Hindusthan
College of Engineering and Technology
An Autonomous Institution

AZIMUTH

DEPARTMENT OF CIVIL ENGINEERING

MAGAZINE
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VISION OF THE DEPARTMENT

- **To be recognized globally for pre-eminence in Civil Engineering education, research and service.**

MISSION OF THE DEPARTMENT

- **To impart scientific and technical knowledge for professional practice, advanced study and research in Civil Engineering.**
- **To equip the students with ingenious leadership and organizational skills for a successful professional career.**
- **To inculcate professional and ethical responsibilities related to industry, society and environment.**

PROGRAM EDUCATIONAL OBJECTIVES (PEO)

To produce graduates with the ability to

- **Excel as practicing engineers, academicians and researchers with a comprehensive knowledge in Civil Engineering.**
- **Play a significant role as team players and leaders in challenging environments for nation's infrastructure development, environmental protection and sustainability.**
- **Uphold professional and ethical responsibilities as engineers, consultants and entrepreneurs while addressing the demands of the society.**

PROGRAMME SPECIFIC OUTCOMES (PSO)

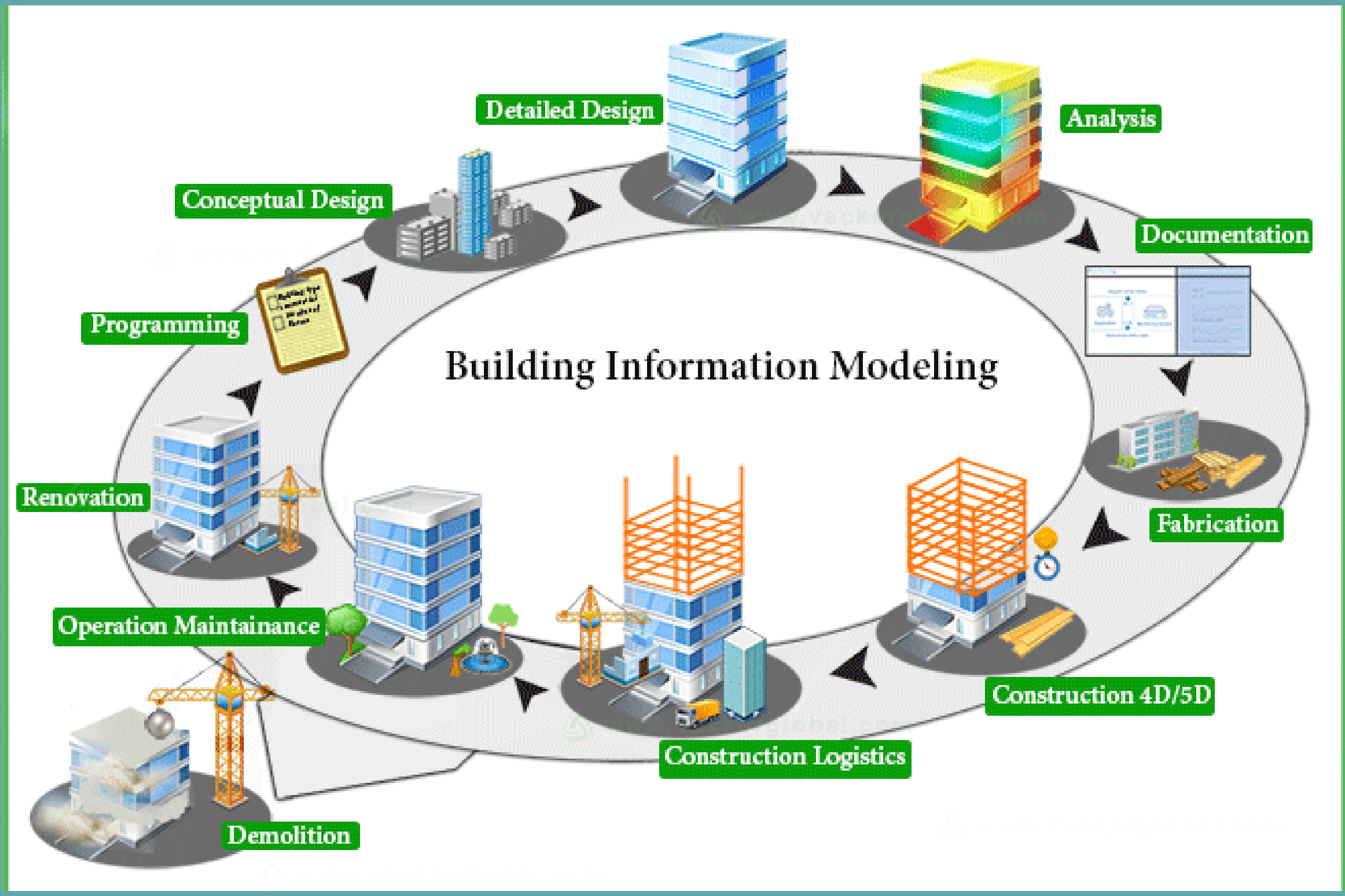
The graduates will be able to

- **Apply their engineering knowledge, communication skills, professional and ethical principles to solve problems in civil engineering and contribute to the infrastructure development in a sustainable way.**
- **Use their engineering background to excel in competitive exams for advanced study, research and professional career.**

Building Information Modeling (BIM)

INTRODUCTION

Building Information Modeling is an exceptional 3D model-based process that Gives Architecture, Engineering, and Construction (AEC) professionals the insight and tools to more efficiently plan, design, construct and manage buildings and infrastructure.



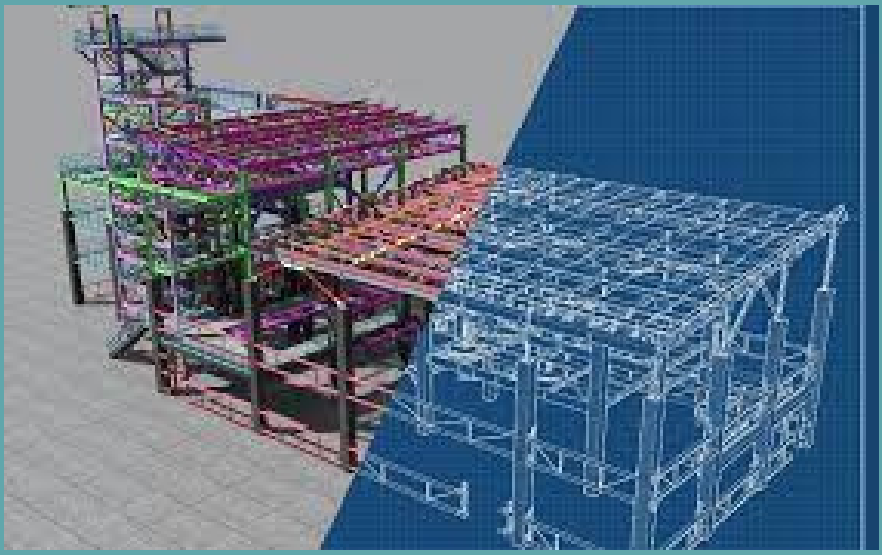
Building Information Modeling (BIM)

Increased prefabrication, modularization, and eco-friendliness. BIM is similar to CAD (computer-aided design), but not exactly the same. It is software for 3D design to digitally model what will be built.

But it's capabilities don't stop there: "It doesn't just create a visually appealing 3D model of the building, it also creates numerous layers of metadata and renders them within a collaborative workflow," writes Engineering.com. It captures things in a way that paper just can't.

30 to 35% of builders are currently using BIM/CAD software. The use of BIM provides space for better collaboration because each person and expertise area can add their piece to the same model, instead of breaking out onto multiple versions of a 2D paper drawing. One of the top trending construction technology in 2020.

This way, the model evolves immediately as people contribute, streamlining the process and increasing efficiency. BIM also helps with problem-solving in the design and planning stages of a project, by automating clash detection and providing a more complete picture of
the project.



Prefabrication Technique

Prefabrication is the practice of assembling components of a structure in a factory or other manufacturing site, and transporting complete assemblies or sub-assemblies to the construction site where the structure is to be located.

Prefabrication is hardly a new innovation in itself. The construction industry has been using prefabrication in various applications for decades. However, new technologies are making the benefits of prefabrication easier to access and change the way the construction industry integrates prefab into the process.

For instance, ManufactOn provides a mobile technology that provides complete visibility into the prefabrication process, so that anyone involved in the project can see what is being manufactured, where it is the process, and when it will be delivered. New integration with BIM 360 Docs will make it possible to view that information in one workflow from beginning to end of the design and build process.

Iconic Structures

Christ the Redeemer created by French sculptor Paul Landowski and built by Brazilian engineer Heitor da Silva Costa, in collaboration with French engineer Albert Caquot. Romanian sculptor Gheorghe Leonida fashioned the face. Constructed between 1922 and 1931, the statue is 30 metres (98 ft) high, excluding its 8-metre (26 ft) pedestal. The arms stretch 28 metres (92 ft) wide.

The statue weighs 635 metric tons (625 long, 700 short tons), and is located at the peak of the 700-metre (2,300 ft) Corcovado mountain in the Tijuca Forest National Park overlooking the city of Rio de Janeiro. A symbol of Christianity across the world, the statue has also become a cultural icon of both Rio de Janeiro and Brazil, and is listed as one of the New7Wonders of the World. It is made of reinforced concrete and soapstone.

Vincentian priest Pedro Maria Boss first suggested placing a Christian monument on Mount Corcovado in the mid 1850s to honor Princess Isabel, regent of Brazil and the daughter of Emperor Pedro II, but the project was not approved. In 1889, the country became a republic, and due to the separation of church and state, the proposed statue was dismissed. The Catholic Circle of Rio made a second proposal for a landmark statue on the mountain in 1920. The group organized an event called Semana do Monumento ("Monument Week") to attract donations and collect signatures to support the building of the statue. The organization was motivated by what they perceived as 'Godlessness' in the society. The donations came ,mostly from Brazilian Catholics. The designs considered for the "Statue of the Christ" included a representation of the Christian cross, a statue of Jesus with a globe in his hands, and a pedestal symbolizing the world. The statue of Christ the Redeemer with open arms, a symbol of peace, was chosen.

Local engineer Heitor da Silva Costa designed the statue. French sculptor Paul Landowski created the work. In 1922, Landowski commissioned fellow Parisian Romanian sculptor Gheorghe Leonida, who studied sculpture at the Fine Arts Conservatory in Bucharest and in Italy.

A group of engineers and technicians studied Landowski's submissions and felt building the structure of reinforced concrete (designed by Albert Caquot) instead of steel was more suitable for the cross-shaped statue. The concrete making up the base was supplied from Limhamn, Sweden. The outer layers are soapstone, chosen for its enduring qualities and ease of use. Construction took nine years, from 1922 to 1931 and cost the equivalent of US$250,000 (equivalent to $3,600,000 in 2019) and the monument opened on October 12, 1931. During the opening ceremony, the statue was to be lit by a battery of floodlights turned on remotely by Italian shortwave radio inventor Guglielmo Marconi, stationed 9,200 kilometres (5,700 mi) away in Rome but because of bad weather, the lights were activated on-site. In October 2006, on the 75th anniversary of the statue's completion, Archbishop of Rio, Cardinal Eusebio Oscar Scheid, consecrated a chapel, named after Brazil's patron saint—Our Lady of the Apparition, under the statue, allowing Catholics to hold baptisms and weddings there.

Lightning struck the statue during a violent thunderstorm on February 10, 2008, causing some damage to the fingers, head and eyebrows. The Rio de Janeiro state government initiated a restoration effort to replace some of the outer soapstone layers and repair the lightning rods on the statue. Lightning damaged it again, on January 17, 2014, dislodging a finger on the right hand. In 2010, a massive restoration of the statue began. Work included cleaning, replacing the mortar and soapstone on the exterior, restoring iron in the internal structure, and waterproofing the monument. Vandals attacked the statue during renovation, spraying paint along the arm. Mayor Eduardo Paes called the act "a crime against the nation". The culprits later apologized and presented themselves to the police.

Christ the Redeemer

Engineering Information to be kept for Record:

1 Gunta = 121 Sq yards
1 Gunta = 101.171 Sq Meter
1 Gaj = 1 Yard
1 Yard = 36 inch
1 Yard = 3 feet
1 Sq yard = 1296 Sq inch
1 Meter = 1.0936 Yards
1 Meter = 39.370 inch
1 Meter = 3.280 feet
1 Sq meter = 1.1959 Sq yard
1 Sq meter = 1550 Sq inch
1 Sq Meter = 10.763 Sq feet
1 feet = 0.304 meter
1 feet = 0.333 yards
1 feet =12 inch
1 Sq feet = 0.111 Sq Yard
1 Sq feet = 0.09290 Sq Meter
1 Inch = 0.0254 meter
1 Inch = 0.0277 yards
1 Inch = 0.0833 feet
1 Sq Inch = 0.00064516 Sq Meter
1 Sq Inch = 0.00077160 Sq Yards
1 Sq Inch = 0.00694444 Sq feet
1 Acre = 4046.86 Sq Meter
1 Acre = 4840 Sq yards
1 Acre = 43560 Sq feet
1 Sq feet = 144 Sq inch
1 inch = 2.54 cm

CONCRETE GRADE

M5 = 1:4:8
M10= 1:3:6
M15= 1:2:4
M20= 1:1.5:3
M25= 1:1:2

Engineering Information to be kept for Record:

7.SHEAR WALL : 25 mm
8.BEAMS : 25 mm
9.SLABS : 15 mm
10.FLAT SLAB : 20 mm
11.STAIRCASE : 15 mm
12.RET. WALL : 20/ 25 mm on earth
13.WATER RETAINING STRUCTURES : 20/30 mm

WEIGHT OF ROD PER METER LENGTH:

DIA WEIGHT PER METER
6mm = 0.222Kg
8mm = 0.395 Kg
10mm = 0.616 Kg
12mm = 0.888 Kg
16mm = 1.578 Kg
20mm = 2.466 Kg
25mm = 3.853 Kg
32mm = 6.313 Kg
40mm = 9.865 Kg

1bag cement-50kg
1feet-0.3048
1m-3.28ft
1sq.m-10.76sq.f ¬t
1cu.m-35.28cu.f ¬t
1acre-43560sq.f ¬t
1cent-435.6sq.f ¬t
1hectare-2.47acre
1acre-100cent-4 ¬046.724sq.m
1ground-2400sq. ¬ft

DESIGN MIX:

M10 (1 : 3.92 : 5.62)
Cement : 210 Kg/ m^3
20 mm Jelly : 708 Kg/ m^3
12.5 mm Jelly : 472 Kg/ m^3
River sand : 823 Kg/ m^3
Total water : 185 Kg/ m^3
Fresh concrete density: 2398 Kg/ m^3

M20 (1 : 2.48 : 3.55)
Cement : 320 Kg/ M 3
20 mm Jelly : 683 Kg/ m^3
12.5 mm Jelly : 455 Kg/ m^3
River sand : 794 Kg/ m^3
Total water : 176 Kg/ m^3
Admixture : 0.7%
Fresh concrete density: 2430 Kg/ m^3

Engineering Information to be kept for Record:

M25 (1 : 2.28 : 3.27)
Cement : 340 Kg/ m^3
20 mm Jelly : 667 Kg/ m^3
12.5 mm Jelly : 445 Kg/ m^3
River sand : 775 Kg/ m^3
Total water : 185 Kg/ m^3
Admixture : 0.6%
Fresh concrete density: 2414 Kg/ m^3
Note: sand 775 + 2% moisture,
Water185 -20.5 =
164 Liters,
Admixture = 0.5% is 100ml

M30 (1 : 2 : 2.87)
Cement : 380 Kg/ m^3
20 mm Jelly : 654 Kg/ m^3
12.5 mm Jelly : 436 Kg/ m^3
River sand : 760 Kg/ m^3
Total water : 187 Kg/ m^3
Admixture : 0.7%
Fresh concrete density: 2420 Kg/ m^3
Note: Sand = 760 Kg with 2% moisture
(170.80+15.20)
STANDARD CONVERSION
FACTORS INCH = 25.4 MILLIMETRE
FOOT = 0.3048 METRE

Glimpse of Student Talent

Drawing by
Mahalakshmi M , III Civil

Glimpse of Student Talent

Drawing by
Pandi Selvam M, II Civil

Glimpse of Student Talent

Drawing by
Pandi Selvam M, II Civil

Glimpse of Student Talent

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Pandi Selvam M, II Civil

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Drawing by
Pandi Selvam M, II Civil

Glimpse of Student Talent

Drawing by
Pandi Selvam M, II Civil

Glimpse of Student Talent

Done by Mahalakshmi M ,
III Civil

Glimpse of Student Talent

Done by Mahalakshmi M ,
III Civil

Thank you...