Vidyavardhini's College of Engineering & Technology
K.T. Marg, Vasai (W).

CIVIL TODAY

VOLUME-I, ISSUE-I DEC 2019

INSIDE THIS ISSUE

ABOUT US:

Vidyavardhini's College of Engineering and Technology, Vasai is located on the sprawling campus of Vidyavardhini, spread over an area of 12.27 acres. It is a short, two minutes walk from Vasai Road (W) Railway Station. The college is also accessible by road from Mumbai. Vidyavardhini Society received approval from AICTE to start the new college of Engineering & Technology with effect from July, 1994. The college is affiliated to the University of Mumbai for the four year degree program leading to the degree of Bachelor of Engineering.

VISSION:

To be a premier institution of technical education, aiming at becoming a valuable resource for industry and society.

MISSION:

- To provide technologically inspiring environment for learning.
- To promote creativity, innovation, and professional activities.
- To inculcate ethical and moral values.
- To cater personal, professional, and societal needs through quality education.

DEPARTMENT VISION:

To transform students into creative and technically proficient Civil Engineers to serve the nation

DEPARTMENT MISSION:

- To adapt to collaborative teaching learning practices for efficient learning.
- To become a centre of excellence for providing knowledge base and consultancy services to the community
- To follow ethical and moral practices and educate students for professionalism and sustainability.

Overview of Precast Concrete Structures in India

Precast concrete is an alternative to *cast-in-situ* concrete. While cast-in-situ concrete is cast in its actual location, precast concrete is cast at another location, either at the building site or in a factory, and is then lifted to its final resting place and fixed securely. This means that unlike cast-in-situ construction, which is monolithic or continuous, precast concrete buildings are made of separate pieces that are bolted or connected together. Here are some key areas where precast concrete has been commonly employed for infrastructure development in India:

- **Bridges and Flyovers:** Precast concrete components, such as beams and segments, are often used in the construction of bridges and flyovers. The ability to manufacture these components off-site allows for faster assembly on-site, reducing overall construction time and minimizing disruptions to traffic.
- **Metro Rail Projects:** Many metro rail projects in India have incorporated precast concrete elements for the construction of stations, platforms, and other structural components. Precasting is especially beneficial in urban environments where minimizing construction time is crucial.
- **Road Infrastructure:** Precast concrete products, including barriers, parapets, and drainage elements, are commonly used in road infrastructure projects. These components are manufactured off-site and transported to the construction site, contributing to quicker project completion.
- **Railway Projects:** In railway infrastructure, precast concrete is used for the construction of platforms, retaining walls, and other structural elements. The off-site fabrication of these components helps in achieving a higher level of precision and quality.
- **Tunnels:** Precast concrete segments are often employed in tunnel construction. These segments, which form the lining of tunnels, are manufactured with precision off-site and then assembled to create the tunnel structure.
- **Dams and Water Projects:** Precast concrete components are used in the construction of dams and other water-related infrastructure. These components may include precast panels, spillway sections, and other specialized elements, contributing to efficient and reliable water management systems.
- **Airport Infrastructure:** Precast concrete is utilized in airport projects for the construction of runways, taxiways, and terminal buildings. The speed of construction and the ability to meet stringent quality standards make precast concrete an attractive choice for airport developments.
- **Smart Cities and Urban Development:** As India continues to focus on developing smart cities and improving urban infrastructure, precast concrete technology is likely to play a significant role. The efficiency and speed of construction make it a suitable choice for projects aimed at enhancing urban living conditions.

-Mr. Jaydeep Chougale
(Asst Prof. Civil Engg Dept.)

INDUSTRIAL TRAINNING & PLACEMENTS

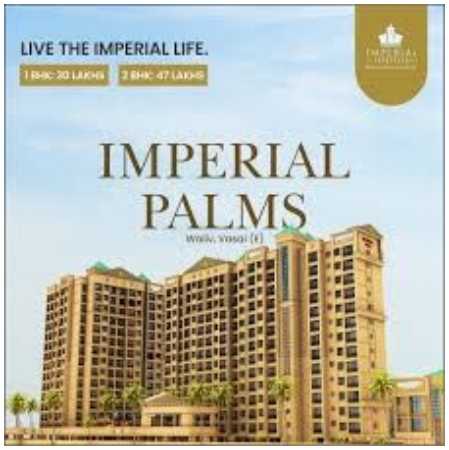
The goal of industrial training is to expose students to actual work in an industrial setting while also allowing them to learn through practical application and job performance. With this viewpoint the department along with placement cell is taking initiative to provide Industrial training to students. The companies that has offered internship & placement to our students in this academic year are:

Infosys®
Navigate your next

BYJU'S
The Learning App

KHODIYAR
GROUP

Walplast©
Foundation Of Trust



SCOPE OF DRONE SURVEYING IN URBAN PLANNING & ENVIRONMENTAL MONITORING

- Urban planning benefits from drone technology through high-resolution aerial imagery and 3D mapping, aiding in infrastructure assessment and disaster risk management. In the mining and quarrying sector, drones provide an efficient means for surveying, monitoring excavation, and creating detailed topographic maps, while also ensuring enhanced safety measures.
- Environmental monitoring and conservation efforts are significantly bolstered by drone applications, ranging from wildlife tracking to pollution control. Drones have proven instrumental in disaster management, offering real-time data for search and rescue operations and damage assessment in affected areas.

-Mr. Vikrant Kothari

(Asst Prof. Civil Engg Dept.)

STUDENTS' ACTIVITY & ACHIEVEMENTS:

- **Leon Gonsalves** successfully completed AIESEC leadership development Experience through a Global Volunteer Opportunity tackling the Sustainable Development Goal Reduced Inequalities at Kyiv, Ukraine.
- **Pranay Jadhav, Sarthak Yadav, Kushagra Goel, Abhishek Vishwakarma secured 1st** Prize in "Brain Teaser" Competition organized by Civil Engineering students Association (CESA) of our college.
- **Yogita Alave, Sanika Mahimkar and Hansashree Pawar** secured Runner Up position in "Brain Teaser" Competition organized by Civil Engineering students Association (CESA) of our college.
- **Darshan Mehata, Safiuddin Halim , Gurpreet Marwaha** secured 1st Prize in Quiz (Civil War) held at St. John College of Engineering and Management, Palghar
- **Darshan Marwaha, Safiuddin Halim , Gurpreet Marwaha** participated in " Bridge making competition" held at St. John College of Engineering and Management, Palghar.
- **Omkar Bhoir, Jidnyesh Mhatre, Harshal Chavan and Yogesh** Pawar secured 1st Prize " Building Planner" Competition organized by Civil Engineering students Association (CESA) of our college.
- **Shashank Shetye, Paras Vairagade, Pakshal Shah and Lovelesh Khatarkar** secured Runner Up position in "Building Planner" Competition organized by Civil Engineering Students Association (CESA) of our college.

FACULTY ACTIVITY & ACHIEVEMENTS

- **Mrs. Puja Kadam** published paper "Treatment of Leachate using Hybrid Constructed Wetlands- A Review Paper" in International Journal of Emerging Technologies and Innovative ResearchVol-7, Issue 4, ISSN: 2349-5162
- **Mrs. Puja Kadam** published paper "Comparative Analysis of Microbial Fuel Cell Performance fed by Different Wastewaters- A Review" inInternational Research Journal of Engineering and Technology (IRJET) Vol-7, Issue-4, p-ISSN: 2395-0072, e-ISSN: 2395-0056
- **Mr. Viren Chandanshive** has participated and presented a paper entitled, "Application of Artificial Neural Network in Environmental Engineering", in Vidyavardhini's National Conference on Technical Advancements for Social Upliftment held in our college
- **Mr. Viren Chandanshive** published paper "Estimation of Building Construction Cost Using Artificial Neural Network" in Journal of Soft Computing in Civil Engineering Volume 3, Issue 1, Winter 2019, Pages 91-107
- **Mr. Jaydeep Chougale** has participated and presented a paper entitled, "Study on Seismic Vulnerability Index Methods for Reinforced Structures" in International Conference on Emerging Trends in Engineering & Science (ICETES) JCON.

TRADITIONAL EARTHQUAKE-RESISTANT BUILDING TECHNIQUES IN INDIA

India, a seismically active region, has a long history of traditional earthquake-resistant building techniques that evolved over centuries. These techniques were developed based on the experiences of communities living in earthquake-prone areas. Some of the traditional earthquake-resistant building techniques in India include:

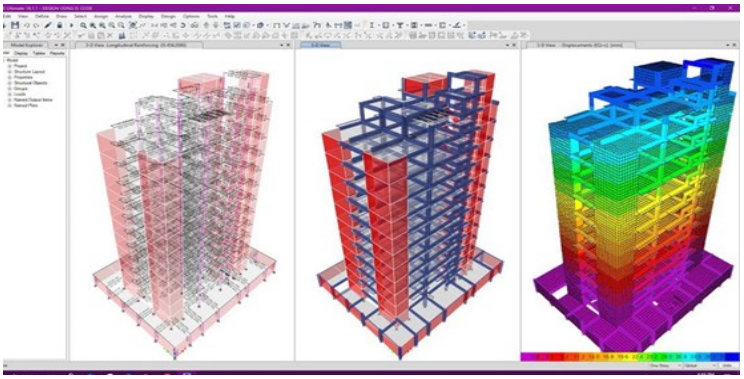
Stone Masonry with Timber Frames: In regions with abundant stone resources, buildings were constructed using stone masonry with wooden frames. Timber frames allowed flexibility, absorbing and dissipating seismic energy during an earthquake.
Bamboo Construction: Bamboo has been a popular building material in earthquake-prone regions due to its lightweight and flexible nature. Bamboo structures can sway during an earthquake, minimizing damage.
Mud and Adobe Construction: Mud and adobe construction involves using locally available materials, like mud, straw, and sometimes a wooden framework. These structures can absorb seismic energy and resist shaking due to their flexibility.
Tie Beams and Bond Beams: Horizontal tie beams and bond beams were often incorporated into traditional buildings to tie walls together and enhance structural stability. These elements help distribute seismic forces throughout the structure.
Vaulted and Domed Structures: Some traditional buildings in earthquake-prone regions featured vaulted or domed roofs. These shapes distribute seismic forces more evenly, reducing the risk of collapse.
Staggered Building Layouts: Communities often built houses in a staggered or zigzag pattern to prevent a domino effect during an earthquake. This arrangement reduces the risk of entire rows of buildings collapsing.
Flexible Foundations: Foundations were designed to be flexible, allowing them to absorb seismic energy without transmitting it to the superstructure. This might involve the use of stone foundations with a layer of sand or other flexible materials.
Traditional Architectural Wisdom: Local builders and communities often had a wealth of knowledge about the seismic behavior of their region. Techniques such as the inclination of walls, appropriate roof weights, and the use of specific materials were often informed by this traditional wisdom.

-Mrs. Anu Murali
(Asst. Professor, Civil Engg. Dept.)

IMPORTANCE OF ETABS SOFTWARE IN CIVIL ENGINEERING

ETABS plays a significant role in civil engineering due to its importance in the design, analysis, and evaluation of building structures. Here are some reasons why ETABS is important in civil engineering:

- **Structural Analysis**: ETABS allows civil engineers to perform advanced structural analysis of building systems. It can simulate the behavior of structures under different loading conditions and accurately predict their response to forces such as gravity, wind, and earthquakes. This helps in ensuring the structural integrity and safety of buildings.
- **Efficient Design**: ETABS provides powerful design capabilities that enable engineers to optimize the design of structural components. It automates the process of generating design loads, performing code-based design checks, and producing detailed design reports. This helps in producing efficient and cost-effective structural designs.
- **Building Performance Assessment**: ETABS assists engineers in evaluating the performance of buildings under various conditions. It can assess factors such as structural stability, lateral stiffness, and deflection limits. This information is crucial for ensuring that buildings meet the required performance criteria and comply with building codes and regulations.
- **Seismic Analysis**: Earthquakes pose a significant risk to buildings in seismically active regions. ETABS offers specialized tools for seismic analysis and design. It can calculate seismic forces, determine the response of structures to earthquakes, and design structural elements to resist seismic loads. This helps in designing buildings that can withstand seismic events and protect human life.
- **Interdisciplinary Collaboration**: ETABS facilitates collaboration between civil engineers, architects, and other professionals involved in building design and construction. It supports the exchange of models and data with other software packages commonly used in the industry. This seamless interoperability allows for efficient communication, coordination, and integration of design decisions.
- **Time and Cost Savings**: ETABS automates several tasks involved in structural analysis and design. This helps in reducing manual effort, minimizing errors, and saving time during the design process. The software also enables engineers to quickly evaluate design alternatives and assess their impact on the structural performance. This iterative design process can lead to cost savings by optimizing the use of materials and reducing construction time and decision-making.



-Ms. Puja Kadam
(Asst. Prof., Civil Engg Dept.)

DIAGRID STRUCTURES

Diagrid structures are architectural and structural systems that use diagonally arranged members to form a grid-like pattern. These structures derive their name from the combination of "diagonal" and "grid." Diagrid systems have gained popularity in modern construction due to their unique aesthetic appeal, structural efficiency, and sustainability. Here are some key points about diagrid structures:

- **Structural Efficiency**: Diagrid structures offer excellent structural efficiency by efficiently distributing loads across the building. The diagonal members act as bracing elements, transmitting forces to multiple points of support. This structural arrangement reduces the need for vertical columns and allows for open floor plans, maximizing usable space.
- **Stiffness and Stability:** The diagonal members in diagrid structures provide inherent stiffness and stability to the building. They resist lateral loads, such as wind and seismic forces, effectively. The triangulated pattern formed by the diagonals offers high rigidity, minimizing deflections and reducing the need for additional bracing elements.
- **Aesthetic Appeal**: Diagrid structures are visually striking and often serve as architectural landmarks. The unique diagonal patterns create an iconic and eye-catching appearance. The exposed diagrid framework can be seen on the exterior of the building, creating an attractive and distinctive architectural expression.
- **Material Efficiency**: Diagrid structures optimize the use of construction materials. The diagonal members efficiently transfer loads, reducing the need for excessive materials compared to conventional vertical column and beam systems. This results in material savings, reduced construction costs, and a more sustainable approach to building design.
- **Natural Ventilation and Daylighting**: The open framework of diagrid structures provides opportunities for natural ventilation and daylighting. The voids created by the diagonal members allow for improved airflow and natural light penetration into the building. This enhances occupant comfort, reduces the reliance on mechanical systems, and contributes to energy efficiency.

–Mr. Arbaz Kazi
(Asst. Prof., Civil Engg Dept)

CONFINEMENT OF CONCRETE COLUMNS

- Confinement of concrete columns refers to the practice of providing additional reinforcement or confinement elements around the perimeter of a concrete column to enhance its strength, ductility, and resistance to various loading conditions, such as axial compression, bending, and seismic forces. This technique is particularly important in regions with high seismic activity. Here are some key points about the confinement of concrete columns:
- Purpose: The primary purpose of confining concrete columns is to improve their performance under extreme loading conditions. Confined columns are better able to withstand higher axial loads, exhibit increased ductility, and provide enhanced resistance to lateral forces and seismic actions.
- Confinement Methods: There are several methods used to confine concrete columns, including the use of steel hoops, spirals, or fiber-reinforced polymers (FRPs) wrapped around the column's perimeter. These confinement elements restrain the lateral expansion of the concrete core, effectively increasing its strength and ductility.
- Steel Hoops or Spirals: Steel hoops or spirals are commonly used for the confinement of concrete columns. These reinforcement elements are placed at regular intervals along the height of the column, providing lateral support to the concrete core. The confinement reinforcement should have sufficient spacing and proper detailing to ensure effective confinement.
- Fiber-Reinforced Polymers (FRPs): Fiber-reinforced polymers, such as carbon or glass fibers, can also be used for column confinement. FRP sheets or wraps are applied around the column's perimeter, improving its strength and ductility. FRP confinement offers the advantage of being lightweight, corrosion-resistant, and easier to handle and install.
- Benefits of Confinement: Confining concrete columns offers several benefits. It increases the compressive strength of the concrete, enhances its ductility and energy dissipation capacity, reduces the risk of premature failure, and improves the column's resistance to spalling and buckling under extreme loading conditions. Confinement also helps control the formation and propagation of concrete cracks.
- Seismic Resistance: Confinement is particularly crucial for concrete columns in seismic regions. During an earthquake, columns experience significant lateral forces and cyclic loading. Confined columns exhibit improved performance by reducing concrete spalling, enhancing ductility, and preventing premature failure, thus contributing to the overall seismic resilience of a structure.

-Mr. Vikrant Kothari
(Asst. Prof., Civil Engg Dept)