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NEWSLETTER OF THE
DEPARTMENT OF
CIVIL ENGINEERING



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1. FROM HOD'S DESK

Dr.N. Sivakumar
Professor and Head
Department of Civil Engineering



It gives me immense pleasure to present this edition of the Department of Civil Engineering Newsletter, which highlights the significant accomplishments, academic excellence, research contributions, and professional activities carried out by our faculty members, students, researchers, alumni, and technical staff during the second half of the academic year 2025–2026.

Our faculty members have continued to demonstrate academic leadership through invited lectures, keynote addresses, expert consultations, professional recognitions, editorial responsibilities, and participation in national and international academic forums. The department recorded an impressive research output with more than 34 international journal publications, including several papers published in high-impact Q1 and Q2 journals, reflecting our commitment to advancing knowledge and addressing contemporary engineering challenges.

Research and innovation remain central to our vision. Faculty members successfully submitted ANRF, TNSCST, Ministry of Education, Ministry of Jal Shakti, AICTE, and Shiv Nadar Foundation, with proposal values exceeding ₹40 Crores. and secured 2 funded research projects worth 45 Lakhs. We are also proud of our growing innovation ecosystem, which resulted in two patent applications submitted during this period.



Our students have continued to excel in technical competitions, paper presentations, project exhibitions, hackathons, and professional certification programmes. During the year, they secured more than 70 awards and recognitions at various state, national, and international events. Their achievements reflect the department's focus on experiential learning, innovation, and holistic development. Besides, our student has secured the best outgoing student of the Institution this year. Our student Hariharan (Batch 2022–2026) has also secured the Best All Rounder Award from Bank of Baroda this year.

We have successfully organised our annual international conference (SPICE 2026) with two international speakers and 75 presentations. Our alumni continue to inspire and guide current students through mentoring sessions, career interactions, and professional networking activities. Their achievements across industry, research, higher education, and public service remain a source of pride for the department.

As we move forward, I extend my sincere appreciation to our faculty members, students, research scholars, alumni, industry partners, and stakeholders for their unwavering support and contributions to the department's growth and success.

Wishing you a great academic year 2026-2027.

2. FACULTY ARTICLE

Listening to Concrete:

Acoustic Emission for Structural Health Monitoring

Dr.V.Radhika

Assistant Professor



Modern infrastructure such as bridges, buildings, dams, and industrial structures is expected to perform safely over several decades. However, factors such as repeated loading, environmental exposure, aging, and accidental events can gradually deteriorate structural performance. Detecting damage at an early stage is therefore essential for ensuring safety, planning maintenance, and extending the service life of structures. This is the primary objective of Structural Health Monitoring, which aims to assess the condition of structures using advanced sensing and monitoring technologies. Among the various techniques available today, Acoustic Emission (AE) has emerged as a powerful non-destructive monitoring tool capable of detecting damage as it occurs. Unlike conventional inspection methods that identify damage only after cracks become visible, AE can detect the formation and growth of cracks within a material in real time, making it an attractive technology for monitoring critical infrastructure.

What is Acoustic Emission?

When a material is subjected to loading, microscopic damage processes such as crack initiation, crack growth, fibre pull-out, or fracture release small amounts of stored strain energy. This sudden release of energy generates transient elastic waves that travel through the material.

These waves are known as acoustic emissions. By attaching sensitive piezoelectric sensors to the surface of a structure, these waves can be detected and converted into electrical signals. The recorded signals contain valuable information about the location, intensity, and progression of damage occurring inside the material. This process is illustrated schematically in Figure 1.

A useful analogy is that of a physician using a stethoscope to listen to the human body. Similarly, AE systems "listen" to a structure and provide information about its internal condition without causing any damage to the structure itself.

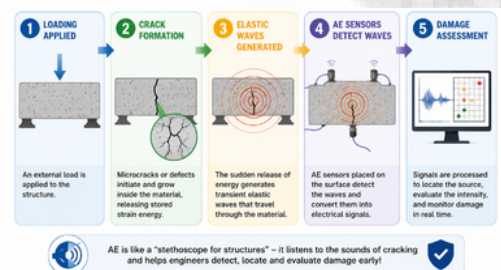


Fig. 1 Schematic illustration of the AE monitoring process

Why is Acoustic Emission Important?

One of the most significant advantages of AE is its ability to detect damage at a very early stage. Many conventional monitoring techniques require visible cracks or measurable changes in structural response before damage can be identified. AE, on the other hand, is sensitive to the microcracking processes that occur long before visible signs of deterioration appear. Another important feature is that AE provides real-time monitoring, as signals are generated only when damage is actively occurring. By using multiple sensors, the source of these signals can also be located, enabling engineers to identify the regions where cracking and damage are developing within a structure. This capability, known as source localisation, provides valuable information about the location and progression of damage without requiring prior knowledge of crack positions (Figure 2). As a result, AE is particularly useful for monitoring structures under service loads, proof loading, and laboratory testing, where both the occurrence and location of damage are of interest.

AE has been successfully applied in the monitoring of concrete bridges, pressure vessels, pipelines, storage tanks, wind turbine components, and aerospace structures. Its ability to provide continuous information about structural condition makes it a valuable tool for preventive maintenance and safety assessment.

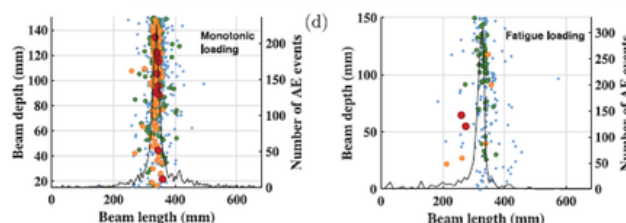


Fig. 2 Source localisation using AE (Keerthana and Kishen, 2020)

Monitoring Fatigue Damage in Concrete

Many concrete structures experience repeated loading throughout their service life. Highway bridges, railway structures, offshore platforms, and industrial facilities may be subjected to millions of load cycles. Although the stress levels associated with individual cycles may be relatively small, repeated loading can gradually lead to fatigue damage and eventual failure.

Understanding fatigue crack growth in concrete remains a challenging task because cracking often develops internally and may not become visible until significant damage has occurred. AE offers a promising solution by providing direct information about the cracking activity taking place within the material.

Recent studies by Radhika and Kishen (2024) demonstrated that fatigue damage in concrete can be assessed using AE measurements. By analysing AE signals generated during cyclic loading, correlations are established between AE parameters and fatigue crack growth. As cracks propagate under repeated loading, the associated acoustic activity increases, enabling the progression of damage to be tracked through AE measurements. The study identifies AE energy as a particularly effective parameter for characterising fatigue behaviour and estimating crack growth rates. An important advantage of this approach is that it does not require continuous measurement of crack length or detailed knowledge of the loading history. This makes it particularly attractive for real-world structures, where direct observation of crack growth is often difficult or impractical. Furthermore, AE measurements naturally capture the influence of the heterogeneous internal structure of concrete, enabling more realistic and structure-specific assessments of fatigue behaviour.

Towards Smarter Infrastructure:

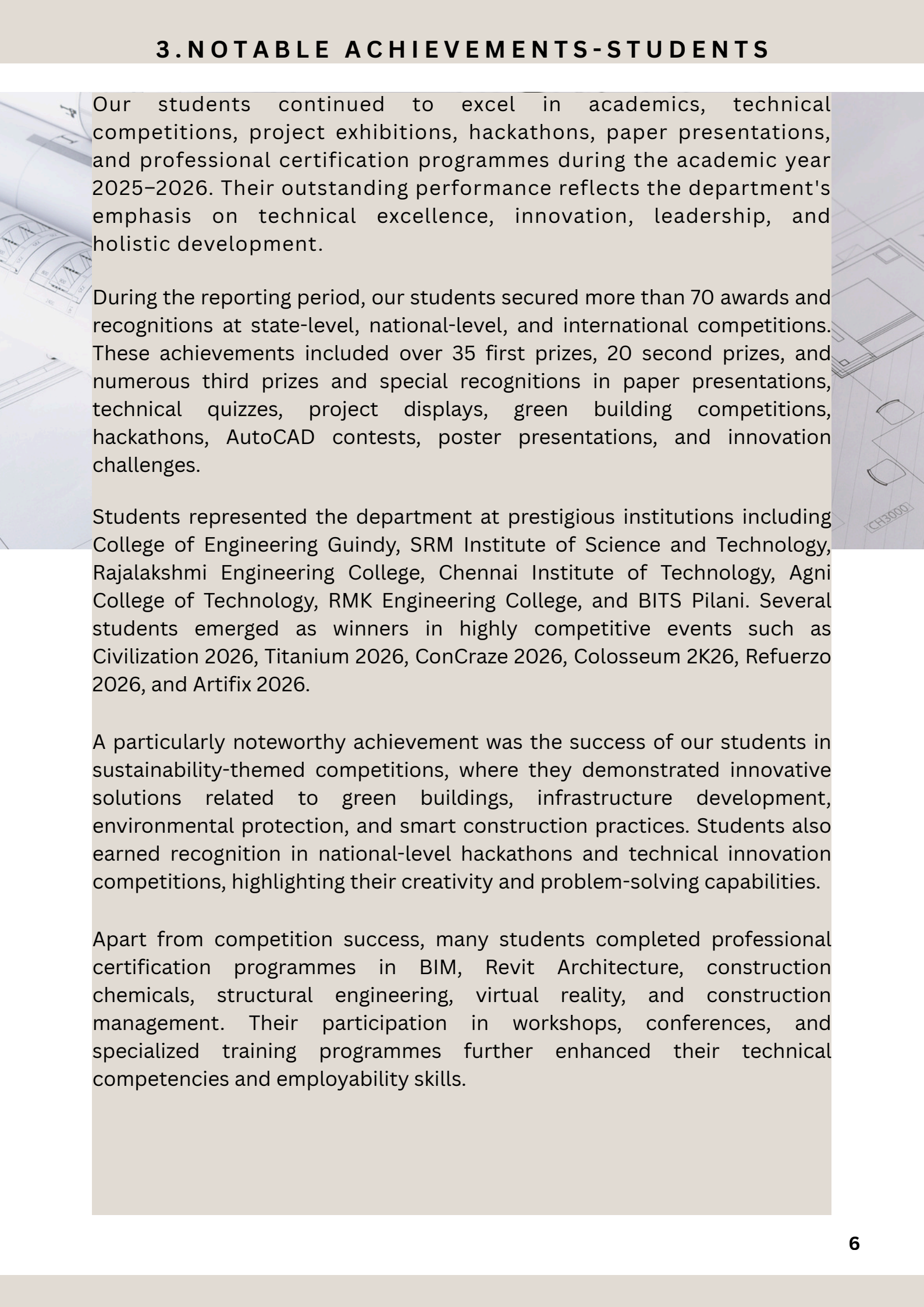
As infrastructure systems continue to age and maintenance resources become increasingly limited, there is a growing need for intelligent monitoring solutions that can provide reliable information about structural condition. AE represents one such technology, offering the ability to detect and monitor damage while structures remain in service.

With ongoing developments in sensor technology, wireless monitoring systems, and artificial intelligence, AE is expected to play an increasingly important role in the future of structural health monitoring. By enabling engineers to detect damage earlier and understand structural behaviour more effectively, this technology contributes to safer, more sustainable, and more resilient infrastructure.

References:

1. Keerthana, K., and JM Chandra Kishen. "Micromechanical effects of loading frequency on fatigue fracture in concrete." *Journal of Engineering Mechanics* 147.12 (2021): 04021111.
2. Radhika, V., and JM Chandra Kishen. "A comparative study of crack growth mechanisms in concrete through acoustic emission analysis: Monotonic versus fatigue loading." *Construction and Building Materials* 432 (2024): 136568.
3. Radhika, V., and JM Chandra Kishen. "Bayesian analysis of acoustic emission data for prediction of fatigue crack growth in concrete." *Theoretical and Applied Fracture Mechanics* 131 (2024): 104385.

3. NOTABLE ACHIEVEMENTS-STUDENTS



Our students continued to excel in academics, technical competitions, project exhibitions, hackathons, paper presentations, and professional certification programmes during the academic year 2025–2026. Their outstanding performance reflects the department's emphasis on technical excellence, innovation, leadership, and holistic development.

During the reporting period, our students secured more than 70 awards and recognitions at state-level, national-level, and international competitions. These achievements included over 35 first prizes, 20 second prizes, and numerous third prizes and special recognitions in paper presentations, technical quizzes, project displays, green building competitions, hackathons, AutoCAD contests, poster presentations, and innovation challenges.

Students represented the department at prestigious institutions including College of Engineering Guindy, SRM Institute of Science and Technology, Rajalakshmi Engineering College, Chennai Institute of Technology, Agni College of Technology, RMK Engineering College, and BITS Pilani. Several students emerged as winners in highly competitive events such as Civilization 2026, Titanium 2026, ConCraze 2026, Colosseum 2K26, Refuerzo 2026, and Artifix 2026.

A particularly noteworthy achievement was the success of our students in sustainability-themed competitions, where they demonstrated innovative solutions related to green buildings, infrastructure development, environmental protection, and smart construction practices. Students also earned recognition in national-level hackathons and technical innovation competitions, highlighting their creativity and problem-solving capabilities.

Apart from competition success, many students completed professional certification programmes in BIM, Revit Architecture, construction chemicals, structural engineering, virtual reality, and construction management. Their participation in workshops, conferences, and specialized training programmes further enhanced their technical competencies and employability skills.

These achievements underscore the department's commitment to nurturing talented engineers who can excel in academic, professional, and entrepreneurial environments. We congratulate all our students for their remarkable accomplishments and look forward to even greater successes in the years ahead.

LINK:



NOTABLE ACHEIVEMENTS OF CIVIL ENGINEERING STUDENTS 2025-2026

4.PLACEMENT ACTIVITIES (2025-2026)

The placement performance of the Department of Civil Engineering during the Academic Year 2025–26 reflects strong participation from core engineering and infrastructure-based organizations. A total of 28 placement offers were secured across 13 companies, covering the core engineering, management and information technology sectors.

Core-sector placements constituted the major share, with 24 out of the 28 offers, accounting for approximately 85.7% of the total placements. This indicates the continued relevance of the programme curriculum and the preparedness of students for careers in construction, infrastructure, energy, engineering consultancy and allied industries.

The major core recruiters included FTC Solar, Brigade, Ramo Industries, JGC, Technip, Drywall, Integra Global, and Enmas G. FTC Solar emerged as the largest recruiter with six offers, followed by Brigade with five offers, Ramo Industries with four offers and JGC with three offers.

The highest salary package of ₹36 lakh per annum was offered by Meesho under the management category. Among the core-sector recruiters, the highest package of ₹6.6 lakh per annum was offered by JGC, while Technip offered ₹6 lakh per annum. Other prominent packages included ₹5.5 lakh per annum from Brigade, ₹5 lakh per annum from FTC Solar and Ramo Industries, and ₹3.5 lakh per annum from Tamil Nadu Electricity Board.

Apart from the core sector, students also secured opportunities in management-oriented roles with Ninjacart, Meesho and Intellipaat, and in the information technology sector with Accenture. The salary packages ranged from ₹2.6 lakh per annum to ₹36 lakh per annum, with an overall average package of approximately ₹6.09 lakh per annum. The median salary package was ₹5 lakh per annum.

The placement outcomes for AY 2025–26 demonstrate a balanced combination of core engineering employment, interdisciplinary career opportunities and high-value placements. The strong presence of core companies, together with opportunities in management and information technology, reflects the diverse technical and professional competencies developed by the students.

Dr. Aswin Sriram G.
Placement and Internship Coordinator

5.HACKATHON-2026

To foster innovation, creativity, and problem-solving skills among future engineers, our Department of Civil Engineering successfully organized a Civil Engineering Hackathon that brought together enthusiastic students from various institutions to address real-world engineering challenges through innovative, technology-driven solutions. The event provided a dynamic platform for participants to develop sustainable ideas in Structural, Environmental, Geotechnical, Materials, Water Resources, and Transportation Engineering. More than 10 multidisciplinary teams competed with problem statements on flood risk management, smart cities, sustainable construction, waste management, geospatial applications, and climate-resilient infrastructure. Students were encouraged to apply Artificial Intelligence, GIS, Remote Sensing, IoT, and data analytics to civil engineering problems. The hackathon showcased technical expertise, teamwork, analytical thinking, and creativity while promoting interdisciplinary collaboration and experiential learning. The innovative solutions presented reflected the students' commitment to sustainability and societal impact. Through such initiatives, the department continues to nurture future-ready engineers equipped to address tomorrow's infrastructure challenges with confidence.



CIVIL ENGINEERING HACKATHON 2026-
CIVHACK 360

6. INTERNATIONAL CONFERENCE ON SPICE (2026)

The Department of Civil Engineering, SSN College of Engineering, successfully organized the 7th Annual International Conference on Sustainable Practices and Materials in Civil Engineering (SPICE 2026) on 19–20 February 2026 in collaboration with the Institution of Civil Engineers (ICE-UK). The conference served as a premier platform for academicians, researchers, industry professionals, and students to exchange knowledge and discuss emerging trends in sustainable civil engineering practices, innovative materials, and resilient infrastructure development.

The conference featured distinguished keynote speakers from academia and industry, including Dr. Cilcia Kusumastuti from Petra Christian University, Indonesia, Prof. Pijush Samui from NIT Patna, Mr. Vikkanagounder Sadasivam, CEng MICE(UK), Larsen & Toubro, Dr. Hafez Ahmed from INTI International University, Malaysia, and Wg Cdr D. Gurunath Reddy, Fellow of ICE and DCGM, AP Metro Rail Corporation Ltd. Their insightful presentations highlighted advancements in sustainable construction, geotechnical engineering, smart infrastructure, transportation systems, and innovative engineering solutions.



SPICE 2026 INAUGURATION

7. ACTIVITY ROUNDUP – PROFESSIONAL SOCIETIES

- Activity Roundup – Workshops, Conferences, Guest Lectures & Professional Society Activities
- The Department of Civil Engineering actively promotes experiential learning through workshops, conferences, guest lectures, technical competitions, and professional society activities. During the academic year 2025–2026, the department organized more than 15 academic and professional development programmes under the banners of ACE, ICE (UK), ICI, IEI, IGBC, and IIC, providing students with valuable exposure to industry practices, emerging technologies, and professional networking opportunities.
- A major highlight was the successful organization of the 7th International Conference on Sustainable Practices and Innovation in Civil Engineering, which brought together researchers, academicians, and industry professionals from diverse disciplines. The department also conducted a Short-Term Training Programme on Structural Health Monitoring, along with several workshops on software applications, digital transformation, and emerging technologies in civil engineering.
- Expert guest lectures and webinars covered topics such as environmental impact assessment, air pollution control, wastewater treatment, geotechnical testing, sustainable construction practices, and higher education opportunities. National-level events including ICE ENGINUITY and CivHack 360 encouraged innovation, technical excellence, and problem-solving among students.
- These initiatives significantly enhanced students' technical competence, industry readiness, leadership abilities, and professional development while reinforcing the department's commitment to academic excellence and lifelong learning.

7.1 ASSOCIATION OF CIVIL ENGINEERS (ACE)

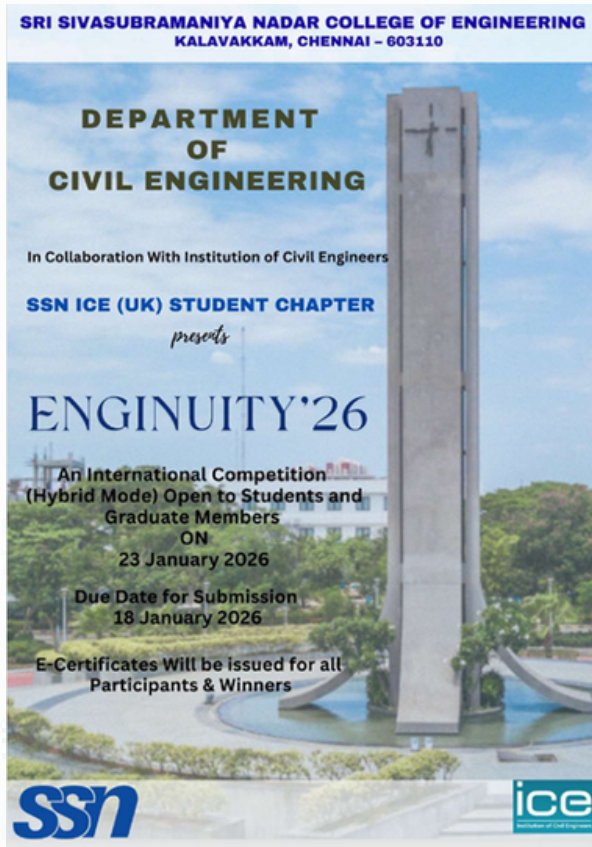
The academic year commenced with the inauguration of the Association of Civil Engineers (ACE) on 28 July 2025 by Thiru. Saminathan Chidambaram, Head of BIM and Digital Delivery, COWI India Limited. Under the ACE banner, several technical events were organized, including a workshop on "Recent Digital Advances in Civil Engineering", guest lectures on geotechnical engineering, and seminars on higher education opportunities abroad.

7.2 INSTITUTION OF CIVIL ENGINEERS (ICE) UK

Under the ICE (UK) Student Chapter, the department organized the international-level technical competition "ICE ENGINEUNITY 2026" on 23 January 2026, attracting around 72 participants from institutions across India. The chapter also facilitated an industrial visit to the Institute of Hydrology and Hydraulics, Poondi Reservoir, providing students with practical exposure to water resources engineering and hydraulic infrastructure.



ICE Tech Fest" - ICE ENGINEUNITY -26



ICE ENGINUITY -26

BUREAU OF INDIAN STANDARDS **INSTITUTION'S INNOVATION COUNCIL** **ice** **ACE** **ICA**

SSN

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

DEPARTMENT OF CIVIL ENGINEERING
One- Day Workshop

**From Theory to Software:
Getting Started with STAAD.Pro**

Resource persons:

Mr. Balamourougane Sr. Structural Engineer TechApps Consulting	Mr. Rajesh Kumar Director Technical TechApps Consulting
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Venue: SSN CE, Civil Engineering Department, CAD Lab
Date: 26.02.2026 **Time: 9.30 AM - 3.30 PM**

Dr. Radhika V. Faculty Coordinator	Dr. N. Sivakumar Professor and Head
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ONE DAY WORKSHOP

7.3 INDIAN CONCRETE INSTITUTE (ICI)

The ICI Student Chapter successfully organized the National-Level ICI Tech Fest 2026, encouraging students to demonstrate technical innovation and engineering problem-solving skills. Faculty members also coordinated a six-day Short-Term Training Programme on Structural Health Monitoring, enhancing participants' understanding of advanced infrastructure monitoring techniques.



GUEST LECTURE ON 3D PRINTING OF CONCRETE



SRI SIVASUBRAMANIYA NADAR COLLEGE OF ENGINEERING
(AN AUTONOMOUS INSTITUTION – AFFILIATED TO ANNA UNIVERSITY)
Rajiv Gandhi Salai, Kalavakkam – 603110

INDIAN CONCRETE INSTITUTE CHENNAI CENTRE – TAMIL NADU

DEPARTMENT OF CIVIL ENGINEERING

SSN – ICI STUDENT CHAPTER

Cordially invites you to the
DEPARTMENT'S WEEKLY
STUDENT – LED CLUB ACTIVITIES

EVENTS:

1. CODE SEARCH
2. WHO AM I ?
3. GUESS THE SOUND



Time: 1.00 to 3.00 pm

Date: 6.01.2026

Day: Tuesday

Venue: CADD LAB

Coordinator

Dr. P. Sangeetha

Professor & Head

Dr. N. Sivakumar

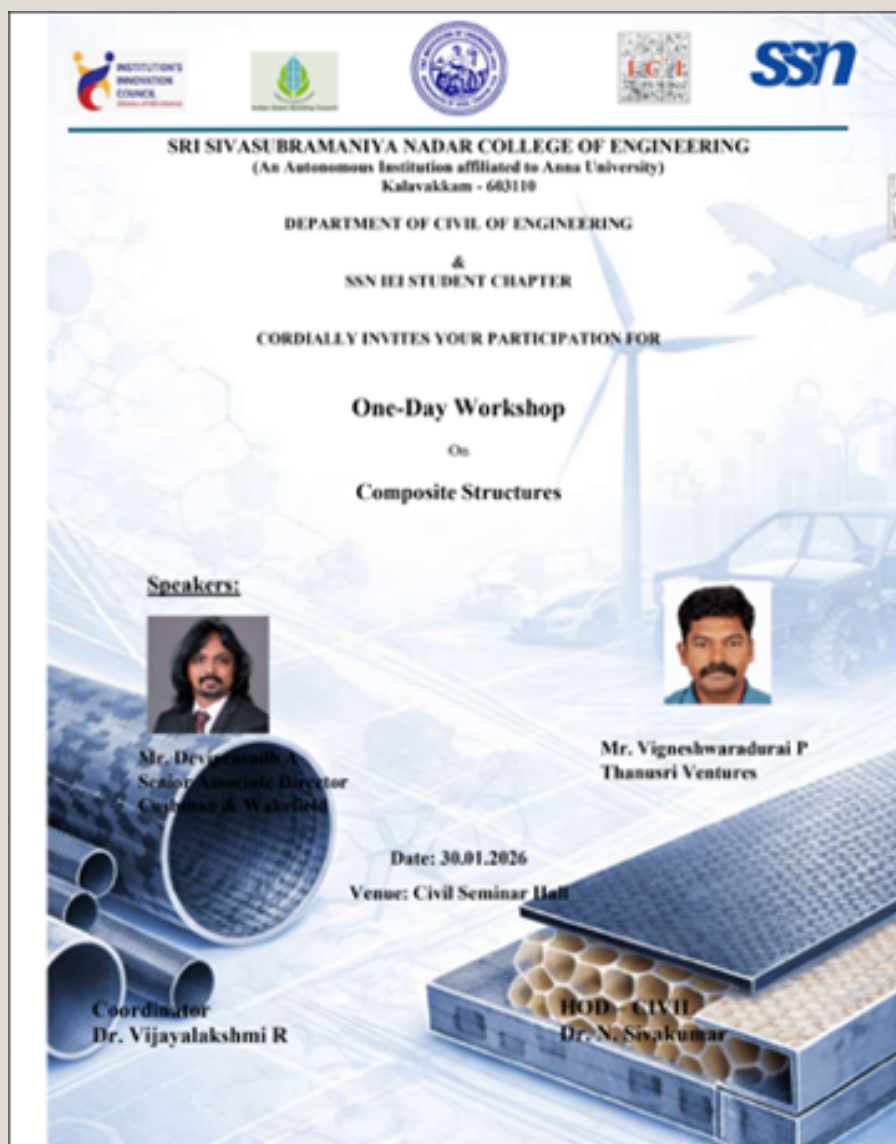


ICI – Fest 2026

7.4 INSTITUTION OF ENGINEERS INDIA (IEI)

The Department of Civil Engineering, SSN College of Engineering, in association with the SSN IEI Student Chapter, organized a One-Day Workshop on “Composite Structures” on 30 January 2026.

The workshop featured expert talks by Mr. Deviraprasada and Mr. Vigneshwaradurai P, offering valuable insights into modern composite construction practices. organized by Dr.Vijayalakshmi R & Dr.Sivakumar N



WORK SHOP ON COMPOSITE STRUCTURES



IEI CLUB ACTIVITIES



SRI SIVASUBRAMANIYA NADAR COLLEGE OF ENGINEERING
(An Autonomous Institution affiliated to Anna University)
Kalyavakkam - 603110



DEPARTMENT OF CIVIL ENGINEERING
and
SSN IEI STUDENT CHAPTER



Cordially Invites your participation for the

DEPARTMENT' S WEEKLY

STUDENT – LED CLUB ACTIVITIES



EVENTS:

- 1. ACT IT**
- 2. CONNECT IT**
- 3. GROUP IT**

Time: 1.00 – 3.00pm

Day: Tuesday

Date: 20.01.2026

Venue: CADD LAB

Dr. R.Vijayalakshmi
Coordinator

Dr. N. Sivakumar
Head of the Department



IEI LED CLUB ACTIVITIES

7.5 Indian Green Building Council (IGBC):

Under IGBC Student Chapter , We have invited Mr. Ashok Kumar from CMTI to conduct workshop on “Green Building” on 21st January 2026 . Our department also organized 3-days value added course about “Green Building” from 17 February 2026 to 19 February 2026. Our chapter also facilitated an Wastewater Treatment Plant visit in our college on 18th March 2026 in order to provide our college students with practical exposure to Wastewater Treatment.



ONE DAY WORKSHOP



VALUE ADDED COURSE



WASTE WATER PLANT VISIT

8.SITE VISIT:

- Dr. Surendar Natarajan organized an industrial visit for second-year Civil Engineering students to the Institute of Hydrology & Hydraulics, Poondi Reservoir, Government of Tamil Nadu (Water Resources Department), on 02 April 2026 under the banner of SSN-ICE(UK) Student Chapter.
- A site visit was organized by Dr. Aswin Sriram and Dr.Preethi V to third year civil engineering students to visit the CETP of Thirumudivakkam Industrial Enviro Private Limited on 06.03.2026 and to learn more about wastewater treatment, Zero liquid discharge, waste management.



Poondi Reservoir

9. PUBLICATIONS

During the academic year 2025–2026, our faculty members and research scholars demonstrated strong research productivity by publishing more than 34 papers in reputed international journals indexed in SCI, Scopus, and Web of Science. Their work covered structural, geotechnical, environmental, transportation, water resources, materials, artificial intelligence, and sustainable infrastructure domains. Several papers appeared in Q1 and Q2 journals, reflecting the quality and global relevance of the research. Key themes included flood hazard mapping, groundwater quality, sustainable concrete, cold-formed steel structures, microplastic remediation, machine learning, and climate-resilient infrastructure. Publications in journals such as Scientific Reports, Journal of Flood Risk Management, and Case Studies in Construction Materials enhanced the department's visibility. The integration of AI, GIS, Remote Sensing, and sustainability into civil engineering further strengthened interdisciplinary research. These achievements enrich our academic ecosystem and contribute meaningful solutions to societal and environmental challenges for students, faculty, and the wider engineering community across the university.

Department publication can be viewed in link: [CLICK HERE](#)

PATENTS

Dr P. Sangeetha, ASP/Civil and Dr P. Kaythry, ASP/ECE, submitted the verified first draft of the complete specification for the invention titled 5G-Enabled River Water Level Forecasting for Bridge Safety and Flood Mitigation to CIntelligence Services Pvt Ltd on 20.02.2026.

Dr. V. Preethi, Asst.Prof, has filed a patent application titled Portable, Large-scale Solar Sono-embedded photocatalytic Hydrogen Production from Wastewater on 29.04.2026.

10.CONFERENCES:

The Department of Civil Engineering strengthened its research culture through active participation in national and international conferences during 2025–2026. Faculty members and students presented 11 papers on groundwater interaction, environmental sustainability, geotechnical engineering, construction materials, wastewater treatment, renewable energy, and microplastic pollution. Key studies included isotope hydrology, greywater treatment, photocatalytic hydrogen production, soil stabilization using digestate solids, coconut leaf geocells, and recycled aggregate concrete. Papers were presented at ICREA 2026, ICB 2026, and other reputed forums. These contributions reflect the department's commitment to innovation, sustainability, and impactful research addressing contemporary engineering challenges for future generations.

Department conference can be viewed in link: [CLICK HERE](#)

11 .FACULTY ACTIVITIES:

11.1 External Recognition:

We take great pride in the outstanding external recognitions and professional achievements earned by our faculty members during the academic year 2025–2026. These accomplishments reflect the department's commitment to academic excellence, research innovation, and professional service.

Our faculty members were invited to deliver keynote addresses, expert lectures, guest talks, and technical sessions at reputed institutions and professional forums across the country. Their expertise in areas such as flood risk assessment, water resources engineering, geospatial technologies, geotechnical engineering, sustainability, and environmental management received significant appreciation from academia and industry alike.

Several faculty members served as doctoral committee members, external examiners, reviewers, advisory board members, and question paper setters for leading universities and professional bodies. These responsibilities highlight the confidence placed in our faculty by the academic community and their contributions toward maintaining high standards in teaching and research.

The department also celebrates various awards and recognitions received by faculty members, including excellence in reviewing, editorial contributions, professional leadership, and appointments to national and international technical committees. Faculty members further strengthened collaborations with government agencies, industries, and professional organizations through consultancy, technical audits, expert consultations, and policy discussions. These achievements continue to enhance the department's reputation, inspire our students, and reinforce our mission of excellence in education, research, innovation, and societal impact.

Department External recognition activities can be viewed in link: [CLICK HERE](#)

11.2 External Grants Applied

Our department continued to strengthen its research and innovation ecosystem through active participation in externally funded research projects. During the academic year 2025–2026, faculty members submitted and secured several competitive research proposals from prestigious funding agencies including ANRF, TNSCST, Ministry of Jal Shakti, AICTE, Shiv Nadar Foundation, and the Ministry of Education.

A total of 14 major project proposals were submitted during the reporting period with a cumulative proposed budget exceeding ₹40 Crores. The projects addressed critical national and global challenges including flood forecasting, climate resilience, groundwater sustainability, artificial intelligence applications, coastal protection, sustainable construction materials, wastewater treatment, renewable energy generation, and infrastructure monitoring.

Among the notable achievements, the department participated in a large-scale ANRF proposal worth ₹29 Crores focusing on multimodal rainfall nowcasting and cloudburst early warning systems. Faculty members also submitted innovative proposals on AI-enabled flood prediction systems, sustainable lightweight concrete, PFAS removal from contaminated water, photocatalytic hydrogen production from wastewater, and machine learning-based infrastructure assessment.

Department External Grants applied can be viewed in link: [CLICK HERE](#)

External Grants Received

The department secured important funding support through sanctioned projects.

The project proposal titled Comparative Analysis of Ancient Indian and Modern Land Measurement Technologies has been sanctioned by the Indian Knowledge Systems (IKS) Division of MoE and the budget approved is 2,70,000/- (Rupees Two Lakh Seventy thousand) for 6 months duration. The PI of the Project is Dr. Aswin Sriram and the CO-PIs are Dr. Sundareswaran R, Dr. Shanmugapriya M.

DR. SURENDAR NATARAJAN, SERVING AS PRINCIPAL INVESTIGATOR (PI) AND ASSISTANT PROFESSOR IN CIVIL ENGINEERING, HAS RECEIVED A GRANT OF INR 3,18,630 UNDER THE 2025 GLOBAL E-STEM AWARD FOR THE PROJECT TITLED ESTIMATION OF SURFACE AND GROUNDWATER FLOW QUALITY WITH MODELLING TECHNIQUES AND IDENTIFICATION OF RECHARGE SOURCES.

Book / Book Chapter:

1.Kaythry P, Sangeetha P - Title: Machine Learning-Based Prediction of Load-Slip Behaviour in Composite Space Trusses for Sustainable Structural Design,Journal name: IEEE 13th Region 10Humanitarian Technology Conference (R10-HTC), Volume: , ISSN Print: , ISSN Online: , Impact Factor: , DOI: , Pages: -.

2.Sangeetha P , Kaythry P - Title: Natural Fibre Reinforced Steel Concrete Composite Wall Panel for Sustainable Building,Journal name: IEEE 13th Region 10 Humanitarian Technology Conference (R10-HTC), Volume: , ISSN Print: , ISSN Online: , Impact Factor: , DOI: , Pages: -.

MoU Related News

Dr.Sivakumar.N (HoD), Dr. Ramanjaneyulu.K (Professor) and Dr.Sivapriya S.V(Associate Professor) of Civil Department visited LnT , Chennai to discuss the proposed Syllabus of SNU- SoE to get the feedback from Industry as a part of MoU signed.

Dr.Sivakumar.N (HoD), Dr. Ramanjaneyulu.K (Professor) and Dr.Sivapriya S.V(Associate Professor) of Civil Department visited ARTELIA CONSULTING ENGINEERS LTD. , Chennai to discuss the proposed Syllabus of SNU - SoE to get the feedback from Industry as a part of MoU signed.

11.3 Research Scholars Related Activities:

Research and doctoral education remained a strength of our department during 2025–2026. We supported scholars through doctoral committee meetings, confirmation and pre-confirmation seminars, annual reviews, and research dissemination activities across structural, geotechnical, water resources, environmental, and sustainable infrastructure domains. More than 10 doctoral milestones were completed, with faculty supervisors providing mentoring and academic guidance. Several scholars successfully fulfilled confirmation requirements, while new research scholars were welcomed into the doctoral programme. Faculty members contributed as doctoral committee members and external experts for Ph.D. evaluations at reputed institutions.

A full-time scholar received the Best Paper Award at an international conference for innovative slope stabilization research. Scholars also enhanced publication output through collaborative work with faculty, resulting in impactful journal papers. Regular technical discussions and reviews further strengthened scholarly progress and ensured timely completion of research goals. These achievements reflect our strong research culture, interdisciplinary collaboration, and commitment to nurturing future researchers globally.

Department Research Scholar Activities can be viewed in link: [CLICK HERE](#)

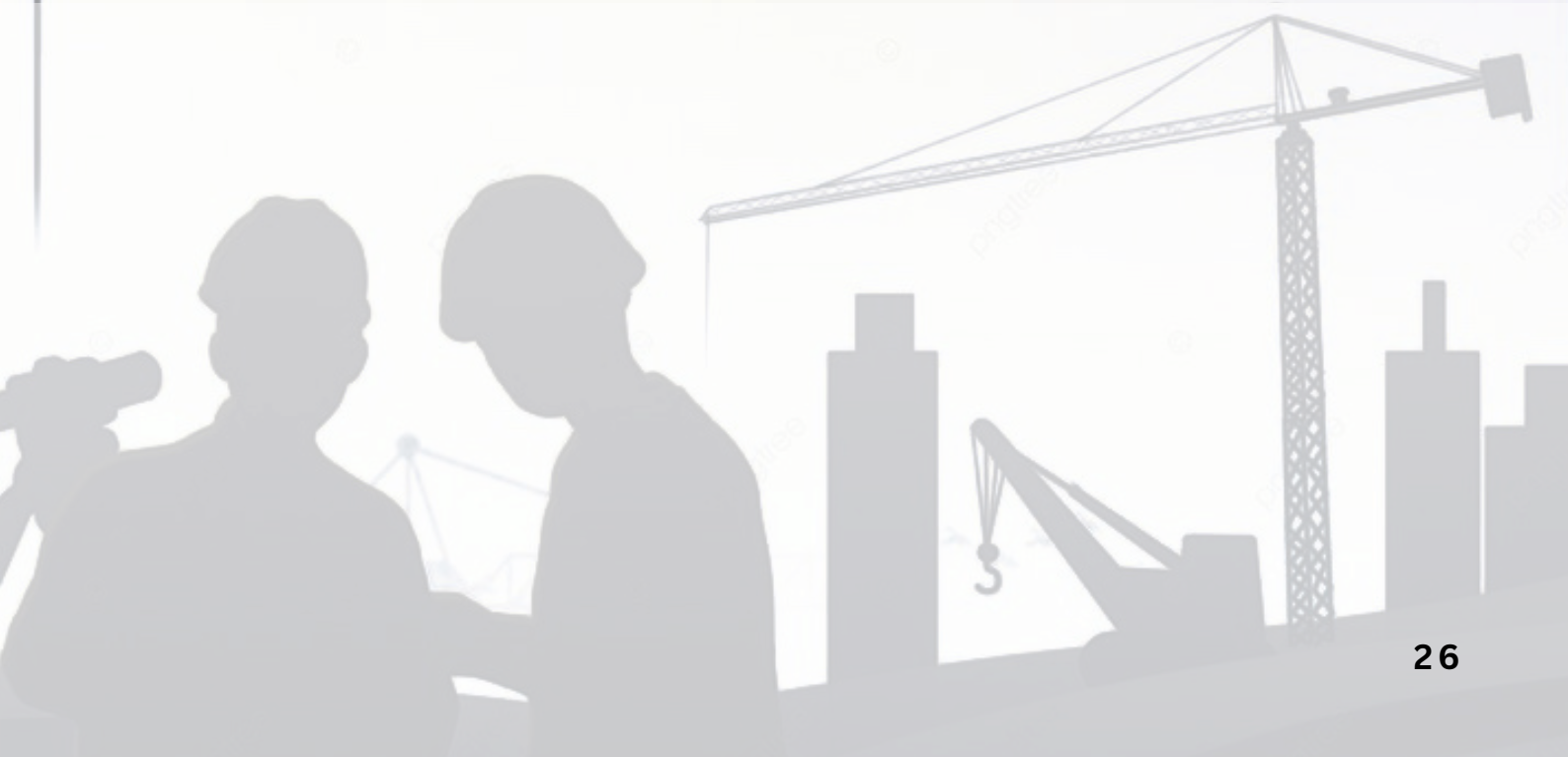
11.4 Faculty Development Programmes & Training:

Continuous professional development remained central to our academic vision during 2025–2026. Faculty members actively participated in over 10 Faculty Development Programmes, workshops, webinars, and certification courses covering Artificial Intelligence, GIS, sustainable infrastructure, fire safety engineering, smart cities, MEP systems, and advanced construction technologies. These initiatives helped faculty stay updated with emerging tools, industry practices, and innovative teaching methods. A notable milestone was the successful completion of an AI Teacher Training Certification comprising 125 learning hours, reflecting our commitment to technology-enabled education. Faculty also attended programmes on AI applications in civil engineering, sustainable development, digital libraries, research databases, and advanced analytical tools. In addition, several faculty members served as resource persons and trainers in FDPs organized by reputed institutions, sharing expertise in geospatial technologies, flood modeling, sustainability, and water resources engineering. These efforts strengthened teaching quality, enhanced research productivity, and promoted innovation-driven learning aligned with global engineering standards and industry needs.

Department attended FDP can be viewed in link: [CLICK HERE](#)

11.5 Consultancy:

1. Sangeetha P, handled a consultancy project titled "Design and analyse the structural support system for the machinery " for Advance Machine and Automation Technologies India Pvt. Ltd. The project duration was from 2025-06-23 to 2026-01-05. The total sanctioned amount was Rs. 42373, out of which Rs. 50000 has been received. The revenue generated by the college is Rs. 42373.
2. Surendar N, handled a consultancy project titled "Hydrological Modeling, Watershed Analysis, Surface And Application Of Geospatial Techniques" for Geomarine Pvt. Ltd . The project duration was from 2025-09-24 to 2025-11-24. The total sanctioned amount Rs. 105000 has been received.
3. Dr. Surendar Natarajan Carried out a consultancy work on Titled " design of drainage systems at the Coast Guard Area in Pocket-01 and Pocket-02, together with the associated perimeter wall near the INS Dega North Gate at IIT Roorkee" dated on 17-12-2025.

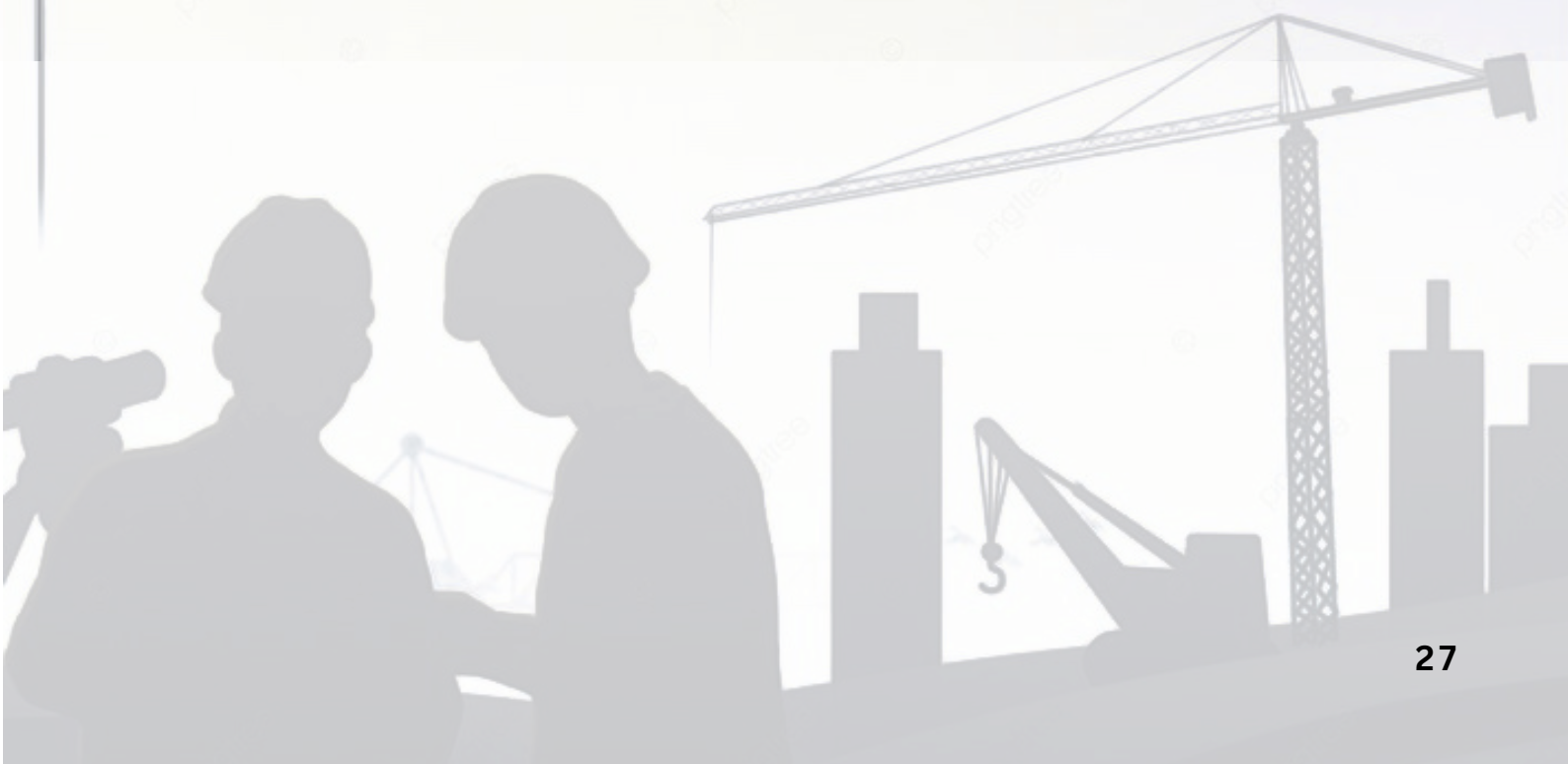


11.6 Alumni Interaction:

Our alumni remain strong ambassadors of the department and play an important role in mentoring students and supporting their career development. During the academic year 2025–2026, the department organized more than 10 alumni interactions, mentoring sessions, and networking programmes to strengthen alumni engagement.

Graduates working in infrastructure, construction management, IT, consulting, public administration, higher education, and international research institutions shared valuable insights on industry expectations, career pathways, higher studies, internships, placements, and professional growth. Alumni from organizations such as TCS, DOW Chemicals, ENMAS EPC, Afcons Infrastructure, and FTC Solar discussed workplace practices, recruitment strategies, and technical skill requirements. Alumni pursuing advanced studies abroad also guided students on overseas education opportunities.

Online mentoring sessions further helped students prepare for interviews, competitive examinations, certifications, and emerging industry demands. We sincerely appreciate our alumni for their continued support, inspiration, and commitment to nurturing future civil engineers. Their engagement continues to enrich learning greatly.



Alumni Visits:



Department alumni meet can be viewed in link: [CLICK HERE](#)

11.7 Work Shop Guest Lectures- Notable Visitors

During the academic year 2025–2026, the Department of Civil Engineering had the privilege of hosting several distinguished academicians, industry experts, researchers, and professionals who shared their expertise with students and faculty members.

- Notable visitors included Thiru. Saminathan Chidambaram, Head of BIM and Digital Delivery, COWI India Limited, Gurgaon, who inaugurated the Association of Civil Engineers (ACE) and delivered insights on digital transformation in the construction industry. Dr. Somayya Ammanagi, Head of R&D, ITW India Pvt. Ltd., Bangalore, interacted with students on advanced civil engineering testing solutions and quality assurance practices.
- The department also welcomed Dr. Prasanna Rousseau, Assistant Professor, Indian Institute of Technology Hyderabad, who delivered an expert lecture on geotechnical laboratory testing and its implications for engineering design. Industry experts Mr. Balamourougane, Senior Structural Engineer, and Mr. Rajesh Kumar, Director Technical, TechAppsConsulting, conducted a hands-on workshop on STAAD.Pro and structural analysis applications.
- In addition, Mr. Srinivasan, Regional Manager, Global Degrees, and Mr. Vamshi Krishna Janga, Assistant Director of Academic Partnerships, Northeastern University, guided students on higher education opportunities abroad. Environmental professionals including Dr. R. Gunasekaran, Environmental Engineer, Tamil Nadu Pollution Control Board, and Mr. R. Rajasekaran, CEO, GE Process & Director-Admin, TIECO, delivered lectures on environmental management, pollution control, and industrial environmental impact assessment.
- These interactions provided valuable exposure to current industry practices, emerging technologies, higher education opportunities, and professional development, greatly enriching the academic experience of our students.

Department notable visitors can be viewed in link: [CLICK HERE](#)

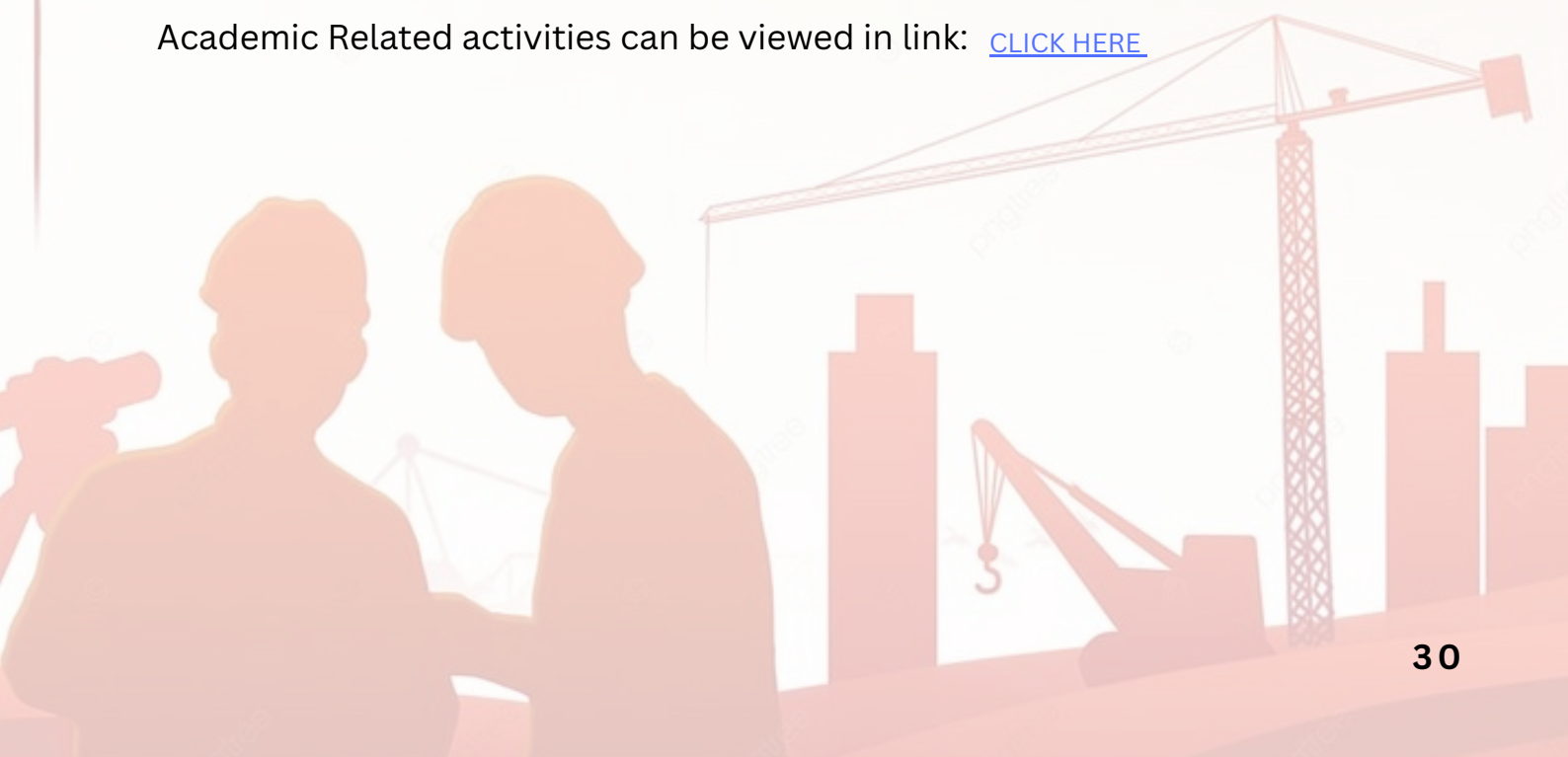
11.8 Academics & Research Associated:

The Department of Civil Engineering continued to demonstrate excellence beyond academics through a variety of professional, outreach, and scholarly activities during the academic year 2025–2026. Faculty members actively contributed to the global research community by serving as reviewers for reputed international journals published by Springer and other leading publishers, including Ain Shams Engineering Journal, Discover Civil Engineering, Arabian Journal of Geosciences, Progress in Engineering Science, and Jordan Journal of Civil Engineering.

Faculty members also undertook important academic responsibilities as external examiners, session chairs, and question paper setters for various universities and engineering institutions. The department strengthened its outreach initiatives by organizing environmental awareness programmes, poster competitions for school students, and technical interactions with visiting architecture students from Thiagarajar College of Engineering, Madurai.

Students benefited from experiential learning through industrial visits to wastewater treatment facilities and participation in national-level innovation events such as CivHack 360. Faculty members also represented the department at national and international conferences as session chairs and technical experts. These activities reflect the department's commitment to academic excellence, professional service, industry engagement, community outreach, and the holistic development of students and faculty members.

Academic Related activities can be viewed in link: [CLICK HERE](#)



12.STUDENT ACTIVITIES

Students Participated in national and international technical competitions, hackathons, paper presentations, and project expos, securing numerous prizes and recognitions across reputed institutions.

12.1 Co-curricular Activities:

Our students continued to excel in academics, technical competitions, project exhibitions, hackathons, paper presentations, and professional certification programmes during the academic year 2025–2026. Their outstanding performance reflects the department's emphasis on technical excellence, innovation, leadership, and holistic development.

During the reporting period, our students secured more than 70 awards and recognitions at state-level, national-level, and international competitions. These achievements included over 35 first prizes, 20 second prizes, and numerous third prizes and special recognitions in paper presentations, technical quizzes, project displays, green building competitions, hackathons, AutoCAD contests, poster presentations, and innovation challenges.

Students represented the department at prestigious institutions including College of Engineering Guindy, SRM Institute of Science and Technology, Rajalakshmi Engineering College, Chennai Institute of Technology, Agni College of Technology, RMK Engineering College, and BITS Pilani. Several students emerged as winners in highly competitive events such as Civilization 2026, Titanium 2026, ConCraze 2026, Colosseum 2K26, Refuerzo 2026, and Artifex 2026.

A particularly noteworthy achievement was the success of our students in sustainability-themed competitions, where they demonstrated innovative solutions related to green buildings, infrastructure development, environmental protection, and smart construction practices. Students also earned recognition in national-level hackathons and technical innovation competitions, highlighting their creativity and problem-solving capabilities. Apart from competition success, many students completed professional certification programmes in BIM, Revit Architecture, construction chemicals, structural engineering, virtual reality, and construction management. Their participation in workshops, conferences, and specialized training programmes further enhanced their technical competencies and employability skills.

These achievements underscore the department's commitment to nurturing talented engineers who can excel in academic, professional, and entrepreneurial environments. We congratulate all our students for their remarkable accomplishments and look forward to even greater successes in the years ahead.

Students co-curricular activities can be viewed in link: [CLICK HERE](#)



12.2 Best Outgoing Student – Civil Engineering:

The Department of Civil Engineering proudly congratulates Mr. Hariharan (Batch 2022–2026) for being recognized as the Overall Best Outgoing Student in Civil Engineering during the 30th College Day Celebrations. This prestigious recognition reflects his exceptional academic performance, leadership qualities, active participation in co-curricular and extracurricular activities, and unwavering commitment to excellence throughout his undergraduate journey.

The Department extends its heartfelt congratulations and wishes him continued success in all his future endeavours.



Best Out Going Student-Civil Engineering



Bank of Baroda Awarded all rounder award to Mr.Hariharan, batch of 2022-2026 civil Engineering

12.3 Internships & Industry Exposure:

The Department of Civil Engineering places strong emphasis on experiential learning through internships, industrial visits, and field-based training programmes. During the academic year 2025-2026, students actively participated in internships at reputed organizations including the Water Resources Department (WRD), Chennai Petroleum Corporation Limited (CPCL), Zeus Project Consultants, Mcube RMX Plant, and the Land and Buildings Department. These internships provided valuable exposure to real-world engineering practices, project execution, quality control, and infrastructure management.

Students also underwent specialized training at the Water Resources Department, gaining insights into hydrological investigations, water resource planning, and construction support activities. To complement classroom learning, the department organized industrial visits to the Institute of Hydrology and Hydraulics, Poondi Reservoir, and a Common Effluent Treatment Plant, where students learned about reservoir operations, flood management, wastewater treatment, and zero-liquid-discharge systems.

These initiatives enabled students to strengthen their technical knowledge, professional skills, and practical understanding of engineering concepts, thereby enhancing their industry readiness and employability.

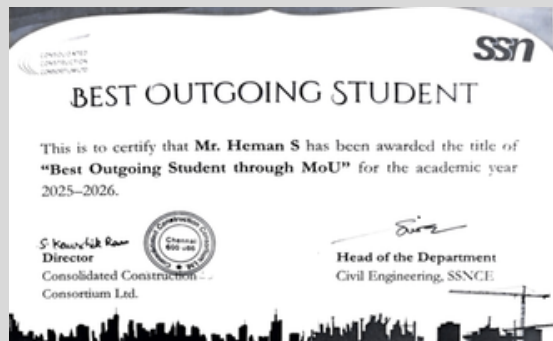
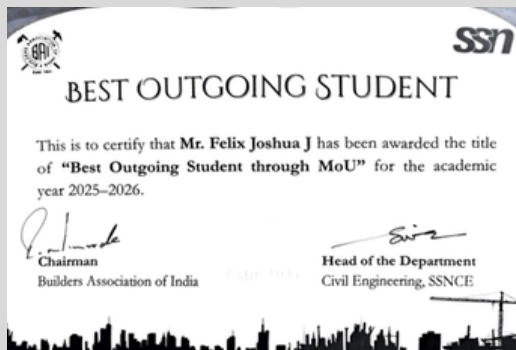
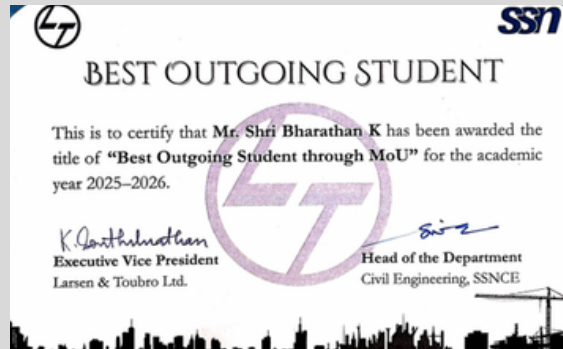
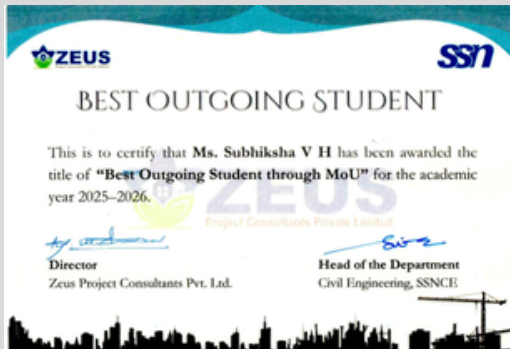
Department consultancy can be viewed in link: [CLICK HERE](#)

12.4 Farewell & Appreciation Day :

12.4.1 Appreciation Day-Receiving Industrial Linked Award:

The Department of Civil Engineering proudly recognized outstanding students during Appreciation Day 2026 through prestigious Industry-Linked Awards sponsored by leading organizations including Zeus Consultants Pvt. Ltd., L&T, ArteLia Consulting Ltd., Builders Association of India, and CCCL. These awards honored students for their academic excellence, leadership, professional conduct, and overall contribution to the department, strengthening the valuable connection between academia and industry while motivating students to strive for excellence in their future careers.





12.4.2 Farewell Celebration – Batch of 2022–2026:

The Department of Civil Engineering organized a heartfelt **Farewell Celebration – “A Day to Remember”** for the graduating **Batch of 2022–2026**. The event provided an opportunity for students, faculty, and staff to celebrate the achievements, cherish memorable moments, and bid farewell to the outgoing students as they embark on the next chapter of their academic and professional journeys. The celebration was filled with gratitude, nostalgia, and best wishes for their future success.



Farewell Celebration –Batch of 2022–2026.

13. Non-Teaching Staff Development Activities

The Department of Civil Engineering strongly encourages the professional development of its non-teaching staff through continuous learning and skill enhancement initiatives. During the academic year 2025–2026, all four Assistant Lab Instructors successfully completed online certification courses through Alison, covering topics such as Building Information Modelling (BIM) and Building Surveying, thereby enhancing their technical knowledge and laboratory support capabilities.

In addition, the non-teaching staff actively participated in a Workshop and Hands-on Training Programme on "Flow, Pressure and Temperature Measurement Devices" organized by the Department of Chemical Engineering on 28 March 2026. These training programmes provided valuable exposure to modern engineering tools, measurement techniques, and laboratory practices, contributing to the effective functioning of departmental laboratories and academic activities.

Non-Teaching staff activity can be viewed in link: [CLICK HERE](#)

SMART WATER MANAGEMENT SYSTEMS : BUILDING WATER-SECURE CITIES **SRINIDHI J M (II YEAR)**

Introduction:

As cities continue to grow, the demand for clean water is increasing rapidly. Traditional water management systems often struggle with water losses, inefficient distribution , and rising consumption. Smart water management systems offer a technology-driven solution for sustainable urban development.

Smart Water Management Systems

A Smart Water Management System (SWMS) is an IoT-based framework that uses connected sensors, AI analytics, and automated controls to monitor, regulate, and optimize water resources. It eliminates guesswork by detecting leaks, managing pressure, and tracking water consumption in real-time, drastically reducing water waste and operating costs.

Why Does It Matter?

- Stops Hidden Leaks – Sensors detect leaks before they become major failures.
- Saves Energy and Money – Smart pumps operate only when required.
- Ensures Water Quality – Continuous monitoring helps maintain safe drinking water.
- Promotes Fair Distribution – Water pressure is managed efficiently across the city.

Singapore's Smart Water Management System

Singapore is a leading example of smart water management. Facing limited natural water resources, the country has adopted advanced technologies such as IoT sensors, smart water meters, and AI-based analytics to monitor and manage its water supply network. These technologies enable real-time leak detection, water quality monitoring, and efficient distribution of water across the city. Managed by Singapore's national water agency, PUB, the system has significantly reduced water losses and improved water security. Singapore's success demonstrates how smart technologies can help future cities achieve sustainable and efficient water management.

Nagpur Smart Water Management Project

Nagpur uses smart meters, GIS mapping and real-time monitoring systems to improve water distribution and detect leaks. These technologies help reduce water losses, enhance operational efficiency, and ensure a more reliable water supply. Nagpur's success highlights the potential of smart water management systems in supporting sustainable urban development.



Role of civil engineers in SWMS

Civil engineers build tech-driven water networks. They connect physical pipes with digital tools.

- Designing Smart Networks: They plan pipeline layouts. They place sensors and automatic valves to collect data.
- Targeting Hidden Leaks: They use data to find sudden pressure drops. This helps fix leaks before roads flood.
- Preventing City Floods: They design smart storm drains. These drains open automatically during heavy rain to divert water.
- Guarding Water Quality: They install pollution sensors. The system blocks the water supply if it detects bacteria.

Importance for Civil Engineering Students

Smart Water Management Systems are highly relevant to civil engineering students as they represent the future of urban water infrastructure. Understanding these systems helps students gain knowledge of sustainable water management, smart technologies, and efficient resource utilization. This knowledge prepares future engineers to address water-related challenges and contribute to the development of smart.

Conclusion

Smart Water Management Systems are paving the way for sustainable and water-secure cities. By combining engineering expertise with smart technologies, cities can manage water resources more efficiently and responsibly. As future civil engineers, it is our responsibility to embrace these innovations and build a better future.

"A drop saved today is a step toward a sustainable city tomorrow."

Shape-Shifting Steel: 4D-Printed SMA Metamaterials in Earthquake-Resistant Construction

ADHVEDHA S B (II YEAR)

Introduction:

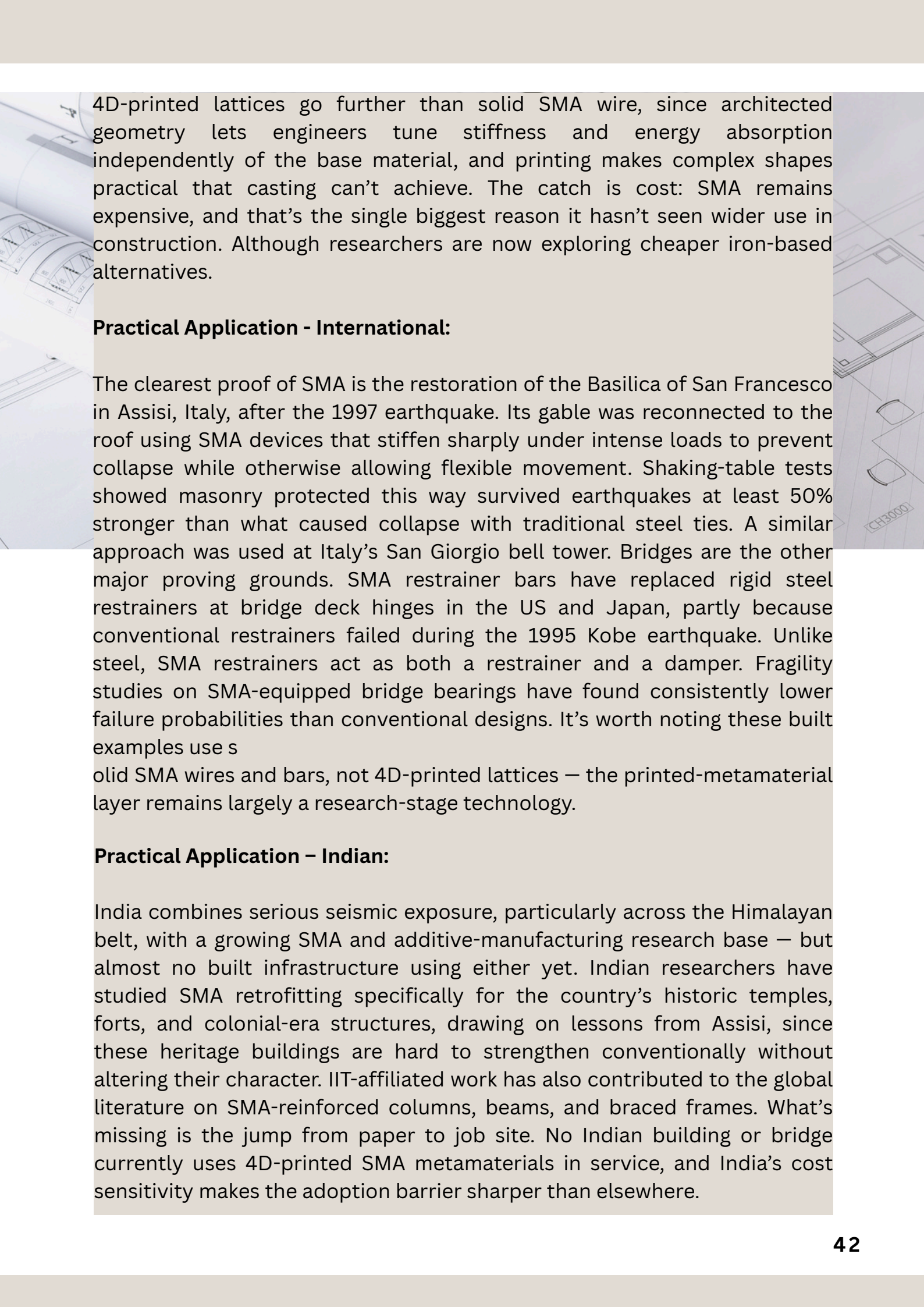
Traditional earthquake resistant structures rely on "sacrificial" structural members that bend permanently to absorb shaking, leaving buildings standing but damaged. But, what if a structural component could bend during an earthquake and then put itself back exactly where it started? That's the idea behind 4D-printed shape memory alloy (SMA) metamaterials – lattice structures that remember their original shape and spring back to it once a load is removed.

What Is a SMA Metamaterial ?

Shape memory alloys, most often made up of nickel-titanium , switch between two crystal structures depending on temperature and stress. The key seismic property of them is Super elasticity . The alloy can be stressed and deformed by several percent strain, far beyond ordinary steel's elastic limit, and still spring back to its original form once unloaded. 3D printing also plays an important role in their manufacture . Instead of casting SMA into a solid bar, additive manufacturing builds it layer by layer into a metamaterial – an architected lattice whose properties come from engineered geometry rather than the raw metal alone. Many of these use "Auxetic" designs (structures that exhibit a negative Poisson ratio) which expand sideways when stretched instead of thinning, letting engineers tune exactly how a component flexes and absorbs energy. The "4D" refers to how the printed shape continues to change and recover over time in response to stress or heat. Recent research found that curving a lattice's cell walls, rather than keeping them straight, shifted failure from a sudden collapse to gradual, controlled deformation with over five times the energy absorption per gram – exactly the predictable behaviour seismic design wants.

Why Does It Matter?

Conventional seismic bracing protects a building by deliberately damaging itself, often requiring partial demolition and rebuilding after the effects ; whereas SMA-based systems target that weakness directly: because the alloy wants to return to its original shape, a brace or damper made from it can absorb shaking and largely undo the resulting deformation on its own – “self-centering.” Studies have repeatedly found that self-centring SMA dampers keep both peak and residual building drift within target limits even during severe simulated earthquakes.



4D-printed lattices go further than solid SMA wire, since architected geometry lets engineers tune stiffness and energy absorption independently of the base material, and printing makes complex shapes practical that casting can't achieve. The catch is cost: SMA remains expensive, and that's the single biggest reason it hasn't seen wider use in construction. Although researchers are now exploring cheaper iron-based alternatives.

Practical Application - International:

The clearest proof of SMA is the restoration of the Basilica of San Francesco in Assisi, Italy, after the 1997 earthquake. Its gable was reconnected to the roof using SMA devices that stiffen sharply under intense loads to prevent collapse while otherwise allowing flexible movement. Shaking-table tests showed masonry protected this way survived earthquakes at least 50% stronger than what caused collapse with traditional steel ties. A similar approach was used at Italy's San Giorgio bell tower. Bridges are the other major proving grounds. SMA restrainer bars have replaced rigid steel restrainers at bridge deck hinges in the US and Japan, partly because conventional restrainers failed during the 1995 Kobe earthquake. Unlike steel, SMA restrainers act as both a restrainer and a damper. Fragility studies on SMA-equipped bridge bearings have found consistently lower failure probabilities than conventional designs. It's worth noting these built examples use s

olid SMA wires and bars, not 4D-printed lattices — the printed-metamaterial layer remains largely a research-stage technology.

Practical Application – Indian:

India combines serious seismic exposure, particularly across the Himalayan belt, with a growing SMA and additive-manufacturing research base — but almost no built infrastructure using either yet. Indian researchers have studied SMA retrofitting specifically for the country's historic temples, forts, and colonial-era structures, drawing on lessons from Assisi, since these heritage buildings are hard to strengthen conventionally without altering their character. IIT-affiliated work has also contributed to the global literature on SMA-reinforced columns, beams, and braced frames. What's missing is the jump from paper to job site. No Indian building or bridge currently uses 4D-printed SMA metamaterials in service, and India's cost sensitivity makes the adoption barrier sharper than elsewhere.



Role of Civil Engineers:

Bringing this technology to site changes an engineer's job at every stage. In design, SMA's non-linear, flag-shaped stress-strain behavior requires dedicated constitutive models rather than standard steel assumptions, approved through finite-element and dynamic analysis under simulated earthquake records. In procurement, engineers must decide where SMA's cost is justified — typically critical connections or isolators rather than every member — and weigh cheaper alternatives like iron-based SMAs where full performance isn't required.

Conclusion :

4D-printed SMA metamaterials mark a genuine shift in seismic design thinking — from buildings that merely survive an earthquake with damage, to components that can absorb shaking and largely reverse it. The underlying science is solid and field-tested, from Assisi's basilica to bridge restrainer systems worldwide. What hasn't happened yet, in India or globally, is widespread use of printed SMA lattices in everyday construction; cost and codification remain the obstacles, not the material science. For India, the more realistic near-term opportunity is selective retrofitting of high-value, high-risk structures rather than ground-up adoption — turning a promising material into ordinary infrastructure is now an engineering and economics problem, not a scientific one.

The construction industry, traditionally known for its reliance on manual processes and labor-intensive operations, is undergoing a significant transformation with the adoption of Artificial Intelligence (AI). As projects become increasingly complex and demand greater efficiency, AI is emerging as a powerful tool that enhances productivity, improves safety, reduces costs, and supports smarter decision-making throughout the construction lifecycle.

The Rise of AI in Construction

Artificial Intelligence refers to computer systems that can perform tasks typically requiring human intelligence, such as learning, problem-solving, pattern recognition, and decision-making. In construction, AI technologies are being integrated into project planning, design, execution, monitoring, and maintenance to streamline operations and deliver better outcomes.

The increasing availability of digital construction data, Building Information Modeling (BIM), drones, sensors, and Internet of Things (IoT) devices has accelerated AI adoption. By analyzing vast amounts of information, AI can identify patterns, predict outcomes, and provide actionable insights that help construction professionals make informed decisions.

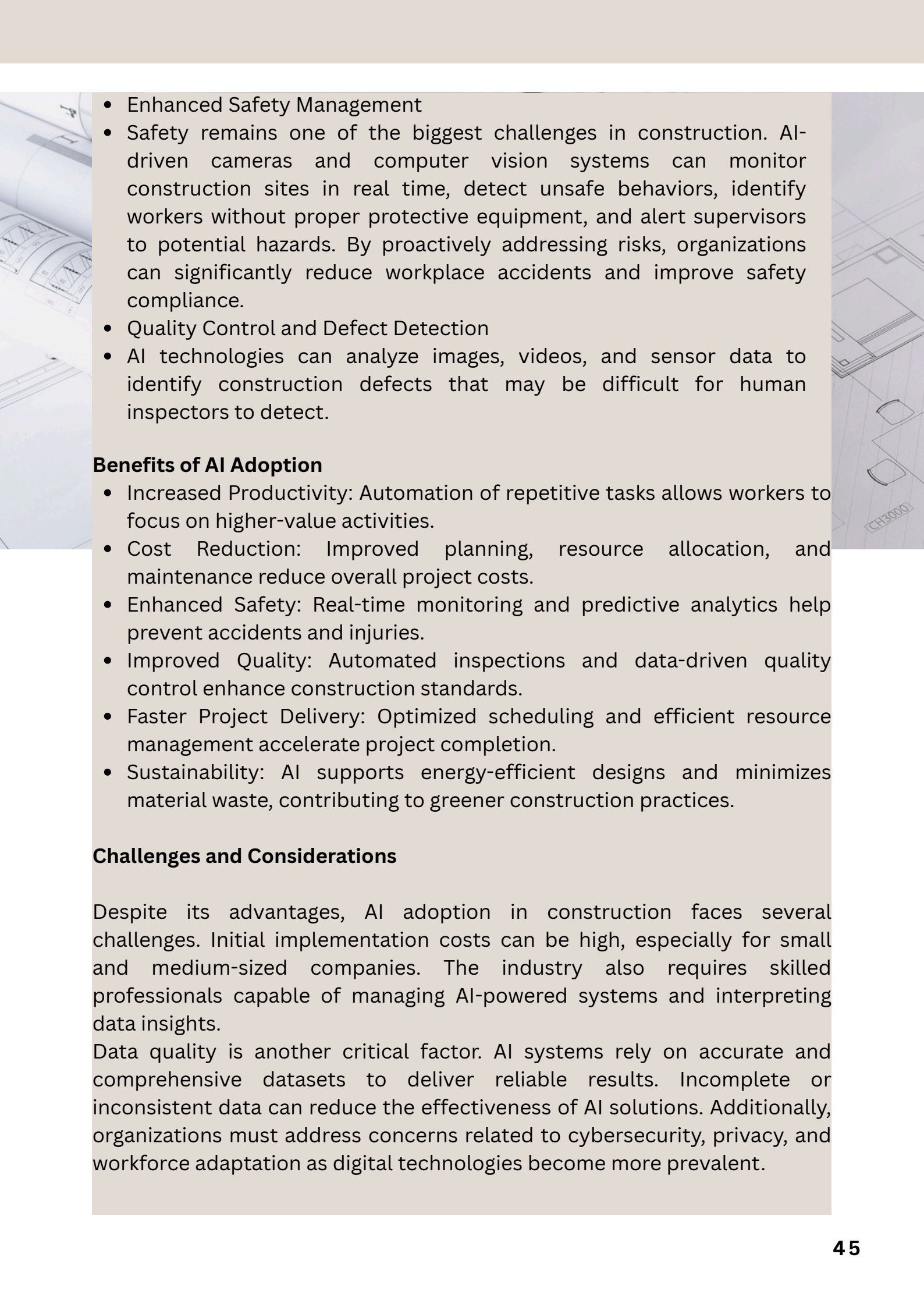
Key Applications of AI in Construction

- **Project Planning and Scheduling**

AI-powered software can analyze historical project data, weather conditions, resource availability, and project constraints to create optimized schedules. These systems can predict potential delays and suggest corrective actions before problems arise. As a result, project managers can improve planning accuracy and reduce schedule overruns.

- **Predictive Maintenance**

Construction equipment represents a significant investment. AI can monitor equipment performance through sensors and identify signs of wear and tear before failures occur. Predictive maintenance helps reduce downtime, extend equipment lifespan, and minimize repair costs, ensuring smoother project execution.

- 
- Enhanced Safety Management
 - Safety remains one of the biggest challenges in construction. AI-driven cameras and computer vision systems can monitor construction sites in real time, detect unsafe behaviors, identify workers without proper protective equipment, and alert supervisors to potential hazards. By proactively addressing risks, organizations can significantly reduce workplace accidents and improve safety compliance.
 - Quality Control and Defect Detection
 - AI technologies can analyze images, videos, and sensor data to identify construction defects that may be difficult for human inspectors to detect.

Benefits of AI Adoption

- Increased Productivity: Automation of repetitive tasks allows workers to focus on higher-value activities.
- Cost Reduction: Improved planning, resource allocation, and maintenance reduce overall project costs.
- Enhanced Safety: Real-time monitoring and predictive analytics help prevent accidents and injuries.
- Improved Quality: Automated inspections and data-driven quality control enhance construction standards.
- Faster Project Delivery: Optimized scheduling and efficient resource management accelerate project completion.
- Sustainability: AI supports energy-efficient designs and minimizes material waste, contributing to greener construction practices.

Challenges and Considerations

Despite its advantages, AI adoption in construction faces several challenges. Initial implementation costs can be high, especially for small and medium-sized companies. The industry also requires skilled professionals capable of managing AI-powered systems and interpreting data insights.

Data quality is another critical factor. AI systems rely on accurate and comprehensive datasets to deliver reliable results. Incomplete or inconsistent data can reduce the effectiveness of AI solutions. Additionally, organizations must address concerns related to cybersecurity, privacy, and workforce adaptation as digital technologies become more prevalent.



The Future of AI in Construction

The future of construction is increasingly connected, automated, and intelligent. Emerging technologies such as autonomous construction equipment, robotic bricklayers, AI-powered drones, and digital twins are expected to reshape how projects are designed and built. AI will continue to enhance collaboration among project stakeholders by providing real-time information and predictive insights.

As construction companies embrace digital transformation, AI will play a central role in driving innovation, improving operational efficiency, and creating safer work environments. Organizations that invest in AI today will be better positioned to remain competitive in an industry that is rapidly evolving.



Conclusion

Artificial Intelligence is no longer a futuristic concept—it is becoming a practical necessity in modern construction. From project planning and safety management to quality control and predictive maintenance, AI is revolutionizing the way construction projects are executed. By leveraging AI technologies, construction companies can achieve greater efficiency, reduce risks, and deliver higher-quality projects while meeting the growing demands of the industry. The integration of AI represents a significant step toward building smarter, safer, and more sustainable infrastructure for the future.

Introduction

The construction industry is one of the largest contributors to global carbon emissions due to cement production, material transportation, and energy use in buildings. To achieve sustainability goals, the concept of Zero Carbon Construction is becoming essential.

Zero carbon construction aims to reduce or eliminate carbon emissions during:

1. Material production
2. Construction activities
3. Building operation

What is Zero Carbon Construction?

Zero carbon construction means designing and building structures that produce no net carbon emissions.

It includes:

1. Reducing embodied carbon (materials)
2. Using renewable energy sources
3. Improving energy efficiency
4. Offsetting unavoidable emissions

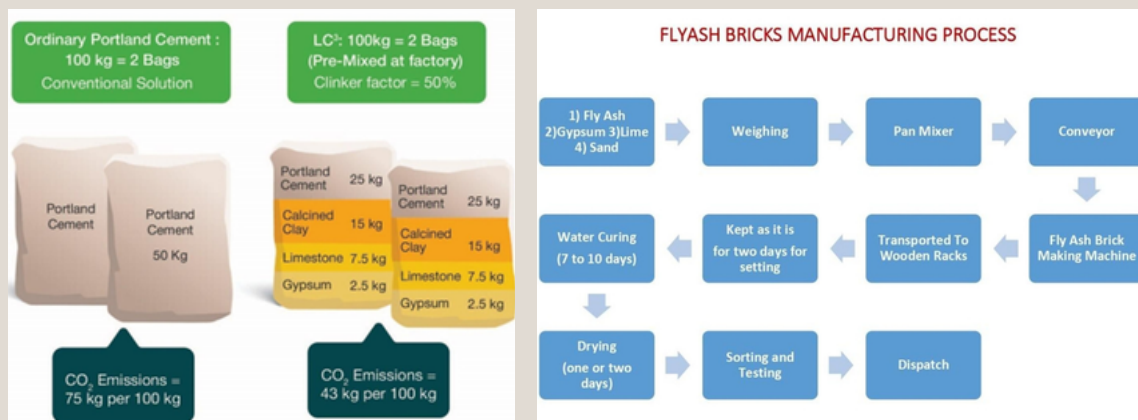
Key Processes in Zero Carbon Construction

A. Sustainable Materials

Low-carbon concrete (fly ash, slag cement)

Recycled steel and aluminium

Bamboo and engineered wood



B. Renewable Energy Integration

- Solar panels on buildings
- Wind energy support systems
- Energy-efficient lighting and HVAC systems

C. Green Construction Methods

- Prefabrication and modular construction
- Waste minimization techniques
- Efficient machinery with low emissions

D. Benefits of Zero Carbon Construction

- Reduces environmental pollution
- Saves long-term energy costs
- Improves air quality and sustainability
- Supports climate change goals (Net Zero targets)
- Enhances building efficiency and value

E. Challenges

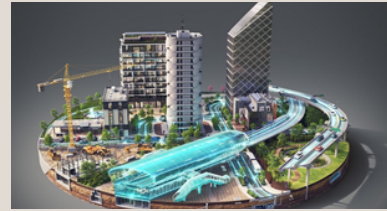
- High initial construction cost
- Lack of awareness and skilled labor
- Limited availability of green materials
- Need for advanced technology and planning

F. Future Scope

- The future of construction is moving towards:
- Smart green cities
- Carbon-neutral buildings
- AI-based energy monitoring systems
- 100% renewable construction sites

Conclusion

Zero carbon construction is not just a trend but a necessity for sustainable development. By adopting eco-friendly materials, renewable energy, and modern construction techniques, the construction industry can significantly reduce its carbon footprint and move towards a greener future.



Introduction :

Rapid urbanization and population growth have created enormous challenges for cities around the world. As the demand for housing, transportation, and commercial infrastructure increases, available land in major cities is becoming scarce. Traditional horizontal expansion often leads to environmental degradation, traffic congestion, and excessive consumption of natural resources. To address these challenges, engineers and architects are exploring innovative solutions that can accommodate future populations while preserving valuable surface land. One such concept is the development of underground skyscrapers. These structures extend deep below the ground and provide space for residential, commercial, and public facilities. With advancements in geotechnical engineering, construction technologies, and smart infrastructure systems, underground skyscrapers are emerging as a promising solution for sustainable urban development.

Need for Underground Development :

Modern cities face numerous problems including overcrowding, increasing land prices, and environmental concerns. Surface construction is becoming more difficult due to limited space and the need to preserve green areas. Underground structures provide an alternative by utilizing the vast unused space beneath the Earth's surface. Several countries have already adopted underground infrastructure in the form of metro systems, tunnels, underground parking facilities, shopping complexes, and utility corridors. Expanding this concept into underground skyscrapers could significantly improve land utilization and reduce pressure on urban environments. In addition, underground developments can help maintain the aesthetic appearance of cities and preserve historical monuments and natural landscapes.

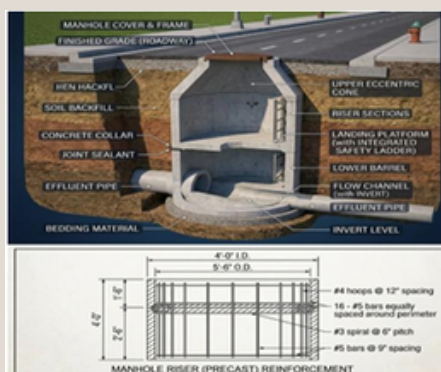
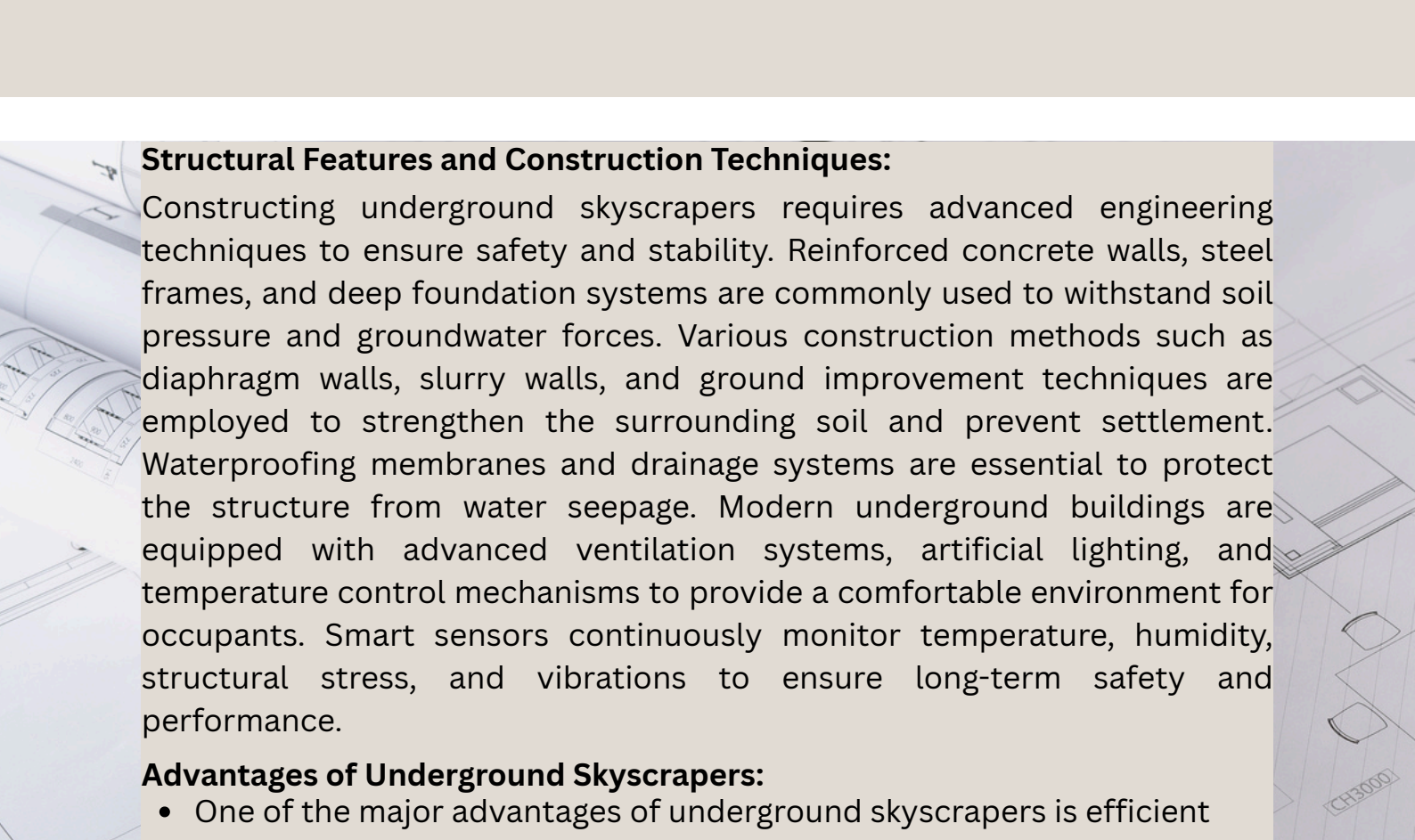


Fig1. Structural components used in underground construction



Fig 2: Conceptual view of an underground skyscraper



Structural Features and Construction Techniques:

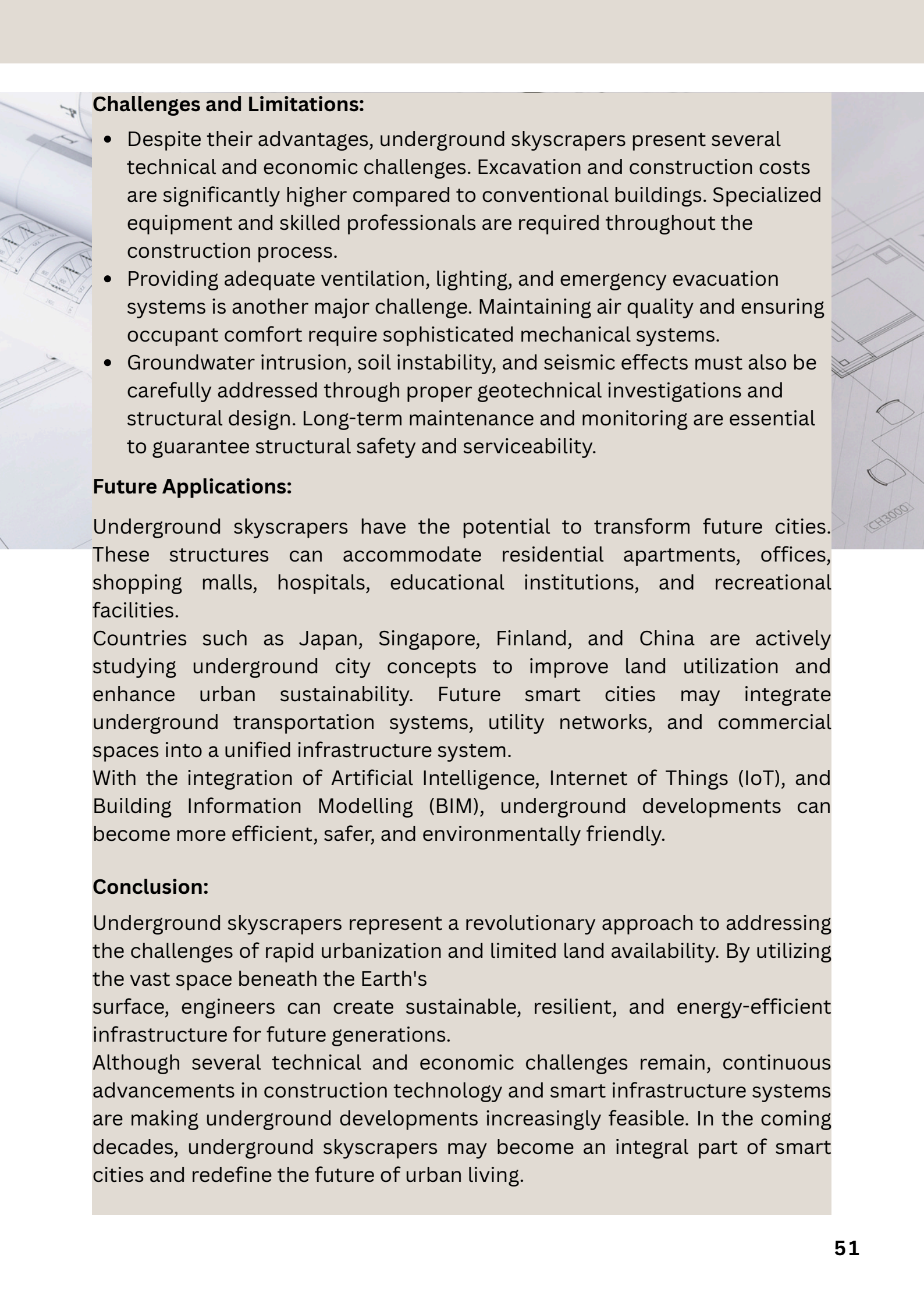
Constructing underground skyscrapers requires advanced engineering techniques to ensure safety and stability. Reinforced concrete walls, steel frames, and deep foundation systems are commonly used to withstand soil pressure and groundwater forces. Various construction methods such as diaphragm walls, slurry walls, and ground improvement techniques are employed to strengthen the surrounding soil and prevent settlement. Waterproofing membranes and drainage systems are essential to protect the structure from water seepage. Modern underground buildings are equipped with advanced ventilation systems, artificial lighting, and temperature control mechanisms to provide a comfortable environment for occupants. Smart sensors continuously monitor temperature, humidity, structural stress, and vibrations to ensure long-term safety and performance.

Advantages of Underground Skyscrapers:

- One of the major advantages of underground skyscrapers is efficient land utilization. Since these structures occupy minimal surface area, they help preserve open spaces and reduce urban sprawl.
- Underground environments maintain relatively constant temperatures throughout the year. This natural insulation reduces energy consumption for heating and cooling, making the buildings more energy efficient.
- These structures are also highly resistant to extreme weather conditions such as hurricanes, heat waves, and heavy storms. Their underground location provides protection from external noise and creates quieter living and working environments.
- Furthermore, underground developments can enhance disaster resilience. They are capable of serving as emergency shelters during natural disasters and can provide secure infrastructure during extreme events.

Environmental and Economic Benefits:

Underground skyscrapers contribute to sustainable development by reducing surface land consumption and preserving ecosystems. Lower energy requirements can significantly reduce carbon emissions and operating costs. These structures can also increase property values in crowded cities and optimize urban planning. Efficient use of underground space allows cities to expand without disturbing existing infrastructure and natural habitats. As construction technologies continue to evolve, underground developments may become economically feasible and play an important role in future urban planning.



Challenges and Limitations:

- Despite their advantages, underground skyscrapers present several technical and economic challenges. Excavation and construction costs are significantly higher compared to conventional buildings. Specialized equipment and skilled professionals are required throughout the construction process.
- Providing adequate ventilation, lighting, and emergency evacuation systems is another major challenge. Maintaining air quality and ensuring occupant comfort require sophisticated mechanical systems.
- Groundwater intrusion, soil instability, and seismic effects must also be carefully addressed through proper geotechnical investigations and structural design. Long-term maintenance and monitoring are essential to guarantee structural safety and serviceability.

Future Applications:

Underground skyscrapers have the potential to transform future cities. These structures can accommodate residential apartments, offices, shopping malls, hospitals, educational institutions, and recreational facilities.

Countries such as Japan, Singapore, Finland, and China are actively studying underground city concepts to improve land utilization and enhance urban sustainability. Future smart cities may integrate underground transportation systems, utility networks, and commercial spaces into a unified infrastructure system.

With the integration of Artificial Intelligence, Internet of Things (IoT), and Building Information Modelling (BIM), underground developments can become more efficient, safer, and environmentally friendly.

Conclusion:

Underground skyscrapers represent a revolutionary approach to addressing the challenges of rapid urbanization and limited land availability. By utilizing the vast space beneath the Earth's

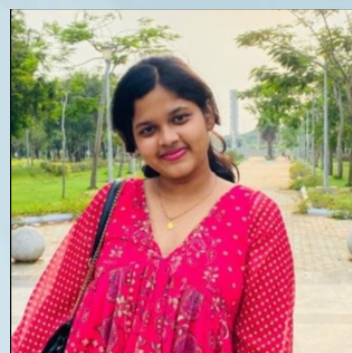
surface, engineers can create sustainable, resilient, and energy-efficient infrastructure for future generations.

Although several technical and economic challenges remain, continuous advancements in construction technology and smart infrastructure systems are making underground developments increasingly feasible. In the coming decades, underground skyscrapers may become an integral part of smart cities and redefine the future of urban living.

15. ALUMINI WRITE UP

A Journey of Growth, Gratitude and New Beginnings

-Nikitha Reddy (2019–2023)



As an alumna of the Department of Civil Engineering, SSN College of Engineering, I look back at my undergraduate journey with immense gratitude and pride. My four years at SSN, from June 2019 to May 2023, were not merely about completing a degree; they were years that shaped my confidence, strengthened my abilities, and prepared me to step into the professional world with clarity and purpose. The Department of Civil Engineering played a vital role in nurturing my academic and personal growth. The department provided a strong foundation in technical learning, while also encouraging practical thinking, teamwork, communication, and problem-solving. The support extended by the Head of the Department, faculty members, and mentors helped me grow beyond the classroom. Their guidance gave me the confidence to face challenges, explore opportunities, and believe in my own potential.

SSN College of Engineering created an environment where students were encouraged to learn, participate, interact, and evolve as individuals. The college gave me opportunities to build discipline, leadership qualities, professional readiness, and the ability to adapt to different situations. The friendships, classroom discussions, departmental activities, and guidance from faculty members became an important part of my growth. I am especially grateful to Dr. Sivakumar Naganathan for his invaluable support and guidance during an important stage of my college-to-career transition. His encouragement and assistance during the placement and hiring process helped me secure my opportunity at Shell. That support was instrumental in shaping the beginning of my professional journey, and I will always remain thankful for it.

After graduating from SSN, I began my career as an Associate Engineer at Shell in July 2023. As a fresher, I was eager and enthusiastic to take up new challenges, learn from experienced professionals, and contribute my skills and fresh perspectives. The foundation I received at SSN helped me enter the workplace with confidence, curiosity, and a willingness to keep learning. My three years at Shell were filled with countless lessons, meaningful experiences, and lifelong memories. What made the journey truly special was not just the work, but the people. From the warm smiles that welcomed me every time I walked into the office to the continuous support I received throughout my journey, Shell became much more than a workplace. It became a community that helped me grow both professionally and personally. Looking back, it is hard to believe how quickly three years passed. Every day brought something new to learn, a reason to smile, and people who made work truly enjoyable.

As I now turn the page to a new chapter at the Indian Institute of Management, Shillong, I carry forward the lessons from both SSN and Shell. Joining IIM Shillong in June 2026 marks another important milestone in my journey of learning and growth. It is a new beginning that brings fresh challenges, new aspirations, and wider possibilities. At this stage too, I remain grateful to everyone who has contributed to my journey—my family, teachers, mentors, colleagues, and friends. The values I gained at SSN, the professional exposure I received at Shell, and the learning environment at IIM Shillong together form important chapters in my life. Each stage has helped me grow stronger, more confident, and more open to new opportunities. To the current students of SSN, my message would be to make full use of the opportunities that the college and department provide. Learn sincerely, seek guidance from faculty, participate actively, build meaningful relationships, and remain open to unexpected career paths. The foundation built during college can guide you through many different phases of life. SSN College of Engineering and the Department of Civil Engineering will always remain close to my heart. The institution gave me not only academic knowledge, but also confidence, values, and resilience. As I begin my journey at IIM Shillong, I carry with me the gratitude, memories, and strength given by my alma mater.

16. INDUSTRY ARTICLE

**MR. RAJESH KUMAR VENU ., M.S.(STRUCTURAL)
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Industry Interaction on Digital Twin Technologies in Civil Engineering

As part of its continued commitment to introducing students to emerging technologies and industry trends, the Department of Civil Engineering organized an insightful expert session on “Digital Twin Technologies in Civil Engineering.” The programme was designed to provide students with a broader understanding of how digital innovation is transforming the planning, design, construction, operation, and maintenance of civil engineering infrastructure. In today’s rapidly evolving construction sector, Digital Twin technology has emerged as one of the most promising tools for improving efficiency, sustainability, and decision-making across the entire lifecycle of infrastructure assets.

The resource person explained the fundamental concept of a Digital Twin as a virtual representation of a physical asset, system, or process that is continuously updated using real-time data. By integrating technologies such as Building Information Modelling (BIM), Internet of Things (IoT), Geographic Information Systems (GIS), sensors, cloud computing, and data analytics, Digital Twins enable engineers to monitor, simulate, and optimize infrastructure performance with greater accuracy. Students gained valuable exposure to the ways in which this technology is being applied in smart buildings, bridges, transportation systems, water supply networks, drainage systems, and urban infrastructure management



The session also highlighted the practical advantages of Digital Twin technology in civil engineering practice. It plays a significant role in predictive maintenance, structural health monitoring, asset management, risk assessment, and lifecycle planning. Through real-world examples and case studies, students learned how Digital Twins help engineers detect potential failures in advance, reduce maintenance costs, improve operational efficiency, and support sustainable infrastructure development. The discussion further emphasized how data-driven decision-making can enhance the reliability and resilience of civil engineering projects in both public and private sectors.

In addition to the technical aspects, the interaction provided students with a clear perspective on the growing importance of Industry 4.0 technologies in the construction and infrastructure domains. The session encouraged students to explore new career opportunities, research possibilities, and interdisciplinary applications in digital infrastructure management. Participants actively engaged in discussions, asked thoughtful questions, and expressed keen interest in learning more about the integration of digital tools in civil engineering practice.

Overall, the programme served as an excellent platform to bridge the gap between academic learning and industry expectations. It inspired students to embrace innovation and prepare themselves for the digital transformation shaping the future of civil engineering. The Department of Civil Engineering remains committed to organizing such industry-oriented programmes that enrich student learning and strengthen their readiness for professional excellence.



17. EDITORIAL MEMBERS



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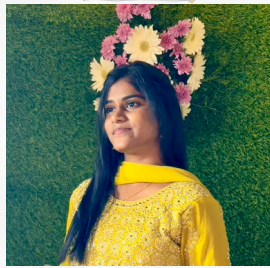
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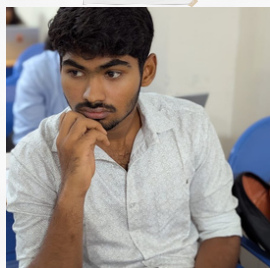


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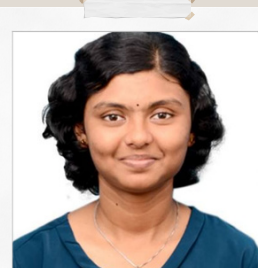
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