** for their swift, smooth and continuous response for execution of preconference propagation. We express our hearty gratitude to all **IFERP** members for their support and contribution to organize **IRICE** at Nagpur.

On behalf of entire team of **IFERP** I express my warm welcome to researchers, delegates and professional experts from nook and corner of India to bestow this conference by added value by their scientific presentation. With gratefulness from core of my heart I appreciate the painstaking effort of our eminent keynote speakers to compromise their valuable schedule for **IRICE**.

I believe attending scientific events makes us update with progressing technology and academic scopes which will support in scientific studies and incubation in Western India.

Sincerely,

Rudra Bhanu Satpathy,

Preface

The **"*International Conference on Innovative Realms in Civil Engineering-2018"*** is being organized by KDK College of Engineering (KDKCE), Nagpur in association with *IFERP-Institute for Engineering Research and Publications on the 24th- 25th January' 2018*.

KDK College of Engineering has a sprawling student –friendly campus with modern infrastructure and facilities which complements the sanctity and serenity of the Metropolis city of Nagpur in Maharashtra.

The ***"International Conference on Innovative Realms in Civil Engineering-2018"*** was a notable event which brings academia, researchers, engineers, industry experts and students together.

The purpose of this conference is to discuss applications and development in area of **"Civil Engineering**" which were given international values by ***Institute for Engineering Research and Publication (IFERP).***

The International Conference attracted over 138 submissions. Through rigorous peer reviews 82 high quality papers were recommended by the Committee. The Conference aptly focuses on the tools and techniques for the developments on current technology.

We are indebted to the efforts of all the reviewers who undoubtedly have raised the quality of the proceedings. We are earnestly thankful to all the authors who have contributed their research works to the conference. We thank our Management for their wholehearted support and encouragement. We thank our Principal for his continuous guidance. We are also thankful for the cooperative advice from our advisory Chairs and Co-Chairs. We thank all the members of our local organizing Committee, National and International Advisory Committees.

Secretary Message

Shri Rajendra Mulak,
Hon'ble Secretary, KDKCE
Patron, IRICE-2018

I congratulate KDK College of Engineering, more particularly, the Civil Engineering Department for holding this International Conference on Innovative Realms in Civil Engineering (IRICE-2018) on 24th – 25th January 2018. This is second successive international conference that is being organized in the institute by Civil Engineering Department. I am sure about the conference that it will serve an effective platform for the technocrats to share their ideas and research. I always encourage to such type of event, which eventually make the society technology aware.

I wish every success to the conference.

(**Rajendra Mulak**)

Treasurer Message

Shri Yashraj Mulak,
Hon'ble Treasurer, KDKCE
Patron, IRICE-2018

It feels proud to mention here that the Department of Civil Engineering is organizing International Conference on Innovative Realms in Civil Engineering (IRICE-2018) on 24th – 25th January 2018. Last year the department has successfully organized International Conference on Emerging Trends in Civil Engineering (ETSE-2017), which was a grand success in the entire domain.

I am confident that this conference would also see the galaxy of technocrats, researchers, and professional in the field of civil engineering and will share their knowledge and wisdom.

I wish lots of success to the conference.

(**Yashraj Mulak**)

Principal Message

Dr D.P. Singh

Principal, KDKCE, Nagpur

Patron, IRICE-2018

I am, indeed, proud and privileged to organize Two days International Conference on '**Innovative Realms in Civil Engineering-2018" (IRICE-2018)** by KDK College of Engineering, Nagpur on 24th & 25th January 2018 at KDKCE Nagpur. The conference is jointly organized by IFERP, Institution of Engineers (I) Nagpur Local Chapter and Indian Concrete Institute Nagpur Centre.

I take this opportunity to brief about KDKCE. The Karmavir Dadasaheb Kannamwar College of Engineering, Nagpur, established in 1984 by Backward Class Youth Relief Committee (BCYRC), is one of the leading engineering colleges in Maharashtra State, approved by AICTE, New Delhi and Director of Technical Education, Maharashtra and affiliated to Rashtrsant Tukadoji Maharaj Nagpur University, Nagpur. Government of Maharashtra has conferred 'A' Grade on the basis of excellence & adequate infrastructure as well as academic achievements of students and faculty. The college runs Six Undergraduate courses and Three Postgraduate courses in Civil Engineering, Mechanical Engineering, and Master of Business Administration with total Intake capacity of 726. The National Board of Accreditation (NBA) had accreditated Civil Engg Department & Mechanical Engg Departments twice. Electrical Engineering department was also accreditated by NBA. The Vision of the college is "Service to the Society through Quality Technical Education". The orientation of academic and administration in the college is such that the stake holders are nurtured to achieve professional competency to help build their career and society at large.

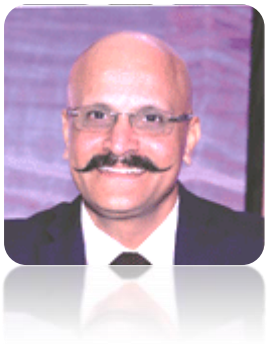
With the whole-hearted support from the management of KDKCE, the college is taking stride in organizing such event to provide platform to the academician, researchers and professional. This conference will also see galaxy of such person exchanging their knowledge and findings in the field of civil engineering.

I congratulate Civil Engineering Department for taking efforts in organization of IRICE-2018 and express my sincere thanks to experts, keynote speakers for their valuable deliberations, and authors of papers, delegates, participants for their valuable contributions. I also extend my thanks to the management of IFERP, ICI, IE (I) for joining their hands in the organization of IRICE-2018.

I wish every success to the entire team of IRICE-2018.

(**Dr. D P Singh**)

Patron Message



Er. Vivek Naik,
President, ICI
Patron IRICE-2018

It is evident that the strong network of infrastructure is the back-bone economical growth of any country. In present world, not only modern infrastructure is required but also smart and sustainable infrastructure solutions are inevitable. This can only happen in various parts of the country, when the research and technological innovations in the field of construction has been shared, understood and implemented.

I, on behalf of Indian Concrete Institute, feels proud to be a part of the International Conference on Innovative Realms in Civil Engineering (IRICE-2018), being organized by the Department of Civil Engineering, KDK College of Engineering on 24th & 25th January 2018 at KDKCE Campus.

Indian Concrete Institute (ICI) is the premier professional body for concrete technology with above 12,000 members with 34 centers spread across India. It has on its fold the captains of Construction Industry, building material manufacturers, Leading Consultants & Civil Engineers, Contractors, Academicians and Educational Institutions. ICI was founded in 1982 with its headquarter at Chennai. The objectives of ICI are to promote growth of concrete construction and its sub-specializations, to disseminate knowledge and to train personnel, to collaborate with national and International agencies in creating better understanding of concrete construction technology.
The conference will witness the eminent speakers from the country and abroad besides knowledge – full technical chair & co-chair and author of the research papers.

I am sure of the platform of IRICE-2018 would be a boon to the academician, researchers, professionals and practicing civil engineers to get enriched with new technologies, research and development in the field of civil engineering for creating smart and sustainable infrastructure for the present and future.

I wish all the very best to the organizing team of IRICE-2018.

(Vivek Naik)

Vice Principal Message

Dr Avinash M Badar

Vice Principal, KDKCE, Nagpur

Conference Chair, IRICE-2018

It gives me immense pleasure to announce the organization of Two-Days International Conference on '**Innovative Realms in Civil Engineering-2018" (IRICE-2018)** by the Department of Civil Engineering, KDK College of Engineering, Nagpur on 24th & 25th January 2018 at KDKCE Nagpur. The conference is jointly organized by Institute for Engineering Research and Publication, Institution of Engineers (I) Nagpur Local Chapter and Indian Concrete Institute Nagpur Centre.

India is going through the transitional phase from the conventional growth to the smart growth. Many cities are enveloped into the smart city concept wherein, the innovative inputs are given in infrastructure construction with more emphasis on sustainable development. Therefore, it is inevitable to congregate all such spearheads *viz.* Academician, Researcher, Consultants, Professional, Practitioner, etc, at one platform to exchange their innovative realms in construction technology.

The International Conference (IRICE-2018) would be witnessing experts from oversea, premier institutions like IITs and NITs to share their knowledge and experience. I, therefore, take this opportunity express my gratitude to all the luminaries for their valuable presence. I also extend my gratitude to authors of papers, delegates for their valuable contribution in the conference.

The papers to be presented in this conference are carefully reviewed and selected for presentation, which, I believe will make a significant contribution in the fields of civil engineering. During all the presentations, evaluation will be done by eminent technical chair & co-chair, which will pave the way for awarding best paper in various categories. I owe my thanks to the members of the Technical chair & co-chair for their support. We are also indebted to many individuals and organizations that made this event happen, namely to our supporting organizations, staff, who handled the logistics and worked to make this event a success, and to the technical and financial sponsors. I hope you will find this conference, a useful for presenting new ideas, results and recent findings in the fields of civil engineering.

I wish every success to entire crew of the IRICE – 2018 for all their efforts in organizing the conference and making it a grand success. I express my gratitude to Chairman, Secretary, and Treasurer of our KDK College for encouraging in the organization of this conference. I also acknowledge the cooperation from IFERP, IEI Nagpur Local Centre, ICI Nagpur Centre.

(**Dr. Avinash Badar**)

Conference Co-Chair Message

Dr. Dilip P. Mase

Chairman- The Institution of Engineers(I), Nagpur Local Centre

Conference Co-Chair , IRICE-2018

The Institution of Engineers (India) is the first professional body of engineers founded in India to be incorporated by Royal Charter in 1935 to promote and advance the atrt, science and practice of the myriad field of engineering and technology. It is today a multi-disiplinary nationwide organisation having an overall membership of over 0.75 million- the largest body of its kind in the whole of Asia with international status and bilateral relations with many sister socities around the world. The Corporate membership of the Institution is open to any person with an accrediated engineering degree with prrescribed professional experience. IEI has prsently more than 100 State/Local Centres in India. Nagpur Local Centre is one such Centre established in 1956. The growth of this Centre has been remarkable right from its inception. Many events of technological advancements like Seminars, workshops, Expert lectures, exhibitions etc are undertaken. The Two-Days International Conference on '**Innovative Realms in Civil Engineering-2018" (IRICE-2018)** by the Department of Civil Engineering, KDK College of Engineering, Nagpur on 24th & 25th January 2018 at KDKCE Nagpur, will definitely bring experts in the field of Engineering at one place and deliberate on various aspects. The theme of the Conference will surely find interest among the civil engineers to dwell on their topic of interest. Eminenet personalities are expeced to participate in the deliberations. I am sure, this conference will benefit the industries, practicing engineers, consultant and engineers.

I take this opportunity to extend my greeting to all.

Dr. Dilip P. Mase

Conference Co-Chair Message

Er.P.S.Patankar

Chairman Indian Concrete Institute, Nagpur Chapter

Conference Co-Chair , IRICE-2018

Indian Concrete Institute is one of the leading professional bodies in India, catering to the professional needs of individuals and orgnisations involved in Concreate. Being a non-profit Orgnisation, it is dedicated to the cause of Disseminating Knowledge on Concreate, to Promote Concreate Technology and Construction and to address the Research Needs of Concreate. ICI Nagpur chapter is a vibrant chapter amongst the various chapters spread across India and we are proud to organise International & National Conferences, Workshops, Expert Lectures by persons of Eminence on various national inportant days. KDKCE students chapter is also awarded with Best Emerging student chapter of ICI. Contributions and active support from members of the Institutions, Govt. / Semi-Govt./ Private Orgnisations, Industries and Engineering Colleges in and around Nagpur, has resulted in phenomenal development of the Centre, which is evident from the infrastructural facilities available.

Two-Days International Conference on '**Innovative Realms in Civil Engineering-2018" (IRICE-2018)** by the Department of Civil Engineering, KDK College of Engineering, Nagpur on 24th & 25th January 2018 at KDKCE Nagpur. with support from the IEI, Nagpur Local Centre, IFERP, will be absolute success. Eminenet personalities are expeced to participate in the deliberations. I am sure, this conference will benefit the industries, practicing engineers, consultant and engineers in Govt./ Private Orgnisations. The discussions and presentations in the conference will open doors for new ideas and practices based on experiences in the field of civil constructions.

On this occasion, I as Chairman of ICI Nagpur chapter extend my greeting to one and all.

Er.P.S.Patankar

ACKNOWLEDGEMENT

Dr Valsson Varghese
Professor & Head, Deptt of Civil Engg, KDKCE
Convener, IRICE-2018

KDK College of Engineering (KDKCE) and Institute for Engineering Research and Publication (IFERP) in association with Institution of Engineers (I) Nagpur Local Chapter and Indian Concrete Institute Nagpur Local Centre is jointly organising two days International Conference on ‘‘**Innovative Realms in Civil Engineering-2018" (IRICE-2018)** by the Department of Civil Engineering, KDK College of Engineering, Nagpur on 24th & 25th January 2018 at KDKCE Nagpur. The aim of the conference is to provide an opportunity for exchanging Technological advancements and scientific research in the Structural Engineering. Engineers, Scientiests and Researchers, Construction practitioners can share their knowledge, expertise and experiences in various concepts and innovations in the present scenario.

Civil engineering is the oldest engineering discipline which encompasses with the built environment much of what defines modern civilization. Civil engineering is the fusion of engineering (the soundness of infrastructures), design (CAD sketches) and art (designing aesthetic structures) and is backbone of comprehensive development of country. Civil engineering is progressing at a fast pace as are other technologies. The works include roads, bridges, buildings, dams, water reservoirs canals, water supply and numerous other facilities that affect the life of human beings Civil engineers are vital to the functioning of advanced societies. Civil engineering is an exciting profession because at the end of the day you can see the results of your work, whether this is a completed bridge, a high-rise building, a subway station, or a hydroelectric dam. Hence studying and understanding various filds of civil engineering is the essence of time.

Research papers are invited from faculties, Research Scholars, Scietiests, Practitionrs working in varied areas of structural engineering domain.

The theme of the conference is :

- Structural Engineering
- Earthquake Engineering
- Geotechnical Engineering

- Transportation Engineering
- Water and Environmental Engineering
- Construction Material & Management
- Sustainability & Green Structures
- Advancements in construction practices
- Computer Aided Design and Application
- GIS & Remote Sensing
- Structural Health Monitoring
- NDT Application in Structural Engineering
- Disaster Mitigation
- Smart structures
- Low cost / affordable building structure

The Seminar proceeding along with CD contains the Technical papers from Expert Civil Engineering consultants, Acadedmicians, Research scholars, students etc. the conference is a good opportunity for the participants coming from different places of India to present and discuss topics in their respective research areas. Various technical sessions of Two days IRCE-2018 reflects different ideas and methods of theme in a lively and accessible way.

I would like to thank all the participants for their contributions to the conference proceedings. Many thanks are due to all the sponsorers, supporters for their support and hospitality, which allowed all the participants to feel more at home.

My special thanks go to my colleagues, committee members for their untiring contributions for the conference in preparing this proceeding volume.

It is our pleasant duty to acknowledge the support and cooperations from the office bearers of IFERP, IEI(I), ICI, The Management of KDKCE for the organisation of this Conference.

Dr Valsson Varghese
Convener 2018

FROM CO-CONVENER'S DESK

Dr. Mrs. N. R. Dhamge
Professor , Deptt of Civil Engg, KDKCE
Co-Convener IRICE-2018

"At its heart, engineering is about using science to find creative, practical solutions. It is a noble profession." – Queen Elizabeth II

Engineers find practical solutions to complex problems. That's the heart of engineering, regardless of discipline, isn't it? Even royalty have recognized the importance and contributions of engineers, as this early quote shows. Modern Engineering with its wings in different direction can find innovative practices in Civil Engineering. New ideas can display creativity but there is no innovation until something gets implemented. We have to take a risk and deliver something for a creative idea to be turned into an innovation. An invention might be a product or device or method that has never existed before. So every invention is an innovation. But every innovation is not an invention. We tend to think of an innovation as a new product but you can innovate with a new process, method, model or material. Indeed every aspect of Civil Engineering is a candidate for innovation. This is where the need of research arises.

The idea behind the organization of International Conference on '*Innovative Realms in Civil Engineering – IRICE-2018*'; is to create the atmosphere of research in the field of Civil Engineering and young faculty members to develop innovative research oriented attitude. With the patronage from Hon'ble Shri. Rajendra Mulak and able guidance from Principal, Dr. D.P. Singh, Vice-Principal, Dr. A. M. Badar and with the guidance of Dr. V. Varghese, this proceeding of International Conference is presented here.

The papers presented in these proceedings are the reflection of the innovative realms of educators, practicing structural consultants, builders, researchers and lecturers. We are also grateful to the members of technical committee and sponsors for providing financial support and authors to make this International Conference a grand success. Finally we thank those who helped in the refereeing process and contributed to increase the quality of the papers presented in these proceedings.

Behind the success of the whole work, we cannot forget the unconditional support of the faculty members. Lastly, let's pray to almighty for strengthening us to achieve the goal by striding on a right path.

Dr. Mrs. N. R. Dhamge

FROM ORGANISING SECRETARY'S DESK

Prof S.R.Satone
Assistant Professor , CED, KDKCE
Organising Secretary IRICE-2018

Prof P.S.Randive
Assistant Professor , CED, KDKCE
Organising Secretary IRICE-2018

We, on behalf of organizing committee, welcome you all to the International Conference on Innovative Realms in Civil Engineering (IRICE-2018) on 24th – 25th January 2018, being jointly organized by the Department of Civil Engineering, KDKCE, in association with IFERP, ICI and IE (I).

The conference is aimed at bringing the research and innovative ideas in the field of civil engineering construction. The themes have been chosen to cater all the domain of civil engineering.

The conference will be witnessing the experts from Australia, IITs, NITs and other premier institute for delivering key-note address and sharing their technical wisdom. The conference will provide a unique forum for exchange of ideas, knowledge, and opportunities in the field of civil engineering.

The information about the conference was largely sent using conventional method of post and the Internet. We have received appreciable number of enquiries and registrations. The abstract was asked to submit electronically, which was reviewed and invited for full paper submission. The full text also has been peer reviewed and selected for presentation. The research articles received for selection and presentation in the conference will be one of the effective reflections of its scientific, academic, and technological contribution.

Organizing committee has selected the venue very carefully along with meticulous arrangement of all the facilities required for presentation and deliberations. Furthermore, the venue renders a comfortable stay in lush green campus with serene atmosphere.

However, the success of meticulously organized program will be nothing without the active participation and support of all the participants. It is our humble and sincere request to you all to come forward with your contributions by way of your presence.

The organizing committee has left no stone unturned to ensure that the conference turns out to be an occasion from which all of you carry back lingering memories of not just scientific excellence but also warm hospitality. We express our heartfelt thanks to all the experts, authors of the papers and entire team of IRICE for their valuable contribution towards the conduction of the conference.

We once again welcome you all and wish you to have a great experience.

Thanking you,

IRICE – 18

International Conference on Innovative Realms In Civil Engineering

Keynote Speakers

Dr. ARCHANA SARKAR.,

National Institute of
Hydrology , Roorkee,Uttarakhand.

BIOGRAPHY

Dr Archana Sarkar is a scientist with the National Institute of Hydrology (NIH), Roorkee, a premier R&D institute under the Ministry of Water Resources, Govt of India. She is a civil engineer from MREC-Rajasthan University (now MNIT, Jaipur) in 1989. She completed her masters in Computer Aided Design in Civil engineering from University of Roorkee (now IIT Roorkee) in 1993 and developed an Expert system for Assessment and Repair of Fire–damaged buildings for the masters thesis.

After joining NIH in 1996, she started working in the area of Hydrology and Water resources and completed her PhD on "Runoff and Sediment Modelling in part of the Brahmaputra River basin" from Dept of Water Resources Development and Management, IIT Roorkee. She has also worked at the Water Resources department of Imperial College, London as a Commonwealth Professional Fellow in 2006. She has a vast research experience of more than nineteen years in the field of Hydrology and Water resources. She has been involved in various national/international research projects with more than sixty research papers to her credit.

Her area of specialization is hydrological modelling; application of Soft Computing techniques like Artificial Neural Networks, Expert Systems and DSS; application of Remote Sensing & GIS in hydrology; and Climate Change studies. Her recent research projects deal with various water resources issues of the Himalayan River basins including Brahmaputra and upper Ganges as well as some isotope studies for the Pushkar Lake in Rajasthan.

She is also actively involved in technology transfer activities as faculty to Institute training courses as well as Institutes like FRI, Dehradun, IPH, Himachal Pradesh, Water Resources Dept, Rajasthan, Irrigation Dept, Haryana, MNIT, Jaipur etc.

Dr.INDUBHUSHAN PATNAIKUNI.,

RMIT University,
Australia

BIOGRAPHY

Dr. Indubhushan Patnaikuni is an academic staff member of the School of Civil, Environmental and Chemical Engineering at RMIT University. He is a Fellow of Engineers Australia (ie. Institution of Engineers Australia). He has published about 180 high quality papers in various journals and international conferences including tree papers which received best paper awards. He chaired numerous technical sessions of international conferences and delivered 28 keynote addresses in international conferences. His expertise in the area of high performance concrete, sustainability and engineering education is well recognised internationally. He received two prestigious ARC research grants. He is frequently invited by prestigious international journals to referee technical papers. He was an examiner for several PhD thesis of prestigious International universities. He received prestigious awards such as Vishal Bharati Gaurav Satkar (2006), Samaikya Bharat Gaurav Satkar (2005), Rashtriya Vikas Shiromani (2003, this is one of the highest award any non-resident Indian can get), Eminent Engineer (1997, during Golden Jubilee Celebrations of Independence of India), three Best Paper Awards for technical papers. He received Sir Arthur Cotton Memorial Gold Medal (1975-76).

Dr. Patnaikuni was a member of the International Committee on Concrete Model Code (ICCMC) and is one of the Editors of Asian Concrete Model Code. He is pioneer of migrant engineer education programs in Australia. He chaired numerous technical sessions of international conferences on engineering education and high performance concrete. He developed innovative programs for migrant engineers, which are first of their kind in the world. The Director of the Commonwealth Department of Employment, Education and Training of Victoria publicly stated that the programs developed by Dr. Patnaikuni for migrant engineers were a model for all other professional courses. He is frequently invited by other organisations to speak on migrant engineer education. Several articles appeared in various publications about his innovative migrant engineers program. He was honoured as a special invitee for the seminar organized by the International Organisation on Migration (IOM), Geneva and the National Office of Overseas Skills Recognition at the World Trade Centre.

He is very well respected among the engineering profession. He was appointed as a member of the International Advisory Committee to advise the National Working Group of India on University Industry Science Partnership (within the framework of UNESCO-UNISPAR Program). He is a member of several other committees. He is a member of scientific and Technical Committees of numerous International Conferences. He is an Executive Committee Member of International Structural Engineering and Construction Conferences. He is a Foundation Executive Committee Member and currently the President of 'Indian Descendent Engineers and Scientists of Australia (IDEAS)'. He is an Executive Committee Member of the Structural Engineering Branch of Engineers Australia (Victoria division)

since 2002 and was Vice-President of The Association for Advancement of Sustainable Materials in construction.

During 1999 Dr. Patnaikuni was judged as the best research supervisor for the entire RMIT University and was presented with 'Supervisor of the Year for 1999' award. Again in year 2000 he received two awards for research supervision, one for Ph. D. supervision and the other for Master of Engineering by research for entire RMIT University. He is frequently invited to review the technical papers of reputed international journals. He was an expert assessor of the prestigious Australian Research Council discovery grant applications in his area of expertise. He was (November 2008) invited to present a seminar on sustainable housing construction in China. Again was invited in 2012. He was also invited to present a keynote paper on engineering education in Kenya in September 2008. He was invited by several international universities to present lectures or seminars in the areas of high performance concrete, sustainability, engineering education etc. He was the co-chair of the highly successful International structural Engineering and Construction conference-4 in 2008.

He was organizing committee member of some of the international conferences. He is an editor of three books. He is frequently invited by the National Science Foundation (of America) as an expert speaker along with six or seven other experts from America and one from UK for their workshops in High Performance Concrete in different countries. He was appointed as an External Expert for the appointment of Senior Lecturer by Griffith University. He was appointed as an Expert Assessor for the Civil Engineering courses if IIT/Patna (Indian Institute of Technology, Patna).

Engineers Australia has honored him in 2011 for his services to the organization. He was felicitated in 2008 in an international conference. Only two international experts including him were felicitated by this conference in the whole history of the conference. Again in 2014 he was felicitated by an international conference as an international expert. He is the only one who was honored by this conference. He was judged as Lecturer of the year in 20910 by the Australian organization of 'The Unijobs and Campus Daily'. The Editor of Australian Journal of Civil Engineering has wriiten that Dr. Patnaikuni's paper on fibre reinforced concrete was a cutting edge research paper and the research work like that keeps Australia competitive in the world. The editorial of Rail Engineering International published from England made a special mention in 1998 about the paper of Dr. Patnaikuni on 'Modernisation of track maintenance at Saudi Railways Organisation'. This was from the work carried out when the Director of Saudi Arabia Railways worked under the supervision of Dr. Patnaikuni. Dr. Patnaikuni received other accolades in addition to the ones mentioned above.

Prof. K.V.L. Subramaniam.,

Indian Institute of Techology,
Hyderabad.

MESSAGE

I am extremely happy to note that IFERP and KDK College of Engineering, Nagpur is organizing the International Conference On Innovative Realms In Civil Engineering (IRICE-2018) during 24th - 25th January, 2018. I am also happy to know that the institute is bringing out a Souvenir on this occasion.

I hope this conference will provide an opportunity to all the participants to interact with each other & discuss on the issues related to the current research and latest advancement and Recent Challenges in Civil Engineering. The deliberation at this conference will, i am sure, enable Academicians, Practitioners, Consultants, Research Scholars, Industry leaders and other Experts to exchange ideas and suggest measures for meeting the evolving challenges. The exchanges will hopefully benefit the community.

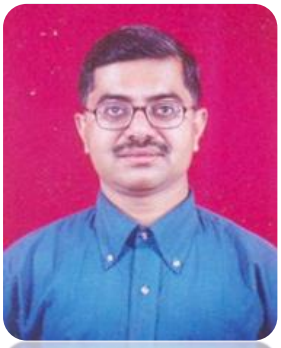
I wish the conference a great success

BIOGRAPHY

Prof. K.V.L. Subramaniam, obtained her Bachelor's Degree in Civil Engineering on 1993 at IIT New Delhi and Master's Degree in 1995 University of Toledo, Toledo, OH, U.S.A and Ph.D degree in Northwestern University, Evanston, IL, U.S.A. 1995/99. He is working as Professor and Head of Civil Engineering Indian Institute of Technology Hyderabad, he has 19 years of experience in Teaching and Research field, worked India and abroad.

Prof. K.V.L. Subramaniam Awards and Recognitions
•Fellow, American Concrete Institute (2010)
•Outstanding Young Researcher Award, Grove School of Engineering, CCNY (2006)
•Catell Research Fellow, Grove School of Engineering, CCNY (2006)
•National Science Foundation, Early CAREER Award (2003)
•ASCE Faculty Award, City College of New York, (2003)
•ACI - James Instrument Award (1999) - for research in Nondestructive Testing of Concrete
•Walter P. Murphy Fellowship, Northwestern University (1995-1996)

His Areas of Interest is Behavior of Concrete and Masonry Structures; Structural Strengthening and FRP-based repair of Concrete Structures; Concrete Durability; High Performance Concrete; Post-tensioned Concrete; Blast Analysis and Mitigation; Sensor Development for infrastructure Monitoring; Non- destructive Evaluation; Geopolymers.



Dr.R.K.Ingle.,

Professor & Dean (FW),
Department of Computer Science and System Engineering,
Department of Applied Mechanics
Visvesvaraya National Institute of Technology (VNIT)
Nagpur, Maharashtra

MESSAGE

It is my pleasure to be the part of International Conference On Innovative Realms In Civil Engineering (IRICE- 2018) to be held on 24th & 25th of January 18, being organized by IFERP-International and KDK College of Engineering, Nagpur, Maharashtra. It is a well thought conference topic and hope to provide an opportunity to all research community and students to interact and share their experience and knowledge in their effort to convert scientific invention to technology. The conference aims to facilitate the exchange of new ideas in the fields of Civil Engineering and to create a dialogue between developer and educators to present and discuss the most recent innovations, trends, and concerns, practical challenges and the problem solution adopted in the field of Civil, Architect, Structural engg.

BIOGRAPHY

Dr. R K Ingle in an Civil Engineer from IIT Mumbai & an Ph.D from Nagpur and having 30 years of experience in Consultancy & Analysis and design, scrutiny of Buildings, water retaining structures, Bridges, Chimney, Transmission line towers, Concrete pavements. Dr. R K Ingle now working as a Professor & Deam (FW) in Department of Applied Mechanics, VNIT, Nagpur.

Research Publications: Total No of Research Papers: Till Date is 30 Journal (National / International) & 46 National / International Conference and Seminars Total 76.

Total No of R&D / sponsored Projects and Amount (Annexure-B): Four nos Total 14.1 Lakhs

No of books written/preparation of additional/supplementary course material for students:

R K Ingle, S K Jain (IIT Kanpur) Explanatory Examples for Ductile Detailing of RC Buildings, . Report IITK-GSDMA-EQ22-V2.0

Dr. O R Jaiswal.,

Professor, Department of Computer Science and System Engineering,
Department of Applied Mechanics
Visvesvaraya National Institute of Technology (VNIT) Nagpur, Maharashtra

MESSAGE

It gives me pleasure to know that KDK College of Engineering, Nagpur, and IFERP is organizing the International conference on ***"International Conference On Innovative Realms In Civil Engineering (IRICE- 2018)"*** will be held on 24th - 25th January, 2018.

I am sure that the interaction of Engineers from the Industry and Academic Institution will go a long way in knowledge sharing to help engineering students to grow and compete globally. The conference will provide a plat form for exchanging ideas and create networks to developed R&D.

I convey my warm greetings & best wishes to all the participants and a great success.

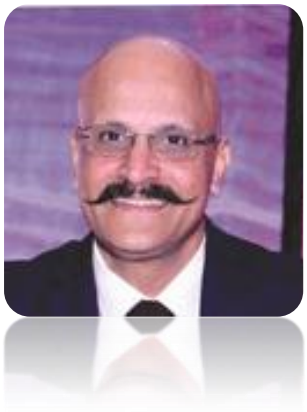
BIOGRAPHY

Dr. O R Jaiswal did Ph.D from IISC Bangalore on 1995 and having more than 15 years of experience. Dr. O R Jaiswal, Professor, Department of Applied Mechanics, VNIT, Nagpur & HoD from April 2010 to March 2012 and Dean (Acd) July 2013 - June 2016. Doing consultancy for Design of Telephone Exchange building at Bangalore; Vibration testing for GI valve for nuclear unit, NECO industries, Nagpur; Structural design checking of water tanks for Govt. of Maharashtra, etc..

Research interests are related to immediate industrial applications that have impact on society which Research interest: Earthquake analysis of structures, Tuned mass dampers, Stability of shells, Wind response of tall chimneys, Elevated water tanks, Railway bridges.

Research projects completed:

- Tuned mass dampers for buildings; 2000-2003; MHRD, Rs. 6 Lakh
- Seismic response control of elevated water tanks, 2002-2005, MHRD, Rs. 10 Lakh
- Guidelines for seismic analysis of liquid storage tanks, 2006, IIT, Kanpur, Rs. 1 Lakh.
- Post earthquake survey of Bhuj in 2001 and Andman island in 2006
- Wind response control of tall RC chimneys, 2006-2009, UGC, Rs. 10 Lakh



Er. Vivek Naik.,

President, ICI
Apple Chemie India Pvt. Ltd.
Nagpur.

BIOGRAPHY

Er. Vivek Naik, President, Indian Concrete Institute

- Motivator and Speaker on Innovations & Concrete Technology
- Authority Speaker on Construction Chemicals & its advancements
- Strategic Advisor for SME (Small & Medium Entrepreneur) Industry Growth

Er. Vivek Naik, obtained BE (Hon.) Civil Engg., ME, M.I.E.M.I.C.I., M.I.W.A., F.I.W.A., F.I.B.E., M.I.R.C. & PGDM – IIM Ahmadabad and President (Elect) of Indian Concrete Institute, Presently on Bureau of Indian Standard committee CED-2.

He delivered more than 200 lectures and More than 50 papers in various National & International seminars also papers are presented in International Forum at Dubai, Denmark, Beijing, Singapore, Shanghai, Mr. Vivek Naik started his career as Erection Engineer in the Factory to design L&N Denmark and was controlling five Tower Cairns and completed construction of 2600 flats in a span of three years. He worked at Hai Saddam project at Iraq for the construction of Underground Coffer dams, Pump Houses, Storm Water pumping, Gas lines and Roads. He constructed 32 sub-stations, 24 School Buildings and 11 Public Buildings including Mosque and Shopping Mall. He was Project Manager for the Construction of Palace of Sheikh Mohamed at Doha, Quatar-1985. He worked on special deputation in Construction Chemicals at Copenhagen,Denmark. Apple Chemie India Pvt. Ltd. has developed "ViscoFlux PCE" Technology as the first manufacturer in India. This technology is patented in India by Apple Chemie

He is presently Managing Director – Apple Chemie India Pvt. Ltd – an ISO:9001:2008 Company in the field of Construction Chemicals and Chief Consultants - Asian Grid Consultant – Consultant for Building and Infrastructure Development Projects also Partner of Black Cat Enterprises – Company involved in Rehabilitation and Repair work with latest construction chemicals

Prof. (Dr) D M Dewaikar.,

Adjunct Professor
Specialization: Geotechnical Engineering

MESSAGE

I am glad to know that the IFERP and KDK College of Engineering, Nagpur, Maharashtra is organizing an International Conference On Innovative Realms In Civil Engineering (IRICE-2018) during 24th - 25th January, 2018.

Organizing such an event at this point of time reinforces the main objective of creating an atmosphere for the exchange of ideas for development. Evolving technologies are mostly interlinked with basic emerging sciences, all innovations and intelligent applications being mostly interdisciplinary. This occasion, not only offers a platform for research scholars, academicians and industrial experts for mutual exchange of ideas on newer findings, but also paves the way to go beyond the current development and upgrade the technical expertise for the benefit of the society at large. I convey my warm greetings and felicitations to the organizers and the participants and extend my best wishes for the success of the conference

PROFESSIONAL SUMMARY

- Education :B.Tech (Honours), Civil Engineering, 1966, IIT, Bombay, M. Tech, Civil Engineering, 1969, IIT, Bombay, PhD, Civil Engineering, 1981, IIT, Bombay
- Faculty member in IIT, Bombay since last more than 44years
- Areas of research : Foundation engineering, Numerical modeling, Off-shore foundations
- Courses taught- Foundation Engineering, Offshore foundations, Finite Element Method, Engineering Mechanics, Numerical Methods
- M. Tech guidance-45 students & PhD guidance- 16 students
- Examiner of PhD/M. Tech theses from other IITs, IISc and other universities
- Publications : More than 140 in national/international conferences, national/international journals
- Conferences attended : Eight international conferences in Japan, U.S.A, Singapore, New Delhi, France Russia, China and Egypt & Several in the country
- Consultancy: Mainly in Foundation Engineering
- Member of the International Society of Soil Mechanics and Foundation Engineering.
- Former Chairman of the Indian Geo-technical Society, Mumbai Chapter.

Er. P.S. PATANKAR.,

Chairman, ICI-NAGC
NAGPUR, MAHARASHTRA

MESSAGE

I am excited to see such an enthusiasm towards an "International Conference On Innovative Realms In Civil Engineering (IRICE- 2018)" held at KDK College of Engineering, Nagpur. Current day engineers need to know what is going on in the industry and how to mould their studies towards a better future.

BIOGRAPHY

Er. P.S. Patankar has done B.E. (Civil Engg.) – 1987 from Government Engineering College, Ujjain (M.P.) & M. Tech (Structural Engineering) from VNIT, Nagpur and He has worked as Lecturer from 10 Yrs. in Polytechnic, Nagpur. Presently he is Director of "Patankar Consultants Pvt. Ltd., Nagpur" .

He is member of several Professional Association, like American Concrete Institute- USA, Indian Concrete Institute- Chennai, Association of Consulting Civil Engineers- Bangalore, Board of Studies " Director of Technical Education"- Mumbai, Board of Studies Government Polytechnic Nagpur (Autonomous Institute) Institute of Engineers, India, Heritage Conservation Committee, Nagpur (M.S.) , Indian Green Building Council .

He is presently Chairman of Indian Concrete Institute, Nagpur Center. (2017-19) and got many awards like Outstanding Concrete Structure award of ICI – Ultratech (Thrice) for Artefact Tower – 2011, Persistent Systems Limited – 2012, Naivedhyam Eastoria – 2014, A-Square – 2017 and Excellent Structural Design for Multi Storied Building (ACCE Award) - 2001

Er. P.S. Patankar Presented at National & International Conferences and He has recently presented a paper at "World Demolition Summit" at Amsterdam Netherland for Demolition of Air Traffic Control Tower at Mumbai International Airport. He has designed number of projects in India & abroad. He is mainly in design of Residential, Commercial, Housing, Malls / Multiplex, I.T. Parks, Banquets, Industrial, STP, ETP, & Highrise Tower design. Till date approximately 7500 Projects have been designed by him. He has his main Office at Nagpur and branch at Mumbai. Since last 25 years he is delivering the Structural Consultancy Services

IRICE -18

International Conference on Innovative Realms In Civil Engineering

Nagpur, Maharashtra 24th & 25th January 2018

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IRICE - 18

International Conference on Innovative Realms In Civil Engineering

Nagpur, Maharashtra

24th – 25th January, 2018

ABSTRACTS

IRICE - 18

Organized by

KDK College of Engineering, Nagpur
and
Institute For Engineering Research and Publication (IFERP)

International Conference On Innovative Realms In Civil Engineering

Nagpur, Maharashtra, 24th & 25th January, 2018

Effect of New Generation Coagulants on Properties of Industrial and Municipal Waste Water: An Overview

A. P. Katarkar., M. Tech. Student (Environmental Engineering), Dept. of Civil Engineering, Government College of Engineering, Amravati, Maharashtra, India.

A. M. Mokadam., Faculty, Government College of Engineering, Amravati, Maharashtra, India.

Abstract:--

Normally, industries and municipalities discharge the wastewater into open land or in water bodies without ample treatment due to which the ecosystem gets disturbed. For the treatment of wastewater, chemical coagulation is intended primarily to remove color, turbidity and chemical oxygen demand (COD) of the wastewater. For increasing the efficiency of primary treatment of industrial and municipal wastewater, better and more effective coagulants are necessary. This paper includes review of comparative studies of various coagulants such as Aluminum Chloro-Hydrate (ACH), Magnesium chloride (MgCl2), Poly-Glu, Poly-Aluminium Chloride (PACl) on laboratory scale, which can prove to be effective in enhancing the coagulation thus rendering primary treatment process of wastewaters more effective.

Keywords:--

Aluminum Chlorohydrate, Coagulation, Magnesium Chloride, Poly-Glu.

Experimental Study of Use of Waste Foundry Sand in Concrete

Aasif M. Baig., Assistant Professor, M.Tech, PCE, Nagpur.
Dr. V. Varghese., Professor & Head, PhD. KDKCOE, Nagpur.

Abstract:--

Solid waste materials which are produced by various industries are dumped as landfills and hence pose environmental threat. Based on earlier research these waste materials can be partially or fully utilized in concrete in replacement to aggregates or cement. Foundry sand is high-quality uniform silica sand that is used to make moulds and cores for ferrous and nonferrous metal castings. In this study an experimental investigation is carried out by varying percentage of fine aggregate with waste foundry sand to produce concrete. Fine aggregates were replaced partially up to 16% with an increment of 2% each time. It was found that concrete properties improved for 6% replacement of waste foundry sand. Hence, it is concluded that waste foundry sand is a very good option to be used in concrete as it improves the mechanical as well as durability properties of concrete. This work is very helpful for those who would like to explore materials for using in concrete as partial replacement of naturally available aggregates.

Keywords:--

Fine Aggregate, Mechanical Properties, Physical Properties, Waste Foundry Sand

Incremental Dynamic Analysis of RC Framed Structures by adopting Site Specific Data

Mr. Abhijeet A. Galatage., MIT School of Engineering, Pune.
Dr. Sastish B. Patil., MIT School of Engineering, Pune.

Abstract:--

Due to improper knowledge of seismic hazards buildings designed using modern principles observe earlier failure. This leads to loss of property as well as lives. Structures subjected to earthquake are supposed to be analysed by possible practical methods for forecasting seismic demands. Hence such methods which are based on behaviour of structures need to be developed prior to design. The exact analysis can be obtained by imparting site specific data to predict the performance of the structure along with nonlinear analysis. Ground motions are scaled to get SSD using SEISMOMATCH 2016 to perform incremental dynamic analysis of structures using SAP 2000 subjected to several ground motions. Pushover curves are plotted for each structural model. The study is carried out considering earthquake prone region of north India on 5, 12 and 18-storey moment resisting RC frames. The structures analysed for selected ground motion found to be more efficient for absorbing like actual vibrations and also makes the analysis procedure more effective.

Keywords:--

Seismic demands, SSD, IDA, Scaling , Pushover Curves.

Buckling Analysis of Non-Prismatic Column

Adesh Singh., Postgraduate student, Department of Applied Mechanics, Visvesvaraya National Institute of Technology (VNIT), Nagpur – 440 010, India.

M. D. Goel., Assistant Professor, Department of Applied Mechanics, Visvesvaraya National Institute of Technology (VNIT), Nagpur – 440 010, India.

Abstract:--

The constraints on construction of various irregular shape is reduced remarkably with the advancement in manufacturing processes. The precise variation in shape of structure, in the form of any mathematical function, along the length is possible and can be achieved with help of three-dimensional printing technique. If 3-D printing technique is implemented to produce structural member, higher specific strength and stiffness can be achieved, with the same volume of material, by varying material distribution along the length of the member. In view of this, an attempt is made herein to investigate the critical load of a solid column due to the variation of shape in terms of a mathematical function. Present investigation is limited to the computation and comparison of critical buckling load of solid clamped-pinned column with linear, trigonometric and exponential variation of shape along the length by employing commercially available FE package ABAQUS®. Detailed FE analysis is carried out and results are compared and discussed for assumed variation.

Keywords:--

Buckling of columns, FE analysis, ABAQUS, Irregular shape.

Literature Review on Use of Composite Structure in Multistoried Building

Ajinkya D. Ruthe., M. Tech. (Structure) Student KDKCE.
Swapnil Satone., M. Tech. (Structure) Assistant Professor KDKCE.
Dr. A. M. Badar., Vice Principal KDKCE.
Er. Satish Raipure., Structural Designer.

Abstract:--

The design of buildings is basically done with concrete and masonry. Reinforced concrete and steel materials are mostly used in framing structure of building. Reinforced Concrete Structures are mostly used in low rise building but for medium to high rise building as it is no longer economical & efficient design concept. Thus, this created the challenge for structural designers for making the economical construction for multi storey buildings. Hence use of composite structures in multistory building has gained the attention of structural engineers to improve the overall performance of building. Thus, composite construction has gained importance over simple RCC and Steel construction of buildings.

Importance of Admixtures for Manufacturing of Concrete for Road Pavement

Akash W. Firke., M. Tech. (Structure) Student KDKCE.
Swapnil R. Satone., M. Tech. (Structure) Assistant Professor KDKCE.
Rishikesh Khope., Quality Control Engg. (Unity Infra Project ltd.)
Valsson Varghese., Professor KDKCE.

Abstract:--

Road pavements are relentlessly exposed to high traffic loads and high temperatures which imparts negative effects on the durability of the concrete. To restore the weakened concrete properties and further to enhance the performance of the pavement an effective multifunctional material is obligatory. Admixtures are widely used for this purpose. Using flyash in concrete may both provide economic advantages and better properties in the production of concrete. Use of polypropylene fiber in concrete has been researched in recent days. Besides in addition of fiber provide better performance for the concrete while fly ash in the mixture may adjust the workability and strength losses caused by fibers and improve strength gain, durability, density, corrosion resistance, etc. Combination of fly ash and fibers has given better performance when tested. Flyash increases 50– 60% of compressive strength and 80 – 90% of tensile strength and fiber decreases shrinkage up to 30-40%.

Use of Inhibitors for Corrosion Control in RC Structures – A Review

Akash R. Modi., PG Student, Department of Civil Engineering, Vishwakarma Institute of Information and Technology, Pune, India
Shilpa V. Patil., Associate Professor, Department of Civil Engineering, Vishwakarma Institute of Information and Technology, Pune, India.

Abstract:--

Corrosion of steel rebar in exposed reinforced concrete (RC) structures located in marine environment is one of the major problems in the construction industry. Corrosion can be described as the deterioration of a metal that results from an electrochemical or chemical reaction to its surrounding environment. The magnitude of reinforcement corrosion has a significant effect on flexural strength, deformational behavior, ductility, bond strength and mode of failure of the reinforced-concrete structures. Hence, from past two decades researchers have developed various techniques which can be used for controlling corrosion of RC structures. Due to cost associated with conventional techniques and some environmental issues related to them, the researchers started developing new cost effective, environmental friendly corrosion controlling technique. Corrosion effect can be minimized by providing proper cover or plastering with cement mortar, so that percolation of atmospheric agents can be minimized. Hence use of corrosion inhibitors is motivated in construction industry. The present paper reviews various types of admixtures which can be effectively used as corrosion inhibitor for corrosion control of steel reinforced in concrete. The paper majorly focuses on use of green materials such as, coconut shell ash (CSA), tamarinds pulp husk extract (TPHE) as a corrosion inhibitor in concrete.

Keywords ::--

Corrosion, Corrosion inhibitors, Concrete, Coconut shell ash (CSA), Tamarinds pulp husk extract (TPHE).

Technical Paper on Stress Analysis for Bridge Piers and Efforts / necessity to develop Standard Method for Analysis.

Amarendra Jaltare., M.Tech (Structure), Ph.D. Scholar, KDKCOE.
Dr.S.R.Choudhari., Principal, J.D. College Of Engineering, Nagpur.
Dr.D.P.Singh., Principal, K D K College of Engineering, Nagpur.

Abstract:--

Prime Minister Narendra Modi launched SETU BHARATAM on 4th March 2016 at a budget of Rs. 102 billion (US$1.6 billion) with an aim to make all National Highways free of Railway crossing by 2019. Under this project, as many as 208 ROB/RUB would be constructed at unmanned Railway Crossings. The National Highway Authority of India has under taken a massive National Highway Road Development programme across the country to develop world class road network. A large number of new bridges are being constructed as per the Scope of Work (4lane/6lane configuration). The Bridge Designers adopts various methods / soft wares for the design of Bridges & analysis of stresses in concrete & reinforcement. But in absence of any standard method for the stress verification, which develops in Pier body under the influence of subjected loads and moments, the size of Pier substructure becomes matter of dispute, leads to adoption of larger size Pier at times, resulting in over expenditure.

This paper deals with the methods adopted by Bridge designers for verification of Stresses in Pier body. The aim of this paper is to develop Standard method for Stress Analysis so as to have optimum utilisation of the resources and maintaining the traffic worthy condition of the bridge structure up to the expected designed life.

Key words:--

Bridge Pier, Loads, Moments, Reinforcement, Stresses

Treatment of Pollutants in Industrial Wastewater Using Fenton's Oxidation Process: An Overview

A. S. Jaltade, M. Tech. Student (Environmental Engineering), Dept. of Civil Engineering, Government College of Engineering, Amravati, Maharashtra India.

A. M. Mokadam., Associate Professor, Government College of Engineering, Amravati, Maharashtra, India.

Abstract:--

Nowadays, there has been more emphasis on strict policies regarding the quality of industrial effluents. This is due to the alarming rate of environmental pollution. Besides, there is also need of treatment processes which are efficient and consume less time. Advanced Oxidation Processes (AOPs) are a viable option in such scenarios. Fenton's oxidation reaction is believed to be a prospective method of oxidation for this. The Fenton's reagent is the combination of hydrogen peroxide [H2O2] and a specific ferrous salt [Fe2+]. The wastewater sample is mixed with hydrogen peroxide and the addition of ferrous sulfate [Fe2+] triggers the formation of highly reactive oxidizing species [•OH]; which can degrade the pollutants of water and wastewater. This paper involves a review of studies carried out on laboratory scale treatment for the removal of specific pollutants from water and wastewater of dairy, textile, distillery and other such industries. The objective is to provide a clearer idea of the effects of the reagent on the degradation of the pollutants in water/wastewater during treatment.

Ker Words:--

Advanced oxidation, Industrial effluents, Fenton's reagent

Earthquake Analysis of Water Tank for Different Staging Height and Sloshing Effect

Apurva A. Jibhkate., Assistant Professor GHRAET Nagpur.
Nidhi P. Tiwari., Assistant Professor GHRAET Nagpur.
Pravin A. Sahare., Assistant Professor GHRAET Nagpur.
Anita M. Jangid., Assistant Professor GHRAET Nagpur.

Abstract:--

From the old experiences of few earthquakes, like Bhuj earthquake in India elevated water tanks were heavily harmed or failed. Liquid loads behave very differently to dry loads at the time of earthquake. When the liquid starts to slosh in the tank, it causes huge weight shifts. Elevated water tank must remain functional after earthquake as it is useful to provide water and fire fighting system, Therefore it is important to study in detail. This paper presents study of earthquake analysis of elevated water tank for different staging height having the same capacity. It is necessary to have a control system for effectively reducing slosh. The purpose of this study is to know the behavior of liquid under motion or vibration by comparing sloshing frequency numerically, experimentally and by ANSYS. And also to analyze model of water tank with different bracing patterns, staging heights to know the minimum deflections.

Keywords :-

Sloshing, Different Staging Height, Seismic Analysis, STADD PRO

Novel approach of organic admixture on the properties of concrete interchanged in hefty measure with fly ash blended cement

Atul A.Dongre, P.G.Scholar, Department of Civil Engineering, PHCET, Rasayani.
Dr. Tejaswini D.Nalamutt., Professor, Department of Civil Engineering, PHCET, Rasayani.
Dr. Shrikant Charhate., Professor, Department of Civil Engineering, PHCET, Rasayani.

Abstract:--

The goal of this paper is to provide a new look into the mechanism of jaggery replaced in large quantity into the concrete and to examine the impact on physical behaviour of it. In this study, the Portland Pozzolana Cement (PPC) which is readily supplemented with fly ash was used as cement. The organic admixture (jaggery) rich in carbohydrate was supplemented with 0, 5, 10 and 15 % in place of cement by weight. The behaviour of cement paste and fresh properties of concrete was analysed using normal consistency, setting time, workability and compaction setup. Mechanical properties of concrete were checked with binary investigation i.e. with non-destructive and destructive method. The results designates that the fresh behaviour of concrete was amended continuously with increased supplementation of admixture in concrete. In case of mechanical behaviour, the concrete was found with varying output of strength when compared with non-destructive and destructive approaches. In both cases, the performance of concrete was found to be dwindled largely, with slight escalation at 15 % jaggery.

Keywords:--

Portland Pozzolana Cement (PPC), jaggery, non-destructive testing behaviour (NTB), destructive testing behaviour (DTB), surface response model (SRM).

Study and Analysis of Material Procurement and Supplier Selection for Residential Building Site

Chaitali Isal., M.E. Research Scholar, Department of Civil Engineering, PHCET, Rasayani, 410207, India.
Dr. Shrikant Charhate., Professor, Department of Civil Engineering, PHCET, Rasayani, 410207, India.

Abstract:--

In civil engineering construction projects, the cost of material can vary from 50-60% of the total project cost. It is important to manage productivity, cost and effective material procurement. An essential factor affecting performance of construction projects are improper material procurement and supplier selection which have great impact on the quality as well as profitability of the contractor. The purpose of this study is to find increase in the cost due to improper material procurement and selection of suppliers. This study also suggests the better methodology for selection of suppliers and material procurement by generating strategies to improve, especially in residential building projects. For faster and proper supplier selection computer program was developed in C++ which will reduce overall time of project. The methodology applied was collection of data in terms of planned and executed quantities for individual activities. The difference in procured material and actual executed materials was calculated to find the extra material procured. It was observed that sudden shortage of material from primary selected suppliers caused immediate call for material from other suppliers which increased the overall cost of the project. Overall increased cost was 13,48,882 for the period of 12 months of study and cost analysis observed 1.5% hike on the total cost of material for this project.

Keywords:--

Material Procurement, Supplier Selection, Construction Materials, Residential Building Site, Computer Programming.

Soil Stabilization using Natural Sand

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Abstract:--

Soil is a most commonly used material in civil engineering construction works. There are different types of soil present on earth according to material property, size, texture; Black cotton soil (Expansive soil) is very fragile as compared to other soils. So to make the soil stable, soil stabilization is required to improve the engineering properties of soil, like to improve load bearing capacity, shear strength and to reduce permeability and compressibility of soil mass. Because black cotton soil is not suitable to carry structural load. The aim of this experiment is to determine the strength of soil by conducting following test: Liquid limit, Plastic limit, Shrinkage limit, Compaction test, Unconfined compressive test, sieve analysis. Soil will be stabilizing by varying percentage of natural sand (5%, 10%, 15%). By conducting these Experiment we can obtain the optimum water content, maximum dry density, reduce permeability and low compressibility.

Keywords:--

Black cotton soil, Stabilization, permeability, compressibility, liquid limit, plastic limit, shrinkage limit, compaction, unconfined compression test, sieve analysis, natural sand, optimum water content, maximum dry density.

Literature Review – Behaviour of Cold Formed Z Purlins with Sag Rods in PEBs

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Dr. Ramesh V Meghrajani., Principal Consultant, NEO Infrastructure Consultants, Nagpur.
Prof. RVRK Prasad., Professor, KDKCE, Nagpur.

Abstract:--

Cold formed steel is widely used in Pre-engineered buildings. It has gained popularity for its unique features of light weight, better and standard connections, faster execution, etc. However, larger variations in the moment of inertias with respect to X and Y axis has led to distortional buckling in the members. Cold formed purlins have depths 100 times to that of its thicknesses. This has promoted lateral torsional buckling in the member for the unbraced length of the purlins. Use of sag rods is a widely adopted technique to curb the lateral torsional buckling in the member. This paper discusses a detailed review of the literature on deformations in cold formed Zed profiles, their comparisons and conclusions. The data generated through the literature survey will help generating better and well-defined configurations of Z purlins and stable models for analysis.

Keywords: -

PEBs (Pre-Engineered buildings), CFS (Cold formed sections), FE (Finite element), FEA (Finite element analysis), UDL (Uniformly distributed load)

Effects of 2015 Gorkha Earthquake on Residential Buildings in Bhaktapur Municipality, Nepal

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Tulshi Laxmi Suwal, President: Small Mammals Conservation and Research Foundation (SMCRF), Nepal.

Abstract:--

The Barpak, Gorkha, Nepal earthquake of moment magnitude 7.8 which shook nearly 1 minute on 25th of April 2015 and its aftershock magnitude 7.3 shook for more than 30 seconds on 12th of May 2015 was a catastrophic. Among the 14 severely affected districts, the historical district Bhaktapur was also affected because of compact ancient Newari settlements of improperly maintained much mud mortar buildings. This research was conducted to assess the situation and the impact of the catastrophic earthquake on the communities of study sites by numerous field visit, secondary data and PRA. There were 17,698 numbers of houses in Bhaktapur municipality in which 5,950 houses were completely damaged and 2,092 were partially damaged. Similarly, Earthquake killed 252 people and 397 were injured badly. In addition, 116 monuments were damaged where 67 were completely damaged and 49 suffered from partial damages including centuries-old buildings of UNESCO World Heritage Sites in Bhaktapur Durbar Square. Out of 865 houses, 53.33% buildings were of Adobe plus Mud joint typology where as 8.68%, 14.43% and 23.55% were Adobe plus Brick in Cement, Brick in Cement and RC Frame buildings respectively. They were analyzed by using SPSS and R software. Based on different four damage characteristics; Adobe plus Mud mortar buildings were 28.65 times more damaged than RC Frame. Similarly, 12.5 times of Adobe plus Brick in Cement and 8.2 times of Brick in Cement were seen more damage than RC Frame typology. Therefore, people should construct new houses and retrofit of damage buildings by the supervision of engineers to preserve historical and cultural iconic view. Strict implementation in a proactive way of building bylaws and building code is necessary by both house owners and concerned authority.

Keywords:--

Buildings, Catastrophic, Earthquake, Heritage

Finite Element Modelling of RCC Girder Bridge for Distribution Factor

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Abstract:--

Finite element analysis is the most common and more reliable method of analysis for bridges. Different modelling techniques are available for the analysis of girder bridges. This paper provides a comparison between three finite element modelling techniques for evaluating wheel load distribution factors for RCC girder bridge. A single span, simply supported bridge is used for the study. The bridge is loaded with IRC 70R wheel load and Class A so as to produce maximum bending moments. The results obtained are compared with that obtained from Courbon's method. A parametric study is also done for distribution factor by varying the span length and girder spacing.

Keywords:--

Distribution Factor, Finite element analysis, RCC Girder bridge.

Study on Effect of Joints in Segmental Concrete Bridges

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Abstract:--

Segment to segment joints are the locations of primary concern in the analysis and design of segmental concrete bridges. Joints are responsible for the transfer of bending moments and shear forces developed in one segment to the other. Hence in majority of the cases, capacity of the joints becomes the governing factor than the capacity of the segments. Capacity of joints depends upon the level of fixity between the segments. It is practically impossible to provide a fully fixed joints between the segments. Hence in this paper, efficiency of joints with varying levels of fixity have been studied and is then compared with a geometrically similar continuous box girder bridge. It has been observed that efficiency of joints directly depends upon the level of fixity between the segments.

Keywords:--

Bending moment, Box girder, Joints, Segmental concrete bridge.

"Study of von Mises Stresses for BFRP and CFRP bonded steel I sections"

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Dr. N K Patil., HOD, SGI Attigre.

Abstract:--

Von Mises stress is widely used by designers to check whether their design will withstand a given load condition. It is considered to be a safe haven for design engineers. Using this information an engineer can say his design will fail, if the maximum value of von Mises stress induced in the material is more than strength of the material. It works well for most cases, especially when the material is ductile in nature. The major objective of this paper is to study the von Mises stress for steel sections bonded with Basalt fiber polymer sheet (BFRP) and Carbon fiber polymer sheet (CFRP)

Analysis and Design of Suspension Cable Bridge : A Review

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RVRK Prasad., Asso. Professor, KDKCE.

Abstract:--

A suspension bridge is a type of bridge where the deck is hung below the suspension cable in vertical suspenders. The main forces are tension in cable and compression in the towers. The cable is anchored at each end of the bridge to maintain tension in this cable. Single steel wires have a 2.54 mm thick can support over half a ton without breaking. The central sag of the cable is varies from 1/10 to 1/15 of the span. The main disadvantage of aerodynamic profile may be required to prevent the bridge deck vibrating under high wind. Suspension bridge is generally not used for heavy rail traffic where high concentrated live load occurs, which adds dangerous stress to the structure. In suspension cable bridge the types of load such as dead load, live load, wind load and design parameter are determined and analyzed by using software sap2000 for different condition. In the following paper same important papers are discussed below.

Keywords :—

Suspension bridge, Bridge deck, Dynamic load, Wind load, Live load.

A Study on Web Buckling of Plate Girders

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Abstract:--

The plate girder is fabricated from plates and the designer has greater freedom to vary the section to correspond with changes in the applied forces. Thus variable depth plate girders have been increasingly designed in recent years. For a given bending moment the required flange areas can be reduced by increasing the distance between them .Thus for an economical design it is advantageous to increase the distance between flanges. To keep the self-weight of the girder as minimum, the web thickness should be reduced as the depth increases, but this leads to web buckling. Web buckling considerations being more significant in plate girders than in rolled beams since Rolled beam section are manufactured by keeping depth to thickness ration such that there will be no local bucking in web. The web buckling of plate girder can be avoided by using thicker web or by using stiffeners .In this paper feasibility of using stiffeners to reduce the dead load, material and fabrication cost of plate girders is studied. Use of transverse stiffeners lead to create tension field in the plate girders prior to buckling and this tension field helps to increases the buckling resistance of web. In this paper as per IS: 800:2007 design of plate girder is done. The optimum section for the given load is found out by varying the thickness of web and number of stiffeners in different trials. Finally the most suitable section for a given load is proposed in this paper.

Keywords:--

Web buckling, Tension field action, Shear strength.

Comparative study on modelling techniques of cable-stayed bridges

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R. S. Sonparote., Associate Professor Visvesvaraya National Institute of Technology.

Abstract:--

The analysis of cable-stayed bridges is much more complex than that of conventional bridges (such as truss and girder bridges) due to their huge size and complicated nonlinear structural behaviour. Over the years, researchers have proposed different methods and softwares to model and analyse cable-stayed bridges but each have their own drawbacks. This paper concerns with the comparison of modelling techniques of cable-stayed bridge in MIDAS Civil and Staad Pro software. The cable-stayed bridge chosen was symmetrical with cables having semi-fan configuration. The bridge had H-shaped pylon and the span cantilevered 50 metres on both sides. The bridge was analysed for gravity loads and the results obtained from both the softwares were presented. It was inferred that all analysis cases need to be considered to arrive at most desirable solution and MIDAS civil might be the preferable tool.

Keywords:--

cable-stayed bridges, gravity loads, Midas civil, modelling, Staad Pro.

An Overview on Seismic Analysis of Multistoried Building using Equivalent Static Load Method & Response Spectrum Method: A Literature Survey.

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Asif Siddique., UG students, K.D.K.C.E.Nagpur.
Mohit Ghate., UG students, K.D.K.C.E.Nagpur.
Janhvee Motghare., UG students, K.D.K.C.E.Nagpur.
Snehal Hadke., UG students, K.D.K.C.E.Nagpur.
Dr. Balbir Singh Ruprai., Asst. Prof K.D.K.C.E.Nagpur.

Abstract:--

Performance based seismic design in the context of prediction of inelastic seismic responses and seismic performances of building structure are very important topic to be concern. Various forces acts on a building but earthquake force is one of the most critical force and must be considered while analysis and design of multi-storeyed building, as per IS: 1893-2016 recommendations. Various software now a days are available for analysis and designing of building by considering the earthquake forces and to review or study the behaviour of multi-storeyed buildings by equivalent static lateral force method and response spectrum method and literature reviews of various papers considering this method are studied. Alternative survey of the research paper is done and it is observed that the response spectrum method is used for analysis of multi-storeyed building and incorporated in most of the course related to earthquake analysis of building. The equivalent static load method is used oftenly for regular buildings.

Keywords:--

Multi-storey building, seismic analysis, response spectrum method, equivalent static lateral force method, STAAD –PRO,ETABS.

Comparison of Wind Codes for Transmission Tower

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Abstract:--

Transmission line is an integrated system consisting of conductor subsystem, ground wire subsystem and one subsystem for each category of support structure. Mechanical supports of transmission line represent a significant portion of the cost of the line and they play an important role in the reliable power transmission. They are designed and constructed in wide variety of shapes, types, sizes, configurations and materials. In general, most towers may be idealized as statically determinate and analyzed for wind forces as per IS 875 part 3:1987. Revised code IS 875 is introduced in 2015. In revised code IS 875: Part 3-2015, loading and design parameters are changed. In this paper the comparison of code IS 875: Part 2-1987 and EN 1991-1-4:2005 will be carried out.

Keywords : -

Transmission line, Mechanical supports, Design Parameters, Loading.

Review of Construction Waste Management Policies in India and other Nations

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Abstract:--

The issue of construction waste management is one that is paramount in any country, especially in developing countries. The scarcity of the availability of raw material has made it very important to study the use of recycled construction waste for newer construction projects. This review is intended to study the guidelines of construction waste management in major countries around the world and layout guidelines that are suitable for India. This will help Indian Government in solving this issue. Various countries like Australia, Germany, Ireland, United States of America, Nigeria, Indonesia, South Korea information and their policies regarding the building materials and construction are studied. They have an environmental impact at every step of the building process and extraction of raw materials, processing, manufacturing, transportation, construction and disposal at the end of a building's useful life. The lowering of embodied impact of buildings is significant given the contribution of re-use that the re-use and recycling industry. Communicating the benefits of re-use and recycling and highlighting how barriers have been overcome will help to address the misperception that re-use of construction and demolition waste in infrastructure is novel, difficult and risky. Land filling is considered to be undesirable due to environmental and ecosystem hazards. Now, most of the landfills are on the verge of arriving at its full capacity. This paper deals with the comparison of construction waste management policies an India and other countries of the world.

Keywords:--

Construction, waste, management, policy, comparison

Failure Study of Underpass & Its Improvement: A Case Study at NH 65, Loni Kalbhor, Pune.

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Abstract:--

This study is to analyze the failure of existing underpass at NH 65, Loni Kalbhor, Pune (i.e. Solapur Highway).The main aim of this study is to find the failure reasons and improvement of underpass service. Underpass was not fully utilized because road users were not aware about the underpass, with no sign boards. Local residents have no idea about entry and exit of the underpass and dumping of garbage is done. The service road width was reduced because partly road width was occupied by the local residents and underpass was not properly maintained. Finding the underpass users by methods: observations, Volume Count Survey, Origin and Destination Survey (O&D) and House Hold Survey. Underpass usage can be improved by implanting proper sign boards, margins for the service road, providing full width of service road, installing the signals. To create awareness about the usage of underpass and service road by advertising either sides of the roads.

Keywords:--

underpass, service roads, volume count survey, sign boards, signals.

Literature Review on Use of Calcite and Fly Ash for Manufacturing of Self Compacting Concrete

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Abstract:--

Self compacting concrete is an advanced concrete that does not required vibration for placing for placing and compacting. It set by its own weight and gravitational force. It used to avoid the concrete voids, develop uniform concrete strength, superior level of finish. The aim of this review is to summarize the previous research work related to utilization of material in self compacting concrete. It is important to represent new research on concept and direction in their research. There are lot of material used for rheological improvement in Self compacting concrete. From these calcite and fly ash are used to improve powder content for flowability, increase workability, compressive strength and durability of concrete. As conclusion this paper will provide substantial idea and useful data for future study.

A review on application of coconut shell in concrete

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Abstract:--

The rising cost of material is a matter of concern in this developing construction environment. The reason for increase in cost is high demand and less availability of materials. The research on alternative materials which can reduce the cost of construction and on the other hand increases the strength and durability of structures is on demand, with regard to this the research on waste material such as fly ash, rice husk, slag and sludge is going on. Coconut shell is an agricultural waste which is abundant to the environment and also raises the risk to health as well as environment. From the previous research, it has been found that coconut shell ash (CSA) can increase the strength of concrete and coconut shells can be used as replacement to the aggregate in concrete. Silica is important oxide present in coconut shell ash that can help in increasing strength of the concrete. Therefore the research in extraction of silica from CSA as well as use of coconut shell either in the form of reduced size or the burnt ash is going on. The present paper provides a review of application of coconut shell in the concrete along-with details of experimental work done by various researchers for investigation of use of coconut in construction industry. The paper describe the use of coconut shell as partial replacement to the course aggregate as well as use of CSA for partial replacement of cement and use of silica extracted from CSA as an admixture along-with their effects on properties of concrete.

Index terms:--

Coconut shell, Coconut shell ash, Concrete, Compressive strength, Silica extraction

A State-of-the-Art Review on Fatigue Analysis of Steel Bridges

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Abstract:--

Fatigue is a localized and progressive cumulative damage accumulation due to continuous cyclic movement on a structure. The effects due to this can be dangerous as compared to conventional static load. On bridges, fatigue occurs due to passage of vehicular load. In railway steel bridges, there are structural members with low dead load stresses but high live load stresses due to movement of wagons and locomotives. These high live load stresses cause decrease in strength well below the design stresses. These in-turn reflects the reduction in useful life of bridge. Here, live load stresses are assessed for different members and details of bridges. Various analytical methods suggested such as nominal stress method, Hot spot stress method, Effective notch method, etc. The results of these methods are compared with the field measurement data obtained from strain gauges or structural health monitoring methods. The nominal stress method has been mentioned in various codes like BS 5400: 1980 (Part X), Steel Bridge Code, RDSO, etc. While the hot spot stress method depends on the finite element analysis of bridges. It finally concludes with the calculation of stress concentration factors for a particular detail. The failure due to fatigue does not depend upon the maximum stress, but on the stress range (absolute difference of maximum and minimum stresses) and the number of cycles corresponding to that stress range also called as stress history. Using the S-N curve and Palmgren-Miner's cumulative damage rule, the damage assessment for each moving load is calculated followed by useful life estimation of structure. This is a brief methodology for nominal stress method. The revised fatigue Appendix 'G' in Steel Bridge Code, RDSO has incorporated this method in addition to geometrical stress method (or hot spot stress). The nominal stress method is widely used for fatigue evaluation and design of steel bridges, but the hot spot stress method is more accurate and effective. Though the field measurement data presents most accurate information for determining the fatigue life of structure, but the above said two methods can be applied successfully for fatigue analysis and design. The main objective of study is to find the difference in methodologies for assessment of fatigue and its application on railway steel bridges. Recently, a number of studies have been started on use of probability concept in fatigue life determination of bridges. Though, these require a combined basics of reliability and probability so they are more dependent on experimental and statistical data. Based on the above analysis, a predefined maintenance and inspection schedule can also be prepared. This schedule depends upon the service life of each structural member or details.

Index Term:--

Palmgren-Miner's, S-N curve, Stress concentration, Stress History, Stress Range.

Application of Artificial Neural Network in Wind Response of Tall Buildings

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Abstract:--

As per World Population Prospects 2017, India is having about 1.3 billion population and ranks second in the world. Due to continuous increase in population, lack of open spaces plays a very vital role in growing economics. With the lack of open spaces, tall buildings are featuring well in developed as well as developing countries. With the increase in demand of tall buildings, it is a basic need to do analysis of the tall buildings considering the dynamic response of tall structure subjected to wind. The Indian code of practice IS 875 (Part-3):2015 gives procedure to determine along and across wind response of tall structures. Artificial Neural Network approach in wind response of tall buildings is very useful and rapid method where availability of major data is critical.

Index Term:--

Along wind response, IS 875 (Part-3):2015, Computer program, Artificial Neural Network, etc.

Non-Destructive Testing using Digital Image Correlation

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M. V. Bhogone., Assistant Professor, Sinhgad College of Engineering, Pune, India

Abstract:--

This paper presents a new optical method referred to as Digital Image Correlation (DIC). It permits full-field measurement of surface displacements. DIC works by comparing digital photographs of a component or test piece at different stages of deformation. By tracking blocks of pixels, the system can measure surface displacement and build up full field 2D and 3D deformation vector fields and strain maps. Software techniques have been developed to obtain sub-pixel resolutions and allow efficient execution of the algorithms. Images can be obtained from a wide variety of sources including conventional charge-coupled device (CCD) image sensors or digital cameras. The DIC correlation process is not restricted to optical images and can also be applied to other datasets such as surface roughness maps and 2D surfaces of structures like tunnels. Theory of the method as well as its applications to strain measurements and nondestructive testing are presented further.

Key words: --

Digital Image Correlation, DIC, full field displacement, nondestructive testing.

Investigation of Slenderness Ratio for Cold Formed C-Section

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Dr. Valsson Varghese., Professor & HOD, Dept. Of Civil Engineering, KDKCE, Nagpur.
Dr. Ramesh Meghrajani., Neo Infrastructure consultants, Nagpur.

Abstract:--

Cold Formed Steel (CFS) has been used as a primary & secondary structure for flexural and compression member. Cold formed sections has various advantages such as high strength to weigh ratio, high corrosion resistance, and ease of fabrication. The criteria need to be considered in improving the structural strength in the fabrication method. Fast and easy fabrication can produce an efficient structure. Design of cold formed sections has obvious complexity in view of buckling and flexure due to use of slender section. Hence to avoid Lateral & Torsional Buckling of member various investigations has been carried out by researchers. In this paper a detail review of research carried out by researchers worldwide has been discussed. The investigation is expected to aid in finalizing configuration of cold form profiles while modeling and analysis.

Index Terms:--

Cold Formed Steel, Lateral & torsional Buckling, Slenderness.

Drought Vulnerability Assessment in Jalna (Marathwada Region) using Standardized Precipitation Index

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Abstract:--

Drought is a weather-related natural disaster affecting vast regions and causing significant structural and non-structural damages. Marathwada Region of Maharashtra, which is mainly located in the main drainage of Godavari River is facing severe drought every year. This region is characterized as a 'frequently drought prone area', where drought can be expected every 6 to 10 years. Jalna District in Marathwada has a semi-arid climate with an average annual rainfall of 729.7 mm, and an average monsoon from June to September with rainfall of 606.4 mm. During the years 1875–2004, it has experienced drought 18 times, including the two years of successive drought in 1984 and 1985. Rainfall data for Jalna shows great year-to-year variability culminating in the extreme drought of 2012. In most cases, the drivers of droughts are context-specific, often inter-linked and act over different time scales. Therefore, the occurrence of drought must be understood and appropriate drought indices should be investigated for different goals such as agriculture practices, engineering practices and watershed management. This study aimed to identify type of drought events, determination of drought severity, duration and spatio-temporal extension of drought for the planning of mitigation measures for farmers. Using the Standardized Precipitation Index (SPI) as an indicator of drought severity for the period from 1901 to 2002, the characteristics of droughts were examined. The multiple-time scaled SPI values were evaluated for June –October months in order to obtain severity of drought events over the years. The overall outcome of this study demonstrates that severe and extreme droughts were experienced from time to time across the study area leading to unfavourable results on agricultural practices and water resources in the area.

Keywords:--

Drought, SPI, Marthawada, Rainfall analysis

Study of Corrosive Soil and Interaction with buried Concrete Structure

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Abstract:--

The various corrosive soil elements immunising into the hardened concrete through pores cause premature deterioration of concrete & steel although it is structurally safe. Soils are made up of large number of geological matter and chemical compounds. They contain salts, acids, alkalis and organic matter. They can be varying in their sizes, from extreme fineness to extreme coarseness. Their structure determines their permeability to moisture, water, air and other oxidants required to favour corrosion. Thus corrosive condition exists in many soils.

In the absence of adequate knowledge about the corrosive environment the structures may have catastrophic failures. Hence proper Chemical analysis needs to be carried out for determining the various corrosive soil.

Keywords: --

saline soils, corrosive soils, carbonation, Buried structures, Corrosive soil elements

Ultrasonic Pulse Velocity Testing of *Gadhi* Soil Adobe Bricks

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O. R. Jaiswal., Professor, Department of Applied Mechanics, Visvesvaraya National Institute of Technology, Nagpur, India
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Abstract:--

The earth or mud is being used for building houses all over the world since ancient times. Earthen construction has gained a significant interest and beneficial edge due to its 'environment friendly' and 'sustainable' properties and also due to the heritage value of numerous historic buildings. In Maharashtra State of India, a stabilized soil; locally known as 'Gadhi Soil' (GS) had been traditionally used for construction of rural houses since many generations. These houses have provided excellent seasonal comfort, strength and durability. In the local construction of these houses, people have been using GS for constructing load bearing cob walls of about 300-450 mm thickness for their houses since several generations. From the physical properties of GS, it is classified as inorganic silts of medium to high plasticity. The compressive strength of the earthen blocks of GS is about 1 MPa and a successful attempt was made to improve its strength by preparing adobe bricks of modified mix adding local quarry sand (QS), cement (C) and fly ash(FA); mix optimized by proportioning the ingredients using Modified Fuller Parabola. Adobe is a sun-dried mud brick and the traditional adobe is made with soil composed of a homogeneous mixture of clay, sand, and silt. There had been a few attempts to use Non-Destructive Testing (NDT) on earthen blocks The methodology included the casting of adobe bricks and carrying out ultrasonic tests using Ultrasonic Pulse Analyzer by direct method of wave propagation. The ultrasonic pulse velocity (V) through the brick samples was determined and an attempt is made to correlate the UPV with the density and the compressive strength of adobe bricks. Those have shown better relationships with the increasing cement contents and also with variations in fly ash contents. A better relationship is observed within the groups made as per their type of mixes. It shows that the adobes can also be standardized by using NDT method viz. ultrasonic pulse velocity measurements and indicates the promising further use of this method in the cracks determination, maintenance and rehabilitation of earthen walls.

Keywords::--

Adobe, Compressive strength, Gadhi Soil, Ultrasonic Pulse Velocity

Effective Utilization of Herbocrete - A natural admixture in cement mortar to assess the strength properties

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Abstract:--

Cement has been used as the major construction material. Lime is arguably the world first true green and versatile building material. With the introduction of Portland cement during the nineteenth century the use of lime mortar in new constructions gradually declined, largely due to Portland's ease of use, quick setting and compressive strength. Lime posse's greater qualities such as stickiness, ease of applications, breathability, moisture resistance, natural antiseptic, self healing, durability, low thermal conductivity, incombustible, solar production, harmonious balance. The traditional lime binder offers greater durability but less strong compared to cement. Now-a-days various chemicals are used as admixture to improve the strength and performance of concrete. The cement and chemicals used in modern construction causes environmental pollution and its effect is significant. But a variety of plants and animal products used in traditional lime mortar not only improves the strength but also proves its durability for centuries. It also helps to retrieve the traditional concept of addition of admixture to concrete. By shifting ourselves to use such eco-friendly (natural) admixtures in mortar will lead the construction industry towards sustainable development. So, in this study an effort is made to improve the strength parameters of the cement mortar by using natural admixtures. The natural admixtures that are found to improve the strength are "Terminalia chebula" (kadukkai). The compressive strength of varying proportions of admixtures is found out by experimental study and the values are compared with the conventional cement mortar. The proportions of admixtures are varied from 2.5% 5% 7.5% 10% 12.5% and 15%. The results show that the admixtures improved the strength of the cement mortar. Terminalia chebula when added to cement mortar has no effect on workability but increases the compressive strength by 1.31 times of reference mortar.

Keywords:--

Terminalia chebula , Jaggery, Kadukkai.

Planning proposal for smart village "KIM"

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Abstract:--

This project report deals with study and development of village as a smart village. We define smart village as bundle of services of which are delivered to its residence and businesses in an effective and efficient manner. " Smart Village" is that modern energy access acts as a catalyst for development in education , health, security, productive enterprise, environment that in turns support further improvement in energy access.

For the betterment of villages by providing the basic infrastructure facilities the development plan proposals are prepared for the village Kim from Olpad taluka of Surat district. In preparation of development plan proposals the smart village guideline of Govt. of Gujarat is comprehended. The information perceived from the representatives and the individuals are considered in making of the proposals. In this report the discussion is about the necessary components of a village which are required to make it smart according to the guideline.

Different proposals for the area are given after studying the current scenario and collecting socio-economic needs. According to the guideline smart issues are found out. Approach for the proposals considers steps including meetings with the village representatives, field visits, study of existing scenario, household surveys, population forecasting, and Gap analysis with the NBC norms, approximate cost estimation and planning strategies.

Village meetings are arranged and field visits are done to know about the basic village characteristics and their culture. Study of existing scenario is required to decide vision of the future planning. Household surveys are done to know about the public opinion about the existing facilities so that priorities of new proposals can be decided. Gap analysis is done on the basis of projected population of 2021. So that lack of facilities can be found out and it helps to prioritize the proposals.

Experimental and Numerical Study of GFRP Wrapped RC Beams Subjected To Flexure

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Abstract:--

The rehabilitation of existing Reinforced Concrete (RC) structures becomes necessary due to defects in design/construction, ageing, damage due to earthquake/fire, corrosion of reinforcing steel, demand in the increased service loads and revisions in the design guidelines. Rehabilitation of RC structures can be done in various ways such as repairing, retrofitting & strengthening. Fiber Reinforced Polymers (FRP) has emerged as promising material for rehabilitation of deficient RC structures and accepted by construction industry due to ease of application. Beams are flexural elements in RC framed structures. From the previous researches it is revealed that most of the work is done to study the flexural behavior of RC beam deficient in flexure by applying GFRP laminates for full length on tension face of the beam or U-wrapping. In this way the GFRP laminates applied on shear zone cannot be efficiently utilized for flexure strengthening. In the present research work, effect of varying length of GFRP laminate on flexural behavior of deficient RC beams was investigated. The investigation was done on beams with GFRP laminates applied on tension side and subjected to three-point static loading system. Finite Element Analysis (FEA) of the similar specimens were carried out using ANSYS. The results obtained from ANSYS were in good agreement with the experimental investigation. From the test results it was observed that flexural capacity of RC beams varied with the length of GFRP laminate applied.

Keywords:-

Reinforced Concrete, Rehabilitation, GFRP, Flexural Strengthening, FEA.

High Performance Concrete: Need of Hour

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Abstract:--

This paper highlights various factors responsible for deterioration of conventional concrete, resulting in its malfunctioning during its service life. In order overcome these issues the development of High Performance Concrete (HPC) has taken place. The primary cause for deterioration of concrete structures is found to be permeation. HPC development is aimed at minimizing this aspect with proper proportioning of available materials, apart from increasing its resistance towards sulphate attack, corrosion of embedded steel, abrasion, erosion and cavitation etc. The Desirable properties of ingredients like cement, aggregate, admixtures,water,etc. used for developing HPC[1] have also been discussed. Approaches for reduction of capillary pore size and role of chemically active binding agents to improve the resistance to permeation have also been presented. Besides these the role of quality control in placing, compaction and curing of concrete for its improved performance is also discussed.

Key Words:--

High Performance Concrete, Cement, Admixtures, Aggregates

Analysis of Dynamic Response of Aqueduct to Seismic Excitations

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Abstract:--

Aqueduct is a watercourse constructed to convey water over an obstacle, such as natural streams, valley etc. In modern days, aqueduct is also used for any system of pipe, ditches, canal, tunnels and bridges which is used as artificial watercourse. If the structure is constructed in earthquake prone area dynamic analysis of structure is necessary. The structure is analyzed by considering pressure effects of fluid, but for special structure simple and yet accurate model for dynamic analysis is needed. To find out fairly accurate results, numerical modeling of water and dynamic analysis is necessary to perform. In this paper, seismic response analysis of a proposed aqueduct in the Pune seismic zone will be performed. Particular effort is devoted to find a suitable numerical model that can accurately represent the proposed aqueduct design, water-structure interaction, and the effects of bearing properties of the aqueduct on its responses to seismic ground excitation. Result shows that, using rigid bearing in the analysis can significantly reduce the aqueduct responses as compared to the bearing pads simulated by elastic link supported aqueduct.

Keywords: -

Aqueduct, Response Spectrum Analysis, Rigid bearing, Elastic bearing, MIDAS Civil.

Travel Time and Congestion Analysis under Heterogeneous Traffic Condition

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Abstract:--

Now a day's vehicle population growth keeps on increasing, due to this there is more congestion among the traffic. The sudden development of economic status of people urges them to buy more vehicles, beyond their demand and this leads to congestion. This congestion causes time delay during their travel. In this study the main objective is to reduce the congestion and travel time among the intersection using the modern simulation software technology (VISSIM 7). The traffic data among the intersection are observed manually, then the readings are given as the input for the VISSIM software and it is simulated. The simulation results were analyzed to give the perfect solution and then the solution is again simulated in that VISSIM software to know the consequence about the solution. By using this software we can able to give a solution that is effectively reduces the congestion and travel time. In this project, the study area taken under consideration was Periyar Bus Stand in Madurai. The study area is a four arm intersection with a high number of vehicular traffic.

Keywords:-

Modelling, Simulation, VISSIM 7 Software, Congestion and travel time analysis.

Comparative Study of Various Design Codes for High Rise Building under Seismic Loads

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Abstract:--

The effective design and construction of earthquake resistance structure have much greater importance all over the world. Hence, there is need of comparative study of various codes. At present there are various software available for earthquake analysis of buildings like STAAD.Pro, SAP 2000, ETABS and many more. The design criteria for different codes are also different. The aim of the paper is to compare the design results for high rise building (G+20) with various codes. The difference in the area of steel for column and beam by Euro code, IS code and ACI code are compared and respective graphs are plotted. Study shows variation in the section as well as reinforcement required to resist the same amount of design moments and shear force, whereas analysis of building is done as per IS 1893(part 1)-2016 .From the result it is found that there is very much similarities in main steel for ACI and Euro code as compare to IS codal provision for design.

Keywords:--

Earthquake resistance design, Codal comparison, Design parameter.

A New Higher Order Shear Deformation Theory for bending Analysis of Isotropic and Orthotropic Plates with Linear thermal Loading

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Abstract:--

In this paper analytical solutions of isotropic and orthotropic laminated composite plates are analyzed by using Higher Order Shear Deformation Theory. By using Principal of virtual work we get the governing equations. A simply supported square plate is used for compare various numerical results. The shear correction factor is obviate in this theory. It observed that solution obtained from present theory make good agreement with exact higher order shear deformation theory.

Key words:--

shear correction factor, principal of virtual work, laminated composite plates.

Flexural Strength Evaluation of Composite Deck System Analyticaly Base on International Standard and Parametric Variation

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Abstract:--

The work presented in this paper is concerned with the evaluation of flexural strength of composite deck system analytically base on international standard and parametric variation. The research work includes study on core base analysis of metal deck composite slab for flexural capacity and limiting geometrical and material parameters under full bond. Estimation and comparison of flexural resistance as per European, British and American Code of practice using developed MS excel tool. Study on parametric variation such as different materials, profile sheet thickness and slab thickness. Analytical approaches considering the bond properties from no bond to full bond cases. This study gives the guidelines to the users in India, for flexural capacity of composite deck as per Indian scenario. The guidelines will be useful for users in India, in absence of Indian code of practice for a composite deck design. The developed MS Excel programs will be useful for design of deck slab.

Key words:-

Deck Sheet, Metal Deck Slab, Shear Bond, Flexural Strength, Fire Rating.

SOLAR ROADWAYS: Answer to our deteriorating highway infrastructure, Crumbling power grid and Global warming crisis

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Abstract:--

As the day by day, asphalt roads are deteriorating more and more and petroleum products are getting huge hike and resources are very less, there will be no longer feasible material such as asphalt for our road surface. Hearing the concerns about global warming and knowing our dependency on fossil fuels, the idea is to replace all current petroleum based asphalt roads, parking lots and driveway with solar road panels that collect energy to be used by our homes and businesses which will also eliminates power interruption caused by fallen or broken electric lines or poles.

Limitation of petrol, diesel and other fossil fuel in nature will create a resource crisis in near future. It's hazardous pollution and global warming is creating severe environment problem even for survival of human. So this has attracted attention all around the world and alternative resources and technologies are becoming significant today. Solar energy collected from radiant light and heat from sun had given a range of ever evolving technologies such as solar voltaic, solar heating, solar thermal energy, solar architecture, satellite based solar power plants and artificial photosynthesis..

Analysis of Retaining Wall in static condition and Qualitative Study of inclusion of geofoam in Retaining Structures.

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Abstract:--

The expanded polystyrene (EPS) geofoam in geotechnical field is popularly used by engineers because of its low density, high young's modulus (E) and high compressibility. In the present study, the use of EPS geofoam is in reducing the static earth pressure on non-yielding retaining wall of height 6 meters , the test was conducted using finite element method in PlAXIS 2D. In this present study, magnitude and distribution of earth pressure on retaining wall with and without geofoam is evaluated. Geofoam densities 0.15 kN/m3 and compressible inclusion thickness (t) were used. With the use of Geofoam a considerable reduction in pressure was recorded.

Key words:-

Low Density, High compressibility, PLAXIS 2D.

Watershed Modeling Using Hec-Hms and Geographical Information System

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Abstract:--

Water is unquestionably the foremost vital resource. Use of water and its management is one among the main challenges for humanity. The demand for water is endlessly increasing thanks to growth, the intensive urbanization and also the development of business and agricultural activities. Within the direction of accelerating pressure on this important resource, it's needed to line up the ample instruments to make sure a rational and well-organized management of this resource. During this context, the hydrological modeling is basically used as an instrument to access these resources. The objective of this paper is to simulate runoff using HEC-HMS hydrological model and SCS-CN method in Brahmani-Baitarni basin. The mappings were prepared by using SRTM-DEM of 90m resolution map, soil map, and land use/land cover map. In this paper, water balance part runoffs are computed and its result are calibrated and validated and eventually, the performance of the model is evaluated.

Keywords:-

HEC-HMS, Runoff simulation, SCS Curve Number, GIS

Flood Frequency Analysis of Subrnarekha River

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Abstract:--

Floods are plausibly the most revenant, far-flung, disastrous, and frequent natural hazards of the world. India is one of the worst flood-affected countries. The problem of flood in the Indian state called Odisha is well known and every year it becomes a recurring problem to the entire region. This paper is centered towards the Subarnarekha River which is an inter-state river and at the South of Dantan it enters the Balasore district and finally falls into the Bay of Bengal near Kirtania, Odisha. However, it is also among the most susceptible areas in India which is prone to flooding. Flood forecasting & flood warning, flood hazard mapping and flood risk zoning are quite effective non-structural procedures in managing floods that decreases the risks and disasters floods may cause. This study introduces about the parameterization of hydrologic modelling for simulation of runoff and Arc GIS software for mapping. Various analysis of hydrological data has been done to look for the rainfall and runoff behavior in Subarnarekha Basin and their cross-correlation. With the help of GIS various maps like digital elevation map, flow accumulation map and land use /land cover map has been generated for further modelling.

Keywords:-

Digital Elevation Map(DEM), Flood hazard mapping, Geographical data systems (GIS), Hydrologic modeling.

Applications of Dampers for Vibration Control of Structures: An Overview

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Abstract:--

For seismic design of building structure, the traditional method, i.e., strengthening the stiffness, strength and ductility of the structure has been in common use for long time. Therefore, the dimensions of structural members and the consumption of material are expected to be increased, which leads to higher cost of the buildings as well as larger seismic responses due to larger stiffness of the structures Thus, the efficiency of the traditional method is constrained. To overcome these disadvantages associated with the traditional method, many vibration-control measures, called structural control, have been studied and remarkable advances in this respect have been made over recent years. Structural Control is a diverse field of study. Controlling the response of structure is one important aim of researcher these days. Dampers are one of the popular vibration control devise of structures, because of their safe, effective and economical design. This paper presents an overview of literature related to the behaviour of different dampers in seismic event. The review includes different types of dampers like metallic damper, viscous damper visco-elastic damper, and friction damper.

Design of precast concrete panels for basement of building

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Abstract:--

Basements are generally used as a utility space for a building where mainly parking is located. However, all the works are to be done in the congested underground environment inside the basement pit in confined space. In such places precast concrete panels can be used. To make the application of precast concrete pavement economical and material effective, an attempt has been made to provide a curved bottom face. Curved panels are easy to place, consume less material, and are cost efficient making them more economical. They provide better consolidation of soil due to the curvature provided at bottom face as compared to a regular (flat based) concrete panel. In order to optimize the curve, that needs to be provided at the bottom face, finite element analysis has been performed. The curved panels are optimised, based on the maximum shear force and bending moment obtained through analysis. Comparison of the key design parameters is made between the curved and regular panel. It is observed that values of optimised curved panels are less to regular panels.

Keywords:--

Precast panel, curved panel, consolidation, finite element analysis, optimisation of curved panels, key parameters.

Study of Conventional Mechanical Rebar Coupler as an Alternative to Lap Splices

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Abstract:--

Lap splicing is the conventional method for connecting the steel reinforcing bars since many years. Splicing the steel reinforcing bars by lapping or welding have various imperfections such as inadequate length of laps, low quality welds, increase in labour cost, failure in joints, etc. To overcome the problems stated above new techniques for splicing steel reinforcing bars has come into practice. Present study is focused on investigation of new techniques for splicing steel reinforcing bars. The use and applicability of reinforcement couplers as an alternative to lap splices would overcome reinforcement congestion problem and increase strength of structure. It was found that the use of reinforcement couplers significantly reduces the consumption of both reinforcing steel and construction time. It also increases the overall reliability of reinforcement splices. Couplers not only provide strength to joints but also prove to economic means of connections of two bars. The objective of our study is to investigate for new techniques in mechanical rebar coupler over the present couplers as an alternative to lap splices. The paper presents performance of mechanical splices as an alternative to lap splices along with experimental test results and the types of failure observed.

Analysis of high rise buildings with viscoelastic dampers

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Abstract:--

Structures constructed now days are high rise R/C structures, which have very less lateral load carrying capacity due to earthquake and wind loads. The reason behind this is structure cannot dissipate earthquake energy by its inherent damping alone, therefore various seismic response control system for structures are developed. In such control systems supplementary damping device are incorporated with in structure, this damping devices are active, passive, semi-active or hybrid types. In this paper feasibility of using viscoelastic dampers to reduce effect of earthquake on high rise buildings is studied. Viscoelastic dampers dissipates buildings mechanical energy by converting it into heat. Analytical study of 12 storey R/C office building for finding out response reduction due to viscoelastic dampers is carried out. A non-linear time history analysis is carried out for building with viscoelastic dampers and without dampers and responses are compared. Top story displacements, velocity, acceleration and base shear is studied for building with damper and without damper.

Keywords : --

Viscoelastic dampers, Non-linear time history analysis.

Urbanisation, Climate and the Phenomenon of Urban Heat Island

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Abstract:--

Urbanization has a dynamic relationship with the physical environment Urban and rural environments differ substantially in their microclimate. These climatic differences are primarily caused by the alteration of the Earth's surface by human construction and the release of artificially created energy into the environment. Inadvertent climate changes induced by urbanization are well documented. Such changes, are epitomized by the concept of `Urban Heat Island`(UHI) India is increasingly becoming urban. According to the 2001 Census, 27.8% of the urban population resides in cities, compared with 25.5% in 1990. The Urban population is expected to rise to around 40% by 2020.City growth and urban development are inevitable phenomenon of the 21st century, hence there is a need to explore the causes and peculiarities of the Urban Heat Island Effect and propose solutions to the problem. This paper is a step towards proposing some solutions to the problem.

Keywords:--

Urbanization, Urban and Rural Environment, Air temperature variation, Urban Heat Island, Sky View Factor.

Introduction to Flexible Arch Bridge

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Abstract:--

Arch bridges are one of the most widely used types of bridges all over the world. This paper describes the advantages and disadvantages of arch bridges. To overcome the drawbacks of conventional arch bridges, new innovative segmental flexible concrete arch bridge is developed by Queens University Belfast with the help of Macrete Ireland Ltd. Study is aimed at introducing this new type of arch bridge. Various advantages of flexiarch over other arch bridges are explained. Different construction methodologies of flexible arch are studied. Installation of Flexiarch plays an important role in construction of the bridge. These installation procedures are briefly explained with the help of figures. For a segmental arch bridge, shape and size of voussoirs is very crucial as number of voussoirs are connected to each other to form an arch. Paper describes the calculation of geometrical properties of an arch from span and rise of the bridge. The study explains the necessity and reliability of this new bridge over conventional bridges and an attempt is made to justify the use of Flexiarch bridge in today's scenario.

Keywords:--

Arch bridge, Flexiarch, Voussoirs.

Correlation between Half-Cell Potential and Corrosion Current Density for Corrosion Assessment of Rebar in RC Structures

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Abstract:--

Corrosion of steel embedded in reinforced concrete (RC) structures is a major problem resulting in reducing the service life and durability of RC structures and causing early failure of structure. Corrosion also costs significantly for inspection and maintenance of deteriorating RC structures. Hence, for preventing premature failure of RC structures, assessment of reinforcement corrosion is of significant importance. Practically, based on visual observation or using qualitative electrochemical techniques like half-cell potential measurement, the level of corrosion can be evaluated. But, for existing structures, it difficult to calculate the rate of corrosion using quantitative electrochemical techniques like Tafel extrapolation technique, linear polarisation technique etc. as the instruments require direct contact with corroding steel rebar. Such measurements require damaging the small area of structure and besides this the potential/current scans applied to reinforcing steel during measurements may accelerate the corrosion process. Hence it is essential to corroborate relation between qualitative and quantitative techniques used for measurement of corrosion. The present paper aims to establish the relation between two electrochemical techniques namely, half-cell potential and Tafel extrapolation technique. For experimental work, RC slabs reinforced with four steel bars were cast and subjected to accelerated corrosion. The electrochemical measurements were recorded every day till the completion of tests to establish the relation between half-cell potential and corrosion current density values obtained from Tafel plots.

Keywords:--

Corrosion, Reinforced concrete structure, half-cell potential, Tafel extrapolation technique.

A Study on Light Weight Characteristics of Self Compacting Concrete Using Fine Pumice Powder and Coconut Shell

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Abstract:--

Combination of Light Weight Concrete and Self Compacting Concrete is a new field of research. Considering its light weight of structure and ease of placement, Light-weight self-compacting concrete (LWSCC) may be the answer to the increasing construction requirements of slender and more heavily reinforced structural elements. Lightweight aggregate SCC properties have been evaluated in terms of flow ability, segregation resistance and filling capacity of fresh concrete as per the standards. The measurement of the mechanical properties of hardened lightweight aggregate SCC, including compressive strength, splitting tensile strength, and density, as well as its specific strength were also carried out. Results showed that Pumice stone powder met the requirements for structural applications. Depletion of natural resources is a common phenomenon in developing nations like India due to rapid urbanization and Industrialization involving construction of Infrastructure and other conveniences. In prospect of this, people have begun researching for suitable other viable alternative materials for concrete so that the existing natural resources could be preserved to the possible extent, for the future generation. Lately, on the environmental issues, restrictions on local & natural access or sources and dispose of waste material are gaining great importance. Aggregate is a major ingredient for making concrete, occupy almost 70-80% part of concrete. The roles of structural grade lightweight concrete reduce considerably the self-load of a structure and permit larger precast units to be managed. Coconut Shell is a waste from the agriculture sector and is used in large quantities in the tropical areas. The waste coconut shell may be utilized to replace natural coarse aggregate.

In this study, M 20 grade of concrete was produced by replacing natural coarse aggregates at 0%, 5%, 10%, 20%, 30%, 40% and 50% by weight with waste coconut shell were casted and their compressive strength was evaluated at 7, 14 and 28 days.

The compressive strength of concrete was reduced as the percentage replacement increased. Concrete mixtures were tested and compared in terms of compressive strength of the conventional concrete at 28 days. Utilization of Coconut Shell will not only be cost effective and Eco friendly, but also resolve the issues related to shortage of conventional material and problem of disposal of waste material.

Keywords:--

Coarse Aggregate, Concrete, Coconut Shell, Compressive Strength, Light Weight Concrete, Sustainable Development.

Compressive strength evaluation by replacing Pozzolanic material in High Alumina Cement

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Abstract:--

Due to the rapid growth of construction activity and the rising cost of construction materials in developing countries has required research into the utilization of substitute materials in structural building industry. The aim of this study is to examine the influence of pozzolanic material such as Fly Ash (FA) as a partial replacement in High Alumina Cement (HAC). In this experiment, different types of concrete mixes were designed such as HAC1, HAC2 and HAC3 where FA have replaced by different proportions such as 0%, 10%, 20% in HAC1 and similarly for HAC2 and HAC3 respectively. M35 grade of concrete was used for a total nine numbers of different concrete mixes were selected where FA was used to replace HAC by volume. Nine number of cubes were cast for each concrete mixes to evaluate the performance of concrete mixture in terms of compressive strength for 7, 14 and 28 days at a constant temperature. The experimental test results obtained after 7 and 14 days signify that the compressive strength test results does not vary more. But 28 days test results showed that compressive strength increases as compared to control specimen.

Keywords:--

Compressie strength, Concrete mix design, Fly Ash, High Alumina Cement.

Application of Ae Based Mathematical Procedure for Quantification of Corrosion in RC Specimen

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Abstract:--

Corrosion is a major cause for degradation of reinforced concrete (RC) structures. Corrosion of steel rebar in concrete is an electrochemical process and it has been widely studied using various non-destructive techniques such as Half-cell potential, linear polarization resistance, electrochemical impedance spectroscopy etc. All these techniques cannot be called truly non-destructive technique as the instruments require physical and electrical contact with steel embedded in concrete. To overcome this difficulty, the research for finding the applicability of other non-destructive techniques such as ultra-sonic pulse velocity, acoustic emission (AE) technique etc. for quantification of corrosion is going on. From the literature it is found that AE technique is a powerful technique for identification as well as quantification of corrosion without having any physical or electrical contact with the reinforced steel. For corrosion quantification AE based mathematical model has been developed which can quantify the corrosion in small scale cylindrical RC specimens. Thus for commercial use of developed mathematical model, it is necessary to check its applicability for changed geometry of specimens. The present paper focuses on checking the applicability of developed mathematical model for rectangular geometry of specimens. For the experimental work RC slabs of dimensions 500 mm x 300 mm x 60 mm with single reinforcing steel bar were cast and subjected to accelerated corrosion. From the experimental results it was found that the predicted mass loss values of corroded rebar using developed mathematical model are in agreement with that of the actual mass loss which indicated that AE based mathematical model can be successfully used for rectangular specimens.

Keywords:--

Corrosion, Rebar, RC element, Acoustic emission technique, Mathematical model.

Earthquake Analysis of Multi - storey building by Two Different Mathematical models

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Dr.G.N.Ronghe., Professor, VNIT, Nagpur

Abstract:--

In recent years various software are available for earthquake analysis of buildings like STAAD.Pro, ETabs and many more. There are multiple methods for earthquake analysis of a multi-storey building by these softwares. The aim of the paper is to compare two such methods by STAAD.Pro software. These two methods are when seismic weight is applied on the nodes and when applied on the beams. From this analysis comparison of storey shear at different storey is observed. Moreover, storey drift and storey displacements at different floor level are compared. Fixed end moments and end shear in beams are also compared for different load cases.

Keywords:--

Displacement, drift, fixed end moment, storey shear.

A Case Study of Low Span Pre-Engineered Industrial Building

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Mrs. P. A. Deotale., Assistant Professor, DBACER.

Abstract:--

The design of industrial building is governed mainly by functional requirements and the need for economy of construction. The main dimensions will be directed by the particular operational activities involved, but the structural designer's input on optimum spans and the selection of suitable cross-sections profile can have an important bearing on achieving overall economy.

An aspect where the structural designer can make a more direct contribution is in lengthwise dimensions i.e. the bay lengths of the building. Here a balance must be struck between larger bays involving fewer, heavier main components such as columns, trusses, purlins, crane beams, etc. and smaller bays with a large number of these items at lower unit mass. An important consideration in this regard is the cost of foundations, since a reduction in number of columns will always result in lower foundation costs.

In this a Case Study of Low Span Pre-Engineered Industrial building located at Vijaywada, used for the Cement Godown having building width of 15m, length of 50m and height of 5m. The minimum total weight of PEIB was found to be 22.51 Tonnes and optimized cost of this building was estimated as 12.54 Lakhs at spacing of 7.14m as against conventional having total weight of 34.4 Tonnes and cost of 14.448 Lakhs at bay spacing of 6.25m.Therefore material saved by using PEIB was 11.73 Tonnes (32.85%) & net money saved by using PEIB was 1.91 Lakhs.

Forecasting Criteria Air Pollutants Using Artificial Neural Network

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Priyanka P. Shinde., PG Student, Department of Civil Engineering, Vishwakarma Institute of Information Technology, Pune.

Abstract:--

Air pollution is a serious problem all over the world which causes terrific loss to human health and other living being. Criteria pollutants like Oxides of Sulphur (SO_2), Oxides of Nitrogen (NO_2) and Respirable Suspended Particulate Matter (RSPM) have either reached or exceeded the acceptable limits specified by Central Pollution Control Board of India for most of the cities like Pune. So, the forecasting of criteria air pollutants is necessary to take precautions from causes due to air pollutants.

In present work, the one day ahead forecasting of air pollutants like SO_2, NO_2 and RSPM is carried out. Feed forward back-propagation (FFBP) and Radial Basis Function Neural Network (RBFNN) tools are used to forecast air pollutants. The univariate time series are used to modeling. The FFBP models for SO_2, NO_2 and RSPM are modeled.

Keywords:--

SO_2, NO_2, RSPM, FFBP, RBFNN, univariate time series

Effect of Combination of Nanomaterials on Performance of Black Cotton Soil

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S.R.Saikhede., Assistant Professor , Department of Civil Engineering,KDKCE, Nagpur.

Abstract:--

Soil stabilization has become useful solution to treat the weak soil to achieve the required engineering properties. Soil stabilization by adding materials such as cement, lime, bitumen, etc. is the effective method for improving the geotechnical properties of soil which have been applied for many years now. This research is intended to study the effect of adding nanomaterials (nano-copper and nanosilica)

on geotechnical properties of soil especially Atterbergs limit, compaction characteristics, unconfined compressive strength, CBR value and swelling pressure. Nanomaterials were mixed with soil in three different percentages (i.e. 1, 1.5, 2.5 % and 0.3, 0.6, 0.9 % by weight of soil). Based on obtained results, in order to reach the maximum increase in strength parameters, the optimum nano-copper and nano-silica content occurs at 1.5 % and 0.6 %.

Keywords:--

Stabilization, Geotechnical Properties,Nano-Cu, Nano-Si, CBR, Swelling Pressure.

Study of Macrocell Corrosion of Coupled Rebars Using Electrochemical Techniques

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Shilpa V. Patil., Associate Professor, Department of Civil Engineering, Vishwakarma Institute of Information Technology, Pune.

Abstract:--

Corrosion, a result of chemical or electrochemical actions, is the most common mechanism responsible for deterioration of reinforced concrete (RC) structures. The phenomenon of corrosion is mainly governed by ingressof chloride ions or carbonation of RC structures.Both these actions cause a breakdown in the passive layer of concrete around the reinforcing steelresulting in active corrosion. Hence, monitoring of reinforcement corrosion is of significant importance for preventing premature failure of structures.The corrosion in RC element can take place in two ways – macrocell and microcell corrosion. Macrocell corrosion occurs when the actively corroding bar is coupled with another bar which is passive, either because of its different composition or because of different environment. On the other hand, microcell corrosion is the term given to the situation where active corrosion and the corresponding cathodic half-cell reaction take place at adjacent parts of the same metal.The aim of present paper is to study the influence of macrocellcorrosion for coupled rebarsusing electrochemical techniques. RC slabs with four coupled reinforced steel bars were cast and subjected to accelerated corrosion. Two different grades ofsteelwere used in the experimental work. From present research work it can be concluded that corrosion condition of a coupled rebars can be identified more accurately using Tafel extrapolation technique than half call potential technique and the effect of microcell and macrocell corrosion on behavior of all rebars under corrosion is approximately same.

Keywords:--

Half-cell potential, Macrocell Corrosion, Reinforced concrete structure, Tafel extrapolation technique.

Impact of revised Earthquake code on Analysis and Design of RC Building with Soft Story.

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R. S. Sonparote., CEO of Login Technique & Curly Brace, Thoothukudi.

Abstract:--

This paper presents the effect of revisions in IS: 1893(Part 1) and IS 13920 in 2016 on the analysis and design of Reinforced Concrete (RC) Buildings. In India it is a common practice to construct residential buildings with soft storey in order to generate parking space, gardening space, and other utilities spaces for various purposes. The revision of IS: 1893(Part1) and IS: 13920 in 2016 requires some changes in the analysis and design of such buildings. The effect of these revisions on the analysis and design of RC Buildings has been illustrated in the paper with the help of Police Housing Building in Maharashtra. Effect of RC Structural wall plan density (SPD), modeling of unreinforced masonary infill walls etc., have been studied in the paper.

Keywords:--

RC Buildings, IS: 1893(Part1):2016, IS 13920: 2016, Structural Wall Plan Density, Unreinforced Masonary Infill Wall

Treatment of Water by using Natural Coagulant

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Abstract:--

Water treatment plants use a variety of chemicals to remove contaminates that affect the taste, odor, cloudiness and overall safety of water. Natural coagulant is a natural based coagulant that can be used in coagulation process of water treatment for reducing turbidity. The paper presents the investigation of the coagulation-flocculation potential of coagulants derived from plants, such as Cactus opuntia, Kidney bean and Cicer arientinum, for removing the turbidity from synthetic turbid water prepared from local clay with the effect of Jet for mixing.

Keywords:--

Flocculation, Jet mixing, Cactus opuntia, Cicer Arientinum

Introduction to Concept of Smart Village

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Radha Desai., Chottubhai Gopalbhai Institute of Technology
Riddhi Champaneriya., Chottubhai Gopalbhai Institute of Technology
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Sachin Bhardwaj., Assistant professor, Uka Tarsadia University.

Abstract:--

The aim of the Smart Villages Initiative has been to identify the framework conditions necessary for the provision of energy services to villages to enable the livelihood opportunities, provision of services (healthcare, education, clean water, and sanitation) and empowerment embodied in the Smart Villages concept. For the betterment of villages by providing the basic infrastructure facilities the development plan proposals are prepared for the village DIHEN from Olpad taluka of Surat district. For preparation of plan proposals, Smart Village guidelines by govt. of Gujarat are understood properly. The information perceived from the representatives and the individuals are considered in making of the proposals. In this report the discussion is about the necessary components of a village which are required to make it smart according to the guideline. Approach for the proposals considers steps including meetings with the village representatives, field visits, study of existing scenario, household surveys, population forecasting, and Gap analysis, approximate cost estimation and planning strategies. Village meetings are arranged and field visits are done to know about the basic village characteristics and their culture. Study of existing scenario is required to decide vision of the future planning. Household surveys are done to know about the public opinion about the existing facilities so that priorities of new proposals can be decided. Gap analysis is done on the basis of projected population of 2031. So that lack of facilities can be found out and it helps to prioritize the proposals.

Methods of Analysis of Pile Load Tests Data

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Abstract:--

To ascertain the field performance and estimate load carrying capacities of piles, in-situ pile load tests are conducted. Due to practical and time constraints, it is not possible to load the pile up-to failure particularly in case of rock socketed piles. These considerations have given greater impetus into search of alternative methods for determining the pile load-settlement behaviour up-to failure to estimate ultimate axial load. In this paper, various methods available for determining pile capacity from field load tests data are detailed. The scope of this paper is limited to the methods of analysis of pile load tests data for axially loaded piles.

Keywords:--

Methods of analysis, Pile load test, Ultimate pile capacity

Innovative Realms in Civil Engineering

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Abstract:--

This paper presents recent trends in civil engineering. This paper reviews some of the latest research trends in the discipline by analysing current literature. Includes some recent advancements in concrete as concrete is the second most consumed materials after water. The new concretes listed are high volume fly ash concrete, geopolymer concrete, polymer concrete and, fiber reinforced concrete. And new construction technologies are mentioned such as 3-D printing and BIM, sustainable housing construction, and solar energy utilisation. Nano technology in concrete also is briefly mentioned.

Influence of Steel fibers on the Crack Opening and Shear Behavior of Self Consolidating Concrete

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Abstract:--

A two-stage investigation on the fracture behaviour and the dilatant crack opening in shear response of self-consolidating concrete (SCC) with discrete steel fiber reinforcement is presented. Hooked-ended steel fibers are used at 0.75% volume fraction. In the first step, the fracture behavior of steel fiber reinforced SCC is investigated. In steel fiber reinforced SCC there is a significant increase in fracture energy at small crack opening. The significant post-cracking resistance to crack opening provided by fibers in an SCC matrix results in a two-fold increase in energy up to 1.0mm opening and is associated with multiple cracking. In the second stage, shear behavior of SCC with and without steel fibers is investigated using a shear beam arrangement. The in-situ dilatant behavior of the shear crack is established from displacements measured across the crack using digital image correlation (DIC). The slip across the faces of the shear crack produces an increase in the crack opening. The direction of crack growth is primarily governed by the applied stress field. The failure in SCC is very brittle and it occurs at a small crack opening less than 0.1 mm. The failure of internal shear transfer across the shear crack results in a loss in the load-carrying capacity. There is an increase in the shear cracking load in steel fiber reinforced SCC. The dilatant behaviour is identical to the dilatant behavior obtained from SCC without fibers. There is an increase in the load carrying capacity of fiber reinforced SCC with continued opening of the shear crack. Due to increased contact stresses on the crack faces, the shear crack at the neutral axis continues to propagate along the initial angle resulting in a straight crack. The crack closing stresses provided by the fibers allow shear stress transfer across the primary shear crack for a crack opening up to 1 mm and the final failure is produced by the formation of a secondary shear crack.

Structural Challenges & Achievements during Construction of Hotel Centre Point, Nagpur

Er.P.S.Patankar., Structural Designer, Nagpur.

Abstract:--

Construction of Hotel Centre Point, Nagpur, was unique in itself as the construction method adopted and challenges faced during the project execution were not typical.

Hotel Centre Point, Nagpur having floors B2+B1+G+6.

Construction method adopted was Top Down construction method as per the requirements.

This method is preferred for buildings having two or more basements. This method enables above ground construction work to be carried out simultaneously with excavation of basement thus resulting in saving of time and resources. In this method basement concrete slabs act as lateral bracing for the perimeter wall system.

Sequence of construction :-

- Plinth Slab
- First floor Slab
- Second floor Slab
- Basement 2
- Basement 1
- Third floor to Terrace Slab

For the construction of Plinth Slab, First floor Slab, Second floor Slab, Piles of Diameter 1000mm & 1200 mm were casted upto a distance of 10-12m below GL. Also RCC Jacketing was provided. Column sizes used 850mm x 850mm & 700mm x 700mm.

Now two basements were taken into consideration for construction.

Initially basement height decided was 3m each. But during construction at the time of excavation basement height considered was 4m for double level parking provision. Due to this column height increased which was not considered in initial design. To eliminate this effect of long column due to which buckling could have occured, Temporary Truss was introduced at ground level to tie columns at this level. After this the excavation was carried out for Basement Slabs. Then Basement 2 i.e Raft Slab was constructed after which Basement 1 Slab was constructed. Temporary Truss was removed after its purpose was achieved.

Due to the depth restriction, PT (Post Tensioned) members were taken into account. At First Slab Level PT Bands 1800mm x 650mm provided; At Second Slab Level PT Beams & Slabs provided; At Third Slab Level PT Beams provided; Floating Columns provided from Third Slab Level; Depth of PT Beam is 3.05m i.e total height of Service floor which is between Second Slab and Third Slab.

Innovation - The Future of Civil Engineering

Er. Vivek Naik., President, Indian Concrete Institute.

Abstract:--

Motivator and Speaker on Innovations & Concrete Technology

Authority Speaker on Construction Chemicals & its advancements

Strategic Advisor for SME (Small & Medium Entrepreneur) Industry Growth.

Civil engineering has been - and will continue to be - a key factor in the development of the human race. Civil engineers have been, are, and will be continually looking for new and specific components and materials for construction, improving building and management process as they go along. In this search they will combine economic and optimisation criteria (strength and durability) with minimal environmental impact (pollution during manufacture and use, and the end of the element's working life) by making the best use of natural resources and minimising waste. Basically, seeking sustainability. To achieve this golden mean, civil engineers across the globe are striving hard and raking their brains to innovate and come up with out of the box solutions to the construction industry.

Innovation is not a new concept. It is a process through which, through a particular action, an element is transformed to give it another use or improve the one it was originally designed for. In the field of civil engineering, countless number of innovations, may it be in the field of transportation, infrastructure, building construction or for that matter even survey are happening in every corner of the world.

Innovation in the field of transport infrastructure, and specifically roads, leads us to the notion of 'smart roads': roads that use photosensitive paint for road markings that can be seen regardless of the weather, generating symbols on the road surface, roads that allow energy to be generated, and to be able to recharge batteries while driving a vehicle.

We are aware that after water, the most widely used material across the globe is concrete. This miracle material which has found numerous uses, is one of the key products where innovation is happening at a micro level. One of the most singular innovations achieved with this material is its self-healing properties. The self-healing is achieved through the inclusion, in the mix, of materials that include a bacteria that remains latent and is only activated when a crack appears, generating calcite (calcium carbonate). Construction chemicals that have become an integral part of the concrete mix are at the helm of innovation with their understanding of chemistry and the cement-chemical relationship.

There are many avenues where civil engineering has progressed and is still struggling to progress. The areas of struggle, pose the opportunity to explore and bring the synergy of technology and implementation.

The detailed presentation on the subject matter will include innovations which are mandatory for the growth of Civil Engineering. It will also include innovations which are expected into civil engineering by virtue of development in other engineering branches and scientific developments.

Use of existing components of structure as Tuned Mass Damper

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Aditya Ghushe., PG student, Department of Applied Mechanics, Visvesvaraya National Institute of Technology, Nagpur.

Abstract:--

Tuned mass Damper (TMD) is a commonly used passive control device for wind and seismic load induced vibrations. Since its first application in 1909 by Frahm, TMD is now considered as a robust and effective control device. Many research studies are devoted to obtain optimum parameters of TMD (Den Hartog 1956; Warburton 1982; Tsai and Lin 1993; Sadeket al. 1997; Bakre and Jangid 2006; Hoanget al. 2008; Tigli 2012). Based on numerical, analytical and experimental results, many new aspects are included in enhancing the effectiveness of TMD. It is seen that a TMD higher damping ratio is quite robust and does not show sensitivity to tuning frequency or frequency content of loading, particularly seismic excitation. Similarly, it is demonstrated that a TMD with higher mass is effective for seismic application (Angelis et al. 2012 and Matta and Stefano 2009). One of the concern in TMD is deployment of an additional mass on the existing structure. In order to overcome this limitation, in some studies, possibility of using existing components of structure as TMD has been explored.

Villaverde (1998) proposed a roof isolation technique to reduce the building vibrations to seismic forces. This system is realized by the insertion of flexible laminated rubber bearings between roof and the columns which support this roof, and the addition of high damping viscous dampers connected between isolated roof and rest of the building. Hoang et al. (2008) designed TMD for Minato Bridge in Osaka, Japan. Existing bearing of the bridge were replaced by a new floor deck-isolation system. Floor decks and isolation systems together act as a large mass TMD, making mass ratio 77%. Reggioet al. (2015) conducted study on a 5-storey model building and sequentially isolating top two storey, one storey and floor of top storey. The required stiffness and damping is provided by flexible pads. In such cases, mass ratio, even exceed 100%. They showed that such TMDs derived from existing part leads to 30-50% reduction in seismic response.

Few studies on using existing part as a TMD, have also been done at VNIT. The range of structures for which this was done are water tanks, buildings and chimneys. Jaiswal and Bakre (2002) have deployed TMD in the form of soft storey at the top of the building. This storey comprised of RC slab, beams and column, and is tuned to the first natural frequency of building. Mass ratio of TMD was 5.8%. Jaiswal (2004) proposed TMD derived from the existing components of tank, i.e. roof slab and column inside the container, which support roof slab. Here, roof slab is detached from the container wall, and hence, roof slab supported

by inner columns constitute a TMD. This TMD which does not require any additional arrangement is very lucrative and gives 15-20% reduction under earthquake loading. Reddy (2012) used maintenance platform of273 m RC Chimney as TMD. Maintenance platforms are provided at regular intervals along the height and one such platform at the top level was used as TMD. For this purpose it was proposed that a bearing will be inserted at the support of the platform. This mass of platform acts as TMD mass, and the stiffness and damping is provided by the bearings. The effect of such a TMD was studied for along- wind and across- wind response. Mass ratio considered was about 1% and TMD damping is taken as 5%.

A Review of Blue Economy for Potential Growth of Infrastructure in India

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N R Dhamge., Professor, Department of Civil Engineering, KDKCE,Nagpur.

Abstract:--

Geographically, India is blessed with great peninsular region well connected by ports. Presently, all the ports in India accounts for handling almost 90 percent of its export and import trades. However, its contribution is just 1 percent against by railways & roads, which accounts 9 percent and 6 percent of the total goods transportation in India respectively. It is estimated that India has about 42 percent of proportional share of goods trade in its GDP growth whereas, other developed countries has about 70 to 75 percent. It reflects that India has great potential in ocean economy. Therefore, keeping the focus on blue economy development, India can integrate its ports development and can have more sustainable business solutions for its overall economical, social, and socio-economical growth. This paper elucidates the status of contribution of blue economy in India's development and opportunities in various sectors of blue world in achieving a growth of infrastructure.

Key Words:--

Ports, Blue economy, Ocean development, Maritime, Ocean

Use of Friction Damper in Response Control of Structure: A State of the Art Review

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Dr. N.R. Dhamge., Professor, Civil Engineering Department, KDK College of Engineering, Nagpur.

Abstract:--

Conventional methods of seismic rehabilitation with concrete shear walls or rigid steel bracing are not considered suitable as upgrades as these methods have considered expensive and time consuming foundation work. The tight budget and schedule meant that these conventional options are not feasible. Of all the methods available to extract kinetic energy from a moving body, the most widely adopted is undoubtedly the friction brake. It is the most effective, reliable and economical mean to dissipate energy. This principle of friction brake inspired the development of friction dampers. Similar to automobiles, the motion of vibrating building can be slowed down by dissipating energy in friction. Several types of friction dampers have been developed. For frame buildings, these are available for tension cross bracing, single diagonal bracing, chevron bracing, and friction connectors at expansion joints to avoid pounding. The paper gives the study of different literature investigation taken on friction damper.

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Finite Element Analysis – Modeling Issues and Ideas

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Abstract:--

Finite element analysis was first developed for use in the aerospace and nuclear industries where the safety of structures is critical. Thanks to the growth in the rapid advances in computer technology and availability of commercial finite element packages that are capable of solving the most sophisticated problems, this is being widely and extensively used in structural analysis by most of the Civil engineers.

FEA consists of a computer model of the structure which can be analysed using the commercially available software. The computer model i.e. mathematical model of the structure consists of mesh of various elements to simulate the behaviour of the structure for given loading. The results of this mathematical model may not be exact as the actual structure but me be quite close.

Here various case studies are presented with different mathematical model for civil engineering structures and results as discussed. Suggestion are stated for better mathematical model.

Autogenous Healing of Concrete Enhanced by Using Supplementary Cementitious Materials - A Review

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U.K Dewangan., Professor, Department of Civil Engineering, NIT Raipur.

Abstract:--

Autogenous healing in concrete occurs when hairline cracks in concrete repairs themselves through reactions in presence of water. This paper presents a review on enhancement of autogenous healing of concrete using different supplementary cementitious materials (SCMs). The supplementary cementitious materials such as fly ash and ground-granulated blast-furnace slag (GGBS) reacts with calcium hydroxide. These materials in terms which delayed reactions, thus being more probable that it remains a reaction capability, when a crack appears. In this paper, a review has been carried out on the properties of concrete such as mechanical properties, durability properties and crack closure. From the study, it is concluded that introducing supplementary cementitious materials improves autogenous healing of concrete.

Keywords:--

Autogenous healing, Crack, Fly ash, Ground-granulated blast-furnace slag (GGBS).

Comparison of Design Capacity Due to Change in Design Stress Strain Curve of Concrete and Reinforcing Steel

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U.K. Dewangan ., Professor, Department of Civil Engineering, National Institute of Technology, Raipur.

Abstract:--

This paper compares the variation in design capacity of flexural and axially loaded elements due to the difference in the design curves in the IS: 456-2000 and IRC: 112-2011. A bridge deck slab section is selected as a flexural element and a bridge pier column section is selected as an axially loaded element with the uniaxial bending moment. Their design capacities are calculated on the basis of the design curves as per the above codes. An interaction curve for axial compression with uniaxial bending is also plotted in MATLAB for given column section with respect to the design curves of both the code. It concludes that new design curves for concrete and steel increases the flexural design capacity of the section significantly but variation in P-M interaction curve is not significant.

Keywords:--

Design Curves, Design Capacities, Flexural Element, Uniaxial Bending.

Comparing the Storey Displacements of Different Types of Building Using Linear Dynamic Analysis

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U. K. Dewangan., Professor, Department of Civil Engineering, National Institute of Technology, Raipur.

Abstract:--

A comparative study of a regular concrete frame building frame with flat plate and frame with flat slab & drop panel is presented in this paper. The IS456:2000 and IS 1893:2000 standards has been used for the loading purpose. All four zones of earthquake are considered and the storey displacement is computed using the equivalent static method and response spectrum method. The software used for the analysis is ETABS. The initial analysis and design for a particular dimension of column and beam is carried on, later based on some failed trials the changes on dimensions are provided, reanalysed and compared. From the analysis and result it can be concluded that flat slab with drop panel shows minimum storey displacement compared to the flat plate model and regular concrete frame model while the flat plate model shows the highest storey displacement. The related graphs are plotted for the comparison purpose.

Index Terms:--

Response Spectrum, Flat Slab, Flat Plate, Storey Displacement

Dye Removal from Waste Water Using Low Cost Adsorbents

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Abstract:--

This study is designed to investigate the performance of Low cost adsorbents for removal Methylene Blue Dye. The adsorbents are synthesized in laboratory, form the agricultural waste like Orange peel and Rice husk. The study is conducted by batch treatment method for various pH levels and dye concentration. The dye concentrations were measured using spectrophotometer. Comparative study is done by plotting the adsorption isotherms for the materials under study and conventionally used activated carbon .Through the experimental results it was found that Efficiency of PAC as an adsorbent for MB dye remains near about same at all the pH values. Removal of MB dye is significantly affected by pH of the system. In the present investigations, maximum removal of dye was found at pH 9 for RHAC and pH 8 for OP Hence it is always better to work with other sorbents instead of with costlier PAC. All adsorbents followed Frundlich adsorption isotherm. Removal of dye is as high, as near to 100% depending on pH for all.

Keywords:--

Adsorption, Mthylene Blue Dye, Low Cost Adsorbents ,Oarange Peel, Rice Husk, PAC, Spectrophotometric Method, Adsorption Isotherm

A Review Paper on Investigation into the Effect of Pounding on High Rise Structure

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Abstract:--

It has been widely seen that when earthquake occurs it causes large and intense shaking of the ground. So the building or the structure of any shape, size or of any height will experience the motion at its base. The level of damage caused by earthquake on a structure depends on the intensity of release of stain energy and the duration of shaking. The amplitudes are largest with respect to the large earthquake and the duration of shaking generally increases with the size of earthquake. When two adjacent building vibrates out of phase the collision occurs due to the insufficient separation or gap this phenomenon is known as pounding of building. This paper includes the study of pounding between adjacent buildings with same or different properties. Lump mass system is considered using MDOF system. In this time history analysis is carried out using past earthquake of Imperial valley.

Effect of Elevated Temperatures on Concrete with Ground Granulated Blast Furnace Slag (GGBFS) as a replacement of cement

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Abstract:--

In This proposed work is an experimental investigation are underway to investigate the impact of raise in temperatures on different properties of conventional and concrete with Ground Granulated blast furnace slag (GGBFS) as an additive. In the analysis, effect on compressive strength, split tensile strength and flexure strength was investigated. This study presents Effect of partially replacement of cement by using GGBFS by 20 %, 40% and 60% with addition 1 % of steel fibers. The said samples where heated from 200 0C to 1000oC in the increment of 200oC for 1 hour. The compressive strength, split tensile and flexure strength was executed for heated samples at different temperature at the age of 28 days. At different elevated temperatures GGBFS1 (20% GGBFS +1% steel fiber) found suitable combination as compared to conventional concrete and other combinations.

Index Terms:–

Ground Granulated blast furnace slag (GGBFS), Cement, Compressive strength, Split tensile strength, Flexural strength.

Influence of the Seismic Variational Parameters on the RC Building with and without use of Master-Slave

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Abstract:--

Earthquake is a natural and unpredictable calamity. It leads to loss of precious human life and property and at the same time pushes national economy in backwards direction. As we know occurrence and magnitude of earthquake is unpredictable. So, codes need regular updating to provide safety to the structures and human lives as well. These codal provisions are based on the return period of the earthquake and its magnitude. By employing these magnitude into considerations, codal provisions have been revised regularly and has a different significance based on the earthquake zones. The prime objective of this investigation is to study the influence of seismic parameters if a building existing in zones with less seismic probability, experienced severe earthquake shakings and what should be the safety measures we need to provide for the safety of the structure and human life as well in such cases? To understand this, a G+6 storied reinforced concrete building is modelled using commercially available 3-Dimesnional Structural Analysis and Design Software (STAAD.Pro) and then analysed it for the different zones against earthquake forces. Seismic analysis has been done with dynamic linear analysis by using response spectrum analysis method by taking the significance of all the zones in India. Use of master-slave has shown the reduction in nodal displacements. Based on this study, it is concluded that analysis with master-slave results in economical design in comparison with design without considering master-slave.

Index Terms:–

Seismic loads, STAAD.Pro, Dynamic linear analysis, Response spectrum analysis method.

Optimisation of Floculation Process Using Jet Floculators

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Abstract:--

Flocculation is the second stage wherein the formation of readily settleable flocs from destabilized colloidal particle is achieved by bringing particles into close proximity by gentle and prolonged mixing. In present study the jet flocculation aspect is considered since small towns in developing countries need water treatment plants which should be simple to operate, have least number of moving parts, need no skilled labour for maintenance and are economical. It is very likely that the raw water pumping station may be located at a far way distance and the floculator may not have the electricity available simultaneously at all time periods. Hence floculators requiring regular maintenance and continuous power supply for the mechanical stirrers provided usually fail to give good results. These facts may compel the public health personnel engaged in water treatment to compromise on the quality of water being supplied to the community. Under these adverse conditions, it is therefore necessary to improve and modify the design of floculator to obviate these problems. The jet floculator is a viable alternative for small water treatment plants (1000cum. /day) which needs to be thoroughly investigated. The jet action in a jet floculator produces the required velocity gradient essential for the formation of flocs without assistance from any moving mechanical parts. In this study various experiments are performed on 3 jet model set i.e horizontal spiral set up, vertical setup and central helical path setup with varying pipe diameters to check the efficiency of the jet flocculation using jet flow. Slow mixing which is usually done with the help of rotating paddles in any conventional floculator, was done using a water jet which creates turbulence in water as required for slow mixing. Result obtained inferred that the jet can be effectively used for the purpose of flocculation with an increase in the duration of sedimentation.

Index Terms:–

Flocculation, Water Treatment, Jet Flocculation, Coagulation

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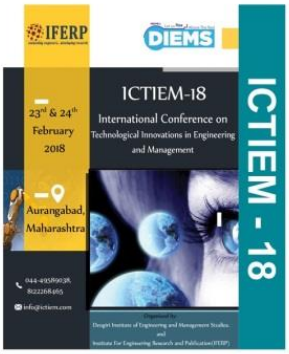

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