



Vidya Vikas Education Trust's

# Universal College of Engineering

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Gujarati Linguistic Minority Institution



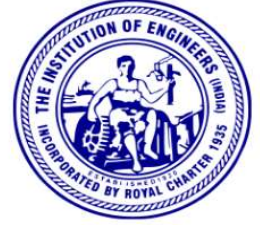
Association of Civil Engineering Students

APRIL 2022

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## THE BENCHMARK



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### Editor's Desk



We are pleased to present April 2022 edition of Benchmark. In this edition you will find an article on The Venice Tide Barrier and other contribution by Students and Faculty members of Department of Civil Engineering highlighted in the month of March. 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.

## THE VENICE TIDE BARRIER

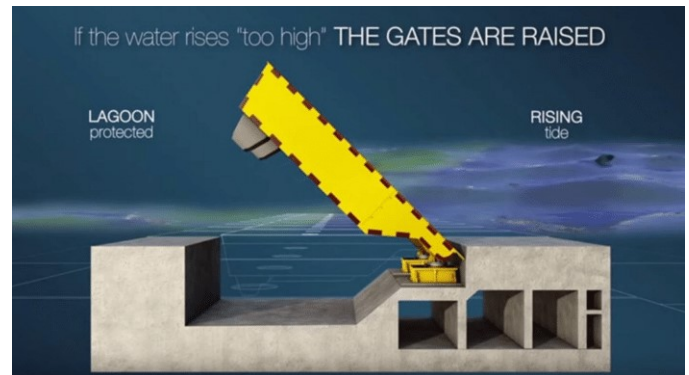
Venice is in danger of becoming the next Atlantis. That's right, this famed city is brimming with priceless art, gorgeous architecture, holy sites and water. Naturally, Italy isn't content to watch one of its cultural crown jewels slump into the sea, so the country is taking on an unprecedented water damming project, which it hopes will block out rising tides. The dam is called MOSE (Modulo Sperimentale Elettromeccanico). The name also aptly harkens to the biblical figure Moses, who parted the Red Sea. This feat is almost as incredible as the Red Sea incident. MOSE will seal off the city from rising tides so that the denizens and structures in Venice stay dry.



MOSE is necessary because Venice is slowly but surely getting swamped. The city is basically propped up in the middle of a lagoon on the eastern shore of Italy, rising just barely above the waterline on a centuries-old clutter of wooden stilts, sand and rubble. Sea tides surge in and out of the lagoon through three inlets, and these days, those tides are getting higher and higher, to the tune of more than 3 millimeters (about one-tenth of an inch) per year. But Venice's problem is more complicated than just rising water. The city itself is sinking due to a combination of soil compaction, tectonic plate shifting and extraction of fresh water from beneath the city.

All of these factors result in more frequent and more severe water intrusions onto sidewalks and streets and into homes, businesses and sacred places. In the early 1900s, the city's low-lying areas faced flooding around 10 times annually. Now, the

same places are waterlogged dozens of times per year. This isn't all that surprising when you consider circumstances from a historical perspective.



Sea levels in Venice are a whopping 6 feet (1.8 meters) higher since the city's beginnings 16 centuries ago. And in just the past century, Venice has plunged 9 inches (22.9 centimeters) into the sea. Saving Venice will take a dam of gargantuan size. And that's exactly what the Italians have in mind.

The Venice Tide Barrier is a project intended to protect the city of Venice, Italy, from tidal flooding of the Adriatic Sea. This project will consist of 78 giant steel panels across the three inlets that allow water to surge from the Adriatic into Venice's lagoon. The construction sites at the inlets, fabrication of the main components of is also proceeding. Restructuring of the buildings and spaces in the area of the Venice Arsenal where maintenance of MOSE and management of the system will be located is also underway.

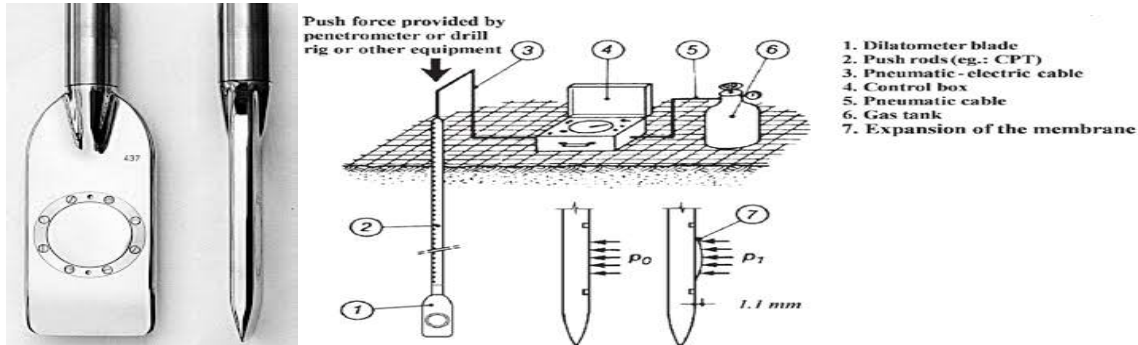
**-BY KHUSHI PATIL  
B.E. CIVIL**

*To know more about Venice Tide Barrier,  
Scan the QR Code*



## Soil Investigations: Flat Dilatometer Test (DMT) A general Overview and Applications

The flat dilatometer is a stainless steel blade having a flat, circular steel membrane mounted flush on one side (Fig. 1). The blade is connected to a control unit on the ground surface by a pneumatic-electrical tube (transmitting gas pressure and electrical continuity) running through the insertion rods. A gas tank, connected to the control unit by a pneumatic cable, supplies the gas pressure required to expand the membrane. The control unit is equipped with a pressure regulator, pressure gage(s), an audio-visual signal and vent valves.



The blade is advanced into the ground using common field equipment, i.e. push rigs normally used for the cone penetration test (CPT) or drill rigs. Push rods are used to transfer the thrust from the insertion rig to the blade. The general layout of the dilatometer test is shown in Fig. 2. The test starts by inserting the dilatometer into the ground. Soon after penetration, by use of the control unit, the operator inflates the membrane and takes, in about 1 minute, two readings: 1) the A-pressure, required to just begin to move the membrane against the soil ("lift-off") 2) the B-pressure, required to move the centre of the membrane 1.1 mm against the soil. A third reading C ("closing pressure") can also optionally be taken by slowly deflating the membrane soon after B is reached. The blade is then advanced into the ground of one depth increment (typically 20 cm) and the procedure for taking A, B readings repeated at each depth. The pressure readings A, B are then corrected by the values DA, DB determined by calibration to take into account the membrane stiffness and converted into  $p_0$ ,  $p_1$ . The field of application of the DMT is very wide, ranging from extremely soft soils to hard soils/soft rocks. The DMT is suitable for sands, silts and clays, where the grains are small compared to the membrane diameter (60 mm). It is not suitable for gravels, however the blade is robust enough to cross gravel layers of about 0.5 m thickness. Due to the balance of zero pressure measurement method (null method), the DMT readings are highly accurate even in extremely soft - nearly liquid soils. On the other hand the blade is very robust (can safely withstand up to 250 kN of pushing force) and can penetrate even soft rocks. Clays can be tested from  $c_u = 2-4$  kPa up to 1000 kPa. The range for moduli  $M$  is from 0.4 MPa up to 400 MPa. The field of application of the Flat Dilatometer Test DMT is very wide 1) Accurate settlement prediction of shallow foundations 2) Compaction control 3) Sensing the effects of pile installations 4) Liquefiability of sands 5) To verify if a slope contains slip surfaces 6) Axially loaded piles in cohesive soils 7) Laterally loaded piles 8) Pavement subgrade compaction control 9) Coefficient of consolidation and permeability of clays 10) Phreatic level in sands 11) Help in selecting FEM input parameters.

*To know more about DMT, Scan the QR code*



**-PROF. SACHIN PAWAR**

Assistant Prof.

Dept. of Civil Engg; UCOE

## COMPOSTING OF AQUATIC WEED “JALKUMBHI”



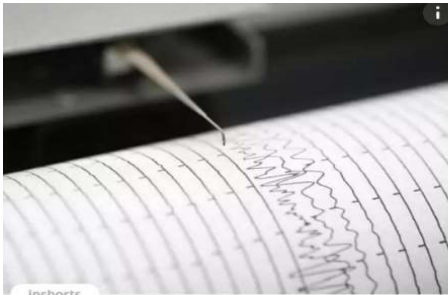
Water hyacinth is called “Jalkumbhi” in Hindi and it is observed that most of the water bodies in India are infested with this species of aquatic weed. This not only degrading the aquatic ecosystems of the area but also affecting the quality and availability of water. Water from such river or lake cannot be used for industrial or domestic use. It also adversely affecting the growth and survival of native fish species. It is observed that the best way to control the infestation of water hyacinth in water bodies of the areas is to use them to prepare compost. As water hyacinth absorbs most of the nutrients from water for self-growth, it has high nutrient content and may be used to prepare good quality of compost. Here before also water hyacinth is used in the removal of BOD, COD, heavy metals, and fluoride removal from water. Water hyacinth plant found to have more carbon, nitrogen, potassium, and phosphorous content which are essential to make good quality of compost because after preparing the compost finally we check its NPK value to assess the quality of compost.

In order to study the quality and nutritional value of water hyacinth compost, three pilots were initiated in Banbarsha village of Kharagpur cluster. Thus six cemented pits were prepared, three for organic waste and three of water hyacinth compost. Three women farmers involved in pilot compost preparation. Two rounds of compost prepared and samples from both water hyacinth compost and organic compost were sent to the laboratory for testing quality and nutritional content. A comparative analysis of both water hyacinth compost and organic compost revealed that the presence of organic carbon, potassium, nitrogen, and phosphorous was comparatively higher in water hyacinth compost. Smt. Ruby Devi from Banbarsha who was part of this pilot study on compost preparation shared that she now used only water hyacinth compost for growing vegetables like okra, ridge gourd, brinjal and bottle gourd. She has completely stopped the used of insecticides and pesticides and felt that the yield from her pilot plot was quite good. She said, “I got so many vegetables from this compost I had to distribute the surplus vegetables to other families in the village.

Such pilot study will not only improve the health of aquatic ecosystems by removing this aquatic weed from water bodies, but improve the soil health and productivity of the agricultural land through the application of compost prepared from the collected water hyacinth.

**-PROF. RAJESH DUBEY**  
Head of Department  
Dept. of Civil Engg; UCoE

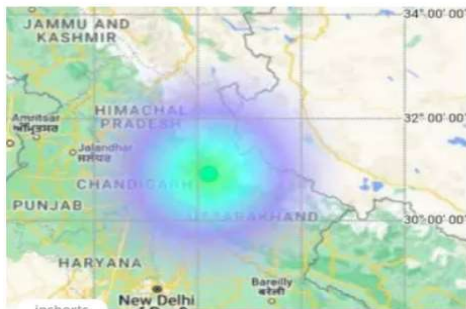
# News Bulletin



Inshorts

## Earthquake of magnitude 5.3 hits Arunachal Pradesh

According to the National Center for Seismology (NCS), an earthquake measuring 5.3 magnitude on the Richter scale hit north of Pangin in Arunachal Pradesh on Friday at 6.56 am. "Earthquake of Magnitude 5.3, Occurred on 15-04-2022, 06:56:19 IST, Lat: 38.62 and Long: 97.05, Depth: 30 Km, Location: 1176km N of Pangin, Arunachal Pradesh," NCS tweeted.



Inshorts

## 4.1-magnitude earthquake hits Uttarakhand's Uttarkashi

An earthquake of magnitude 4.1 on the Richter scale hit Uttarakhand's Uttarkashi on Saturday, the National Centre for Seismology (NCS) informed on Twitter. According to the NCS, the earthquake took place at 4:52 pm at a depth of 10 kilometres and around 30 kilometres North-West of Uttarkashi. However, no reports of damage or loss of lives have been reported yet.



Inshorts

## CAQM issues closure notices to 407 polluting units in Delhi

The Commission for Air Quality Management (CAQM) in NCR and Adjoining Areas said that it has issued closure notices to 407 industries, construction and demolition sites across Delhi. It added that 4,890 sites were inspected by 40 flying squads till February 15. The fresh inspections found 392 of these units had remained shut until February 15, CAQM stated.



Inshorts

## Delhi NCR developers plan to halt construction as raw material costs soar

Developers in Delhi NCR are planning to stop purchase of raw materials and construction activity due to rising raw material costs, according to industry body CREDAI NCR. "After COVID-19, the current crisis is a dual blow on real estate developers," said CREDAI NCR President Pankaj Bajaj. CREDAI members in Maharashtra are also planning to stop work for the same reason.



Inshorts

## Rajkot International Airport expected to be functional by Aug-Sep

The Hirasar Airport or Rajkot Greenfield International Airport is expected to be functional by August or September 2022, the Rajkot District Magistrate said. "There is very good progress in the construction work. About 85% of work on the runway is complete," he added. Located 30 kilometres from the Rajkot industrial city, the airport will cover an area of 1,032 hectares.



Inshorts

## 25 dead in landslides and flooding caused by storm in Philippines

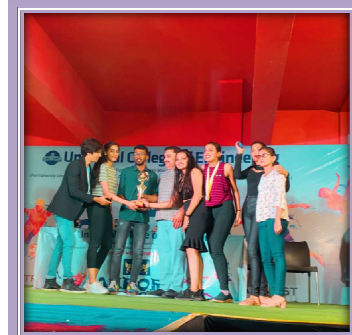
Landslides and floods caused by tropical storm Megi have left at least 25 people dead in the Philippines, authorities said on Monday. At least six people are missing and rescue operations are being carried out to find them, an official said. Notably, Megi is the first storm to hit the country this year, which sees around 20 such storms annually.



# DEPARTMENTAL ACTIVITIES

## AURORA 2022

This time BE civil won the 1<sup>st</sup> prize for fashion show (theme- breaking stereotypes), Drama (theme- Covid journey) and Girls Kabbadi. Also gold in various individual events and runner up in various sports.



## VYRO 2022

### Civil Events

#### *Crane-o-mania*

Students had to showcase their technical skills by building a crane with ice cream sticks that should carry maximum load with minimum deflection.

#### *Rapid survey*

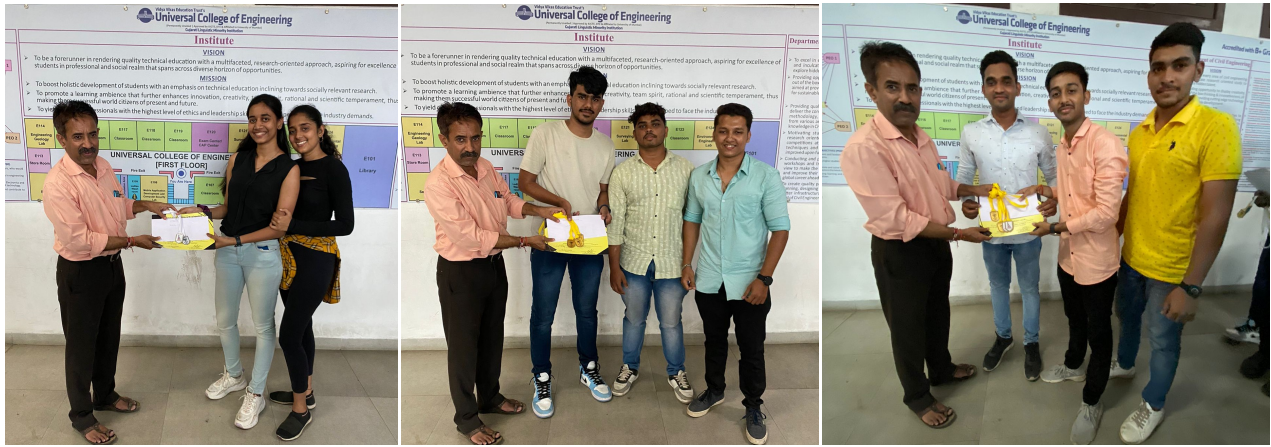
Students had to use surveying instruments like theodolite and autolevel. Inside a classroom, calculate the areas of given outline.

#### *Urbania*

Students had to put forth their new and innovative ideas by designing a smart city at a conceptual level and explain their design to judges.

#### *Tech housie*

Students played housie in a technical manner, wherein the numbers were replaced by the answers which were asked by the host.



## BHANDARDHARA

An industrial visit was arranged for final year and third year students at bhandardhara dam. The visit was for 1 night and 2 days from 14 march 2022 to 15 march 2022. Students were taken to bhandardhara dam and power plant.



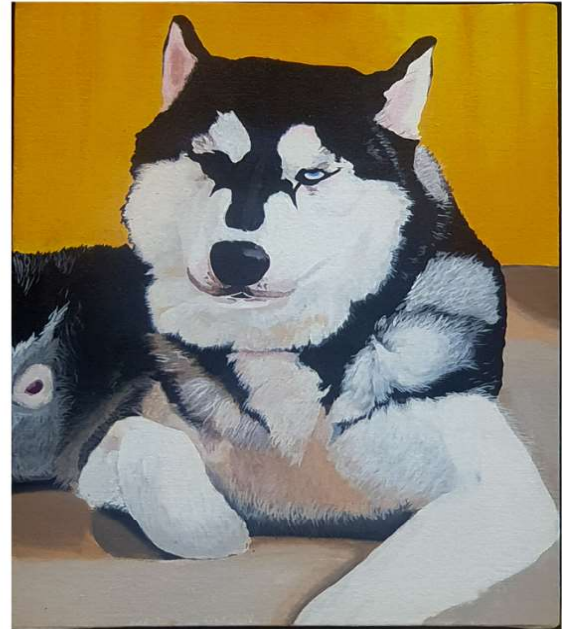
## UPCOMING EVENT

### JUNIOR TANTROTSAV

Junior Tantrotsav is an event where all the engineering minds meet to compete, which enhances their practical knowledge. It aims to foster scientific temper, innovation, inquisition, and creativity among the masses and to enlighten young minds through technology.

Join us on 23<sup>rd</sup> April 2022 for Jr. Tantrotsav conducted for Diploma Students

# CANVAS



**PRANAY CHUDASAMA**  
**B.E. CIVIL**