



Vidya Vikas Education Trust's

Universal College of Engineering

Gujarati Linguistic Minority Institution

Approved by AICTE, DTE, Maharashtra State Government and Affiliated to Mumbai University
Accredited with "B+" Grade by NAAC



The Benchmark

Issue 24: July 2020 Edition

Patrons

Dr. Jitendra B. Patil
- Campus Director

Mr. Rajesh Dubey
- H.O.D., Civil

POST BEARERS

Mr. Shubham Sawant
- IET Head

Mr. Pranav Tawale
- General Secretary

Mr. Sanket Darekar
- Joint Secretary

Mr. Chirag Shetty
- Treasurer

Mr. Rahul Patil
- Technical Head

Mr. Chirag Gangani
- Event Head

Mr. Vighnesh Pandit
- Public Relation Officer

Ms. Takshika Bhut
- Hospitality Head

Mr. Divit Mistry
- Discipline Head

Ms. Sanya Kaur
- Documentation Head

Mr. Yash Patel
- Creative Head

Mr. Brijesh Chauhan
- Logistics Head

EDITORS

Mr. Jay Jagada

Ms. Vrushali Sawant

FACULTY ADVISORS

Ms. Swapnali Onkar

Mr. Rajesh Dubey

BUS RAPID TRANSIT SYSTEM (Pg. - 02)



Concrete Cafe



Seismic River

Gravel Garden

Grouting Gym

Canvas (Pg. - 08)

Tension Tower

Volume Village

Editor's Desk

We are pleased to present July 2020 Edition of Benchmark. In this Edition you all will find an article on "Bus Rapid Transit System" This edition focusses on sanitation of water and mechanically stabilized earth wall structure. Other contributions of students & faculties of Department of Civil Engineering in the month of June is highlighted.

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

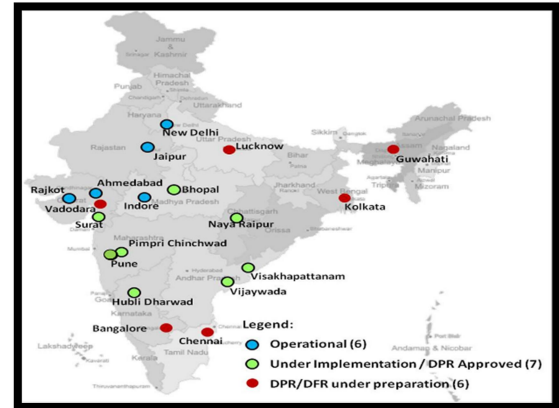
- Providing qualified, motivated faculties to deliver the content using updated teaching methodology, inviting industry experts from various areas to disseminate subject knowledge in Civil Engineering.
- Motivating students to undertake the Research Oriented studies, participate in competitions at all 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.

Bus Rapid Transit System

Overview

- Bus Rapid Transit (BRT), also called a bus-way or transit-way, is a public transport system designed to improve capacity and reliability relative to a conventional bus system. It typically includes roadways that are dedicated to buses to reduce delays caused by passengers boarding or leaving buses, or purchasing fares. BRT aims to combine the capacity and speed of a metro with the flexibility, lower cost and simplicity of a bus system.
- Vehicle capacity, which can range from 50 for a conventional bus up to some 200 for an articulated vehicle arranged for standing passengers. The theoretical maximum through put measured in passengers per hour per direction for a single traffic lane is some 90,000 passengers per hour i.e. 250 passengers per vehicle and one vehicle every 10 seconds.
- The first BRTS in India is Rainbow Bus Rapid Transit System in Pune, started in 2006. Buses take up over 90% of public transport in Indian cities. Services are mostly run by state government owned Transport Corporations.
- BRT systems have proved efficient in terms due its features are segregated busways on the majority of the network length, location of the bus station, provides a good integration of network of routes and corridors.
- Be included in the system, kerbside stops allowed-to cater to the existing routes, any kind of bus is allowed to enter the system and on board On contrary open BRT system has flexibility in features such as allows existing bus routes to ticketing is acceptable in this system.
- As the government of India is planning for building 100 smart cities across the country, BRT will be a major contribution towards a sustainable and cost effective mode of transport system. Adoption of better techno-management practices, and proper planning, adequate budgetary provision for funding etc. can make BRTS an effective and efficient mode of public transport system in India.

Photos



India's first high-quality bus-rapid-transit system was inaugurated in 2009 in Ahmedabad — the Janmarg bus-rapid-transit. Janmarg set a national benchmark and inspired systems across India, including the Rainbow bus-rapid-transit in the twin cities of Pune and Pimpri-Chinchwad that was launched in 2015.



DID YOU KNOW?

Mushrooms can be made into bricks that are strong enough for building structures. They are solid, lightweight, biodegradable, made with agricultural waste, and producing them created no carbon emissions.

To know more about Bus Rapid Transit System, Scan the QR Code



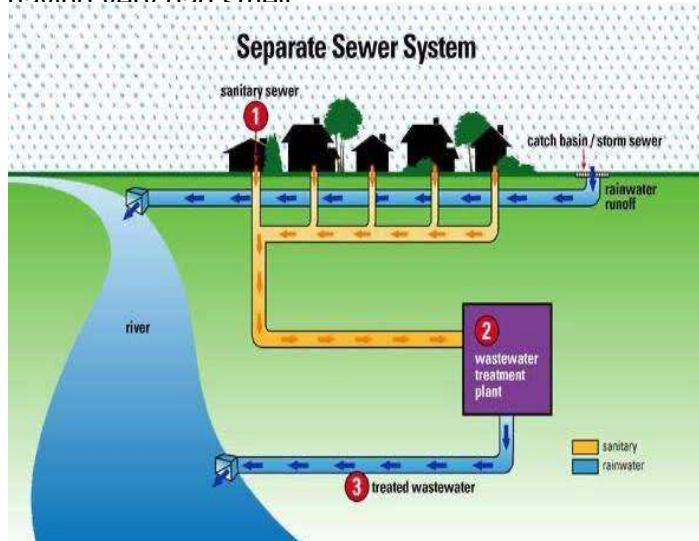
Page 03: - Sanitation Of Karivali

Karivali is a town in the Thane district in the state of Maharashtra. Karivali is located nearly 55 km to the northeast of the Mumbai city center. Karivali lake is the main lake streaming beside the town along with many other ponds. In the same lake a sewer is connected in which all the industrial municipal and domestic wastewater is disposed. The effluents are mainly from textile and dyeing industries is causing pollution. Sanitation is the important which covers the important aspects of management of human excreta, domestic and industrial wastewater and hazardous substances.

Most diarrheal deaths in the world (88%) are caused by unsafe water, sanitation or hygiene. Every year, 1.5 million children die due to diarrhoea caused by the combined effects of inadequate sanitation, unsafe water supply, and poor personal hygiene. There are two major indicators to measure the progress of India - one is drinking water supply and the other is sanitation. The situation is further aggravated due to the movements of carts and animals which result in the creation of pot holes and ditches that gets filled up with dirty stagnant water.

The mosquitoes and flies find good breeding centers in these places and spread diseases. Furthermore, the agricultural waste and domestic refuse collect in drains obstructing the flow of water and ultimately, all these things appear on the streets. The objective of this study is to suggest steps to improve Sanitation and analysis of Waste Water at Karivali site. To suggest the appropriate treatment method of the industrial and municipal waste water to reduce the impurities present in it and maintain good sanitation of the area through which drainage flows.

We have collected the waste water sample from the drainage to study its physical, chemical characteristics. We have carried turbidity test on water and its turbidity found to be 13 NTU. So by providing coagulation cum sedimentation tank we can reduce the turbidity of water. Another test conducted was Odour test and this water sample was having very bad smell.



In 1977, the United States military began decontamination of Enewetak and other islands. During the three-year, \$100 million cleanup process, the military mixed more than 111,000 cubic yards (85,000 m³) of contaminated soil with Portland cement and buried it in an atomic blast crater. Today, a concrete dome covers the material.

Scratch Your Head!!

1) Which of the following values of pH represents a stronger acid?

- A. 2 B. 5
C. 7 D. 10

This drain also carries waste from WC along with industrial waste. It creates a large odour nuisance for the people leaving around the drainage area. The threshold odour number for this sample has found to be 801. This indicates that anaerobic condition developed due to non-availability of dissolved oxygen. Such highly odorous water can be treated either by aeration or dilution. We have diluted this sample 801 times its original volume in the laboratory which is practically not possible on site. The municipal corporation should take necessary action against those who are polluting it with human waste or they should provide an aeration unit to increase dissolved oxygen content.

Total suspended solids and dissolved solids found to be within permissible limits and pH of water around 7.18. Alkalinity of water is found to be 62 mg/l and chloride content found to be 1800 mg/l whereas the permissible limit is 250 mg/l. The total hardness of water found to be 36 mg/l and BOD of waste water is found to be 320 mg/l.

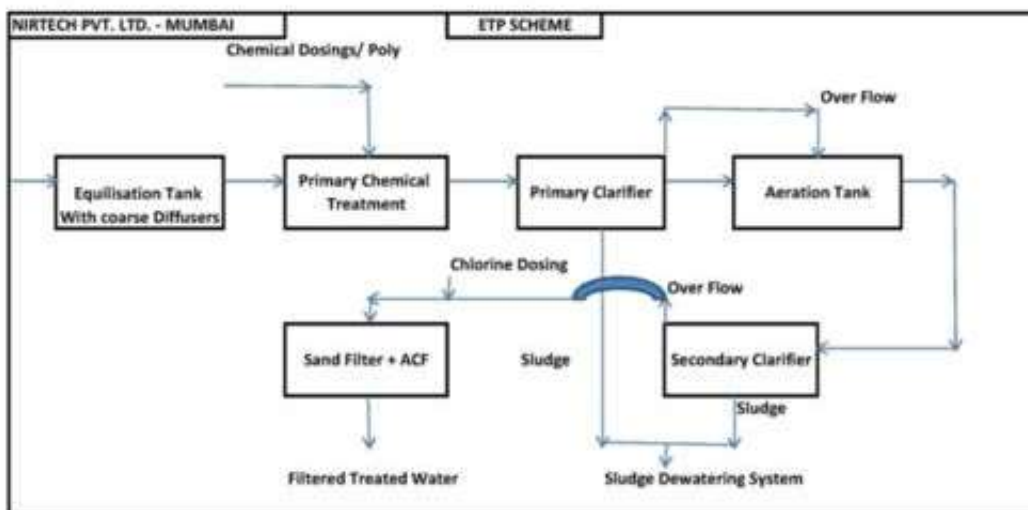
The BOD content is high as wastewater in the drainage system carries human waste with industrial waste, which leads to bad smell in the atmosphere and unhygienic conditions which may spread diseases like malaria.

The 320 mg/l of BOD can only be controlled by creating awareness among people that they should not discharge toilet waste into drainage or by providing a biological treatment unit (sewage treatment plant).

By providing a sedimentation tank followed by an aeration unit followed by an activated sludge process unit, this water can be treated and then it should be discharged into a nearby waterbody.



To maintain the sanitation of Karavali village, the drainage line should be properly covered throughout its length so that there will not be emission of foul gases in the surrounding area. A proper bed slope should be provided to drainage so that no silting will occur and self-cleansing velocity will generate. Apart from this, along the drainage line, inspection chambers such as 'Manhole' or 'Lampole' should be provided and regular maintenance of sewer should be carried out.



-Mr. Rajesh Dubey
Asst. Professor UCoE



"Live as if you were to die tomorrow, Learn as if you were to live forever."
-Mahatma Gandhi

Page 05:- Mechanically Stabilized Earth Wall

Mechanically Stabilized Earth Walls (MSEWs) and Reinforced Soil Slopes (RSSs) are cost-effective soil-retaining structures that can tolerate much larger settlements than reinforced concrete walls. By placing tensile reinforcing elements (inclusions) in the soil, the strength of the soil can be improved significantly. Use of a facing system to prevent soil raveling between the reinforcing elements allows very steep slopes and vertical walls to be constructed safely.

Inclusions have been used since prehistoric times to improve soil. The use of straw to improve the quality of adobe bricks dates back to earliest human history. Many primitive people used sticks and branches to reinforce mud dwellings. The use of geotextiles in MSE walls and RSS started after the beneficial effect of reinforcement with geotextiles was noticed in highway embankments constructed over weak subgrades. The first reported use of reinforced steepened slopes is believed to be the west embankment for the Great Wall of China. The introduction and economy of geosynthetic reinforcements has made the use of steepened slopes economically attractive

1. MSE Walls

MSEW structures are cost-effective alternatives for most applications where reinforced concrete or gravity type walls have traditionally been used to retain soil. These include bridge abutments and wing walls, as well as areas where the right-of-way is restricted, such that an embankment or excavation with stable side slopes cannot be constructed. They are particularly suited to economical construction in steep-sided terrain, in ground subject to slope instability, or in areas where foundation soils are poor.

In such cases, the elimination of costs for foundation improvements such as piles and pile caps, that may be required for support of conventional structures, have resulted in cost savings of greater than 50 percent on completed projects.

2. Reinforced Soil Slopes

Reinforced soil slopes (RSS) are a form of mechanically stabilized earth that incorporate planar reinforcing elements (typically geosynthetics) in constructed earth sloped structures with face inclinations of less than 70 degrees. Multiple layers of reinforcement are placed in the slope during construction or reconstruction to reinforce the soil and provide increased slope stability. RSS structures are cost-effective alternatives for new construction and reconstruction where the cost of fill, right-of-way, and other considerations may make a steeper slope desirable. There are two primary purposes for using reinforcement in engineered slopes.

1. To increase the stability of the slope, particularly if a steeper than safe unreinforced slope is desirable or after a failure has occurred
2. To provide improved compaction at the edges of a slope, thus decreasing the tendency for surface sloughing Reinforced Fill Materials .



Scratch Your Head!!

2) The width of the analogous column in the method of column analogy is?

- | | |
|-----------|------------|
| A. $2/EI$ | B. $1/2EI$ |
| C. $1/EI$ | D. $1/4EI$ |

MSEW Structures MSE walls require high quality wall fill for durability, good drainage, constructability, and good soil reinforcement interaction which can be obtained from well graded, granular materials. Many MSE systems depend on friction between the reinforcing elements and the soil. In such cases, a material with high friction characteristics is specified and required. Some systems rely on passive pressure on reinforcing elements, and, in those cases, the quality of reinforced wall fill is still critical. These performance requirements generally eliminate soils with high clay contents. From a reinforcement capacity point of view, lower quality wall fills could be used for MSEW structures; however, a high quality granular wall fill has the advantages of better drainage, providing better durability for metallic reinforcement, and requiring less reinforcement. There are also significant handling, placement and compaction advantages in using granular soils. These include an increased rate of wall erection and improved maintenance of wall alignment tolerances.

RSS Structures Reinforced Soil Slopes are normally not constructed with rigid facing elements. Slopes constructed with a flexible face can thus readily tolerate minor distortions that could result from settlement, freezing and thawing, or wetting-drying of the backfill. As a result, any soil meeting the requirements for embankment construction could be used in a reinforced slope system. However, a higher quality material offers fewer durability concerns for the reinforcement, and is easier to handle, place and compact, which speeds up construction.

Methodology and Model:

The major factors that consider for the selection of an MSE/RSS include: 1. Geologic and topographic conditions, 2. Environmental conditions, 3. Size and nature of the structure 4. Aesthetics, 5. Durability considerations, 6. Performance criteria, 7. Availability of materials 8. Cost

Soil samples should be visually examined and appropriate tests performed for classification according to the Unified Soil Classification System (ASTM D2488). Index testing includes determination of moisture content, Atterberg limits, and gradation. The dry unit weight of representative undisturbed samples should also be determined. Shear strength determination by unconfined compression tests, direct shear tests, or triaxial tests will be needed for external stability analyses of MSE walls and slopes. At sites where compressible cohesive soils are encountered below the foundations of the MSE structure, it is necessary to perform consolidation tests to obtain parameters for performing service state settlement analyses.



The design techniques uses limit equilibrium method for stability analysis of mechanised earth slope The computer software can be used to analyze the stability of slope. Intermediate soil layers are often provided in the fly ash embankment for ease of construction, to facilitate compaction of ash and to provide adequate confinement. While constructing high embankments using fly ash, to avoid the possibility of any liquefaction to occur, fly ash should be properly compacted to at least 95 per cent of modified proctor density and in case water table is high, it should be lowered by providing suitable drains or capillary cut-off.



-Mr. Sachin Pawar
Asst. Professor UCoE



"The greatest sin is to think yourself weak."

-Swami Vivekanand

Page 07: - Yoga Day And Environmental Day

YOGA DAY

Our honorable P.M. Shri NARENDRA MODI proposed Yoga Day on 27th September 2014. Every year 21st June is celebrated as international yoga day. Yoga is an invaluable gift of Indians ancient tradition. It embodies unit of mind and body, thought and action, restraint and fulfilment.

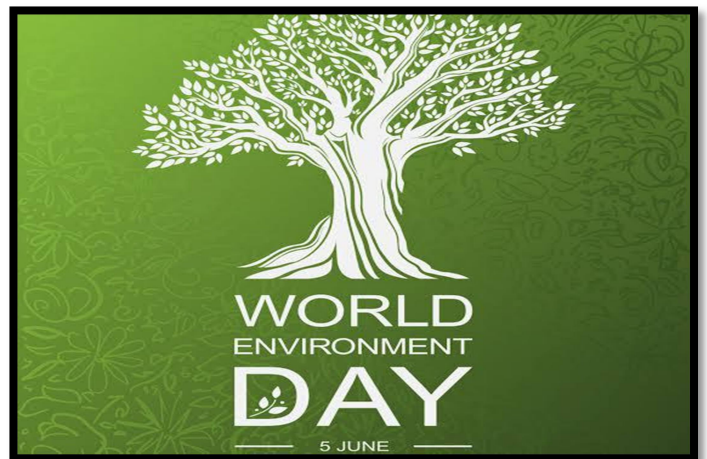
This year on 6th WORLD INTERNATIONAL YOGA DAY Universal college of engineering commemorate yoga day. An initiative was taken by NSS volunteer involving all NSS volunteers, teaching faculties and other beneficiaries.

Due to corona pandemic we celebrated this event staying at home being safe. Occasion started with words of NSS program officer MS. SWAPNALI ONKAR. She advised us as in this fitness treak world people relied on gymnasium from a long time due to corona pandemic all gymnasium, sports club are shut close to in inculcate social distancing. In this time span Yoga can have proved efficient as it can be done at home without interruption to social distancing.

Further the session was handed over to faculty coordinator MR. DEEPAK DAVE. A online video was launched on platform such as Google meet and you tube. This video included various asanas performed by student MS. SUVARNA JADHAV. Audio upgradation of video and editing were taken care by MR. YASH JANI and MR. MEGHADATTA KORGAONKAR. All participants performed these asanas at their home along at their family members. The video also includes information about our immunity system and some immunity boosting practices were discussed. The online session proved helpful to once again evoke yoga practice in day to day life.

WORLD ENVIRONMENTAL DAY

World Environment Day (WED) is celebrated on 5 June every year, and is the United Nations' principal vehicle for encouraging awareness and action for the protection of the environment. First held in 1974, it has been a flagship campaign for raising awareness on environmental issues emerging from marine pollution, human overpopulation, and global warming, to sustainable consumption and wildlife crime. World Environment Day has grown to become a global platform for public outreach, with participation from over 143 countries annually. Each year, WED has provided a new theme that major corporations, NGOs, communities, governments and all celebrities worldwide adopt to advocate environmental causes.



"The best way to find yourself is to lose yourself in the service of others."
-Mahatma Gandhi

Better to Help then Regret

Growing up, I always thought of having a husband who would love me immensely for who I am. Being financially poor, I always hesitated to go out for a movie or simply a drink, dreaming positively that it's no problem, I'll have my good days with my husband, why waste my parents hard earned money? I was under average in my educational career but had a keen interest in artistry which I wasn't aware of then.

One day, a friend asked me if I wanted to accompany her to join a makeup course. I thought of it as an opportunity to get a decent source of income since I wasn't earning a penny. She dropped off amidst but I completed it and eventually got a job as I, for instance, had found my passion. After a couple of happy years, I was married off to a man, Sumit Kumar, who had his own house and was a businessman. There it was, Sumit Kumar Weds Pratika Shetty, I sat looking at the wedding invitation card with content that all my dreamy days of having a wonderful partner for life would come true.

Little did I know that I was going to have to stay in a joint family with 10 people in a two room flat. Within a year of my marriage, I found out my husband wasn't a businessman, his brother was one. My husband used to sell lottery tickets. Felt deceived but I still let it go out of love. Yea! Sounds pretty dumb of me but I had a pati pameshwar type approach towards my marriage.

I was never enough for my husband as a wife. I had to cook in the morning and leave for work, return back home by 10:00 pm only to eat all the leftovers without a single kind word from Sumit. I loved my husband despite his flaws, gave him my salary for managing the house. My days worsened after he started physically abusing me. I ended up being emotionally stressed at work. My husband didn't drink nor smoke, had an amazing personality socially, had family support and I was alone, completely left out. I really tried being the perfect wife, managing the house as well as work but nothing worked. He made me miserable with nowhere to go, kept a watch on me by coming to my workplace so I couldn't meet my family members.

My husband didn't drink nor smoke, had an amazing personality socially, had family support and I was alone, completely left out. I really tried being the perfect wife, managing the house as well as work but nothing worked. He made me miserable with nowhere to go, kept a watch on me by coming to my workplace so I couldn't meet my family members.

I couldn't share anything with my colleagues as they were friends with him and thought of him as a perfect husband. I felt like I was drowning with nobody to help me, absolutely nobody. I've had several sleepless nights with tears in my eyes, trying not to sniff so he couldn't hear me. Thought I wasn't enough and continued self-doubting myself as a wife. Cursed myself to be born with this fate. I preferred spending time alone to stay away from my colleagues. Continued blaming myself and kept going down this dark, dark hole of self guilt.

One day, Sumit hit me so much that I had bruises on my face and hands. I left the house for work in the same condition. I reached work, got a lot of stares but ignored. During lunch time, a female colleague came forward and asked me what had happened. After insisting, I told her and she couldn't believe that Sumit could do such a thing, gave me hug and I let go. Cried my guts out and shared everything. She stayed alone on rent and offered help, told me not to go home and to file for a divorce. She, out of all the people reached out for help, a complete stranger. It took a lot of strength to get out of all this but if it wasn't for her, I would have died internally. She gave me hope to live, to be confident, to be independent and most importantly, to fight. Today, I own a house, live alone, visit my family, have friends and I have her, Alicia, my best friend. I am living all my dreams, I go for movies, cafes and am a successful makeup artist. So what if I do it alone. Sometimes, you just need someone who listens. It can make a huge difference, it can save a life. It's better to help than regret when it's too late. Be happy and stay strong. You are not alone.

-Vrushali Sawant
B.E. CIVIL

ANSWERS to "Scratch Your Head"

1) 2 2) 1/EI