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ASCE INSIGHTS

“Without Sight there is no Insight”

ASCE CET STUDENT CHAPTER

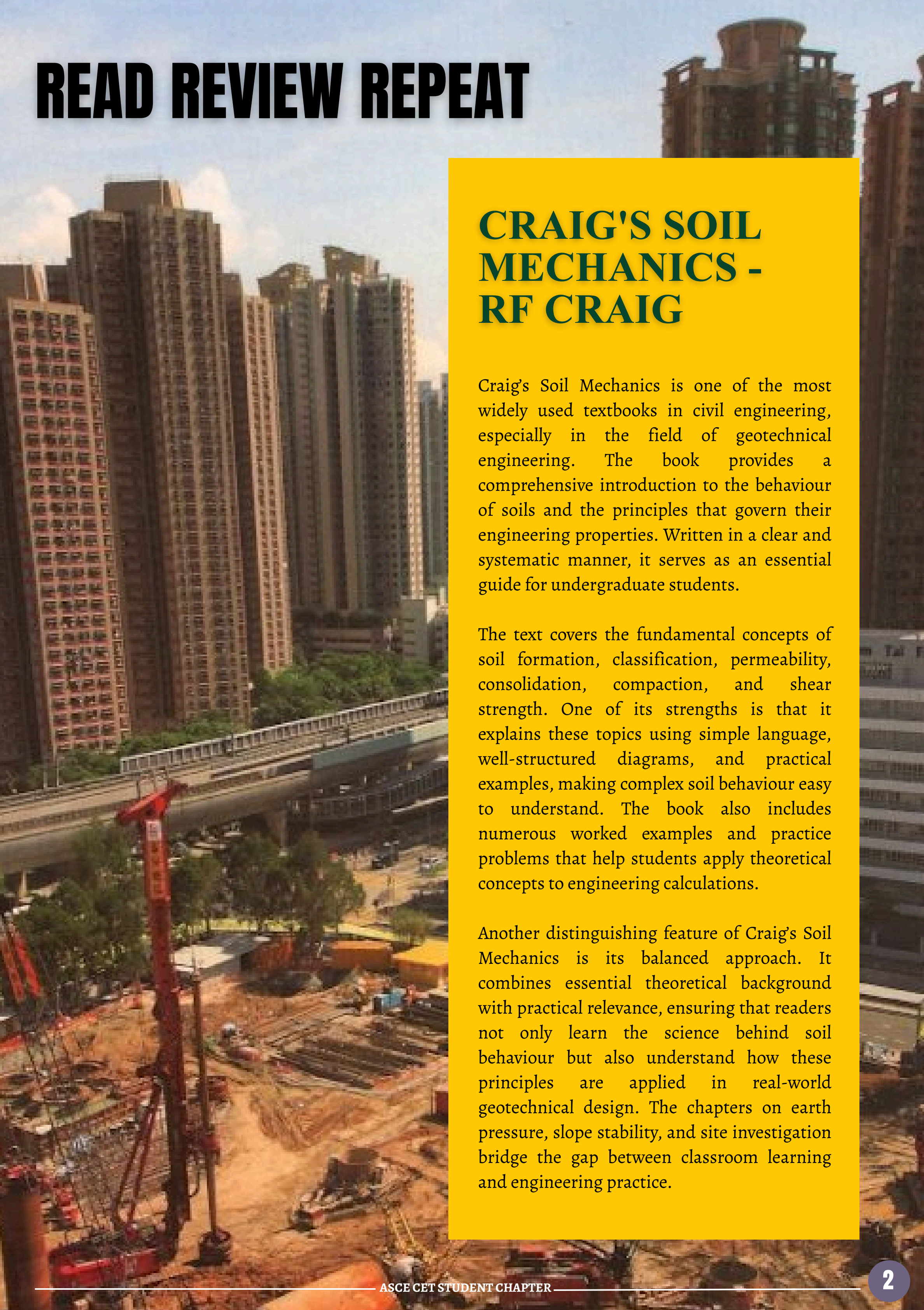
MONTHLY NEWSLETTER

December Edition

Inspiring & Visionary

Civil engineering is more than calculations and construction; it is the art of shaping a world that supports and uplifts society. Every road, every bridge, and every structure reflects the dedication of those who envision progress and work tirelessly to build it. As civil engineers, we carry the responsibility of creating safe, sustainable, and resilient communities for generations to come.

READ REVIEW REPEAT



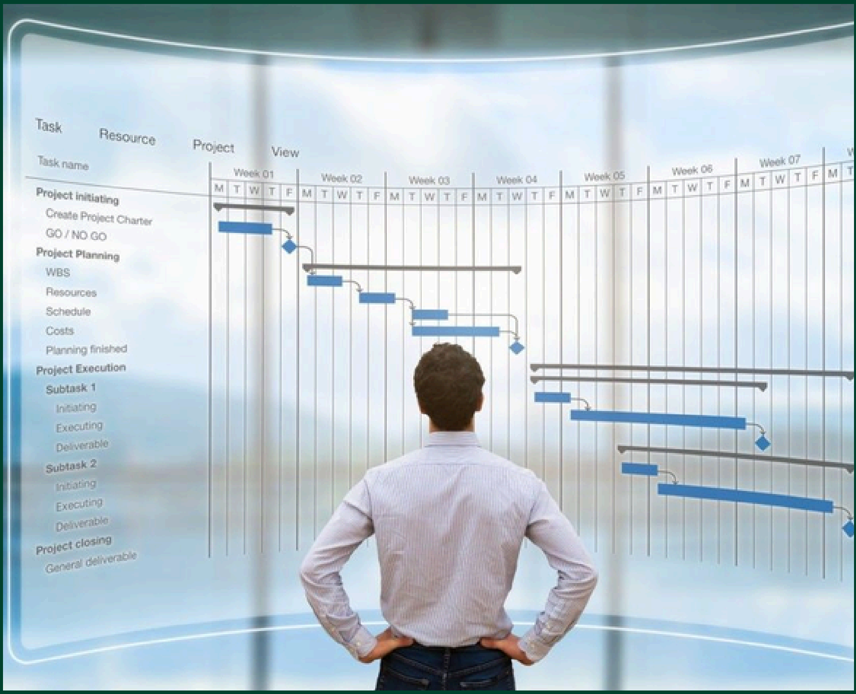
CRAIG'S SOIL MECHANICS - RF CRAIG

Craig's Soil Mechanics is one of the most widely used textbooks in civil engineering, especially in the field of geotechnical engineering. The book provides a comprehensive introduction to the behaviour of soils and the principles that govern their engineering properties. Written in a clear and systematic manner, it serves as an essential guide for undergraduate students.

The text covers the fundamental concepts of soil formation, classification, permeability, consolidation, compaction, and shear strength. One of its strengths is that it explains these topics using simple language, well-structured diagrams, and practical examples, making complex soil behaviour easy to understand. The book also includes numerous worked examples and practice problems that help students apply theoretical concepts to engineering calculations.

Another distinguishing feature of Craig's Soil Mechanics is its balanced approach. It combines essential theoretical background with practical relevance, ensuring that readers not only learn the science behind soil behaviour but also understand how these principles are applied in real-world geotechnical design. The chapters on earth pressure, slope stability, and site investigation bridge the gap between classroom learning and engineering practice.

SOFTWARE SPOTLIGHT



PRIMAVERA P6

Primavera P6 is a powerful project management software widely used in construction, engineering, and large-scale infrastructure projects. Developed by Oracle, it helps planners and project managers schedule, plan, monitor, and control complex projects with thousands of activities.

The software allows users to create detailed project schedules, assign resources, define relationships between tasks, and track progress in real time. One of its major strengths is its ability to handle large and multi-project environments efficiently, making it suitable for big construction companies and government projects.

Primavera P6 also supports critical path analysis, cost control, risk management, and resource optimization. Through features like Gantt charts, baselines, and dashboards, it gives clear insights into delays, cost overruns, and overall project performance.

STUDENT ARTICLES

AI IN TRANSPORTATION: THE SELF-LEARNING ROAD NETWORKS

"Ever wondered while standing in traffic just before a traffic signal, waiting for it to turn green, just so you have to wait at another signal right after even though there might not be any traffic from other roads on the intersection?"

The waste of fuel, time, and patience it happens because our traffic signals are stuck in the past. They run on fixed, pre-programmed timers, blind to the real-time reality on the roads. But what if they could see, learn, and adapt?

The Vision: Signals That Think
The solution lies in equipping traffic signal posts with sensors for our road networks. These sensors would continuously monitor vehicle flow, pedestrian movement, and even emergency vehicle approaches. They wouldn't just observe they'd analyze, learning patterns over time.
This data is directed into a cloud which consists of a central software that processes information from thousands of intersections simultaneously. Using AI, this system wouldn't just react it would predict.

The Challenges : Scale and Cost
Covering an entire city, with hundreds or thousands of intersections, requires:

Hardware: Sensors, cameras, radar/LIDAR units, communication modules, and upgraded signal controllers at every intersection.

Software: Advanced AI platforms capable of real-time optimization, machine learning models, and secure cloud infrastructure.

Connectivity: High-speed network (like 5G or fiber) to handle constant data transmission between signals and the cloud.

Installation & Maintenance: Labor for installation, ongoing calibration, updates, and repairs.
The Cost would be in lakhs of crores , as such the investment required is large

The Approach: Start Small and Train
Instead of equipping an entire large city, the smarter path is to start small.

Phase 1: Pilot in a Small City or District
Choose a small town or a controlled district within a larger city—maybe a business park, university campus, or hospital zone with 10–20 interconnected signals. This reduces initial costs and complexity.
Here, the system can be installed, tested, and refined. The AI learns local patterns: morning rush versus weekend flow, event traffic, seasonal changes. Engineers can troubleshoot issues on a manageable scale.

Phase 2: Expand
Once the system proves reliable, expand where congestion is worst. Connect signals along a major road from downtown to the suburbs, optimizing flow along that route.

Phase 3: Network Integration
Finally fully expand to create a full network, where signals communicate not just along one road, but across the entire grid.

The Return on Investment: Worth and Time
Though the investment required is steep the long term benefits aren't to be scoffed at either.

Time Recovery: Reduced commute time .
Fuel & Emissions: Less idling means lower fuel consumption and reduced CO_2 emissions.
Safety: Adaptive systems can prioritize pedestrian crossings, detect accidents faster, and create emergency vehicle green waves.
Economic Productivity: Faster, more reliable travel boosts local commerce and workforce efficiency.
Deferred Infrastructure Costs: Optimizing existing roads can delay or eliminate the need for expensive road widening or new construction.

The Human Factor: Adapting could be hard
There's a psychological element too. Drivers are used to predictable signal patterns. When lights start changing based on invisible algorithms, it might feel erratic or unfair—especially if you're the one stopped at a seemingly empty intersection.
Transparency and public education become part of the rollout. Maybe there's a public dashboard showing how the system is improving flow, or real-time explanations.

Conclusion: An Investment in Flow
To overcome the inefficiency due to the old traffic system Sensor-based, AI-driven traffic networks replaces rigid timing with adaptive intelligence.
The cost is real, but so is the cost of the status quo: wasted time, polluted air, and constrained economic growth. By starting small, proving the concept, and scaling thoughtfully, cities can transform their streets into efficient pathways.
The red light that makes you wait for no one doesn't have to be a permanent feature of city life. It can become a relic of the past—once we give our signals the eyes and brains to see a better way forward.
-Naveen Narayan

EV BATTERY WASTE COULD HELP DECARBONIZE CONCRETE: A SCALABLE PATH TO GREENER INFRASTRUCTURE

New research is shedding light on an innovative solution to two of the world's fastest-growing environmental challenges: the rise of electric vehicle battery waste and the carbon intensive nature of concrete. As global EV adoption accelerates, the volume of end-of-life lithium ion batteries is projected to increase rapidly, yet only around 5% of these batteries are currently recycled. This creates a mounting waste stream that scientists are now exploring as a potential resource for low-carbon construction materials.

Concrete remains the world's most heavily used manufactured substance, with an estimated 30 billion tonnes produced annually enough to build a hypothetical concrete wall encircling the entire planet every year. However, this Cement the binding component of concrete, is responsible for 7 to 8% of global CO_2 emissions, making it one of the largest single industrial contributors to climate change.

The new studies focus on processing lithium rich byproducts from EV batteries and lithium extraction into supplementary cementitious materials (SCMs). When blended into concrete, these materials can partially replace cement without weakening structural performance. In some trials, concrete incorporating these additives even displayed improved durability and binding strength. By reducing the amount of cement required, this approach directly lowers the carbon footprint of each cubic metre of concrete produced.

If scaled effectively, utilizing EV derived waste in concrete could simultaneously reduce hazardous battery disposal, cut emissions from cement production, and align construction practices with circular economy principles. Challenges remain particularly the low global battery recycling rate and the need for industrial scale processing but the convergence of rising EV waste and massive concrete demand presents a rare environmental opportunity.

This emerging technology represents a significant step toward greener infrastructure, illustrating how tomorrow's sustainable cities may be built from the discarded materials of today's clean-energy transition.

-Devadath J N

IS 1893 – Criteria for Earthquake Resistant Design of Structures

IS 1893 is India's primary code for earthquake-resistant design. It provides guidelines for calculating seismic forces on buildings and other structures. The code covers: Seismic zone classification of India, Response spectrum and design lateral forces,
Importance factor and structural system factors,
Methods for dynamic analysis
,Special rules for irregular buildings and different structural types.

This code ensures structures are designed to withstand expected earthquake forces, enhancing safety and performance during seismic events.

KNOW YOUR CODE: IS 1893

QUESTIONS OF THE MONTH

1. The natural water content of soil is defined as the ratio of:
A. Weight of water to weight of solids
B. Weight of water to total weight of soil
C. Weight of solids to total weight of soil
D. Volume of water to volume of solids

2. The Atterberg limits are used mainly for:
A. Determining compaction properties
B. Classifying fine-grained soils
C. Determining permeability
D. Calculating shear strength directly

3. The permeability of soil depends MOSTLY on:
A. Soil colour
B. Grain size distribution
C. Specific gravity
D. Atterberg limits

4. Which test is commonly used to determine the shear strength of cohesive soils?
A. Direct shear test
B. Standard penetration test
C. Unconfined compression test
D. Cone penetration test

5. The consolidation of clay under load occurs mainly due to:
A. Immediate elastic settlement
B. Expulsion of air from voids
C. Expulsion of water from voids
D. Increase in shear strength

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Articles are invited.
Please do scan the below attached
QR code and sent your article.