SRI VENKATESWARA COLLEGE OF ENGINEERING
विद्या परा देवता

CIVILIAN CHRONICLE

2022-23

CEA

ICI
Indian Concrete Institute

EDITORIAL BOARD

DEPARTMENT VISION

To become a department of excellence in Civil Engineering education producing globally competent civil engineers with an emphasis on research for the benefit of the industry and society.

DEPARTMENT MISSION

- To offer quality undergraduate technical education in civil engineering by providing state-of-the art resources that contributes to an excellent learning environment.
- To produce globally competent practicing civil engineers and entrepreneurs by imparting necessary skills, cultivating moral and ethical values who will contribute to the growth and development of the country and to the needs of the industry.
- To establish regular and efficient interaction with industries for the benefit of faculty members and students..
- To motivate the students to take up competitive exams and pursue higher education.
- To promote research and development activities in emerging areas of civil engineering and offer services to society and industry through education, research and consultancy activities.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

Civil Engineering graduates during the first few years of graduation will:

I. Practice civil engineering in construction industry, public sector undertaking or as an entrepreneur by applying ethical principles and following norms of civil engineering practice.

II. Pursue higher education for professional development

III. Exhibit leadership and team working skills in their profession and other activities with demonstrable attributes to contribute to the societal needs and to adapt to the changing global scenario.

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PROGRAM OUTCOMES (POs)

Students in the Civil Engineering program should, at the time of their graduation, be able to

1. Apply the knowledge of mathematics, science, engineering fundamentals and concepts of Civil Engineering to the solution of complex engineering problems. **(Engineering knowledge)**
2. Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences. **(Problem analysis)**
3. Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations. **(Design/Development of Solutions)**
4. Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions for complex problems. **(Conduct Investigations of Complex Problems)**
5. Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations. **(Modern Tool Usage)**
6. 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. **(The Engineer and Society)**
7. Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development. **(Environment and Sustainability)**

8. Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice. **(Ethics)**
9. Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings. **(Individual and Team Work)**
10. 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. **(Communication)**
11. 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. **(Project Management and Finance)**
12. Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change. **(Life-long Learning)**

PROGRAM SPECIFIC OUTCOMES

Students in the Civil Engineering program should, at the time of their graduation, be able to

1.Provide solutions for real-life problems related to core areas of civil engineering by applying knowledge of mathematics, Basic and Engineering Sciences and by using appropriate engineering tools.
2.Plan, analyse, design, execute and manage infrastructure projects considering safety, societal and environmental factors.

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RECENT TRENDS AND ADVANCEMENT IN CONSTRUCTION TECHNIQUES

If it's not broken don't fix it, right? Despite technological progress, it's not uncommon for construction companies to still rely on spreadsheets, manual data entry, and paperwork. Low IT budgets and lack of time for training have contributed to a hesitancy around adopting new methods and technology. These cutting-edge technologies are drastically changing how the industry operates and how future projects will be completed.

Types of Construction Technology Impacting the Industry:

- Mobile Technology
- Drones
- Building Information Monitoring (BIM)
- Virtual Reality and Wearables
- 3D Printing
- Artificial Intelligence

1. Mobile Technology

Mobile technology isn't just for games anymore. Apps are becoming more of the norm in construction, and for good reason. The increased portability of tablets and smartphones allows for greater communication and the ability to work from anywhere. Integrating this type of technology into your current processes can be much simpler and require a smaller upfront investment while still providing major benefits and boosting productivity in your day to day operations. So if you want to start implementing technology, this is a good place to start.

Mobile technology can help to save time and keep your project moving forward faster by providing real-time updates and making information available between the job site and the office. You can easily access the latest revisions to plans or report a problem to the project manager off site.

2. Drones

Drones are the most widely used emerging construction technology. They can conduct site surveys more quickly and accurately than a crew on the ground and are cheaper than aerial imaging. Their high resolution cameras and the data collected can createinteractive 3D or topographical maps and models, and take volume measurements.

Another benefit of using drones is the ability to inspect hard to reach places such as bridges or around tall buildings, and to do it safely. You can also use them to monitor progress on a job site and see how people are working.

Source: https://images.google.com/

3. Building Information Modeling (BIM)

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 your building—it creates numerous layers of metadata and renders them within a collaborative workflow, It captures things in a way that paper just can't.

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 broken out onto multiple versions of a 2D paper drawing. 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.

Source: https://images.google.com/

4. Virtual Reality and Wearables

Virtual reality technology is often used in conjunction with BIM to help better understand complex projects. Think of the potential: you create a building design with BIM and then are able to use VR to actually walk around it. Pretty cool, right? This will give your team, or the client, an even more realistic idea of what the project will look like once completed. Having a more complete grasp on the project before it begins gives you the opportunity to avoid big changes and expensive change orders mid-way through.

Source: https://images.google.com/

Wearables are a construction technology that will have an impact on job site safety and risk management. The Daqri smart glasses, though still in the early stages, are one example. The glasses have an augmented reality display, wide-angle camera, depth sensor and other features that allow workers to collect and see data based on their environment. The glasses give workers the information and instructions they need to complete a task right on the display, getting the job done faster and with less room for error

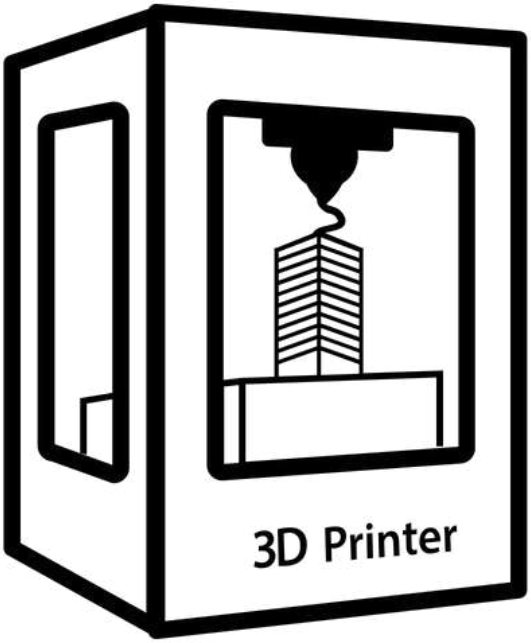
5. 3D Printing

3D printing as a construction technology has the potential to change material sourcing. For prefabrication, materials for a project can be printed and then transported to the job site, ready for use immediately. This can allow you to get materials faster and streamline the process by removing extra steps in the middle.

According to the U.K. Green Building Council, around 15% of materials delivered to construction sites end up in landfills, and the American Institute of Architects believe that building-related waste makes up between 25% to 40% of America's solid-waste stream, reports Fortune.

With 3D printing it will even be possible to print materials right on site, reducing waste and further saving on transportation and storage costs.

One of the current challenges with adoption of this technology is limitations with mass production. Although some 3D printers can produce on a larger scale, they are expensive.



Source: https://images.google.com/

6. **Artificial Intelligence**

The construction industry is already seeing implementation of artificial intelligence on the job site with the use of robotics for tasks like bricklaying and autonomous equipment that can operate and complete tasks without the need for human interaction.

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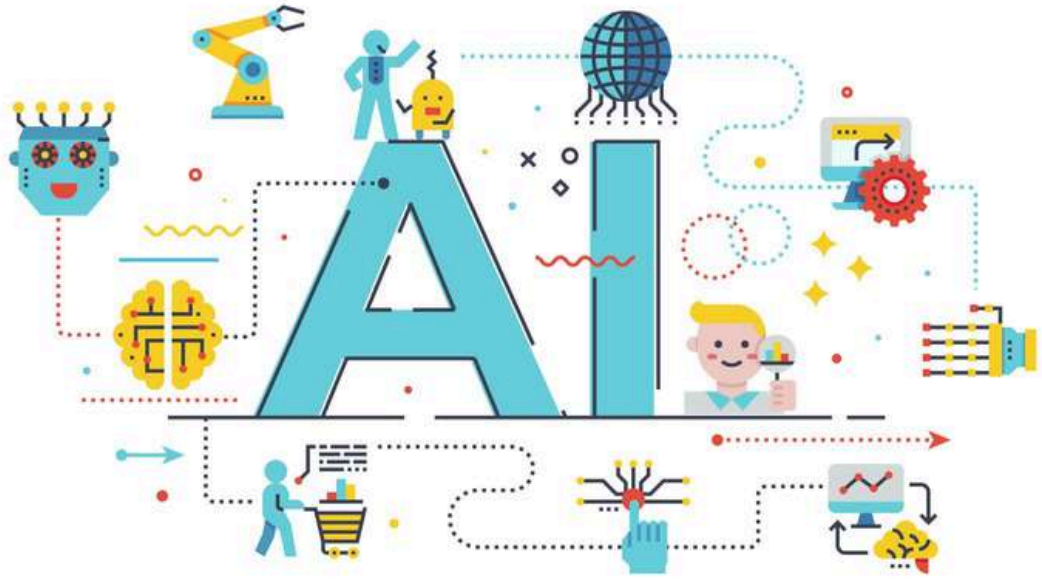


Source: https://images.google.com/

AI can benefit construction projects through increased safety, improving workflows, and getting jobs done faster and better. "AI can replicate the judgments, decisions, and actions of humans without getting fatigued," said Dan Kara of ABI Research. It can identify when information or pieces are missing and ask questions, and use the data it collects

Padmanaban N
IV year
Civil Engineering

CONSTRUCTION TECHNIQUES OF PILE FOUNDATION

The method of construction of pile foundations depends on the type of pile, whether the pile is a bored pile or a driven pile.

METHOD 1. BORED PILE :

In the case of a bored pile, a circular hole is drilled into the soil/rock up to the required depth, with the help of rotary or percussion drilling tools, similar to those used for soil exploration. Temporary casing of minimum 1-m length is generally used in the bore hole. Additional length of temporary casing may be used depending on the condition of soil strata and groundwater level. Drilling fluid or drilling mud of suitable consistency may also be used instead of temporary casing for stabilizing the sides of the bore hole. The drilling mud is a bentonite suspension with montmorillonite clay having exchangeable sodium cations.

If a bore hole is stabilized by drilling mud, the bottom of the bore hole is cleaned carefully before concreting is taken up. Temporary casing is not required except near top if the drilling mud is used.

Once the bore hole of required depth is made, the reinforcement cage is placed in position and concreting is done. As per IS – 2911 (Part I/Sec II)-1979, the minimum area of reinforcement is 0.4% of the cross-sectional area of the pile. The minimum clear cover is 40 mm. The minimum clear spacing between longitudinal reinforcement is 100 mm. The minimum diameter and spacing between lateral ties and spirals is 6 and 150 mm, respectively.

The concrete used should have a minimum slump of 100 mm when the concrete in the pile is not compacted. The slump should not exceed 180 mm in any case. The minimum grade of concrete to be used for piling should be M-15. When concrete is not exposed to sulphates, the minimum cement content should be 300 kgf/m3. For concrete exposed to sulphates, the minimum cement content should be in accordance with IS – 456-1978. When concreting under water or drilling mud, 10% additional cement over that required for the designed mix of concrete for the required slump should be used subject to a minimum of 370 kgf/m3.

Source: https://images.google.com/

Concreting is done uninterrupted using the tremie method. The tremie pipe is submerged in the concrete already placed, without permitting the concrete to fall through free water into the bore hole.

In exceptional cases, when interruption in concreting is permitted, this interruption should not be more than 1 or 2 h in duration and the tremie should not be taken out of the concrete during this period.The top of the concrete in a pile is brought above the cutoff level to permit removal of laitance (weak concrete) before the pile cap is constructed to ensure proper embedment of the pile into the pile cap. The cutoff level is the level where the installed pile is cut off to support the pile caps or beams or any other structural component at that level. Manual chipping above the cutoff level is permitted after three days. Pneumatic tools should not be used up to seven days of casting the "pile.

METHOD 2. DRIVEN PILE:

The equipment for driving and installation of driven piles, known as pile driving rig, consists of a movable steel or timber structure designed for handling, pitching and driving the piles in the correct position and alignment. A hammer, operating in the guides or leaders of the rig, is used to provide the required energy for driving the piles.

Different types of hammers are available, designated by type and size, and are described as follows:

i. Drop hammer: It is made of cast iron, weighing 1-1.4 t, falling freely through a height of 3-9 m. The hammer is raised by a winch and allowed to fall freely on the pile top. The drop hammer is the oldest type of hammer. The rate of application as well as the efficiency of the blow is low and, hence, it is rarely used these days .

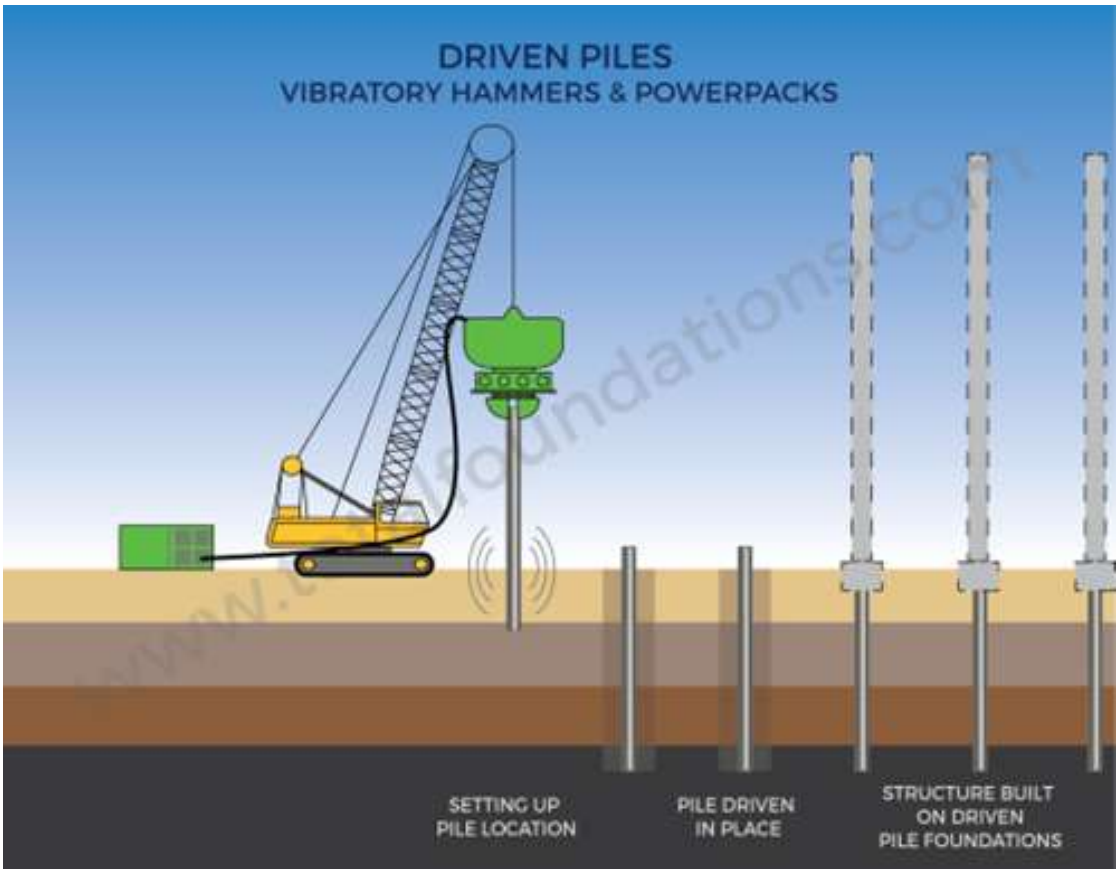
ii. Single-acting steam hammer: In this case, the hammer is attached to the piston of a steam cylinder. The hammer weighs about 1.8 t, and the height of fall is about 1 m. Although the height of fall is less, the rate of application of blows is very fast, about 50-65 blows per minute .

iii. Double-Acting Steam Hammer : In this case, the hammer is raised by the steam pressure up to a required height and then the steam pressure is applied on the other side of the piston so that the blow is applied under steam pressure with more impact energy.

iv. Diesel Hammer: A diesel hammer consists of a ram, a fuel injection system and an anvil at its lower end. The ram is first raised manually and the fuel is injected near the anvil. When the hammer drops on the anvil, it compresses the fuel and the fuel is ignited simultaneously. The pressure, developed by compression and combustion of fuel, pushes the pile downward and the ram upward. The energy imparted varies from 1 to 4 tm, depending on the design of the diesel hammer.

v. Vibratory Hammer: A vibratory hammer, or pile driver, consists of two shafts, known as exciters, rotating in opposite directions. The horizontal components of the centrifugal forces generated by the exciters cancel each other, while the vertical components add together, causing driving of the pile. The method is used where the vibration and noise of conventional pile driving equipment cannot be permitted.

vi. Pile Driving by Water Jet Method: When piles are to be driven through soft soil or a thin hard layer, the water jetting technique, similar to the wash boring method used in soil exploration, can be used. In this, a pipe is attached to the side of a pile and water is pumped down through the pipe. The water jet softens the soil and scours the material. The water jet and the hammer can be used together for pile driving in stiff clay.



Source: https://images.google.com/

vii. Partial Auguring Method: In this method, a power auger is used to drill the hole for part of the pile length. The pile is then inserted into the hole and driven by hammer blows for the remaining length. Batter piles are generally installed by the partial auguring method to ensure that the alignment is properly maintained.

METHOD 3. SCREW PILE :

A screw pile consists of a cast iron or steel shaft terminating into a helix or screw base. The pile shaft may be hollow or solid. The pile is installed by screwing the pile into the ground by using an electric motor. Screw piles are useful in soft clay or loose sand, where the large contact area of the screw helps in increasing the load capacity of the pile through skin friction resistance.It consists of a hollow cylindrical shaft, in the form of a hollow steel pipe of diameter 5-100 cm, with one or more helical plates welded outside at different heights in the form of plates of various thicknesses and diameters. The screw pile is provided with a 45° end cut to assist the driving of the pile.

The "thread" or helix on the screw pile allows it to be turned into the ground with speed and accuracy and without the noise and vibrations associated with a pile driver. The addition of the helix also increases the bearing capacity and pull-out resistance, making screw piles a good option for deep foundations, such as for transmission towers, as well as lighter load projects such as decks or fences. Screw piles are the fastest, most flexible and environmentally friendly foundation options available. .

Source: https://images.google.com/

Installing a screw pile does not require any pre-excavation, and there is no need to dispose of tailings. There is no waiting time for the concrete to cure, and there are no noisy pile drivers or cumbersome cement trucks to deal with.

A Jenisha,
IV Year
Civil Engineering

DECENTRALIZATION: A SUSTAINABLE SOLUTION TO CHENNAI'S FLOOD CRISIS

INTRODUCTION

The recent floods in Chennai, caused by Cyclone Michaung, have once again highlighted the urgent need for effective urban planning and flood management strategies. One such strategy I propose that could potentially alleviate the city's recurring flood problem is decentralization.

Source: https://images.google.com/

THE PROBLEM: HIGH POPULATION DENSITY

Chennai, like many other rapidly growing cities, suffers from high population density. This often leads to the over-utilization of resources, including land. In many cases, this results in the encroachment of water bodies for residential purposes, disrupting the natural ecosystem and increasing the risk of floods.

THE SOLUTION: DECENTRALIZATION

Decentralization involves the development of more than one city or urban center within a region. By distributing the population more evenly across a region, we can reduce the pressure on a single city, preserve natural resources, including water bodies, and reduce the risk of floods.

BENEFITS OF DECENTRALIZATION

Developing multiple urban centers ensures that each city has a manageable population, adequate resources, and sufficient infrastructure. This can lead to more sustainable urban development and a higher quality of life for residents.

IMPLEMENTING DECENTRALIZATION

While decentralization offers a promising solution, it requires careful planning and execution. It's crucial to ensure that the new urban centers are well-equipped with necessary infrastructure and amenities to support the population. Strict regulations should be in place to prevent encroachment on water bodies and other natural resources. Public awareness campaigns can also play a vital role in educating people about the importance of preserving our natural resources.

CONCLUSION

While decentralization is not a quick fix, it offers a sustainable solution to the challenges faced by rapidly growing cities like Chennai. By embracing this approach, we can work towards creating a more resilient and sustainable urban landscape. As we continue to face the challenges posed by climate change, developing resilient and sustainable cities becomes even more critical. Let's work together towards building a more resilient future

FOR MORE ON DECENTRALIZATION :

1. "What Has Urban Decentralization Meant? A Case Study of Delhi" - This paper critically examines urban decentralization in Delhi, India, with a focus on the Bhagidari or partnership/stakeholder scheme.
2. "The Historical Origins and Causes of Urban Decentralization in the United States" - This paper discusses the historical origins and causes of urban decentralization in the United States.

A Jai Siddharth,
I Year
Civil Engineering,

HARNESSING BIO INSPIRATION IN CIVIL ENGINEERING: LESSONS FROM NATURE

Civil engineering, often characterized by its concrete structures and steel reinforcements, might seem far removed from the organic world of biology. However, a growing trend in the field is embracing biomimicry – the practice of drawing inspiration from nature to solve engineering challenges. This article explores the fascinating intersection of biology and civil engineering, showcasing how lessons from the natural world are shaping the infrastructure of tomorrow.

Source: https://images.google.com/

Structural Resilience Inspired by Trees: Trees are marvels of natural engineering, with their ability to withstand wind, storms, and even earthquakes. Engineers are studying the structure of trees to develop innovative designs for buildings and bridges that can better withstand dynamic loads and environmental stresses.

Self-Healing Materials Inspired by Skin: Just like our skin has the ability to heal cuts and bruises, engineers are developing self-healing materials for infrastructure. These materials have microcapsules of adhesive or healing agents that rupture when cracks form, effectively repairing the damage and extending the lifespan of structures.

Termite Mound Ventilation Systems: Termite mounds are remarkable examples of ventilation systems that maintain stable internal temperatures despite fluctuations in the external environment. By studying the intricate network of tunnels and airflows within termite mounds, engineers are designing more efficient HVAC systems for buildings, reducing energy consumption and improving indoor air quality.

Adaptive Facades Inspired by Plant Cells: Plant cells respond to environmental cues by opening and closing their stomata to regulate water loss and gas exchange. Similarly, engineers are developing adaptive facades for buildings that can adjust their permeability in response to changing environmental conditions, optimizing energy efficiency and occupant comfort.

Biomimetic Bridge Designs: Bridges are critical infrastructure elements that must withstand various loads and environmental conditions. By mimicking the structural principles found in natural phenomena like spider webs or bird wings, engineers are designing lighter, stronger, and more resilient bridge structures that minimize material usage and construction costs.

Conclusion:

The marriage of biology and civil engineering holds immense promise for creating sustainable, resilient, and efficient infrastructure systems. By looking to nature for inspiration, engineers can unlock innovative solutions to some of the most pressing challenges facing modern society. As we continue to delve deeper into the mysteries of the natural world, we are sure to uncover even more insights that will shape the future of civil engineering.

Mr.L.Dhanush Kannan
III Year
Civil Engineering

STUDENT'S SPECIAL TALENTS

DRAWING ON THE THEME "SELF LOVE OF A WOMEN"

R Hemalatha,
IV Year
Civil Engineering

SKETCH OF A GIRL

Vivedhitha Varshini V
IV Year
Civil Engineering

DRAWING ON THE THEME "BEAUTY OF THE NATURE"

Vivedhitha Varshini V
IV Year
Civil Engineering

DRAWING ON THE THEME "BEAUTIFUL DOLPHINS"

Kavinmalar
IV Year
Civil Engineering

PHOTOGRAPHY AS MY HOBBY.....

Vignesh A
IV Year
Civil Engineering

BUILDING SUCCESS: FINANCIAL STRATEGIES FOR A VIABLE CONSTRUCTION BUSINESS

INTRODUCTION:

As the demand for infrastructure and development continues to surge, the role of engineering graduates in the construction industry becomes increasingly vital. Establishing and maintaining a financially viable construction business requires a unique blend of technical expertise, project management skills, and financial acumen. In this article, we explore key principles that engineering students can apply to run a successful and economically sustainable construction business.

Source: https://images.google.com/

COMPREHENSIVE PROJECT COSTING:

A cornerstone of financial viability in construction is accurate project costing. Before embarking on any project, engineers-turned-entrepreneurs must meticulously estimate costs, including materials, labor, equipment, and overhead. A detailed understanding of project expenses ensures that bids are competitive yet profitable.

CASH FLOW MANAGEMENT:

Construction projects often involve a complex web of financial transactions. Effective cash flow management is crucial to ensure that there are sufficient funds to cover operational expenses, pay suppliers and subcontractors, and invest in growth. Construction business owners should implement robust invoicing and payment systems to maintain a healthy cash flow.

CONTRACT NEGOTIATION AND MANAGEMENT:

Successful construction businesses excel in contract negotiation. Engineers must develop a keen understanding of contract terms, negotiate fair agreements, and manage contracts effectively. Clear communication with clients, suppliers, and subcontractors is vital to avoid misunderstandings and disputes that can impact financial stability.

TECHNOLOGY INTEGRATION:

Embracing technology can enhance efficiency and financial performance in construction. Project management software, Building Information Modeling (BIM), and other technological tools can streamline processes, improve communication, and reduce the likelihood of costly errors.

EQUIPMENT AND ASSET MANAGEMENT:

Construction businesses heavily rely on equipment and assets. Managing these resources efficiently is essential for financial viability. Regular maintenance, strategic equipment acquisitions, and proper depreciation accounting contribute to the longevity and productivity of the construction fleet.

Source: https://images.google.com/

REGULATORY COMPLIANCE:

Construction projects are subject to a myriad of regulations. Ensuring compliance with local, state, and federal regulations is not only a legal requirement but also a financial imperative. Failure to comply with regulations can lead to fines, delays, and reputational damage.

SUSTAINABLE PRACTICES:

In an era of increasing environmental awareness, integrating sustainable practices into construction operations is not only ethical but can also yield financial benefits. Energy-efficient construction methods, waste reduction, and green building certifications can attract environmentally conscious clients and potentially result in cost savings over the long term.

RISK MITIGATION AND INSURANCE:

Construction projects inherently involve risks, ranging from unforeseen site conditions to weather disruptions. Identifying potential risks and implementing risk mitigation strategies are crucial for financial stability. Adequate insurance coverage, including liability and performance bonds, provides a safety net in case of unexpected events.

Source: https://images.google.com/

CONCLUSION:

Running a financially viable construction business requires a unique set of skills that combines engineering know-how with astute financial management. As engineering graduates venture into entrepreneurship in the construction industry, they have the opportunity to shape not only the physical landscape but also the economic landscape of their communities.

By applying these financial principles, aspiring construction business owners can build a solid foundation for success in an industry that plays a pivotal role in shaping the world around us.

Mr.G.Arun,
Assistant Professor,
Department of Civil Engineering,SVCE
garun@svce.ac.in

ALUMNI MESSAGE

"The student life at SVCE was full of fun, amazing. The co-curricular activities were filled with enjoyment. We had lot of exposure which helped us shape ourselves. The faculties were friendly and a had a healthy relationship with most of them"

Mr. Rogan Kumar M
Auckland Transport
New Zealand
2012-2016 Batch