SIR M. VISVESVARAYA INSTITUTE OF TECHNOLOGY

DEPARTMENT
OF
CIVIL ENGINEERING
PRESENTS

INFRA Today

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Supported by:
Prof. V. R. Manjunath, Principal
Mr. H. P. Mahendra Babu, Head
Ms. Vyshnavi D. R., Assistant Professor

DEPARTMENT NEWS

Milestones acheived by staff and students

EXCITING ARTICLES

Insights and Ideas of Writers

DEPARTMENT GALLERY

Memories of the year
Photography and Art

SIR M. VISVESVARAYA INSTITUTE OF TECHNOLOGY

AFFILIATED TO VTU, BELAGAVI | APPROVED BY AICTE , NEW DELHI/ GOVT. OF KARNATAKA | ACCREDITED BY NAAC UGC

DEPARTMENT OF CIVIL ENGINEERING

VISION AND MISSION OF CIVIL ENGINEERING DEPARTMENT

VISION

- To create competent, disciplined quality Engineers and administrators of global standards in Civil Engineering with capability of accepting new challenges.

MISSION

- To impart quality education in civil engineering to raise satisfaction level of all stake holders.
- To serve society and the nation by providing professional civil engineering leadership to find solution to community, regional and global problems and accept new challenges in rapidly changing technology.
- To create competent professionals who are trained in the design, and development of civil engineering systems and contribute towards research & development activities.

DEPARTMENT OF CIVIL ENGINEERING

Program Educational Objectives (PEOs):

- Graduates will become leaders in the industries associated with civil engineering and become professional entrepreneurs. They will be experts working in public sector, private sector, and international organizations.
- Graduates will engage in continual learning by pursuing advanced degrees or additional educational opportunities through coursework, professional conferences and training, or participation in professional societies.
- Graduates will adapt to different roles and responsibilities in multidisciplinary environment by respecting professionalism and ethical practices. They will contribute to the well-being of the society and environment through responsible practice of engineering profession.

PROGRAM OUTCOMES (POS):

- **PO1-Engineering knowledge: Apply the knowledge of mathematics, science, engineering Fundamentals and an engineering specialization to the solution of complex engineering problems in CIVIL Engineering.**
- **PO2-Problem analysis: Identify, formulate, review research literature, and analyse complex Engineering problems in CIVIL Engineering reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.**
- **PO3-Design/development of solutions: Design solutions for complex engineering problems and design system components or processes of CIVIL Engineering that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.**
- **PO4-Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments in CIVIL Engineering, analysis and interpretation of data, and synthesis of the information to provide valid conclusions for complex problems:**

1. **that cannot be solved by straightforward application of knowledge, theories and techniques applicable to the engineering discipline as against problems given at the end of chapters in a typical text book that can be solved using simple engineering theories and techniques;**
2. **that may not have a unique solution. For example, a design problem can be solved in many ways and lead to multiple possible solutions;**
3. **that require consideration of appropriate constraints / requirements not explicitly given in the problem statement such as cost, power requirement, durability, product life, etc.;**
4. **which need to be defined (modelled) within appropriate mathematical framework; and; that often require use of modern computational concepts and tools, for example, in the design of an antenna or a DSP filter.**

- **PO5-Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities in CIVIL Engineering with an understanding of the limitations.**
- **PO6-The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice in CIVIL Engineering.**
- **PO7-Environment and sustainability: Understand the impact of the professional engineering solutions of CIVIL Engineering in societal and environmental contexts and demonstrate the knowledge of and need for sustainable development.**
- **PO8-Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.**

- **PO9-Individual and team work:** **Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.**
- **PO10-Communication:** **Communicate effectively on complex engineering activities with the Engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.**

- **PO11-Project management and finance:** **Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.**
- **PO12- Life-long learning:** **Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.**

PROGRAM SPECIFIC OBJECTIVES (PSO'S):

1. **PSO1. Identify the broad context of civil engineering problems, including describing the problem Conditions, Identifying possible contributing factors and generating alternative solution strategies.**
2. **PSO2. Undertake laboratory, field and other data collection efforts using commonly used measurement techniques to support the study and solution of Civil Engineering problems.**
3. **PSO3. Employ mathematics, science and computing techniques in a systematic, comprehensive and rigorous manner to support the study and solution of civil engineering problems.**
4. **PSO4. Exhibit good teamwork skills and serve as effective member of multi-disciplinary project teams.**

DEPARTMENT NEWS

1.The Project on “Study on Smart Irrigation system in Chikkaballapur Taluk, Karnataka” guided by **Dr.Shivanna S.** got a sanction under Student Project Programme-44 series by KSCST.

2.Industrial Visits to Traffic Management Centre, Bangalore, Organized by **K.V.R. Prasad**, Associate Professor in the Department of Civil Engineering, on 13th December 2021.

3. Online Alumni meet, organized by Department of Civil Engineering on 18th Sept 2021 by **Dr. Ravi Kumar H.**

4. Webinar on “Mineral resources, society &Future” by **Dr. M. Lingadevaru,** Assistant Professor in Geology Central University of Karnataka, Gulbarga, Organized by Department of Civil Engineering on 16th Sept 2021.

5.Webinar and motivational speech on Engineers Day by **Dr. G. C. Bhanu Prakash** HOD, Department of Computer science Engineering, Sir MVIT Bangalore Organized by Department of Civil Engineering, on 14th Sept 2021.

6.Webinar on “Tall structures”, by **Dr. Sunil Kumar Tengli** Professor School of Civil Engineering REVA University Bangalore, Organized by Department of Civil Engineering, on 7th September, 2021.

7. Webinar on “Fundamentals of Geopolymers”, by **Dr. Radhakrishna** HOD, Department of Civil Engineering RVCE, Bangalore, Organized by Department of Civil Engineering, on 17th August, 2021.

8.Webinar on “Yoga - Natural Immunity Booster”, On “International Yoga Day”, by **Dr. Ravi Kumar H.** (Associate Professor), Sir MVIT, Bangalore, Organized by Department of Civil Engineering, on 21st June, 2021.

9.**Mr. K.V.R. Prasad** delivered a guest lecture on "Traffic safety Issues and challenges" at Moodalkatte Institute of Technology on 23 June 2021.

10.**Dr. Ravi Kumar H.** has delivered a lecture on "3D printing of Building’s" at Moodalkatte Institute of Technology on 30 June 2021.

11. **Dr. Shivanna S.** has delivered a lecture on "Applications of Geology in Civil Engineering" at Reva school of Engineering on 26 May 2021.

STAFF NEWS

1.**Dr. Shivanna S., Vyshnavi D. R. & Pradeepa S.** published a paper titled "Study on the Water Chemistry of Chikkabanavara Lake,Bangalore Urban District, Karnataka, India" International Journal of Emerging Technologies and Innovative Research, 450-455, Vol.9, Issue 7, ISSN: 2348-5162.

2.**K.V.R. Prasad & Dr. Ravi Kumar H.** published a paper titled "Proposals and Remedial Measures to Decongest Yelahanka Police Station Junction" International Journal of Advanced Research Trends in Engineering and Technology, pp. 12-17, Vol 9, Issue 2, ISSN: 2394-3785.

3.**Dr. Shivanna S., Vyshnavi D. R., Pradeepa S.** published a paper titled "Study on Smart Irrigation system in Chikkaballapur Taluk, Karnataka, India", Journal of Emerging Technologies and Innovative Research, pp 477-481, Vol 9, Issue 4, ISSN: 2348-5162.

4.**K. V. R. Prasad, Dr. Ravi Kumar H.** published a paper titled "Proposals and Remedial Measures to Decongest Yelahanka Police Station Junction", International Journal of Advanced Research Trends in Engineering and Technology, pp 12-19, Vol 9, Issue 2, ISSN: 2394-3785.

6.**Dr. Shivanna S., Vyshnavi D. R.** published a paper titled "Groundwater pollution Due to Agricultural Activity in Hosakote Taluk, Bangalore District, Karnataka, India: A Case Study",International Journal of Advanced Scientific Research and Management.pp 1-4, Vol 6, Issue 10, ISSN 2455-6378

7.**Dr. Shivanna S., Vyshnavi D. R.** published a paper titled "Study and Analysis of Chikkabanavara lake, Bangalore Urban district, Karnataka India", Journal of Emerging Technologies and Innovative Research,pp231-236, Vol 8, Issue 9, ISSN: 2348-5162.

8.**Dr. Shivanna S., Vyshnavi D. R.** published a paper titled "Groundwater Quality and Management in Devanahalli Taluk, Bangalore Rural District, Karnataka, India: A Case Study", International Journal of Science Technology & Engineering, pp37-41, Vol 8, Issue 2, 2349-784X.

9.**Pradeepa S., Anitha J., Ramya N., Tamil Selvi N., Dr. Ravi Kumar H.** published a paper titled "A new approach of Steel Manufacturing Flash Bainite Technique: Review", Journal of Emerging Technologies and Innovative Research, pp529-539, Vol 8, Issue 8, ISSN: 2348-5162..

10.**Dr. Ravikumar H., Dr. Shivanna S., Anitha J., Vyshnavi D. R., Pradeepa S.** published a paper titled "Design of Roof top Rainwater Harvesting in Suggata Village - Bangalore North", International Journal of Advances in Science Engineering and Technology, pp1-7, Vol 8, Issue 10, ISSN: 2394-3785.

11.**Dr. Ravi Kumar H., K.V.R. Prasad , Mrs Pradeepa S., Anitha J., Tamil Selvi N.** published a paper titled "Exterior Insulation and finishing systems" in Journal of Emerging technologies and Innovative Research, Volume 8 Issue 9,ISSN: 2348-5162.

12.**Shivanna S., Vyshnavi D. R., H.P. Mahendra Babu** published a paper titled "Morphometric Analysis of Hesaraghatta Watershed, Bangalore Rural District, Karnataka", International Journal of Science, Technology and Engineering ,pp.1-5.Vol.7, Issue 10, 2349-784X.

13.**Shivanna S., Vyshnavi D R., Pradeepa S., Bhavya S.** published a paper titled "Groundwater Contamination due Agricultural Practices in Mandya Taluk, Karnataka, India", Journal Emerging Technologies and Innovation Research , pp. 303-305, Volume 8., Issue 8, ISSN: 2348-5162.

14.**Anitha J., Pradeepa .S, Tamil Selvi N., Ramya N., Dr. Ravi Kumar H.** published a paper titled "Investigation of Iron ore Tailings In Production Of Masonry Blocks", Volume 8, Issue 9, ISSN-2349-5162.

15.**Anitha J., Pradeepa S., Ramya N., Tamil Selvi N.** published a paper titled "Influence of Manufactured Sand on Mechanical Properties of Self Compacting Concrete" Journal of Emerging technologies and Innovative Research, pp 320-326, Vol 8, Issue 4, ISSN-2349-5162.

STUDENT NEWS

1. **Rithushree C.** with USN 1MV17CV028 of 2017 batch has Secured 10 rank in VTU Convocation for academic year 2020-21.

2. **S. Pruthvi** with USN 1MV20CV024 has participated and Secured Second place in Connectivity event of Concrete Fair 2021, on 14 and 15 December 2021, organized by Depatment of Civil Engineering, RV College of Engineering in association with ICI Bengaluru Centre, ICI Student Chapter RVCE & ASCE Student Chapter RVCE.

3. **Sathvik A.** with USN 1MV20CV025 has participated and Secured First place in Connectivity event of Concrete Fair 2021, on 14th and 15th December 2021, organized by Department of Civil Engineering, RV Caollege of Engineering in association with ICI Bengaluru Centre, ICI Student Chapter RVCE & ASCE Student Chapter RVCE.

Rebuild

CONFIDENCE

World Trade Center

The Design, Safety, and Security of One World Trade Center

High-rise construction did not halt, or even pause, after the destruction of the World Trade Center. On the contrary, it accelerated. The number of buildings exceeding 200 meters (656 feet) tall worldwide has increased fourfold since 2000, and the construction rate of tall and supertall buildings continues to accelerate

One World Trade Center embodies a massive design effort led by the New York office of Skidmore, Owings & Merrill (SOM) with key contributions from global engineering firm WSP and myriad consultants, manufactu--rers, and contractors.

The concrete used in the construction of One World Trade Center was stronger than any mix previously used in the city, with a compressive strength of up to 14,000 psi.

The use of 3D building information modeling (BIM) software—the first on a super high-rise—helped coordinate the delicate threading of steel structural members, conduits, and shafts through a maze of infrastructure.

A huge factor in saving lives in the event of a fire in a tall building is stopping the fire from spreading. Giving the occupants additional time to safely evacuate in the event of a fire is the No. 1 priority in fire-stopping systems. Beyond coating the structure in cementitious fireproofing, this means creating a barrier between the edge of each two-hour-rated floor slab and the non-rated curtainwall system. The sophisticated perimeter fire containment system at One World Trade Center is provided by Owens Corning Thermafibre.

The essential ingredient is mineral wool, made from slag and naturally occurring rock that is melted and spun into fibrous blankets, explains Thermafiber's technical services leader Angie Ogino. At One World Trade Center, galvanized steel hangers secure the mineral wool—which has been shown to resist temperatures surpassing 2,000 F—into the spandrel openings; Safing insulation, also made

ne World Trade Center's non uniform floor plates, which transition from square to octagonal and back to square, meant that the Thermafiber Insolutions technical team had to analyze thousands of architectural drawings and issue roughly two dozen engineering judgments, supported by test results, to help provide comprehensive and code compliant fire protection.

The firm set out to design the safest skyscrapers on the planet. First came 7 World Trade Center, the 743-foot-tall, 52-story glass enclosed office tower on the north side of the 16-acre site.

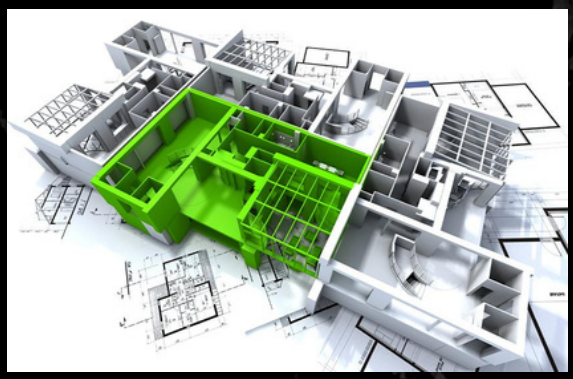
The parallelogram-shaped structure, opened in 2006, would serve as a warm-up for the planning and construction of its forthcoming 1,776-foot-tall neighbor, One World Trade Center. Not that the latter project went up easily. Designed from 2003 to 2005 and constructed from 2006 to 2014, the LEED Gold-certified One World Trade Center took more than a decade to realize.

Behind the curtainwall insulation, steel reinforcements at the floor line are also critical where the floor slab intersects at the spandrels' mid-height to provide a tight seal when the compression-fit joint material is packed into the void. This detail prevents the curtainwall insulation from bowing due to the compression fit of the Safing insulation. Next, a strip of mineral wool, called the mullion cover, is applied to the inner face of the vertical aluminum mullions and all the mechanical attachments. Finally, a smoke-impermeable sealant is applied to the mineral wool insulation at the edge of the floor slab.

The 204-foot-square footprints of the original Twin Towers are now black granite pools of falling water. Those dimensions also define the base of One World Trade Center, a connection that its occupants could almost overlook. Peer deep inside this building's core, however, and what emerges is a cross-section of the entire building industry working together to rethink life safety in construction, influencing a new generation of tall and supertall buildings in New York and beyond.

-SATHVIKA

BUILDING INFORMATION MODELLING



Building Information modelling (BIM) is the digital creation of physical as well as functional features of a construction project in a detailed manner by indicating length, width and height of a construction project. 2D drawings only showed the width and length of the project, which were having less clarity on the details of a project. It was also very hard to tackle out the probable issues faced during the execution part unless and until the execution part is done. but BIM helps in creation of 3D Models, 3D plans, 3D sections and 3D elevations of the project. Which were having enough clarity regarding the various issues to be tackled during construction and maintenance of construction project.

Using BIM we can design Electrical, sewage or water pipelines running inside the wall, under the ground etc. We can also find out the exact cost and quantity of materials for building construction in just a clicks, which saves the time in tedious, time consuming and manual calculations especially in huge projects. BIM is also beneficial in representation of Steel details such as determining the Diameter of a steel bar, cutting length and spacing of steel bars in a RCC structure. BIM also helps in showing clients the final aesthetic appearance of the building, before the construction is initiated and BIM helps in making the required corrections and decisions in design or any part of construction work before the actual execution is done which saves the wastage of time, materials and cost. BIM provides the final look of how the actual building looks after the finish. New advancements of 4D, 5D, 6D and 7D modelling of project is also being done using BIM which shows up exact time required for construction, exact cost of construction and its flexibility, sustainability and facility management for the construction project.

In a nut shell BIM shows up each and every thing of a construction project right from the beginning to the demolition phase of a construction project. Which is very useful to economical and echo friendliness and in smooth running of a construction project.

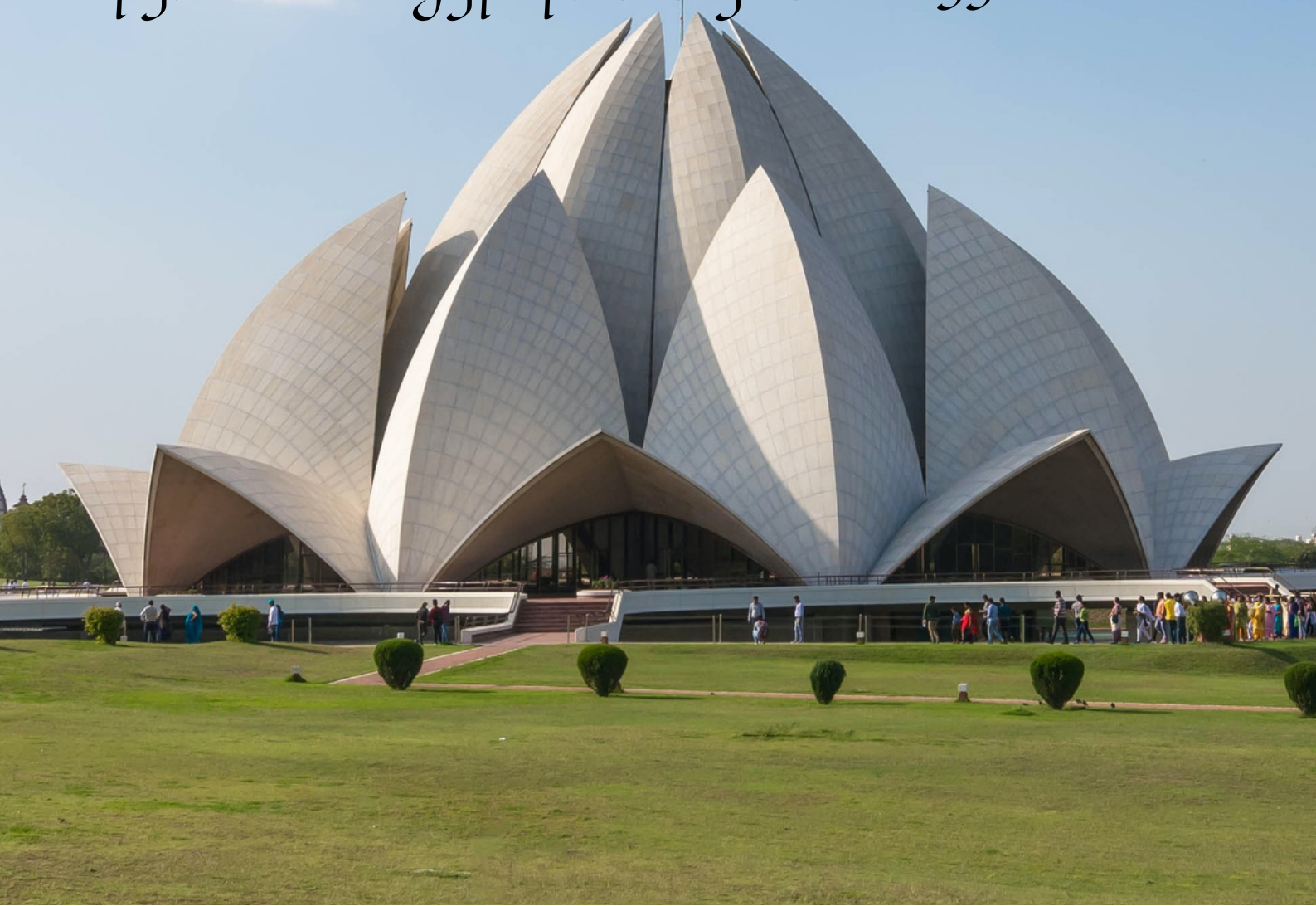
-K Mohammed Adnan

MODERN AGE CONSTRUCTION:

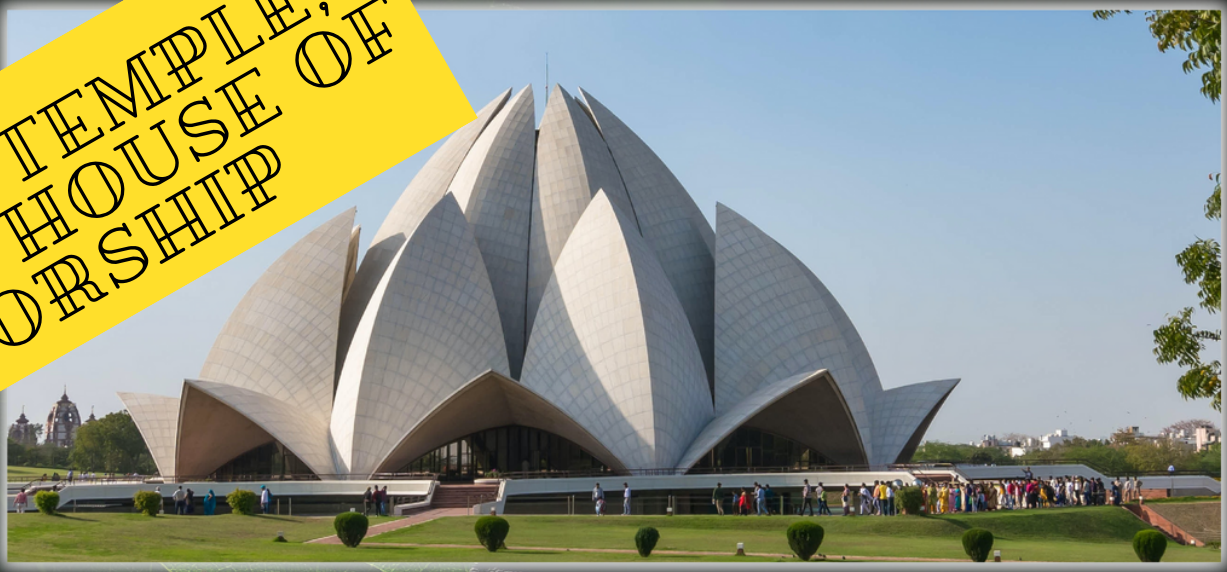
LOTOUS TEMPLE

So, from above article we came to know that civil engineering was commenced a long ago when humans started to creating a need for construction of shelter. Civil engineering is the oldest form of engineering and one of the earliest professions of the people. Now civil engineering has evolved in a superior manner that most of the ancient buildings were mostly constructed with some traditional tools and required more physical efforts but now the construction of modern buildings has arrived with a new technologies that we easily know from where to start and where to end. Not only in construction field but also in other aspects like so many inventions in civil engineering has taken place from decades to decades. We can make differences easily between ancient methods of constructions and modern methods of construction where in ancient construction man power was the main need which was also the reason for delay in construction but now in modern construction everything is being done by the machines except some works hence the period of construction has also advanced. And also, the history tells that

"The first engineer in the world was IMHOTEP who was civil engineer who constructed step pyramid in Egypt probably about 2550 BCE".



LOTUS TEMPLE; BAHA'I HOUSE OF WORSHIP



The famous temple is located in Delhi, India. The temple is a Baha'i House of Worship that was dedicated in December 1986. The temple is flowerlike shaped for which it is the center of attraction in the Country. The special feature of the temple is that it is open to all people regardless of religion or any other qualification. Fariborz Sabha, an Iranian architect designed the structure. The structure was undertaken by a UK firm named Flint and Neill.

The temple resemblances the national flower of India "Lotus". That is why the name Lotus temple. The monument is composed of 27 free-standing marble-clad "petals". These are arranged in a cluster of three to form nine sides. The nine doors open onto a central hall with a height of slightly over 34 meters. The temple has the capacity of seating 2500 people together.

Including Lotus Temple, all Baha'i Houses of Worship share certain architectural elements, some of them are specified by Baha'i scripture. The son of the founder of the Baha'i religion Abdul Baha'i stipulated that an essential architectural character of a House of Worship is to be a nine-sided circular shape. The concept of all current Baha'i Houses of Worship have a dome is not regarded as an essential part of their architecture.

The floor of the house is made of white marble brought from Penteli Mountain in Greece. The same marble is used in the construction of many ancient monuments and other Baha'i buildings. The whole temple buildings along with surrounding gardens and ponds cover an area of 26 acres. The land was donated by Ardeshir Rustampur of Hyderabad, whose will dictated that his entire life savings would go for this purpose.

The savings from the construction budget was used to build a greenhouse to study indigenous plants and flowers that would be appropriate for use on the site.

Lotus temple is the first temple in Delhi to use solar power. Out of the total electricity used of 500 kilowatts, 120 kW power is provided by solar power generated by solar panels on the building. This saves a good amount per month for the Temple.

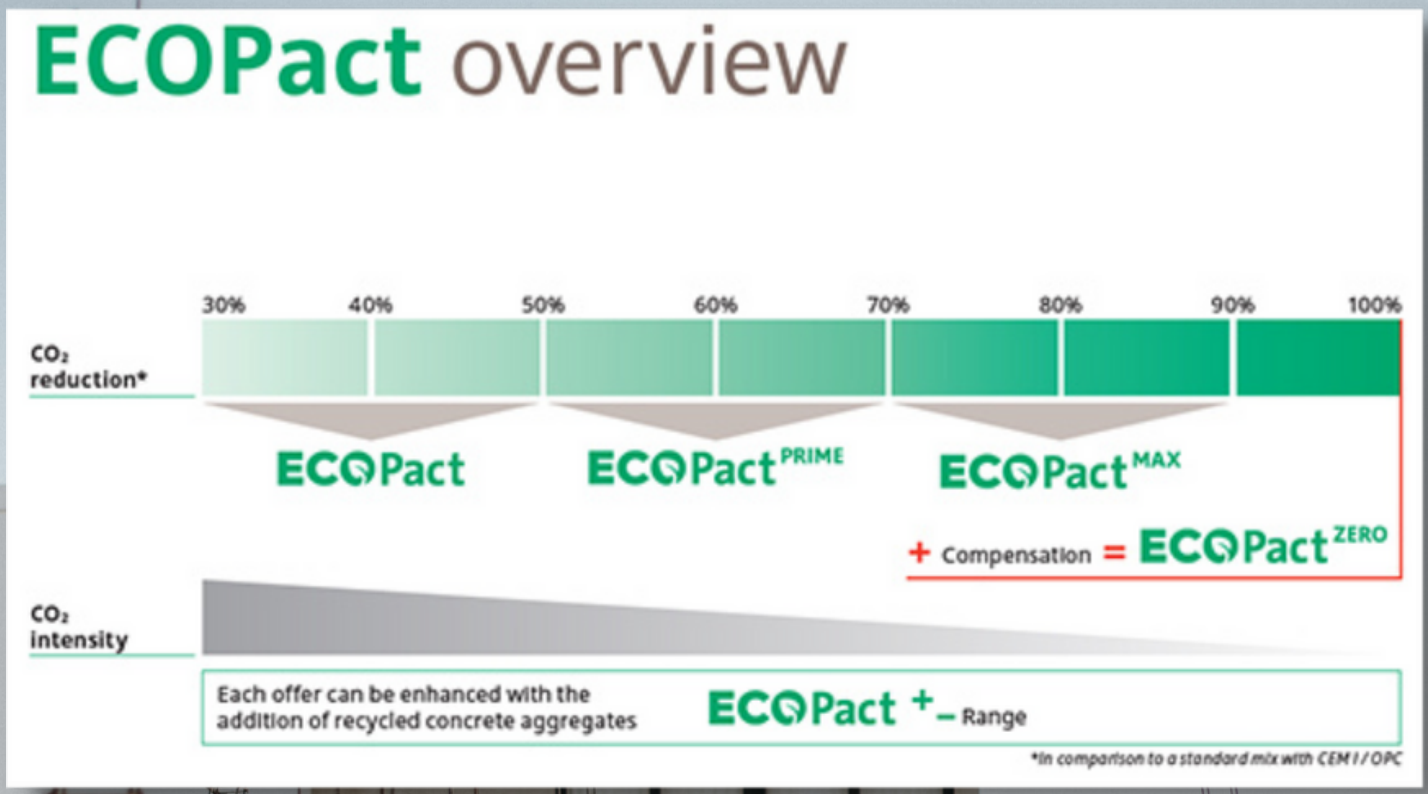
The temple is constructed on an arcaded construction system. The inner folds enclose the interior dome in a canopy made of crisscrossing ribs and shells of intricate patterns. When one sees it from inside, each layer of ribs and shells disappears as it rises behind the next lower layer. Finest architect Fariborz Sahba's Lotus flower had been converted to definable geometrical shapes such as spheres, cylinders, toroids, and cones to be constructed. The structures were expressed as mathematical equations that could be used as a basis for structural analysis. The final geometry was so complex that it took more than two and a half years to complete it. The aesthetical view is also enhanced by nine water pools in the surrounding.The lotus is open at the Top. At the level of radial beams of the structure, glass and steel roofs provide protection from rain and allow natural light to come to the center.

TOWARD GREEN CONCRETE FOR BETTER SUSTAINABLE ENVIRONMENT

Eight to 10 percent of the world's total CO2 emissions come from manufacturing cement. The global warming gas is released when limestone and clays are crushed and heated to high temperatures. Green concrete is defined as a concrete which uses waste material as at least one of its components, or its production process does not lead to environmental destruction, or it has high performance and life cycle sustainability. Various efforts have been conducted by researchers to arrive at some alternatives that are able to significantly reduce high energy consumed and environmental impacts during fabrication process of cement, including implementing the concept of industrial ecology and green chemistry as well as nanoengineering that study the behavior of the structure and organization of nanoparticles of cement in the mix for achieving higher performance.

The goal of the Centre for Green Concrete is to reduce the environmental impact of concrete. To enable this, new technology is developed. The technology considers all phases of a concrete construction’s life cycle, i.e. structural design, specification, manufacturing and maintenance, and it includes all aspects of performance, i.e .Mechanical properties (strength, shrinkage, creep, static behaviour etc.) Fire resistance (spalling, heat transfer etc.) Workmanship (workability, strength development, curing etc.) Durability (corrosion protection, frost, new deterioration mechanisms etc.) Thermodynamic properties (input to the other properties)

Green concrete having reduced environmental impact with reduction of concrete industries CO2 emissions by 30%.So definitely use of concrete product like green concrete in future will not only reduce the emission of CO2 in environment and environmental impact but also economical to produce.



-SATHVIK A

ARTIFICIAL ISLANDS

An artificial island is landmark surrounded all sides by water which is constructed artificially by means of human manpower with uses of advance technologies and machineries. An artificial island is an application of various engineering concepts that has brought a drastic change on construction technology.

In ancient periods they were constructed over lakes by driving piles into lake beds. The traces of artificial islands date back to the ancient Egyptian Civilisation.

This concept has been mostly used in developed countries like Qatar, Japan, Dubai, etc.

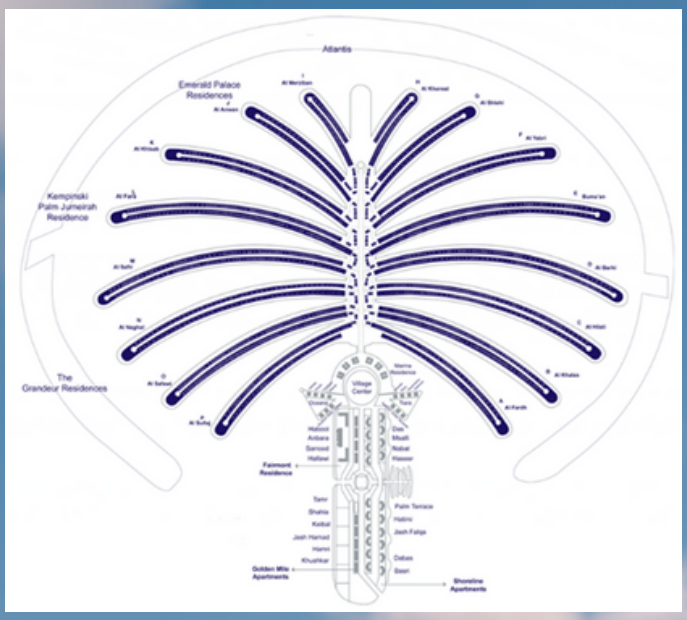
Unlike the natural islands, artificial islands are constructed in a variety of shapes and sizes using highly sophisticated machinery, technology and engineering skills. Artificial islands are erected through either of the different methods like land reclamation, constructing or extending over the already existing islands, rock or even coral reef, or through linking islets by filling the in-between areas using different construction material.

Today we live in the world where the population growth [1.1% per year] and global warming are two major issues which causes two other issues that is shortage of new areas and rise in sea level [at a rate of 3.2mm per year] due to which the density becomes high in the areas and leaving less space for further development or new development in the areas.

Such a level of rising, despite looking small can seriously affect low lying areas, such as islands and river deltas, worldwide. The areas bound to be more heavily affected are islands and coastal zones. The Rise in sea levels will lead to several other issues to the local populations like economic instability, natural disasters and population displacement.

The higher cost of civil protection, the inevitable loss of land areas to the sea and possible conflicts with other states are other major problems. Presently preservation and land reclamation has been seen as the answer to the land loss of coastal zones. Despite their high cost (Japan's cost of preserving the Okinotorishima islets is estimated at 29.3 billion Yen so far and the cost of major preservation works in small states like the Maldives would be far beyond their capacity) and their positive effectiveness, as well as their temporary status, these techniques seem to be the way that may provide a solution to the land loss or land shortage.

These changes have led to the demand of new interventions or adjustments which may provide new opportunities to the development. For tackling the problem related to gradual sinking of lands, especially in case of Small Island and Low-Lying states, various methods, including the use of Artificial Islands and Structures are proposed or already in practice. On the other hand, environmental and safety issues have been much more thoroughly elaborated on national and regional level, but only for exploration and exploitation platforms.



Some of the leading countries in the construction of artificial islands are China, Japan, the United States of America and the United Arab Emirates, Island-building is a highly expensive process, however, in the future there is more scope for further construction of artificial islands as a result of increasing urban congestion along with better technology making it easy for humans to construct islands

The design and construction of any types of structures require the different types of loading acting on structure, their magnitude and direction. The artificial islands are subjected to three major types of loads: permanent loads, variable loads and natural or environmental loads.
The construction of an artificial island is always fraught with difficulties, and the further the main land is located from the future island, the more difficult it is. When conducting construction work on the water surface, one mistake can cause irreparable damage to the environment. For this reason, the selection of the right construction procedures is a critical task. The rules of working process in the territory surrounded by water are always very tough and difficult.:
The Typical Construction procedure is as follows:
1.Study of Sea Bed,
2.Construction of Rock for Wave breaking protection / Breakwater,
3.Dredging,
4.Filling-In,
5.Compaction,
6.Concreting.
Apparently with growing population and rise in sea level, the artificial islands are expected to be more in practices in near future. Due to rise in sea level because of global warming, land reclamation could be most effective tool for creating new spaces for habitat or recreational needs. There have been several proposals of land reclamation in Asian countries as well.

CARBON-POSITIVE CONCRETE HOTEL RISING IN COLORADO

Durable and strong, concrete is the most widely used building material in the world, but research shows it is also one of the most environmentally destructive. According to a 2019 paper in The Proceedings of the National Academy of Sciences, the cement industry accounts for 8% of global carbon emissions — the most of any industrial emitter.

"The built environment, including homes, accounts for 45% of the global carbon footprint every year, and as developers, we need to take some responsibility for that impact," explains Grant McCargo, co-founder, CEO, and chief environmental officer of real estate developer Urban Villages.

Urban Villages is developing the hotel with sustainable design and construction features to meet its structural carbon budget, which is set at 4,397 MT CO2e, says McCargo. (This is the equivalent of the amount of energy used by 530 homes annually)

Scheduled for completion in late 2023, the hotel will rise 13 stories and have 265 guest rooms. A striking facade with domed windows will contribute to the building's carbon-positive operation while also evoking Colorado's aspen trees, scientifically known as Populus tremuloides — lending the hotel its name, Populus.

To meet that objective, the team is using a variety of approaches to limit the amount of concrete in the project. These include maximizing slab continuity, placing columns to take advantage of exterior cantilevers, and limiting column transfers while considering the impacts to the required amounts of steel reinforcement, O'Hara says. "The most important items are the integration of the column rhythm and cantilevers with the unit layout and the facade support strategy," he says. "With the desire to reduce material, we reviewed a variety of spacing options and cantilevers to work with the unit needs and mechanical circulation, and (we considered) how those integrated with the main level and amenity needs."

In addition to limiting the amount of concrete in the project, the team will use low-carbon concrete to meet the carbon budget. Fly ash, for example, reduces the amount of carbon in concrete. "We're at a minimum of 20% fly ash on this project, and we limited the maximum embodied carbon for each type of concrete placement, for example in the drilled piers, walls, columns, flat slabs, etc." O'Hara notes.

THE COLOSSEUM, PRIDE OF ROME

It is situated in the city of Rome, Italy. It is the largest freestanding amphitheater ever built in the classical world. It stands as a monument of Roman engineering genius. The engineering required to build this monument was revolutionary. It took the genius of the Roman arch and they used it on a colossal scale. In 72 AD the emperor Vespasian began the construction and it was completed in 80 AD. The significance of the structure is the patronage of the Flavian dynasty, during whose reigns it was built. The Colosseum was built to provide a stage for gladiator events and other public shows like execution, dramatic performances, and mock battles.

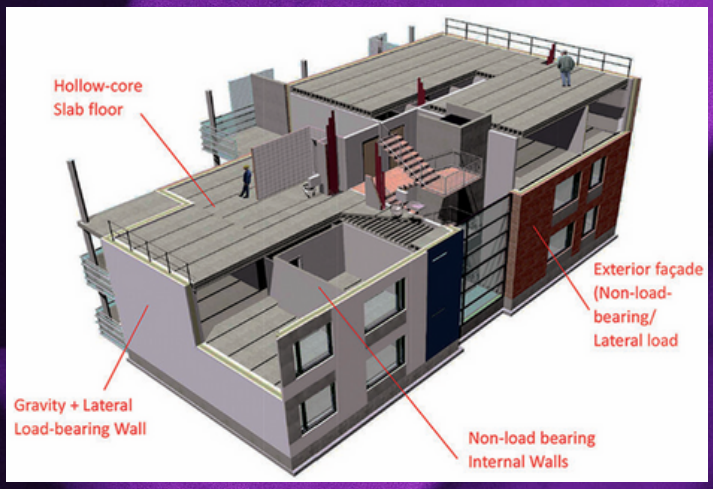
The exterior facade of the building consists of four levels. The bottom three levels are composed of 80 arches each. Because of the exterior arches, structurally it is possible in such an immense size. The Colosseum is an elliptical or oval-shaped building having a short axis of 156 m and a long axis of 188 m. It was 50 m in height, 190 m in length, and 156 m in width. Several materials were used to build the structure. For load-bearing pillars, travertine blocks were used, for external walls, stairs, and radial walls blocks and bricks of tufa were used. The structure is supported by arches and vaults solidly.

he strength and durability of the structure were increased by the combination of concrete, stone, and sand used in the construction. The foundations were made of concrete. Around 100000 travertine stones were transported to Rome from the quarries of Tivoli.

During the medieval period, the Colosseum went through several changes. The building was used for housing and workshops were created in the vaulted spaces in the arcades and also rented to local people. Around 1200, the Frangipani family surrounded the building and used to live in it. They used it as a castle. In 1349, a devastative earthquake caused severe damages to the structure. Frequent lightning strikes and other earthquake worsen the situation. The outer south side was totally collapsed because of this earthquake. The south side of the building was built on alluvial unstable ground. Pope Benedict XIV in 1749 declared the building was a sacred site. He told that was a place where early Christians had been martyred by Romans. After this, the building was banned for its use for commercial purposes.

As of today, the Colosseum is the most visited monument in Italy. It is the symbol of the power and prestige of Rome. It is one of the main tourist attractions in the World. Every year about 4 million people visit this monument. In modern times, the Colosseum is also a site for Christian ceremonies. The size and scale of the monumental of the Colosseum as well as the design for accommodation and control of such a large crowd indicate it as one of the greatest architectural achievements of the Roman era

PRECAST CONSTRUCTION IN INDIA AND ITS FUTURE AHEAD



Precast is fast adopting itself into the construction sector, as skilled labour availability is diminishing day by day in India, and the construction demand is on the rise in the country. Builders and Developers are looking at ways of adopting the precast into the construction and achieve speeds and quality.

As the skilled labour availability is diminishing day by day, the projects delivery schedules are getting affected with delays. This has prompted the developers to think of alternative construction technologies to speed up their construction and meet the delivery demands.

More and more developers are departing from the conventional construction and transforming their construction into advanced construction technology like monolithic construction using aluminium formwork. As aluminium formwork repetitions are limited and needs to go for new form work for new projects, they are moving forward to Precast Construction Technology duly setting up their own precast set up, and some developers are giving orders to the precast industries.

The developers who have set up their own precast factories in order to meet their delivery requirements with less dependency on the labour are as follows:

In Hyderabad: Janapriya Developers, Aurobindo Reality, My Home Constructions Pvt. ltd., Pooja Craft Constructions

In Bangalore: Brigade and Shobha Developers

In Ghaziabad: Bharat City Developers

The demand for precast systems is rising day by day. The developers and Govt. institutions have felt the necessity of completion of projects faster and thus pass on benefits to the customers early as well as for themselves.

. Precast construction is fast catching up and is establishing itself as the construction technology of the future. Both the State and Central Governments are insisting for the new construction technologies to be adopted into construction. Taking note of this, the Govt., institutions are calling the tenders for construction of buildings using precast construction technology in the locations wherever the precast units are available.

The DRDO is constructing the apartment buildings required for them using the Precast Construction Technology. MES Dept., is also promoting the precast construction technology for faster delivery of their structures. The Telangana State (TS) Govt. has constructed the affordable houses using Precast Construction Technology, Monolithic Construction Technology and Tunnel Form Technology in the city of Hyderabad and around. Now, the TS Govt. has taken up the construction of medical universities and the buildings in it using the prefabricated Construction Technology such that the buildings can be completed faster.

GROUND WATER EXPLORATION USING GIS AND REMOTE SENSING TECHNIQUES

Groundwater is the most preferred source of water in various user sectors in India on account of its near universal availability, dependability and low capital cost. The increasing dependence on ground water as a reliable source of water has resulted in indiscriminate extraction in various parts of the country without due regard to the recharging capacities of aquifers and other environmental factors. On the other hand, there are areas in the country, where ground water development is sub-optimal in spite of the availability of sufficient resources, and canal command areas suffering from problems of water logging and soil salinity due to the gradual rise in ground water levels. As per the latest assessment, the annual replenishable ground water resource of country has been estimated as 433 billion cubic meter (bcm), out of which 399 bcm is considered to be available for development for various uses. The irrigation sector remains the major consumer of ground water, accounting for 92% of its annual withdrawal. The development of ground water in the country is highly uneven and shows considerable variations from place to place. Though the overall stage of ground water development is about 58%, the average stage of ground water development in North Western Plain States is much higher (98%) when compared to the Eastern Plain States (43%) and Central Plain States (42%). Management of ground water resources in the Indian context is an extremely complex proposition. The highly uneven distribution and its utilization make it impossible to have single management strategy for the country as a whole. Any strategy for scientific management of ground water resources should involve a combination of supply side and demand side measures depending on the regional setting.

As far as ground water resource availability is concerned the share of alluvial areas covering Eastern Plain states of Bihar, Orissa (part), Eastern Uttar Pradesh and West Bengal and North Western plain states of Delhi, Haryana, Punjab, Western Uttar Pradesh, Chandigarh; is about 44% of the total available resource. However, these groups of states have overall development of the order of 43% and 98% respectively. In view of the marked difference in stage of ground water in these areas, there is a need to critically analyze the underlying factors responsible for the imbalances in terms of technical and socio-economic considerations. These should also be taken for consideration while formulating any comprehensive water resources management initiatives for the country. There is urgent need for coordinated efforts by various Governments and non-governmental agencies, social service organizations and the stakeholders for evolving implementable plan for effective management of this precious natural resource. Modelling is an attempt to replicate the behavior of natural groundwater or hydrologic system by defining the essential features of the system in some controlled physical or mathematical manner. Modelling plays an extremely important role in the management of hydrologic and groundwater system. The reliability of any groundwater model depends on a proper simulation of the groundwater situation in the basin. This depends on proper calibration, for which the availability of the data on the geometry and hydraulic characteristics of the aquifer and data on water levels and the water balance are indispensable.

– AKANKSHA

BIOASPHALT BINDERS: INTRODUCING SUSTAINABILITY IN A NON-RENEWABLE ROAD CONSTRUCTION MATERIAL

With a population of 1.4 billion and being one of the fastest growing world economies, India must ensure security and sustainability of energy systems to sustain the economic growth. India is the third largest consumer of petroleum crude after China and the US, and is dependent on foreign imports for about 83.8 percent of its crude oil demand (Sharma, 2020). Realizing the finite nature of fossil fuel reserves, there is a strong motivation to use alternative resources, particularly bio-based renewable sources for fulfilling the needs for energy and fuels. This is also apparent from the increased push by the government to use bio-ethanol as partial substitute for petrol and bio-diesel as partial substitute for petroleum-based diesel.

The road network in India is the world's second largest with more than 5.89 million km of roads spanning the length and width of the country (MoRTH, 2020). However, the international standard highways (national highways and expressways) comprise only 2 percent of the total road length and carry more than 40 percent of road traffic (PIB, 2020). To meet the demand for high standard and durable highway network, many highway development projects aimed at construction/ expansion/ upgradation of the nation's road infrastructure are under implementation. An amount of US $1.4 trillion has been allocated under the National Infrastructure Pipeline for 2019-25, aiming for the infrastructural development, and out of this the road sector accounts for about 18 percent of the capital expenditure (IBEF, 2020).

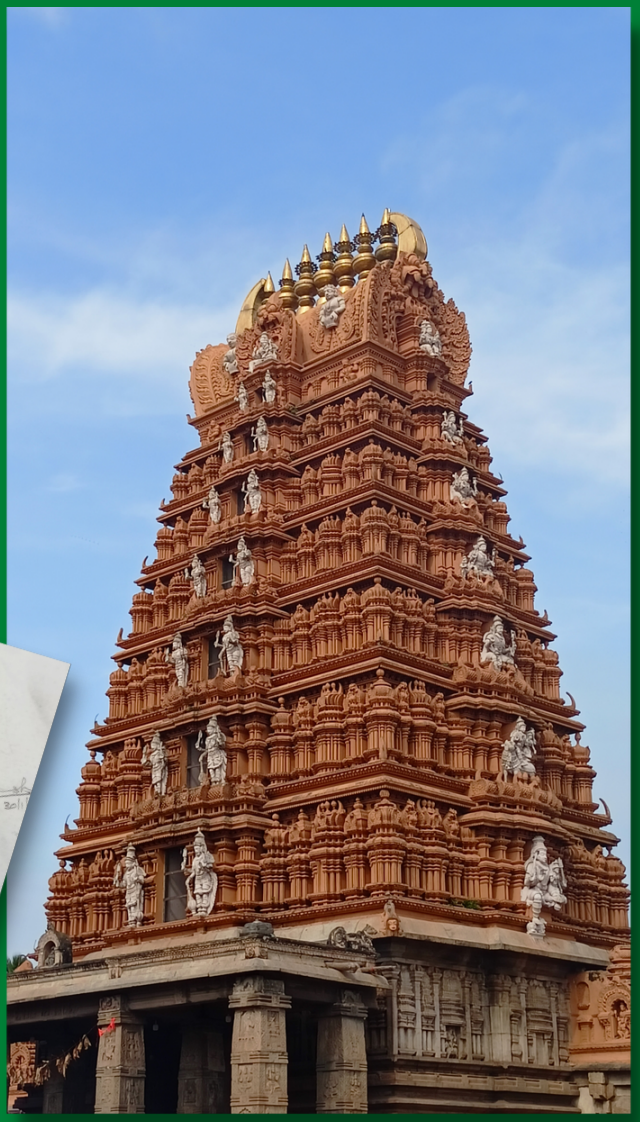
The use of renewable biomaterials or products in road infrastructure development is a noteworthy emerging research domain. Biomaterials are receiving widespread interest primarily due to their renewability, lower price, environment friendliness, and less dependency on petroleum-based resources. Biomass may refer to any organic matter that stores solar energy and includes all plants, animals, microbes and the organic matter derived from these organisms.

Plants produce biomass continuously through the process of photosynthesis. Biomass contains a significant amount of carbohydrates, e.g. cellulose and hemicellulose. Processing of biomass from wood industries, agriculture, forestry and other spheres results in the production of wastes. It has been estimated that India produces about 370 million tons of agricultural and forestry biomass wastes per year (Mary et al. 2016). Some examples of such wastes include saw dust, waste wood, seed cover, etc. These 'bio'-wastes can function as feedstock for the production of sustainable materials for use in road construction.

Use Of Biochar In Bioasphalt Binders And Their Rheological Characterization

Biochar obtained as a by-product from the pyrolysis of seed cover waste of Mesua ferrea tree (rose chestnut and locally known as Nahor in the North-Eastern part of India) and bamboo chips are studied for production of bioasphalt binders. Pyrolysis of seed cover waste of M. ferrea and bamboo chips is mainly targeted to get biofuels and the biochar is generated as a by-product of the process. Details of pyrolysis process can be referred elsewhere (Kumar et al. 2018, 2019). The physical appearance of both M. ferrea seed cover and bamboo biochar is like a black powder.

DEPARTMENT Gallery



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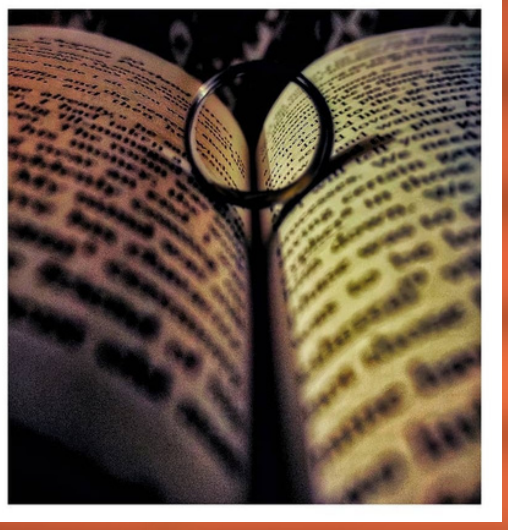

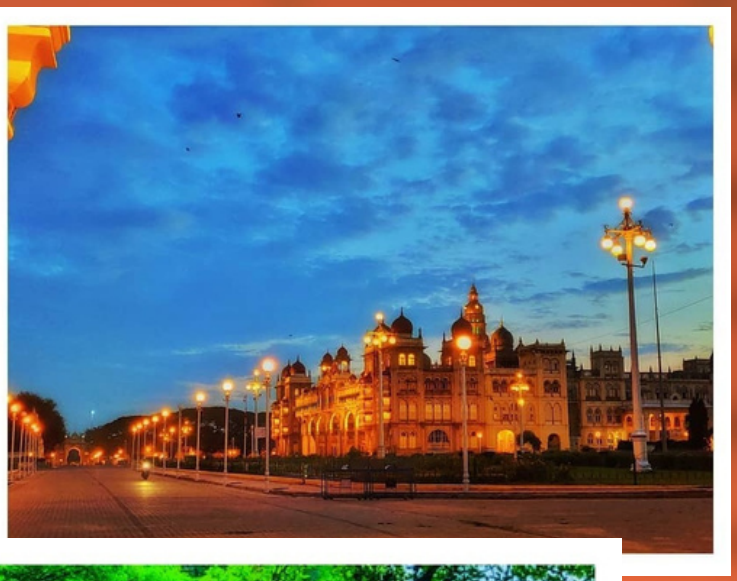

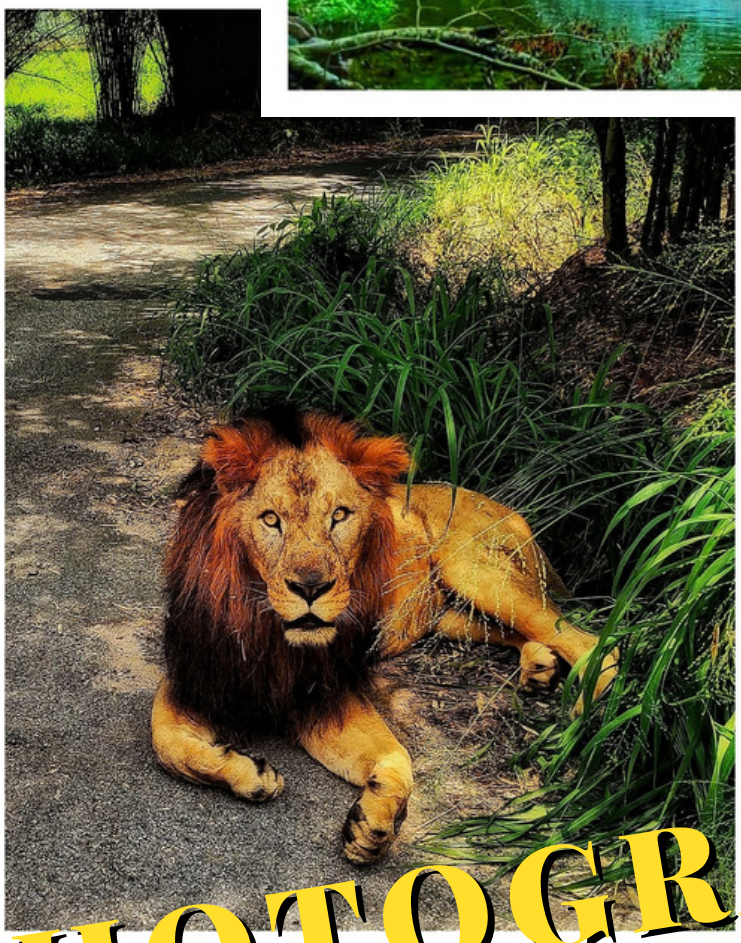

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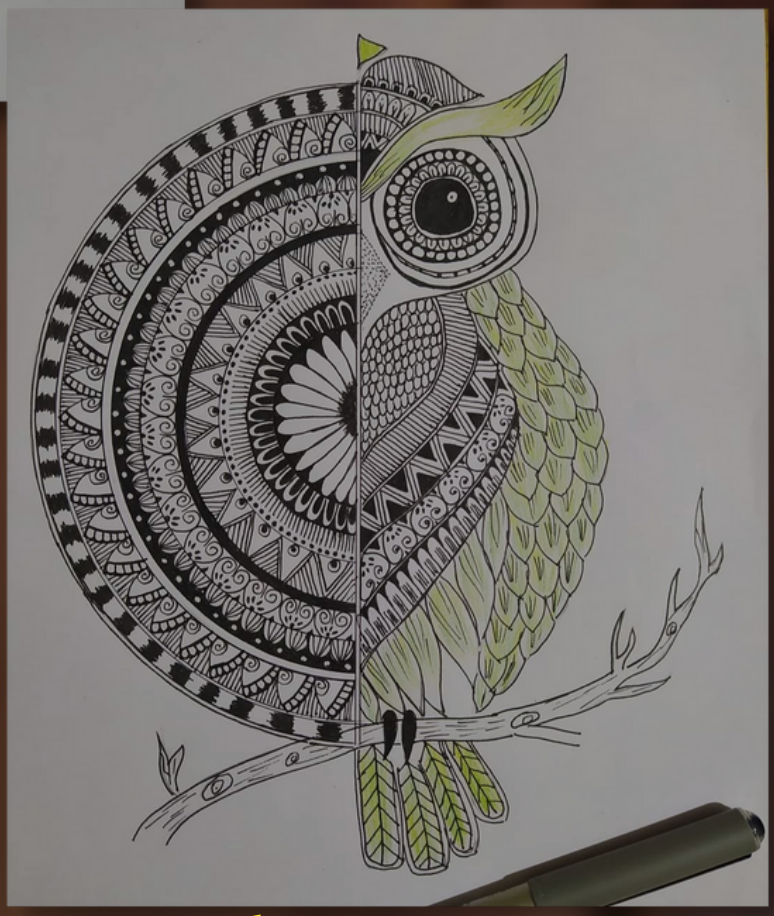

MANDALA ART BY TANUJA

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EDITORIAL TEAM

Akanksha

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