Vidya Vikas Education Trust's

Universal College of Engineering

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Gujarati Linguistic Minority Institution

ACES

Association of Civil Engineering Students

FEBRUARY 2022

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THE BENCHMARK

Editor's Desk

We are pleased to present February 2022 edition of Benchmark. In this edition you will find an article on Palm Jumeirah and other contribution by Students and Faculty members of Department of Civil Engineering highlighted in the month of January. News update and departmental activities are the part along with Canva.

Department Vision:

- To excel in every area of Civil Engineering, inculcate research oriented study to explore hidden talent.
- Providing Opportunity to display creativity, out of the box thinking & innovativeness, aimed at providing cutting edge technology for sustainable development.

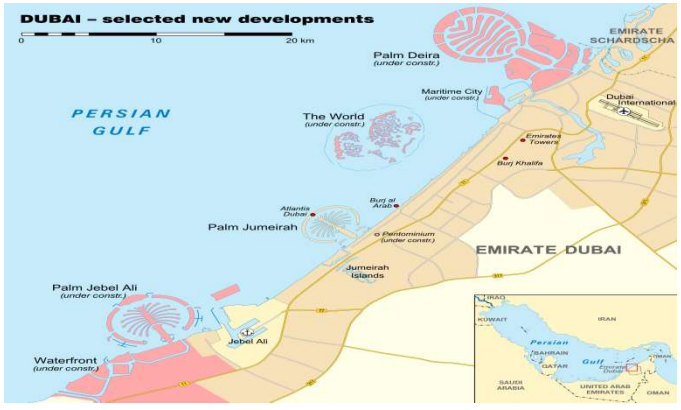
Department Mission:

- Providing qualified, motivated faculties to deliver the content using updated teaching methodology, inviting industry experts from various areas to disseminate subject knowledge in Civil Engineering.
- Motivating students to undertake the Research Oriented studies, participate in competitions at all levels, grasping new techniques and methods which can be improved on further.
- Conducting and participating in seminars, workshops and training programs with a view to make the students industry ready and improve their employability factor for global career ahead.
- To create quality professionals capable of planning, designing and analytical skills for better infrastructural development in the field of Civil Engineering.

PALM JUMEIRAH

Palm Jumeirah, artificial offshore islands in Dubai, United Arab Emirates, the site of private residences and hotels. From the air, the archipelago resembles a stylized palm tree within a circle. Palm Jumeirah was built in the early 21st century and was largely financed from Dubai's substantial income from petroleum.

Trunk, spine, fronds, and crescent are the names by which the principal sectors of Palm Jumeirah are known. The broad trunk, connected to the mainland by a bridge, serves as the entrance to the development. Another bridge connects the trunk to the spine, a narrow central axis from which 17 fronds protrude. The crescent is a breakwater that nearly surrounds the other sectors. It is divided into three sections so as to facilitate the circulation of seawater. A vehicular tunnel connects the spine to the crescent, and a transit monorail runs about 3 miles (4.8 km) from the mainland to the crescent through the spine and trunk. The crescent is 650 feet (200 metres) wide and about 10.5 miles (17 km) long altogether. At least 1,380 acres (560 hectares) of new land were created in all, within an area about 3.1 miles (5 km) in diameter.



The developer of Palm Jumeirah was Nakheel, a real estate company now owned by the government of Dubai. The master plan was drawn up by Helman Hurley Charvat Peacock, an American architectural firm. The islets were made mostly from sand dredged from the floor of the Persian Gulf, but the side of the crescent that is exposed to the open sea was shored up with stones and boulders from the mainland. Work started in 2001, and land and basic infrastructure were in place by 2004. Construction of the buildings began in 2006, and the first residents arrived in 2007.

Apartments, retail facilities, and a few hotels are situated on the trunk. Closely spaced villas line the long fronds, while most of the hotels and resorts are located on the crescent. In the second decade of the 21st century, at least 10,000 people lived in Palm Jumeirah; some estimates were much higher. The recently opened destinations The Pointe, Club Vista Mare and Nakheel Mall are the latest additions to Palm Jumeirah.

Palm Jumeirah was intended to be the first of three similarly shaped offshore developments in Dubai. The others, Palm Jebel Ali and Palm Deira, are both much larger than Palm Jumeirah. In the summer seasons, jellyfish frequent the beaches surrounding the Palm.[9] In early 2020, due to the reduction of human activity during the COVID-19 pandemic, an increase in wildlife, such as dolphins, around The Palm Jumeirah was observed.

-BY KALPITA CHAFEKAR
B.E. CIVIL

To know more about Palm Jumeirah,
Scan the QR Code

SELF-HEALING CONCRETE

Self-healing concrete is a new type of concrete. It imitates the automatic healing of body wounds by the secretion of some kind of material. To create self-healing concrete, some special materials (such as fibers or capsules), which contain some adhesive liquids, are dispensed into the concrete mix. When cracks happen, the fibers or capsules will break and the liquid contained in them will then heal the crack at once. However, self-healing concrete is only at the research stage. Its application in the concrete industry is still some way off.

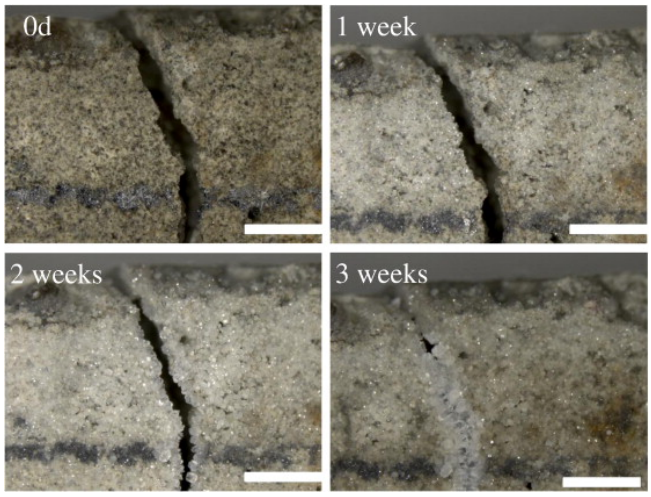
Self-healing concrete is mostly defined as the ability of concrete to repair its cracks autogenously or autonomously. It is also called self-repairing concrete. Cracks in concrete are a common phenomenon due to its relatively low tensile strength. Durability of concrete is impaired by these cracks since they provide an easy path for the transportation of liquids and gases that potentially contain harmful substances. If microcracks grow and reach the reinforcement, not only the concrete itself may be attacked, but also the reinforcement steel bars will be corroded. Therefore, it is important to control the crack width and to heal the cracks as soon as possible. Self-healing of cracks in concrete would contribute to a longer service life of concrete structures and would make the material not only more durable but also more sustainable.

Self-healing is actually an old and well-known phenomenon for concrete as it possesses some natural autogenous healing properties. Due to ongoing hydration of clinker minerals or carbonation of calcium hydroxide ($Ca(OH)_2$), cracks may heal after some time. However, autogenous healing is limited to small cracks and is only effective when water is available, thus making it difficult to control. Nonetheless, concrete may be modified to build in autonomous crack healing. Dry started to work on the autonomous self-healing concrete in 1994. In the following years, several researchers started to investigate this topic. Many self-healing approaches are proposed. They mainly include autogenous self-healing method, capsule-based self-healing method, vascular self-healing method, electrodeposition self-healing method, microbial self-healing method, and self-healing method through embedding shape memory alloys (SMAs). For example, Edvardsen found that the greatest potential for autogenous healing exists in early age concrete. Mihashi et al. used urea-formaldehyde microcapsules (diameter 20–70 μm) filled with epoxy resin and gelatin microcapsules (diameter 125–297 μm) filled with acrylic resin to achieve self-healing of concrete under compression and splitting. Joseph et al. made use of an air-curing healing agent, provided by glass tubes. One end of the tubes was open to the atmosphere and curved to supply healing agent. When the tubes become depleted after concrete cracking occurred, additional agent could be added via the open end to allow healing of wider cracks. Otsuki et al. proposed the electrodeposition method as a means of repair for cracked concrete structures and investigate the effects of this method on various concrete properties. Jonkers et al. investigated the potential of bacteria to act as self-healing agent in concrete, i.e., their ability to repair occurring cracks. They proved that application of bacterial spores as self-healing agent appears promising. Kuang and Ou, and Li et al., found that the SMA wire as reinforcing bar can make cracks close and perform the task of emergency damage repair in concrete structures. The cracks are closed due to the super elastic behavior of embedded SMAs.

The Environmental Advantage: Self-healing concrete generally reduces a significant amount of carbon dioxide emissions that result from concrete production. This is because the concrete production to some extends is very energy intensive, when transportation, mining, as well as the concrete plants are been considered. However, the industries are the main actors that are responsible for about 10% carbon dioxide emitters in the United State of America. As far as self-healing concrete increases the lifespan of the concrete as well as reduce maintenance and repairs, it will definitely reduce the production of excess amounts of concrete and this will surely reduce the carbon dioxide emissions in our environment

Some Disadvantages: There are two key obstacles that couple key impediments that require being overwhelmed if selfhealing cement is to modify concrete structure in the next ten years. The primary concern is that the clay pellets carrying the self-healing agent constitute 20 percent of the volume of the concrete. This same twenty percent usually include hard aggregate like gravel. The clay is extremely weaker than conventional aggregate and this undermines the concrete by about 25 percent and significantly decreases its compressive intensity. In numerous constructions, this would not be an obstacle except in specialized applications, wherever higher compressive strength is required like in high-rise structures, it can never be viable.

Introducing the bacteria within the concrete performs it extremely useful it improves the attribute of the concrete, which is higher than the conventional concrete. Bacteria fix the cracks in concrete by providing the calcium carbonate crystal that block the cracks and fixes it. Many researchers have done their job on the self-healing sort of concrete and they had obtained the subsequent result that bacteria develop the property of conventional concrete such as increment in 13.75 percent strength raised in 3 days, 14.28 percent in one week as well as 18.35% in week one. Nevertheless, if concrete could identify cracking and heal itself, then there would not only be meaningful cost savings, save an environmental gain in addition because concrete production accounts for an important quantity of the world's CO2 emissions.



Reference: https://www.sciencedirect.com/topics/engineering/self-healing-concrete
https://www.theijes.com/papers/vol8-issue5/Series-1/I0805014754.pdf

-PROF. SACHI PAWAR
Assistant Prof.
Dept. of Civil Engg; UCoE

Scratch Your Head!!

1) What begins with a T , ends with a T, and has T in it ?

Ans :- _____

2) The day before two days after the day before tomorrow is Saturday. What day is it today?

Ans :- _____

DEPARTMENTAL ACTIVITIES

Short Term Training Program on Soil Exploration, Investigation, characterization and ground improvement.

The Association of Civil Engineering Students in association with The Institution of Engineers (IEI), Belapur Local Centre, India had conducted a five-day, dual session training program on 'Soil Exploration, Investigation, Characterization and Ground Improvement from 3rd January to 7th January. The workshop was conducted by eminent speakers from IITs and Industries.

Survey Project- Field Visit at Khopolia

As per the syllabus prescribed by University of Mumbai, students of Second Year Civil Engineering should execute following field workunder the courses Surveying (Sem IV) & Skill based Lab (Total Station) in Sem IV. But due to Pandemic situation, we could not arrange in Sem IV, so soon after these batch's Sem V end semester examination, the Department planned for the field work considering & following all the Covid protocols. It was a 4 day visit from 20Dec 2021 to 23Dec 2021. On day 3, in the evening, 6pm onwards, there was motivational speech by UCoE Campus Director Dr. J B Patil on Future Scope of Civil Engineers and also conducted "Smart town Planning" wherein students were asked to represent their ideas as Civil Engineer for a township in 2050. Students were highly motivated, enjoyed the session and learnt the team-work & Presentation skills.

FACULTY ACHIEVEMENTS


ICTACADEMY

CERTIFICATE OF PARTICIPATION

RAJESH DUBEY

Universal College of Engineering , Mumbai

has participated in 10 Hours of Faculty Development Program on

Modern House Design in Revit Architecture (Online Live FDP)

conducted by ICT Academy on 13 Dec 2021 to 17 Dec 2021


F.No AICTE/FDP-SI/OnlineWorkshop/217/101271

ALL INDIA COUNCIL FOR TECHNICAL EDUCATION

NELSON MANDELA MARG, VASANT KUNJ, NEW DELHI

Certificate of Participation

This is to certify that Mr. Rajesh Subhash Dubey from Universal College of Engineering, Vasai has participated and successfully completed the 5-day online FDP on the theme "Inculcating Universal Human Values in Technical Education" organized by All India Council for Technical Education(AICTE) from 15th November, 2021 to 19th November, 2021.

Dr. Rajneesh Arora
Chairman
National Coordination Committee for Induction Program

Prof. Rajive Kumar
Member Secretary, AICTE


CENTRE FOR CONTINUING EDUCATION (CCE)
INDIAN INSTITUTE OF SCIENCE (IISc)
BENGALURU – 560012

CERTIFICATE

This is to certify that

SACHIN PAWAR

has participated in two-week Online Skill Development and Training course on

"Applications of Geosynthetics in Infrastructure Projects"

sponsored by Ministry of Textiles, Govt. of India, New Delhi

during 17 – 28 January 2022

Prof. G L Sivakumar Babu
COURSE CO-ORDINATOR

Prof. Madhavi Latha G
COURSE CO-ORDINATOR

Prof. G L Sivakumar Babu
CHAIR, CCE


ग्रामोदय 2022

GLOBAL VILLAGE CONCLAVE

CERTIFICATE OF PARTICIPATION

Presented to Mr. Sachin Ashok Pawar

Ideas for Waste Management

24-25th January 2022

Kalpen Shukla
President, IITDAA

Dr. Ranjana Aggarwal
Director, CSIR-NISTADS

Prof. V.K. Vijay
CRDT, IITD & National Coordinator, UBA

DID YOU KNOW

Palm Island is visible from space to the naked eye. It adds about 180 kilometer of shoreline to the mainland of Dubai. Technically, Palm Island is not an island as it is connected to the mainland by a bridge. Approximately 32 million cubic meters of sand was used in making this island.

News Bulletin

Shapoorji Pallonji completes solar assets sale to Actis

Shapoorji Pallonji Infrastructure Capital on Sunday said it has completed the sale of 194 MW of operating solar portfolio to Sprng Energy, the renewable energy arm of investment firm Actis. The divestment is part of the company's efforts to redeploy capital for the development of new solar projects. The financial value of the deal was not disclosed.

New Parliament building's cost to rise by ₹200 crore to ₹1,200 crore: Report

The new Parliament building's cost may reportedly increase by over ₹200 crore due to higher expenditure on steel and electronics. The Central Public Works Department is expected to get Lok Sabha Secretariat's approval for the enhancement, which will take the total cost to around ₹1,200 crore, PTI reported citing sources. In 2020, the government estimated a cost of ₹971 crore.

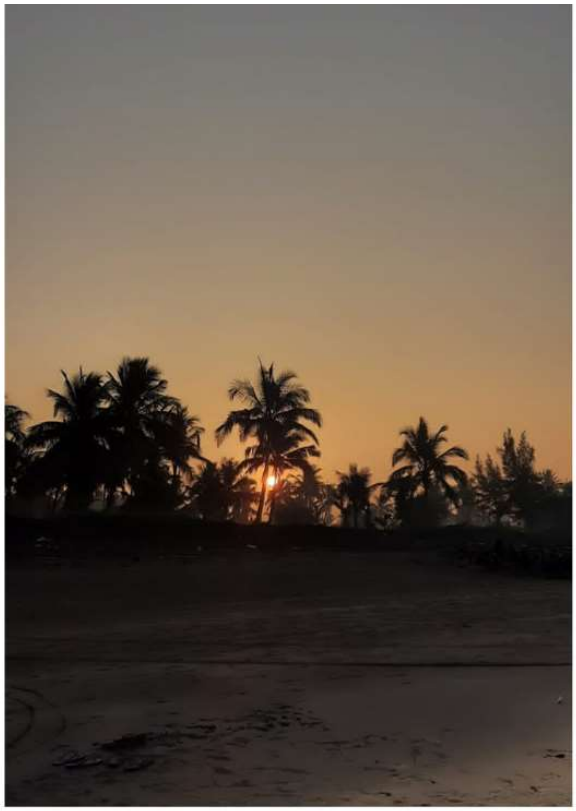
Gujarat to build ₹1,670 crore corridor linking Statue of Unity and Shabri Dham

Gujarat government has approved a ₹1,670-crore budget to build a 218-kilometre long corridor to link the Statue of Unity in Narmada district and Shabri Dham in Dang. The corridor will connect Saputara, Shabri Dham, Songadh, Ukai, Devmogra, Mathasar and Zarwani. The state government on Wednesday approved infrastructure projects worth ₹4,437 crore, including the construction of a coastal highway.

This is an infrastructure and growth-focused Budget: Windmill Capital

Capex outlay has been increased and private capital will be required to finance infrastructure projects, said Windmill Capital Pvt Ltd, a SEBI-registered research analyst - INH200007645 about Budget 2022. Enhancing viability with best practices, innovative financing, and balanced risk allocation will be facilitated to focus on growth, it added. WCPL creates baskets of stocks called smallcases.

CANVAS



PRAJAKTA PANDIT
B.E. CIVIL

KALPITA CHAFEKAR
B.E. CIVIL