

EDIFICE

JAN 2026

**NEWSLETTER OF THE
DEPARTMENT OF
CIVIL ENGINEERING**

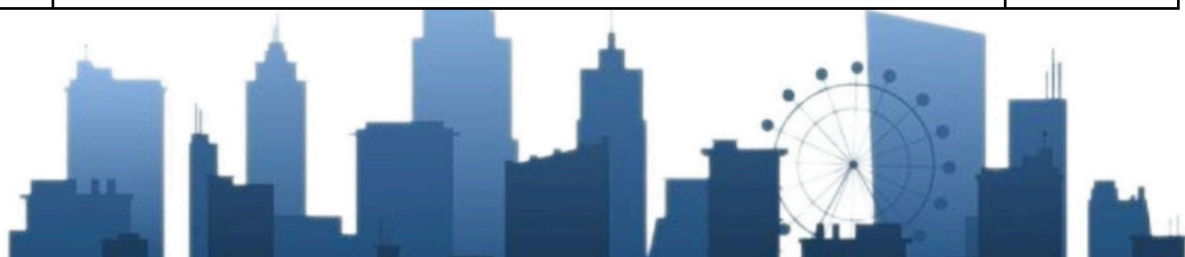
VOLUME-10

January 2026

ISSUE II



S.No	CONTENTS	Pg. No
1	FROM HOD'S DESK	1
2	FACULTY ARTICLE	3
3	NOTABLE ACHEIVEMENTS	6
4	PLACEMENT ACTIVITIES	8
5	Faculty Development Programme	9
6	ACTIVITY ROUNDUP – PROFESSIONAL SOCIETIES	11
	6.1 Association of Civil Engineers (ACE)	11
	6.2 Instution of Civil Engineers (ICE) UK	11
	6.3 Indian Concrete Institute (ICI)	12
	6.4 Institution of Engineers India (IEI)	13
7	MOU	14
8	SITE VISITS	16
9	INDUSTRIAL VISITS	17
10	PUBLICATIONS	18
11	CONFERENCES	19
12	FACULTY ACTIVITIES	20
13	STUDENT ACTIVITIES	27
14	NON-TEACHING STAFF ACTIVITY	27
15	STUDENTS ARTICLES	28
16	ALUMINI WRITE UP	41
17	INDUSTRIAL ARTICLE	42
18	EDITORIAL MEMBERS	45



1. FROM HOD'S DESK

Dr.N. Sivakumar
Professor and Head of the Department



“Education becomes impactful when learning, research, and societal relevance move forward together.”

It gives me immense pleasure to present the achievements and progress of the Department of Civil Engineering during the academic year 2025 through this departmental newsletter. The year has been marked by academic excellence, research growth, curriculum innovation, and strong industry engagement, reflecting our collective commitment to quality education and societal relevance.

One of the most encouraging highlights of the year is the outstanding performance of our students. A total of 13 awards received by our students during the second half of 2025 with a total of 71 awards in the whole year for academic excellence, technical competitions, research contributions, and co-curricular achievements at institutional, state and national levels. These accomplishments stand testimony to the students' dedication and the faculty's continuous mentoring. Our graduates have also demonstrated strong employability, securing placements in prominent national and multinational organizations such as L&T, Dow Chemicals, Brigade Group, JGC India, and Artelia Consulting LLP. Such placements highlight the department's emphasis on industry-ready competencies and professional ethics

In the area of research and consultancy, the department has made good progress. During the year, external research grants were applied, and multiple funding opportunities are currently under review, indicating the department's growing research ecosystem and collaborative outlook.



Faculty members and research scholars have contributed significantly to scholarly output, with 39 publications in reputed national and international journals, addressing contemporary challenges in water resources, geotechnical engineering, structural engineering, environmental engineering, and sustainable infrastructure. These efforts reinforce our commitment to evidence-based engineering solutions and knowledge dissemination.

Curriculum innovation has been a major focus area this year. The R2024 curriculum, approved in the previous academic year, has been successfully implemented across programs. The revised curriculum emphasizes outcome-based education, multidisciplinary learning, sustainability, digital tools, and alignment with industry and societal needs, in line with national education policies and global trends. Laboratory components, project-based learning, and professional skill development have been strengthened to enhance experiential learning and graduate attributes.

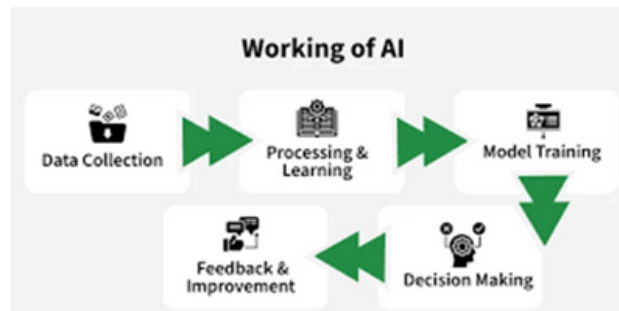
The department continues to actively engage with professional societies, encouraging both faculty and students to participate in technical chapters, workshops, seminars, conferences, and outreach programs. Two workshops, 7 guest lectures, one Hackathon, one boot camp, and 4 site visits had been conducted in the second half of 2025 to give industry relevant exposure to the students. An MoU was signed between CSIR–Structural Engineering Research Centre (CSIR-SERC) and Sri Sivasubramaniya Nadar College of Engineering (SSNCE) on 8 October 2025 to strengthen academic and research collaboration.

I sincerely acknowledge the dedication of our faculty members, the enthusiasm of our students, and the constant support from the institution's management and alumni. As we move forward, the Department of Civil Engineering remains committed to academic excellence, impactful research, industry collaboration, and the development of socially responsible engineers who can contribute meaningfully to national development and global sustainability.



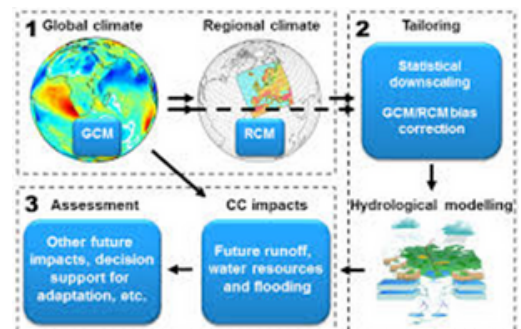
Data-Driven and Artificial Intelligence (AI) Models

Artificial Intelligence (AI) and Machine Learning (ML) techniques are increasingly used to model complex hydrological processes that are difficult to represent using conventional methods. Algorithms such as Artificial Neural Networks (ANN), Random Forest, Support Vector Machines (SVM), and Deep Learning models are applied for rainfall–runoff modeling, groundwater level prediction, reservoir operation, and climate impact assessment. These models enhance predictive accuracy and support real-time decision-making under uncertainty.



Climate Change Modeling and Impact Assessment

Coupled Global Climate Models (GCMs) and Regional Climate Models (RCMs) are extensively used to assess the impacts of climate change on precipitation patterns, temperature, evapotranspiration, and streamflow. Downscaling techniques—both statistical and dynamical—help translate global climate projections into regional and basin-scale scenarios. Such tools are critical for designing climate-resilient water infrastructure and developing long-term adaptation strategies.



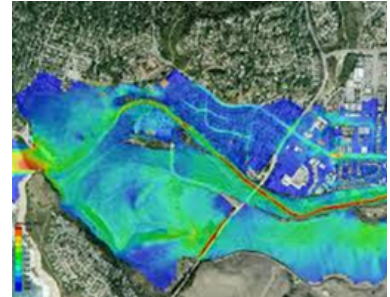
Smart Water Systems and Internet of Things (IoT)

The integration of Internet of Things (IoT) technologies has enabled real-time monitoring and management of water systems. Smart sensors and telemetry networks are now used for continuous measurement of rainfall, river stage, groundwater levels, and water quality parameters. These systems support early warning for floods, efficient irrigation scheduling, leakage detection in water distribution networks, and adaptive reservoir operation.



Hydrological and Hydraulic Modeling Platforms

Modern software tools such as SWAT, HEC-HMS, HEC-RAS (2D), MIKE suite, and WEAP provide integrated modeling environments for simulating surface water, groundwater, sediment transport, and water quality. These models support scenario-based analysis of land-use change, climate change, and water allocation policies, enabling informed planning and sustainable resource management.



Nature-Based and Sustainable Solutions

Recent emphasis on Nature-Based Solutions (NbS) integrates ecological principles with engineering practices. Techniques such as rainwater harvesting, green roofs, constructed wetlands, managed aquifer recharge, and river restoration are increasingly supported by modeling and monitoring technologies. These solutions enhance climate resilience while promoting environmental sustainability.



Conclusion

The convergence of remote sensing, AI, climate modeling, IoT, and sustainable engineering practices is redefining hydrology and water resources engineering. Adopting these emerging technologies is essential for addressing future water challenges under changing climatic conditions. Continuous research, interdisciplinary collaboration, and capacity building are vital to ensure resilient and sustainable water systems for generations to come.

3. NOTABLE ACHEIVEMENTS

- Ananth SP has secured first place in the Builders Association of India (BAI) Oratorical Competition 2025.
- Swarna Kamali L of III year has participated in the National Cube Contest - Second Edition organized by Department of Civil Engineering, PSG College of Technology during 10th March 2025.
- Sharvesh B.S of III year has won Second position in Ideathon event at CEA Fest 2025
- Nivishree III year has secured first place in the Builders Association of India (BAI) Oratorical Competition 2025.
- Sharvesh B.S of III year has participated in Ideas to Impact Challenge (one of the top 40 teams out of 800 teams across India) event during 25th October 2025
- Swarna kamali L of III year has participated in "Ideas to Impact challenge" organized by IIT Madras during 25th October 2025
- M.Hema Varshni of 3rd year has won 2nd place in the Paper Presentation event of Asthivaara Kenshin organised by Easwari Engineering College during 29th and 30th of August 2025.
- M.Hema Varshni of 3rd year has won 3rd place in the Green Building AutoCAD event of Asthivaara Kenshin organised by Easwari Engineering College during 29th and 30th of August 2025.
- Swarna kamali. L of III year has participated and secured II place in "paper presentation" conducted by Asthivaara kenshin'25 on 30th August 2025 at Easwari Engineering College , Ramapuram.
- Swarna kamali. L of III year has secured III place in "Green Building Design Competition using AutoCad " conducted by Asthivaara kenshin'25 on 30th August 2025 at Easwari Engineering College, Ramapuram.
- Yaanis Hadriyan J of Second year won 1st place presentation competition in youth climate action summit organized by CCCDM Anna University.
- Nikhil Narayanan S., Heman S., Sasurudha M. and Lokesh Kumar, of III-year civil Engineering students under the mentorship of Dr. Manthiram Karthik Ravichandran received a grant of Rs. 48,000, to carry out the next phase of ideas to innovation challenges (i2i) organized by IIT Madras, Chennai in collaboration with Wipro foundation.
- B.S.Sharvesh, J.Monish Kumar, L.Swarna Kamali & V.R.Gautam, of II-year civil Engineering students under the mentorship of Dr. P.Sangeetha, received a grant of Rs. 50,000, to carry out the next phase of ideas to innovation challenges organised by IIT Madras, Chennai in collaboration with Wipro Foundation.



NOTABLE ACHIEVEMENTS OF CIVIL ENGINEERING STUDENTS 2025



4. PLACEMENT ACTIVITIES (2025)

The Civil Engineering Department of Sri Sivasubramaniya Nadar College of Engineering places strong emphasis on enhancing placement opportunities for students through a structured combination of department-driven training programs, soft-skill development, and industry-oriented internships. For the 2022–2026 batch, focused efforts were undertaken during the Odd Semester of AY 2025–26 to align student competencies with the expectations of core civil engineering and interdisciplinary recruiters. To enhance placement readiness, the Civil Engineering Department conducted structured domain-specific technical training programs, complemented by soft-skill and professional readiness sessions, all delivered by internal faculty. The technical training provided integrated exposure to structural engineering and design, construction materials and concrete technology, geotechnical engineering, surveying, fluid mechanics, and construction planning and management, with emphasis on conceptual clarity, codal awareness, problem-solving ability, and practical application. These sessions were aligned with industry expectations for EPC, construction, consultancy, infrastructure, and interdisciplinary roles, thereby strengthening students' technical competence and interview preparedness. In parallel, soft-skill and placement-oriented training was facilitated through the department and placement cell, covering communication skills, aptitude preparation, interview readiness, and professional conduct, ensuring holistic placement preparedness. Building on the technical training, students of the 2022–2026 batch undertook internships during May–July 2025 across core industry organizations, government infrastructure agencies, and research institutions. Internships with leading private-sector companies such as Larsen & Toubro Limited, Technip Energies, Dow Chemical International Private Limited, Artelia Consulting Engineers, Dilip Buildcon, Ashoka Buildcon Limited, and other construction and consultancy firms provided exposure to live projects, site execution, and engineering workflows. Government sector internships at organizations including Water Resources Department (WRD), Public Works Department (PWD – C&M), Chennai Metro Rail Limited (CMRL), Highways Department, Chennai Metropolitan Development Authority (CMDA), and NLC India Limited enabled students to gain insight into public infrastructure planning, execution, and regulatory processes. Research-oriented internships at NIT Calicut and NATPAC further strengthened analytical and applied research skills.

The combined impact of domain-specific training, soft-skill development, and structured internship exposure has resulted in positive placement outcomes. As of the Odd Semester of AY 2025–26, 10 students have secured placement offers. Core civil engineering placements were achieved with Brigade Group, Technip Energies, and JGC India, while an interdisciplinary placement was secured with Accenture (IT services). These outcomes demonstrate that the department's focused training initiatives, coupled with meaningful internship experiences, have significantly enhanced students' technical competence, industry awareness, and professional readiness, thereby improving placement performance in both core and allied sectors.

Dr. Aswin Sriram G

Placement and Internship Coordinator

5. FACULTY DEVELOPMENT PROGRAMME

The Department of Civil Engineering, Sri Sivasubramaniya Nadar College of Engineering (SSNCE) successfully organized a Short-Term Training Programme (STTP) on “Structural Health Monitoring (SHM)” from 24th to 29th November 2025, in association with the Institution of Civil Engineers (ICE-UK) and the Indian Concrete Institute (ICI). The programme was designed to provide participants with advanced theoretical knowledge and practical exposure to emerging SHM technologies for modern civil infrastructure.

The six-day programme followed a well-structured schedule comprising more than 12 expert lectures delivered by eminent professionals from IIT Madras, VIT Chennai, L&T Construction, NIT Trichy, CSIR-SERC, and SSNCE. Technical sessions covered key areas such as smart materials, fiber optic sensors, piezoelectric systems, wireless sensor networks, IoT-enabled SHM, UAV-based inspections, 5G applications, and AI-driven data analytics, supported by real-world case studies and hands-on demonstrations.

A key highlight of the STTP was an exclusive SHM site visit facilitated by L&T Construction at the Thiruvanmiyur Metro Rail (CMRL) construction site. Participants observed live monitoring systems, sensor installations, vibration measurement setups, and on-site data acquisition, which significantly enhanced their understanding of real-time SHM implementation.

The programme attracted faculty members, undergraduate and postgraduate students, research scholars, and industry professionals. Industry participants, including Dr. Narayanakumar (ENPX Technologies Pvt. Ltd.) and Mr. N. Babu (Consultant Civil Engineer), enriched the discussions with practical insights. Overall, the STTP strengthened academia-industry collaboration and enhanced competencies in interdisciplinary SHM technologies for developing smart and resilient infrastructure.





Participants & Faculty Members of SSN CE -Short-Term Training Programme (STTP)



An exclusive SHM site visit facilitated by L&T Construction was organized to provide participants with hands-on exposure to real-time structural monitoring.



6. ACTIVITY ROUNDUP – PROFESSIONAL SOCIETIES

6.1 Association of Civil Engineers (ACE)

Dr. Sivapriya S. V., Associate Professor, Department of Civil Engineering, actively contributed to academic enrichment through multiple professional initiatives under the banner of the Association of Civil Engineers (ACE). She organized a guest lecture on “Practical Implementation of Shear Strength Parameters and Slope Stability Concepts” by Er. L. Sureshkumar, Assistant Engineer, CPWD, on 02.04.2025 for II–IV year students. She also conducted “CivHack 360”, a National-Level Hackathon, on 24.03.2025. Additionally, she organized guest lectures on “Need of Civil Engineering” by Shri. A. N. Balaji, and “Strong Foundations, Strong Structures” by Er. R. Sharvesh, benefiting undergraduate students through industry interaction and practical exposure.

Workshop

The Association of Civil Engineers (ACE) successfully conducted a one-day workshop on “Recent Digital Advancements in Civil Engineering” on 28.07.2025, providing participants with insights into emerging digital tools and technologies in the field.

Link:

6.2 Institution of Civil Engineers (ICE) UK

Dr. N. Sivakumar, Professor and Head, Department of Civil Engineering, and Dr. Surendar Natarajan, Assistant Professor, Civil Engineering, organized an online guest lecture on “Innovation in Bridge Design and Construction” on 12.08.2025, in collaboration with the Institution of Civil Engineers (ICE–UK), focusing on faculty development and higher studies, as part of a ICE UK student chapter activities.





Sri Sivasubramaniya Nadar College of Engineering
(An autonomous institution - Affiliated to Anna University)
Kalavakkam – Chennai-603110

DEPARTMENT OF CIVIL ENGINEERING


Seminar on

**Pathways to Higher Education at
Northeastern University**

Speaker: Mr. Vamshi Krishna Janga
Assistant Director of Academic
Partnerships, South Asia,
Northeastern University

Venue: SSN CE, Civil Engineering Department, CAD Lab
Date: 18.09.2025 Time: 10.00 AM-12.00 Noon

Dr. Radhika V. Faculty Coordinator
Dr. N. Sivakumar Professor and Head



SRI SIVASUBRAMANIYA NADAR COLLEGE OF ENGINEERING
(AN AUTONOMOUS INSTITUTION - AFFILIATED TO ANNA UNIVERSITY)
KALAVAKKAM - CHENNAI


SSN-ICE(UK) STUDENT CHAPTER
DEPARTMENT OF CIVIL ENGINEERING

CORDIALLY INVITES YOU FOR
ONLINE GUEST LECTURE ON

**"INNOVATION IN BRIDGE DESIGN AND
CONSTRUCTION"**

12 AUGUST 2025, TUESDAY, 4:00 PM - 6:00 PM

PRESENTER



Mr.V.SADASIVAM CEng MICE
L&T CONSTRUCTIONS, CHENNAI

MODE : ONLINE [CLICK TO JOIN](#)





Dr. N SIVAKUMAR, CEngMICE – PROFESSOR AND HEAD
Dr. SURENDAR NATARAJAN FACULTY CO-ORDINATOR

FOR ANY QUERY, CONTACT STUDENT CO-ORDINATORS – REVANTH KUMAR G / 9150462790 • YOGESH THIAGU M K / 9444439487

Dr. V. Preethi Organized a guest lecture titled 'Disaster risk reduction and management: A case study of India', delivered by Dr. Durgesh Nandini, Professor of Public Administration, University of Delhi on 24.10.2025 held Via Online platform for third year students of Civil Engineering Department.

6.3 Indian Concrete Institute (ICI)


Dr. P. Sangeetha, under the banner of the ICI Student Chapter, organized a series of guest lectures to enhance students' technical understanding. A lecture on "Recent Advances in Steel Structures" was delivered by Dr. Mahendarakumar Madhavan, Dean (Alumni and Corporate Relations) and Professor, IIT Hyderabad, on 22.07.2025 for II and III year students. Another session on "Effect of Admixtures on Concrete Properties" was conducted by Mr. Dhilipkumar, DCM Technical, Aditya Infrastructure Pvt. Ltd., on 30.07.2025. Additionally, Dr. P. Sangeetha and Dr. N. Sivakumar jointly organized an online lecture on "Behavior of Ductile Detailing and Implementation Difficulties" by Er. L. Sureshkumar, Assistant Engineer, CPWD, on 31.08.2025, benefiting II-to-IV-year students.

Indian Concrete Institute
SRI SIVASUBRAMANIYA NADAR COLLEGE OF ENGINEERING
 (AN AUTONOMOUS INSTITUTION-AFFILIATED TO ANNA UNIVERSITY) KALAVAKKAM-CHENNAI

DEPARTMENT OF CIVIL ENGINEERING
SSN-ICI STUDENT CHAPTER
 cordially invites you to the
GUEST LECTURE
 on
RECENT ADVANCES IN STEEL STRUCTURES

DATE : 22nd July, 2025
 TIME : 09.00-10.00AM
PRESENTER



Prof. Mahendrakumar Madhavan
 Dean Alumni and Corporate Relations
 Professor, Department of Civil Engineering
 Indian Institute of Technology Hyderabad

Dr. P SANGEETHA
 COORDINATOR

Dr. N SIVAKUMAR, CEngMICE
 PROFESSOR AND HEAD

For any queries, contact Student Co-ordinator -Ezhilarasan E /7305399587
 -Nikhil Narayanan S/7010991745

6.4 Institution of Engineers India (IEI)

Dr. R. Vijayalakshmi, Associate Professor, along with faculty members from EEE, CSE, IT, ECE, Mechanical, Chemical, and BME, successfully conducted a three-day boot camp workshop on “Design Thinking – Idea to Impact” for second-year students from 02 to 04 September 2025. The program focused on innovation, problem-solving, and interdisciplinary collaboration. Additionally, Dr. Aswin Sriram G., Assistant Professor, and Dr. R. Vijayalakshmi, Associate Professor, Department of Civil Engineering, organized a two-day workshop on “BIM Fundamentals using AUTODESK REVIT” on 03.09.2025 and 04.09.2025 at SSN College of Engineering, providing hands-on exposure to Building Information Modeling and enhancing students’ technical and industry-ready skills.

7. MOU

A Memorandum of Understanding (MoU) was signed between the CSIR-Structural Engineering Research Centre (CSIR-SERC) and Sri Sivasubramaniya Nadar College of Engineering (SSNCE) on 8 October 2025 to promote academic and research collaboration. The MoU facilitates joint supervision and co-guidance of UG, PG, and PhD students, summer internships, knowledge sharing through invited lectures, and the joint organization of workshops, Faculty Development Programmes (FDPs), and international conferences, along with the submission of collaborative research project proposals.

The MoU process was coordinated by Dr. S. Radha, Principal, Dr. N. Sivakumar, Head of the Department of Civil Engineering, and Dr. K. Ramanjaneyulu, Professor, Department of Civil Engineering. Dr. A. Kanchana Devi, Senior Principal Scientist, CSIR-SERC, and Dr. Sivakumar Naganathan, Professor and Head, Department of Civil Engineering, SSNCE, have been nominated as the nodal officers to coordinate activities under this collaboration. The MoU will remain in force for a period of five years from the date of execution.





CSIR-SERC–SSNCE Academic and Research Collaboration MoU



8. SITE VISIT

Dr. R. Vijayalakshmi organized a site visit for third-year Civil Engineering students to the Ladies' Hostel building at Sri Sivasubramaniya Nadar College of Engineering on 31.07.2025, providing practical exposure to on-campus construction practices.

In addition, a site visit to Kamarajar Port Limited, Ennore, was facilitated by Dr. N. Sivakumar and Ms. Sumetha R. for 43 final-year B.E. Civil Engineering students. The visit was accompanied by Dr. Manthiram Karthik and Ms. Sumetha R., Assistant Professors, and was guided by Mr. R. E. Ganesh, Assistant Manager (Public Relations), Kamarajar Port Limited, offering valuable insights into port infrastructure and operations.



Site Visits for Civil Engineering Students Kamarajar Port Limited, Ennore

9. INDUSTRIAL VISITS

Dr. Surendar Natarajan and Dr. Radhika V. coordinated an industrial visit for 40 second-year Civil Engineering students from 13 to 16 September 2025. The program included technical visits to Harangi Dam, focusing on hydraulic structures and water resources management; a food processing factory in Chikmagalur, highlighting industrial infrastructure; the Golden Temple, showcasing architectural and heritage engineering; and a Bengaluru site visit emphasizing modern construction practices. These visits effectively bridged theoretical concepts with practical exposure in structural, hydraulic, and architectural engineering.



Harangi Dam



Golden Temple Visit

Industrial Tour Visits of Civil Engineering Students



10. PUBLICATIONS

The Department of Civil Engineering demonstrated strong research performance during 2025–26, with faculty members publishing extensively in reputed national and international journals. Research contributions covered diverse domains including structural engineering, geotechnical engineering, sustainable construction materials, water resources and flood modelling, environmental engineering, BIM, AI and machine learning applications, and renewable energy materials. Several publications appeared in Scopus- and SCI-indexed journals, including Q1 and Q2 quartiles, reflecting high research quality and impact.

The department's work emphasizes sustainability, resilience, digitalization, and innovative engineering solutions, reinforcing its commitment to advancing knowledge, supporting societal needs, and strengthening academic and industry-oriented research outcomes.

Department publication can be viewed in link:

<https://docs.google.com/document/d/1OKT7HgCHFSk51P8AndXwSBsFR0aBGSikZiAtZLgDRJs/edit?usp=sharing>



11.CONFERENCES

Faculty members of the Department of Civil Engineering actively contributed to international conferences and congresses during 2025, showcasing research excellence in geotechnical engineering and water resources. Research papers were presented at the Asian Congress on Contemporary Sciences – XI and the International Conference on Sustainability, Circularity, Outreach and Policy for Environment (SCOPE 2025).

Key studies addressed the use of construction and demolition waste to improve CBR values, behavior of sand and stone columns, slope stabilization using natural and man-made reinforcements, and flood peak discharge estimation in wetland tank cascade systems. Notably, Dr. Surendar Natarajan received the Best Paper Award at SCOPE 2025 at IIT Kanpur, highlighting the department's impactful and sustainability-driven research contributions.

Department conference can be viewed in link:

https://docs.google.com/document/d/1OrWa1_Uij2ENp5mcoFXxJLqjNdA7SQE6rOFh2Ard1jk/edit?usp=sharing



12 FACULTY ACTIVITIES

12.1 External Recognition

The Department of Civil Engineering demonstrated strong academic and professional engagement during 2024–25 and 2025–26 through faculty contributions in curriculum development, research supervision, academic governance, and knowledge dissemination. Faculty members served on Boards of Studies, doctoral committees, and as external examiners, reviewers, and editorial board members for reputed journals, including Springer Nature. They delivered invited and guest lectures at premier institutions such as IITs, Anna University, CSIR-SERC, and SRMIST, chaired technical sessions at international conferences, and participated in syllabus framing and curriculum development initiatives. These activities highlight the department's strong academic leadership, research involvement, and national-level professional recognition.

Department External recognition activities can be viewed in link:

<https://docs.google.com/document/d/1vqwMBcQ7qIlg5Ypzj0tWx0sFlm2bkvdc6lpYWGB6ZcgU/edit?usp=sharing>

12.2 External Grants Applied

The Civil Engineering faculty at SSN, led by Dr. Surendar Natarajan, Dr. P. Sangeetha, and colleagues, have executed a wide range of research and applied projects addressing sustainability, environmental management, and smart infrastructure. Key focus areas include eco-friendly construction using industrial and agricultural wastes, development of self-compacting and geopolymer concretes, utilization of end-of-life tires and seashell waste in civil materials, and innovative approaches for fluoride and dye removal from wastewater. Projects also explore advanced water resource management through remote sensing, isotopic analysis, flood forecasting, and groundwater-surface water interaction studies. Additionally, precision farming with drone technology, AI-based contaminant prediction, renewable energy integration, and waste-to-energy solutions highlight the interdisciplinary and technology-driven nature of the research. Funded by national and international agencies including ANRF, DST, SNF, TNSCST, DIT, and MNRE, these initiatives combine experimental, computational, and machine learning approaches to provide sustainable, scalable, and impactful solutions for environmental, water, and infrastructure challenges.

Department External Grants can be viewed in link:

<https://docs.google.com/document/d/1>

12.3 Research Scholars Related Activities

Dr. Sivapriya S.V, Associate Professor/Civil, conducted pre-confirmation seminars and confirmation meetings for her full-time MS research scholars, Mr. V. Vinot on 12–13 August 2024 and Ms. Bijivemula Sruthi Reddy on 29–30 April 2025. Dr. N. Sivakumar, Professor/Civil, supervised Ms. Thota Gireeshma, Ph.D. scholar, who received confirmation of her provisional registration from Anna University (Procs. No. 23251997174/Ph.D./AR13) on 09 July 2025. Additionally, Ms. Shanmugapriya M secured admission in July 2025 for a part-time Ph.D. in Civil Engineering under the guidance of Dr. R. Rajkumar, Associate Professor (G2), categorized as an industrial candidate. These activities reflect ongoing mentorship and research progress in the Civil Engineering Department.

Research Scholars related activities can be viewed in link:

<https://docs.google.com/document/d/1>



12.4 Faculty Development Programme Attended

The Civil Engineering faculty at SSN actively engaged in diverse professional development programs to strengthen their expertise in emerging technologies, sustainable construction, and research methodologies. Dr. Sivapriya S.V, Associate Professor, attended multiple FDPs, including a six-day AICTE-sponsored UHV-II FDP (19–24 August 2024), a one-week FDP on Smart Materials and AI in Civil Engineering (09–14 December 2024), and a nine-day NEP 2020 Orientation and Sensitization program sponsored by the Ministry of Education (16–24 October 2024). Dr. R.Rajkumar, Associate Professor (G2), participated in a five-day FDP on Innovations in Civil Engineering integrating geospatial technologies, AI, and sustainability (16–20 June 2025).

Dr. R. Vijayalakshmi and Dr. Aswin Sriram G completed 16-week SWAYAM courses on Design Thinking and Innovation (Jan–June 2025) and attended one-week FDPs on Sustainable Construction Practices (28 July–01 August 2025). Dr. Manthiram Karthik Ravichandran attended an FDP on Enabling Smart Cities through Computer Applications (9–19 June 2025). Dr. V. Preethi and Dr. Radhika V attended FDPs on research proposal writing using generative AI (14–21 July 2025) and inculcating universal human values (9–13 June 2025), respectively.

Dr. Surendar Natarajan participated in IIT Delhi's Centre for Engineering Education Excellence program (23 June–04 July 2025) received a fellowship of 50 thousand and an online training on open-source flood modelling solutions (22–26 September 2025). Dr. Srinath Rajagoplan completed a CII-certified course in carbon footprint assessment, while Dr. N. Sivakumar attended an FDP on smart materials and durable structures (15–19 September 2025). These initiatives have significantly enhanced faculty competencies in research, teaching, and sustainable civil engineering practices.

Department attended FDP can be viewed in link:

<https://docs.google.com/document/d/1>

12.5 Events Attended

The Civil Engineering faculty actively participated in webinars, conferences, FDPs, and professional engagements to enhance technical expertise and academic visibility. Dr. Sivapriya S.V, Associate Professor, attended one-day webinars on Geosynthetic Solutions for Sustainable Ground Infrastructure organized by the Department of Civil Engineering, SRMISTE, Kattankulathur on 28 June 2024, and by the Institution of Engineers (India) in association with Maccafferri Environmental Solutions Pvt. Ltd. on 08 August 2024.

Dr. Radhika V. presented a technical paper at the Third International Conference on Construction Materials and Structures (ICCMS 2025) organized by IIT Tirupati from 03–05 July 2025 and also participated in the pre-conference workshop titled From Sustainable Materials to Sustainable Structures on 02 July 2025. Dr. R. Rajkumar, Associate Professor (G2), successfully completed a two-week AICTE-supported FDP on Structural Analysis and Design using STAAD Pro.

Dr. N. Sivakumar, Professor and Head, attended online guest lectures on Innovation in Bridge Design and Construction organized by SSNCE and the ICE (UK) Student Chapter. He also participated in a five-day FDP on Smart Materials and Technologies for Durable Structures. Additionally, Dr. Sivakumar Naganathan attended the South Asia Regional Planning Meeting 2025 of ICE-UK at Colombo in his capacity as ICE-UK Chennai Representative and Chairman.

Dr. Srinath Rajagoplan completed the CII Certified Professional Course in Carbon Footprint, further strengthening sustainability-oriented expertise within the department.

Dr. Sivakumar Naganathan, Professor & Head/ Civil engineering attended the South Asia Regional Planning meeting 2025 of the Institution of Civil Engineers in his capacity as the ICE UK Chennai Representative and Chair of ICE UK Chennai committee at the Galle Face Hotel Colombo on 15-11-2025.

Department attended FDP can be viewed in link:

<https://docs.google.com/document/d/1yQZFfVpYrKTzwxBnk-TObWk131tbrGCGiqY7h4JidjE/edit?usp=sharing>



12.6 Consultancy

The Department of Civil Engineering actively engaged in consultancy services during the academic years 2024–25 and 2025–26, contributing technical expertise to industry and infrastructure projects. Dr. Sivapriya S.V, Associate Professor, undertook multiple consultancy assignments related to soil investigation and geotechnical reporting for Falcon Industrial Testing Laboratory Pvt. Ltd. and Minerva Civil Testing Private Limited, Chennai. These assignments, executed between July 2024 and May 2025, included soil investigation, report generation, and township development assessments, with all consultancies successfully completed. Dr. Srinath Rajagopalan, Associate Professor, provided international consultancy services to BSLV Ltd., United Kingdom, conducting a BREEAM In-Use assessment for an existing building in London during May 2025, emphasizing sustainability and green building compliance. Dr. Aswin Sriram G, Assistant Professor, and Dr. R. Vijayalakshmi, Associate Professor, jointly delivered design engineering consultancy for a residential construction project at Virudhunagar for Vikaath Associates. Dr. Surendar Natarajan, Assistant Professor, offered advanced consultancy to Geomarine Pvt. Ltd., Chennai, focusing on hydrological modeling, watershed analysis, and geospatial techniques for hydrodynamic simulations. Additionally, Dr. N. Sivakumar, Professor, and Dr. P. Sangeetha, Associate Professor, conducted a quality assessment of a G+1 residential apartment for Amman Construction, Chennai. All consultancy projects were completed successfully, generating significant revenue, and strengthening industry–academia collaboration.

Department consultancy can be viewed in link:

https://docs.google.com/document/d/1wwO1jJ-J3d0V3cMX_Yho_5mPjGiQM5hwZje-FfGGh2k/edit?usp=sharing



12.7 Alumni Interaction

The Department of Civil Engineering regularly organizes alumni interaction sessions to strengthen industry-academia linkage and support student development. Distinguished alumni from various professional backgrounds interact with students and faculty, sharing insights on career pathways, higher studies, industry expectations, emerging technologies, and professional ethics. These sessions provide students with practical exposure beyond the curriculum, guidance on skill development, internships, and placement preparedness. Alumni also contribute by mentoring students, suggesting curriculum enhancements, and exploring collaborative opportunities in research, consultancy, and entrepreneurship. Such interactions foster a strong alumni network, promote lifelong engagement with the institution, and motivate students by showcasing successful professional journeys rooted in the department.

Details of alumni interactions can be viewed in the link:

https://docs.google.com/document/d/1-lRdBFw2SU6AhePR4wjXZ_nABX9tZ-g8iPkE2YWQ9nA/edit?usp=sharing



Alumni Interaction



12.8 Notable Visitors

The Department of Civil Engineering hosted several eminent industry and academic experts as part of guest lectures and professional interactions. Distinguished visitors included Dr. Mahendarakumar Madhavan, Dean (Alumni and Corporate Relations) and Professor, IIT Hyderabad, who delivered a lecture on recent advances in steel structures. Er. L. Sureshkumar, Assistant Engineer, CPWD, addressed students on ductile detailing, implementation challenges, and geotechnical practices. Shri. A. N. Balaji, Immediate Past Chairman, Builders Association of India (Southern Centre) and Founder of Arunachalaa Infratech, interacted with students on the role and relevance of civil engineering. Industry experts such as Mr. Dhilipkumar (Aditya Infrastructure Pvt. Ltd.), Er. R. Sharvesh (FALCO Industrial Testing Laboratory), and professionals from ICE-UK contributed insights on concrete technology, testing practices, and innovative bridge design.

12.9 Academics & Research Related

Dr. Radhika V. is recognised as a supervisor (Ref. No. 4510012) for guiding PhD students in Anna University under faculty of Civil Engineering

The Department of Civil Engineering actively engaged in a wide range of academic activities during the academic year. Faculty members contributed significantly to scholarly research by reviewing manuscripts for reputed international journals published by Elsevier, Springer Nature, UTP Press, and other leading publishers. National-level technical symposia such as INVENTE 2024 and INVENTE 2025 were successfully organized, along with academic events including Teachers' Day celebrations, Appreciation Day, and student association inaugurations. Faculty also conducted doctoral committee meetings, pre-confirmation reviews, and thesis evaluations. Participation in conference reviewing, FDP funding applications, and outreach talks further strengthened academic governance, research quality, and institutional visibility.

Academic Related activities can be viewed in link.

https://docs.google.com/document/d/1B9FQCsmIdRs_GUzVyj4mNOCsL3Ko9P2Ll8FykuZxk4s/edit?usp=sharing



13 STUDENT ACTIVITIES

13.1 Co-curricular Activities

Students of the Civil Engineering Department actively participated and excelled in various national-level technical, innovation, and awareness programs. Sharvesh B.S (III year) secured second place in the Ideathon event at CEA Fest 2025 and was shortlisted among the top 40 teams nationwide in the Ideas to Impact Challenge. Swarna Kamali L (III year) and Gautham (III year) also participated in innovation challenges, paper presentations, and Green Building AutoCAD competitions at IIT Madras, PSG College of Technology, and Easwari Engineering College. M. Hema Varshni (III year) won second and third places in paper presentation and Green Building AutoCAD events, respectively. Yaanis Hadriyan J (II year) won first place at the Youth Climate Action Summit organized by Anna University and UNICEF.

Students co-curricular activities can be viewed in link:

<https://docs.google.com/document/d/157T7TjdseyHJqOeYYm7n9cxNyWFNCIgwYQZfcXz5Jk/edit?usp=sharing>

14. NON-TEACHING STAFF ACTIVITY

The technical and administrative staff of the Department of Civil Engineering actively participated in various skill development programs during 2025 to enhance technical, digital, and communication competencies. Assistant Lab Instructors Mr. Aravindh S., Mr. Princely K., Mr. C. Parthiban, and Mr. Balaji M. attended workshops on technical report writing, recent digital advancements in civil engineering, BIM applications, and domain-specific guest lectures on concrete technology. They also completed online certification courses through Alison on business communication, 3D modeling, MS Project, and related tools. Ms. G. Deborah, Junior Executive, completed multiple Alison-certified courses on advanced Microsoft Excel, PowerPoint, presentation skills, and public speaking, and also attended an Autodesk BIM workshop. These initiatives strengthened professional efficiency, digital proficiency, and technical support capabilities within the department.

Non-Teaching staff activity can be viewed in link:

https://docs.google.com/document/d/1lOcAd0zlG0vPvE_nC-f3z_Delq3blxsgQPlnnTwbpBw/edit?usp=sharing

15. STUDENTS ARTICLES

1. DRONES AND AI IN SITE SURVEYING AND MONITORING: TRANSFORMING MODERN CONSTRUCTION

GOWRI SHANKAR K (II year)

The construction industry is undergoing a significant technological transformation. The integration of drones and Artificial Intelligence (AI) in site surveying and monitoring is fundamentally reshaping how projects are executed, managed, and delivered.

Advanced Technology Integration

Unmanned Aerial Vehicles (UAVs) equipped with high-resolution cameras, LiDAR sensors, and RTK-GPS systems now capture comprehensive site data in hours rather than days. When combined with AI-powered analytics and machine learning, these systems interpret data in real time, detect anomalies, map terrain, and monitor progress against design specifications with centimetre-level precision.

Measurable Impact

The results are compelling: industry research shows up to 75% reduction in inspection time and over 50% decrease in site survey labour costs, while simultaneously improving measurement accuracy. AI algorithms automatically identify progress deviations, detect safety hazards, and classify work zones, enabling faster, evidence-based decision-making that reduces costly rework.

Enhanced Safety and Collaboration

Drones eliminate the need for personnel to access hazardous areas—high elevations, unstable ground, or confined spaces—significantly reducing on-site accident risks. Cloud integration enables instant data sharing across project teams, while AI analytics integrate with Building Information Modelling (BIM) systems to compare actual conditions against design models, catching discrepancies early.

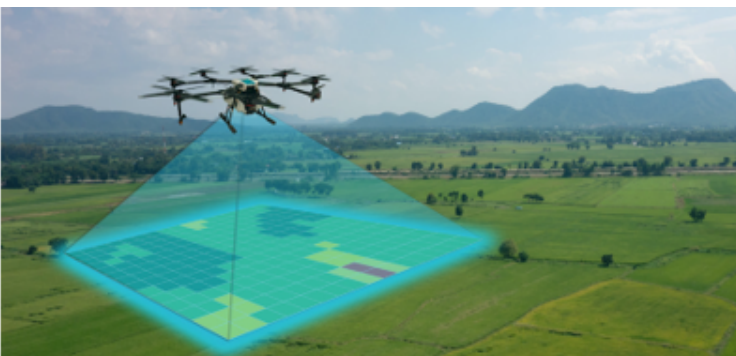
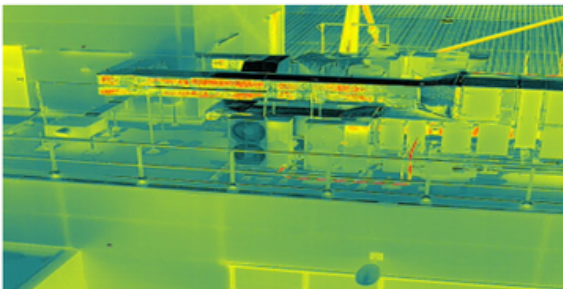


Economic and Environmental Value

Automation of surveying and monitoring tasks reduces labour, time, and equipment costs. Accurate volume calculations for earthwork and material inventories optimize resource usage and minimize waste, contributing to more sustainable construction practices and addressing growing ESG considerations.

Conclusion

Drones and AI are transitioning from innovative tools to essential infrastructure in modern construction. Organizations embracing this technology position themselves for competitive advantage through superior project outcomes, enhanced safety records, and operational excellence. The question is no longer whether to adopt these technologies, but how quickly firms can integrate them to maximize strategic value.



2.SUSTAINABLE CONSTRUCTION MATERIALS

MALATHI M (II year)

Construction business is among the giants in the world, and its impact on the environment is just as enormous. The historic tradition of intensive resource use is no longer possible where the need to increase our demand for modern infrastructure is growing at an alarming rate. To this, a seismic shift in civil engineering is being made towards solutions of the environmentally friendly construction material to minimally affect the environment of the production until the disposal of the material.

Redefining the Infrastructure Ingredients.

The transition to sustainable development is formed with the capacity to replace the high-impact aspects to the greener ones. These materials are intended to solve three significant challenges such as emission reduction and preservation of natural raw resources, and establishment of healthier living conditions.

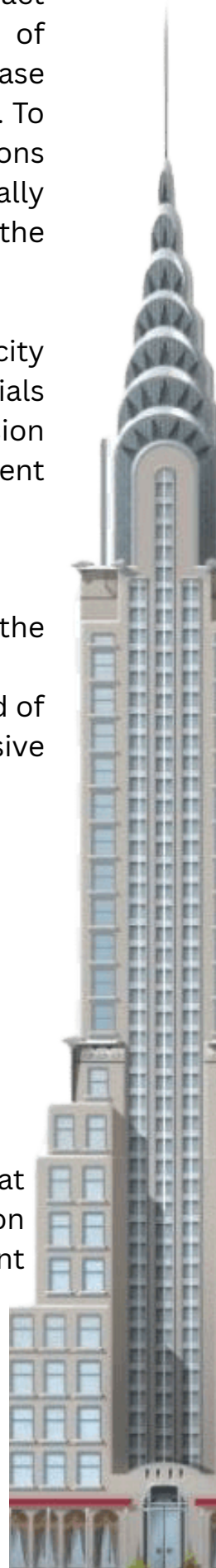
1. By-products as an Industry Resource.

Engineers are utilizing this to strengthen buildings instead of letting the industrial waste be deposited in the landfills:

Fly Ash: This is a by-product of power plants that will be used instead of some portion of cement that will reduce the carbon-intensive production of cement but will increase concrete durability



GGBS (Ground Granulated Blast Furnace Slag): This is a product that enhances the concrete life cycle and makes the overall carbon footprint of the great mass construction of buildings a significant impact





Geopolymer Concrete: This is also an alternative where industrial waste is used to remove Ordinary Portland Cement (OPC) with the resultant production of a binder that is fire resistant and low in emissions

2. Circularity and Generating the Power of Recycling.

Going circular, the industry will be able to transform the destruction of yesterday into the foundation of tomorrow:

§ Recycled Aggregates: Crushed waste Aggregates It is made of old buildings, which are recycled; hence, no natural stone is required to be quarried.

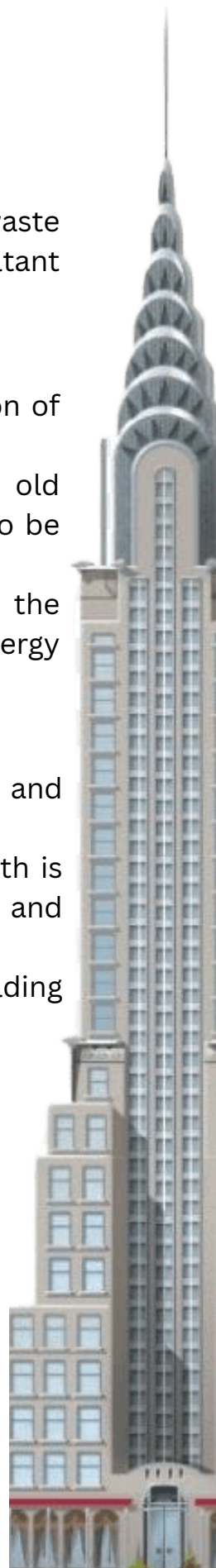
§ Recycled Steel and Glass: This is a resource that ensures that the resources are used without wastage as opposed to the case of energy which has been consumed in production.

3. Returning to Nature

New interest in the modern engineering is finding the bio-based and traditional materials:

Ø Bamboo: This is also known as green steel and its tensile strength is high which makes it a renewable power force since it is also cheap and rural houses power.

Ø Timber and Mud Bricks: Timber and mud bricks are low-energy building materials, which offer natural insulation and carbon sedation.



Sustainable Insulation: The materials like cork, sheep wool and recycled cellulose have been known to significantly lower the energy that is consumed by a building to heat and to cool the building and hence lower the cost of building operation in the long run.

The Path Forward

Green materials are not an option anymore, but an obligatory solution. The task of the existing civil engineers is not complex; they have the mandate to design infrastructure that is resilient and responsible at the same time. As we choose the materials that put the planet first, we ensure that our planet is not the cost of developing our cities.

The future greener, safer and more sustainable future depends on the current sustainable material choices.



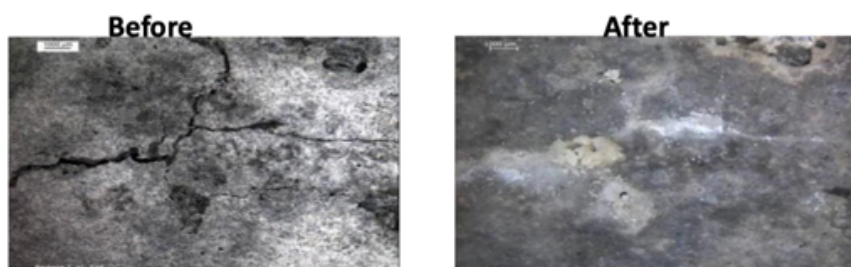
3.SELF HEALING CONCRETE :THE FUTURE OF DURABLE INFRASTRUCTURE

MONISH S M (III year)

Introduction

Concrete is the most widely used material in the construction industry worldwide. However, concrete has many inherent disadvantages. Among the most prominent drawbacks of concrete is the formation of concrete cracks. Formation of concrete cracks can be due to the shrinkage of concrete, thermal expansion and contraction of concrete, overload of concrete structures, and the action of environmental forces. The small concrete cracks have the ability to allow the entrance of water, chloride ions, sulphate ions, and carbon dioxide.

To remedy this problem, an innovative material has been created, referred to as “self-healing concrete.” This concrete has the capability to heal cracks on its own. Self-healing concrete has the potential to completely transform civil engineering since it has the ability to extend the lifespan of buildings, cut down on maintenance, and is sustainable.



Requirement for Self-Healing Concrete

Traditional repair techniques, including epoxy injection, grouting, as well as patch repair, are quite costly and time-consuming, as they are often effective only as a temporary measure. Large structures, such as bridges, tunnels, and sea structures, whenever they are frequently repaired, cause traffic congestion.

Also, many of these cracks are internal, microscopic, and are not observable until substantial damage has been done. The application of self-healing concrete remedies this by making it possible to automatically heal the material at an early stage, thereby inhibiting further damage. Such an innovation suits contemporary performance-based design and construction principles.

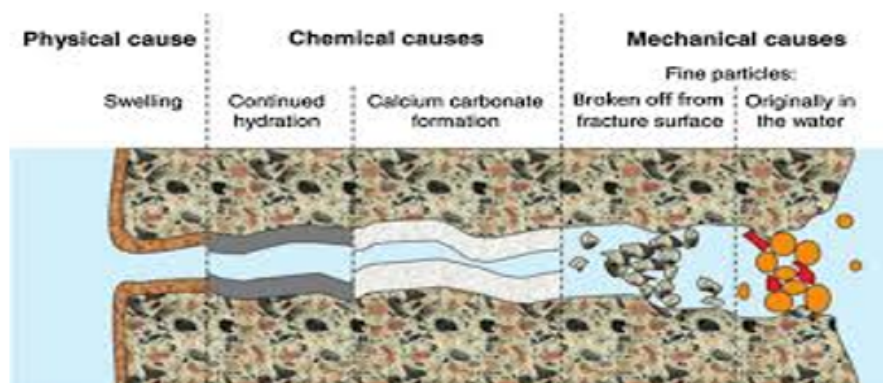
Mechanism of Self-Healing Concrete

Self-healing in concrete involves the closure of cracks by materials that are produced naturally in the concrete matrix or in a laboratory setting. This process reverses any disruption in water tightness but may also reverse any reduction in strength.

1. Autogenous Healing

Autogenous healing is a natural process that also takes place in conventional concrete. This is chiefly attributable to:

- Continued hydration of unhydrated cement particles
- Formation of calcium carbonate precipitate due to reaction of calcium hydroxide and carbon dioxide in aqueous media.
- Such a mechanism is only effective for very tiny cracks of sizes usually under 0.2 mm. It needs the help of water in the process. Although the mechanism is quite valuable, the repair it has in the process is limited in nature



1. Engineered Self-Healing

To counter the disadvantages of autogenous healing, self-healing systems have been designed and engineered.

a) Bacteria-Based Self-Healing

In this process, the particular type of bacteria with the ability to withstand alkaline conditions is mixed into the concrete mixture along with nutrients like calcium lactate. When the concrete cracks, water seeps into it, causing the bacteria to activate, resulting in the production of calcium carbonate as waste products. The calcium carbonate fills the cracked portion, thereby closing it.

Advantages

- Effective for crack sealing up to 0.8 mm
- Enhances durability & water resistance
- Environmentally Friendly

Exceptions:

- Lower Initial Cost
- Long-term bacterial survival requires careful design

a) Capsule-Based Self-Healing

The technique involves the use of micro-capsules containing compounds for the healing process, such as epoxy resins, sodium silicate, or polyurethanes. Once a crack occurs, the capsule bursts and the compound heals the crack by reacting with water or air to form a bond.

Advantages

- Fast healing process
- Can restore partial mechanical strength

Exceptions:

- One-time healing only.
- Concrete strength can be weakened by capsules if they are not designed carefully
- Water absorption depend

a) Vascular Self-Healing

This technique, inspired by natural systems, consists in creating a network of empty tubes or channels in concrete. These channels can be filled with healers, which can be provided several times.

Advantages:

- Repeated healing capability
- Suitable for critical structures

Limitations:

- Complex design and construction
- High initial cost

Performance Characteristics

Studies have shown that self-healing concrete has several properties:

- Decreases water permeability by as much as 90%
- Delays onset of Reinforcement Cor
- Extends service life by 30-50%
- Reduces Maintenance and Repair Cycles

However, in situations where the strength is not entirely recovered, the main objective of self-healing concrete is the improvement of durability.

Applications

Self-healing concrete can be considered highly valuable in situations where the maintenance of the structure may be problematic or expensive, for instance, in the case of

- Bridges and flyovers
- Subterranean Tunnels and Metros
- Marine and coastal structures
- Water retaining structures such as tanks, reservoirs, and so forth
- High-rise buildings & foundations

Sustainability and Economic Gains

Despite the fact that self-healing concrete costs higher to produce compared to regular concrete, its life-cycle cost is much lower because of diminished maintenance costs associated with repairs. It helps to minimize the following costs by prolonging the lifespan of structures:

- Cement demand
- Construction waste
- Amount of carbon dioxide emitted in association with the carrying out of repair works

This renders self-healing concrete as a hopeful building material in the aim to attain the sustainable development goals.

Challenges and Future Scope

Although the technology has its benefits, several hurdles may prevent the widespread use of self-healing concrete:

- Lack of Design Codes Having regard to all the foregoing
- High initial cost of the material
- Little field-scale data exists

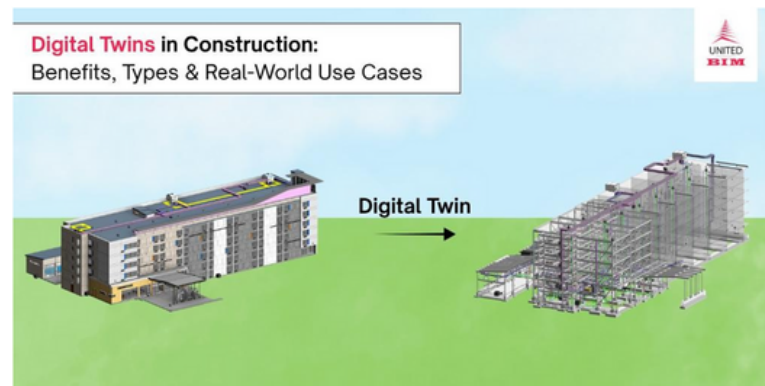
Future work will include the improvement of the efficiency of the healing process, the lowering of costs, the development of hybrid self-healing systems, and the combination of self-healing materials and smart sensing systems. As the technology continues to improve, self-healing concrete is expected to enter the mainstream of the construction industry.

Conclusion

Self-healing concrete is a major breakthrough in civil engineering materials, providing a solution for concrete's long-standing problem: cracking. This self-healing property improves durability, minimizes repairs, and promotes green development for infrastructure. Although some obstacles exist, it is evident from ongoing studies that self-healing concrete is a key that could unlock a new future for resilient and durable civil engineering structures.

4.DIGITAL TWINS IN CIVIL ENGINEERING

NIKHIL NARAYANAN S (IV year)



Introduction

Digital Twins are one of the most significant technological advancements in modern civil engineering. A Digital Twin is a virtual representation of a physical structure such as a building, bridge, road, or water system. It is created using design data, sensor inputs, and real-time monitoring tools. This technology allows engineers to observe, analyze, and predict the performance of infrastructure throughout its life cycle.

Concept of Digital Twins

In simple terms, a Digital Twin works like a “living model” of a structure. Unlike traditional drawings or static models, it continuously updates itself using data collected from the real structure. Sensors placed in the physical structure send information such as load, vibration, temperature, and stress to the digital model. This helps engineers understand how the structure behaves under real conditions.



remember it as:

- Physical structure → real bridge/building
- Sensors → collect data
- Digital Twin → virtual copy that reacts like the real one

Applications in Civil Engineering

Digital Twins are used in various stages of civil engineering projects:

· Design stage

Engineers can simulate loads, environmental conditions, and material behavior to optimize designs.

· Construction stage

Progress monitoring, clash detection, and quality control become more accurate.

· Operation and maintenance stage

Real-time monitoring helps detect cracks, settlements, or failures early.

· Infrastructure management

Useful for bridges, tunnels, highways, water supply networks, and smart cities.

Advantages of Digital Twins

The use of Digital Twins offers several benefits to civil engineers and society:

- Early detection of structural problems
- Reduction in maintenance cost

Improved safety and reliability

- Better decision-making using real-time data
- Longer service life of structures

These advantages make Digital Twins an important tool for sustainable and resilient infrastructure development.

Role in Smart Cities and Sustainability

Digital Twins play a key role in the development of smart cities. By integrating them with technologies like BIM, IoT, and data analytics, engineers can manage traffic flow, energy consumption, water distribution, and waste systems more efficiently. This helps in reducing environmental impact and promoting sustainable urban development.



Importance for Civil Engineering Students

For final year civil engineering students, understanding Digital Twins is essential as the industry is rapidly shifting towards digital construction practices. Knowledge of Digital Twins improves employability and prepares students for future challenges in infrastructure planning, monitoring, and management.

Conclusion

Digital Twins represent the future of civil engineering by bridging the gap between physical structures and digital technology. They enable smarter design, safer construction, and efficient maintenance of infrastructure. As a civil engineering student, learning about Digital Twins highlights the importance of adapting to modern tools while maintaining strong fundamentals. Embracing this technology will help civil engineers build safer, smarter, and more sustainable infrastructure for future generations.



16. ALUMNI WRITE UP

I am Yeswanth D, a proud alumnus of the Department of Civil Engineering, Sri Sivasubramaniya Nadar College of Engineering, Class of 2025. My journey at SSN has been truly transformative, shaping both my professional aspirations and personal values. The strong academic foundation and practical exposure I received in core civil engineering subjects inspired me to choose Civil Engineering as my optional subject for the UPSC Civil Services Mains Examination. I was placed in SPIC, marking an important milestone in my professional journey, and I am currently preparing for the UPSC examination at Aram IAS Academy with a deep aspiration to serve the nation.



Yeswanth D
Alumnus (2021-2025)

My academic journey was enriched by notable achievements, including securing second rank in the department during my fifth semester and receiving a Certificate of Merit with a Silver Medal. I was also honored with the Best Outgoing Student Award for Discipline by Zeus Project Consultants Private Limited, reinforcing my commitment to professionalism and ethical conduct.

Beyond academics, I actively undertook leadership roles as President of the department fun club, KRACIVA, and contributed significantly to organizing INVENTE'23 and INVENTE'24. I am deeply grateful to the management, faculty, and my peers for their unwavering support. SSN has laid a strong foundation for my future, and I carry its values with pride and gratitude.



17. INDUSTRIAL ARTICLE

Civil Engineering at the Cutting Edge — 2025 Industry Update

As we progress through 2025, the civil engineering industry continues to undergo rapid transformation. Driven by digital innovation, sustainability imperatives, and global infrastructure needs, the profession is adopting technologies that not only improve efficiency and safety but also redefine how structures are conceived, built, and maintained. Here's a snapshot of the most impactful developments shaping our industry today.



PRAGADESWAR K

**Planning Engineer
URC Construction (P) Ltd,
Bengaluru**

1. Smart Materials and Sustainable Construction

Sustainability has moved from a buzzword to a core practice in civil engineering. New materials are enabling longer-lasting infrastructure with lower environmental impact:

- Sustainable and green concretes — Laboratories and universities are pioneering geopolymers concrete that eliminates traditional cement, using industrial by-products like fly ash and slag to cut carbon emissions significantly while maintaining strength and durability.
- Self-healing and responsive materials — Advanced concrete mixes embedded with microcapsules or reactive agents automatically fill cracks, extending service life and reducing maintenance costs.
- Photocatalytic and climate-responsive materials — These materials can improve air quality and adapt to environmental stresses, promoting healthier and more resilient infrastructure.

Sustainable practices also extend to modular and prefabricated construction, reducing waste and accelerating timelines while lowering site disruptions.

2. Digital Revolution — AI, BIM, and Data Analytics

Digital technologies are now fundamental to civil engineering operations:



- Artificial Intelligence (AI) and Machine Learning – AI is transforming project planning and execution with predictive scheduling, automated risk detection, and design optimization. Construction management platforms now embed AI for tasks like real-time progress tracking and safety forecasting.
- Advanced Building Information Modeling (BIM) – BIM has evolved into integrated systems (4D, 5D) that link design, cost, scheduling, sustainability metrics, and lifecycle data. BIM's interoperability with AR/VR fosters immersive planning and helps stakeholders visualize outcomes before ground is broken.
- Digital Twins and IoT-Enabled Infrastructure – Real-time data from embedded sensors creates digital replicas of physical assets, enabling proactive maintenance and improved structural health monitoring.

Research also shows novel AI architectures specifically developed for civil applications – such as hybrid vision systems for automated defect detection on construction sites – improving inspection accuracy even with limited training data.

3. Robotics, Automation, and Autonomous Systems

Automation continues to gain traction on and off the construction site:

- Drones and autonomous aerial vehicles provide rapid site surveying, progress monitoring, and high-precision mapping, enhancing safety and reducing inspection times.
- Robotic construction systems – From concrete 3D printers building complex formwork to autonomous excavation and grading machines – are increasingly deployed to improve precision and accelerate construction.
- Edge-AI enabled drones and robotic platforms highlight how low-power autonomous systems can perform real-time detection and navigation tasks, laying the groundwork for fully autonomous construction support systems.

4. Resilient and Smart Infrastructure

Civil engineering is responding to global challenges such as climate change, urbanization, and aging infrastructure:

- Smart cities and IoT networks – Integrated systems of sensors and analytics improve traffic flow, water distribution, and waste management in urban environments.



- Resilient design principles – Structures are increasingly engineered to withstand extreme weather events, seismic forces, and evolving environmental loads.
- Digital infrastructure management – Real-time monitoring of bridges, roads, and public utilities enables predictive maintenance, reducing lifecycle costs and improving safety outcomes.

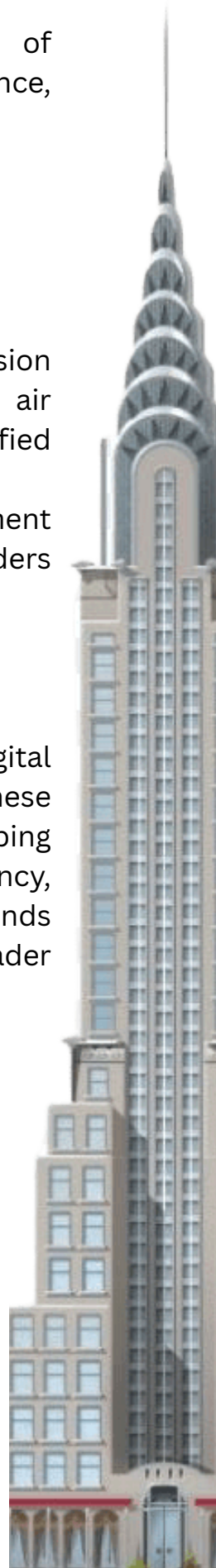
5. Industry Trends and Policy Impacts

The industry is also influenced by regulatory and societal shifts:

- Cities like Oslo have demonstrated how electric and low-emission construction machinery can significantly reduce noise and air pollution on job sites, suggesting a broader shift toward electrified construction fleets.
- Global efforts to decarbonize hard-to-abate sectors like cement manufacturing are accelerating investment in low-carbon binders and carbon capture integrations to meet net-zero targets.

Conclusion:

Civil engineering in 2025 is defined by smart integration of digital tools, sustainable materials, and automated systems. These technologies are not just enhancing productivity – they're reshaping our profession to meet future-scale demands: resilience, efficiency, sustainability, and safety. As engineers, staying ahead of these trends will be critical not only to project success but also to achieving broader societal and environmental goals.



18. EDITORIAL MEMBERS

Chief Editor



Dr.N. Sivakumar
Prof/ HoD Civil Engineering

Faculty coordinator



Dr. Surendar Natarajan
Asst Prof/ Civil Engineering

Design



Renuga Suvathi L II Year



Sandya B Rajan II Year

Editors



Rakshith II Year

Content writing team



Sasurudha M IV year



Kaviya malar S III Year