

12TH TWELVETH

13th & 14th MAY 2022

INTERNATIONAL CIVIL ENGINEERING CONFERENCE



being held on the occasion of
NED Centennial Year (1921-2021)

INTEGRATING TECHNOLOGY IN CIVIL ENGINEERING



JOINTLY ORGANIZED BY



The Institution of Engineers Pakistan
Karachi Centre



NED University of Engineering
& Technology, Karachi



NED International Alumni Network
(NEDIAN) Association Pakistan

IN COLLABORATION WITH



The Asian Civil Engineering
Coordinating Council



Federation of Engineering Institutions
of South & Central Asia (FEISCA)



Federation of Engineering Institutions
of Islamic Countries (FEIIC)



Balochistan University of Information
Technology Engineering &
Management Sciences, Quetta



Balochistan University of
Engineering & Technology, Khuzdar



Sir Syed University of
Engineering & Technology, Karachi



FORTHCOMING CONFERENCES



being organized by
The Institution of Engineers Pakistan
Karachi Centre

**10th International Conference
Health Safety & Environment (10th-HSE-2022)**
to be held on 2nd & 3rd September, 2022
Website: iepkarachi.org.pk

**1st International
Bio-Medical & Digital Health Conference-2022 (1st IBDC-2022)**
to be held on 15th & 16th November, 2022
Website: iepkarachi.org.pk

International UN SDG's Conference 2022
to be held on 25th & 26th November, 2022
Website: iepkarachi.org.pk

**4th International Conference on
Advance Materials & Process Engineering (4th AMPE-2022)**
to be held on 2nd & 3rd December, 2022
Website: www.nedampe.com

For further information please contact

Engr. Farooq Arbi, FIE, PE

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CHIEF MINISTER SINDH



Engr. Syed Murad Ali Shah

Chief Minister Sindh

“ I feel honored to know that the Institution of Engineers Pakistan, NED University of Engineering & Technology and NED International Alumni Network Association, Pakistan are holding the 12th International Civil Engineering Conference on 13 & 14 May, 2022 in collaboration with The Asian Civil Engineering Coordinating Council, Federation of Engineering Institutions of Islamic Countries (FEIIC), Federation of Engineering Institutions of South & Central Asia (FIESCA), Balochistan University of Information Technology Engineering & Management Sciences-Quetta (BUITEMS), Balochistan University of Engineering & Technology-Khuzdar (BUET) and Sir Syed University of Engineering & Technology-Karachi (SSUET).

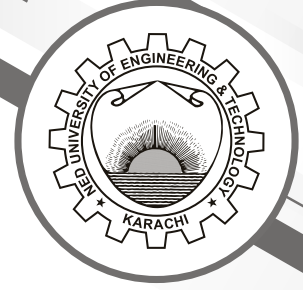
I wish all those attending the conference a happy and comfortable stay of two days during the conference. Engineers have played significant role in the overall development of the Country. The Institution of Engineers Pakistan has helped the engineers in widening their engineering knowledge and techniques by holding various technical activities. Its services to the nation are exemplary. The Institution of Engineers Pakistan has also played vital role by deliberating over the pertinent issues and making appropriate recommendations to the government.

The 12th ICEC-2022 is one of the feature events of these continuing development efforts of the Institution of Engineers Pakistan (IEP) and NED University of Engineering & Technology (NEDUET).

I am sure the 12th International Civil Engineering Conference being attended by engineers from all over Pakistan and from around the world will provide an excellent opportunity to the participants to benefit from the experiences of one another and to find solutions to our current problems. The knowledge transferred by this Conference will be helpful for the participants, in increasing their professional ability and find ways and means to tackle the national and International problems. The role played by the Institution of Engineers Pakistan is commendable and I wish every success for the Institution.

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VICE CHANCELLOR NEDUET



Engr. Prof. Dr. Sarosh H. Lodi

Vice Chancellor,
NED University of Engineering and
Technology, Karachi

“ It gives me an immense pleasure to welcome you to the 12th International Civil Engineering Conference (ICEC-2022) which is jointly organized by The Institution of Engineers Pakistan, Karachi Centre and NED University of Engineering & Technology in collaboration with International organizations and regional universities.

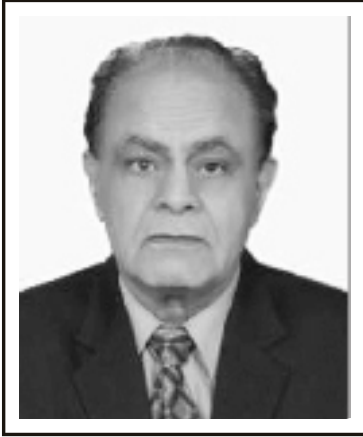
This conference provides the platform to researchers, academics, engineers and experts, not only from Pakistan but also from different countries around the world to share their research in the field of Civil Engineering and explore possibilities for collaboration in various fields. The theme of the Conference i.e. “Integrating Technology in Civil Engineering” is of great significance. The theme is aligned with the fact that Civil Engineering profession has been evolving rapidly with recent technological innovations and integration with other disciplines of Engineering. However, we need to integrate these innovations with sustainability principles for a better built environment. Moreover, the technological innovations spherically in construction technology, use of artificial intelligence (AI), virtual reality (VR), 3D printing and other innovations in Civil Engineering profession are transforming traditional civil engineering world over. Therefore, it is important to discuss and deliberate such transformation to keep up with the developed world. Such efforts will help towards sustainable built environment and achievement of sustainable development goals (SDGs).

I am sure that the 12th International Civil Engineering Conference (ICEC-2022) will provide an excellent opportunity to the participants to benefit from the experiences of one another.

I wish all participants a successful conference in the beautiful city of Karachi. The Institution of Engineers Pakistan, Karachi Centre and NED University of Engineering & Technology would feel immense pleasure to welcome you in future conferences as well.”

PRESIDENT

The Institution of Engineers, Pakistan



Engr. Dr. Javed Younas Uppal

President

The Institution of Engineers, Pakistan

“ I am extremely honored to express my deep hearted feeling of happiness that the Institution of Engineers Pakistan Karachi Centre and NED University of Engineering & Technology and NED International Alumni Network Associating, Pakistan are holding the 12th International Civil Engineering Conference (12th ICEC-2022) in collaboration with The Asian Civil Engineering Coordinating Council, (ACECC), Federation of Engineering Institutions of Islamic Countries (FEIIC) Federation of Engineering Institutions of South & Central Asia (FEISCA), Balochistan University of Engineering & Technology, Khuzdar (BUET), Balochistan University of Information Technology, Engineering and Management Sciences (BUIITEMS) Sir Syed University of Engineering & Technology (SSUET) scheduled to be held on Friday 13th & Saturday 14th May, 2022.

It is also a matter of great satisfaction that renowned experts from within the country and from abroad shall be presenting their papers on the topic “Integrating Technology in Civil Engineering” All the Engineers attending the conference shall benefit from the experience in their respective fields.

The Institution of Engineers Pakistan, Karachi Centre is working hard for dissemination of knowledge by holding National, International Engineering Conferences, Technical Seminars, Workshops and Lectures for the benefit of engineering profession and development of the Country. The Chairman, IEP Karachi Centre Engr. Sohail Bashir, Vice-Chairman (Civil and allied) and Secretary, IEP Karachi Centre Engr. M. Farooq Arbi, Vice-Chancellor, NED University of Engineering and Technology Engr. Prof. Dr. Sarosh Hashmat Lodi, Members of the Organizing Committee and Central/Local Council Members of Karachi Centre deserve appreciation for organizing the 12th ICEC- 2022 for the benefit of engineering community.

I pray for the success of this 12th International Civil Engineering Conference.

CHAIRMAN IEP, Karachi Centre



Engr. Sohail Bashir

Chairman
The Institution of Engineers Pakistan
Karachi Centre

“ The Institution of Engineers Pakistan (IEP) is playing a vital role in the development of Pakistan since its inception within the frame work of its aims & objectives which revolves around the promotion of technology, advancement of the engineering practice, application of principles of science in engineering and dissemination of technical knowledge. Upholding its tradition continuously for the last eleven years, this year also the 12th International Civil Engineering Conference is being hosted by the IEP Karachi Centre with more zeal and enthusiasm. The theme for this year conference is “Integrating Technology in Civil Engineering” The conference shall dwell on the latest technological development in the field of Civil Engineering and allied engineering disciplines which would not only broaden the vision of participants but shall led them to the frontiers of the existing knowledge and the way forward. Indeed to hold such International gathering was not only a challenge but was also an uphill task for which IEP Karachi Centre, NEDUET and NEDIAN- Pakistan and all collaborating Institutions deserves all commendation. The collaborative role of Department of Civil Engineering of NEDUET, BUITEMS, BUET-Khuzdar, SSUET, deserves special commendation.

On behalf of The Institution of Engineers Pakistan, Karachi Centre and the Organizing Committee of ICEC-2022, I would like to express my sincere appreciation for active participation, both from academia and industry. Indeed, all the members of Advisory Board, IEP Headquarters Committee, Management Committee, and Technical Review Committee worked extremely hard to make this event happen. I have no doubt whatsoever that without their cooperation, support and active participatory role, this event would not have been possible for which I record my appreciation for all of them. Special thanks to the Conference Key Note Speaker of Inaugural session, Dr. Naveed Anwar, Vice-President for Knowledge Transfer, AIT Thailand and to Dr. William Kelly of American Society of Civil Engineers, the Key Note Speaker of Closing Session. Thanks to all invited speakers from industry, authors and sponsors for strongly supporting the conference. My sincere gratitude are to Engr. Prof. Dr. Sarosh Hashmat Lodi, Vice Chancellor, NEDUET & Convener, ICEC-2022 for his guidance & help in organizing ICEC-2022.

I would like to take this opportunity to place on record my sincere appreciation for Engr. Prof. Dr. Rizwan-ul-Haque Farooqui, Chairman Department of Civil Engineering, NEDUET, Engr. Prof. Dr. Abdul Jabbar Sangi, Co-Convener, ICEC-2022, Engr. Dr. Shamsoun Fareed, Secretary, ICEC-2022, Engr. Shoaib Ahmed Co-Secretary, ICEC-2022, and the student volunteers of NEDUET for their hard work for ICEC-2022.

Finally, I would like to welcome each one of the participant and hope that they will find ICEC-2022 not only useful in enhancing their technical knowledge but also to be a forum to meet many highly respected engineers under one roof for effective interaction in future.



PRESIDENT NEDIAN



Engr. Asim Murtaza Khan

President
NED International Alumni Network
(NEDIAN) Association

“ It is a matter of great pride that The Institution of Engineers Pakistan, Karachi Centre, NED University of Engineering & Technology, NED International Alumni Network Association Pakistan are jointly holding 12th International Civil Engineering Conference on Friday 13th & Saturday 14th May, 2022 at NEDUET, Karachi in collaboration with National Engineering Universities.

It gives me great satisfaction that renowned experts from within the country and from abroad shall be presenting their valuable papers during the conference. This event will provide opportunity to young engineers to benefit from the knowledge of experienced engineers in their relevant fields.

The Institution of Engineers Pakistan, Karachi Centre is working hard for dissemination of knowledge by holding National/International Engineering Conferences, Technical Seminars, Workshops and Lectures for the benefit of Engineering profession and development of the Country.

As President, NED International Alumni Network Association & CEO, Petroleum Institute of Pakistan I am confident the delegates, participants and corporate members attending the Conference, will be benefited by the presentations to be made by the experts from all over Pakistan and abroad. The participants will be able to improve their skills in their respective fields. It is hoped the participants attending this Conference will be able to apply their improved knowledge for better productivity in their practical life..

I pray for the success of the 12th International Civil Engineering conference 2022.

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VICE CHANCELLOR BUIITEMS



Engr. Ahmed Farooq Bazai (S.I)

Vice Chancellor
Balochistan University of IT, Engineering
and Management Sciences (BUIITEMS)

“ It is my pleasure to be part of the 12th International Civil Engineering Conference (ICEC-2022) I congratulate the Institution of Engineers Pakistan, Karachi Centre, NED University of Engineering & Technology and NED International Alumni Network Association, Pakistan for organizing the conference series. The conference has successfully contributed to promoting progressive academic exploration and collaborations among the key stakeholders including the institutions of higher learning, industry and the government. With a prodigious demand for technological solutions, there is an everlasting need for innovative measures to cope with the strains of the forth industrial revolution. In this regard, “Integrating Technology in Civil Engineering” is worthy of the efforts; providing a platform to foster advancements within the domains of civil engineering, promoting inter-disciplinary crosscutting technological breakthroughs in a variety of fields.

BUIITEMS is especially focused on equipping the youth of today to meet future technological challenges by furnishing them with ample research and collaboration opportunities. As a collaborator of the ICEC-2022, we are certain of the opportunities provided under the theme. We hope that our partnership in this conference would go a long way and it will prove to be prolific to our faculty and students.

I sincerely commend the efforts of the entire organizing team in making this conference possible. I acknowledge the collaboration of the Asian Civil Engineering Coordinating Council (ACECC), Federation of Engineering Institutions of Islamic Countries (FEIIC), Federation of Engineering Institutions of South & Central Asia (FEISCA), Sir Syed University of Engineering & Technology (SSUET), Balochistan University of Engineering & Technology, Khuzdar and Balochistan University of IT, Engineering and Management Sciences (BUIITEMS), Quetta in jointly making this conference a success.

On behalf of BUIITEMS, I would like to extend my warm wishes to all the delegates and participants.

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VICE CHANCELLOR
BUET, Khuzdar



Prof. Dr. Ehsanullah Khan Kakar

Vice-Chancellor
Balochistan University of
Engineering & Technology, Khuzdar

“ It is a matter of great pleasure and honor for me and Balochistan University of Engineering & Technology, Khuzdar to be a part of 12th International Civil Engineering Conference-2022, which is going to be held at Karachi, Pakistan. The 12th ICEC-2022, will focus on “Integrating Technology in Civil Engineering’. The aim of the conference is to provide a premier platform for civil engineers and researchers from Pakistan and abroad to present their research experiences and ideas in the domain of Civil Engineering.

The Institution of Engineers Pakistan, NED University of Engineering & Technology and NED Intentional Alumni Network Association, Pakistan in collaboration with various other universities organizes national and international conferences at regular basis. These academic events make the industry-academia linkages stronger and provide a better platform for future developments.

The conference objective is focused on the new and challenging problems related to Civil Engineering . The experts around the globe will share the new trends, solutions, in their respective areas of research which will benefit the conference participants at large. Best wishes for the successful organization of the event and comfortable stay as well.

”

VICE CHANCELLOR SSUET



Prof. Dr. Vali Uddin

Vice Chancellor,
Sir Syed University of
Engineering & Technology, Karachi

“ Apart from imparting quality higher education in the contemporary academic disciplines, the hallmark of a seat of higher learning is to create new knowledge through quantitative and qualitative research in their respective domains. Against this backdrop, the 12th International Civil Engineering Conferences (ICEC-2022), on the theme “Integrating Technology in Civil Engineering” is highly laudable. On behalf of Sir Syed University of Engineering & Technology, a collaborator and partner of ICEC-2022, I offer congratulation both to The Institution of Engineers Pakistan Karachi Centre, NED University of Engineering & Technology and NED International Alumni Network Association, Pakistan for organizing this Conference aims to featuring research papers on the theme.

Undoubtedly, conferences like ICEC-2022 provide a dynamic platform to deliver and facilitate the networking between scientists, engineers and industrial employers. In the long run, their collaboration result in world-class research that become fundamentally vital for the society's progress and well-being. The universities/higher education institutions are primarily responsible and accountable to their respective societies, their employees and students; but above all, they facilitate each other in promoting Ilm-e-Naafa (beneficial knowledge) as required by their contemporary context and realities. And in our present techno-age, the ICEC-2022 is indeed relevant and will certainly prove to be thought-provoking and enriching in terms of bringing forth new knowledge on the theme of the Conference.

I trust that the creditable platform of ICEC-2022 will promote a meaningful dialogue between the researchers from the universities from home and abroad. This will indeed go a long way in scientific and technological development in the country. I felicitate all the participating research scholars and especially those whose papers have appeared in this MDPI Engineering Proceeding Journal and will be selected; and extended versions of the papers will be sent for publication in the NED University Research Journal after review process.

On behalf of Sir Syed University of Engineering & Technology, Karachi, I offer felicitation to the organizers, participants and delegates of ICEC-2022 and wish them godspeed.

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SECRETARY GENERAL

The Institution of Engineers, Pakistan



Engr. Amir Zamir Ahmed Khan

Secretary General

The Institution of Engineers, Pakistan

“ It is a matter of great pleasure that the Institution of Engineers Pakistan, Karachi Centre, NED University of Engineering & Technology and NED International Alumni Network Association, Pakistan are holding 12th International Civil Engineering Conference (12th ICEC-2022) in collaboration with The Asian Civil Engineering Coordinating Council, (ACECC), Federation of Engineering Institutions of Islamic Countries (FEIIC) Federation of Engineering Institutions of South & Central Asia (FEISCA), Balochistan University of Engineering & Technology-Khuzdar (BUET), Balochistan University of Information Technology, Engineering and Management Sciences-Quetta (BUIEMS), Sir Syed University of Engineering & Technology-Karachi (SSUET) scheduled to be held on Friday 13th & Saturday 14th May, 2022.

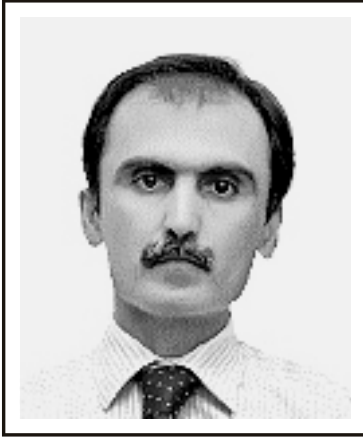
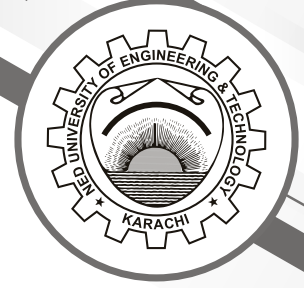
The Institution is the premier body of qualified engineers in Pakistan and has made significant contributions to the development of the country. The role played by the Institution in spreading modern skills and technology is highly commendable. Recent advancements in Science and Technology have placed enormous power at the disposal of man which must be harnessed for the welfare of humanity. Pakistan possesses vast natural resources and it is the duty of our engineers to utilize these resources for the welfare of the society and eradication of disease, ignorance, poverty and hunger.

As Secretary General of the Institution of Engineers Pakistan I appreciate the efforts of Engr. Sohail Bashir, Chairman, IEP Karachi Centre for his effort in holding the 12th International Civil Engineering Conference.

I am sure that 12th International Civil Engineering Conference being attended by engineers from all the provinces of Pakistan and also from abroad will provide an excellent opportunity to the participants to benefit from the experiences of one another in the light of Theme of the Conference “Integrating Technology in Civil Engineering”.

I wish the Institution of Engineers Pakistan Karachi Centre and Participants of the Conference all the success

PRO-VICE CHANCELLOR NEDUET



Engr. Prof. Dr. Muhammad Tufail

Pro Vice Chancellor
NED University of Engineering & Technology

“ It indeed is my proud privilege to be part of the 12th International Civil Engineering Conference (ICEC 2022) which is jointly organized by The Institution of Engineers Pakistan, Karachi Centre, NED University of Engineering & Technology and NED International Alumni Network Association, Pakistan in collaboration with International organizations and regional universities.

It is heartening to know that this time more than 40 research articles shall be presented which will be focusing on the core issues in line with the conference theme which is "Integrating Technology in Civil Engineering".

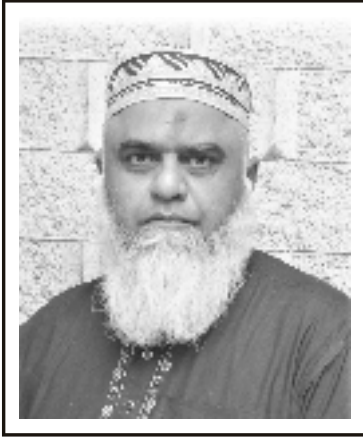
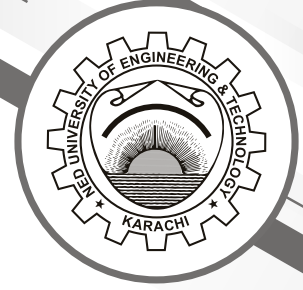
I am sure this conference will provide the platform to researchers, academics, engineers and experts, not only from Pakistan but also from different countries around the world to share their research in the field of Civil Engineering and explore possibilities for collaboration in various fields.

For a developing country like Pakistan, it is of paramount importance that engineers and policy makers start working towards implementing and achieving sustainable development goals (SDGs) for the development of the country. I am confident that the participants of the conference will greatly benefit from the research work to be presented.

I wish all participants and organizers a successful conference

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DEAN
NEDUET



Engr. Prof. Dr. Asad-ur-Rehman Khan

Dean
Faculty of Civil & Petroleum Engineering
NED University of Engineering & Technology

“ I am pleased to be part of the 12th International Civil Engineering Conference being organized by the Institution of Engineers Pakistan and Department of the Civil Engineering of the NED University of Engineering & Technology on the 13th & 14th May, 2022. The conference is being organized in collaboration with The Asian Civil Engineering Coordinating Council, (ACECC), Federation of Engineering Institutions of Islamic Countries (FEIIC) Federation of Engineering Institutions of South & Central Asia (FEISCA), Balochistan University of Engineering & Technology-Khuzdar (BUET), Balochistan University of Information Technology, Engineering and Management Sciences, Quetta, (BUIITEMS) and Sir Syed University of Engineering & Technology-Karachi (SSUET).

Engineers have an important role in the development of any country and platforms like this conference provide an excellent opportunity to keep themselves abreast of the latest advancements and innovations in the Engineering field.

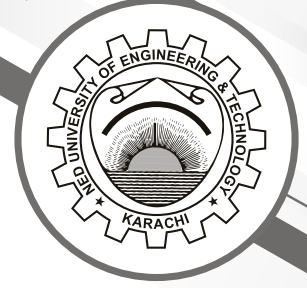
The 12th ICEC is one of the feature events of these continuing development efforts of the Institution of Engineers Pakistan (IEP) and NED University of Engineering & Technology (NED) and this time around 42 Technical Papers shall be presented which will be focusing on the core issues in the line of the conference theme which is "Integrating Technology in Civil Engineering".

I am sure that the 12th International Civil Engineering Conference will provide a platform to the participants to benefit from the experiences of one another and to find solutions to our current problems. The knowledge transferred by this Conference will be helpful for the participants, in increasing their professional abilities and find ways and means to tackle the national and International problems.

I wish all those attending the conference a happy and comfortable stay of two days during the conference.

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**CHAIRMAN
NEDUET**



Engr. Prof. Dr. Rizwan Ul Haq Farooqui

Chairman

Department Civil Engineering

NED University of Engineering & Technology

“ The theme of the 12th International Civil Engineering Conference (ICEC-2022) “Integrating Technology in Civil Engineering” is not only pertinent but relevant as well in the wake of Industry Revolution 4.0. Like all other professions, Civil Engineering, over the last decade or so, has witnessed new dimensions in technological improvements and interventions. From BIM to VR/ AR to smart sensors to drones to artificial intelligence to data analytics to IoT, technology has challenged traditional civil engineers to revisit engineering approaches and solutions to complex engineering problems. Curriculums have seen radical alignments. As the proud custodian of the oldest and largest Department of one of the most prestigious engineering institutions in Pakistan amidst its centennial celebrations, it gives me immense pleasure to witness this integration of technology in civil engineering curriculum and practice, glimpses of which are being presented at the twelveth chapter of ICEC series of conferences - a joint venture of Department of Civil Engineering, NED University and IEP Karachi Centre.

The ICEC series of conferences has remained a success since its inception. We have always been getting wonderful response in form of scholarly contributions from both national as well as international academicians and practitioners. For this particular Conference, over 40 articles under 10 technical streams within Civil Engineering and 12 parallel sessions are being presented over two days in addition to Key Notes and Invited Talks from industry.

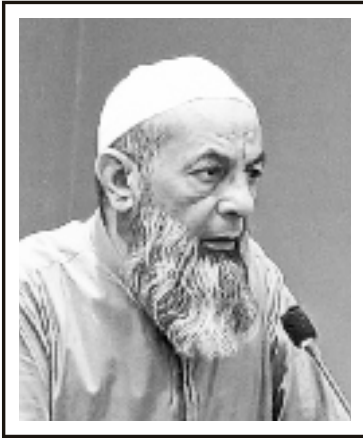
Civil engineers, being the custodian of the infrastructure of any country and hence the backbone of economy, have to play a pivotal role towards developing and advancing technology-driven sustainable built environment, particularly in the developing side of the world. I am confident that the technical papers and talks offered at the conference would provide useful recommendations towards technology adoption in civil engineering practice.

I would personally like to acknowledge the endless efforts extended from IEP, NED Committee Members, partner Universities, authors, invited speakers from the industry, keynote speakers and volunteers for making this event a success. I sincerely hope that the Conference would pave way for further strengthening the academia-industry linkage and coming up with sustainable, collaborative and technology-driven solutions to our indigenous issues in the built environment.

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SECRETARY

IEP, Karachi Centre



Engr. M. Farooq Arbi

Secretary,
The Institution of Engineers Pakistan
Karachi Centre

“ I am honored to warmly welcome all of you to the 12th International Civil Engineering Conference (ICEC- 2022) being jointly organized by The Institution of Engineers Pakistan Karachi Centre, NED University of Engineering & Technology and NED International Alumni Network Association, Pakistan on 13 & 14 May, 2022. This time our collaboration include Federation of Engineering Institutions of Islamic Countries, Federation of Engineering Institutions of South & Central Asia, The Asian Civil Engineering Coordinating Council, Balochistan University of Information Technology Engineering & Management Sciences-Quetta (BUIITEMS), Sir Syed University of Engineering & Technology, Balochistan University of Engineering and Technology-Khuzdar, on the theme “Integrating Technology in Civil Engineering”.

The Institution of Engineers Pakistan is playing a vital role in the Development of the Nation since its inception within the periphery of its approved aims and objectives, mostly revolving around the promotion and advancement of the practice and application of principles of Engineering, through its nine Centres, spread across Pakistan and four overseas Centres. Upholding its traditions, the 12th International Civil Engineering Conference is being hosted by IEP-Karachi Centre .

The theme of the Conference i.e “Integrating Technology in Civil Engineering” is of great significance. The theme is aligned with the fact that Civil Engineering profession has integrated technology from many other disciplines for enhancing its efficiency and productivity. Moreover, the technology specifically that of construction technology has also gone through prosperous evolution. Use of artificial intelligence (AI), virtual reality (VR), 3D printing and other technological advancements in Civil Engineering profession are transforming traditional civil engineering. Future of Civil Engineering profession lies in technology. Therefore, it is important to discuss and deliberate such transformation to keep up with the development world.

I take this opportunity to express my appreciation to the joint efforts of Engr. Prof. Dr. Sarosh Hashmat Lodi, Vice-Chancellor & Convener, ICEC-2020, NEDUET and Engr. Sohail Bashir, Chairman, IEP Karachi Centre, for the success of this conference. Special thanks to Engr. Prof. Dr. Abdul Jabbar Sangi, Co-Convener, ICEC-2022, Engr. Dr. Shamsoon Fareed, Secretary ICEC-2020 and Engr. Shoaib Ahmed Co-Secretary, ICEC-2022, and my office staff for their untiring effort for ICEC-2022.

Finally, I welcome each participant and hope that they will find the 12th International Civil Engineering Conference not only useful in many respects but also to be a good opportunity to meet people and connect positively through networking in available time slots.

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GENERAL SECRETARY NEDIAN



Engr. Muhammad Abbas Sajid

General Secretary
NED International Alumni Network
(NEDIAN) Association

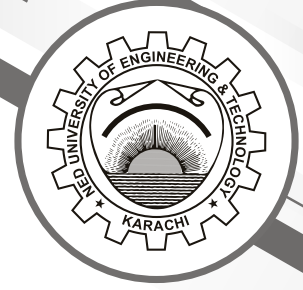
“ As Secretary General of NED International Alumni Network (NEDIAN) Association Pakistan I am delighted to have the opportunity to share a few thoughts at the time of 12th International Civil Engineering Conference (ICEC-2022). It is a great initiative taken by Institution of Engineers Pakistan, Karachi Centre, NED University of Engineering & Technology, Karachi and NED International Alumni Network Association, Pakistan in collaboration with The Asian Civil Engineering Coordinating Council, (ACECC), Federation of Engineering Institutions of Islamic Countries (FEIIC) Federation of Engineering Institutions of South & Central Asia (FEISCA), Balochistan University of Engineering & Technology, Khuzdar (BUET), Balochistan University of Information Technology, Engineering and Management Sciences (BUIITEMS), Sir Syed University of Engineering & Technology (SSUET).

The 12th edition of the conference itself is an indicator of the quality and credibility of the Conference Internationally. This conference is a great opportunity for engineering professionals to sit and brainstorm ideas for solving regional and global issues. ICEC-2022 encompasses wide spectrum of Civil Engineering domain which includes Traffic Simulation and Modeling, Disaster Management, Structural Engineering, Water Resources, Construction Project Management and Transportation planning etc.

This Conference provides a platform for all professional to learn from each other. IEP and NED University deserves a great applause for bringing academia, Industry experts and other stakeholders from all over the world to address common challenges.

I congratulate all office bearers, and organizers of the conference for organizing such a wonderful event and I wish them great success. ”

CO-CONVENER ICEC-2022



Engr. Dr. Abdul Jabbar Sangi

Co-Convener, ICEC-2022

NED University of Engineering and Technology

“ It is my proud privilege to be the Co-Convener of the 12th International Civil Engineering Conference (ICEC-2022) jointly organized by The Institution of Engineers Pakistan Karachi Centre, NED University of Engineering & Technology & NED International Alumni Network Association Pakistan in collaboration with The Asian Civil Engineering Coordinating Council, Federation of Engineering Institutions of Islamic Countries and Federation of Engineering Institutions of South & Central Asia on Friday 13th & Saturday 14th May, 2022 in Karachi. The event is organized in partnership with regional universities including Balochistan University of Engineering & Technology Khuzdar, Balochistan University of Information Technology, Engineering & Management Sciences (BUIITEMS) Quetta and Sir Syed University of Engineering & Technology, Karachi.

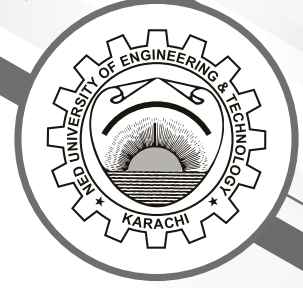
This year, the 12th International Civil Engineering Conference (ICEC-2022) is being held under the theme “Integrating Technology in Civil Engineering”. The idea is to bring together latest civil engineering knowledge, research and development efforts from scientific community, engineers and practitioners focusing on recent innovations incorporating notions of sustainability that can help in contributing towards establishing a better built environment and achieving sustainable development goals. The multiple challenges faced by developing countries related to the built-environment can only be solved by adopting innovative technological approach towards the development process based principles of sustainability.

I would like to thank IEP and NED committee members, partner Universities, authors, invited speakers from the industry and volunteers for their valuable contribution towards the event.

I hope that this conference would strengthen further the meaningful interactions between industry, academia and scientific community, which will enable further research & development and help develop sustainable built-environment in the country.

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SECRETARY
ICEC-2022



Engr. Shamsoon Fareed

Secretary
ICEC-2022

“ I feel honored to be a secretary of the 12th International Civil Engineering Conference jointly organized by Department of Civil Engineering, NED University of Engineering & Technology and The Institution of Engineers Pakistan Karachi Centre. It is my proud privilege to be the secretary of the ICEC conference since last three years and it is indeed good to see that the series of Conferences have come a long way over the past few years.

For this particular Conference, over 40 articles under 12 parallel sessions are being presented in addition to Key Notes and Invited Talks from industry, which in itself is an indicator of success of the event. I am very hopeful that the papers presented in the conference would provide useful recommendations towards sustainable social development via civil engineering innovation.

I would personally like to thanks IEP and NED for providing me an opportunity to be a part of such esteemed conference. I would also like to thanks committee members, partner Universities, authors, invited speakers from the industry, keynote speakers and volunteers for making this event a success. I sincerely hope that the Conference would pave way for further strengthening the academia-industry linkage and coming up with sustainable, innovative and collaborative solutions to our indigenous issues in the built environment.

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The Institution of Engineers Pakistan

The main goal of the Institution of Engineers, Pakistan is to Build Better World as appearing in its logo.

The aims and objectives of the Institution are:

- a. To Promote and advance the science, practice, and business of engineering in all its branches throughout Pakistan.
- b. To Promote efficiency in the engineering practice and profession.
- c. To Regulate the professional activities and assist in maintaining high standard in the general conduct of its members.
- d. To Lay down professional code of ethics and to make it mandatory for its members in their professional conduct.
- e. To Help in the acquisition and exchange of technical knowledge.
- f. To Promote the professional interest and social welfare of its members.
- g. To Encourage original research in engineering and conservation and economic utilization of the country's materials resources.
- h. To Foster coordination with similar institutions in other countries and Engineering Universities, Institutions and Colleges in Pakistan and in other countries for mutual benefits in furthering the objects of Institution.
- i) To diffuse among its members information on all matters affecting engineering and to encourage, assist and extend knowledge and information connected therewith by establishment and promotion of lectures, discussions or correspondence, by the holding of conferences, by the publication of papers, periodicals and journals, proceedings, reports, books, circulars and maps or other literary undertaking, by encouraging research work or by the formation of library or libraries and collection of models, designs, drawings, and other articles of interest in connection with engineering or otherwise howsoever.
- j) To promote the study of engineering with a view to disseminating the information obtained for facilitating the scientific and economic development of engineering in Pakistan.
- k) To establish, acquire, carry on, control or advise with regard to colleges or other educational establishments where students and apprentices may obtain a sound education and training in engineering on such terms as may be settled by the Institution.
- l) To encourage, regulate and elevate the technical and general knowledge of persons engaged in or about to engage in engineering or in any employment manual or otherwise in connection therewith and with a view thereto function as an Educational Institution and to provide for holding of coaching wherever possible and to test by examination or otherwise the competence of such persons and to institute and establish professor-ships, student-ships, scholar-ships, rewards and other benefactions and to grant certificates of competency whether under any Act of the Government of Pakistan or Local Government under the Bye-Laws of the Institution regulating the conduct and qualification of engineer or otherwise howsoever.
- m) To-operate with various Government agencies and industrial and commercial enterprises connected with engineering and advising them in matters concerning the profession and practice of engineering and promotion of technical education.
- n) To encourage inventions and investigate and make known their nature and merits.
- o) To arrange and promote the adoption of equitable forms of engineering contracts and other legal documents, to encourage settlement of disputes by arbitration and to act as and nominate arbitrators and to act as and nominate arbitrators and umpires on such terms as may be expedient.
- p) To promote just and honorable dealing and to suppress mal-practice in engineering
- q) To do all such other acts and things as are incidental or conducive to the above objects or any of them.

The Institution ever since its inception has been taking concerted efforts to upgrade the knowledge and technical know-how of its member engineers by undertaking various technical activities. IEP has, on number of occasions, conducted numerous studies on various technical problems, and has submitted its recommendations to the government.

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1. World Federation of Engineering Organizations (WFEO)
2. Federation of Engineering Institutions of Islamic Countries (FEIC) (comprising all Engineering Institution of Islamic Countries).
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4. Asian Civil Engineering Coordinating Council (ACECC)
5. Common-Wealth Engineers Council (CEC) (which works under the aegis of United Nations Organization).
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The Institution of Engineers Pakistan

Inaugural Session
at Audio Visual Hall, Department of Civil Engineering,
NED University of Engineering & Technology, Karachi
(Friday 13th May, 2022)

15:30 - 16:00	Registration
16:00 - 16:05	Recitation from the Holy Quran
16:05 - 16:10	National Anthem
16:10 - 16:15	Welcome Address by Engr. Prof Rizwan Ul Haque Farooqui Chairman, Department of Civil Engineering, NED University
16:15 - 16:20	Conference Briefing by Engr. Prof. Dr. Abdul Jabbar Sangi Co-Chairman Deptt. of Civil Engg. NED University & Co-Convener ICEC-2022
16:20 - 16:25	Address by Prof. Dr. Asad-ur-Rehman Khan Dean, Faculty of Civil & Petroleum Engineering, NED University
16:25 - 16:30	Address by Engr. Sohail Bashir, Chairman IEP, Karachi Centre, ICEC 2022
16:30 - 17:15	Keynote: "Integrating Technology in Civil Engineering" by Dr. Naveed Anwar Vice President for Knowledge Transfer, AIT Thailand
17:15 - 17:25	Address by Engr. Dr. Javed Younas Uppal President, The Institution of Engineers, Pakistan
17:25 - 17:30	Address by Engr. Prof. Dr. Muhammad Tufail Pro-Vice Chancellor NED University of Engineering & Technology
17:30 - 17:35	Address by Chief Guest
17:35 - 17:50	Presentations of Conference Mementos/certificates
17:50 - 18:00	Vote of Thanks by Engr. Muhammad Abbas Sajid General Secretary, NEDIAN - Pakistan.
18:00 - 18:30	Refreshments

TECHNICAL SESSIONS Saturday the 14th May, 2022 at NEDUET, Karachi	
09:30 - 11:00	Technical Session-1 - Structural Engineering at Video Conferencing Hall Civil
	Technical Session-2 - Materials Engineering at AV Hall Mechanical
	Technical Session-3 - Construction Engineering at UG Computer Lab Civil
	Technical Session-4 - Hydraulic Engineering at New Block Civil
11:00 - 11:15 Tea Break	
11:15 - 12:45	Technical Session-5 - Structural Engineering at Video Conferencing Hall Civil
	Technical Session-6 - Material Engineering at AV Hall Mechanical
	Technical Session-7 - Transportation Engineering at UG Computer Lab Civil
	Technical Session-8 - Sustainable Engineering at New Block Civil
12:45 - 14:00 Prayer & Lunch break	
14:00 - 15:30	Technical Session-9 - Material Engineering at Video Conferencing Hall Civil
	Technical Session-10 - Construction Engineering at AV Hall Mechanical
	Technical Session-11 - Geotechnical Engineering at UG Computer Lab Civil
	Technical Session-12 - Structural Engineering at New Block Civil

ICEC-2022 PARALLEL TECHNICAL SESSIONS 9:30 - 11:00

	Day-2 - Session-1 Time: 09:30 – 11:00 on Structural Engineering at Civil AV Hall NEDUET, Karachi Session Chairs: Engr. Arif Kasam, ACEP Dr. Asad-ur –Rehman Khan, NEDUET Engr. Nadeem Manzoor Hasan, IEP	Day-2 - Session-2 Time: 09:30 – 11:00 on Materials Engineering at Mechanical AV Hall NEDUET, Karachi Session Chairs: Dr. Tehmina Ayub, NEDUET Mr. Hasan Akhter, Industry Engr. Farooq Razzak Fazal, IEP	Day-2 - Session-3 Time: 09:30 – 11:00 on Construction Engineering at UG Computer Lab Civil NEDUET, Karachi Session Charis: Dr. Farrukh Arif, NEDUET Dr. Mir Shabbar Ali, SSUET Engr. Pyamul Haq Siddiqui, IEP	Day-2 - Session-4 Time: 09:30 – 11:00 on Hydraulic Engineering at New Block Civil NEDUET, Karachi Session Charis: Dr. M. Shafqat Ejaz, NEDUET Mr. Bashir Lakhani, Industry Engr. Khalid Mirza, IEP
09:30-10:00	Keynote “Shape Memory Alloy (SMA) based Self-Cantering Structures” Dr. M. Sharia Alam Professor, The University of British Columbia (UBC) Canada	Keynote Towards Enhanced Durability & Sustainable Construction Through Tuned Cellulose Nanofibres. Dr. Vivek Bindiganavile Associate Professor University of Alberta, Canada	Invited Talk	Invited Talk
10:00-10:15	Performance Evaluation of Jute Fibers Reinforced Concrete Walls having GFRP Reinforcement for Impact Energy Dissipation <i>Shehryar Ahmed and Majid Ali</i>	Impact of Carbon Fibers on Mechanical and Durability Properties of Self-Compacting Concrete <i>Nadeem Abbas, Muhammad Saad and Mudassar Habib</i>	Calculation Of Realistic Esal Values For Future Design of Rural Roads <i>Shahbaz Khan, Aqeel Ur Rehman, Arsalan Khan, Osama Khan and Inam Ullah</i>	Deficit Irrigation-Smart Agriculture For Districts of Sindh <i>Hania Hamdani and Hammad Khalid</i>
10:15-10:30	Case Study: Rapid Seismic Assessment of Existing Hospitals in Karachi <i>Dr Aslam Faqeer Muhammad, Dr Rashid A. Khan, Muhammad Afnan Siddiqui and Muhammad Hammad</i>	Improvement In Damping Of Concrete With Combined Effects Of Banana Fibers And Used Diesel-Engine-Oil <i>Zain Ul Abideen and Majid Ali</i>	Optimal Rendering of Resource Leveling for Building Construction Projects <i>Salman Hamad, Syed Mohsin Ali, Saddam Hussain, Majid Khan and Lal Zaman</i>	Estimation of Suspended Sediment Concentration of Keenjhar Lake by Remote Sensing <i>Abdullah Azzam, Haqqan Uddin and Umair Maman</i>
10:30-10:45	Effect of Jute Fibers on Behavior of RC Beam Column Joint <i>Ghanzanfar Rafi and Majid Ali</i>	Incorporation of Bokashi Fermented Leaves (BFL) to improve the Algal Growth on Concrete Surface <i>Abdul Mannan Yousfani, Tomohisa Kamada, Toshiharu Kishi and Farhan Ahmed Shaikh</i>	Impact of Window Configurations on Heating and Cooling Demands of Building in a Regional Climate – A Case Study <i>Muhammad Saad Ifrahim and Ahsan Zafar</i>	Experimental Study Of Energy Dissipation In An Open Channel Flow With Intermediate Vegetation And Different Dykes. <i>Muhammad Imran, Dr. Afzal Ahmed, Hafiz Ubaid Ur Rehman, Shees Ur Rehman, Ahmad Abdullah Ahmad Abdullah and Muhammad Taha Hussain</i>
10:45-11:00	A review on the correlation between damage stages in structure lifespan and structural health monitoring. <i>Muhammad Jalil Khan and Majid Ali</i>	Potential of Wastes as possible Construction Materials: A Review <i>Syed Asad Abbas and Majid Ali</i>	Unethical Practices (Causes, Effects and Remedial Measures) in The Public Sector Construction Projects of Balochistan <i>Shakeel Ahmed, Syed Abdullah Shah Hashmi, Nafees Ahmed Memon</i>	Delineation of the River Network Using Varries GIS Applications: A study of Rompin River, Malaysia <i>Syeda Maria Zaidi Jacqueline Isabella Anak Gisen</i>
11:00-11:15	TEA BREAK			

ICEC-2022 PARALLEL TECHNICAL SESSIONS 11:15 - 12:45

	Day-2 - Session-5 Time: 11:15 – 12:45 on Structural Engineering at AV Hall Civil, NEDUET, Karachi Session Chairs: Dr. Shuaib Haroon Ahmed, NEDUET Engr. Farhat Adil, IEP Engr. Mukesh Kumar, NESPAK	Day-2 - Session-6 Time: 11:15 – 12:45 on Materials Engineering at AV Hall Mechanical NEDUET, Karachi Session Chairs: Engr. Mir Salman Dr. Farnaz Batool, NEDUET Engr. Javed Aziz Khan, IEP	Day-2 - Session-7 Time: 11:15 – 12:45 on Transportation Engineering at UG Computer Lab Civil NEDUET, Karachi Session Chairs: Dr. Mir Shabbar Ali, SSUET Dr. Adnan Qadir, NEDUET Engr. Rehan Zamin, NESPAK	Day-2 - Session-8 Time: 11:15 – 12:45 on Sustainable Engineering at New Block Civil NEDUET, Karachi Session Chairs: Dr. Farrukh Arif, NEDUET Dr. Tariq Jamil, NEDUET Engr. Nooruddin Ahmed, IEP
11:15 -11:45	Invited Talk	Invited Talk	Invited Talk	Invited Talk
11:45-12:00	Economical Design Of Combined Pile Raft Foundation System <i>Ameer Hamza, Aqeel Ur Rehman and Irfan Jamil</i>	Effects of Blast Furnace Slag and Coconut Shell on Properties of Concrete for Sustainable Construction - A Review <i>Arshad Qayyum, Muhammad Uzair, Naveed Afaq and Sohail Afzal</i>	Macrosopic Fundamental Diagram Estimation of Urban Cities by Subset of Loop Detectors <i>Syed Muzammil Abbas Rizvi</i>	Effect of fly ash and silica fume on compressive strength of Autoclave aerated concrete <i>Mohsin Ali and Aqsa Murad</i>
12:00-12:15	Strengthening of Reinforced Concrete Columns with External Steel Bars <i>Inayat Ullah Khan, Akhtar Gul, Khalid Khan, Nasim Ayub and Iqtedar Shah</i>	A Review On Fiber-reinforced Foam Concrete <i>Majid Khan, Muhammad Shakeel, Adil Khan, Khalid Khan and Saeed Akbar</i>	Passenger Car Equivalent Factor Estimation for Local Traffic <i>Afzal Ahmed Syed Muhammad Noman Mirza Asad Ullah Baig, Muhammad Ali Ismail, Adnan Qadir</i>	Shortterm and Longterm Needs for Sustainable Concrete - An Overview <i>Shiza Khan and Majid Ali</i>
12:15-12:30	An Overview of Shortcomings in Conventional RC Structures from Sustainability perspective <i>Raza Ahmed Sheraz and Faiza Khalid</i>	Parametric study on the Compressive Strength of Fly ash based Geopolymer Concrete <i>Aqsa Murad, Mohsin Ali and Aneel Kumar</i>		Fiber Reinforced Concrete: A Review <i>Majid Khan, Muhammad Anas, Hazrat Bilal, Shantul Jadoon and Muhammad Nadeem Khan</i>
12:30-12:45	Different Aspects of Interlocking Blocks Geometry: From Literature Perspective <i>Safeer Ullah and Majid Ali</i>	Mechanical Properties of Steel Fiber Reinforced Concrete <i>Inayat Ullah Khan, Akhtar Gul, Khalid Khan, Saeed Akbar and Irfan Ullah</i>		Performance Of Fibre Reinforced Self Compacting Concrete Against Chloride Attack <i>Mudasar Hassan, Ayub Elahi and Mehwish Asad</i>
12:45 – 14:0	Prayer & Lunch Break			

ICEC-2022 PARALLEL TECHNICAL SESSIONS 2:00 - 3:30

	Day-2 - Session-9 Time: 14:00 – 15:30 on Materials Engineering at AV Hall Civil NEDUET, Karachi Session Chairs: Engr. Prof. Dr. S.F.A.Rafeeqi, NEDUET Dr. Saeedullah Jan, BUITEMS Dr. Sadaqatullah Khan	Day-2 - Session-10 Time: 14:00 – 15:30 on Construction Engineering at AV Hall Mechanical NEDUET, Karachi Session Chairs: Mr. Junaid Hamid Dr. Rana Rabnawaz Khan, NEDUET Engr. Umer Mashkoor Makhdumi, IEP	Day-2 - Session-11 Time: 14:00 – 15:30 on Geotechnical Engineering at UG Computer Lab Civil NEDUET, Karachi Session Chairs: Dr. Amanullah Mari, NEDUET Engr. Al-Kazim Mansoor, IEP Dr. Sadaf Qasim, NEDUET	Day-2 - Session-12 Time: 14:00 – 15:30 on Structural Engineering at New Block Civil NEDUET, Karachi Session Chairs: Engr. Monis Suri (Industry) Engr. Bushra Nadeem Mufti, IEP Engr. Faiza Saeed, IEP
14:00 -14:30	Invited Talk	Invited Talk	Invited Talk	Invited Talk
14:30-14:45	Corrosion Effect in Underground LV Distribution Networks in Domestic and Commercial Buildings <i>Muhammad Bin Zubaid Ramay, Salman Amin, Yasir Buti and Muhammad Sohail</i>	An overview on the need for automatic structural detailing of area elements in BIM tools <i>Abbas Ali Shah and Majid Ali</i>	An overview on different cross-sectional shapes of canal and their characteristics <i>Ali Rehman and Majid Ali</i>	Behavior of SMRF and IMRF RC Building During Earthquake A Review <i>Blawal Hasan and Majid Ali</i>
14:45-15:00	Evaluation of Mechanical and Durability Aspects of Self-Compacting Concrete by using Thermo-Mechanical Activation of Bentonite. <i>Mudassar Habib, Mudammad Saad and Nadeem Abbas</i>	An analysis of employee motivation in construction industry: the case of Hong Kong <i>Taiwo Ridwan, Kwok Chin Wang, Oludolapo Ibrahim Olanrewaju, Salman Tariq, Owalabi Titilayo Abimbola, Imran Mehmood and Tarek Zayed</i>	Reduction Of Local Scour Around Square Bridge Pier Using Double Hooked Collar And Bar As A Countermeasure <i>Hafiz Ubaid Ur Rehman</i>	Behaviour of Concrete Column Reinforced with Steel Bars Exhibiting Uncertain Yield Strength <i>Gul Khan, Muhammad Saad Khan and Prof. Dr. Muhammad Masood Rafi</i>
15:00-15:15	Damping of Hybrid Natural Fiber Reinforced Concrete <i>Muhammad Abrar and Majid Ali</i>	Quality Attributes for Supplier Selection in the Construction Industry of Pakistan: The Contractors' Perspective <i>Faizan Ur Rehman Qambrani and Abdul Mannan Yousfani</i>	Utilization of Acacia Modesta Gum Powder as Viscosity Modifying Agent in Self Compacting Paste Systems <i>Muhammad Waqas Malik</i>	
15:15-15:30	Experimental Study on Bond Strength of Locally Manufactured GFRP Bar <i>Muhammad Saad Ifrahim, Dr. Abdul Jabbar Sangi and Syed Muhammad Hamza</i>			

Day & Date: Saturday 14th May, 2022, Time: 09:30 – 11:00

Technical Session-1

on Structural Engineering

at Civil AV Hall, NEDUET, Karachi

Session 1 - Paper 1

Session Name: STRUCTURAL ENGINEERING

PERFORMANCE EVALUATION OF JUTE FIBERS REINFORCED CONCRETE WALLS HAVING GFRP REINFORCEMENT FOR IMPACT ENERGY DISSIPATION

Shehryar Ahmed^{1*}, Majid Ali²

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Structures are often exposed to dynamic loading in case of accidental impacts. Such scenarios require special precautionary measures to counteract the induced forces. The goal of this research is to investigate the effect of jute fibers (JF) addition in the glass fiber reinforced polymer (GFRP) rebars reinforced concrete wall for possible impact energy absorption. Concrete was prepared for testing of mechanical, dynamic and impact properties of specimens. Mix design ratio was 1:2:3 with 0.6 water cement ratio. Addition of 50 mm long jute fibers was 5% by mass of cement. Wall panels were reinforced with a mesh of 350 mm long GFRP rebars with 6 mm diameter. A 2.925 kg hammer was used to perform impact strikes at the centre of a 3-edge supported wall panel in a modified pendulum impact apparatus. A failure criteria was defined up to 25 mm penetration for impact strikes quantification. Dynamic properties were evaluated at regular intervals. Accelerometers were mounted at three different locations to assess dissipated energy through wall. Energy dissipation turned out to be greater in jute fiber reinforced concrete (JFRC) than plain concrete (PC). Monitoring of internal fracturing at regular intervals could be utilized for further investigation of energy dissipation phases.

Keywords: Wall Panels, Impact Load, Jute Fibre Reinforced Concrete, Pendulum Impact, GFRP Rebars.

Session 1 - Paper 2

Session Name: STRUCTURAL ENGINEERING

CASE STUDY: RAPID SEISMIC ASSESSMENT OF EXISTING HOSPITALS IN KARACHI.

Aslam Faqeer Mohammad, Rashid Ahmed Khan

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Hospitals are considered as safe haven in scenario of an earthquake or any other natural calamity, therefore these essential structures should be prepared and remain functional if such an event occurs. Past seismic events showed the poor performance of essential structures such as bridges and particularly the hospital buildings and accountable to intensify the loss of life in high seismicity region of Pakistan. In order to prevent disruption in functionality or any damage to the infrastructure of the hospital it is wise to come up procedures so that can be performed pre and post-earthquake assessment to evaluate the integrity of the structural as well functional aspects of the hospital. To this end, in this paper a modified Rapid Visual Screening (RVS) procedure is employed and applied to three major hospital buildings located in the city of Karachi, which is metropolitan city and financial hub of Pakistan. In current study, three tiers procedure adapted from ASCE41-17 and the shortcomings of the structural aspects considered herein and evaluated at component and global levels by developing an FEM model of case-study hospital. Results presented in the form of quick checklists obtained from tier-01 and verified from tier-02 procedure for further necessary action or intervention.

Keywords: Seismic Evaluations, Hospitals, Rapid Visual Screening (RVS), Finite Element Analysis, Disaster Prevention

Session 1 - Paper 3**Session Name: STRUCTURAL ENGINEERING****EFFECT OF JUTE FIBERS ON BEHAVIOR OF RC BEAM COLUMN JOINT****Ghanzanfar Rafi, Majid Ali**Capital University of Science & Information Technology, Islamabad, Pakistan
engineer.ghanzanfar@gmail.com, majid.ali@cust.edu.pk

Beam column joint or structural connections are critical points under earthquake loading. Concrete is a brittle material and weak in tension therefore during event of an earth-quake concrete fails specifically from column beam joints. Damages caused to concrete in such conditions may be spalling and scaling of the surface, large chunks are coming off, exposing of aggregates and usually exposed aggregates are un-cracked, surface parallel cracking, gaps around aggregates in most of cases. Fibers are used to enhance the mechanical properties of concrete by many researchers. The specific aim of this study is to use Jute fiber reinforced concrete (JFRC) and glass fiber reinforced polymer rebars (GFRP) to improve the performance of building connections by enhancing the properties of concrete. An experimental investigation has been carried out to study the behavior of beam column joint prototype with JFRC and GFRP for improving RC beam-column joint. A total of four specimens were casted, two with plain concrete with GFRP rebars and other two with Jute fibers with GFRP rebars. Specimens were kept in water for 28 days at room temperature. Prototype testing were performed along with simplified boundary conditions. Single mix design ratio 1:2:3:0.6, 5% fiber content, and 50mm fiber length used. Dynamic properties were tested according to ASTM C215-02. Relative comparison of prototype of beam-column joint of JFRC and RC has been made and cracking pattern

Session 1 - Paper 4**Session Name: STRUCTURAL ENGINEERING****A REVIEW ON THE CORRELATION BETWEEN DAMAGE STAGES IN STRUCTURE LIFESPAN AND STRUCTURAL HEALTH MONITORING****Muhammad Jalil Khan, Majid Ali**Department of Civil Engineering, Capital University of Science and Technology, Islamabad, Pakistan.
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Structural health monitoring (SHM) is the deployment of an efficient monitoring system that evaluates the performance of structures, thus achieving economy and safety. For efficient deployment of an SHM system, a strategy is adopted which is based upon the required assessment of the structure. The strategy implemented correlates the damage stages and the governing parameters by resulting in a qualitative index from which a conclusion such as a warning can be deduced. An SHM system consists of many components, such as data acquisition, transmission, processing, management, and decision making. Hence, it results in costly deployments. Correlation analyses and plots evaluate the current and future structural health conditions by performing data interrogation from both computational and measured data. As a review, the paper offers meaningful perspectives and suggestions on the correlation between damage stages and governing parameters in SHM. Out of the study made, it is analyzed that the combined use of SHM approaches results in expounded damage stages. And, that use of computational numerical technologies results in better-correlated results for evaluation.

Day & Date: Saturday 14th May, 2022, Time: 09:30 – 11:00

Technical Session-2

on Materials Engineering

at Mechanical AV Hall, NEDUET, Karachi

Session 2 - Paper 1

Session Name: MATERIALS ENGINEERING

IMPACT OF CARBON FIBERS ON MECHANICAL AND DURABILITY PROPERTIES OF SELF-COMPACTING CONCRETE.

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Self compacting concrete is known for its better performance in construction as it minimizes the energy used in compacting the concrete and gives high strength. But improving the strength and durability parameters of self compacting concrete is always the main priority of modern research. The purpose of this research was to find out the optimal percentage addition of carbon fiber in self compacting concrete with respect to the maximum positive variation that occurs in concrete strength and durability. It is found from experimentation that less carbon fiber in the slump affects workability as the slump diameter diminishes. Adding 0.8 percent carbon fiber reduces drop diameter. Addition of carbon fiber to self-compacting concrete decreases slump. The maximum carbon fiber content reduces blockage ratio, meaning the concrete hardens as lumps emerge. Carbon fiber in concrete increases strength over time. The tensile strength of self-compacting concrete without carbon fiber is poor. The split test is comparable to the compression test. If just 0.6 percent of self-compacting concrete is reinforced with carbon fiber, the effect is positive. Concrete requires water absorption to develop. However, adding carbon fibers to self-compacting concrete limits water absorption. Adding carbon fiber minimizes absorption and hence increases concrete durability. It also illustrates how carbon fiber might improve self-compacting concrete's resilience and resistance to acid attacks, which can limit its service life.

Keywords: Carbon Fibers, Self-Compacting Concrete, Strength and Durability of Concrete.

Session 2 - Paper 2

Session Name: MATERIALS ENGINEERING

IMPROVEMENT IN DAMPING OF CONCRETE WITH COMBINED EFFECTS OF BANANA FIBERS AND USED-DIESEL-ENGINE-OIL

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The demand for traditional construction materials is increasing day by day as a result of the pressures on the construction industries to achieve increased growth and property development. These have given developers the option of using completely different materials as an alternative material in construction. Natural fibre composites are nowadays frequently employed in engineering applications. The researcher focused on the damping properties of natural fibre composite materials in the presented study. As the usage of plastic, glass, and alternative items as fibres in concrete, many different types of by products are considered to prevent cracks, to ensure sustainability, and to achieve durability. The purpose of this paper is to investigate the variation of damping qualities in composite materials made from natural banana fibres (BF) and Used diesel engine oil (UDO). The objective of this study is to evaluate the damping of concrete containing banana fibres in percentages ranging from 0 to 2.5 percent, with a difference of 0.5 percent in 5 proportions and 50 mm fiber length fixed and 9.4 percent diesel engine oil. The addition of banana fiber has been done by taking the percentages 0.5%, 1%, 1.5%, 2%, 2.5% of the mass of cement. The values of the Used diesel fiber reinforced concrete (UDFRCS) of all admixed specimens are compared with normal plain concrete. It is observed from the results that the addition of used diesel engine oil decreases the value of the damping ratio but on the other hand, using BF effect increment of the damping value. It is concluded that in terms of enhancing the damping ratio of the concrete, fibre was more effective than used diesel engine oil.

Keywords: Banana fiber, Used diesel engine oil, Concrete-admixture, damping ratio, Fiber reinforced concrete.

Session 2 - Paper 3

Session Name: MATERIALS ENGINEERING

INCORPORATION OF BOKASHI FERMENTED LEAVES (BFL) TO IMPROVE THE ALGAL GROWTH ON CONCRETE SURFACE

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Fermented Leaves through Bokashi process were incorporated as a partial alternative to sand in concrete to produce a concrete type that can be a prospective artificial reef material. The specimens were checked in small pools where algae *Chlorella Vulgaris* was added and checked for growth. The results show that the concrete with 20% Bokashi Fermented Leaves (BFL) by the weight of cement had 40 times higher algal coverage on the surface by the end of 35 days. Concrete with 2% Bokashi Fermented Leaves (BFL) however tended to increase the algal coverage by 3 times only. The higher algal coverage was due to two specific reasons. pH of the surface of concrete and the nutrients that were packed inside the Bokashi Fermented Leaves (BFL).

Keywords: Artificial Reefs, Bokashi Fermented Leaves, Algal Growth, Adsorption, Amino Acids

Session 2 - Paper 4

Session Name: MATERIALS ENGINEERING

POTENTIAL OF WASTES AS POSSIBLE CONSTRUCTION MATERIALS: A REVIEW

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Despite the fact that the globe generates millions of tonnes of garbage annually, the vast majority of it is not recyclable. Waste recycling is also an energy and pollution hog. There is also a lot of rubbish in the suburbs, which is quite harmful to the ecology. It is possible to eliminate waste while also improving the characteristics of concrete by incorporating waste material into concrete manufacturing. Due to the rapid growth of the green concrete sector, it is now more important than ever to assess the capabilities of waste-concrete mixes. Waste may substitute cement, sand, and aggregates, and that is the focus of this study. Material that has been utilised as a replacement for concrete is highlighted and its properties examined. The inclusion of rubber and agricultural and PET wastes in non-structural concrete was shown to increase fire resistance and ductility, while glass aided to improve thermal stability. Check the consequences of replacing cement, aggregate and sand with waste products. Samples with waste material are subjected to a variety of laboratory procedures to determine their mechanical properties. To find out how sand and aggregate substitution impacts concrete behaviour, we utilised the data from this study. As a last step, we'll look at how waste materials may be used in lieu of regular components and evaluate how it performs in the real world.

Keywords: Waste material, replacement, sand, aggregate, environment.

Day & Date: Saturday 14th May, 2022, Time: 09:30 – 11:00

Technical Session-3

on Construction Engineering

at UG Computer Lab Civil, NEDUET, Karachi

Session 3 - Paper 1

Session Name: CONSTRUCTION ENGINEERING

CALCULATION OF REALISTIC ESAL VALUES FOR FUTURE DESIGN OF RURAL ROADS

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During the design life of the pavement, the pavement structure is subjected to a repetitive load of vehicles. If the vehicle is overloaded than the limits described by the concerned authorities, it will cause serious damage to the pavement structure before reaching the design life. In order to study the effect of heavy vehicular loadings, a study was done on the Equivalent Single Axle Load calculations (ESAL) and the structural design of roads. The study was done by using the background knowledge of the AASHTO road test 1961, whose results are still widely used in present-day for the design of roads. The study was done for the three rural roads i.e., KDA road Kohat, Nasir Bagh Road Peshawar and Topi Swabi road. Average daily traffic data was obtained and forecasted for 20 years. ESALs were calculated and then the structural number was calculated by using the method prescribed by the AASHTO design guide, 1993. On the basis of structural number, road layer thicknesses were calculated. The results showed that heavy trucks pose more serious damage to the pavement than passenger cars. These trucks are sometimes more loaded than prescribed by the concerned authorities resulting in damage to pavement structure. In order to save pavement structures from damaging effects, it is necessary to have a proper check and balance on the load limits given by the concerned authorities.

Keywords: Daily Traffic, Average annual daily traffic, ESAL, Design Life, Pavement design.

Session 3 - Paper 2

Session Name: CONSTRUCTION ENGINEERING

OPTIMAL RENDERING OF RESOURCE LEVELING FOR BUILDING CONSTRUCTION PROJECTS

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The construction of building projects consists of interlink and diverse activities which have to be completed within a yardstick cost and specific deadline. For this, a project manager needs to optimally render the planning and to schedule tasks simultaneously in such cases due to limitations of resources, like availability at the right place and at the right time is a big problem. Such problem can be resolved using resource leveling. This research presents how to practice resource leveling via Microsoft (MS) Project using a case study. A three-story building is selected as a case study. The basement was allocated for parking and there were flats on the rest of the two stories. Upon different dependencies, all the activities of the project were taken interconnected, and resource-leveling was brought out. Different flow charts like Cost flow, cost distribution over resources, resource scheme, etc. were drawn in MS project. MS project was found to be very productive and efficient especially in small industries i.e. where there is less activities and complexities.

Keywords: Resource Leveling, MS Project, Resource optimization, PM software

Session 3 - Paper 3

Session Name: CONSTRUCTION ENGINEERING

IMPACT OF WINDOW CONFIGURATIONS ON HEATING AND COOLING DEMANDS OF BUILDING IN A REGIONAL CLIMATE A CASE STUDY

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The energy consumed by building is more than the energy consumed by transportation. The windows are found to be a weak thermal link through which heat is gained in the summer and lost in the winter, consequently increasing the building's energy consumption. This study focuses on the impact of window to wall area ratio (WWR) and orientation of the building on energy consumption under typical Karachi climate conditions. The energy analysis is conducted using Green Building Studio (GBS). It is found that WWR and orientation have a significant influence on the heating and cooling demands of the building. The space cooling consumption is found considerably higher than space heating consumption.

Keywords: Sustainability, BIM model, energy efficiency, energy consumption, window to wall area ratio, orientation, Karachi

Session 3 - Paper 4

Session Name: CONSTRUCTION ENGINEERING

UNETHICAL PRACTICES (CAUSES, EFFECTS AND REMEDIAL MEASURES) IN THE PUBLIC SECTOR CONSTRUCTION PROJECTS OF BALOCHISTAN

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The construction industry is composed of various professionals with ethical code of conducts, governed by a statutory body, however, these codes are not always followed. The most commonly unethical practices are bid bribery, illegal award of tender, conflict of interest and nepotism. The causes of unethical practices are political influence, monopoly of biggest firm, inadequate administrative structure, greed, and favouritism. These causes effect dissatisfaction of client, poor work quality, loss of public money, maintenance cost, and cost & schedule overruns. The unethical practices can be overcome by considering the legislative laws of punishment for breach of ethical practices, providing proper ethical trainings, implementation of ethical guidelines and proper check and balance of ethical practices. Therefore, this study focused to find out the areas of unethical practices, their causes, effects, and remedial measures to mitigate these unethical practices. This study is done in public sector construction projects of Balochistan to address the problems for better project performance. The data is obtained by using well-structured questionnaires through the experienced construction professionals working in construction industry. Total seventy five questionnaires were distributed with fifty three returned. Mean Item Score through SPSS is used to analyse the returned data. The obtained results will improve the professionalism and ethical behaviour in the public sector construction projects of Balochistan.

Day & Date: Saturday 14th May, 2022, Time: 09:30 – 11:00

Technical Session-4

on Hydraulic Engineering

at New Block Civil, NEDUET, Karachi

Session 4 - Paper 1

Session Name: HYDRAULIC ENGINEERING

DEFICIT IRRIGATION-SMART AGRICULTURE FOR DISTRICTS OF SINDH

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Pakistan is an agriculture country with wheat being one of the essential Rabi crops of the country is sown majorly in Punjab and Sindh. Rabi season starts from October and normally ends in April and water requirement for it varies with location and time of the season. With increasing scarcity and growing competition for water, judicious use of water in agricultural sector is very necessary. Recent advances in irrigation technologies helped in identifying irrigation scheduling strategies effective in minimizing the water demand with minimal impacts on yields and yield quality, leading to improved food security. The study discusses the detail method for crop and irrigation water requirement and latest concepts of irrigation scheduling and strategies involved in irrigation scheduling. Total five scenarios are defined in the study out of which two scenarios of deficit irrigation (DI) along with traditional irrigation practice has been experimented on the field and two additional scenarios i.e., Scenario 4 (Full CWR) and scenario 5 (half of the CWR) has been analyzed on CROPWAT 8.0 model for validation. Water saved due to DI in District Tando Allah Yar (TAY) has been concluded as 41.34% and 35.5% accompanied by a yield reduction of 9% and 4% in winter wheat for Scenario 2 and Scenario 3 respectively, through field experiment. Whereas for District Sujawal the amount of water saved is 51.63% and 43.71% respectively, for Scenario 2 and Scenario 3 respectively, with the yield reduction of 10.7% and 7.14% for wheat crop. From this study, we can conclude that substantial amounts of water can be saved by applying DI with no significant reduction in yields, especially in wheat crop.

Keywords: heat, Deficit Irrigation (DI), Irrigation Scheduling Activities, CROPWAT, Crop Water Requirement (CWR)

Session 4 - Paper 2

Session Name: HYDRAULIC ENGINEERING

ESTIMATION OF SUSPENDED SEDIMENT CONCENTRATION OF KEENJHAR LAKE BY REMOTE SENSING

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Water quality is one of the most concerning issues in megacities. Karachi is the world's third most populated city with poor water supply and management. The city gets more than 80 percent of its water from Keenjhar Lake, the second-largest freshwater lake in the country. Keenjhar Lake and all other water bodies currently lack a water quality monitoring system. This study provides a solution to monitor water quality by remote sensing by calculating the lake's suspended sediment concentration and other quality parameters. To calculate the surface reflectance values, satellite images from Landsat 8 are analyzed in ENVI 5.3. The reflectance values from different sampling points are compared with spectral signatures to calculate the concentration and validated with several regression equations and standard established relations.

Keywords: Water Quality, Suspended Sediment Concentration, Remote Sensing, GIS, Image Processing

Session 4 - Paper 3

Session Name: HYDRAULIC ENGINEERING

EXPERIMENTAL STUDY OF ENERGY DISSIPATION IN AN OPEN CHANNEL FLOW WITH INTERMEDIATE VEGETATION AND DIFFERENT DYKES.

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During large floods, tremendous hydrodynamic pressures may cause considerable structural damage to homes and structures that are directly exposed to flood waves. Flood damage may be minimised with the help of natural barriers like a dyke and vegetation. The purpose of this study is to determine how much energy is lost via vegetation and a dyke in a continuous subcritical flow. The vegetation thickness is kept constant. The dyke's height and other dyke characteristics have the greatest impact on the energy dissipation. When compared to smaller dykes, the energy loss from large dykes is the greatest. The energy loss increases by changing the dyke from small dyke to large dyke in case of Intermediate Vegetation at 10 cm increases from 47.18% to 62 %. Energy dissipation depends upon spacing between dyke and vegetation, dyke dimensions, type of vegetation and Froude number. The energy dissipation is maximum in case of large dyke and smaller distance (10cm). By increasing distance between dyke and vegetation energy dissipation decreases. Energy mitigation is maximum at minimum Froude number (0.33) and minimum at maximum Froude number of 0.58. So, for maximum energy loss, minimum spacing between dyke and vegetation, minimum Froude number and large dyke are necessary

Keywords: Flood, Vegetation, Energy Dissipation, Small Dyke, Intermediate Dyke, Large Dyke.

Session 4 - Paper 4

Session Name: HYDRAULIC ENGINEERING

DELINEATION OF THE RIVER NETWORK USING VARIES GIS APPLICATIONS: A STUDY OF ROMPIN RIVER, MALAYSIA

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Flooding areas are closely depending on the topographical elevation in the basin where lower ground is more likely to be affected. Thus, it is essential to extract the physical characteristics of the basin to be integrated in flood analysis. The objective of this study is to evaluate the performance of different GIS applications in delineation of river networks and catchment for the Romping River Basin. Digital Elevation Model (DEM) of 30 m resolution was applied in both GIS application tools (ArcGIS and QGIS). The simulated river network from ArcGIS and QGIS were evaluated and compared with the digitised river network from Google map for their performances. The obtained results from both GIS applications were compared and determined. The database about the Earth's surface that analysed in GIS softwares can be utilized to derive topographic properties, geomorphometric parameters, morphometric factors or terrain data in common. In combination with other spatial data, computerized elevation models are a vital database for topography-related analyses or 3D video animations. By providing the datasets of the DEM, the topography is analysed and visualized through GIS to generate the database for the input of hydrological modelling process. In order to prevent the flood problem, datasets for the topography can be analyse and compile for the forecasting of the flood problem.

Keywords: Rompin River Basin, Watershed delineation, ArcGIS, QGIS, 30m DEM

Day & Date: Saturday 14th May, 2022, Time: 11:15 – 12:45

Technical Session-5

on Structural Engineering

at AV Hall Civil, NEDUET, Karachi

Session 5 - Paper 1

Session Name: STRUCTURAL ENGINEERING

ECONOMICAL DESIGN OF COMBINED PILE RAFT FOUNDATION SYSTEM

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The strength of a building lies in its foundation. The foundation's main purpose is to hold the structure above it and keep it upright. With high-rise buildings touching the sky these days, it has become all the more important to have powerful foundations. For high-rise buildings designing rafts without piles in the foundation is not sufficient because settlement is too much in this condition. Interaction between piled raft components is very important in the design and analysis of the foundation. Ignoring these factors will result in conservative and uneconomical design. In conventional foundation (without raft contribution) the number of piles is very large. Raft contribution reduces the number of piles up to 4-5 times the total number of piles in conventional design. This study has been carried out to determine the economical design of the combined piled raft foundation system by using the finite element approach, ETAB's 17 and PLAXIS 3D. A comparison of different case studies is carried out with a numerical approach. The lateral contribution of the raft significantly reduces lateral deflection and bending moment in piles. All these conclusions show that the raft's vertical and lateral contribution is very important because it makes the foundation economical.

Keywords: Piled raft foundation, ETABS 17, PLAXIS 3D, finite element program, Piles.

Session 5 - Paper 2

Session Name: STRUCTURAL ENGINEERING

STRENGTHENING OF REINFORCED CONCRETE COLUMNS WITH EXTERNAL STEEL BARS

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Column is the most important structural element, which transfer load from floors to foundation, whose proper strength is utmost importance. Failure of column may lead to collapse of the whole framed-structure. The main focus of this study is to check the effectiveness of strengthening technique for a column. This research was carried out by designing and constructing a total of four column's specimens, two circular columns and two square columns. Two column from each combination were then strengthened by removing their clear cover and steel bars were welded to the ties of existing main bars and the clear cover was casted again. The columns were subjected to axial compressive loads. The load carrying capacity of the strengthened circular and square column was increased by 50% and 58% respectively, from that of control columns. Moreover, the deformation capacity of the strengthened columns was enhanced significantly.

Keywords: Strengthening, Reinforced Concrete Columns, External Steel Bars

Session 5 - Paper 3

Session Name: **STRUCTURAL ENGINEERING**

AN OVERVIEW OF SHORTCOMINGS IN CONVENTIONAL RC STRUCTURES FROM SUSTAINABILITY PERSPECTIVE

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Concrete despite having numerous benefits, including durability, long life, and organic inactivity, has few negative impacts such as carbon foot print in manufacturing and operational phase, recyclability and high density. Cement production is one of the most energy-concentrated process materials used in the construction industry and is a major contributor to atmospheric CO₂. The life cycle of concrete construction is reviewed and impacts were determined on the environment by literature review. For the investigation of reinforced concrete structures, various technologies can be used. Four types of emissions, namely carbon emissions (CO₂), nitrogen oxides (NO_x), sulphur oxides and suspended particulate matter, are assessed (SPM) and impacts of RC construction are discussed in societal and environmental context. To reduce the quantity of concrete used in buildings to minimize environmental impact, there is a need to use alternative and sustainable materials.

Keywords: Concrete, Emissions, Environmental impact, Sustainability

Session 5 - Paper 4

Session Name: **STRUCTURAL ENGINEERING**

DIFFERENT ASPECTS OF INTERLOCKING BLOCKS GEOMETRY: FROM LITERATURE PERSPECTIVE

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The construction related industry is conceding the robust requirement to speed up the construction techniques and development, as the conventional techniques are more labour intensive and take long. To overcome this many attempts were made to make larger size of masonry units, thereby reducing the overall construction time. It was needed to accelerate construction speed and eliminate the bedding mortar. Thereby, nonconventional methods were developed for masonry techniques ie adaptation of special interlocking blocks. This paper aims at the discussion on geometry (shapes) of different interlocking blocks (IB), effect of geometrical features on the performance of IB. Furthermore, consideration of various important aspect of geometry of IB are discussed. To understand the importance of mortarless masory, history of IB is discussed in detail. Conclusions based on the literature review are presented.

Keywords: Interlocking Blocks, Prism test, Compressive strength of Mortarless units

Day & Date: Saturday 14th May, 2022, Time: 11:15 – 12:45

Technical Session-6

on Materials Engineering

at AV Hall Mechanical, NEDUET, Karachi

Session 6 - Paper 1

Session Name: MATERIALS ENGINEERING

EFFECTS OF BLAST FURNACE SLAG AND COCONUT SHELL ON PROPERTIES OF CONCRETE FOR SUSTAINABLE CONSTRUCTION - A REVIEW

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New construction practices are diverting the interest of civil engineers towards sustainable development and sustainable approach to the various construction related projects problems and challenges. As in this race of rapid development, the most active progress is observed from construction industries every day. In this scenario, two martial wastes, coconut shell and blast furnace slag, these materials feasibly reused in concrete mixture to reduce the use of fine and coarse aggregates. The increase in pollution and decrease of natural resources due to speedy construction became research motivation. Which pursue to achieve the aim and objectives as use waste material to save the natural resources, prepare an environmentally friendly and sustainable concrete mixture. Moreover, to recycle the industrial and natural waste by partial replacement of sand and coarse aggregate. By this the cost of the concrete will be reduce without compromising on strength. The project will go ahead in several phases from mix design to the testing and result analysis. The expected outcome is to use the waste like blast furnace slag and coconut shell to make sustainable construction without compromising on the strength.

Keywords: Use of industrial and natural waste, Cheap construction material, Sustainable construction, Save environment and Use of BFS and Coconut Shell.

Session 6 - Paper 2

Session Name: MATERIALS ENGINEERING

A REVIEW ON FIBER-REINFORCED FOAM CONCRETE

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Cost-effectiveness and affordability are important factors in the selection of construction material. To achieve this cost-effectiveness, new materials must be brought into use. One such material is foam concrete which seems affordable and economical. Foam concrete is having the best thermal insulation and fire resistance properties. But using foam concrete as a construction material is a major challenge because of its low tensile strength and brittle nature. To improve the properties of foam concrete, researchers added various fibers. This paper reviews the effects of various artificial and natural fibers on the mechanical and physical properties of foam concrete. Incorporating fibers in foam concrete is slightly increased compressive strength, however, it increased tensile strength (up to 3 times), flexural strength (up to 4 times), and impact strength (up to 6 times).

Keywords: Foam Concrete, Fiber-reinforced Foam Concrete, Fibers, Mechanical and Physical Properties, Tensile Strength

Session 6 - Paper 3

Session Name: MATERIALS ENGINEERING

PARAMETRIC STUDY ON THE COMPRESSIVE STRENGTH OF FLY ASH BASED GEOPOLYMER CONCRETE

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Currently, the world produces 4.4 billion tons of concrete annually and this amount may increase to 5.5 billion tons by the year 2050. The production of concrete requires cement; that not only releases huge amount of CO₂ but also damages the earth layer due to continuous mining of limestone. It's also worth noticing that each pound of concrete releases 0.93 pounds of CO₂ into the atmosphere. Therefore, the best alternative to the conventional OPC concrete is the Geopolymer concrete (GPC). This concrete may reduce the carbon footprint upto 80%. In this research, we have produced the Geopolymer concrete by utilizing fly ash that is by product of coal combustion. The effect of various parameters on the compressive strength of GPC were also studied such as alkaline activator solution to binder content (AAS/Bc) as 0.5, 0.6, 0.7 and water to geopolymer solids ratio (Water/GPS) as 0.39, 0.46, 0.52 by keeping molarity fixed at 16 and curing temperature at 600C for 24 hours. The results showed that the with the increase in AAS/Bc, the compressive strength of fly ash based GPC decreased. Similar behavior was observed at Water/GPS. Whereas, the highest compressive strength was achieved as 30 MPa at 0.5 AAS/Bc.

Keywords: Geopolymer Concrete (GPC), Alkaline activator solution to binder content (AAS/BC), Geopolymer Solids (GPS), Carbondioxide gas (CO₂), Molarity.

Session 6 - Paper 4

Session Name: MATERIALS ENGINEERING

MECHANICAL PROPERTIES OF STEEL FIBER REINFORCED CONCRETE

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The rapid increase in vehicle use leads to a tire waste, whose proposal management is a social and environmental concern. The steel wires in the tire have good application in concrete if the proper amount and distribution of steel fiber in the concrete matrix is ensured. This experimental setup evaluates the effect of steel fiber dosage on compressive, splitting tensile strength, and flexure strength of concrete. The relationship between flexure and compressive strength vs dosage of steel fiber is also found. Significant enhancement in compressive and flexure strength was found with the use of steel fiber. Moreover, the effect of the length of steel fiber on the mechanical properties of concrete is checked. 2% dosage of steel fiber with 3" length showed excellent performance in compression and flexure. The first crack has appeared at 10% more load than the control specimen. Based on detailed analysis, 2% dosage with 3" fiber length is recommended for the production of the structural concrete

Keywords: Steel Fiber, Mechanical properties, tire waste, flexure strength.

Day & Date: Saturday 14th May, 2022, Time: 11:15 – 12:45

Technical Session-7

on Transportation Engineering

at UG Computer Lab Civil, NEDUET, Karachi

Session 7 - Paper 1

Session Name: TRANSPORTATION ENGINEERING

MACROSCOPIC FUNDAMENTAL DIAGRAM ESTIMATION OF URBAN CITIES BY SUBSET OF LOOP DETECTORS

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An accurate estimation of MFD is required for determining the traffic flow parameters of the road network. MFD was estimated for the urban road network by the data of subset links. The accuracy of the estimated MFD is affected by the heterogeneity of the road network. Including the effect of heterogeneity in the selection of links decreases the susceptibility of subset links to inhomogeneity. The literature does not include the effect of heterogeneity in the link selection. This study developed a method first of the kind for having the impact of heterogeneity in link selection using traffic flow data only. The first objective was the weight assignment to the time intervals of data collection for maintaining the temporal homogeneity between the subset links. Secondly, the ranking of links on which loop detectors were installed was developed by weighted saturation level. The high-ranked links were the most homogenous sample of subset links. Furthermore, the measure developed for determining the heterogeneity level was the difference between the weighted and unweighted average flow of the road network. The methodology was applied to the traffic data of Zurich and London. The methodology was inexpensive and straightforward, and increasing the number of links will increase the computational time linearly.

Keywords: Macroscopic Fundamental Diagram, Heterogeneity, Loop detectors, Entropy weights, TOPSIS.

Session 7 - Paper 2

Session Name: TRANSPORTATION ENGINEERING

PASSENGER CAR EQUIVALENT FACTOR ESTIMATION FOR LOCAL TRAFFIC

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A variety of methods have been proposed in the existing literature for the estimation of Passenger Car Equivalent (PCE) factors. These methods are based on the comparison of selected attributes of different vehicles. This research, for the first time, utilizes the basic notion of the linear relationship between road area occupancy and density for the estimation of PCE factors for different vehicle types in heterogeneous traffic. Aerial photographs obtained from an Unmanned Aerial Vehicle (UAV) were analyzed to estimate the road area occupancy and the number of vehicles classified in seven selected groups. A linear least-squares regression model was developed between road area occupancy and classified vehicle count. The coefficients of the occupancy-density linear regression model were used to estimate PCE and MotorCycle Equivalent (MCE) factors. The comparison of the estimated set of PCE values with the values reported in the literature shows that PCE factors estimated using the proposed method are reasonable and produce a better occupancy-density relationship than the other studies. In comparison with the existing methods that rely on lane-based measurements, the proposed method is well suited for traffic with weak/ no lane discipline, as it considers the entire road width and the dynamics of lateral movement of different types of vehicles. The proposed method does not need extensive traffic data of speeds, headways, flow rates etc. and is applicable on aerial photographs obtained from other sources, such as satellites.

Keywords: Unmanned Aerial Vehicle; Heterogeneous Traffic; MotorCycle Equivalent Factors; Karachi, Pakistan; Driving Behaviour

Day & Date: Saturday 14th May, 2022, Time: 11:15 – 12:45

Technical Session-8

on Sustainable Engineering

at New Block Civil, NEDUET, Karachi

Session 8 - Paper 1

Session Name: SUSTAINABLE ENGINEERING

EFFECT OF FLY ASH AND SILICA FUME ON COMPRESSIVE STRENGTH OF AUTOCLAVE AERATED CONCRETE.

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Increasing construction industry results in increase of cement production; consequently, CO₂ emission also increases. 5 to 10 % of world's carbon dioxide emission is due to construction industry. Around one ton of cement produces 1 ton of CO₂. This huge amount of CO₂ emission can be decreased to some extent by utilizing waste materials such as fly ash and silica fume. A lot of research has been already done on replacement of cement with fly ash and silica fume as separate entities. This research is carried out to check the combine effect of Fly ash and silica fume on the properties of Autoclave aerated concrete. Auto-clave aerated concrete is a light weight concrete in which autoclaving technique is used for curing. Initially, cement was replaced with fly ash and silica fume, separately, and their effect on compressive and tensile strength was observed. Replacement percentage for both entities were 10%, 15%, 20% and 25%. The temperature and pressure at which specimens were cured was 200 °C and 1.5 pascal. The optimum compressive strength was achieved at 20 % replacement of fly ash and the optimum compressive strength was achieved at 15 % replacement of silica fume.

Keywords: Fly ash (FA), Silica Fume (SF), Autoclave Aerated Concrete (AAC), Carbon dioxide gas (CO₂).

Session 8 - Paper 2

Session Name: SUSTAINABLE ENGINEERING

SHORT-TERM AND LONG-TERM NEEDS FOR SUSTAINABLE CONCRETE AN OVERVIEW

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The world's population is increasing rapidly, which has increased the demand for constructing new structures. The need for increased construction is not only creating a shortage of natural resources but is also depleting the environment. Not only this but waste materials such as plastic, glass wastes, etc. are not disposed of properly, which are risking flora and fauna to the point of extinction. After such a condition, ecologists suggested the world opt for "sustainable development," with the aim of developing the world in such a way that natural resources and the environment are conserved, because concrete is one of the leading contributors of CO₂ emissions into the atmosphere. This approach is about making sustainable concrete by utilizing wastes such as PVC and glass mix as a replacement for fine aggregate, i.e., sand. This will help decrease the CO₂ emissions from concrete to a considerable level. This will be done by replacing the PVC-Glass mix in different ratios with sand. Thus, this will contribute to the usage of waste materials, which will help in preserving the environment along with flora and fauna that are at the risk of extinction. And the world's sustainable concrete demand will be met without compromising concrete strength.

Keywords: Sustainable development, environment, flora and fauna, PVC-Glass mix.

Session 8 - Paper 3

Session Name: SUSTAINABLE ENGINEERING

FIBER REINFORCED CONCRETE: A REVIEW

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Concrete is widely used in the construction industry as a construction material due to its wide range of applications to civil infrastructure works. But the use of concrete has been limited due to its certain deficiencies like brittleness, low tensile strength, proneness to crack opening and propagation and low durability. To subdue these drawbacks, researchers have modified concrete by adding various synthetic and natural fibers to improve the nature of concrete. The demand for high strength and cracks resistant concrete led to the development of fiber-reinforced concrete. This paper reviews the effects of fibers inclusion on the properties of concrete. Generally, the addition of fibers improves tensile strength, flexural strength, and durability performance. Moreover, incorporating fibers reduces the shrinkage cracks of concrete. However, incorporating fibers in concrete has some negative effects like low workability.

Keywords: Fiber-reinforced Concrete, Tensile Strength, Crack Opening, Fibers, Brittleness.

Session 8 - Paper 4

Session Name: SUSTAINABLE ENGINEERING

PERFORMANCE OF FIBRE REINFORCED SELF COMPACTING CONCRETE AGAINST CHLORIDE ATTACK

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This paper presents the combined effect of polypropylene fibers (PPF), silica fume (SF) and fly ash (FA) on the characteristics of normal strength self-compacting concrete (NSSCC). NSSCC is proposed to be prepared by several combinations of PPF and class C FA as partial replacement of cement. NSSCC was prepared by incorporation of SF at 10% and PPF at 0.5%, 1% and 1.5% by mass of Portland cement. Cohesion and adhesion properties of concrete become much better, along with increased tightness and excellent deformability due to the binding strength of PPF. These fibres inhibit the formation of pores in the concrete matrix and prevent the crack formation and its spread along with the matrix. The chloride migration coefficient was determined in accordance with NT Build 492. Mass diffusivity of chloride ions reduces with increasing concentrations of fly ash in concrete. Results indicate that fibre-reinforced concrete has the improved durability compared to other methods.

Keywords: Self-Compacting Concrete (SCC), Poly Propylene Fibres, Durability of SCC, Chloride migration test, Chloride attack.

Day & Date: Saturday 14th May, 2022, Time: 14:00 – 15:30

Technical Session-9

on Materials Engineering

at AV Hall Civil, NEDUET, Karachi

Session 9 - Paper 1

Session Name: MATERIALS ENGINEERING

CORROSION EFFECT IN UNDERGROUND LV DISTRIBUTION NETWORKS IN DOMESTIC AND COMMERCIAL BUILDINGS

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The underground distribution network is an essential part of our domestic and commercial area buildings. PVC cables are mostly used for household wiring including underground cables installation in LV distribution networks. Small cracks in cable insulation or gaps in connectors during or after installation can cause water to seep through onto the conductor. Heated conductor in presence of water causes corrosion of conductor and eventual failure. These are the most common causes of emerging faults in underground networks. Such faults occur frequently and result into a permanent failure soon after the occurrence. Mostly the failures arise in low voltage levels in distribution systems and has a large impact on its durability. Despite the fact that majority of customers are affected, the impact to annual customer minutes lost is significant and the annual expenses of resolving the outages become large. Al/PVC/PVC cables are mostly used for commercial installation including four different sizes; 10 mm² (2-core, 4-core), 120 mm² (4-core), 240 mm² (4-core). In this research, the effect of corrosion on these sizes was studied under the electric stress. Deterioration of an Aluminum conductor was used to investigate the effects of heat and voltage. Such parameters highly influence the rate of corrosion.

Keywords: LV Distribution Network, Differential Voltage, Current Peaks, PVC cable Samples, Dry-band Arcing

Session 9 - Paper 2

Session Name: MATERIALS ENGINEERING

EVALUATION OF MECHANICAL AND DURABILITY ASPECTS OF SELF-COMPACTING CONCRETE BY USING THERMO-MECHANICAL ACTIVATION OF BENTONITE.

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With rapid developments in the construction industry, it has become vital to develop structures and materials which are both cost-effective and environmentally sustainable to reduce carbon footprints. This research work is aimed to inspect mechanical as well as durability aspects of self-compacting concrete (SCC) using thermo-mechanical activation and mechanical activation of bentonite as a partial replacement with cement by weight. Incorporating supplemental cementitious materials (SCMs) many researchers found that the mechanical and durability characteristics of (SCC) can be enhanced. Activation treatments can improve the binding capacity of bentonite and enhance its substitution level. Bentonite was replaced by weight with ordinary Portland cement (OPC) for 10%, 15%, 20%, and 25%. By introducing bentonite, the fresh characteristics of SCC were reduced but remain within the limitation given by the EFNARC. The use of thermo-mechanical activation can significantly increase both hardened and Durability Properties. Compressive and Split tensile strength yielded the best results at 15% substitution level and comparable at 25%. Water absorption and Resistance to acid attack showed better results with an increase in bentonite content at 56 days. These findings indicate that the use of bentonite can cut CO₂ emissions while also producing long-lasting (SCC) at a reasonable price.

Keywords: Bentonite, Slump flow, Self-Compacting concrete, Mineral admixture, Acid attack resistance

Session 9 - Paper 3

Session Name: MATERIALS ENGINEERING

DAMPING OF HYBRID NATURAL FIBER REINFORCED CONCRETE

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The risk of natural hazards is increasing in developing countries. Earthquake is one of the natural hazards which has imposed severe damaging effects to human life and properties in past centuries. Earthquake risk reduction is essential. Damping is the property which plays an important role in vibration reduction. On the other hand, natural fibers are gaining popularity in developing countries due to their easy availability, low cost, decomposable and eco-friendly nature. Wheat straw and jute fiber are the natural fibers which have good physical properties and potential to be used as construction materials in concrete. In this research, the damping properties of hybrid natural fibers reinforced concrete (HNFRC) are focused. The specific aim of this study is to explore the damping properties of composite containing hybrid natural fibers of varying lengths. For this purpose, the jute fibers of 25 mm, 50 mm and 75 mm lengths are used along with wheat straw fibers of 12.5 mm and 25 mm lengths for hybridization. Specimens of cylinders and beamlets are casted and an accelerometer is used to record the longitudinal, lateral and transverse frequencies. The values obtained are compared with the plain concrete (PC) values. The results indicated that the hybrid natural fibers considerably improved the damping of concrete resulting in enhancing the energy absorption of concrete. Due to higher damping properties HNFRC5 can be used in structures prone to dynamic loading.

Keywords: Damping ratio, Dynamic properties, Hybrid natural fiber reinforced concrete.

Session 9 - Paper 4

Session Name: MATERIALS ENGINEERING

EXPERIMENTAL STUDY ON BOND STRENGTH OF LOCALLY MANUFACTURED GFRP BAR

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GFRP rebar is found corrosion resistant and has a greater tensile strength. GFRP rebars are being explored as an alternative way to preventing the degradation of civil infrastructures. GFRP materials, as opposed to steel reinforcement, have anisotropic, non-homogeneous, linearly elastic properties and having different surface deformation patterns (e.g. ribs, thread wrapped, sand coated etc), which may lead to a unique force transfer mechanism between the reinforcement and the concrete. In order to investigate the bond strength of steel and GFRP bars, total twelve (12) cube specimens (200mm x 200mm x 200mm) were cast. The effect of bar material, diameter, and embedded length was examined on bond strength. The bond strength of GFRP bar to concrete was shown to be 42 percent less than the bond strength of steel rebar to concrete. It was also found that the bond strength of GFRP bar to concrete reduced as bar diameter and embedded length increased.

Keywords: GFRP bar, Bond strength, Pull out test, locally manufactured, Reinforced concrete

Day & Date: Saturday 14th May, 2022, Time: 14:00 – 15:30

Technical Session-10

on Construction Engineering
at AV Hall Mechanical, NEDUET, Karachi

Session 10 - Paper 1

Session Name: CONSTRUCTION ENGINEERING

AN OVERVIEW ON THE NEED FOR AUTOMATIC STRUCTURAL DETAILING OF AREA ELEMENTS IN BIM TOOLS

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The structural detailing was performed to verify the structure's ductility and to prevent failures caused by various design parameters. Ductility refers to a reinforced concrete member's capacity to withstand significant deflection before failing. This property of Reinforced concrete is important since it predicts failure and helps to avert the over-all destruction and failure. This is specifically true in earthquake-prone areas. For structural detailing, many design regulations and detailing guidelines are utilized. The main purpose of this study paper is to review the philosophy of the non-seismic and seismic detailing of RCC area element. To discuss the potential of BIM tools in structural detailing of area element, different literature will be reviewed, as well as interviews with structural engineers. In BIM tools the unavailability of specific features was highlighted that could help in the automation of selecting rebars in RCC area elements. This overview concludes with a comprehensive description of several features of non-seismic and seismic RCC area elements.

Keywords: Non-Seismic detailing, Seismic detailing, BIM, ETABS, AutoCAD.

Session 10 - Paper 2

Session Name: CONSTRUCTION ENGINEERING

AN ANALYSIS OF EMPLOYEE MOTIVATION IN CONSTRUCTION INDUSTRY: THE CASE OF HONG KONG

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Hong Kong is a top-tier region in terms of technological advancement, globalization, and competitiveness. One of the drivers of the global relevance of any region is the attitude or motivation of its employees towards their jobs, as it determines their productivity which has a direct impact on the economy. This study is conducted to identify the factors contributing to employees' motivation in the construction industry in Hong Kong. A questionnaire survey is administered to experienced professionals/workers in the construction industry to examine the significance of the motivators. "Monetary incentive" is found as the most correlated factor with the level of employees' motivation in Hong Kong, while "Job security" is found as the least motivating factor. Furthermore, ten hypotheses are developed based on the identified motivators using the literature. These hypotheses are validated by analyzing the responses of the questionnaire using ANOVA. Subsequently, an employee motivation model based on Porter and Lawler's model is developed showing the complete relationships between the factors, and recommendations are presented to improve the state-of-the-art of employee motivations.

Keywords: Employee Motivation, ANOVA, Correlation, Hong Kong, Porter and Lawler.

QUALITY ATTRIBUTES FOR SUPPLIER SELECTION IN THE CONSTRUCTION INDUSTRY OF PAKISTAN: THE CONTRACTORS' PERSPECTIVE**Faizan ur Rehman Qambrani**

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In order to ensure quality work, the main contractor chooses suppliers based upon various quality attributes. The key to quality works on mega projects is to select best-quality suppliers. This research shows the data analysis results of preference rating of quality factors for supplier selection in the Pakistan's construction industry as per the importance given by the contractors. After thorough literature review, a total of 25 factors were finalized and then a survey was conducted targeting the well-known contractors of Pakistan. Weighted Sum Model (WSM) was used to analyze the over-all preference of the quality factors through literature and respondent scores. Correlation analysis was performed to select the dominating and reliable weight split. After significant analysis, 10 crucial factors were identified for the supplier selection in the quality domain. Quality Management System Certification, Product Reliability and Capability of handling abnormal Quality Problems were the top three selection criterions.

Keywords: Quality Management, Quality Attributes, Construction Industry, Supplier Selection, Weighted Sum Model (WSM).

Day & Date: Saturday 14th May, 2022, Time: 14:00 – 15:30

Technical Session-11

on Geotechnical Engineering

at UG Computer Lab Civil, NEDUET, Karachi

Session 11 - Paper 1

Session Name: GEOTECHNICAL ENGINEERING

AN OVERVIEW ON DIFFERENT CROSS-SECTIONAL SHAPES OF CANAL AND THEIR CHARACTERISTICS

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Irrigation canals are critical infrastructure that helps to develop sustainable agriculture and agricultural operations. The minimum area, or maximum velocity cross-section, is usually used for lined irrigation canals. This portion is the most cost-effective because it requires the least amount of earthwork and the least amount of lining surface. The current study aims to evaluate the different canal section characteristics and shapes. A detailed literature review is conducted for the canal with various shapes and parameters. The rectangular, trapezoidal, triangular, and parabolic cross-sections are the most frequent cross sections for canals. It is concluded that there are equations connecting the design variables for distinct practical portions. The following are some essential aspects that must be carefully considered when designing lined canals. Subgrade preparations, cross-section, roughness coefficient, Embankments, Joints, and lining thickness. The design of lined canals is relatively complex. In the optimal channel design, the researchers employed Manning's equations, a uniform flow equation. In addition, a standard resistance equation based on roughness coefficient was adopted in the optimum design of irrigation canals.

Keywords: Canals, cross-section shapes, canal design related variables.

Session 11 - Paper 2

Session Name: GEOTECHNICAL ENGINEERING

REDUCTION OF LOCAL SCOUR AROUND SQUARE BRIDGE PIER USING DOUBLE HOOKED COLLAR AND BAR AS A COUNTERMEASURE

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The scouring around bridge piers has been studied using a variety of methods and approaches. For bridge erosion, the most serious threat comes from local scour near a bridge's anchorage. One of the most difficult aspects of pier building is reducing scouring via the use of a variety of countermeasures. Various methods are used to reduce scouring because of the formation of a vortex and an increase in flow. A square bridge pier is encircled by single and double hooked collars, which are used to test whether scouring may be reduced experimentally. Hooked collars are placed at various depths below and above the streambed level to determine the appropriate depth for reducing scouring to the greatest extent possible. Installing two hooked collars, one at the streambed and the other 0.5B below the streambed, yielded the best results. Even after 48 hours of testing, the bottom collar remained intact, suggesting a scouring reduction of up to 58% when compared to a pier without any protection. Scouring was reduced by 21% and 34% when using a single hooked collar at 0.5B above the streambed and bed levels. By installing a double-hooked collar at 0.5B above the bed, however, it is reduced by half.

Keywords: Square bridge pier, bars, scouring, hook-collar, and countermeasure

UTILIZATION OF ACACIA MODESTA GUM POWDER AS VISCOSITY MODIFYING AGENT IN SELF-COMPACTING PASTE SYSTEMS**Muhammad Waqas Malik^{1,2}*, Syed Ali Rizwan³**

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The properties of self-compacting concrete mainly depend upon the properties of the cement paste phase. Some published literature exists on use of acacia gums in self-compacting cementitious systems but no previous work has reported the utilization of AM gum powder as viscosity modifying agent in self-compacting paste systems (SCPs). This study focuses on the utilization of Acacia Modesta (AM) gum powder as viscosity enhancing agent in SCPs. AM gum powder with average particle sizes (D50) of 135 microns is used with variable Acacia Modesta (AM) gum powder dosages in the range of 0.25% to 1% by weight of the cement. Superplasticizer demand, flow and viscosity, apparent viscosity, air content, fresh density, harden density and compressive strength tests are performed. Result indicates that super-plasticizer demand, flow and viscosity and apparent viscosity, air content of SCPs containing AM gum powder increases with the increase in the percentage of the AM gum powder. While, fresh density, harden density and compressive strength decreases with the increase in the percentage of the AM gum powder proper. On the basis of results, it can be concluded that AM gum powder can be used as viscosity modifying agent in SCPs by changing the amount of AM gum powder in such systems due to nature and composition of the AM gum powder.

Keywords: Acacia modesta gum powder, self-compacting paste systems; Viscosity modifying agent; compressive strength,

Day & Date: Saturday 14th May, 2022, Time: 14:00 – 15:30

Technical Session-12

on Structural Engineering

at New Block Civil, NEDUET, Karachi

Session 12 - Paper 1

Session Name: STRUCTURAL ENGINEERING

BEHAVIOR OF SMRF AND IMRF RC BUILDING DURING EARTHQUAKE A REVIEW

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As it is a concern with the forces induced due to response to earthquake all structural systems are treated differently. Characteristics of structural arrangements, uniformity, distribution of mass, and vertical symmetry should be contemplated. The consequence of ductility, stiffness, and strength in interrelation to the bearable response must also be acknowledged. Moment resisting concrete frames, bearing walls, lateral bracing are taken under consideration in design of the structure to resist lateral and earthquake loadings. Many options come up to have structural systems like lateral bracing, moment-resisting frames, bearing wall, moment resisting concrete frame structures designing it comes up with an option to use intermediate moment resisting frames (IMRF) or special moment resisting frames (SMRF). Response reduction factor (R) is one mostly faced problem in finding the best and most suitable framing system and mechanism of load resisting when structures are to be designed in field. It is a measurement of ductility and over structure's strength and used to calculate the base shear. IMRF and SMRF are highlighted in the research and detailed about their significance according to zone characteristics and type of building use. Different structures having different numbers of stories, plans, and heights of stories are analyzed and compared. It is observed that SMRF has shown a greater collapse capacity than IMRF.

Keywords: SMRF, IMRF, earthquake, response modification factor.

Session 12 - Paper 2

Session Name: STRUCTURAL ENGINEERING

BEHAVIOUR OF CONCRETE COLUMN REINFORCED WITH STEEL BARS EXHIBITING UNCERTAIN YIELD STRENGTH

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In Pakistan, raw material from several sources is utilized in the production of steel bars; consequently, chemical and mechanical properties of locally manufactured bars differ drastically. According to the reviewed literature, there is a significant amount of variation in the data on rebar yield strength. This unintentionally higher yield strength might have serious consequences on Reinforced Concrete (RC) column, as the failure mode could shift from ductile to brittle. The purpose of this study is to investigate the repercussions of unintentionally higher rebar yield strength on RC column. In order to mitigate the effects of unintentionally higher rebar yield strength on the behaviour of RC column, some modifications to the design approach are recommended. A reduction factor is introduced, and an equation for minimal tie spacing is proposed.

Keywords: Uncertain yield strength, higher yield strength, RC column, production flaws, RC design, failure mode.



The Institution of Engineers Pakistan

Closing Session

at Video Conferencing Hall, Department of Civil Engineering,
NED University of Engineering & Technology, Karachi
(Saturday 14th May, 2022)

16:10 - 16:15	Recitation from the Holy Quran
16:15-16:20	Conference Highlights by Engr. Prof . Dr. Abdul Jabbar Sangi Co-Convener, ICEC 2022, Department of Civil Engineering, NED University
16:20 - 16:25	Address by Engr. Prof Rizwan Ul Haque Farooqui Chairman, Department of Civil Engineering, NED University
16:25 - 16:30	Address by Engr. Sohail Bashir, Chairman, IEP, Karachi Centre
16:30 - 16:35	Address by Engr. Asim Murtaza Khan President, NEDIAN Association- Pakistan
16:35 - 16:40	Address by Engr. Dr. Javed Younas Uppal President, The Institution of Engineers, Pakistan
16:40 - 16:45	Address by Engr. Dr. Sarosh Hashmat Lodi, Vice-Chancellor, NEDUET
16:45 - 17:10	Keynote Speech "Sustainable Infrastructure and Technology Integration in Civil Engineering" by Dr William Kelly American Society of Civil Engineering, USA
17:10 - 17:15	Address by Chief Guest
17:15 - 17:20	Conference Recommendations by Engr. Dr. Shamsoun Fareed, Secretary, ICEC 2022 Department of Civil Engineering, NED University
17:20 - 17:25	Presentation of Chairman IEP Medal for Best Paper
17:25 - 17:35	Presentations of Conference Mementos / Certificates
17:35 - 17:40	Vote of Thanks by Engr. M.Farooq Arbi, Vice Chairman, Civil & Allied & Secretary IEP, Karachi Centre
17:40	Tea

List of Papers presented in 11th International Civil Engineering Conference (ICEC-2021) held on 1st April, 2021 at IEP, Karachi Centre

Keynote Address "Recent Technology Development in Japanese Construction Industry"

by Dr. Kenichi Horikoshi, Secretary General, ACEEC and Vice-President Japanese Geotechnical Society, General Manager, Taisei Corporation, Japan

Identification of cracks in concrete by visual inspection and recommendation for their repair - case studies
By Kapil Dev

Effects of Stirrup.s spacing on the confinement, ductility, strength and curvature of circular column using matlab cumbia code
Syed Waqar Younas, Dr. Shahid Ullah, Tawqeer Alam and Bilal Siddiq

Comparative study on seismic analysis and design of high-rise building using static and dynamic analysis by Etabs
Abrar Ahmad, Mamoon Riaz, Tayyab Zafar and Kanwar Kashif Zulfiqar

Numerical Modelling of Three-Dimensional Flow Structure in Open Channel having Patches of Aquatic and Riparian Vegetation
Muhammad Asif and Usman Ghani

Experimental Investigation on Different Geometrical Shapes of Dual Bridge Pier Scouring
Akhtar Abbas and Usman Ghani

A Ninth Century Earthquake induced Landslide Breaching and Downstream flood impact assessment on River Jhelum
Muntaha Ateeq, Roger Bilham and Imran Ahmed

Assessing and Mitigation of Quality Issue of High-Rise Buildings in Pakistan

Zeeshan Ullah, Engr. Muhammad Irfan, Shah Jahan, Engr. Saleh Hayat, Engr. Faheem Ahmed Soomro and Engr. Faizan Ahmed Waris

Schedule performance in dam construction projects of Sindh

Sohail Ali Mallah, Nafees Ahmed Memon, Aftab Hameed Memon, Samiullah Sohu, Naeem Aziz Memon

Evaluation the effect of artificial light weight aggregates on energy performance of building
Zeeshan Ullah, Engr. Talat Habib, Engr. Muhammad Irfan, Engr. Shah Jahan, Engr. Faheem Ahmed Soomro and Engr. Maryam Sadia

Integration of Low Head Turbine with Wastewater for Power Generation: A Case Study

Musab Waqar, Hammad Khalid and Ibtihaj Ahmed

Water Saving Techniques in Civil Engineering Department of Mehran UET Jamshoro

Haresh Kumar, Ashfaqe Ahmed Pathan, Abdul Waheed Kalhoro, Jaipal Rathore and Kelash Kumar

Investigating the Effects of Finite Length Rigid Emergent Vegetation on Inland Flood Attenuation

Kamran Tariq, Ghufran Ahmed Pasha, Norio Tanaka, Usman Ghani and Afzal Ahmed

Fire Protection and Safe Evacuation Issues for Congested Areas in Pakistan

Muhammad Imran

Seismic Performance of Moment Resisting Reinforced Concrete Frames under Code Compatible Ground Motions

Naik Muhammad, Abd Ullah, Mahnoor Mirwani, Faiza Nadeem and Saeed Ullah Jan Mandokhail

Improvement In Impact Resistance Of GFRP Reinforced Concrete Wall Panels Using Jute Fibres

Shehryar Ahmed and Majid Ali

A review on observed flaws in bricks and their possible sustainable remedies for local construction

Waleed Raza, Faiza Khalid and Majid Ali

A Review On Different Influential Factors And Techniques For Evaluating Bonding Between Asphalt Overlay And Concrete Pavement

Muhammad Ali Tariq, Muhammad Usman Farooqi and Majid Ali

Effect of Fly Ash and Polypropylene Fiber on Compressive Strength of Concrete at Normal as Well as Elevated Temperatures

Ghulam Qanber and Faisal Shabbir

Soil reinforcement by using geotextile

Asif Nazir, Usama Khan, Rana Muhammad Umar Farooq and Muhammad Abrar

Treatment of expansive soil by using silica fume

Asif Nazir, Usama Khan and Rana Muhammad Umar Farooq

Foundation on Swelling Soils

Farooq Fazal

Study of the flow characteristics around permeable and impermeable spur dike in an open channel

Sohail Iqbal, Ghufran Ahmed Pasha and Usman Ghani

To Investigate the Breaching Phenomenon of a Fuse plug

Zain Ud Din, Ghufran Ahmed Pasha, Usman Ghani and Afzal Ahmed

Impact on Local Scouring Around Bridge Pier by Submerged Trapezoidal Broad Crested Weir

Muhammad Asadullah and Naeem Ejaz

Effect of submerged vegetation with increasing patch density on the flow structure

M. Hasnain Tariq

Prediction Models for Maximum and Minimum Dry Density of Coarse-Grained Soils

Engr. Muhammad Saad, Zeeshan Ullah, Engr. Muhammad Irfan, Engr. Maryam Sadia, Engr. Faheem Ahmed Soomro and Engr. Shah Jahan

SFRC specimens under increasing compressive loading rates

Laiba Ayub, Minza Mumtaz and Shamsun Fareed

Influence of Asymmetry on Local Damage Response of Plan-Asymmetric Reinforced Concrete Structure

Zeshan Alam

Experimental Research on Post-Fire Repair of RC T-Beams Using Method of Curing

Salman Khan, Muhammad Yaqub, Muhammad Noman and Muhammad Usman Rashid

Behavior of interlocking plastic-block wall with opening under harmonic loading using locally developed shake table

Mehran Sudheer and Majid Ali

Numerical investigation of GFRP Reinforced Non-Circular Concrete Column with Fibre-glass Grating Mesh (FGM) Ties

Muhammad Fawad Rashid, Afaq Ahmad and Mohamed Elchalakani

Analysis of Adhesion and Moisture Susceptibility of Different Modified Bitumen

Using Bitumen Bond Strength and Rolling Bottle Testing Techniques

Muhammad Sohail Jameel, Naveed Ahmad, Syed Bilal Ahmed Zaidi, Hafiz Ammar Zahid, Sohail Iqbal and Muhammad Tausif

Use of admixtures in improving bonded asphalt overlay on concrete pavements-A critical review

Minhas Shah, Muhammad Usman Farooqi and Majid Ali

Assessment of asphalt overlay performance over concrete bridge deck

Syed Zulnorain Ali, Majid Ali and Usman Farooqi

Comparative study of concrete properties using different coarse and fine aggregate abundantly available in Pakistan

Asif Nazir, Usama Khan and Rana Muhammad Umar Farooq

Utilization of Natural Fibers in Concrete for Improving Behavior of Non-Structural Elements A Review

Ahsan Abbas, Ali Ejaz and Majid Ali

Cost Comparison of Concrete Framed Commercial Building Using Natural and Artificial Coarse Aggregates

Zeeshan Ullah, Engr. Muhammad Irfan, Engr. Talat Habib, Engr. Maryam Sadia, Engr. Faheem Ahmed Soomro and Engr. Salman Khan

Adoption of Building Information Modeling (BIM) in Construction Industry of Pakistan: Benefits and Barriers

Muhammad Saleem Raza, Danish Kumar, Hassnain Nawab, Aqeel Murtaza, Shoaib Farooq and Zaid Khan Pathan

Comparison of Green Building Rating Tools by Assessment of Residential Apartment

Usman Hussain and Shuja Safdar

Resource Procurement and handling Issues Generating Waste in Construction Projects

Shahzad Ali, Aftab Hameed Memon, Tauha Hussain Ali, Shabir Hussain Khahro, Nafees Ahmed Memon

Evaluation of Critical Success Factors for improvement of project performance in Government Sector of Pakistan

Zeeshan Ullah, Muhammad Irfan, Engr. Saleh Hayat, Engr. Faheem Ahmed Soomro, Engr. Shah Jahan and Engr. Faizan Ahmed Waris

A critical review on Limitations of non-linear analysis of multi-storey structures

Asma Bashir, S ana Gul and Majid Ali

Influence of Jute Fibre and GFRP Rebars in Compressive and Dynamic Behavior of Prototype Thin Shear Concrete Walls

Abaid Ur Rehman and Majid Ali

Condition Assessment of an Aging Bridge: A Case Study

Rashid Ahmed Khan, Aslam Faqeer Mohammad, Abdul Jabbar Sangi and Amir Nizam

Finite element modelling of uplift in structures - a review

Irfan Waris and Majid Ali

Seismic Analysis and Design of Elevated Water Tower A Review

Muhammad Bahram Tufail Kiani and Majid Ali

Effect of Rice Husk Ash on Properties of Self Compacting Concrete Containing Marble Powder

Muhammad Hamza Irshad and Ayub Elahi

Effect of Heavy Weight Magnetite Aggregate on Mechanical and Radiation Shielding Properties of Concrete

Muhammad Umair Anwar and Ayub Elahi

Effect of Waste Glass Powder on the Fresh and Hardened Properties of Concrete

Naraindas Bheel, Santosh Kumar Meghwar, Zubair Hussain Shaikh, Rameez Ali Abbasi, Irfan Ali Shar, Ali Aizaz Dayo

Evaluation of Effect of Silica Fumes in Reducing Structural Member Size by Improving Properties of Concrete

Zeeshan Ullah, Engr. Muhammad Irfan, Engr. Maryam Sadia, Engr. Faheem Ahmed Soomro, Engr. Talat Habib and Engr. Shah Jahan

Evaluation of Fatigue Characteristics of Reclaimed Asphalt Pavement (RAP) Binder

Muhammad Hammad Hassan

Energy Dissipation in 3D Structure With Multiple Uplifts at Column Bases

Hassam Ud Din and Majid Ali

Performance Comparison of Circular and Rectangular Cross-Sectioned FRP Stirrups

Muhammad Tahir and Zhenyu Wang

Out-of-plane behavior of mortar-free interlocking solid-walls under seismic loading A review

Sohail Afzal and Majid Ali

Performance evaluation of moment resisting frame under real and synthetic ground motions

Naik Muhammad, Farhad Khan, Muhammad Umar, Abdul Samad, Muhammad Ibrahim, Najeeb Ullah and Saeed Ullah Jan Mandokhail

Performance Evaluation of MRF Under Real and Artificial Ground Motions:A Study of Quetta Region Baluchistan

Naik Muhammad, Farhad Khan, Muhammad Umar, Abdul Samad, Muhammad Ibrahim, Najeebullah

Analyzing the mobility of multi-lane highway using travel time as a performance measure

Jamal Khan, Muhammad Khurshid, Arshad Hussain and Muhammad Iqbal

Sustainable Construction in Balochistan: Issues and Challenges

Shakeel Ahmed, Syed Abdullah Shah Hashmi, Salah Uddin, Nafees Ahmed Memon

Effect of Transport Infrastructure Development on Health of Natives: A Case Study of Lahore Orange Line Metro Train Project.

Zeeshan Ullah, Engr. Muhammad Irfan, Engr. Maryam Sadia, Engr. Faheem Ahmed Soomro, Engr. Shah Jahan and Engr. Talat Habib

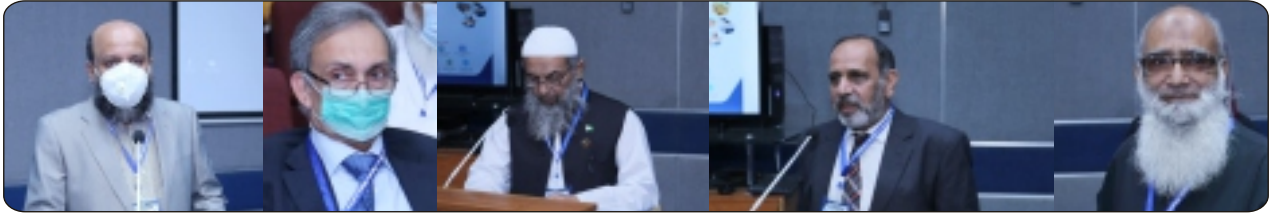
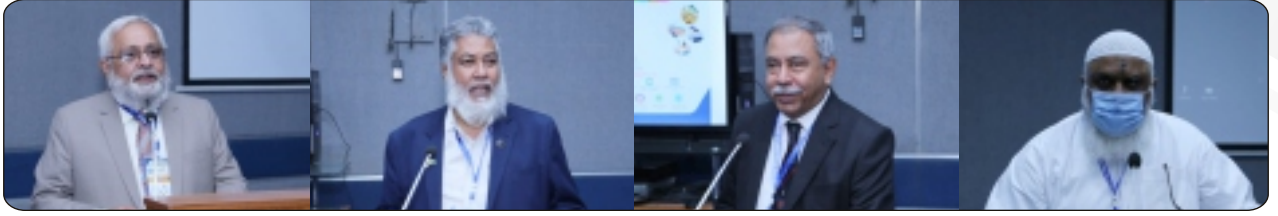
An ultimate Reward-based Blockchain deployment for road user safety

Muhammad Mursaleen, M. Abdul Aziz, Jjaz Nazir Mehr

Use of BIM Tools In Highway Transportation System In Developed Countries -A Review

Misbah Ur Rehman, M. Usman Farooqi and Majid Ali

GLIMPSES OF 11th ICEC-2021



A BRIEF ABOUT IEP

The Institution of Engineers Pakistan was founded with the blessing of the Father of the Nation, Quaid-e-Azam Muhammad Ali Jinnah, in 1948 with its Headquarter at Dhaka. In 1972 the Headquarter was shifted to Lahore. Presently IEP has 5 Capital & Provincial Local Centres at Islamabad, Karachi, Lahore, Peshawar & Quetta and 5 local centres at other major cities which includes Hyderabad, Sukkur, Multan, Faisalabad & Gujranwala. IEP also has 3 International Centres at Saudi Arabia, Bahrain & USA. Beside various Technical programs organized regularly, every year IEP Karachi Centre and NED University of Engineering & Technology, Karachi in collaboration with almost all PEC Accredited Engineering Institutions of Karachi & Balochistan organizes three International Conferences on Civil, Mechanical & Electrical Engineering. In these conferences International & Local researchers, academicians & distinguish Engineers from Industry actively participate and present their papers / research / achievements.



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FATHER OF THE NATION

Quaid-e-Azam Muhammad Ali Jinnah

Message on the occasion of
Foundation Stone Laying Ceremony of the
Institute of Engineers Pakistan, Headquarters
at Dacca on 30th May, 1948

"If Pakistan is to take its proper place among the progressive nations of the world, it will have to take up a good deal of leeway in the realm of scientific and technical education which is so necessary for the proper development of the country and the utilization of its resources. The establishment of institution like the Institute of Engineers will greatly stimulate technical research and help in disseminating available information.

The Institute of Engineers will not only benefit the engineers themselves by improving their technical knowledge but also bring lasting benefits to public services which they are called upon to perform.

I wish the Institute every success"