IIT BOMBAY

CIVIL INSIGHTS 2025

भारतीय प्रौद्योगिकी संस्थान मुंबई

INDIAN INSTITUE OF TECHNOLOGY BOMBAY

Department Of Civil Engineering

presents

CIVIL INSIGHTS 2025

Message from the Editorial Team

We're excited to introduce the sixth edition of Civil Insights, the magazine of the Civil Engineering Association (CEA) at IIT Bombay. As one of the institute's founding departments, Civil Engineering holds a special place, with a global reputation for excellence.In this issue, we've put together a glimpse of the department's highlights from the academic year 2024-2025. You'll find updates on major events, activities, and milestones, all crafted to offer a concise yet engaging overview for our readers.A big thank you to our faculty, staff, and students who poured their time and energy into making this magazine possible. Special gratitude goes to our Head of Department, Prof. Tom V. Mathew, and our faculty advisors, Prof. Eswar Rajasekaran, Prof. Solomon Debbarma, and Prof. Srineash V. K., for their guidance and support.We hope this magazine resonates with readers of all backgrounds. While we've done our best to ensure accuracy, we apologize for any mistakes that might have slipped through.Finally, to the graduating class of 2025, this magazine is a token of our appreciation as we celebrate your journey and bid you farewell at the Institute's 63rd Convocation. We wish you all the success in your future endeavors.

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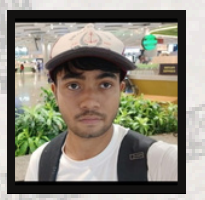

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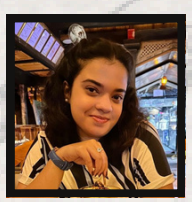

Sreshtha Lahiri
Editor

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Message from the HoD

Prof. Tom V. Mathew
Head, Department of Civil Engineering
IIT Bombay

A very warm welcome to the Department of Civil Engineering of IIT Bombay! The Department of civil engineering has been one of the founding Departments of IIT Bombay since 1958. Over the years, it has grown tremendously and is now recognized as one of the country's best and major Engineering departments and ranked highly in the world for Civil Engineering. With its multifaceted faculty (58 regular Faculty, 2 Adjunct, 2 Visiting Faculty, and 2 Guest Faculty), it provides high-quality teaching and research. We provide very attractive facilities and an environment for those who join the department as Faculty or Students. Currently, there are about 350 doctoral students, 250 master's students, and 650 B. Tech students are enrolled in the department. We are supported by 25 permanent staff including both technical and administrative staff. We are also have large number of project staff working in the department helping various sponsored research projects.

Among JEE (Advanced) qualified candidates who opt to join the undergraduate (UG) program, our department is one of the top destinations in the country for Civil Engineering. Similarly, for GATE-qualified candidates, this department is one of the most priority institutes to join for postgraduate (PG) programs. Among the large number of applications received for the PhD program, only less than 5% get admission to the department. Our department received in 2025-25 over 250 applications from foreign students for PG (M. Tech and PhD) programs, showing the high demand for our academic programs in India and other countries. Additionally, as per the recently signed MoU between IIT Bombay and SVNIT Surat, under the Early Induction Program, 3 final year UG Civil Engineering student of SVNIT joined UG Civil Engineering program at IIT Bombay. The recent QS world ranking 2024 shows our department's world ranking is 42, with one of the top in India in the domain of Civil

Engineering. National Institutional Ranking Framework (NIRF) by the Ministry of Education, IIT Bombay is 3rdin the country, and tops in the area of innovation. Our expert faculty members are involved in several basic and applied research works, many of which also get translated to solve various challenging issues of the country and society at large.

Eight of our department faculty members are also listed in the world's top 2% of scientists/researchers in the domain, as per the recent Stanford University database. These are possible because of various contributions made by several of our former students. As the problems society faces are multi-dimensional, so must be our efforts at combating them. With this view in mind, since the inception of the Department, our goal is to do research on challenging engineering problems and provide efficient engineering solutions in the various sub-disciplines of Civil Engineering. The department has a strong focus on the research areas of Transportation Systems Engineering, Geotechnical Engineering, Water Resources Engineering, Structural Engineering, Ocean Engineering, Remote Sensing, and Construction Technology and Management. The department has M. Tech. and PhD programmes in all these areas of research along with its traditional B.Tech. programme in Civil Engineering. Department has 17 high-end teaching and research laboratories in these areas.

The Department also hosts Postdoctoral Fellowship programmes in various specializations sponsored by Institute (IPDF), DST, and other agencies. Currently there are about 40 post docs are working in the department. The department is actively involved in basic and applied research and consultancy and provides high-quality technical advisory support through various R & D projects and consultancy to various organizations. Department generated a revenue of about 70% for the entire institute's related consultancy projects in the F.Y. 2024-25 through the industry projects. This is one of the major contributions of the department to make an academic institute selfsustained financially. Through academic and sponsored research, our faculty members and students have published a large number of research publications in peer-reviewed reputed Journals having high impact factors in the domain. In the recent past, the department has attracted a significant amount of sponsored research funding from government and private organizations and delivered excellent output in terms of implementable solutions for the benefit of the country and society at large. The department is well known because of our multi-talented alumni. Several former UG and PG students of this department are in various topmost prestigious positions globally in different sectors like academia, research organization, industry, government bureaucrats etc.

Many of our Civil Engineering alumni have given back to the department by instituting merit awards, Chair Professor positions and various other contributions to their alma mater. Recently, Mr. Jayant Kanitkar (B.Tech./Civil Engineering/1977) has generously donated for instituting the "Kanitkar Merit Awards" for toppers of 3rd year and 4th year B.Tech. Civil Engineering with an award amount of INR 2,50,000/- each. Another alumnus Mr. Pankaj Jagtap (B.Tech./Civil Engineering/1995), has started the "Anantrao Jagtap Chair" position for an outstanding faculty member who is working in the domain of Construction Management.

Late Prof. R. S. Ayyar's family (elder daughter of Prof. Ayyar, Ms. Ranjini is an alumnus, B.Tech. Civil Engineering) donated two flats in Mumbai to the institute, from which one Chair Professor position in the department will be created and the 1st-floor conference room is named in memory of late Prof. Ayyar. Very recently, in memory of one of our beloved former UG students Mr. Manu Akula (B.Tech./Civil Engineering/2008), whom we lost in recent times, a memorial award in the name of Manu has been instituted by his family and well-wishers for the toppers of Construction Technology/Management courses in UG.

Towards social welfare, the department generously contributed a few desktop computers to the institute's common facility, IIT Hospital, for the upgradation of services provided by this essential unit IIT Hospital for students, staff and faculty members.

The Department disseminates the knowledge gained from its high-quality research through training programs and interacts with world-renowned personalities through workshops and conferences. The students and faculty members have won prestigious national and international awards and recognitions and continue to bring laurels to the Department and the Institute. Quite a good number of our faculty members continue to be Editors or Associate Editors or Members of the Editorial Boards of a number of reputed International/ National Journals. As per the vision and mission, our aim is to deliver the best to our students, to society and the nation.

Best wishes
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Department Achievements

The faculty members of department of civil engineering have won prestigious national and international awards and recognition and continue to bring laurels to the Department and the Institute. Some of them are:

- **Prof. Siddhartha Ghosh** and his PhD scholars **won the Best Paper Award at APCS 2025, Kanazawa, Japan**, for their work on "Effect of Wrinkling Allowance in Tensile Membrane Structures.
- **Dr. Kukku Sara, Prof. Eswar Rajasekaran** and collaborators received the **Best Paper Award 2025 from PFG – Journal of Photogrammetry, Remote Sensing & Geoinformation Science**.
- The **department** has been awarded the **DST FIST 2024 grant** at Level-C to strengthen its research infrastructure.
- **Prof. R.S. Jangid and Prof. Deepankar Choudhury** played a key role in a new BMC policy granting formal identity recognition to Geotechnical/Foundation Engineers for high-rises above 120 m.
- **Prof. Deepankar Choudhury** convened the BIS WG17 team that developed the new **Indian Standard IS:19117 (2025)** for the design and construction of Combined Piled-Raft Foundations.
- **Prof. Subimal Ghosh and Prof. Siddhartha Ghosh** were appointed to **Chair Professorships** for 2025-28, bringing the department's total to six Chairs.
- **Prof. Deepankar Choudhury** was honoured with **the Springer Nature Editor** of Distinction Award 2025 for his contributions as Editor-in-Chief of the Indian Geotechnical Journal.
- **Prof. Ravi Sinha and Prof. Deepankar Choudhury** were appointed non-officio members of the **Maharashtra State Disaster Management Authority** chaired by the Chief Minister.
- **Prof. Deepankar Choudhury** has been invited to the **AICTE Subject Expert Committee** to help revamp the Civil Engineering curriculum across India.
- **Dr. Vikas Sharma** (B.Tech. 2009-13) joined **Kyoto University, Japan,** as an Assistant Professor.
- **Dr. Anurag Sahare** (M.Tech. 2016-18) joined **Tokyo City University, Japan**, as a Research Assistant Professor.
- **Prof. Swathy Manohar and her PhD student Athira V.S.** won the **CII 4R Award 2024** for their research in waste-to-worth technologies.
- **Prof. Swathy Manohar** was selected as an **INSA History of Science Young Associate 2024** by the Indian National Science Academy.

Alumni Contributions

Kanitkar Merit Award

Aim of the Award: The Civil Engineering department presents the Kanitkar Merit Award at the end of each academic year to encourage and foster healthy academic competition among undergraduate students, promoting academic excellence in Civil Engineering.

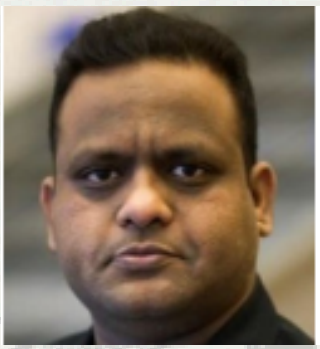
About Mr. Jayant Kanitkar: Mr. Jayant Kanitkar is a Financial and Tax Advisor at JayKan Company. He started the Kanitkar Merit Awards at IIT Bombay in 2021. He graduated with a B.Tech in Civil Engineering from IIT Bombay in 1977, earned an MS in Structural Engineering from Vanderbilt University, and completed an MBA from the Kellogg School of Management at Northwestern University. He also served as a Visiting Faculty member at the Shailesh J. Mehta School of Management, IIT Bombay, during the Autumn Semester of 2008.

Recipient of the Award in 2022: Bhuvan Aggarwal, an institute student with Roll No. 190040026, received the "Kanitkar Merit Award - 2022" as the top student with a CPI greater than 9.0 at the end of the 3rd year of his B.Tech in Civil Engineering. He was awarded INR 250,000.00, along with an additional INR 22,000.00 from the office of the Dean (Alumni and Corporate Relations), totaling INR 2.72 lakhs for his outstanding academic performance.

Note: If the top student does not achieve a CPI above 9.0 out of 10, the award will not be given that year.

Dr. Manu Akula Memorial Award for Academic Excellence in CTaM

In memory of the late Dr. Manu Akula, a former B.Tech. Civil Engineering student at IIT Bombay from the class of 2008, his family, friends, and well-wishers established the "Dr. Manu Akula Memorial Award for Academic Excellence in Construction Management" in 2023.



An award of INR 50,000 (Rupees fifty thousand) will be given to each of the two top students in the B.Tech. Civil Engineering program specializing in "Construction Management" who successfully complete the elective course by the end of their 4th year.

An MoU was signed between IIT Bombay, IIT Bombay Heritage Foundation, Mr. Anirudh Akula, and Dr. Ihab Ismail on 24th April 2023 to formalize this award.

Alumni Contributions

Prof. R. Subrahmonia Ayyar

IIT Bombay, along with Mrs. Parvathy Subrahmonia Ayyar and her daughters, Mrs. Ranjani Saigal and Dr. Jayashree Subrahmonia, honored the legacy of the late Prof. R. Subrahmonia Ayyar. Prof. Ayyar was a former Head of the Department of Civil Engineering and former Dean (AP) at IITB, and a cherished member of IIT Bombay's extended family.

To honour his memory, they lauched two special initiatives for the Civil Engineering Deartment.

1. Establishing a Chair Professorship in the Department of Civil Engineering.
2. Naming the 1st floor Conference Room of the Civil Engineering Department as the Prof. R. S. Ayyar Conference Room.

These initiatives were made possible through generous funding from Prof. Ayyar's family, including the donation of two flats.

The Civil Engineering department of IIT Bombay is extremely grateful to Prof. Ayyar's family for their generous contributions to the department.

Anantrao Jagtap Chair for Construction Management

Aim of the Award: Mr. Pankaj Jagtap has sponsored a chair professorship in memory of his late father, Shri. Anantrao Jagtap, who was a Civil Engineer with a passion for Construction Management. This position, called the 'Anantrao Jagtap Chair for Construction Management', aims to attract young and talented faculty members from around the world. The goal is to provide them with the support needed to develop a world-class Construction Management program at IIT Bombay, aiming to make it a leading program both nationally and internationally.

Criteria for the Awardee: The recipient should have a strong reputation for promoting Construction Management. They should have initiated new academic programs, improved existing ones, and contributed to academic activities that benefit IIT Bombay. The awardee should provide technical and intellectual leadership in Construction Management and work towards establishing the Civil Engineering department at IIT Bombay as a global leader in the field.

Recipient of the Award: Prof. Venkata Santosh Kumar from Delhi was appointed as the inaugural "Anantrao Jagtap Assistant Chair Professor" on March 5, 2022, for a three-year term. He is the first Assistant Professor at the institute to hold a named Chair position. This appointment will support junior researchers at the institute in pursuing outstanding research and advancements in Construction Management within the Civil Engineering department at IIT Bombay.

Research Article

Flood Foresight: Mapping, Modeling, Forecasting, and Managing the Risk

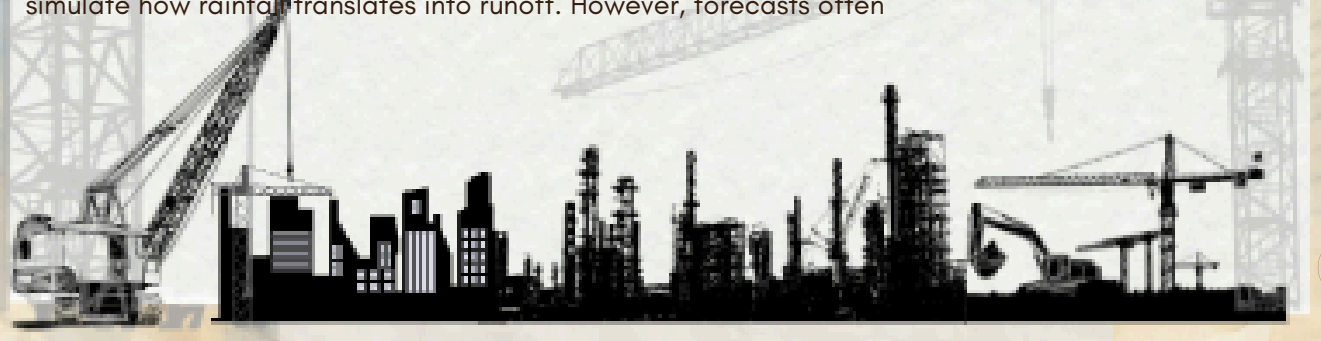
Gaurav Tripathi, Ekant Sarkar, Basudev Biswal
Department of Civil Engineering, IIT Bombay

Floods are among the most devastating natural hazards globally, affecting more people annually than any other disaster. In recent years, record-breaking floods have battered cities and rural landscapes alike from the Himalayan foothills to coastal metropolises, leaving behind shattered homes, disrupted livelihoods, and mounting economic losses. As climate change intensifies rainfall extremes and accelerates sea-level rise, the urgency to understand, predict, and manage floods has never been more critical. Yet despite decades of scientific advances, the question persists, "Why are we still caught off guard?" The answer lies in a complex web of data limitations, modeling gaps, and institutional inertia compounded by a rapidly changing hydrological reality that demands smarter tools and integrated strategies.

At the heart of flood preparedness lies the ability to visualize flood inundation. Flood mapping involves creating spatial representations of areas prone to inundation under various scenarios, be it a 10-year rainfall event or a glacial lake outburst flood. Modern-day flood maps are created using a mix of Satellite imagery (e.g., Sentinel, Landsat), Digital Elevation Models (LiDAR, SRTM), Drone surveys, and Historical flood extents. However, mapping alone is not a silver bullet. Many regions, particularly in the Global South, lack high-resolution terrain data or ground validation. Urban flood maps often fail to capture stormwater drainage failures, compound events, or recent land-use changes, limiting their utility for on-ground action.

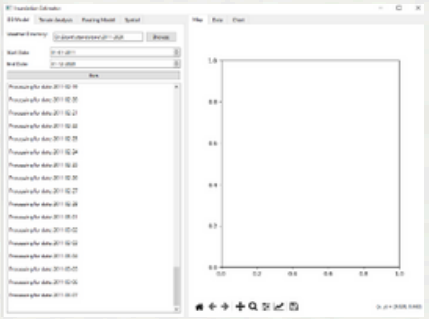
If a flood map shows where water may go, flood models explain how it will get there. Hydrologic and hydraulic models simulate the movement of water across landscapes and through river networks. These range from basic rainfall-runoff models to advanced 1D/2D simulations like HEC-RAS, LISFLOOD-FP, MIKE FLOOD, etc. They integrate inputs such as Rainfall intensity and duration, Soil saturation, River geometry, Terrain slope, etc, to model the flow of the water. But real-world implementation isn't easy. Calibration of such models requires long-term hydrological data, which is often missing for the majority of river basins. High-resolution simulations demand computational power, and their results can be sensitive to assumptions about river-bed roughness or channel width. The future frontiers include AI-enhanced modeling and hybrid approaches that blend physics with machine learning. These offer hope for improving model performance in data-scarce and rapidly changing environments.

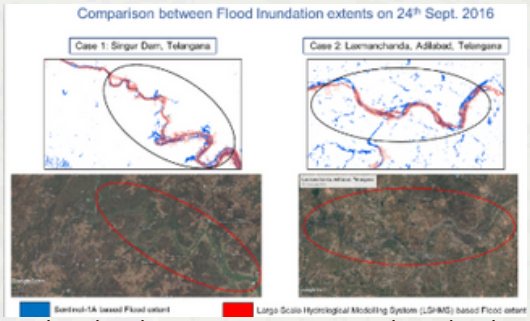
Forecasting floods is like predicting chaos with a deadline. The aim is to provide timely warnings to save lives and reduce damage. This depends on Weather forecasts (short-term and ensemble predictions), Streamflow monitoring (via gauges or remote sensing), and Hydrologic models that simulate how rainfall translates into runoff. However, forecasts often



suffer from uncertainty, especially during extreme rainfall or flash floods. Urban catchments respond in minutes, not hours, making lead times razor-thin. Data latency, communication gaps, and weak last-mile connectivity can render even accurate forecasts ineffective. Emerging solutions include satellite-based nowcasting, AI-driven early warning systems, and integrated mobile alert platforms that translate complex forecasts into actionable messages for communities.

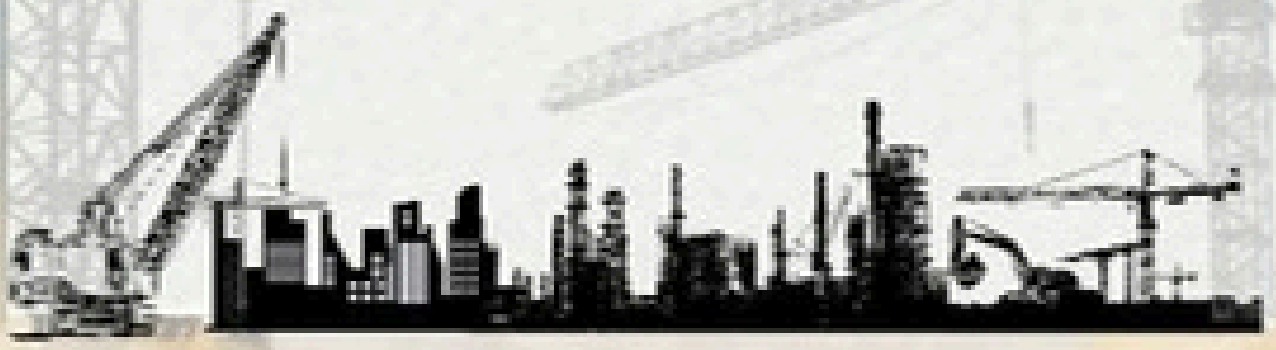
Our research group is involved in the development of LSHMS (Large Scale Hydrological Modelling System), a stand-alone software with a GUI for predicting streamflow and flood inundation. It produces results with minimal computational resources. Users can visualize discharge and inundation depth at any chosen location. The software does have the capacity to hindcast/ forecast riverine flooding events. The software is currently undergoing minor checks. LSHMS is leveraged with a couple of modules (DB module, Terrain analysis, HAND computation, Construction of Independent Channels, Routing module, and Spatial demonstration), which consider a set of input parameters (ESRI shapefile of river boundary, River geometry data, DEM data, Rainfall and Temperature min-max) to produce intermediate results, being used further in discharge and flood depth estimation along with the flood inundation extent. The images below show the LSHMS GUI and flood inundation outputs are as follows:





No map or model matters unless it informs action. Flood risk management involves both structural measures like embankments, retention basins, and dams, and non-structural tools, such as land zoning, insurance schemes, and awareness programs. Increasingly, there's a shift toward Nature-based solutions (restoring wetlands, mangroves, and floodplains), Community-centred planning where local knowledge guides mitigation, and Risk financing including climate insurance and adaptive funds. But coordination remains a key challenge. Scientists build models in isolation. Planners lack access to usable data. Communities aren't consulted in design. Bridging these silos is crucial for building resilient flood governance systems.

Despite technological advances, several hurdles continue to hinder effective flood resilience. These include a lack of reliable and high-resolution data, particularly in developing regions, alongside disjointed policy frameworks that separate mapping, modeling, and management efforts. Local-level technical capacity often remains low,and public communication of flood risks and forecasts is frequently inadequate. Furthermore, persistent funding gaps undermine long-term resilience planning. However, the flood resilience landscape is evolving. Open-access platforms such as Google Earth Engine and FloodHub are democratizing data access, while citizen science initiatives are enabling local communities to contribute to monitoring efforts using tools like smartphones. Advances in AI and big data are enhancing predictive accuracy, and transboundary collaborations, such as those in the Hindu Kush Himalaya and Mekong River Basin regions, are fostering shared tools, data, and best practices.



Ultimately, navigating the age of the deluge requires a fundamental shift in our relationship with water. We cannot engineer our way out of this crisis with concrete alone. The path forward lies in weaving together our most advanced technology with the wisdom of nature and the power of community. It's about building cities that are not just flood-proof, but flood-resilient; societies that can bend with the water, but never break.

As the waters rise, so must our collective capacity to adapt.

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Research Article

Role of met-oceanic response to the intensification of tropical cyclones: A comparative analysis on cyclone Tauktae and Yaas

Amit Kumar Jena, Manasa Ranjan Behera, Sachiko Mohanty, and Srineash VK

Abstract

The present study investigates the physical response of surface met-ocean variables during the tropical cyclones (TCs) Tauktae (14-19 May) and Yaas (23-28 May) along the eastern Arabian Sea and western Bay of Bengal, respectively using multi-platform datasets. This study synthesizes scientific understanding of the complex interplay between TCs, Marine heat waves (MHWs), and vertical wind shear, and focuses on their combined effects on ocean dynamics. The TC Tauktae developed and rapidly intensified without encountering any MHW event and required longer lifespan (3 days) to reach its peak as an Extremely Severe Cyclonic Storm (ESCS). Conversely, prolonged MHW event, persisting for five-fold duration (26 days), significantly influenced the intensification of TC Yaas into a Very Severe Cyclonic Storm (VSCS) within a shorter duration (1.5 days). TC Yaas intensified due to vertical wind shear, which transported heat and moisture from the Arabian Sea, creating favourable environment for its growth and development. Furthermore, the low vertical wind shear preceding Yaas provides favorable conditions for the persistence of MHW events. The presence of an anticyclonic eddy along the track played a crucial role in the intensification of TC Tauktae and Yaas. Before TC Yaas, elevated shortwave radiation and reduced longwave radiation played a significant role in sustaining the MHW event, unlike TC Tauktae. After the landfall of TC Yaas, the barrier layer thickness and mixed layer heat content were still high, whereas these were low in case of Tauktae. This signifies that higher translational speed of TC Yaas, relative to Tauktae, leads to reduced churning effects within the ocean, allowing for the retention of a substantial amount of heat within the mixed layer.

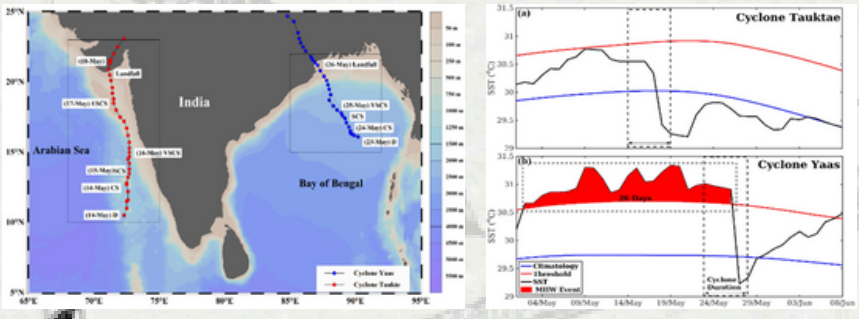

Figure 1: Study area of the north Indian Ocean (left), showing Cyclone Tauktae in the Arabian Sea and Cyclone Yaas in the Bay of Bengal, along with the associated marine heatwave events (right).

Research Article

Hydrodynamic performance of an oscillating water column with power take-off interaction: An experimental investigation

R Sashank, J S Rony, Nimma Rambabu, V K Srineash

Concerns on global warming are rising day by day. Also, the dependency of major off grid locations and islands mostly dependent on fossil fuel and other thermal power generation systems. Consequently, and consistently pushing the world to find alternatives that can help to reduce global warming and sustainable like ocean wave energy. Ocean waves stand out for its frequent and consistent source of harvestable energy throughout a day over 90% of the time. To harvest the energy, among various wave energy converters Oscillating Water Column (OWC) wave energy converter. In this study we conducted an experimental investigation into the hydrodynamic performance of an OWC system integrated with a power take-off (PTO) mechanism. This research focused on understanding how wave conditions, device geometry, and turbine interaction influence overall efficiency.

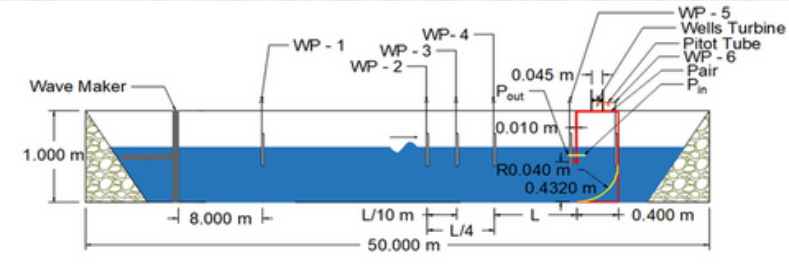

Figure 1: Schematic of OWC with circular bottom profile place in the wave flume

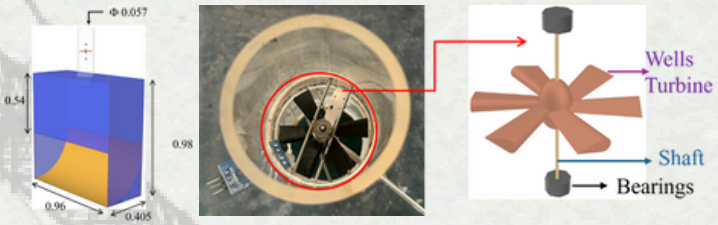

Figure 2: 3D schematic of OWC and positioning of Wells turbine inside the airduct

An OWC consists of a partially submerged chamber with an underwater opening on its front wall. Incoming waves cause the water level in the chamber to rise and fall, compressing and decompressing the air above it. This bidirectional airflow drives a turbine in this case, a Wells turbine which spins in the same direction regardless of flow direction and produces electricity. While the concept is simple, optimizing performance is complex, as many factors influence how effectively wave energy is captured and converted.

We constructed a physical model of an OWC with a circular bottom profile to enhance the vertical oscillations of the water column. A cylindrical projection was added to the front lip wall to reduce turbulence and improve energy capture. The PTO damping effect was provided by a Wells turbine placed inside the air duct. The model was installed in a 50-metre-long wave flume at Ocean Engineering Lab, IIT Bombay and tested under 54 different wave conditions, varying wave heights and periods to simulate both shallow and intermediate water depths. High-precision sensors measured wave run-up, air pressures, airflow velocities, and turbine performance parameters. The study found that wave reflection from the device's front wall was the primary bottleneck to performance. While the internal conversion from water motion to air motion was already highly efficient, a significant portion of wave energy was being lost before entering the chamber. Longer waves were found to carry more energy and produce higher airflow velocities, leading to better turbine performance, even if hydrodynamic efficiency was lower.

The mechanical power output in the scaled experimental setup peaked at around 0.2 W for the highest tested wave height at an intermediate relative water depth. While this value may appear small, it is limited by scale effects in the laboratory. In a full-scale device, both the turbine's aerodynamic performance and the available wave power would be much greater, leading to significantly higher outputs. Another key insight from the research was the importance of phase matching between the water column oscillations and the pressure changes inside the chamber. A minimal phase difference at resonance allowed for maximum energy transfer, while mismatched phases reduced efficiency. This understanding opens opportunities for further optimization by tuning chamber geometry and PTO damping to maintain phase alignment across different sea states. The implications of this research are far-reaching. By addressing wave reflection and optimizing PTO performance, OWC systems can become a more competitive renewable energy option, particularly for remote coastal locations where traditional power generation is costly or impractical. The device's stability, reliability, and ability to harness a predictable energy source make it a strong candidate for hybrid systems alongside solar and wind power.

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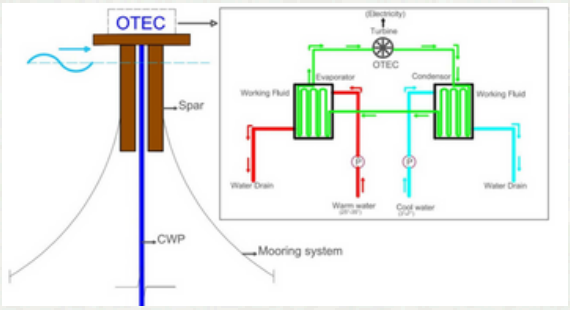
Research Article

Hydrodynamics of floating offshore OTEC platforms – a review

N. V. Nasma Noor, V. K. Srineash & Manasa Ranjan Behera

The global push for clean energy has spurred interest in utilising the vast potential of the ocean, which covers two-thirds of the earth's surface. An Ocean Thermal Energy Conversion (OTEC) system generates power by exploiting the temperature difference between warm surface seawater and cold deep seawater to run a heat engine. The large diameter cold water pipe (CWP) draws huge volumes of deep ocean water, typically from depths of 800–1000 m, providing the cold sink necessary for the thermodynamic cycle. A floating structure is needed to position the plant in deep water close to shore or offshore, support the long CWP, and allow station keeping while withstanding ocean environmental loads. This configuration (refer fig. 1) produces tightly coupled hydrodynamics: wave-structure interaction of the hull, flexible-body dynamics of the CWP, internal flow-induced forces from the OTEC plant, and line dynamics in the mooring system.



The study reviews spar, semi-submersible, and moored ship-based OTEC concepts, outlining their hydrodynamic advantages and critical knowledge gaps. It emphasizes the need for coupled numerical modelling to capture platform motions with CWP dynamics, given past CWP failures under extreme events. Key conclusions are that the CWP can introduce Additional coupled natural periods in the heave-pitch range, alter damping characteristics, and act as both a load generator and a motion control element depending on geometry and stiffness. Accurate prediction of these effects requires fully coupled time-domain simulations incorporating wave/current loads, mooring dynamics, and CWP hydrodynamics, supported by targeted experimental validation for extreme and operating sea states. Laboratory testing remains challenging due to deep-water similitude requirements, yet essential for accurate RAO prediction under varying wave conditions. CWP size, type, and boundary conditions influence surge, heave, and pitch, with evidence of heave damping but minimal impact from internal flow. Literature on spar and semi-submersible OTEC hydrodynamics is limited, warranting further research driven by deep-water energy exploitation needs.

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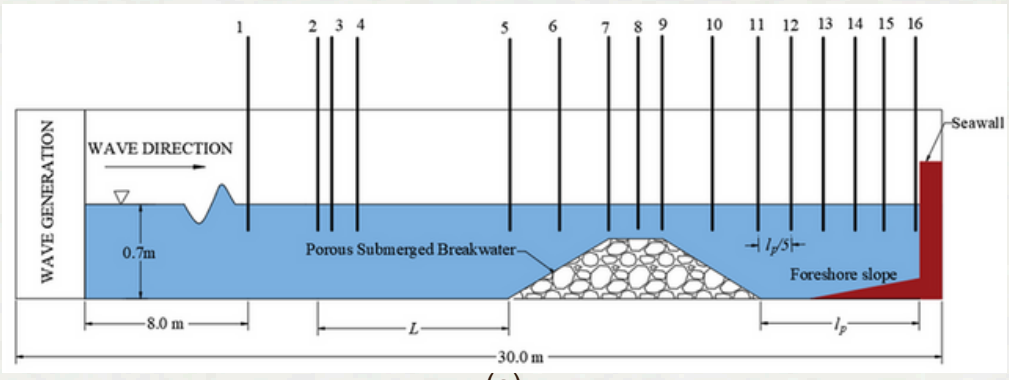
N. V. Nasma Noor, V. K. Srineash & Manasa Ranjan Behera (11 Sep 2024): Hydrodynamics of floating offshore OTEC platforms – a review, Ships and Offshore Structures, DOI: 10.1080/17445302.2024.2398131

Research Article

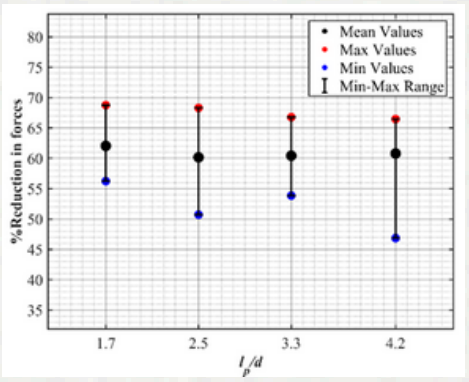
Random Wave Interaction with Vertical Seawalls Defended by Porous Submerged Breakwaters

Rambabu Nimma and Srineash V K

Seawalls are the hard coastal protection measures constructed to protect low-lying coastal areas from coastal flooding. However, the rise in sea levels, wave-induced loads, and increased wave overtopping rates resulting from climate impacts may cause damage to existing seawalls and makes less functional. Hence, the existing seawalls may not be resilient enough to withstand increased wave action. Therefore, developing methods to upgrade and reinforce these structures is crucial for enhancing climate resilience. Submerged breakwaters are emerging as a viable solution to mitigate the adverse effects of increased wave action on seawalls. This research examines the hydrodynamic performance of porous submerged breakwaters placed seaward of vertical seawalls, focuses on identifying the optimal pool length for minimizing wave force and overtopping. An open-source CFD model, REEF3D, is employed to simulate wave interactions with a seawall protected by porous reef breakwaters. This model utilizes the high-order spatial and temporal discretization schemes, which ensure numerical stability and accuracy and level set method to effectively capture fluid interfaces. The porous media is modelled using the VRANS approach and resistance coefficients are calibrated based on the experimental measurements. Figure1(a) shows the typical numerical setup of seawall with porous submerged breakwater. The study finds that both force and overtopping reduction varies non-monotonically with changes in pool length. The results in Figure 1(b) and 1(c) demonstrate that pool length has a minimal impact on the hydrodynamic performance of the reef breakwater as the average reduction in forces and overtopping remains consistent under the given conditions across all pool lengths. However, further investigation is required across a wider range of pool lengths to substantiate this. This study provided empirical formulations for predicting wave forces and overtopping rates on vertical seawalls with and without submerged breakwaters, demonstrating strong statistical validation and practical applicability in coastal engineering design.



(a)



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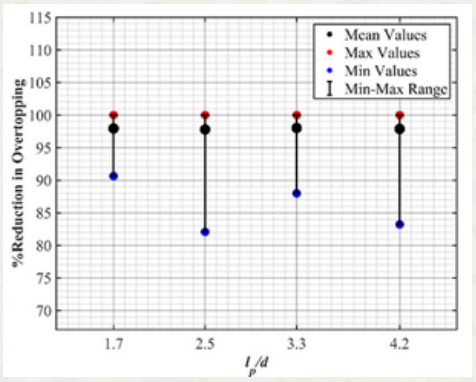

(c)

Figure 1. (a) Numerical model setup of Seawall with Porous Submerged Breakwater, Percentage reductions in (b) Significant wave forces (c) Overtopping for different lp/d ratios

Research Article

MARINE DREDGED SEDIMENTS AS A SUPPLEMENTARY CEMENTITIOUS MATERIAL

Prashant Devda and Salman Muhammad

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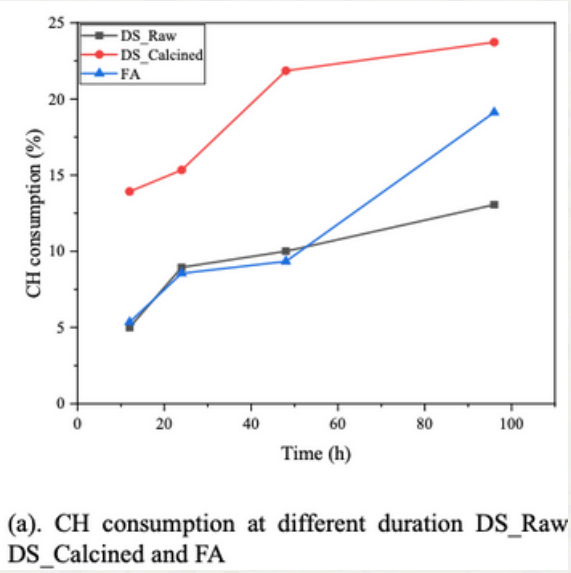
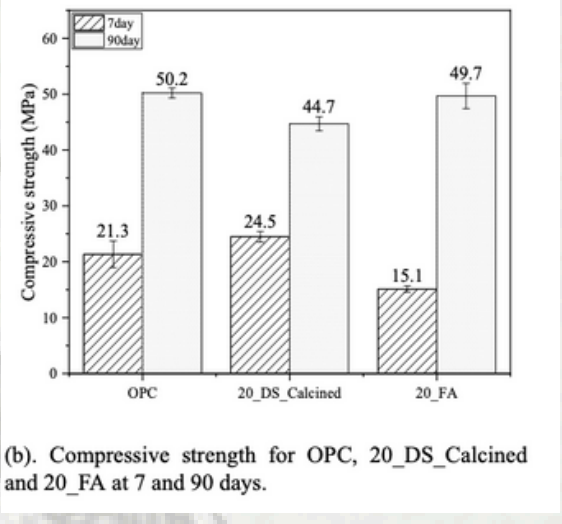
2 Prof. Muhammad Salman, Department of Civil Engineering, Indian Institute of Technology Bombay, Mumbai, India. msalman@iitb.ac.in.

Abstract:
Global cement production, at around 4 billion metric tons annually, accounts for roughly 5% of global CO2 emissions, with ordinary Portland cement (OPC) producing about 842 kg CO2per ton of clinker. The use of alternative cementitious materials, such as fly ash, slag, and silica fume can significantly reduce CO2 emissions, their limited long-term availability in meeting the global demand underscores the need for alternative sources. Marine Dredged sediments (DS) are generated in large quantities during routine maintenance dredging of seaports to maintain navigational depth for ships. DS pose environmental challenges if improperly disposed—disturbing marine ecosystems through turbidity and contaminant release, or degrading terrestrial environments via soil chemistry changes, dust, and leachates. Their transformation into SCMs offers both environmental and material-efficiency benefits.This study examines the pozzolanic activation of DS through controlled calcination. Physical, chemical, and mineralogical properties of raw and calcined DS were characterized, and pozzolanic activity was assessed via suspension and paste studies. Comparative analysis with Class F fly ash (FA) provided performance benchmarks.
Figure (a) shows that the CH consumed by DS_Calcined was higher compared to FA. This result indicates that DS_Calcined was more reactive compared to FA. This outcome underscores the pozzolanic potential of DS, indicating their capacity to interact with CH, thus generating hydration products. Figure (b) shows mortars with 20% OPC replacement by DS_Calcined achieved higher 7-day strength than FA mixes, while at 90 days, OPC-DS_Calcined reached 44.7 MPa (90% of control strength) compared to FA's parity with the control (˜50 MPa). Findings reveal that the material calcined to specific temperatures possesses pozzolanic potential comparable to that of fly ash. These results underscore the viability of calcined DS as an effective cement substitute in construction applications, offering both sustainable and performance benefits.



(a). CH consumption at different duration DS_Raw DS_Calcined and FA



(b). Compressive strength for OPC, 20_DS_Calcined and 20_FA at 7 and 90 days.

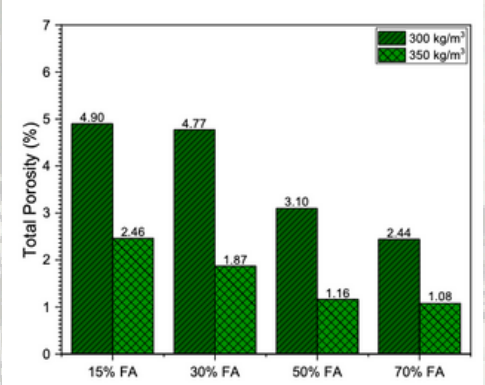
Research Article

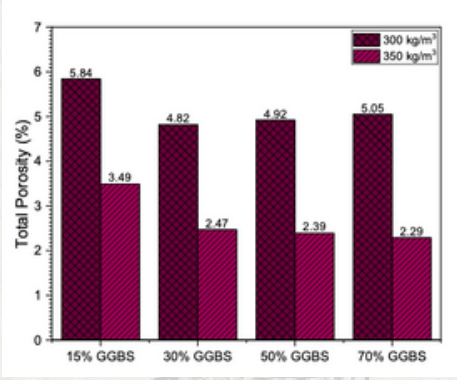
MARINE Impact of High SCM Replacement Levels on Macroporosity: Insights from Micro-CT Imaging

Vivek V S and Muhammad Salman

This research investigates the use of X-ray micro-CT for measuring the macro-porosity in cementitious systems that incorpor ate Fly ash (FA) and Ground Granulated Blast Furnace Slag (GGBFS) at various replacement levels, emphasizing that three-dimensional imaging can uncover alterations in pore volume, equivalent spherical diameter, and sphericitythat are not detectable through conventional experimental methods. Macro-pores significantly influence the long-term durability and transport properties of concrete. The way these pores are connected and distributed has a direct impact on permeability, resistance to harmful agents, and mechanical strength.

Fly ash particles are fine and spherical, which reduces the water demand and promotes a denser, more uniform pore structure as the pozzolanic reaction progresses. Whereas, GGBFS particles are more angular thus it requires additional water to maintain the workability with increase in GGBFS content. This extra water results in larger, more uneven pores, particularly when replacement levels exceed 50%. With higher replacements of FA, the Equivalent Spherical Diameter (ESD) reduces and an inverse relationship is seen with replacement of GGBFS which shows that size of pores increases which higher replacement levels. Sphericity is a measure of how much a particle's shape deviates from being spherical, higher replacements of FA increases the sphericity and it decreases with replacement of GGBFS which shows that non spherical pores are formed with higher replacement levels.





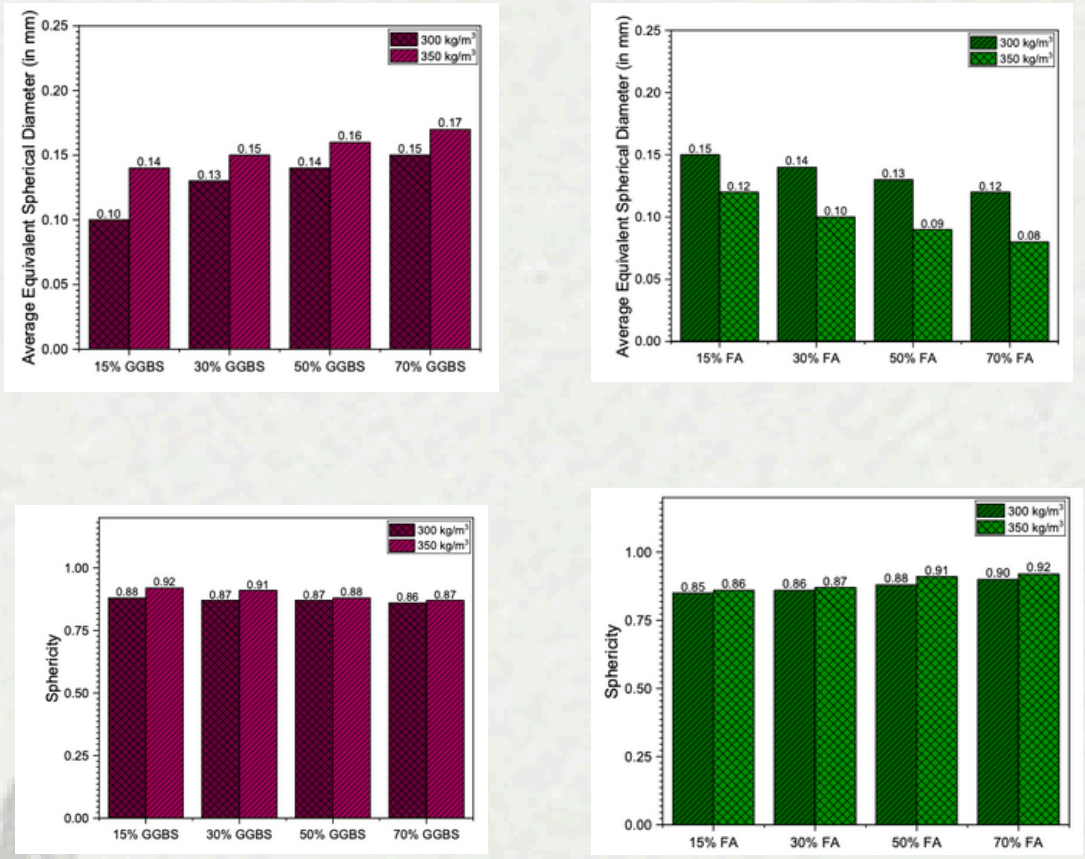


Fig. 1: Effect of Fly Ash and GGBFS Replacement Levels: a) Total Macro-porosity b)Equivalent spherical diameter c) Sphericity

Research Article

Valorization of coal bottom ash as a sustainable supplementary cementitious material

Gayathri K S and Muhammad Salman

Coal-based thermal power plants are an integral part of India's energy generation due to rapidurbanization and rising energy demands. However, these are highly accountable for generating coal combustion residues, composed of 75-80 % fly ash (light-weight ash particles), and the remaining 15-20% of bottom ash (coarser residue obtained from the furnace bottom). While fly ash has been extensively studied due to its availability and promising properties compatible with concrete application, coal bottom ash remains underutilized and limitedly explored as a supplementary cementitious material (SCM) due to its inherently porous and slow-reactive nature. Inefficient ash handling can result in substantial landfill costs and environmental pollution.

This study focuses on the beneficiation of raw coal bottom ash through milling to use it as SCM. A detailed evaluation of physicochemical properties, hydration kinetics, and strength and open porosity was performed. Based on the pozzolanic activity of ground coal bottom ash (GCBA), its reactivity potential of GCBA was observed to be equivalent to that of FA, achieving similar strength and hydration kinetics at later ages (beyond 56 days) and reducing open porosity. The findings highlight the potential of GCBA as a sustainable alternative SCM, offering a viable pathway for enabling clinker reduction and providing a cost-effective solution for greener construction materials.

Research Article

Residual Service Life Prediction of Reinforced Concrete in Marine Environments

Harshit Agrawal and Salman Muhammad

The durability of reinforced concrete (RC) has become a major concern for modern infrastructure, especially in aggressive environments like coastal regions. Chloride ions from seawater penetrate through the concrete cover and trigger corrosion of the embedded steel, leading to premature deterioration, higher repair costs, and reduced service life of structures. Traditionally, the rate of chloride ingress is studied using Fick's second law of diffusion, where the chloride diffusion coefficient (Dcl) plays a critical role in predicting service life. However, conventional methods for determining Dcl, such as ASTM C1556, are destructive, labour-intensive, and time-consuming. Other rapid laboratory tests, while faster, often fail to fully capture long-term diffusion mechanisms and field realities.

In recent years, electrical resistivity of concrete has emerged as a promising parameter linked to ion transport properties. Since resistivity is governed by pore structure and moisture content, it provides an indirect yet rapid measure of ion ingress. However, a major limitation lies in neglecting chloride binding, where chlorides chemically or physically attach to cement hydration products, especially in mixtures with supplementary cementitious materials (SCMs). Binding significantly alters diffusion behavior and must be considered for realistic service life prediction.

This research addresses this gap by proposing a time-dependent model that integrates resistivity with chloride binding. The model was validated on SCM-based concrete exposed to simulated seawater for up to one year, and further benchmarked against ASTM C1556 tests (as shown in Fig. 1.a). Its field applicability was demonstrated on a marine-exposed RC structure in Mumbai (location showed in Fig. 1.b), showing promise as a reliable and practical tool for predicting service life of RC structures.

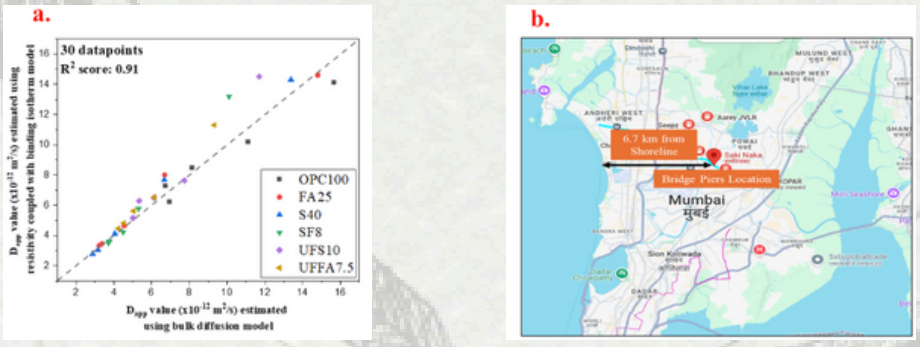


Fig.1.a. Correlation between chloride diffusion coefficients obtained from the proposed resistivity–chloride binding model and conventional ASTM C1556 method for different concrete mixes and b. Field validation site showing the location of RC bridge piers exposed to marine environment in Mumbai, India (6.7 km from shoreline).

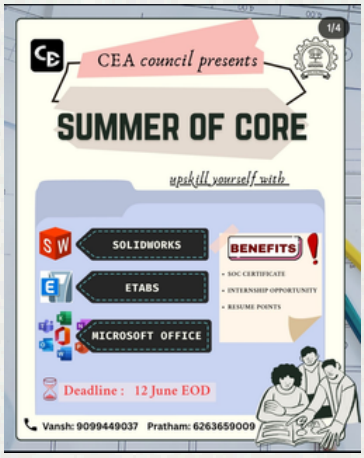

Cea
EVENTS

CEA EVENTS

The Civil Engineering Association (CEA) was created to share knowledge and tackle key challenges in the civil engineering field. It's a hub where students, professors, and industry professionals come together, bridging the gap between academia and real-world practice. CEA organizes events to keep its members updated on the latest trends and innovations in the industry. Understanding the importance of practical experience, it also hosts site visits, allowing students to learn directly from industry experts. Beyond academics, CEA values overall development and regularly holds social events for students to unwind and connect. By fostering collaboration and offering hands-on opportunities, CEA shapes the next generation of civil engineering leaders.

SUMMER OF CORE

The Summer of Core is an immersive program designed for students eager to sharpen their skills in essential software like ETAB, AutoCAD, and Excel. This program offers a hands-on experience, focusing on real-world projects and process optimization to build both technical and problem-solving expertise. Guided by expert mentors, students not only learn but also apply their knowledge to practical scenarios, making the experience both enriching and relevant. At the end of the program, participants receive a certificate acknowledging their accomplishments. Additionally, Summer of Core provides internship opportunities, giving students valuable exposure to industry practices and helping them kickstart their professional journey. It's the perfect opportunity to enhance core engineering skills and prepare for the challenges of the real world.



CEA EVENTS

Esports Week

Esports Week was an exciting, week-long event that brought together students from different departments to bond over gaming. The event featured a variety of popular games like Call of Duty (COD), Valorant, Chess, BGMI, and Clash Royale. It wasn't just about competition but also about fun and teamwork. Students showcased their gaming skills, and the winners were rewarded with prizes for their outstanding performance in each game. Esports Week truly highlighted the spirit of camaraderie among students while giving them a chance to unwind and enjoy.

Convocation Ceremony

The 62nd Convocation Ceremony was a proud moment celebrating the achievements of the graduating class of 2024. The event was graced by distinguished guests, including Chief Guest Mr Vinayak Pai, MD & CEO, Tata Project Ltd, a renowned civil engineering scholar, and the Guest of Honour Dr Vinaykumar Dadhwal, a leading scientist. Their speeches inspired the graduates to aim for excellence and make meaningful contributions to society. The ceremony ended on a high note with degrees and medals awarded to the graduates, marking the beginning of a new chapter in their lives.

CEA EVENTS

UNDERGRADUATE ORIENTATION

The Civil Engineering Department extended a warm welcome to the incoming batch of 2025 through an engaging Undergraduate Orientation. The formal session featured an address by the Head of Department, highlighting the values of academic growth and community spirit, followed by faculty members familiarizing students with the curriculum, research opportunities, and extracurricular avenues. Faculty advisors were also introduced, marking the beginning of their mentorship journey with the students.

The mood turned lively during the informal session, where ice-breaker games sparked interaction and camaraderie. The day concluded with the Batch of 2029 showcasing their varied talents, adding a vibrant and personal touch to their first departmental event.

POSTGRADUATE ORIENTATION

The Postgraduate Orientation marked the beginning of an exciting academic journey for the new PG entrants, offering them a platform to connect with fellow scholars, faculty members, and the department. Professors representing various specialisations within Civil Engineering shared insights into their respective fields, giving students a broader perspective of the department's diverse expertise and opportunities.

CEA EVENTS

TRADITIONAL DAY

Traditional Day was a dazzling celebration of culture and rhythm. Students dressed in vibrant traditional attire gathered at the Open-Air Theatre, filling it with colours and traditions from all over India.The evening unfolded with a series of the energetic and graceful dance performances. Each performance lit up the stage with enthusiasm and cultural pride, leaving the audience cheering and applauding. As the formal events came to an end, the excitement soared with a lively DJ session. Students from all backgrounds came together on the dance floor, celebrating unity through music and movement. It was a night filled with joy, tradition, and unforgettable energy - truly capturing the spirit of campus life

CIVIESTA (enthuCEASM)

Civiesta, the much-awaited Civil Engineering Sports Week, kicked off on January 31, bringing a burst of energy and enthusiasm to campus life. More than just a series of matches, the event turned the department into a vibrant arena of cheers, teamwork, and unforgettable moments. Students competed passionately in a wide range of sports including football, cricket, badminton, volleyball, and table tennis. From last-minute goals to thrilling rallies, every game had the crowd on the edge of their seats.

The atmosphere was electric, with classmates turning into cheer squads. Winners and runners-up were honoured with trophies and applause, but the true highlight of Civiesta was the spirit of unity it fostered. The event gave students a break from academics, helped them build lasting friendships, and reminded everyone of the power of teamwork and sports in shaping a strong, supportive community.

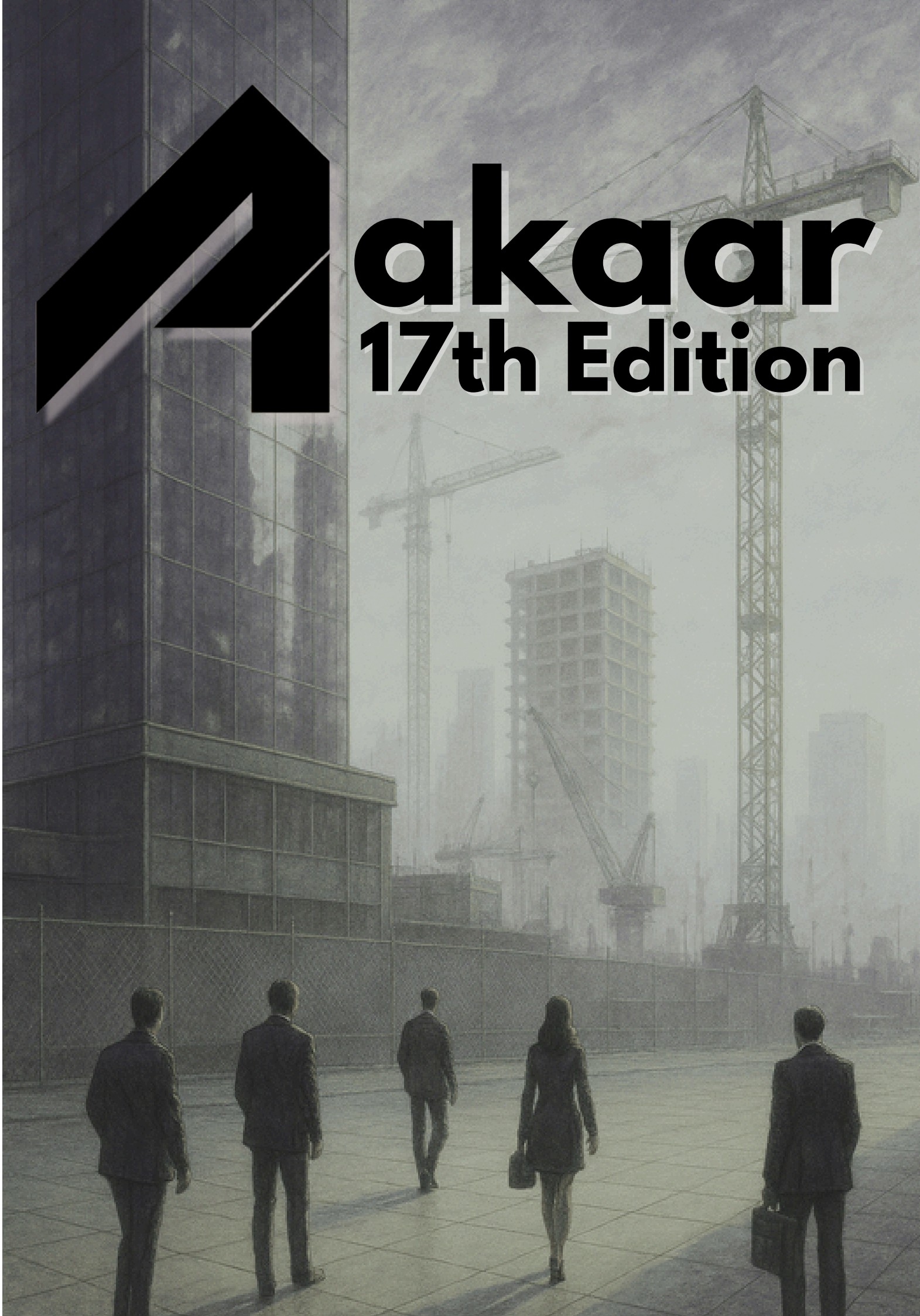
CEA EVENTS

TEACHERS DAY

The Teachers' Day celebration was a heartfelt event filled with gratitude. Teachers received personalized cup and diary as tokens of respect, and students expressed heir appreciation through personal notes, deeply touching the professors.
Awards were given to faculty members for their exceptional contributions. The evening featured informal interactions, a cake-cutting ceremony, and snacks, making the celebration memorable and warm.

VALEDICTORY FUNCTION

The Valedictory Function (VALFI) marked the end of the college journey with a graduation ceremony. It began at Jalvihar with final year students in formal attire and a photoshoot. The event continued at FC Kohli Auditorium with speeches from the HOD and Professor Swathy Manohar, along with presentations on the students' achievements. Awards were given to the graduating batch to honor their college experiences, and the event concluded with a dinner at Civil Cafe.


akaar
17th Edition

AAKAAR

Emerging from its inception as Asia's premier departmental college festival, Aakaar at IIT Bombay has blossomed into an extraordinary platform, beckoning aspiring civil engineers to delve into the vast expanse of their field. Within its embrace, students not only demonstrate their innovative ideas and engineering skills but also gain valuable insights from experienced professionals. This grand event acts as a catalyst for nurturing inventiveness, promoting entrepreneurship, and sparking creativity among students. With anticipation and excitement, we look forward to the opportunity to connect and embark on this exhilarating journey with all of you.Spanning two captivating days in the heart of March, Aakaar stands as the pinnacle of technical festivals, hosting a variety of competitions that resonate throughout the nation yearround. The horizon beckons, and we are always eager to unite and embark on this remarkable odyssey together.

Inauguration

Aakaar 2024 featured Shri Akhilesh Srivastava, ex-CGM, National highway authority of India and Road safety ambassador - IRF as the chief guest.

CEO Power Hour

The "CEO Power Hour" lecture series made a remarkable debut as a new addition to the 16th edition of Aakaar, Asia's largest Civil Engineering Festival, hosted by IIT Bombay on March 16, 2024. This series brought together industry leaders to share their expertise and insights on pivotal topics in engineering and infrastructure.

CENEx (Civil Engineering National Exhibition)

Provides a once-in-a-lifetime opportunity for all Civil engineering students in India to present research projects incorporating new technology through models, prototypes and simulations in front of eminent professors and professionals

AAKAAR

Key note session

The "Keynote Session" made an impactful presence at the 17th edition of Aakaar, Asia's largest Civil Engineering Festival. This engaging session brought together industry leaders to share their expertise and forward-looking perspectives on pivotal topics shaping the future of infrastructure.

The theme for this year's keynote was "Digital Footprint of Modern Infrastructure", focusing on how cutting-edge digital technologies are revolutionizing planning, execution, and maintenance in the civil engineering sector.
The distinguished speakers for the session were:

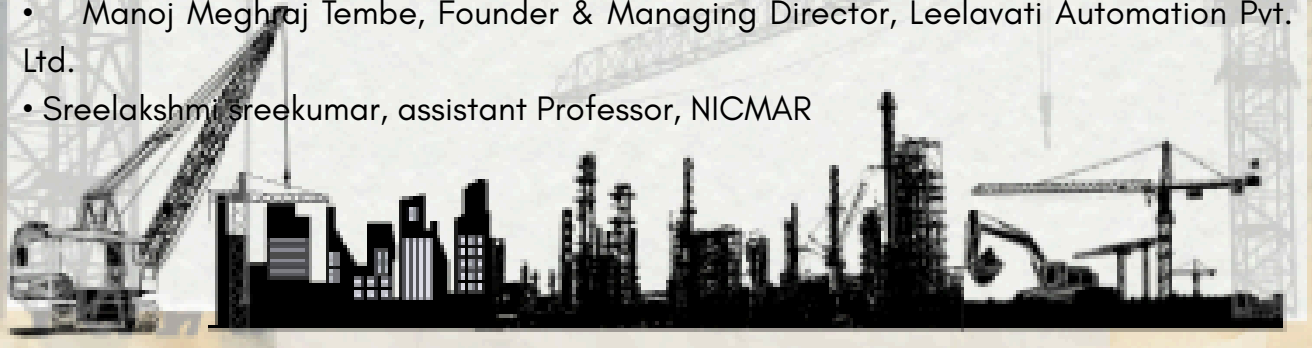
Mr. Rahul Lodha, deputy CEO, lodha group, who shared insights into leveraging digital tools for enhanced efficiency, sustainability, and precision in modern infrastructure projects.

Mr. Nilotpol Kar, Managing director, India Sila India pvt. Limited, who highlighted the role of emerging technologies and data-driven solutions in transforming the lifecycle of infrastructure assets.

Panel discussion

A panel of esteemed dignitaries gathered at Aakaar 2025 to discuss and deliberate on the topic "Digital Footprint of Modern Infrastructure." This thought-provoking session provided the audience with valuable insights into how emerging digital technologies are reshaping the planning, execution, and maintenance of infrastructure projects worldwide.
The distinguished speakers who participated in this year's panel were:

* Prashant Khandelwal, CEO, Agami Realty
* Rahul Sharma, CIO, TATA Projects
* Raghvendra Vokuda Digital Head & Technology Evangelist, JSW Cement Ltd. Projects
* Rajesh Gajjar, MD, GMD Consultants
- Manoj Meghraj Tembe, Founder & Managing Director, Leelavati Automation Pvt. Ltd.
- Sreelakshmi sreekumar, assistant Professor, NICMAR



AAKAAR

The session featured dynamic exchanges of ideas, exploring topics ranging from the integration of Building Information Modeling (BIM) and IoT in infrastructure to sustainable construction enabled by real-time data analytics. Their diverse expertise inspired students and professionals to embrace technology-driven solutions for building a resilient and future-ready infrastructure

AAKAAR

AAKAAR Symposium 2024

Aakaar's Symposium is one of the biggest of its kind in the nation and features different kinds of research presentations from students. It provides a stage where researchers can showcase their work in front of seasoned professors, civil engineering industry experts, and industrialists while competing against the top civil engineering students. The Symposium aims to elevate research and civil engineering to a whole new level.

International Civil Engineering Symposium (ICES)

Since its inception, Aakaar at IIT Bombay has embarked on a grand adventure. Over the past six years, the International Civil Engineering Symposium (ICES) has garnered significant international participation. In its seventh edition, Aakaar once again showcased top research from around the world at ICES. This event provides a platform for aspiring researchers to present their work to the country's most talented professors, esteemed academics, and leading professionals in the field of civil engineering

Paper Presentation

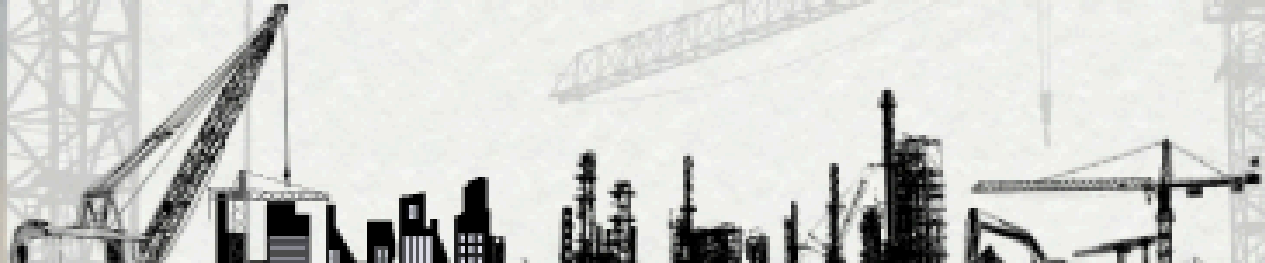
The ICES Paper Presentation offers students interested in research a platform to showcase their work to some of the nation's most accomplished professors, industry leaders, and experts in the field of civil engineering.

Poster Presentation

Aakaar introduced the Poster Presentation as a concise method for showcasing your study and understanding of a subject. This format involves analyzing, evaluating, and synthesizing the concept, as well as creatively presenting your research findings.

Thesis 180

The competition cultivates PhD researchers from different IITs and NITs, who take part in presentation and research communication. It celebrates the exciting research taking place in India. Participants curate their thesis in such a way that they can express it in 3 minutes and deliver it to a jury that doesn't belong to the Civil Engineering specialization. This year marks the second edition of this event, coinciding with Aakaar's 16th edition in 2024.



AAKAAR

COMPETITIONS

BRIDGE-IT

This competition challenges participants to create the most efficient bridge using popsicle sticks, cotton threads, and adhesive while meeting specific criteria

SEISMIC

Participants in SEISMIC must design a sustainable and earthquake-resistant structure using basic popsicle sticks to encourage the study of earthquake engineering among students.

CONQUER-IT

In this competition, participants are tasked with designing and casting high-strength, permeable pervious concrete to meet specified requirements.

LOGiQ

An online quiz series for civil engineering enthusiasts in India, covering basic to advanced concepts across various disciplines. Aakaar hosts LOGIQ in three phases: Phase-I, Phase-II, and Phase-III.

Industrial Design Problem

Showcase your creativity and innovation in the Aakaar Road Design Competition, organized in association with Bentley Education. Using their latest software OpenRoads Designer, participants will design efficient and sustainable road infrastructure, including pavement layers, highway geometry, and even animated simulations. This challenge offers an exciting opportunity to apply advanced digital tools for shaping the future of transportation.

AAKAAR

Workshops: Bridging Theory and Practice

Workshops serve as the perfect platform to connect theoretical knowledge with practical applications. At Aakaar 2024, workshops introduced leading professional software used in the construction field. Learning from top experts, participants gained in-depth knowledge of these tools, which will undoubtedly enhance their understanding of the subject. These sessions also offered opportunities to interact with like-minded individuals and seek clarification from professionals.

Revit Architecture Workshop

An immersive session in collaboration with Autodesk, unlocked the power of Revit Architecture. Participants elevated their design skills with Revit, the cutting-edge architectural design software revolutionizing the industry. This workshop provided hands-on experience and advanced knowledge, helping attendees stay ahead in the field of architectural design.

"open road design" software

Gain hands-on experience in road infrastructure planning with our Workshop on OpenRoads Designer, conducted in association with Bentley Education. Learn to model pavement structures, create precise highway geometry, and develop animated visualizations of your designs using industry-leading software. This workshop is perfect for civil engineering enthusiasts eager to explore modern digital design workflows.


EERI
EERI IIT Bombay Student Chapter

EERI IIT Bombay Student Chapter

MISSIONS AND GOALS

Established in March 2021, the EERI IIT Bombay Student Chapter aims to advance earthquake engineering and related fields through study, practical application, and research. The primary objective is to encourage students to pursue careers in these areas by building relationships with experienced professionals. The chapter has outlined the following goals:

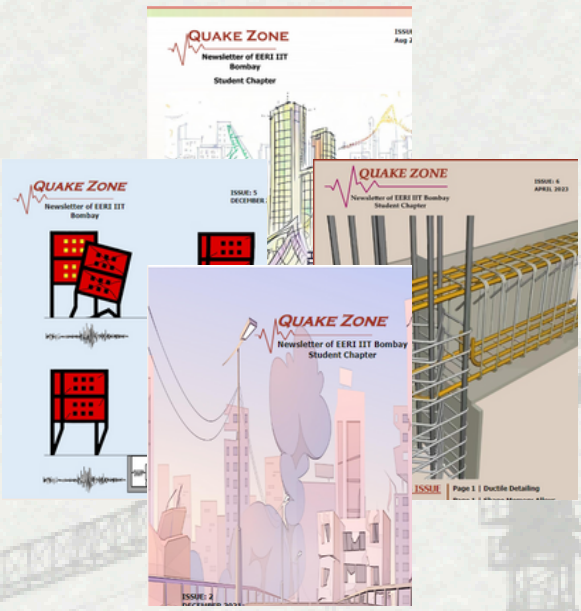
- Organize talks by industry experts and notable researchers in earthquake engineering.
- Conduct workshops tailored to students' interests.
- Create a global platform for students to engage in various EERI competitions and activities.
- Organize outreach programs in local schools and organizations to enhance awareness of earthquake hazards.

CHAPTER ACTIVITIES

Introduction session for new postgraduates and undergraduates in the civil engineering department at EERI. Orientation for the Seismic Design Competition (SDC). Special lecture by Mr. Umesh Rajeshirke, Managing Director of Spectrum Consultants Pvt. Ltd, discussing "Design and Construction of Cable-Stayed and Extradosed Bridges" scheduled for March 2, 2023

QUAKEZONE

"Quakezone" is the official newsletter of the EERI IIT Bombay Student Chapter, released periodically. Issue 5 came out in December 2022, with Issue 6 following in May 2023. This newsletter offers unique perspectives on the newest research, designs, structures, and ideas in earthquake engineering. It also features essential information about upcoming events and conferences. "Quakezone" is distributed to all students, guests, and professors in the Department of Civil Engineering.



EERI IIT Bombay Student Chapter

EARTHQUAKE ENIGMA

The Earthquake Enigma event blends education with fun! In this online competition, students take on the role of "Googlers" and tackle questions and challenges that require them to use Google searches for solutions. These carefully designed questions aim to encourage critical thinking and immerse participants in the field of earthquake engineering. The Earthquake Enigma attracted over 225 participants from 30 colleges.

SEISMIC DESIGN COMPETITION (SDC)

IIT Bombay has proudly represented India at the Earthquake Engineering Research Institute's (EERI) prestigious Seismic Design Competition (SDC) for the past four years. This global event challenges university teams to design and build cost-effective, earthquake-resilient building models, attracting participation from top institutions worldwide.

The journey began in 2021, when IIT Bombay made a remarkable debut as the first Indian team to win an award at SDC — the Charles Richter Award for the Spirit of the Competition during the online edition. In 2022, 21 undergraduate students from the Civil Engineering Department competed in-person at Salt Lake City, Utah. Their model withstood two major seismic tests, earning them 16th place out of 32 teams.

In 2024, the team continued its momentum at the competition in Seattle, Washington. Of the 21 members, six represented the team on-site. Although the model collapsed during the tests, IIT Bombay secured 3rd place among all collapsed structures, demonstrating resilience and steady progress.

In 2025, IIT Bombay made a strong comeback at UC Berkeley, California, securing an impressive 15th place among top global teams. Seven students represented the 38-member IITB Student Chapter at the event, bringing renewed drive for excellence. This year marked a milestone — with one of the most resilient structures ever built by the chapter. Despite undergoing the competition's most rigorous seismic testing, the model emerged completely undamaged. Every aspect of the process saw improvement — from material quality and structural detailing to teamwork, preparation, and the enthusiasm to excel.

It was a defining year for IIT Bombay at SDC, showcasing the team's growth, grit, and increasing global competitiveness.

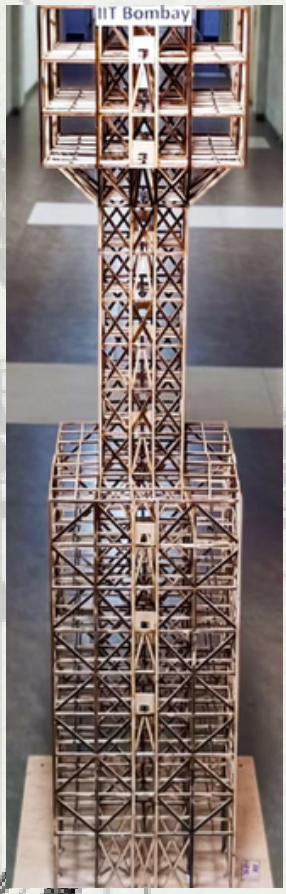
EERI IIT Bombay Student Chapter

MOVING AHEAD

Being a newly established chapter in the institute, we are expanding our range of activities. Our future endeavors are designed to not only benefit the institute's students but also the broader community, focusing on increasing awareness about seismic hazards and their prevention. These plans involve hosting regular lecture series by experts across different domains, providing software training, and conducting outreach programs within the institute and neighboring schools.

EERI IIT BOMBAY WELCOMES ALL

The EERI chapter at IIT Bombay is open to all. Embracing a wide range of disciplines within earthquake engineering, our chapter includes both postgraduate and undergraduate students from our institute. Our diverse community provides a unique opportunity to share knowledge, conduct research and fieldwork, develop managerial skills, and promote teamwork. Join us now and contribute to "Reinforcing Resilience."



TEAM SHUNYA

Building a sustainable future

TEAM SHUNYA

INTRODUCTION

Team Shunya is a group of passionate students from I.I.T. Bombay dedicated to creating sustainable housing through innovative solutions. They're making a global impact with their eco-friendly initiatives. With their Solar Electric Vehicle (SEV) team, they're set to transform the automotive industry using advanced solar technology, championing clean energy in transportation, and inspiring a greener future.

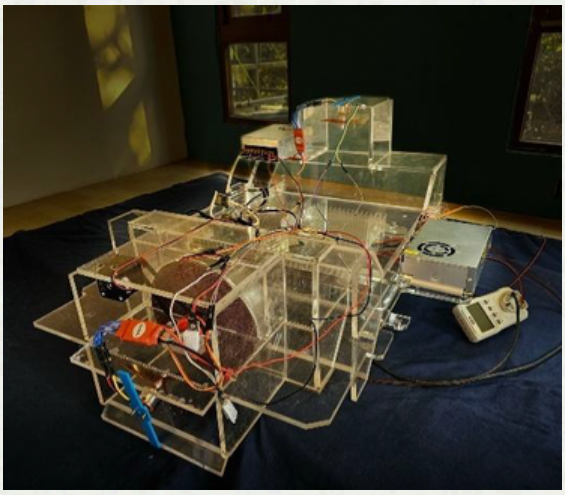
USSD 2024-25

The Net Zero Retrofit of the Community Healthcare Centre in Palghar, India, was undertaken as part of a design competition, aiming to reimagine a poorly performing public health facility built in 1994 and expanded in 2010. Project SEVA focused on achieving energy efficiency and operational carbon neutrality through strategic retrofitting, while also embedding values of inclusivity, accessibility, and community empowerment. By integrating passive design interventions, renewable energy solutions, and user-centric spatial planning, the project sought to demonstrate how existing infrastructure can be revitalized to meet future-ready healthcare standards, particularly in underserved regions like Palghar.

Shortlisted during the semifinals for the finale. Around A month before finals, the US Solar Decathlon 2025 got converted to the BuildingsNEXT Student Design Showcase. We presented virtually on 26 April 2025.

TEAM SHUNYA

SDI 2024-25



Participated in the Product Division of the Solar Decathlon India competition. As part of our design and development process, conducted extensive brainstorming sessions, interviewed industry experts, and carried out comprehensive market surveys and user research. Through these efforts, we identified high humidity levels as a critical issue in coastal cities such as Mumbai and Chennai, which significantly impact indoor comfort and energy efficiency. Based on this insight, we focused on developing a sustainable solution to address the problem. Our team designed and successfully prototyped a CODE- Vayu, a dehumidifier that utilises a solid desiccant-based system—an energy-efficient and environmentally friendly alternative to conventional methods. This innovative approach has the potential to improve indoor air quality and reduce energy consumption in humid climates.

ROOH Challenge

We participated in the prestigious Roof Over Our Heads (ROOH) Challenge, a global competition aimed at designing resilient housing solutions for informal settlements across diverse Indian climate zones. The team contributed innovative retrofit ideas tailored for weather-vulnerable homes using locally sourced materials and sustainable techniques.

EEBA Home Summit Conference

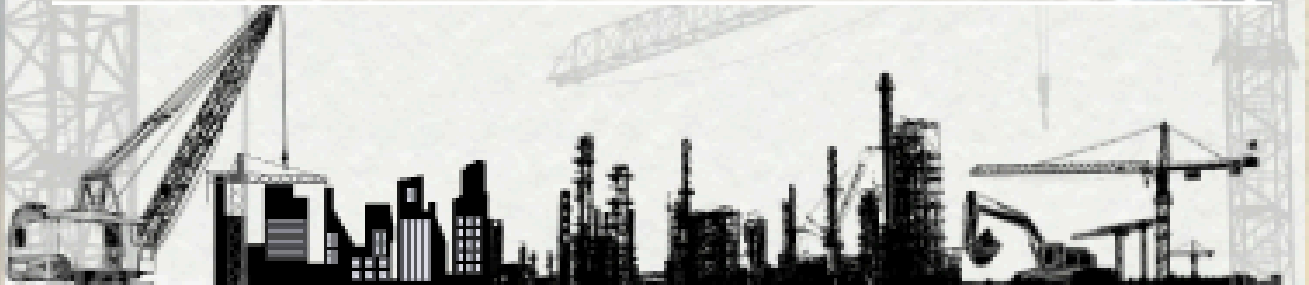
Team SHUNYA was honoured to be invited to the EEBA (Energy and Environmental Building Alliance) Home Summit Conference, a prestigious international event focused on advancing high-performance, sustainable housing.

TEAM SHUNYA

At the conference, the team had the opportunity to showcase the work on energy-efficient and environmentally conscious housing solutions developed at IIT BombayEngaging with global experts, industry leaders, and fellow innovators, Team SHUNYA gained valuable insights into emerging technologies, best practices, and policy trends in sustainable construction.

Sustain 5.0

This year marked the successful fifth edition of the event. We proudly collaborated with prominent organisations such as K.P. Group, Ease my Trip, Tapu, etc. to bring a diverse and impactful lineup of programs focused on sustainability and innovation. Key highlights included the Eco Employment Talk, which featured discussions on green job opportunities and the future of sustainable careers, and the Green Idearium, a competition where student teams (comprising 2 to 4 members) pitched startup ideas centred around sustainability and environmental impact. The event also featured interactive games like “What’s the Future?”, designed to spark creativity and awareness about climate challenges. Additionally, we hosted hands-on workshops on industry-relevant software tools such as Design Builder and One Click LCA, equipping participants with valuable skills for sustainable design and lifecycle assessment.



INTERNSHIP INTERVIEW

SAKSHAM GARG

Hi, I'm Saksham Garg, a fourth-year undergraduate student at IIT Bombay. I recently received a Pre-Placement Offer (PPO) from AXXELA Research & Analytics Private Limited, a proprietary trading firm. The internship and selection process were both unique and intense, offering a deep dive into the fast-paced world of quantitative trading — something I've always been passionate about.

Selection process

The selection process at Axxela is entirely non-resume-based, with no CPI cutoffs or shortlisting. Candidates are assessed through a quantitative aptitude test, a trading simulation game, and a short interview. If you have a genuine interest in financial markets or trading, and some prior experience, your chances of selection are significantly higher.

Prepration

I've always cared deeply about finance and built my profile accordingly, with two prior internships — one in venture capital and another in finance — along with a founder's office role. I also worked on a finance-focused machine learning project, which proved extremely useful, as ML skills are increasingly valuable in trading today. One resource that helped me a lot was QuantMethod.com, which trained my mind for fast mental math and pattern recognition. Since the process wasn't based on traditional metrics, being sharp with quick calculations and logical thinking was essential.

The most important skill I developed was market intuition — knowing how to react to information in real time. I also strengthened my ability to process data under time pressure and make quick risk-reward decisions. The internship gave me valuable insight into how traders build strategies, interpret news, and analyze data across different sectors.

Challenges

The biggest challenge in this path is sustainability. Trading isn't a conventional job — there's no job security, and income is performance-based. While the bonuses and earning potential are massive, so is the uncertainty. You need to love the markets and accept the risks that come with them.

The peer group was one of the most valuable aspects. Everyone was deeply driven, and I learned by observing how others approached market research, news analysis, and strategy building. The openness to share knowledge and critique ideas created a strong learning environment.

Work Culture

The work culture at Axxela was relaxed but focused — no dress code, no rigid hierarchy, and no office politics. What matters is performance. Whether you work 5 hours or 12 hours, the only thing that counts is your ability to generate value.

This is not a conventional path — it can be the best or worst decision depending on your mindset. If you genuinely enjoy trading, love taking calculated risks, and thrive in high-pressure environments, it can be incredibly rewarding. I'm excited to accept the PPO and continue exploring trading professionally.

Advice to juniors

Follow your real interests. Don't chase hype or stipends. If you're into trading or finance, explore internships in those fields early. Be honest with yourself — this field demands passion and resilience. In the end, life is about risk and reward. Believe in yourself and take the leap if it feels right.

INTERNSHIP INTERVIEW

Parul Khicha

Hi, I'm Parul, a third-year undergraduate at IIT Bombay. I interned at McKinsey & Company during the summer of my third year. It was a highly intense and rewarding experience that gave me a solid glimpse into the fast-paced world of management consulting and pushed me well beyond my comfort zone.

Resume

The process began with resume shortlisting, where having a strong academic record , relevant internship experience, and leadership roles really made a difference. I had a clear focus on consulting through my profile – with earlier internships, PORs, and extra initiatives – and that helped me stand out. Once shortlisted, I was assigned a buddy from the firm to help me prepare for interviews. The final Day One selection round included both an HR interview and a case interview.

Prepration

I didn't follow a strict course for preparation but ensured my resume was reviewed by seniors and focused on case-solving practice for interviews. The buddy system was invaluable in understanding how to approach cases, and I also referred to basic consulting frameworks while practicing mock interviews with peers.

Intership

The internship involved daily problem-solving, client interaction, and extensive work on Excel and PowerPoint. I learned to break down complex business problems, structure solutions, and communicate insights clearly, which strengthened my analytical thinking, attention to detail, and sense of ownership.I worked on live projects, helping identify key inefficiencies in one of their processes. My tasks included data analysis, building slides for client presentations, and collaborating with the team to develop actionable insights. Even as an intern, I was entrusted with responsibilities that had direct business impact.

Challenges

The biggest challenge was the workload around 12-14 hours daily and the intensity of the environment. Initially overwhelming, I soon adapted to the pace and learned to stay organized and focused under pressure. Support from peers on the same journey made a big difference.

Despite being a short internship, McKinsey provided exposure to multiple facets of consulting – including client communication, data modeling, and market research. I was encouraged to ask questions, seek feedback, and contribute beyond my assigned work, and this proactive culture made the experience very enriching.

Work Culture

Work Culture McKinsey's flat and collaborative culture meant titles didn't matter and everyone was approachable. Even partners took time to explain concepts and offer feedback. The team valued my inputs and made me feel like an integral part of the project from day one, which greatly enhanced my learning and growth.

Looking back, I am grateful for the exposure and growth the internship offered. It was tough, but incredibly fulfilling.

Advice to juniors:

If you are aiming for consulting, start early – build your resume strategically, seek internships aligned with the field, and reach out to seniors. Most importantly, be clear about your interests. Consulting isn't for everyone, but if you enjoy solving problems and working in fast-paced environments, it can be an amazing opportunity for personal and professional growth.

INTERNSHIP INTERVIEW

ANNU KUMARI

Hi, I'm a 3rd year student in the Civil Engineering department. I interned at Experion Developers Pvt. Ltd. during my third-year summer. The internship was a valuable opportunity to apply core engineering knowledge in a real-world setting

Selection process

The selection process involved a resume shortlisting followed by a single interview. What made my profile stand out was my consistent inclination toward core civil engineering. Prior experiences, such as my second-year internship at L&T and participation in initiatives like EERI and AAKAAR, showcased a clear and sustained interest in the field. My commitment to working in the core sector was evident throughout my resume, which played a significant role in securing the internship.

Resume

I built my resume around core experiences — including projects, prior internships, PORs, and coursework. While I didn't take specific online courses, I made sure to revise key academic material, especially from core subjects. Relying on professors' slides and the guidance of seniors proved more than sufficient for interview preparation.

Internship

During the internship, I gained hands-on exposure to widely used industry tools such as ETABS, AutoCAD, and Microsoft Excel. These were integral to daily tasks and gave me practical skills that went beyond classroom learning. The role allowed me to engage with both the quantitative and managerial aspects of civil engineering, providing a balance between technical detail and project-level decision-making.

My primary responsibility was quantification and optimization of reinforcement for a high-rise building. I also worked on reinforcement design and detailing using ETABS and briefly explored contracts management. This work had direct implications on the project's cost efficiency and material optimization, making it both impactful and rewarding.

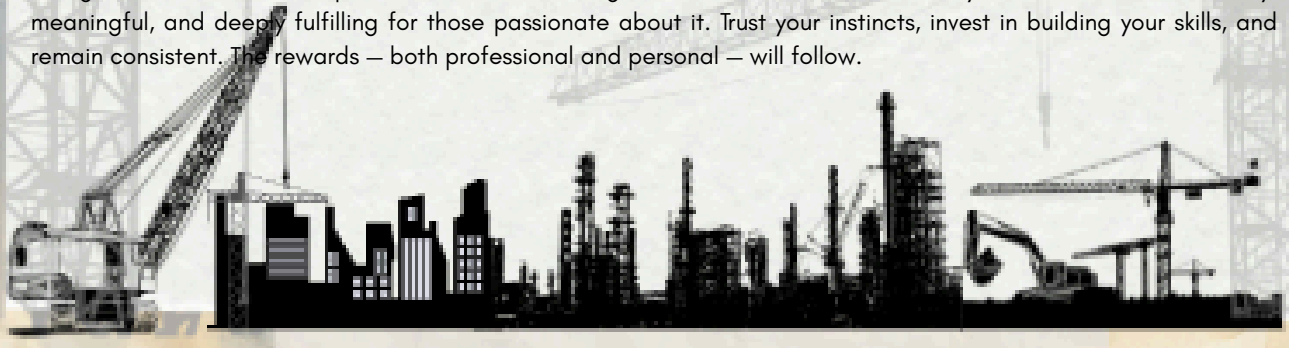
Although I chose the corporate setup, where the gender ratio was relatively balanced, occasional site visits offered a broader perspective on on-ground realities including the noticeable gender imbalance in certain site settings. Time management was another key challenge. The initial weeks involved adjusting to long hours and a demanding commute, compounded by preparation for master's applications. However, I gradually adapted, developing an efficient work rhythm and learning to manage priorities effectively. One of the highlights of the internship was the flexibility to explore multiple departments. Experion encouraged interns to observe and contribute in areas beyond their core responsibilities — including Contracts, Project Management, and Structural Design. This open structure was particularly beneficial for someone like me, who wanted to understand the breadth of the construction industry. For those who are curious and proactive, there is a lot to learn beyond your assigned role.

Work Culture

The work environment stood out for its openness and inclusivity. There was no rigid cabinet hierarchy even senior managers and vice presidents sat in open spaces alongside the rest of the team. This approachability fostered a collaborative culture where asking questions, seeking feedback, and taking initiative felt natural and encouraged.

Advice to juniors

Don't feel pressured to follow popular trends. If you are genuinely interested in core engineering, stay committed to it — regardless of the career paths others are choosing. Growth in the core sector may take time, but it is steady, meaningful, and deeply fulfilling for those passionate about it. Trust your instincts, invest in building your skills, and remain consistent. The rewards — both professional and personal — will follow.



WORDS BY GRADUATING STUDENTS

Piyush Raj

Balancing Academics and Extra-Curriculars at IITB

I think most students at IITB manage academics and extra-curriculars quite well—it's almost part of the culture here. For me, it was all about managing my time wisely and knowing my priorities. Once you figure out what matters most at any given moment, balancing both becomes much easier.

Favorite Courses At IITB :

ME119 (Engineering Graphics & Drawing) for the sake of visualizing in one's head and drawing on paper; Solid Mechanics for its simplicity and exposure to structural engineering; CE232 (Building Materials & Construction) and CE660 (Conservation of Heritage Structures) for field trips, new insights greater than sand-cement-rebars, and Prof. Swathy's fun classes.

Placement Experience :

One of the most unforgettable phases at IITB was placement season. I genuinely miss those days—the constant rush, the confusion about how to prepare, and figuring things out on our own with friends. The thrill of seeing your name on a shortlist was unmatched. At the same time, it was nerve-wracking—everyone was tense, many of us were doubting ourselves, and the pressure felt endless. Looking back, it was both a beautiful and traumatic time. But in the end, it was all worth it, because all my friends landed good placements, and we came out stronger for it.

"Unforgettable, Only at IIT Bombay" Moment

Sitting on the H17 terrace with my friends, talking for hours about everything and nothing, will always be etched in my memory. Planes would glide in every couple of minutes, their lights twinkling in the night sky, while the Powai Lake shimmered quietly below us. Beyond that, the grand towers of Hiranandani stood glowing in the distance. It was one of those moments where time felt slower, the world felt bigger, and life at IITB felt truly magical.

Skills Achieved

Looking back, I'm genuinely happy with everything I experienced and everything my professors offered during my academic journey. One of the most valuable skills I gained at IITB was learning how to balance academics with other aspects of life while still making time to be with friends. Taking up management roles on campus also helped me develop leadership, organization, and people skills, which I believe will stay with me long after IITB.

Make friends some will be amazing, some maybe not so much but they'll be yours. They'll remember you forever, and you'll find yourself missing them long after you've left. It is always the people, not place.

ARTWORKS BY STUDENTS

Samriddhi Mehrotra

Prashansa Priya

Abhishek Sangamkar

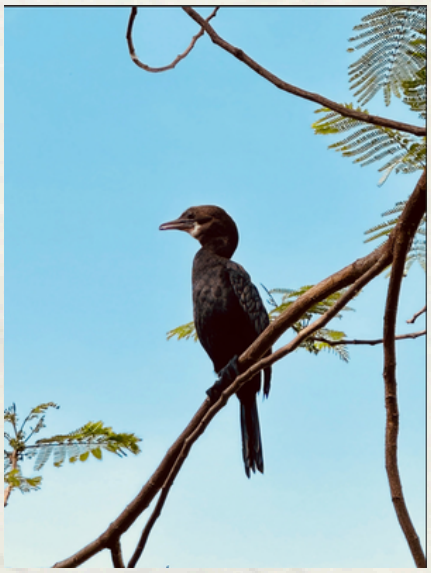
Swayam

Sakshi Harde

Aaqib Gulzar

ARTWORKS BY STUDENTS

Adarsh Pratap Singh



Aum Bhatt

Samriddhi Mehrotra

Sakshi Harde

Ritik Kumar

Prashansa Priya

Graduating students of 2025

DEGREE OF BACHELOR OF TECHNOLOGY

Akshat Sarraf 200040017	Gireesh Kumar 200040056	Govind Kumar 200040058
Shivraj Jarwal 200040136	Uday Sopiya 200040155	Vishal Meghwal 200040165
Vamshika Sutar 210010069	Abhay Vinod Awachar 210040003	Abhishek Kumar 210040004
Abhishek Singh 210040005	Adarsh Raghuwanshi 210040007	Aditya Arora 210040008
Aditya Jangid 210040009	Ajaypal Singh 210040010	Alfia Zareen Khan 210040013
Aman Kushwah 210040014	Ankit Raj 210040016	Anmol Kaloiya 210040017
Anuj Agrawal 210040018	Anukool Vikram 210040019	Anurag Yadav 210040020
Arushi Mastana 210040021	Aryan Patni 210040023	Ashish Kumar Saini 210040025
Ashutosh Bharti 210040026	Aviral Gupta 210040027	Ayush Sahu 210040029
B C Gunawanth Rayalu 210040031	Bhagchandani Dhruv G 210040032	Bhanu Jangid 210040033

Graduating students of 2025

Bibhuti Kumar Mishra 210040035	Boda Kavya 210040036	Bunty 210040037
Chirag Rao 210040040	Daksh Bansal 210040041	Deelip 210040042
Deepika Jandu 210040043	Deep Medatwal 210040044	Deven Ratnaparkhi 210040045
Dev Shiromani 210040046	Dewaansh Vijayvargiya 210040047	Gawade Vaishnavi Sudhi 210040051
Gourish Singhal 210040053	Harish Kumar Meena 210040055	Harshita Giriraj Jaju 210040057
Harshit Yadav 210040058	Harsh Kumar Gupta 210040059	Harsh Vardhan 210040061
Harshvardhan Chouhan 210040062	Harsh Vardhan Mahawar 210040063	Himanshu Dhakad 210040066
Himanshu Nagar 210040067	Himanshu Raj 210040068	Hitarth Nareshkumar Chauhan 210040069
Hulawale Piyush Pandurang 210040070	Jagmeet Singh 210040071	Kartikay Agrawal 210040072
Kartik Khandelwal 210040073	Kaustubh Pandey 210040074	Kaveeshwar Adarsh Raghuramchandra 210040075

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Mahek Maheshwari 210040085	Malay Jani 210040086	Manav Kumar 210040088
Manish Mukesh Bhavsar 210040089	Mariyam Saqib 210040090	Mehul Agrawal 210040091
Mhatre Hrithik Tulshiram 210040092	Mihir Dinesh Sangode 210040093	Mihir Narendra Bors 210040094
Mohak Gupta 210040097	Mohak Vyas 210040098	Mohit Rakh 210040100
Mukesh Kumar 210040101	Nagar Jayant Deepchand 210040102	Naman Jain 210040104
Navyansh Mahla 210040106	Nilay Sandipbhai Parekh 210040107	Nisha Meena 210040108
Nishant 210040109	Nupur Pandey 210040111	Piyush Garg 210040113
Piyush Raj 210040114	Pooja 210040115	Pote Amogha Ketan 210040116
Prashant Ranjan 210040117	Raghvendra Singh 210040119	Rahul Agarwal 210040120

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Rohit Meena 210040127	Rowthu Vivek 210040128	Rushikesh Vijaysing Kachhava 210040129
Ryakam Sai Sri Laxmi 210040130	Sahil Dhanraj Barbade 210040131	Sahil Vijay Bhoge 210040132
Saloni Kajal 210040134	Sandipan Das 210040135	Sangharsh Laxman Morey 210040136
Sanidhya Garg 210040137	Sawan Kumar Meena 210040141	Shashank Chandra 210040145
Shraddha Kamath 210040148	Shringar Bansal 210040149	Shruti Singh 210040150
Shubham Taletiya 210040151	Siddharth Acharya 210040152	Soham Sanjay Gugale 210040154
Srishti Kumari 210040155	Subham Agrawal 210040156	Sumran Meena 210040157
Tanisha Kumari 210040158	Thula Radhasree 210040161	Tirupati Vivek Vardhan Reddy 210040162
Udank Jain 210040163	Umate Aditya Dinesh 210040164	Utsav Paliwal 210040166

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Yadav Samiksha Vijay 210040171	Prince 210040172	Anmol Gayakwad 21D180005
Harshit Porwal 21D180014	Shubhang Shanghvi 21D180039	Adarsh Kumar 210040006

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Achintya Singh 23M0543	Girase Manjitsinh Indrasinh 23M0544	Prasad Kshitiz Vinaykumar 23M0545
Aditya Verma 23M0546	Aman Choudhary 23M0548	Ravi Shankar 23M0549
Meshram Suvijay Jayant 23M0550	Dharme Ketan Mohan 23M0552	Kamidi Nitesh Reddy 23M0555
Chand Manoj Mohan Radha 23M0556	Tripathi Harshit Upendranath Meera 23M0557	Mohammed Arbaz Mohammed Yunus 23M0560
Anustup Biswas 23M0564	Shubhashish Saha 23M0565	Vivek Chandrakant Jadhav 23M0566
Nikita Budholiya 23M0567	Burande Raj Vinod 23M0568	Raghu L 23M0570
Awale Deeptish Vinayak Manisha 23M0571	Bhujbal Rishabh Rajendra 23M0572	Shivam Kartikeyan Atal 23M0573

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Patil Samruddhi Madhukar 23M0576	Patil Abhijeet Shivaji 23M0578	Kaustav Kundan Kalita 23M0579
Pradip Dhaniram Jamaiwar 23M0582	Mohd Abdul Arsalan Uz Zama 23M0583	Ritvik Singh Arya 23M0584
Sonawane Sagar Uttam 23M0586	Hotkar Tejaswini Pramod 23M0588	Odise Yuvaraju 23M0590
Kruthik Prem Gowda H M 23M0591	Mathangi Akhil 23M0592	Kharat Abhinav Arun 23M0593
Jyoti Prakash 23M0595	Rahul Ramchandra Ghindani 23M0596	Somisetty Gowri Sai Eekshitha 23M0597
Rishikesh Kumar 23M0598	Ayushi Sharma 23M0599	Yarlagadda Hemanth 23M0600
Udhaya Kumar G 23M0601	Makwana Meetkumar Rajnikant 23M0602	Arnab Pal 23M0603
Adarsh Pal 23M0604	Abhas Mishra 23M0605	Shubham Agarwal 23M0606
Vaibhav Rediwal 23M0609	Lubhit Mahendra Bisen 23M0610	Teli Omkar Ankush Aarti 23M0612
Siddharth Prakash Singbal 23M0613	Nikhil 23M0615	Rupesh Kumar 23M0616

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Narupa Devi Singh 23M0622	Jessica Rakesh Kumar 23M0624	Radhe Shyam Sah 23M0625
Ajay Kumar Sah 23M0626	Radhe Shyam Sah 23M0625	Ajay Kumar Sah 23M0626
Dhananjay Shah Kanu 23M0627	Mamdouh Abdelalim Hamad Osman 23M0629	Anubhav Ghimire 23M0630
Manish Kumar Jha 23M0631	Bibek Chand 23M0632	Janak Raj Bhatt 23M0633
Rajan Sharma 24M0634	(Ms) Roji Sah 23M0636	Himanshu Gupta 23M0637
Makwana Daksh Prahladbhai 23M0638	Shoray Sharma 23M0639	Rahul Kumar Mishra 23M0640
Anindita Sarker 23M0641	Maneesh Kumar Meena 213040039	Ramesh Kumar 22M0566
Niraj Kumar Mahato 22M0614	Sanket Adhikari 22M0623	

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DEGREE OF BACHELOR OF TECHNOLOGY + DEGREE OF MASTER OF TECHNOLOGY

Dinesh Kumar 200040045	Manasi Bandichode 200040078	Tushar Verma 200040154
Sairaj Rajesh Gaddam 200040128	Shashank Nyol 200040133	Wankhayday Harsshh Promoad 200040167
Thanke Shivam Maruti 200040151	Vinay Kahar 200040162	(Ms) Shinde Vaishnavi Sunil 200040135
Shyam Manchhani 200040139		

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Pushkraj Mangesh Pathak 200040112	Rohit Srivastava 200040124	Apoorv Jayswal 200040026

DOCTOR OF PHILOSOPHY

Ramkumar D 194046003	Ajay Kumar Maurya 194040011	(Ms) Khadke Leena Sanjay 204046001
(Ms) Richa Prajapati 194044002	(Ms) Meera Vasudevan S. 174048003	(Ms) Narayanan Dhanya 184046005
Avinash Kumar 174048008	Aneerudha Paul 204428001	(Ms) Nivedita Dubey 204046002

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(Ms) Pajgade Radhika Prakash 184040006

Patil Vikas Sahebrao 164047006

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Prithvendra Singh 204040001

(Ms) Ruparati Chakraborti 194040005

MASTER OF SCIENCE BY RESEARCH

Dhiroj Kumar Behera 214047007

Sai Krishna C. 22D0314

Goddu Pavan Sai Goud 23D0282

MASTER OF TECHNOLOGY + DOCTOR OF PHILOSOPHY

Mohan Gowda K T 143040016

(Ms) Anantha Krishnan Sri Neela Lakshmi Bragathambal 23M0587

Akash Verma 193040036

Kadu Akshay Pramodrao 183040033

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