Vivekananda Education Society's Polytechnic

Civil Engineering

VIVEKANAND EDUCATION SOCIETY'S POLYTECHNIC

Civil Insights

2024-25
Vol-2

Content

Vivekanand Education Society's Polytechnic, Chembur

Civil Engineering Department

ABOUT DEPARTMENT:

Civil Engineering program established in the year 2018-2019 with the intake of 60 seats and has the distinction of being the one of the core departments in the institute. Civil Engineering is recognized as the mother branch of Engineering and has kept pace with the growing technological world. The department have modern, well equipped and adequate laboratories to fulfill the academic requirements as well as students need beyond the curriculum.

VISION:

Provide sound civil engineering technocrats having sensitivity towards society and environment.

MISSION:

Impart competency and right attitude to work in multidisciplinary environment. Develop cognitive and psychomotor skills and imbibe leadership attitude to be an entrepreneur. Inculcate ethical education fostering societal responsibilities

Program Educational Objectives

PEO 1:
Provide socially responsible, environment friendly solutions to Civil engineering related broad-basedproblems adapting professional ethics.

PEO 2:
Adapt state-of- the- art Civil engineering broad-based technologies to work in multi-disciplinary work environments

PEO 3:
Solve broad-based problems individually and as a team member communicating effectively in the world of work

Program Specific Objectives

PSO 1:

Construction Planning and Designing: Perform optimal civil engineering construction, planning and designing activities of desired quality at optimal cost.

PSO 2:

Construction Execution and Maintenance: Execute civil engineering construction and maintenance using relevant materials and equipment.

"The education that you are getting now has some good points, but it has a tremendous disadvantage which is so great that the good things are all weighed down."

Result Analysis

Analysis for the Academic Year 2024-25

SHRIMUKH VEDANT PEMBARTHI
1st Year
85.11%
Rank 1st

SWARIT SALASKAR
1st Year
75.56%
Rank 2nd

NIKHIL CHAVAN
1st Year
75.00%
Rank 3rd

Result Analysis

Analysis for the Academic Year 2024-25

YADAV KRISHNA

2nd Year

84.44%

Rank 1

RAHATE HARSH

2nd Year

83.78%

Rank 2

PRITEE .G. GITE

2nd Year

83.22%

Rank 3

SUMIT CHAURASIYA

3rd Year

86.63%

Rank 1

BHUMIK MHATRE

3rd Year

85.37%

Rank 2

VIKAS SAWANT

3rd Year

83.16%

Rank 3

Activities | Guest Lectures |Industrial Visit

Sr. No.	Program	Date-Month- Year	Resource Person with Designation	Mode
1	Current Proprietor of Hope lifecare	03/09/2024	Mr. Virendra Dubey Ex. Marketing Head Shilpa Medicare Ltd.,	Expert Lecture
2	ISSE, Failures in Construction	04/09/2024	Er. Madhav B. Chikodi Managing Trustee, ISSE	Expert Lecture

Sr. No.	Program Code	Course Name	Objectives	Industry/ Organization Name	Address	Date
3	CE4K	EES	To create awareness about Environment, Ecosystem at Natuere park.	Maharashtra Nature Park, Sion	Sion bandra link road, PMGP Colony, Dharavi 400017	30/01/2025
4	CE6I	Maintenance & rapairs structures	To help students gain practical knowledge and experience of the real world working environment.	Shubham stone crusher, Pune	Pangari Tarfe Otur, Junnar, Pune	12/03/2025
5	CE6I	Beyond Curricular	To help students gain practical knowledge and experience of the real world working environment.	RMC Plant, Junnar	Shivaji Chouk, Junnar, Pune	12/03/2025
6	CE6I	Solid Waste Management	To help students gain practical knowledge and experience of the real world working environment.	Tikekarwadi Grampanchayat, Junnar	Tikekarwadi, Junnar, Pune	12/03/2025
7	CE4K	Water & waste water Engineering	To understand the process of Sewage Water Treatment	Sewage Treatment Plant, Sanpada	Sanpada, Navi Mumbai	20/03/2025

Students Corner | Achievements

Student Activities for the academic year 2024-2025

1	CE4K	Khushi Ghadigaonkar	State Level Hackathon	VES Technothon	VES Polytechnic, Chembur, Mumbai-400071	01/03/2025 & 02/03/2025	Participation
2	CE4K	Khushi Ghadigaonkar	State Level Hackspark-1.0	Hackspark-1.0	Thakur Shyamnarayan Engineering College	15/03/2025 & 16/03/2025	Participation
3	CE4K	Khushi Ghadigaonkar Satyajeet Nayak	Load- Lock competition	Build Smart	Shri Bhagubhai Mafatlal Polytechnic	22/03/2025	Participation
4	CE6I	Atharv Vishwasrao Vivek Rewale Sumitkumar Chaurasiya Anuj Bhagat Anirudh Kondvilkar	Project Exibition	Vivek Technotronix	VES Polytechnic, Chembur, Mumbai-400071	21/03/2025 & 22/03/2025	First Prize
5	CE6I	Lakshay Jain Atharv Raut Atif Naik Kartik Bansode Ishan Marwa	Project Exibition	Vivek Technotronix	VES Polytechnic, Chembur, Mumbai-400071	21/03/2025 & 22/03/2025	Second Prize
6	CE6I	Mohit Choudhari Aditya Kharat Bhumik Mhatre Vikas Sawant	Project Exibition	Vivek Technotronix	VES Polytechnic, Chembur, Mumbai-400071	21/03/2025 & 22/03/2025	Third Prize

USE OF PRECAST CONCRETE IN MODERN CONSTRUCTION

Precast concrete is transforming the way civil engineering projects are executed by offering faster, safer, and more efficient construction methods. Unlike traditional cast-in-place concrete, which is poured and cured on the construction site, precast concrete components are manufactured in controlled factory environments and then transported to the site for assembly. This process ensures higher quality control, greater dimensional accuracy, and a significant reduction in construction time. Civil engineers and contractors are increasingly turning to precast systems for applications ranging from bridges and tunnels to high-rise buildings and stadiums.

One of the key advantages of using precast concrete is the speed of construction. Since the components can be produced in parallel with site preparation, the overall project timeline is shortened, which also reduces labor costs. Additionally, the controlled manufacturing conditions help produce more durable elements with better resistance to weather, corrosion, and chemical exposure. This makes precast concrete particularly suitable for critical infrastructure projects where long-term performance and low maintenance are priorities. Its modular nature also supports repeatable design and efficient transportation, making it ideal for standardized infrastructure like culverts, sound barriers, and utility vaults.

Another important benefit is improved site safety. Because most of the construction happens off-site, there is less clutter, reduced equipment use, and fewer risks associated with on-site concrete pouring and curing. In urban environments where space is limited and traffic disruptions must be minimized, precast solutions offer logistical advantages. With advancements in engineering and design software, complex precast elements can now be customized to meet architectural and structural requirements without compromising on quality. As sustainability becomes a greater focus in construction, precast concrete also contributes by minimizing waste, reducing energy use during construction, and improving thermal performance when used in building envelopes.

Beyond speed and safety, the use of precast concrete offers significant environmental advantages. The controlled environment of precast plants reduces material wastage, allows for precise batching of concrete mixes, and optimizes the use of resources like water and energy. Moreover, many precast elements are made using recycled materials, and the structures themselves can often be disassembled and reused, aligning with the principles of sustainable construction. This makes precast technology not only a practical choice but also an environmentally responsible one in today’s push for greener infrastructure.

From a design standpoint, precast components can be engineered to suit a variety of architectural styles and structural demands. They allow for smooth finishes, intricate details, and complex forms that are otherwise difficult to achieve with cast-in-place methods.

USE OF PRECAST CONCRETE IN MODERN CONSTRUCTION

Despite its many benefits, the adoption of precast concrete still faces some limitations. Transportation of large or heavy elements can be challenging and costly, especially to remote or difficult-to-access sites. Additionally, on-site connections between precast units require careful detailing to ensure structural integrity and performance. However, ongoing research and innovation in jointing techniques, lightweight materials, and modular assembly methods continue to address these challenges. As urbanization increases and infrastructure needs expand, precast concrete stands out as a key solution in the civil engineer's toolkit for building faster, safer, and more sustainable structures.

Pre-Cast Concrete, JK Cement

-Aryan Sabale

ADVANCES IN THE EARTHQUAKE STRUCTURAL DESIGNS

The increasing frequency and intensity of earthquakes across the globe have highlighted the urgent need for advanced earthquake-resistant structures. Civil engineering has responded to this challenge with innovative design methodologies and materials that aim to minimize structural damage and ensure occupant safety during seismic events. Earthquake-resistant design is no longer limited to high-risk zones; it has become a global priority due to urbanization, population density, and climate-related uncertainties that may increase seismic risks in previously low-risk regions.

In addition to mechanical and structural innovations, the integration of advanced materials has greatly contributed to seismic resilience. High-performance fiber-reinforced concrete (HPFRC), shape memory alloys, and composite materials offer enhanced energy dissipation, crack resistance, and self-centering capabilities. These materials can significantly improve the post-earthquake functionality of critical infrastructure such as hospitals, bridges, and emergency shelters. Engineers are also turning to precast modular construction systems that allow precise quality control and better detailing for seismic resistance while reducing construction time.

Recent earthquakes have provided valuable real-world data that influence design codes and construction practices. For example, the 2011 Tōhoku earthquake in Japan led to revisions in building codes to account for multi-directional seismic loading and tsunami effects. The use of performance-based seismic design (PBSD) is gaining popularity as it allows engineers to design buildings based on the desired level of performance—whether operational, life-safety, or collapse prevention—under specific seismic intensities. This approach considers various parameters such as ground motion records, soil-structure interaction, and the probabilistic nature of earthquakes.

Despite these advances, challenges remain. Retrofitting existing structures is costly and technically complex, especially for aging infrastructure that predates modern seismic codes. Moreover, developing countries often lack the regulatory frameworks and financial resources to implement seismic-resistant construction on a wide scale. Research continues to focus on cost-effective retrofitting techniques, such as externally bonded fiber-reinforced polymers (FRPs) and energy-dissipating dampers, that can be applied without major disruption to building usage.

In conclusion, the development of earthquake-resistant structures is a dynamic and evolving field within civil engineering. It combines material science, structural dynamics, and geotechnical considerations to create safer, more resilient buildings and infrastructure. As technology progresses and more data become available, the focus is shifting toward holistic, performance-based, and economically viable solutions that can protect both lives and investments in the face of future seismic events.

-Aditya Kharat

SUSTAINABLE CONCRETE USING INDUSTRIAL WASTE

The construction industry is one of the largest consumers of natural resources and a major contributor to global carbon emissions. Among the materials used, **concrete**—though indispensable due to its strength and versatility—is also responsible for a substantial environmental footprint, mainly due to cement production. To address these sustainability concerns, civil engineers and material scientists have been actively exploring alternatives that reduce environmental impact without compromising structural integrity. One promising approach is the use of **industrial waste materials** such as fly ash, ground granulated blast furnace slag (GGBS), silica fume, and recycled aggregates in concrete mixtures.

Fly ash, a by-product of coal combustion, and GGBS, obtained from the steel industry, are widely used as **supplementary cementitious materials (SCMs)**. When partially replacing Portland cement, these materials not only reduce CO_2 emissions but also enhance certain properties of concrete, such as long-term strength, durability, and resistance to chemical attack. Silica fume, another by-product from silicon production, contributes to improved density and reduced permeability, making the concrete suitable for aggressive environments. These materials have demonstrated positive performance in both laboratory testing and real-world applications, particularly in large-scale infrastructure projects like bridges, marine structures, and high-rise buildings.

The incorporation of **recycled aggregates**—sourced from construction and demolition waste—is another strategy gaining traction. Though recycled aggregates typically have higher water absorption and lower strength compared to natural aggregates, they can be effectively used in non-structural components or blended in specific proportions for structural applications. This not only reduces the burden on landfills but also conserves natural stone resources. Techniques such as pre-soaking, use of admixtures, and surface treatment of recycled aggregates have shown improvements in their bonding characteristics and mechanical properties.

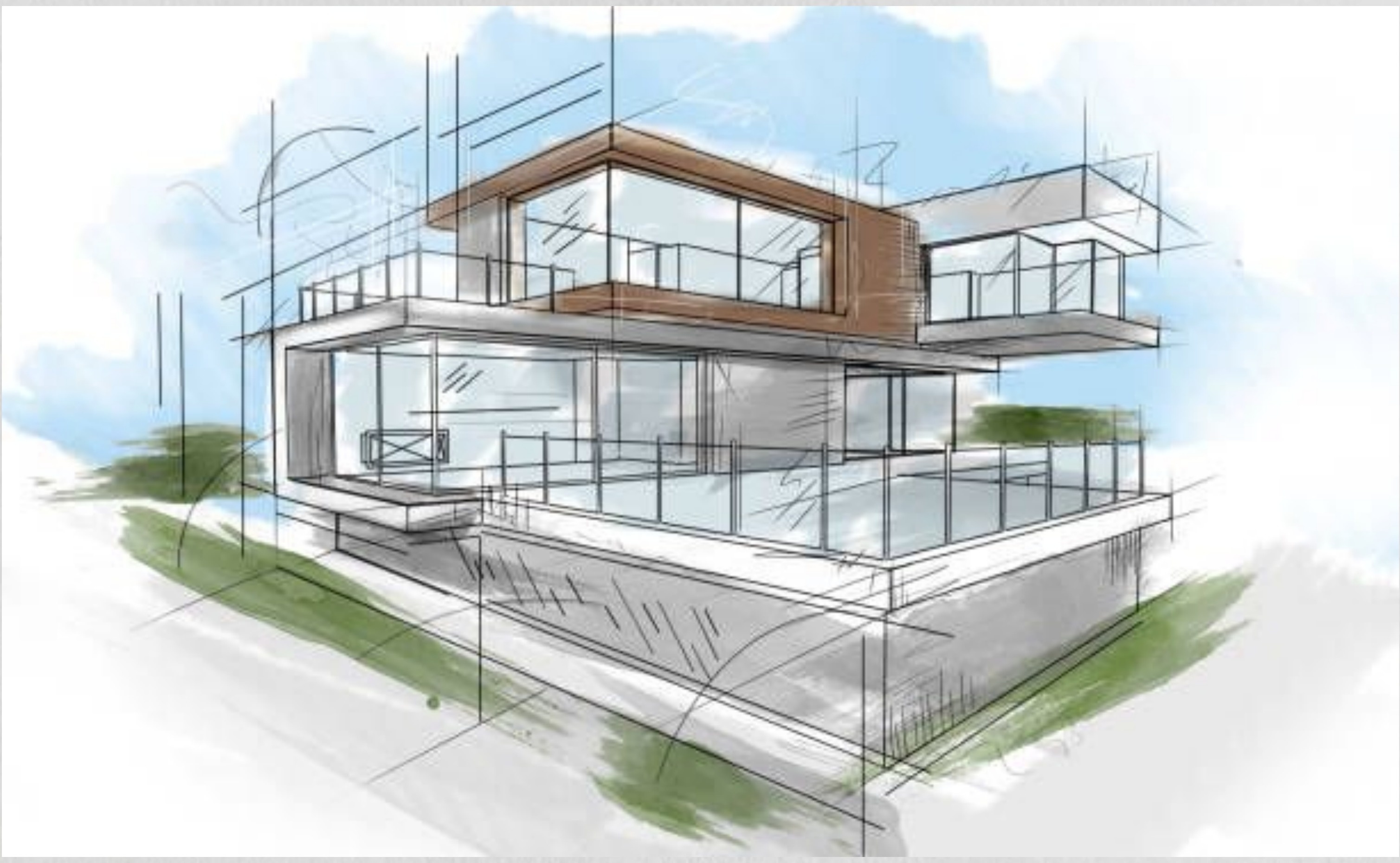
Recent advances in **chemical admixtures** and **nano-materials** are also enhancing the feasibility of sustainable concrete. For example, nano-silica and carbon-based nanomaterials can fill micro-voids and refine the microstructure of cement paste, leading to better strength and durability. Furthermore, the development of **geopolymer concrete**, which uses no Portland cement at all, is being actively researched as a long-term solution. Geopolymers made from fly ash or metakaolin, when cured under specific conditions, have shown comparable or even superior performance in terms of compressive strength and thermal resistance.

In conclusion, utilizing industrial waste materials in concrete presents a viable and environmentally responsible alternative to traditional construction practices.

-Bhumik Mhatre

Students Corner | Sketches

Student Activities for the academic year 2024 - 2025



-Sidharth Patil

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