THE BLUE PRINT

Department of Civil Engineering

Volume -6 2022-23

In This Issue

DEPARTMENT OF CIVIL ENGINEERING

VISION

- To develop Civil Engineering Department as a Centre of Excellence for imparting value-based education to the students at under-graduate and post-graduate level to meetindustry needs and to develop as a major research center to meet the national and international standards.

MISSION

- To impart in-depth and up-to-date knowledge of Civil Engineering, stressing concepts with focus on character enhancement, leadership qualities, effective communication, social responsibility, pursuit of lifelong learning and professional development.
- To provide a platform to students to engage in innovative research work.

FACULTY OF CIVIL ENGINEERING DEPARTMENT

PRINCIPAL'S MEASSAGE

Dr. C.D. Naidu, Principal
VNRVJIET

I am pleased to introduce our Civil Engineering Department Newsletter, showcasing our department's achievements and activities. This platform unites students and teachers, encouraging creativity and the exchange of ideas.

At VNR VJIET, we focus on holistic development, preparing students for technological advancements. Our various initiatives ensure personal and professional growth, making students competent professionals. This newsletter allows students to share and disseminate information related to their field.

In these times of change, adaptability and excellence are key. The newsletter nurtures creativity and sharpens skills, reflecting our academic pursuits and future goals.

Congratulations to the team and students for their efforts.

EDITORIAL NOTE

Dr. A. Mallika, Prof. & Head-CE
VNRVJIET

It is heartening to note that "The Blueprint" volume 6 is being published on-line, a compilation of all achievements of the students, faculty, and Department. The effort of the Editorial Team is highly appreciable, and I wish to put it on record.

Congratulations to all the stakeholders of the Department for granted with 6 years NBA accreditation for UG (B. Tech- Civil Engineering) program in Outcome Based Education. The Civil Department has all along contributed not only for academic excellence but also its increasing visibility in Research.

Department's commitment to provide students with a strong fundamental knowledge, using cutting edge technologies and modern equipment coupled with dedicated efforts of the faculty and staff have resulted in excellent outcomes. Many research facilities across the laboratories are augmented to enhance the quality research and the research ecosystem. Research Interest Groups (RIGs) are active and working with academic and industry collaborations. All the academic accolades, achievements in research (Publications, Research grants, patents) in this year are noteworthy to mention in the volume.

Wishing all the students a brilliant and bright future.

DEPARTMENT NEWS

ACHIEVEMENTS

- B.Tech. Civil Engineering Program is accredited for 6 years (2022-2028) by NBA consecutively for the 2nd time.
- The Department of civil Engineering bagged second prize for the “Sustainable Campuses" competition at IIT Madras.
- Sh. K. Sitaram Anjaneyulu, Rtd. Chief Scientist, CSIR, New Delhi is associated with the department of Civil Engineering as an Adjunct Professor.
- The Department of Civil Engineering signed an agreement on 25th March 2023 for extending its technical support to Gram Bazaar in Plastic recycled products for the next one year.

Memorandum of Understanding (MoU):

List of active MoU’s in the department of Civil Engineering.

- NHAI
- COACT Solutions
- ECC L&T Construction
- Venkata Praneeth Projects Ltd.
- BSCPL Infrastructure Ltd.
- SEW Infrastructure Pvt. Ltd.
- Keerthi Industries

MoU with M/s Keerthi Industries

MoU with M/s Praneeth Group

Consultancy Works carried out by the Department:

- Dr. A. Mallika and Dr. S. Rakesh carried out a consultancy work on “Feasibility for Construction of One Additional Floor for the Existing Building (Villa No. 268) of M/s. Megha Engineering Infrastructures Ltd., located at Hill County, Nizampet, Hyderabad” (Rs. 0.465 Lakhs).

- Dr. A. Mallika, Dr. R. Durga Prasad and Dr. S. Rakesh carried out a consultancy work on “Structural Stability and Study on the Feasibility for Construction of One Additional Floor for the Existing Building of M/s. Srinagar Colony Recreation Club located at Srinagar Colony, Hyderabad” (Rs. 0.62 Lakhs).

- Dr. R. Durga Prasad carried out consultancy work on “Non-Destructive Evaluation for the Existing Building of M/s. Kakatiya Anna Satra Sangam, located at Srisailam” (Rs. 0.21 Lakhs).
- Dr. R. Durga Prasad and Dr. S. Rakesh carried out consultancy work on “Non- Destructive Evaluation and Structural Stability of the Existing Building for M/s.Aizant Ltd., located at Narsapur” (Rs. 0.947 Lakhs).
- Dr. R. Durga Prasad and Dr. S. Rakesh carried out consultancy work on “Rebound Hammer Test for columns of Unit-I and Unit-II (Parking and Dining Hall and Packing Hall) of M/s. Gland Pharma Ltd., located at Pashamylaram, Patancheruvu, Sangareddy” (Rs. 0.296 Lakhs).
- The Department of Civil Engineering carried out Third Party Quality Control GHMC works and generated a revenue of **Rs. 28,57,988.**

Best practices:

* Clean and affordable energy (SDG-7)
* Waste management.
* Green Initiatives (SDG-3)
* Good health and well-being.
* Clean water and sanitation (SDG-6)

Societal Impact Projects:

- A study on Durability and service life prediction of reinforced Concrete Structures.
- A comparative study on the Analysis and Design of Pre- Engineered Buildings using IS and AISC codes.
- Study on Soil Moisture and Terrestrial Water Storage using Radar Remote Sensing and PYTHON Program
- Pavement condition assessment using image processing.
- A study on the settlement of shallow foundation on blended soil

GUEST LECTURES ORGANIZED:

- Mr. Ramakrishna Vidap, the Managing Director of Speed Dry Mix India Pvt. Ltd delivered a lecture on "Dry Mixes ", on July 4, 2022.
- K. Sitaram Anjaneyulu, Rtd. Chief Scientist, CSIR-Central Road Research Institute, New Delhi delivered a lecture on “Pavement construction practices and challenges” on August 18,2022
- Mr. D. V. Sridhar Murthy, Managing Director, m/s Samarth Infra. Engineering delivered a lecture on Pavement Design and its field challenges on August 20,2022
- Dr. V. Srihari, Deputy Dean (Academics), NICMAR Hyderabad delivered a lecture on “Scope of Engineering Graduates in Techno Management Sector” on January 21,2023.

- Mr. M. Obula Reddy & Mr. Srinivas MVDS Directors ANVI Technical Advisors India Pvt Ltd. delivered a lecture on “Property Valuation” on February 15,2023.
- Dr. N. V. Ramana Rao, Director, NIT Warangal delivered a lecture on ‘Ready Mixed Concrete Technology’ on February 25,2023.
- Mr. Rakesh Kamal, Co-founder Suno India, National Coordinator – Climate Reality India delivered a lecture on “The Water Crisis- Exploring the Dewatering Effect of Climate Change in Earth’s Most Vital Resource” on March 21,2023.
- Dr. P. N. Singh, Former Professor UC Davis delivered a lecture on “Ground Water Extraction in India- Evolution and Challenges” on March 23,2023.
- Mr. P. Ramesh, Subject expert and Motivational Speaker from ACE Academy Hyderabad delivered a lecture on “Career Guidance Program After Engineering” on March 24,2023.

Dr.P.N. Singh delivering lecture on Ground water extraction in India.

Dr. M. Amaranatha Reddy, Professor, IIT Kharagpur, interacting with faculty.

PROGRAMS ORGANIZED:

The department of Civil Engineering organized a Two-day workshop on “Tekla Structures Steel Detailing” on 24th & 25th January 2023.

FACULTY CORNER

INTERNATIONAL JOURNAL PUBLICATIONS

- **Dr. B. Narendra Kumar** and G. Vinod Kumar published a paper titled, "Study on Combined Effects of Fly Ash, GGBS, and Advanced Nanomaterials on the Properties of SCC" in the Journal of The Institution of Engineers (India): Series A, Volume 103, pages 1259–1270, July 2022, ISSN: 2250-2157.

- **Suresh Kommu** and Krishna Karthika published a paper titled, "Effect of surcharge on arching phenomena in back-to-back MSE walls" in the Journal of Geotechnical and Transportation Engineering, Volume 7, Issue 1, September 2022, ISSN: 2397-8777.

- Gayathri Keerthana, **S. Rakesh, and A. Jyothirmai** published a paper titled, "Development of ternary blend geopolymer mortars" in IOP Conference Series: Earth and Environmental Science, Volume 1086, Article 012059, August 2022, ISSN: 1755-1315.

- Kamani Saikiran and **V. Ramya Krishna** published a paper titled, "Evaluation of bearing capacity of shallow foundation resting on a cohesionless soil using different methods. A case study of Vizag city" in IOP Conference Series: Earth and Environmental Science, Volume 1086, Article 012018, August 2022, ISSN: 1755-1315.

- B. Chandu and **D. Harinder** published a paper titled, "Laboratory assessment of core geotextile mats under wheel load conditions for low volume roads" in IOP Conference Series: Earth and Environmental Science, Volume 1086, Article 012027, August 2022, ISSN: 1755-1315.

- Swetha B., **Sangeetha S**., and Hari Krishna P. published a paper titled, "Numerical Prediction of Tunneling Induced Surface Settlement of a Pile Group" in Lecture Notes in Civil Engineering, Volume 260, September 2022, ISBN: 978-981-19-2144-5.

- V. Munni and **B. D. V. Chandra Mohan Rao** published a paper titled, "A comparative study on seismic analysis of regular and plan irregular buildings resting on different soils" in Materials Today: Proceedings, Volume 71, Part 2, pages 325-331, October 2022, ISSN: 2214-7853.

- Kormani Pavankalyan, **R. Durga Prasad,** and S. Pradeep Kumar published a paper titled, "Mechanical and durability studies on concretes containing crumb rubber fine aggregate" in IOP Conference Series: Earth and Environmental Science, Volume 1086, Article 012013, October 2022, ISSN: 1755-1315.

- Jadi Raju, **Ravella Durga Prasad,** and P. V. Chandrasekhara Rao published a paper titled, "Performance assessment of high strength concretes containing foundry sand as fine aggregate" in IOP Conference Series: Earth and Environmental Science, Volume 1086, Article 012058, October 2022, ISSN: 1755-1315.

- Harihara Kumar PV, **Sasanka Mouli Sravanam, Shiva Bhushan JYV,** and Faizanjunaid Mohammed published a paper titled, "Assessment of Liquefaction Potential of Ash Ponds in Indian Regions Incorporating Different Seismic Conditions" in IOP Conference Series: Earth and Environmental Science, Volume 1086, Article 012019, October 2022, ISSN: 1755-1315.

- **J. Y. V. Shiva Bhushan,** Madhav Madhira, and G. V. Narasimha Reddy published a paper titled, "Effect of Compressibility on Bearing Pressure of Soft Ground" in Lecture Notes in Civil Engineering, Volume 295, pages 75-80, November 2022, ISBN: 978-981-19-6359-9.

- Nayakam Venkatesh, **Kadali Srinivas,** and Madhav Madhira published a paper titled, "Estimation of Shaft-Base Initial Stiffness and Ultimate Resistance of O-Cell Piles" in Lecture Notes in Civil Engineering, Volume 295, pages 55–64, November 2022, ISBN: 978-981-19-2144-5.

- **G. Lalitha**, C. Rihviq Reddy, and S. Aslam published a paper titled, "Experimental Study on Behavior of Various FRP on Strength Properties of Concrete" in the International Journal of Concrete Technology, Volume 8, Issue 2, December 2022, ISSN: 2456-8317.

- N. Pradeephi, N. Bindu, N. Karthik, and P. Adithya, Sai Teja and **G. Lalitha** published a paper titled, "Study on Properties of Concrete cured with Poly Ethylene Glycol -600" in the International Journal of Concrete Technology, Volume 8, Issue 2, December 2022, ISSN: 2456-8317.

- **G. Lalitha**, B. Rama Krishna, E. Sravan Kumar, G. Ravali, M. Santhosh, Md. Gouse Pasha, and M. Dilip published a paper titled, "An Experimental study on Strength parameters of OPC, PPC and Geopolymer Mortars" in the Journal of Structural Engineering and Management, Volume 9, Issue 3, December 2022, ISSN: 2393-8773.

- Apoorva M. and **Narendra Kumar Boppana** published a paper titled, "Development of Standard and High Strength Concretes using Sustainable and Recycled materials" in Materials Today: Proceedings, Volume 71(2), pages 202-208, December 2022, ISSN: 2214-7853.

- T. Sai Krishna and **B. Narendra Kumar** published a paper titled, "Impact of Construction and Demolition Waste and Slag Sand on the properties of High Strength Self-Compacting Concrete" in Materials Today: Proceedings, Volume 71(2), pages 209-214, December 2022, ISSN: 2214-7853.

- M. Soma Sri and **B. Narendra Kumar** published a paper titled, "An Experimental Study on Micro-Structure and Hardened Properties of Ultra-High Strength Self-Compacting Concrete by Incorporating Graphene Oxide" in ASPS Conference Proceedings, Volume 1, pages 187-193, December 2022, ISSN: 2830-909X.

- B. Kezia Sukeerthi and **BDV Chandra Mohan Rao** published a paper titled, "Evaluation of critical connections in an irregular precast building" in Materials Today Proceedings, Volume 71, Part 2, pages 332-338, December 2022, ISSN: 2214-7853.

- Himavarsha and **Shiva Bhushan** published a paper titled, “Effect of compressibility on Undrained Bearing Pressure of circular footing Resting on Two-layered clay” in Trends in Machine Design, Volume 9, Issue 3, December 2022, ISSN: 2455-3352.

- Raikanti Amulya and **Suresh Kommu** published a paper titled, “Evaluation of Equal Settlements of Geosynthetic Reinforced Piled Embankment” in the Journal of Structural Engineering and Management, Volume 9, Issue 3, pages 29-34, January 2023, ISSN: 2393-8773.

- **Dr. B. Narendra Kumar** and G. Vinod Kumar published a paper titled, “Influence of Nano Materials on the Characteristics of Ternary Mixes for Cement Mortar and Concrete for Urban High-Rise Structures” in the International Journal of Multidisciplinary Innovative Research, Volume 3, Number 1, pages 25-34, January 2023, ISSN: 2583-0228.

- C. Abhinay Kumar, **J. Y. V. Shiva Bhushan**, and Madhav Madhira published a paper titled, “Lateral Displacements of Soft Ground Treated with PVDs Under Embankment Loading” in Lecture Notes in Civil Engineering, Volume 300, pages 119-128, January 2023, ISBN: 978-981-19-6359-9.

- **Boppana Narendra Kumar**, Akula Akhil Kumar, and Mirkute Rushikesh published a paper titled, “Assessment of Crack Development Age Due to Corrosion on Reinforced High Strength Self-Compacting Concrete with Inclusion of Potential Ternary Blended Cementitious Materials” in the Journal of Computational Engineering and Physical Modelling, Volume 6, Issue 1, Serial Number 21, pages 18-35, January 2023.

- Srinath Reddy G., Yamini Devi Kadiyam, Bhumika Munuga, Santhosh Kumar K., and **Mallika Alapati** published a paper titled, “Prediction of Bolt Loosening Using Vibrational Analysis and Machine Learning” in the IOSR Journal of Mechanical and Civil Engineering, Volume 20, Issue 1, pages 27-36, January 2023, ISSN: 2320-334X.

- G. Venkateshwar Reddy and **Pupalwad Arti Sudam** published a paper titled, “Synthesis of Low-cost Artificial Sand from Fly Ash and Its Application as a Filter Material” in the Journal of Geotechnical Engineering, February 2023, ISSN: 2394-1987.

- K. Ravichandra, **K. Ravi Kumar**, N. Anil Kumar, and D. Swetha published a paper titled, “Design of Strategic Street Water Filters for Rocky Terrain Communities” in the Industrial Engineering Journal, Volume 16, Issue 3, March 2023, ISSN: 0970-2555.

- **Pupalwad Arti Sudam**, M. Heeralal, and Kadali Sriniva published a paper titled, “Strength Characteristics of Geopolymer Synthetic Sand Using Fly Ash” in the Journal of Materials in Civil Engineering, Volume 35, Issue 6, March 2023, ISSN: 1943-5533, 0899-1561.

- Reddy, G. Sandeep, **Ramesh A.,** and Ramayya, V. Venkat published a paper titled, “Effect of Nano-modified Binder on Fracture Properties of Warm Mix Asphalt Containing RAP” in the International Journal of Pavement Research and Technology, Volume 16, Issue 2, pages 319-332, March 2023, ISSN: 1997-1400, 1996-6814.

- **Shiva Bhushan** published a paper titled, "Effect of Compressibility on Undrained Bearing Capacity of Circular Embedded Footings Resting on Non-homogeneous Ground" in the Indian Geotechnical Journal, Volume 53, Issue 5, pages 1089-1102, April 2023, ISSN: 2277-3347.

- **Ramesh Adepu**, Ramayya Venkat V., Mamatha A., and Vinayaka Ram V. published a paper titled, "Fracture studies on basalt fiber reinforced asphalt mixtures with reclaimed asphalt pavement derived aggregates and warm mix additives" in the Journal of Construction and Building Materials, April 2023, ISSN: 0950-0618.

- Verma Sugam, Parthiban P., **Ravikumar K.**, Das I.C., and Das Ashutosh published a paper titled, "Steady-state Assessment of Hydraulic Potential at Water Scarce regions of Agniyar River Basin, India using GMS-MODFLOW" in Disaster Advances, Volume 16, Issue 5, pages 38-43, April 2023, ISSN: 0974-262X.

- **Dr. G. Lalitha**, G. Sri Varshitha, P. Pratham, and T. Puneeth published a paper titled, "Evaluation of Strength Properties of Geopolymer Concrete Inculcated with Wire Mesh" in the Journal For Basic Sciences, Volume 23, Issue 4, pages 187-195, April 2023, ISSN: 1006-8341.

- G. Gautham Kishore Reddy, Prathik Kulkarni, **P. Rama Rao**, Vikas Ravekar, and Narendra Kanhe published a paper titled, "Experimental studies on behavior of hybrid materials concrete using non-destructive testing methods" in Materials Today: Proceedings, April 2023, ISSN: 2214-7853.

- **Gokulan Ravindiran**, Raja Murugadoss Jeyaraju, Govind Nandipati, Satheeshkumar Seerangagounder, Nabil Al-Zaqri, Ahmed Boshaala, and Gasim Hayder published a paper titled, "Prevention of groundwater contamination from the pollutants released from dyeing industries using biochar produced from palm shell" in Urban Climate (Elsevier), Volume 49, Article 101515, pages 1-13, May 2023, ISSN: 2212-0955.

- L. Shailender Goud, Erla Srilekha, Sk. Affan Uddin, P. Preethi Reddy, and **A. Jyothirmai** published a paper titled, "A Study on Free Vibration Analysis On Diagrid Structural Systems Using Etabs" in the International Journal of Mechanical and Production Engineering, Volume 11, Issue 5, pages 20-24, May 2023, ISSN: 2320-2092.

- J. Anup Kumar, **D. Harinder**, and D. Vamshi published a paper titled, "Evaluation of flexible pavement overlay using highway development and management (HDM-4)" in AIP Conference Proceedings, Volume 2747, Article 020009-1–020009-16, May 2023, ISSN: 0094-243X, 1551-7616.

- Prattipati N. V. V. Sowjanya and **Adepu Ramesh** published a paper titled, "Influence of modified binder with partial replacement of rice husk ash as filler in asphalt mixtures" in AIP Conference Proceedings, Volume 2747, Article 020004, May 2023, ISSN: 0094-243X, 1551-7616.

- **K. Sai Sahitya**, C. S. R. K. Prasad, P. Kabeer Das, M. Sanjana, and S. Jeshwanth published a paper titled, "Non Linear modelling of urban road network accessibility" in

the Journal of Transportation Engineering and Traffic Management, Volume 4, Issue 3, June 2023.

- **Gokulan Ravindiran**, Lakshmi Keshav, P. Senthil Kumar, Ganesh Prabhu Ganapathy, and Gayathri Rangasamy published a paper titled, "Production of Bio Briquettes from Gloriosa Superba Wastes-Turmeric Leaves (GSW-TL) with Cassava Starch Binder for Environment Sustainability" in Waste and Biomass Valorization, June 2023, ISSN: 1877-2641E, https://doi.org/10.1007/s12649-023-02185-6.

- Aditya Mantripragada, **Ramesh Adepu**, Venkat Ramayya Varanasi, and Harinder Devavath published a paper titled, "Assessment and Prioritization of highway stretch deploying functional and structural characteristics" in the Jordan Journal of Civil Engineering, Volume 17, Issue 3, June 2023, ISSN: 2225-157X.

- **D. Harinder**, P. Anusha, A. Ramesh, and K. Mehaboob Peera Kamatalam published a paper titled, "Evaluation of flexible pavement performance based on HDM-4 and international roughness index" in E3S Web of Conferences, Volume 391, Article 01202, June 2023, ISSN: 2267-1242.

NATIONAL JOURNAL PUBLICATION:

- Srinath Reddy G, Yamini Devi Kadiyam, Bhumika Munuga, Santhosh Kumar K, and **Dr.Mallika Alapati** published a paper titled, "Prediction of Bolt Loosening Using Vibrational Analysis and Machine Learning" in the IOSR Journal of Mechanical and Civil Engineering, Volume 20, Issue 1, pages 27-36, January 2023, ISSN: 2320-334X.

CONFERENCES PUBLICATIONS:

- **G. Lalitha** and C. Ritvik Reddy presented a conference paper on "The mechanical and durability performance of sustainable concrete with fly ash aggregate" at IC-RAIWC-2022 in July 2022.

- **A. Mallika** and G. Raghavender presented a conference paper on "The detection and monitoring of bolt loosening of bolted lap joints using vibrational analysis" at IC-RAIWC-2022 in July 2022.

- **Ms. R. Harika** and L. Harshini presented a conference paper on "The performance evaluation of Geopolymer concrete using hybrid fibers" at IC-RAIWC-2022 in July 2022.

- **S. Rakesh** and Gayathri Keerthana presented a conference paper on "The development of ternary blend geopolymer mortars" at ASMI 2022 in August 2022.

- **D. Harinder** and B. Chandu presented a conference paper on "The evaluation of the partial replacement of waste rubber using conventional and recycled aggregate for rigid pavement" at ICIET 2022 in September 2022.

- **T. Naga Teja** and Aravind Sagar. B presented a conference paper on "The introduction of an IoT enabled smart monitoring system to access the early age compressive strength of concrete mix' at ICIET 2022 in September 2022.

- **K. Ravindra Babu**, **Harinder.D, and G. Sambasiva Rao** presented a conference paper on "The performance and evaluation of the urban transport system by service level benchmarking" at ICIET 2022 in September 2022.

- **Kadali Srinivas** and Madhu Panugothu presented a conference paper on "The development of instrumentation for the determination of thermal conductivity for geomaterials" at DFI-India 2022 in September 2022.

- B. Prasanna and **Kadali Srinivas** presented a conference paper on "The investigation of the shear strength resistance of Ennore sand from a conventional direct shear test" at ICIET 2022 in September 2022.

- **Kadali Srinivas** and Madhu Panugothu presented a conference paper on "The study for the determination of thermal conductivity for soil materials" at ICIET 2022 in September 2022.

- **Ramesh A**, Rajkumar M, and Kumar M presented a conference paper on "A comprehensive investigation of pavement evaluation through field and laboratory testing and prioritization" at RATE2022 in November 2022.

- **Dr. Kadali Srinivas** and Srinivas Leena presented a conference paper on "The evaluation of the particle size distribution characteristics of fine-grained soils by LSD and hydrometer" at the Proceedings of the Indian Geotechnical Conference 2022 Volume 1 - GEOLEAP in December 2022.

- Naveen Kumar Chikkakrishna, **Naga Teja Tallam**, and Imran Baba Mohammed presented a conference paper on "The structural strength evaluation of flexible pavements using IoT" at the Recent Trends in Microelectronics, Automation, Computing and Communication Systems conference in December 2022.

- Naveen Kumar Chikkakrishna, Bhukya Mounika, and **Teja Tallam** presented a conference paper on "The development of a smart rigid pavement health monitoring assessment tool" at the Recent Trends in Microelectronics, Automation, Computing and Communication Systems conference in December 2022.

- **Sangeetha S.,** HariKrishna P., and T. Naveen Kumar presented a conference paper on "The research on the biodegradation of disposable masks in municipal solid waste management soil through bioaugmentation" at the Indian Geotechnical Conference-2022 in December 2022.

- Premanvitha, Sasanka Mouli, and **Shiva Bhushan** presented a conference paper on "The analysis of the geofoam backfills retaining wall" at the Indian Geotechnical Conference-2022 in December 2022.

- **Dr. K. Ravi Kumar** presented a conference paper on "The design of strategic street water filters for rocky terrain communities" at the 2nd International conference on Revolutionary Technology in Civil Engineering in February 2023.

- P. Pavan, **Dr. B. Narendra Kumar**, S. Akhil, and D. Raj Kumar presented a conference paper on "The development of self-compacting geopolymer hybrid fiber reinforced concrete using highly potential sustainable materials" at the Two-day international

conference on Cement and Building Concrete for a Sustainable and Resilient Infrastructure at NIT Warangal in March 2023.

- **Dr. B. Narendra Kumar**, N. B. Chandana, and A. Shivani presented a conference paper on "The development of lightweight and low-cost construction bricks using sustainable materials" at the Two-day international conference on Cement and Building Concrete for a Sustainable and Resilient Infrastructure at NIT Warangal in March 2023.

- Venkateswara Rao Sarella, Padakanti Rakesh, **Rakesh Siempu**, and Rathish Kumar Pancharathi presented a conference paper on "A comparative study on the bond behavior of ternary blended geopolymer concrete and conventional concrete" at the International Conference on Cement Building and concrete for a Sustainable and Resilient Infrastructure (CBKR-2023) in March 2023.

- **K. Ravindra Babu**, G. Sanjay, L. Srilaxmi, L. Sravanthi, Pranav.j, and **Dr. A. Ramesh** presented a conference paper on "fracture studies on mixes prepared with reclaimed asphalt pavements aggregates (RAP) and inclusion of fibers" at the Two-day international conference on Sustainable Infrastructure Innovations Opportunities and Challenges (SIIOC 2023) in April 2023.

- E. Madhu, **D. Harinder, and S. Rakesh** presented a conference paper on "A review on the utilization and benefits of construction demolished waste and crumb rubber in rigid pavement" at the Two-day international conference on Sustainable Infrastructure Innovations Opportunities and Challenges (SIIOC 2023) in April 2023.

- Battula Varun, Kanapathi Venkatesh, Tagre Praneeth, **Teja Tallam** presented a conference paper on "Estimation of Pothole Dimension Using Image Processing" at "Innovations in Civil Engineering Through Sustainable Technologies (NICEST '23)" in June 2023.

BOOK CHAPTERS PUBLISHED

- S**hiva Bhushan, J. Y. V**., Madhira, M., & Reddy, G. V. N. (2022). Effect of Compressibility on Bearing Pressure of Soft Ground. In Foundation and Forensic Geotechnical Engineering (November 2022).
- Venkatesh, N., **Srinivas, K**., & Madhira, M. (2022). Estimation of Shaft-Base Initial Stiffness and Ultimate Resistance of O-Cell Piles. In Foundation and Forensic Geotechnical Engineering (November 2022).

FACULTY AS JOURNAL/ CONFERENCE REVIEWER/ EDITORIAL BOARD MEMBER:

Name of the Faculty	Name of the Journal/Conference/Editorial Board
Dr. A. Mallika	i-Manager's Journal of Structural Engineering- **Editorial Board**
Dr. K. Ramujee	Materials Today Proceedings (Elsevier) - Reviewer

Dr. Ch. Nageshwar Rao	International Conference on Construction Materials and Smart Structures for Sustainable Development (ICCMSSD 2022) - Reviewer
Dr. A. Ramesh	International journal of Pavement Engineering (Taylor & Francis) - Reviewer
Dr. Kadali Srinivas	• Korean Society of Civil Engineers (KSCE) - Reviewer • Applied Sciences (MDPI) - Reviewer • Sustainability (MDPI) - Reviewer • Journal of Marine Science and Engineering (JMSE) - Reviewer
Dr. R. Durga Prasad	National Conference on Structural and Geotechnical Engineering (NCSGE 2022) - Reviewer
Mr. T. Naga Teja	Proceedings of the Institution of Civil Engineers-Smart Infrastructure and Construction- Reviewer
Mr. K. Veerendra Gopi	Journal of Hydrology (Elsevier) - Reviewer
Dr. G. Lalitha	Materials Today Proceedings (Elsevier) - Reviewer
Dr. S. Rakesh	• IoP Conference Series: Earth and Environmental Sciences, "Advancements in Sustainable Materials and Infrastructure" August 18-20, 2022, Srinidhi Institute of Science and Technology - Reviewer
Dr.B.Murali Krishna	• Structures (Elsevier) - Reviewer • Journal of Building Engineering (Elsevier) - Reviewer • Advancement in Sustainable Materials and Infrastructure (ASMI 2022) - Reviewer • Materials Today: Proceedings (Elsevier) - Reviewer
Dr. Gokulan Ravindiran	Water (MDPI) - Reviewer

FACULTY ACHIEVEMENTS:

Patents Published:

- **Dr. A. Ramesh**, Professor Published a patent titled "Automatic water dispenser".
- **Dr. K. Suresh**, Sr. Assistant Professor Published a patent titled "Interlocking Paver Block".
- **Dr. G. Lalitha**, Assistant Professor Published a patent titled "Solar energy storage system."

NPTEL Achievements:

- Gurikini Lalitha, Dr B Murali Krishna, Dr. K Ravikumar, Dr. K Sai Sahitya, Mr. G Sambasiva Rao, Panugalla Rama Rao, and B D V Chandra Mohan Rao have

successfully completed various NPTEL courses with Elite certificate in latest technologies.

- Mrs. A. Jyothirmai received Topper certificate for the course “Probability Methods in Civil Engineering” organized by IIT Kharagpur from January 23 to April 14, 2023.

FACULTY SPONSORED /PARTICIPATED FOR CONFERENCES/ SEMINARS/ WORKSHOPS /FDP’s:

- **Dr. G. Lalitha** attended a workshop on "Developing Winning Research Proposals" organized by RCC, VNRVJIET, held from August 8, 2022, to August 12, 2022.

- **G. Samba Siva Rao** attended a workshop on “Designing and Modelling of IoT, AI & ML Systems" organized by AICTE, Life Augmented, held from August 1, 2022, to August 5, 2022.

- **Dr. B. Murali Krishna** attended a workshop on “Manak Manthan" organized by the Bureau of Indian Standards on July 29, 2022.

- **Dr. G. Lalitha** attended a workshop on "Tekla Structures Steel Detailing" organized by VNRVJIET-CED. The workshop covered the topic of Tekla software usage and took place on January 24-25, 2023.

- **Dr. K Ravi Kumar**, and **Dr. K. Sai Sahitya** attended a two-day workshop on "Enriching Quality of Academics & Research in relevance to NEP-2020" at VNR VJIET from February 24, 2023, to February 25, 2023.

- **Smt. V. Ramya Krishna**, and **Dr. B. Murali Krishna**, attended a six-day national workshop on "Effective Filing of NAAC AQAR - Streamlining Institutional Performance" at Vardhaman College of Engineering from March 13, 2023, to March 18, 2023.
- **Mr. K. Ravindra Babu**, attended the International Conference on Innovations in Engineering & Technology organized by JNTUH, focusing on "Performance and evaluation of urban transport system by Service level benchmarking: a case study at Guntur" held from September 16, 2022, to September 17, 2022.
- **Dr. K Ravi Kumar** attended the International Conference on "Revolutionary Technology in Civil Engineering" organized by St. Martin's Engineering College, Hyderabad, held on 24th & 25th February 2023.
- **Mr. Samba Siva Rao**, participated in a Training Program on "BIS Standard Club mentors Training Program" organized by Aditya Trade Centre on July 7th and 8th, 2022.

- **Dr. K Ravi Kumar** attended a FDP on "Python for Data Science" organized by NPTEL Online Course (NOC) - MOOCS from July to September 2022.

- **Sri B Mani Kanta Reddy** attended FDP on "Ground motion modelling and response computations in earthquake engineering" organized by NIT- Warangal from August 4, 2022, to August 13, 2022.

- **Dr. G. Lalitha**, participated in an FDP on "Design of Reinforced Concrete Structures" organized by IIT Kharagpur from July to September 2022.

- **Dr. S. Rakesh** attended a FDP on "Advanced Non-Destructive Testing Methods for Condition Assessment of Materials and Structures" organized by NIT Warangal from June 13th to 18th, 2022.

- **G. Samba Siva Rao** attended an FDP on "Python for Data Science" organized by NPTEL Online Course (NOC) - MOOCS from July to September 2022.

- **Smt. P. Arti Sudama and Dr.G. Lalitha** attended a FDP on "Applications of Artificial Intelligence & Machine Learning in Civil Engineering" organized by ACE Engineering College from January 30, 2023, to February 4, 2023.

- **Dr. K Ravi Kumar** attended an NPTEL-FDP on "Microwave Remote Sensing in Hydrology" organized by IIT Madras from January 24 to April 20, 2023.

- **Dr. K. Sai Sahitya** attended an FDP on "Applications of AI and ML in Civil Engineering" organized by Seshadri Rao Gudlavalleru Engineering College, Gudlavalleru from February 20 to February 25, 2023.

- **Dr. Harinder Devavath, Mr. K. Ravindra Babu, Mr. P. Rama Rao and Mrs. J. Soujanya** participated in a FDP on "Recent Trends in Civil Engineering" organized by J B INSTITUTE OF ENGINEERING & TECHNOLOGY from February 20 to February 25, 2023.

- **Dr. Ch. Nageshwar Rao** attended an FDP on "Statistical Analysis using Python" organized by VNRVJIET H&S, CSE (CYS, DS) from March 6 to March 11, 2023.

- **Mr. K. Ravindra Babu, Mr. P. Rama Rao, Dr. Dinesh, and Ms. S. Vedhasri** participated in a 5-days FDP on "Instructional Design and Delivery Systems" organized by NITTTR Chennai, held from March 20 to March 25, 2023.

LECTURES DELIVERED BY OUR FACULTY AT OTHER INSTITUTIONS:

- Dr. A. Ramesh Professor visited ECSI, Hyderabad to deliver an Expert lecture on “Chaos and Conflicts on Indian Roads”, “Crash Patterns and Mechanisms”, “Road Engineering & Traffic Management Measures for Road Safety” and “Design Aspects & Importance of Road”.

- Dr. A. Mallika, Professor visited ACE Engineering College, Hyderabad to deliver an invited lecture on “Applications of Artificial Intelligence & Machine Learning in Civil Engineering”.

STUDENT CORNER

INDUSTRIAL VISITS:

- B. Tech & M. Tech Students visited several prominent organizations Praneeth Innovative LLP, CII - Sohrabji Godrej Green Business Centre, M/s. Shangrila Infracon India Pvt Ltd, INCOIS, Environment Protection Training and Research Institute, TS Engineering Research Laboratory, Ultra Tech Cement to gain practical knowledge and industrial insights.

II B.Tech. Students at Industrial Visits – CII - Sohrabji Godrej Green Business Centre

III B.Tech. Students at Industrial Visits – M/s. Shangrila Infracon India Pvt Ltd

II B.Tech. Students at Industrial Visits –Praneeth Innovatives LLP

Students Achievements:

- 7 students from final year students have successfully completed oxford English online certificate courses.
- Ms. K. Hima Bindu, Ms. B. Archana, Mr. M. Dileep, Mr. M. Santhosh and Ms. G. Ravali have successfully completed "Infrastructure Entrepreneurship" Course offered by Contractors Development Institute (CDI) and National Academy of Construction (NAC), Hyderabad from 3rd December 2022 to 2nd April 2023.
- Ms. D. Swetha, Mr. N. Anil Kumar, Ms. V. Sevika, Mr. K. Ravi Chandra, Mr. K. Ravi Kumar, and Mr. C. Madhusudan presented a conference paper at 2nd International Conference on Revolutionary Technology in Civil Engineering (ICRTCE-2023) organized by St. Martins Engineering College, Hyderabad from 24th and 25th February 2023.
- Ms. D. Lakshmi Trishitha, and Ms. K. Bavyasree bagged first prize in VALOROUS 2K23 - A National Level Technical Fest organized by Marri Laxman Reddy Institute of Technology & Management, Hyderabad on 13th & 14th March 2023.
- Ms. K. Hima Bindu, and Ms. B. Archana bagged second prize in Event "Sonic Survey" as part of STHAPATYA 2023 organized by JNTUH University College of Engineering, Science and Technology, Hyderabad on 26th & 27th April 2023.
- Mr. B. Varun, and Mr. K. Venkatesh received best paper award for their conference paper presentation at 2-Day National Conference on "Innovations in Civil Engineering through Sustainable Technologies (NICEST-2023)" organized by Mahatma Gandhi Institute of Technology (MGIT), Hyderabad on 9th & 10th June 2023.
- Mr. S. Geeteshwar, Mr. M. Krishna Vamsi Reddy, Mr. M. Greeshmanth, and Mr. M. Swaraj secured Third position in Event "CEA Modelling" as part of CEA Fest 2023 organized by Civil Engineering Association (CEA), IIT Madras on 31st March 2023 to 2nd April 2023.
- Mr. B. Rama Krishna secured Second position in Event "Potential Professor" as part of CEA Fest 2023 organized by Civil Engineering Association (CEA), IIT Madras on 31st March 2023 to 2nd April 2023.
- Mr. Shaikh Abdul Rahman, and Mr. B. Rama Krishna secured Second position in Event "Sustainable Campuses" as part of CEA Fest 2023 organized by Civil Engineering Association (CEA), IIT Madras on 31st March 2023 to 2nd April 2023.
- K Vineela represented India at Quadrangular International Throwball Championship–2023 DHAKA, Bangladesh and secured second place in Throwball.

- K. Sai Krishna participated in AURA 2022-National Level Inter Engineering College Sports Fest at CBIT from November 4-6, 2022, and won in Basketball.
- K. Sai Krishna participated in the National Level Inter Engineering College Sports Fest at MREC from November 28-29, 2022, and won in Basketball.
- K. Vineela participated in the State Level Inter Engineering College Sports Festival at Sridevi Women's Engineering College from December 2-3, 2022, and was the runner-up in Throwball.
- K. Sai Krishna participated in the 14th Indian Open Inter Engineering Collegiate Sports Fest at VNR VJIET from February 9-10, 2023, and won in Basketball.
- Taneeru Manogya and Lohith Varma participated in the 14th Indian Open Inter Engineering Collegiate Sports Fest at VNR VJIET from February 9th & 10th, 2023, and won in Football.
- K. Vineela participated in the 14th Indian Open Inter Engineering Collegiate Sports Fest at VNR VJIET from February 9th & 10th, 2023, and won in Throwball.
- P. Sravanth Reddy participated in the 14th Indian Open Inter Engineering Collegiate Sports Fest at VNR VJIET from February 9th & 10th, 2023, and was the runner-up in Cricket.
- H. Mahesh, V. Sainath and MD. Mokthair participated in the 14th Indian Open Inter Engineering Collegiate Sports Fest at VNR VJIET from February 9th & 10th, 2023, and was the runner-up in Volleyball.
- K. Sai Krishna participated in MILAN 2023 at VJIM from February 23rd to 25th, 2023, and won in Basketball.
- K. Vineela participated in MILAN 2023 at VJIM from February 23rd to 25th, 2023, and won in Throwball.
- H. Mahesh participated in MILAN 2023 at VJIM from February 23rd to 25th, 2023, and was the runner-up in Volleyball.
- MD. Mokthair participated in MILAN 2023 at VJIM from February 23rd to 25th, 2023, and was the runner-up in Volleyball.
- V. Lohith Varma and Taneeru Manogya participated in MILAN 2023 at VJIM from February 23rd to 25th, 2023, and was the runner-up in Football.

Throwball Women's Team Winners

- A total of 135 students have successfully completed online certification courses through NPTEL.
- 17 Students have presented research papers in various national and international conferences.
- 86 Students of 2019-2023 batch were placed at various reputed companies listed below.

Cognizant	Mediamint	INN CIRCLES
TCS	NCL	Square Yards
Enlight CAD	LTI	Voltas
Aarvee Associates	Ctrl+S	Infosys
Worley	Accenture	Wipro
Deloittee	Aparna Constructions & Estates Pvt. Ltd.	Federal Bank
Frey Energy	Capgemini	Colruyt It Consultancy
Keynce	ACC Concrete	

- 24 students are pursuing their higher education at various universities abroad and in India.

NICMAR	University of Houston
University of Houston	NIT Karnataka - Suratkal
IIT Roorkee	Latrobe University
VT graduate School	Deakin University
University of Dayton	University of Winsdor
Woxsen University	NYU Tandon School of Engineering
University of New Heaven	New York University
IISc Bangalore	Conventry University

TRAINING PROGRAMMES/ OTHERS ORGANISED FOR STUDENTS:

Students were offered the following training programs by industry experts in the academic year 2022-23 for skill enhancement.

Training programs	Beneficiaries
Primavera	III B.Tech
MEP	III B.Tech
Advanced Training in surveying practices using DGPs and Drones	II, IV B.Tech
Coding skills - Smart Interviews	III B.Tech
Training program on C	I B.Tech
Soft skills	III B.Tech
High Intensity Technical training	III B.Tech
Aptitude Training	III B.Tech

- III B. Tech and IV B. Tech students attended a session by NICMAR on 'Scope of Engineering Graduates in Techno-Management Sector' on January 27, 2023, with 120 attendees.

CIVIL ENGINEERING ASSOCIATION (CEA) & INDIAN CONCRETE INSTITUTE (ICI) STUDENT CHAPTER

The Civil Engineering Association (CEA), Indian Concrete Institute (ICI) and Indian Green Building Council (IGBC) have organized the following events during the academic year 2022-2023.

1. The CEA-ICI-IGBC have organized the "World Green Building Week (WGBW 2023)" during 12th - 16th September 2023. As part of this World Green Building Week (WGBW 2023), the following events were organized.

a. One Minute Video Competition
b. Lecture on Health and well-being of occupants in Green Buildings
c. Essay Writing Competition
d. Quiz Competition
e. Promise Campaign
f. Photography Contest

g. Green Sketching Competition
h. Awareness through Cyclothon
i. Make from Waste
j. Planting of Saplings

2. A total of 40 students from B.Tech. (CE) (17 from IV B.Tech. and 23 from II B.Tech.) have volunteered for the Indian Green Building Council's (IGBC's) "20th Edition of Green Building Congress (GBC)" during 20th to 22nd October 2022 (3 Days) Organized by Confederation of Indian Industry (CII) Indian Green Building Council (IGBC), Hyderabad.
3. A competitive event "CADATHON" was conducted on 24th and 25th, January 2023 as part of Convergence 2K23 and 140 students participated.
4. 20 students from CEA-ICI-IGBC B.Tech. (CE) have participated in the Republic Day Parade on 26th January 2023.

DISTINGUISHED ALUMNI

- Mr. Rishi Thirupari, Vice President Sustainability, Wynn Macau of 2002 admitted batch is generous in sponsoring annual tuition fee for I. Pavan Kalyan (17071A0182), Civil Engineering student under "Rishi Thirupari Endowment Scholarship".
- Mr. Sharath Chandra Reddy (0871A0154) received the Young Distinguished Professional of the Year' by Construction Management Association of America (CMAA), USA
- Ms. A. Sasya Reddy of 2015 admitted batch secured All India Rank 214 in Civil Services Examination-IAS

Mr. Rishi Thirupari

Mr. Sharath Chandra

Ms. A. Sasya Reddy

TECHNICAL ARTICLES

LOW-COST HOUSING

Dr. G. Lalitha,

Assistant Professor -CED

Definition: Low-cost housing refers to residential structures specifically designed to be economically accessible for individuals or families with limited financial resources. Low-cost housing is very much required in countries like India where most of the people are below poverty line. As a Civil Engineer one should follow Value engineering which adopts methods of adopting design, materials and labor just suitable for the structure and achieving economy in overall construction.

Low housing concept has still not been accepted by majority of architects and engineers due to various reasons like Simple (architectural features make it costly) low specifications (rich specifications make it costly) low acceptability among middle income group and high-income group people. But particularly for GOVT Schemes When mass housing is required, and financial resources are limited like Indira Awas Yojana or similar other schemes prefers low-cost housing.

When mass housing schemes are required after natural disasters, particularly due to limited time and funds available for construction. When recession is here, and the lower middle class finds it difficult to purchase the flats due to their financial constraints. Low-cost housing reflects that it is the housing of low cost and though it may have nothing to do with whom the housing is made but general concept is that low-cost housing is for poor, and it is very difficult to change the existing concept. Some of the engineers and administrators have started calling it affordable housing, which is again for them who cannot afford a good house at a higher cost. Typically, these housing options are priced below the average market rates, making them affordable for lower-income households.

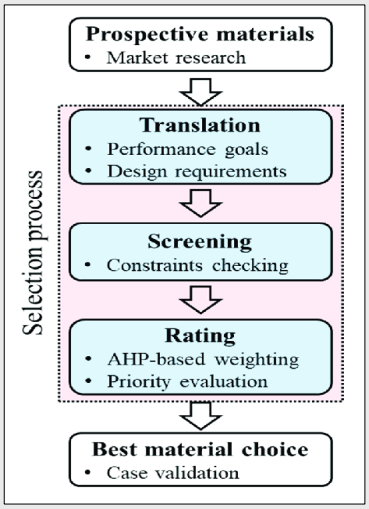
Fig:1 Map showing Housing Market in India

Different Housing Schemes with Low-cost:

1. Pradhan Mantri Awas Yojana (PMAY)
2. Tata Value Homes
3. Mahila Housing SEWA Trust (MHT)
4. Ashiana Housing
5. Livelihoods Resource Centre (LRC)
6. Green Habitat
7. Affordable Housing Projects by State Governments (2BHK Housing Scheme in Telangana)
8. Shubham Housing Development Finance Company

Low-cost Housing Materials:

Material selection is very important to achieve low cost without loosing comfort to the stockholder. Generally, the following sequence will be followed to achieve this.



Materials generally used for construction of Low-cost Housing are:

- Concrete blocks
- Inter locking bricks
- Autoclaved aerated concrete blocks
- Fly ash

Fig:2 Flow Chart-Material Selection

Low-cost Construction Technologies: Low-cost construction technologies leverage innovative methods and materials, reducing expenses While Maintaining Quality. Sustainable, Efficient, and affordable, these solutions revolutionize building processes, addressing housing needs globally.

Compressed Earth Blocks (CEBs):

Overview: Blocks made from locally available soil, compressed to form building blocks.

Advantages: Environmentally friendly, cost-effective, energy efficient.

Bamboo Construction:

Overview: Bamboo is a sustainable and renewable building material used for framing, walls, and flooring.

Advantages: Fast growth, low cost, eco-friendly.

Fig:5 Shipping Container Architecture

Fig:3 Compressed Earth Blocks

Shipping Container Architecture:

Overview: Repurposing shipping containers for residential or commercial structures.

Advantages: Cost-effective, quick construction, recycling.

Fig:4 Bamboo Construction

Earthbag Construction:

Overview: Polypropylene bags filled with earth or other materials used to build walls.

Advantages: Low cost, easy construction, resistant to natural disasters.

Ferrocement Technology:

Overview:

Combination of cement mortar and metal mesh used to construct thin, strong structures.

Advantages: Cost-effective, earthquake-resistant, durable.

Fig:7 Ferrocement Technology

Light Gauge Steel Framing:

Overview:

Steel frames made from thin, lightweight steel sections for residential and commercial buildings.

Advantages: Durable, lightweight, recyclable.

Fig:8 Light Gauge Steel Framing

References :

Various internet sources are acknowledged.

No Aggregate Concrete / Nano Concrete (NAC)

Mrs. D.Praseeda,

Assistant Professor-CED

No aggregate concrete was the brainchild of Dr.Bhanumati Kalidas and Kalidas of INSWAREB. They have developed concrete without aggregate (fine and coarse) having the same characteristics of the conventional concrete consisting of cement and aggregate.

The aggregates (sand and stone) in concrete are indispensable inputs for three reasons:

- Without aggregates a cement cast element is liable to get shrinkage, leading to cracks.
- Strength of neat cement is around 70-90 MPa against popularly used concrete with strength of 20-25 MPa. Thus aggregates help to moderate the strength of concrete to the required grade.
- The cost of aggregates is certainly less than that of cement, thus bringing down the cost of concrete.

If there is a cementitious paste which can overcome shrinkage and cost-issues, despite avoiding aggregate, why not accept such concrete? Moreover, if such concrete is lighter in weight and

higher in strength, increasing the factors of safety, is it not more desirable? Over and above, if such concrete is made of industrial byproducts using lesser cement it is even more a welcome development. This is exactly what the founder directors of this institute, Dr N Bhanumathidas and N Kalidas invented and patented in 2010. This wonder product is called No-Aggregate Concrete (NAC), which means a concrete without sand and stone.

Background to the Invention:

The urge to use complementary cement materials out of industrial wastes and thrust to conserve natural materials have given rise to NAC. As popularly known in building material research, the inventors developed FaL-G technology in 1989 introducing FaL-G as the cementitious material by using all the inputs, fly ash, lime and gypsum out of industrial byproducts.

FaL-G Mansion 1991-slab with FaL-G concrete in lime route without using even a gram of cement

Tie beams in FaL-G concrete slab

To prove its efficacy, they did cast 2000 sft of slab way back in 1991 for their house that consists of 15-18 ft long beams, where a couple of them are tie beams too. This has helped to demonstrate the potential of FaL-G as structural cement and inspiring confidence to its use for bricks and blocks. In their further studies for optimizing FaL-G they developed various mixes using 4th generation admixtures in result of which they encountered with a mix showing up absolute workability, compaction, and cohesiveness, all at 0.15 WCF (factor of Water/cementitious material) with grade strengths of 55 MPa to 65 MPa.

When they looked at the broken specimens the matrix looked somewhat close to that of ceramic with absolute pore refinement. This has caught up their imagination that using such material as structural media would address the issues of durability in a single go in a holistic manner.

The inventors emphasize FaL-G as the ‘Ayurveda’ of cement-concrete formulation. The more the attrition greater is the potency. The edge runner serves this basic principle by tapping the holistic performance of fly ash. There upon the special admixture does the wonder. The role of anhydrite too cannot be ignored. All this collectively accounts for the high workability at the least WCF in FaL-G as NAC.

Immediately they conducted some basic engineering studies applicable to concrete, patented and declared the invention as No-Aggregate Concrete (NAC). In convention to their practice

of taking the lab work to field without delay, they did cast the dome of 10.5 ft dia with NAC over the 2nd floor of FaL-G Mansion, which was due for face-lift at that time, in addition to other applications such as cantilever beam and shear wall. It is interesting to note that the 2-year specimen has shown up a compressive strength of 110 MPa, almost double the strength over its 28-day strength. They have also christened their product Nano Concrete.

In each material and matrix, smaller the particles higher the bond, so much so the energy required to snap such bond. Nano science works on this premise, and Nano Concrete performs very much within this frame. Micron and sub-micron particles of fly ash that develop adhesive bond at early ages do attain cohesive bond with progress of age due to reaction of lime and other mineralogical hydrates on surface of particles. This is manifested in Nano Concrete developing over 100 MPa strength over a year as against 55 MPa at 28-day. Such quantum jump in strength is uncommon in cement concrete, whatever be the technique of preparation.

Issues with Transition Zone:

Transition zone is the interface between coarse aggregate and cement paste. Generally concrete do fail at transition zone, when subjected to stress, because of adverse effects caused by differential thermal stresses and weak crystallography at this zone. When OPC is used, belching out high surplus lime at early ages, such surplus lime gets dissolved in water tending to settle at transition zone. In high performance concretes aggregate size is rationalised in order to minimise differential stresses at transition zone, upon which the strengths are attributable to the strength of cement matrix associated with sand. In NAC, first of all, there is no scope for transition zone for having avoided coarse aggregate. Even the inert fly ash particles do develop cohesive bond with cement matrix making the ultimate NAC-matrix close to monolithic. This is manifested in NAC by high strength (55-70 MPa) and lowest permeability at 27 coulombs.

Dome, cast on the upper floor of FaL-G Mansion, Visakhapatnam, in Jan 2010

Fly ash works as pozzolan to the extent of reactive portion and micro-aggregate to the extent of inert portion. Basic engineering data has been developed at INSWAREB as recorded in the table below:

Strength in MPa

Age of testing :	**3-day**		**7-day**		**28-day**	
Engineering data:	**Cement Concrete**	**NAC**	**Cement Concrete**	**NAC**	**Cement Concrete**	**NAC**
Compressive strength	15.6	10.6	25.0	20.2	39.3	56.2
Split tensile strength	--	--	--	--	3.47	3.69
Flexural Strength-MOR	--	--	--	--	4.40	5.20
Bond Strength	--	--	--	--	14.6	12.7

Chloride Permeability: Coulombs	**Control**	**NAC**
At accelerate curing-24 hrs.	5701	27
At 90-day-Normal curing.	4346	405

Note: The two-year strength conducted on NAC specimen cast during the execution of dome, has shown up the strength of 110 MPa.

NAC makes good sense for precast elements because:

- Accuracy of inputs is possible due to dosing mechanisms governed by instrumentation techniques.

- Butter-like mix of NAC facilitates casting with absolute finish associated with detailing of mould profiles, if any, making it amenable for ornamental concrete too.

- The density of NAC is around 1800-1900 kg/cu.m; almost 20-25% reduction over that of control concrete.

- High early strengths of NAC, which can also be augmented within 36 hours through accelerated curing, prove conducive for handling precast elements for immediate dispatch to market bringing down the inventory costs.

- As the construction market is gearing up to produce and use precast elements, we believe that NAC is the timely boon to precast industry.

References :

Various internet sources are acknowledged.

STUDENT ARTICLES

Guarding Jakarta: Indonesia's Ambitious Garuda Seawall Project to Defend Against Sinking Capital

Orsu Sharon,

23071A0149

Introduction

Historically, the construction of large-scale water infrastructure projects has been a cornerstone in the production of 'modern' industrial society. The 20th century heralded the 'hydraulic age,' characterized by state-led centralized approaches mobilizing large-scale technologies to manage water. This era witnessed the proliferation of monumental infrastructure projects like the Hoover Dam in the US and the Zuiderzee Works in the Netherlands. Such projects symbolized modernization, development, and state power. However, at the turn of the 21st century, this paradigm began to decline, giving way to demand-side technologies and water management strategies such as leakage reduction and metering systems aimed at achieving increased efficiency and reduced water usage. This shift has been influenced by the growing role of the private sector in water management and resistance to the economic, social, and environmental costs of large-scale projects.

In recent decades, a broader 'ecological turn' in engineering has emerged in Western Europe and North America, particularly regarding flood mitigation. This approach advocates for planning with nature rather than controlling it, moving away from traditional reliance on hydraulic engineering and 'hard' infrastructure towards experimenting with 'softer' flood mitigation techniques, such as restoring mangrove forests to protect coastlines against storm surges and tides.

$40 Billion to Save Jakarta: The Story of the Great Garuda

Forget Venice. The fastest-sinking city in the world is Jakarta, Indonesia's capital, where some areas are sinking by 25 cm (about 9.84 inches) per year. An ambitious and controversial plan, known as the Giant Sea Wall and Great Garuda projects, aims to save Jakarta from drowning. The centerpiece of this proposal, with an estimated cost of $40 billion (about $120 per person in the US), is a massive dike arcing 25 miles across Jakarta Bay. This would create a vast artificial lagoon, with a new coastal megacity built on reclaimed land around it.

The project, officially known as the National Capital Integrated Coastal Development (NCICD) program, is backed by aid from the Dutch government and supported by Indonesia's president Joko Widodo, a former governor of Jakarta.

Materials Used for Construction of Seawall

Seawalls are constructed from various materials, most commonly:

- Reinforced concrete
- Boulders, steel, or gabions

Other materials include vinyl, wood, aluminum, fiberglass composite, and biodegradable sandbags made of jute and coir.

Theoretical Framework: Science and Technology Studies, Urban Political Ecology, and Postcolonial Urban Theory

Scholarship in science and technology studies has enhanced our understanding of the coproduction of politics and technology, capitalism, and science. For instance, Latour and Woolgar's ethnography of laboratories elucidates the coproduction of the 'social' and the 'technical' as scientists strive to produce order from disorder. Bijker's analysis of why levees failed New Orleans while dykes protect the Netherlands argues that such "socio-technologies" are "thick with power relations and politics." Socio-technologies do not exist in a political vacuum but shape and are shaped by social structures.

Scholars have used the term 'techno-politics' to capture the coproduction of technology and politics, alongside the social and natural worlds. Timothy Mitchell, for example, argues that Egypt's economic disaster in 1942-1944 resulted from the interconnections of war, disease, and agriculture, highlighting the interactions between human and nonhuman elements.

Conclusion

The Great Garuda plan, unique in its scale and approach, is divided into three phases:

1. Reinforcing the current sea wall, combined with water treatment projects and coastal revitalization.
2. Constructing the Garuda-shaped Sea wall in the west, combined with a new city for 300,000 residents and 600,000 workers.
3. Building an eastern sea wall combined with port expansion and a new airport.

Despite its ambitious scope, the project faces potential negative environmental impacts and social consequences. A study by Indonesia's Ministry of Maritime Affairs and Fisheries suggests it could erode islands in western Jakarta Bay, destroy coral reefs, and lead to the stagnation of polluted water behind the sea wall. However, Dutch experts argue that treated city water will ensure that rivers dump clean water into the bay.

References :

Various internet sources are acknowledged.

ALUMNI ARTICLES

The Transformative Role of AI and Machine Learning in Civil Engineering

B L V V D S S Abhinav,
Lead, Inncricles

Introduction

The integration of Artificial Intelligence (AI) and Machine Learning (ML) into civil engineering is revolutionizing the field. These technologies are enhancing efficiency, accuracy, and sustainability in various civil engineering domains, from structural analysis and construction management to infrastructure maintenance and smart city development. This article explores recent advancements, research findings, and case studies demonstrating the profound impact of AI and ML on civil engineering.

1. Revolutionizing Structural Analysis and Design

One of the most profound impacts of AI and ML in civil engineering is in the realm of structural analysis and design. Traditional methods, while robust, are often time-consuming and labor-intensive. AI algorithms, particularly those leveraging machine learning, can analyze vast datasets to predict structural behaviors under various conditions. For instance, neural networks can be trained to optimize designs, ensuring materials are used efficiently while maintaining structural integrity. This not only saves time but also significantly reduces costs and material waste.

Research Findings: A study by Zheng et al. (2023) demonstrated that neural networks could optimize the design of high-rise buildings by predicting load distribution and material stress with remarkable accuracy. This optimization reduces material usage by up to 15% while ensuring structural integrity.

Case Study: The Morpheus Hotel in Macau utilized AI-driven design tools to create its unique, free-form exoskeleton structure. The software optimized the load paths, reducing material wastage and construction time.

2. Enhancing Construction Management

Construction projects are notorious for their complexity and the myriad of challenges they present, from scheduling and resource allocation to risk management and quality control. AI and ML are game-changers

in this domain. Predictive analytics can forecast potential delays and cost overruns by analyzing historical data and current project parameters. AI-driven project management tools can optimize resource allocation, ensuring that labor and materials are used most efficiently. Moreover, machine learning models can enhance safety by predicting and mitigating risks before they manifest on-site.

Research Findings: According to a report by McKinsey & Company (2022), construction projects using AI for project management saw a 20% reduction in costs and a 15% improvement in project timelines.

Case Study: The Sydney Metro project employed AI to optimize its construction schedule. By analyzing data from previous projects and real-time updates, the AI system provided recommendations that significantly reduced delays and cost overruns.

3. Improving Infrastructure Maintenance and Management

The maintenance and management of infrastructure is another area where AI and ML are making significant inroads. Predictive maintenance, powered by AI, allows for the early detection of potential issues in infrastructure systems, such as bridges, roads, and tunnels. Sensors and IoT devices collect real-time data, which AI models analyze to predict failures and suggest proactive maintenance schedules. This not only extends the lifespan of infrastructure but also ensures public safety and reduces maintenance costs.

Research Findings: A study by IBM Research (2021) found that predictive maintenance using AI reduced maintenance costs by 25% and extended the lifespan of infrastructure components by 30%.

Case Study: The New York City Department of Transportation implemented an AI-based system to monitor the health of its bridges. The system's early warning capabilities have prevented several potential structural failures, ensuring public safety and reducing maintenance costs.

4. Advancing Environmental Sustainability

Sustainability is a critical concern in modern civil engineering. AI and ML contribute to greener practices by optimizing energy use and reducing emissions in construction processes. Machine learning algorithms can design more energy-efficient buildings by simulating various environmental conditions and material choices. Additionally, AI-driven models can optimize the use of renewable energy sources and improve waste management systems, promoting sustainable urban development.

Research Findings: Research by the World Green Building Council (2022) highlighted that AI-driven energy management systems in buildings could reduce energy consumption by up to 30%.

Case Study: The Edge, an office building in Amsterdam, uses AI to optimize its energy use, making it one of the most sustainable buildings in the world. The building's AI system adjusts lighting, heating, and cooling based on occupancy and weather conditions, significantly reducing energy consumption.

"No matter how talented you are or naturally gifted you are, there's no substitute to hard work if you got to maintain standards."

-Rohit Sharma

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