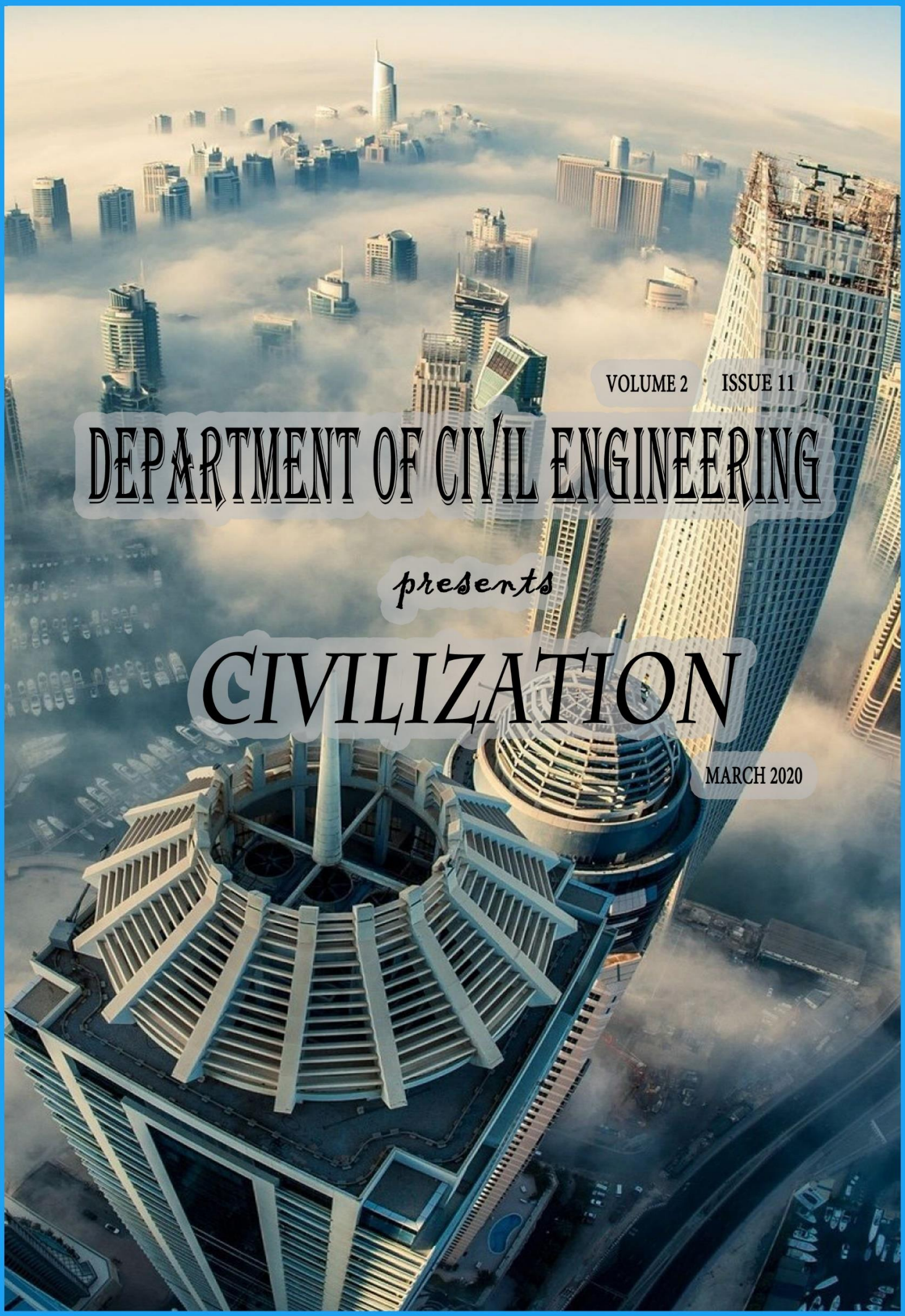


VOLUME 2 ISSUE 11

DEPARTMENT OF CIVIL ENGINEERING

presents

CIVILIZATION

MARCH 2020

VISION

- To be a Department imparting knowledge in Civil Engineering Education, Research, Entrepreneurship and Industry outreach services for creating sustainable infrastructure and enhancing the quality of Life with professional and ethical values.

MISSION

- To provide an effective learning environment enabling to be a competent Civil Engineer.
- To motivate Research and Entrepreneurial initiatives in the field of Civil Engineering.
- To inculcate ethical values to serve the society with high order Professionalism.

Hyperloop Transportation

Why India is positioned to lead the next transport revolution?

India moves 23 million people on its railway system every day, with 2400 flights taking off daily from its airports, and 230 million registered vehicles on Indian roads. I can say with certainty that business as usual and incremental change alone will not solve the transportation challenges cities face today. We need a proposition for the 21st century.

India has the chance to build the first new mode of mass transportation in over 100 years – one that is fast, safe, cost-effective, with zero direct emissions. By being the first country to have a hyperloop system, the project could create close to one million direct and indirect employment opportunities that support Make in India industries, attract investment from around the globe, and solidify the country's future as a knowledge and research hub.

Here, engineers working for Virgin Hyperloop One are testing a radically different type of mass transit: one that aims to move people and cargo in small wheel-less pods in a vacuum tube at speeds that could exceed 600 mph.

The concept was promoted by Elon Musk, of electric-car and private-rocket renown, and then offered by one of his companies as open-source technology available to all. It works by propelling pods using magnetic levitation through a low-pressure, near-vacuum tube.

The low pressure minimizes friction and air resistance, greatly reducing the power needed. And because the pods travel in a tube, they're not subject to shutdowns because of harsh weather like snow and polar vortexes.

Because of its slow take-off rate, "you'll feel 30 to 40 percent of the acceleration compared to an airplane", Babur (Executive Chief Civil Engineer) said. The trip will be so smooth, he added, that coffee wont slide even at 600 mph.

Virgin, which has raised $295 million, is in the developmental stage with projects in India and Ohio. Few months ago, the Indian state of Maharashtra

declared the company's proposed hyperloop system between Pune and Mumbai as an official infrastructure project.

Connecting Mumbai and Pune in less than thirty minutes will create one of the most globally competitive mega-economic regions, rivaling Chinas super-city clusters plan. The hyperloop system we have proposed to the Government of Maharashtra will support 150 million passenger trips annually, save 90 million hours of travel time, and bring potential economic benefits worth USD 55 billion over the next 30 years. The project ensures high ridership potential, offers affordability as a mass transit mode, becomes more effective as it scales, and provides benefits that outweigh the costs to build and operate.

This system becomes more powerful when replicated across different regional clusters. Imagine commuting between Delhi and Mumbai in 55 minutes, Mumbai-Chennai in 50 minutes, Bangalore-Thiruvananthapuram in 41 minutes, and Bangalore-Chennai in 20 minutes. Hyperloop systems can be built to inter-connect with existing High-Speed Rail (HSR) or Metro projects.

Hyperloop Transportation Technologies, which has raised $42 million, is in the design phase for a 1,100-yard test track in Abu Dhabi, United Arab Emirates.

India will become the global manufacturing and export hub for hyperloop systems which will fuel demand for high-tech jobs in India and partnerships with education institutions.

By E. Kaviya Priya

Final Year Civil B

Building Integrated Photovoltaics (BIPV)

One of the most promising renewable energy technologies is photovoltaics. Photovoltaics (PV) is a truly elegant means of producing electricity on site, directly from the sun, without concern for energy supply or environmental harm. These solid-state devices simply make electricity out of sunlight, silently with no maintenance, no pollution, and no depletion of materials.

There is a growing consensus that distributed photovoltaic systems that provide electricity at the point of use will be the first to reach widespread commercialization. Chief among these distributed applications are PV power systems for individual buildings.

Interest in the building integration of photovoltaics, where the PV elements actually become an integral part of the building, often serving as the exterior weather skin, is growing worldwide. PV specialists and innovative designers in Europe, Japan, and the U.S. are now exploring creative ways of incorporating solar electricity into their work. A whole new vernacular of Solar Electric Architecture is beginning to emerge.

A Building Integrated Photovoltaics (BIPV) system consists of integrating photovoltaics modules into the building envelope, such as the roof or the facade. By simultaneously serving as building envelope material and power generator, BIPV systems can provide savings in materials and electricity costs, reduce use of fossil fuels and emission of ozone depleting gases, and add architectural interest to the building.

While the majority of BIPV systems are interfaced with the available utility grid, BIPV may also be used in stand-alone, off-grid systems. One of the benefits of grid-tied BIPV systems is that, with a cooperative utility policy, the storage system is essentially free. It is also 100% efficient and unlimited in capacity. Both the building owner and the utility benefit with grid-tied BIPV. The on-site production of solar electricity is typically greatest at or near the time of a building's and the

utility's peak loads. The solar contribution reduces energy costs for the building owner while the exported solar electricity helps support the utility grid during the time of its greatest demand.

PV Technologies

There are two basic commercial PV module technologies available on the market today:

Thick crystal products include solar cells made from crystalline silicon either as single or poly-crystalline wafers and deliver about 10-12 watts per ft^2 of PV array (under full sun).

Thin-film products typically incorporate very thin layers of photovoltaicly active material placed on a glass superstrate or a metal substrate using vacuum-deposition manufacturing techniques similar to those employed in the coating of architectural glass. Presently, commercial thin-film materials deliver about 4-5 watts per ft^2 of PV array area (under full sun). Thin-film technologies hold out the promise of lower costs due to much lower requirements for active materials and energy in their production when compared to thick-crystal products.

A photovoltaic system is constructed by assembling a number of individual collectors called modules electrically and mechanically into an array.

Applications

Photovoltaics may be integrated into many different assemblies within a building envelope:

Solar cells can be incorporated into the facade of a building, complementing or replacing traditional view or spandrel glass. Often, these installations are vertical, reducing access to available solar resources, but the large surface area of buildings can help compensate for the reduced power.

Photovoltaics may be incorporated into awnings and saw-tooth designs on a building facade. These increase access to direct sunlight while providing additional architectural benefits such as passive shading.

The use of PV in roofing systems can provide a direct replacement for batten and seam metal roofing and traditional 3-tab asphalt shingles.

Using PV for skylight systems can be both an economical use of PV and an exciting design feature.

By V. J. Vedhanayaghi
Assistant Professor
Department of Civil Engineering

What Tsunami taught us?

A common geographic phenomenon called tsunami becomes a disaster when it affects so many people and structures beyond the society could bear. Tsunami waves hit the shore and inundate into the low-lying coastal regions with such a great force that it can cause severe damages, as any moving object can be a potential danger when it moves out of control.

After this tragic event in 2004, a Global Tsunami Warning System was set-up in areas connected with Indian Ocean, Northeast Atlantic Ocean, Mediterranean Sea and the connected areas. This is an international organization which functions in collaboration with the Intergovernmental Oceanographic Commission and gives tsunami warnings to prepare the communities, gearing up saving measures and thus, avoid heavy damages.

Glimpses of the impact of Tsunami

These organizations create awareness as to how to act during tsunami emergencies, how to read signs and initiate evacuation processes, even if the warnings are delayed. Mid to high-rise reinforced concrete buildings with robust shear walls and strong foundations have been shown to survive both earthquakes and tsunamis, which are recommended for vertical evacuation. Guidelines for tsunami risk assessment and mitigation for the Indian Ocean "knowing your tsunami risk – and what to do about it" are updated to assist coastal and emergency managers in making rational judgments on the likely scale and frequency of damaging tsunami events.

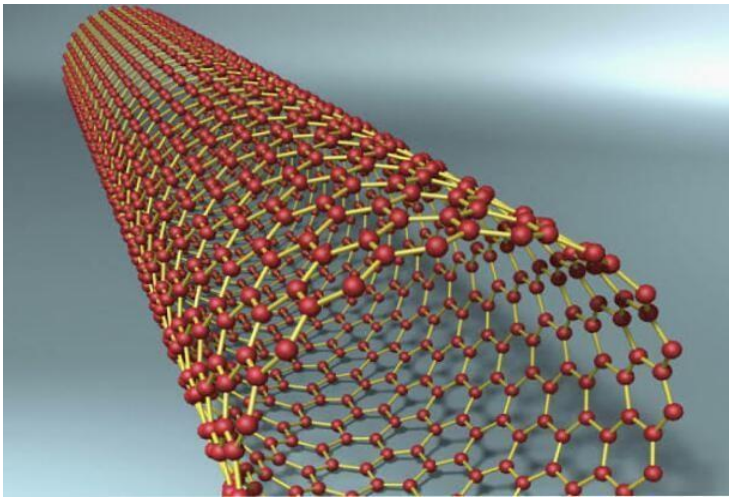
By Dr. A. Rose Enid Teresa

Professor & Head

Department of Civil Engineering

Carbon Nanotubes (CNTs)

Carbon nanotubes (CNTs) are tubes made of carbon with diameters typically measured in nanometers. Carbon nanotubes often refer to single-wall carbon nanotubes (SWCNTs) with diameters in the range of a nanometre. Single-wall carbon nanotubes are one of the allotropes of carbon, intermediate between fullerene cages and flat graphene. In this construction, periodic boundary conditions are imposed over the length of this roll up vector to yield a lattice with helical symmetry of seamlessly bonded carbon atoms on the cylinder surface.



Properties of CNT

Its mechanical tensile strength can be 400 times that of steel. They are very light-weight – their density is one sixth of that of steel. Its thermal conductivity is better than that of diamond. They have a very high aspect ratio greater than 1000, i.e. in relation to their length they are extremely thin. Carbon nanotubes are 100 times stronger than steel but at one-sixth the weight. They also conduct heat and electricity better than copper.

Soil Stabilisation Using CNT

Effects of adding CNT to kaolinite causes the liquid limit, plastic limit to increase in the mixture. This indicate that the mixture will have a lower soil strength, higher compressibility and reduced hydraulic conductivity. The presence of carbon nanotube (CNT) in a soil cement matrix has the ability to reduce the inter particle spacing, which will promote the construction of a stronger and stiffer soil skeleton matrix together with the cementitious materials, therefore improving the mechanical properties of the material. Additional CNT can lead to increased durability, decreased brittleness and increased tensile strength with routine use of large volumes of non- traditional materials like fly ash. Soil cement is extremely weak in tensile and flexural strength due to its brittleness. Thus, cracks tend to propagate quickly as the soil cement is put through undue stress in tension and by using a few amount of CNT, the problem is solved. The use of carbon nanotubes (CNT) in material science have already been documented to providing 117 times more tensile strength than steel and 30 times more strength than Kevlar (heat resistant, strong synthetic fiber used as a replacement for steel). The use of CNT also provides an increase in Young's modulus and elastic potential, which means that the soil, cement and concrete can take greater loads without any potential permanent damage.

By B. THULASIRAM
III YEAR CIVIL B

DEPARTMENTAL ACTIVITIES

STUDENT ACHIEVEMENTS

- S. Saravanan of Final Year Civil B have been placed in SUTHERLAND, Chennai.
- K. Chandrasekar (IV/A), T. Sithrubi(IV/B), P. Sandhiya (IV/B) have been placed in LANDTECH, Chennai.
- K. Sathyapriya and A. Akilan of Final Year Civil A have been placed in BESTEN, Chennai.
- K. Sathyapriya, B. Anjali Kumari Shaw, A. Balamurugan, B. Ramakrishnanan of Final Year Civil A and B. Kaaviya, R. Sarojini, P. Vinoth Kannan of Final Year Civil B have been placed in JT ALU GLAZING, Chennai.
- S. Uma Shankar and R. Vishal of Final Year Civil B have been placed in S10, Chennai.
- A. Balamurugan, J. R. Akansh Gulecha, P. Kavin, S. Indumathi of Final Year Civil A and D. Ajay Prakash of Final Year Civil B have been placed in SPEC, Chennai.
- M. J. Sathish Anand & A. Naveen Aravind of III Year B along with Mrs. S. Muthu Lakshmi/AP(SG) published a journal paper titled "Enhancement of Strength Characteristics of Clayey Sand using Fly Ash and Geonet" in Materials Today: Proceedings, Elsevier Publication.
- V. Balaji & J. Govindha Krishnan of III Year A won First Prize in Foundation Marking in Nakshatra'20 held at S.A. Engineering College on 8th February 2020.
- V. Balaji & J. Govindha Krishnan of III Year A won First Prize in Survey Treasure Hunt in Nakshatra'20 held at S.A. Engineering College on 8th February 2020.
- J. Govindha Krishnan of III Year A presented a paper titled "Pre-Engineered Cellular Beams" and also won Second Prize in Paper Presentation in Nakshatra'20 held at S.A. Engineering College on 8th February 2020.

- V. Balaji of III Year A presented a paper titled "Tunnel Formwork" and also won Third Prize in Paper Presentation in Nakshatra'20 held at S.A. Engineering College on 8th February 2020.
- V. Balaji of III Year A cleared Level 2 in National Level Technical Quiz Competition on Public Health Engineering (I Save Water), organized by Easwari Engineering College on 13th February 2020.
- S. Kousiya and M. Latika of II Year A and J. Nagarjun of II Year B participated in National Level Technical Project Exhibition & Competition "SRISHTI 2020" held at Saint Gits College of Engineering, Kottaiyam on 10th & 11th February 2020.
- K. Aravinthan, R. Ranjithraj, S. Balaji, B.V. Agaliya, S. Pavithra, M. J. Satish Anand, C. T. Singaram, E. Surya, A. Naveen Aravind, I. Vasanth and B. Thulasi Ram of III Year B attended One Day National Workshop on "Problematic Soils - Mitigation and Case Histories" held at Rajalakshmi Engineering College on 5th March 2020.
- A. Bharathiagilan of III Year A was Runner Up in Women's Volley Ball at State Level Inter-Collegiate Tournament held at S.A. Engineering College on 21st and 22nd February 2020.
- P. Ajayraj, D. Kamalesh & A. Kishore Kumar of III Year A were Winners of Independence Day Cup - Men's Throw Ball organized by Chennai District Throw Ball Association from 31st January to 2nd February 2020.
- R. Adhithya Sudees of II Year A won Second Prize in Kick Boxing at Wako India Open International Kickboxing Tournament held at New Delhi from 9th February to 13th February 2020.

INDUSTRIAL VISITS ARRANGED

S. No.	Company / Site Visited	Year/Section	Student Strength	Date
1	Waste Water Treatment Plant Nesapakkam	III / A	25	05.03.2020
2	Waste Water Treatment Plant Perungudi	III / A	25	05.03.2020
3	Waste Water Treatment Plant Nesapakkam	III / B	25	06.03.2020
4	Waste Water Treatment Plant Perungudi	III / B	25	06.03.2020
5	Waste Water Treatment Plant Koyambedu	III / B	25	06.03.2020
6	M Sand Plant - Seyyar	II / A	45	12.03.2020
7	M Sand Plant - Seyyar	II / B	45	13.03.2020

GUEST LECTURES ARRANGED

S. No	Topic	Name of the Speaker	Organization	Student Strength	Year/ Section	Date
1	Effect of Construction Admixtures in Construction Industry	Mr. M. Senguttuvan/ Managing Director & Mr. I. Venkata Swaroop/ Cluster Manager	SPEC & BASF	88	II / A & B	04.02.2020
2	Applications of Pumps and Turbines	Dr. S. Parimala Ranganayagi/ Associate Professor	VIT, Vellore	90	IV / A & B	08.02.2020
3	Career Guidance	Mr. M. Nageswaran/ Junior Engineer	RRB	90	IV / A & B	12.02.2020
4	Problematic Soils - Mitigation & Case Histories	Dr. S. Bhuvaneshwari/ Associate Professor & Dr. S. V. Sivapriya/ Associate Professor	SRMIST & SSN	88	II / A & B	05.03.2020
5	Problematic Soils - Mitigation & Case Histories	Mr. N.Sugavaneswaran/ Sr. Engineering Manager	L & T	110	III / A & B	05.03.2020

FACULTY ACCOMPLISHMENTS

RESEARCH PROPOSALS SUBMITTED

- Dr. S. Geetha and Dr. M. Selvakumar submitted a research proposal to Tamil Nadu State Council for Science and Technology on **"Development of an Engineered Wet Land System for Landfill Leachate Treatment"** for a budget of Rs.19,76,700/-.
- Dr. S. Geetha, Mr. M. Manoharan and Mr. P. Krishnakumar submitted a research proposal to Tamil Nadu State Council for Science and Technology on **"Lightweight Heat Resistant Precast Panels"** for a budget of Rs.19, 91,000/-.
- Dr. M. Uma Maguesvari, Dr. A. Rose Enid Teresa & Mr. P. Muthaiyan submitted a research proposal on **"Utilization of Pervious Concrete for promotion of water conservation and sustainable environment"** for a budget of Rs. 19,93,000/-.
- Dr. S. Geetha and Dr. M. Selvakumar submitted a research proposal on **"Self sensing multi-functional cementitious nano composite for damage assessment in smart structures"** for a budget of Rs. 52,52,452/-.
- Dr. S. Geetha submitted proposal for consultancy project on **"Potential use of Foundry Sand in Concrete"** to Sakthi Auto Components Ltd., Erode on 15th February 2020.

JOURNAL PUBLICATION

- Dr. M. Selvakumar published a journal paper titled **"Optimization of Latex Concrete with Hybrid Fibres"** in International Journal of Engineering (IOSR JEN).
- Mrs. S. Muthu Lakshmi published a journal paper titled **"Enhancement of Strength Characteristics of Clayey Sand using Fly Ash and Geonet"** in Materials Today: Proceedings, Elsevier Publication.

CONFERENCE PAPER PUBLICATION

- Dr. S. Geetha and Dr. M. Selvakumar presented a paper on **"Ductile cementitious composite with copper slag as Fine Aggregate"** at the 10th International Conference on Material Processing and Characterisation, held at GLA University, Mathura during 21st to 23rd February 2020.
- Dr. M. Selvakumar and Dr. S. Geetha presented a paper on **"Monitoring Air Pollution from Industries using Point Source Models"** at International Conference THE3E2020 held at PSG Tech, Coimbatore on 18th March 2020.

ONE DAY NATIONAL WORKSHOP ON "PROBLEMATIC SOILS – MITIGATION AND CASE HISTORIES"

The Department of Civil Engineering organized a One Day National Workshop on "Problematic Soils – Mitigation and Case Histories" on March 5th 2020. Eminent speakers from reputed Institutions and Industry such as SRM Institute of Science and Technology, SSN College of Engineering and L&T were invited to deliver valuable lecture on Geotechnical Engineering and Ground Improvement Techniques. They shared their experience and enlightened the Students and Faculty gathering. 17 external participants from various affiliated institutions and 11 internal participants from Rajalakshmi Engineering College along with the Faculty Members of Civil Engineering attended the workshop and found it to be very useful.

The programme was inaugurated by Dr. S. V. Sivapriya / Associate Professor from SSN College of Engineering followed by her lecture on "Basic Concepts in Geotechnical Engineering". Session II was handled by Dr. S. Bhuvaneshwari / Associate Professor from SRMIST on "Problems encountered in soil at the construction site". After lunch, the last session was engaged by Mr. N. Sugavaneswaran / Senior Engineering Manager of L&T, Chennai on "Real Time Case Histories related to Geotechnical Problems encountered at various sites". The

workshop was successfully completed with Mr. N. Sugavaneswaran as the Chief Guest for the valedictory function.

Inaugration of Workshop

Dr. S. V. Sivapriya / AOP

SSN College of Engineering

Dr. S. Bhuvaneshwari/AOP, SRMIST

Mr. N. Sugavaneswaran

Senior Engineering Manager, L&T, Chennai

FDP's & WORKSHOP's

ATTENDED BY FACULTY MEMBERS

- Dr. M. Selvakumar attended a National Level Workshop on "**Ion Chromatography and Water Purification Systems**" (ICWPS-2020) at VIT Chennai on 9th January 2020.
- Dr. M. Selvakumar attended AICTE STTP on "**Air delivery systems and indoor environment quality**" at IITM from 2nd to 7th March 2020.
- Dr. S. Geetha attended the SPARC workshop on "**Sustainability and Durability of Concrete Structures using By-products and Recycled Materials**" at IIT Madras Research Park during 17th & 18th January 2020.
- Dr. S. Geetha attended CII Business Session on "**Sustainable Chennai and Digital Transformation**" at Hotel Ramada Plaza on 14th February 2020.
- Mr. R. Madhavaperumal attended 3 days FDP on "**Teaching Techniques with Gamification**" from 29th to 31st January 2020 at DMI College of Engineering, Chennai.
- Mr. P. Krishnakumar attended Research Oriented Two Day Faculty Development Training Programme under the UGC XII Plan Scheme on "**Ground Water Modelling**" at Centre for Water Resources, Anna University, Chennai on 21st and 22nd February 2020.
- Faculty members of Civil Department attended One Day National Workshop on "**Problematic Soils - Mitigation and Case Histories**" held at Rajalakshmi Engineering College on 5th March 2020.

OTHER ACHIEVEMENTS

- Dr. A. Rose Enid Teresa was invited as an Expert Member for formulating Curriculum and Syllabus for Autonomous Stream at Sri Manakula Vinayagar Engineering College on 15th February 2020.

- Dr. A. Rose Enid Teresa was appointed as Board of Studies Member, Anna University Nominee at S.A. Engineering College (Autonomous Institution) and the meeting was conducted on 29th February 2020.
- Dr. M. Selvakumar delivered a Guest Lecture on "Working Principle and Design of Water Treatment Systems" for B. Arch Students on 10th February 2020.
- Consultancy work on use of Automobile waste in Concrete is being carried out for ILJIN by Dr. S. Geetha.
- Dr. S. Geetha and Dr. M. Selvakumar have carried out consultancy work worth Rs. 28,000/- for PWD Krishna water project.
- Consultancy work in material testing of concrete blocks has been carried out for Sakthi Builders.
- Faculty members Mrs. M. Hemavathy and Mr. M. Manoharan participated in Logo and Design contest for an "Indigenous Vending Machine" on 15th January 2020 at Rajalakshmi Engineering College.
- Mr. E. S. Karthic has been awarded as Registered Structural Engineer Grade-II(SE) by Chennai Metropolitan Development Authority (CMDA), Egmore.

EDITORIAL BOARD MEMBERS

STAFF INCHARGE

Mrs. S. Muthu Lakshmi / AP(SG)

STUDENT INCHARGES

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B. Anjali Kumari Shaw (IV/A)

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