AY 2023-24

TERRA 24

DEPARTMENT OF CIVIL ENGINEERING

MADANAPALLE INSTITUE OF TECHNOLOGY & SCIENCE

Affiliated to JNTUA Ananthapuramu, Approved by AICTE New Delhi
Madanapalle, Annamayya District, Andhra Pradesh 517 325
Accredited by NAAC with A+ Grade, Accredited by NBA

From Principal

Dr. C. Yuvaraj. Principal MITS, Madanapalle, AP

MESSAGE FROM PRINCIPAL

I am happy to note that the Civil Engineering Department MITS is showcasing their activities & achievement through the Department magazine “TERRA". I wish them success in their future endeavor!

From H.O.D Desk

We, the Department of Civil Engineering happy to announce the release of our department magazine “TERRA". for the Academic year 2021-2022. I appreciate the department for such an initiative to provide a platform for communicating the innovative ideas of the students and faculty member. Assistant Professor Civil Department showcases the numerous events organized by the department of Civil Engineering, the extracurricular, co-curricular, achievements and academic success of the department’s students and faculty. This new endeavor is the result of the efforts put in by a dedicated team of teachers and students. I congratulate the Department and the concerned staff members, students and editorial team for the efforts taken by them to bring out this newsletter and making it a grand success

Dr. Dipankar Roy Professor & HOD Civil Department MITS, Madanapalle, AP

TERRA

2022-23

ABOUT THE DEPARTMENT

The Department of Civil Engineering is started in the year 2014. The Department offers 4 years B.Tech Programme. The course offers a deep insight into the discipline and enables promising engineers to acquire skills required to succeed both individually as well as in Industry. Keeping in view of the technological advancement, the department is fortified by the most qualified and experienced faculty. The department is well equipped with modern laboratories. The B.Tech. Programme under Department of Civil Engineering was Accredited by the National Board of Accreditation (NBA) of All India Council for Technical Education (AICTE)

VISION

To grow as a globally recognized Civil Engineering Department through cutting-edge education and research to bring sustainable cultural, economic and social growth in the nation.

MISSION OF THE DEPARTMENT

To provide modern educational tools and techniques to the students in order to enrich them to solve complex civil engineering problems. To develop sustainable technologies and solutions for various organizations involved in developmental activities through consultancy and research services. · To foster the socio-economic and cultural upliftment in the region through formal and informal education

Editorial team

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M.Tech

Celebrating Excellence: Honoring the Achievements of MITS Civil Engineering Faculty

At Madanapalle Institute of Technology & Science (MITS), we believe that the strength of an institution lies in the brilliance of its faculty. The Department of Civil Engineering stands as a testament to this belief, with its dedicated educators and researchers consistently pushing the boundaries of knowledge, innovation, and academic excellence. Over the past year, our faculty members have once again demonstrated their exceptional expertise, contributing to groundbreaking research, industry advancements, and transformative education that shapes the engineers of tomorrow.

From pioneering sustainable construction techniques to securing prestigious research grants, publishing in high-impact journals, and mentoring the next generation of civil engineers, our faculty's accomplishments reflect their unwavering commitment to excellence. Whether it's developing innovative solutions for infrastructure challenges, receiving national and international recognition, or collaborating with industry leaders, their work reinforces MITS's reputation as a premier institution for engineering education.

This special section is a tribute to their hard work, perseverance, and passion. We invite you to explore the inspiring stories of our faculty's achievements—each milestone not only highlights individual brilliance but also strengthens the legacy of MITS Civil Engineering.

Civil Engineering

ASCE Student Chapter at MITS: Building Future Civil Engineering Leaders

The American Society of Civil Engineers (ASCE) Student Chapter at Madanapalle Institute of Technology & Science (MITS) is a dynamic student-led organization dedicated to fostering technical excellence, professional development, and innovation in civil engineering. Affiliated with the world's largest civil engineering society, our chapter provides students with opportunities to network, compete, and contribute to sustainable infrastructure solutions.

Mission & Vision

- Empower students with hands-on learning and leadership skills.
- Promote sustainable and resilient infrastructure practices.
- Connect members with industry experts, alumni, and global ASCE resources.

Activities & Achievements

- Technical Workshops & Webinars:
  - Guest lectures by industry leaders on topics like smart cities, green construction, and AI in civil engineering.
  - Training sessions on software (AutoCAD, STAAD.Pro, Revit) and advanced research methodologies.
- **Competitions & Conferences:**
  - Participation in ASCE India Student Symposia, including concrete canoe and steel bridge competitions.
  - Paper presentations at national/international conferences, showcasing MITS' research prowes
- **Student Benefits**
  - Skill Development: Enhance technical, teamwork, and project management skills.
  - Networking: Interact with ASCE professionals, potential employers, and peers.
  - Scholarships & Awards: Access to ASCE-funded opportunities for outstanding members.
  -

Join Us!

Whether you're passionate about structural engineering, environmental sustainability, or smart infrastructure, the ASCE Student Chapter at MITS offers a platform to grow, innovate, and lead.

Follow us on:

Instagram: [@mits.asce]

LinkedIn: [ASCE Student Chapter-MITS]

Contact:

Faculty Advisor: Dr. Dipankar Roy (Dept. of Civil Engineering)

Student President: D.Dilli Prasad (22691a0109@mits.ac.in)

SPOTLIGHT EVENTS

Field to Future: Industrial Visits

On November 20, 2023, 102 aspiring civil engineers from MITS embarked on an eye-opening industrial visit to Krishnapatnam Port, Andhra Pradesh's gateway to global trade. Organized by the Industry-Institute Interaction Cell (IIIC) and ASCE Student Chapter, this expedition wasn't just a tour—it was a masterclass in large-scale infrastructure.

"Seeing 20-ton containers dance across cranes made me realize—we don't just build structures; we build economies."

Hands-On Learning:

- Adani Wilmar Hub: Students decoded the engineering behind massive oil storage tanks and automated warehouse logistics.
- Port Operations: Witnessed ship-to-shore cranes in action and container stacking algorithms that keep global supply chains moving.
- Skill Development Center: Explored training modules blending tech and tradition in port management.

Industry Meets Academia:
Guided by Mr. Kalaiva Mahesh (UDAAN Foundation) and Dr. Swapneel Jaiswal, the visit highlighted:

✓ Multidisciplinary Synergy: How civil, mechanical, and electrical engineering converge in port design.

✓ Professional Ethos: Why soft skills matter as much as steel beams in mega-projects.

✓ Project UDAAN's Vision: Bridging classroom theories with real-world execution.

MAY 2024

FIBER REINFORCED POLYMER (CFRP)

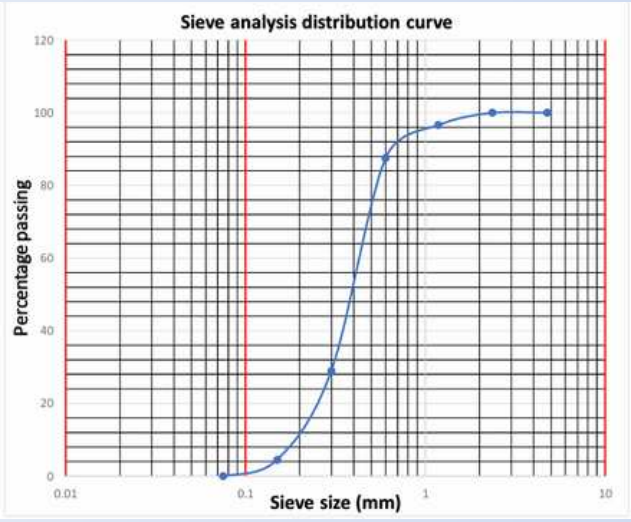
Abstract

A fantastic invention for repairing the old structure is carbon fiber reinforced polymer material. The structure's lifespan is extended by it. CFRP is lightweight, flexible, and has a high tensile strength. The effectiveness of CFRP-wrapped concrete in comparison to regular concrete is examined in this research. In this study, the application of carbon fiber reinforced polymer wrap (CFRP) to the current concrete element is examined. This research examines the compressive strength, ultimate load carrying capacity, and other properties of concrete specimens that have been retrofitted with CFRP wraps, such as cubes, cylinders, and columns. We examined the characteristics of normal concrete with concrete wrapped with CFRP sheets. According to the study's findings, CFRP has significantly increased load carrying capacity. This study examined the use of carbon fiber reinforced polymer (CFRP) to strengthen a plain cement concrete cylinder externally under an axial compressive load. The project has taken into account a single concrete grade and CFRP composition.

In an era where ecological balance and resource conservation are paramount, the construction industry faces a critical challenge: how to extend the lifespan of aging infrastructure without wasteful demolition. Carbon Fiber Reinforced Polymer (CFRP) emerges as a groundbreaking solution, transforming structural reinforcement through innovative material science. By wrapping deteriorating beams and columns with CFRP - a lightweight yet incredibly strong composite - engineers can enhance load-bearing capacity by up to 45% without increasing structural dimensions.

This advanced technique addresses the inherent weaknesses of traditional concrete, which typically suffers from low tensile strength and cracking susceptibility. Research by Ali Chahrour (2005) and Tom Norris (1997) demonstrates CFRP's remarkable ability to realign with stress patterns, offering superior crack resistance compared to conventional materials (as illustrated in comparative diagrams).

1. Material Performance:
   - CFRP-wrapped cylinders showed 55.62% and 45.92% higher compressive strength compared to unwrapped cylinders after 7 and 28 days, respectively.
   - CFRP acted as a confinement layer, reducing cracks and improving load-bearing capacity.
2. Methodology:
   - Conducted lab tests on aggregates (specific gravity, sieve analysis) and designed an M20-grade concrete mix per IS codes.
   - Prepared and tested 6 cubes, 6 plain cylinders, and 6 CFRP-wrapped cylinders under axial compression.
   - Used unidirectional CFRP sheets bonded with epoxy resin (Gold Bond 1893 series).
3. Results:
   - Unwrapped cylinders: Average strength of 13.25 MPa (7 days) and 18.4 MPa (28 days).
   - CFRP-wrapped cylinders: Achieved 20.62 MPa (7 days) and 26.85 MPa (28 days).
   - Failure modes: Unwrapped cylinders fractured abruptly, while CFRP specimens showed controlled cracking without CFRP rupture.



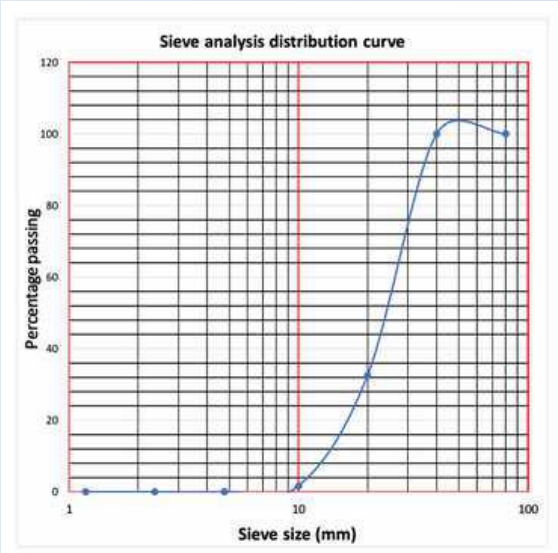


Fig 3.2.5.1 Grading Curve of Coarse Aggregate

- CFRP retrofitting reduces resource waste by extending the life of existing structures, aligning with SDG 9 (Industry Innovation) and SDG 11 (Sustainable Cities).

CONCLUSION

In this project, the ultimate compressive strength of concrete cylinder and compared with the strengthened concrete cylinder using CFRP were studied by compression testing machine. In addition, the preliminary test of materials (specific gravity, bulk density, and sieve analysis) was conducted for both fine and coarse aggregates to complete the mix design. For preparation of concrete sample, the mix design was done as per IS: 10262-2019 and IS:10262-2009. The concrete grade of M20 grade was used in this work. A total of 6 concrete cubes, 6 concrete cylinders and 6 strengthened cylinders were casted and tested. Unidirectional CFRP was used in the research work. In this project, resins like Gold Bond 1893 Primer A & Primer B and Gold Bond 1893 saturant A & saturant B were used to wrap the CFRP sheets to strengthen the concrete cylinder. In both schemes the CFRP strengthened specimen exhibits an effective increase of compressive capacity compare to un-strengthened specimen. The compressive strength of strengthened specimens with CFRP sheets was increased by 55.62% and 45.92% for 7 days and 28 days when compared to controlled specimen. The application CFRP can use for plan concrete sample to improve the strength. However, need to study more research work for other parameters such as other grade of concrete and number of CFRP layers.

Symposium

The CITA 2K24 event, organized by the Department of Civil Engineering at Madanapalle Institute of Technology & Science (MITS), is a prestigious one-day national-level technical symposium. This event serves as a platform for students, researchers, and professionals to exchange ideas and advancements in the field of civil engineering. With the theme “A Step Towards Viksit Bharat,” the symposium aims to inspire innovation and technological progress in infrastructure and construction. The chief guest for this event is C. R. Rajagopal, Superintending Engineer (WRD), Madanapalle, who will be sharing his expertise and insights with the participants. The event will take place on May 3, 2024, at Seminar Hall - B, featuring interactive sessions, technical discussions, and knowledge-sharing opportunities. The symposium is supported by distinguished patrons, faculty coordinators, and student volunteers who have worked tirelessly to make this event a success. CITA 2K24 is not just a gathering but a movement towards empowering the future of civil engineering with sustainable and innovative solutions.


National
Pollution
control day

National Pollution Control: A Civil Engineering Perspective

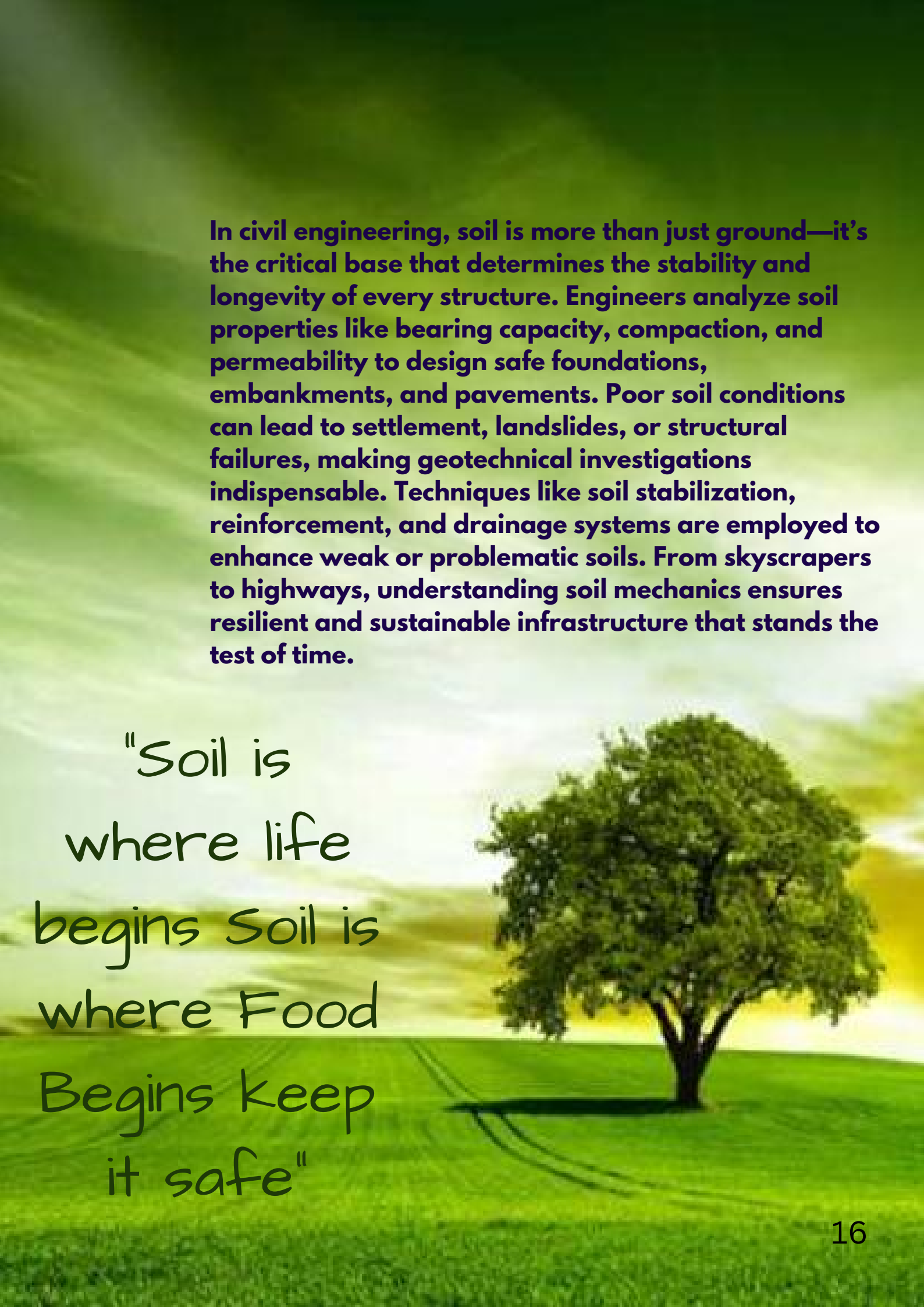
"Be a part of the Solution Not Part of the Pollution"

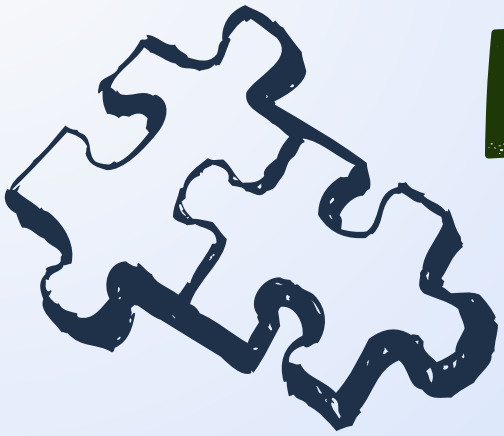
National Pollution Control: A Civil Engineering Perspective Pollution control is a critical aspect of sustainable development, and civil engineers play a pivotal role in designing and implementing solutions to mitigate environmental degradation. With rapid urbanization and industrialization, air, water, and soil pollution have reached alarming levels, necessitating innovative engineering interventions. Civil engineers contribute by designing efficient waste management systems, wastewater treatment plants, and air quality monitoring frameworks that align with national pollution control standards.

As the guardians of infrastructure development, civil engineers must continue to innovate in pollution control technologies. By integrating sustainable practices into national projects, they can help India achieve its environmental goals while fostering economic growth. The future of pollution control lies in interdisciplinary collaboration, policy adherence, and public awareness—all areas where civil engineering can lead the way.


World
soil day

In civil engineering, soil is more than just ground—it's the critical base that determines the stability and longevity of every structure. Engineers analyze soil properties like bearing capacity, compaction, and permeability to design safe foundations, embankments, and pavements. Poor soil conditions can lead to settlement, landslides, or structural failures, making geotechnical investigations indispensable. Techniques like soil stabilization, reinforcement, and drainage systems are employed to enhance weak or problematic soils. From skyscrapers to highways, understanding soil mechanics ensures resilient and sustainable infrastructure that stands the test of time.





EDITORIAL BOARD

It is with immense pride that we present this year's edition of TERRA, a testament to the innovation, dedication, and excellence of our civil engineering community. Within these pages, you'll find groundbreaking research, inspiring achievements, and thought-provoking insights that reflect our collective pursuit of knowledge and progress. This publication not only captures our milestones but also ignites conversations that will shape the future of infrastructure and sustainability. To our contributors, readers, and supporters-thank you for being the pillars of this intellectual journey. Let's continue to build, learn, and inspire together!

EDITORIAL TEAM
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DEPARTMENT OF CIVIL ENGINEEGING
MADANAPALLE INSTITUTE OF TECHNOLOGY &SCIENCE
(UGC Autonomous Institute)
Approved by AICTE, New Delhi and Accredited by NBA Affiliated To JNTU Anantapur Post Box No: 14, Kadiri Road, Angallu, Madanapalle-517325 Andhra Pradesh

"We shape our buildings, there after they shape us."