

AICTE Training and Learning (ATAL) Academy sponsored online Faculty Development Program on Environmental Geotechnology

(21st - 25th June 2021)

The ATAL academy sponsored online faculty development program on Environmental Geotechnology was inaugurated by our Honorable Director, Prof. Dr. Gopal Mugeraya on 21st June 2021. Prof. Dr. D N Singh, IIT Bombay delivered the keynote lecture. Dr. Sreeraj E S, HoD, presided over the function. The event was conducted on Cisco webex platform and consisted of faculty members, research scholars and students from various institutes pan India. The coordinator of the event was Dr. Harikumar M and the Co-coordinators of the event were Dr. Harish N, Dr. Prasenjit Ghosh, Mr. Tanvesh Dabholkar and Ms. Vanessa Fernandes. The student volunteers were Ms. Sudeeptha, Ms. Ganga Pratima, Ms. Mahima Rawal, Mr. Manas Hadkar, Ms. Krishnapriya S, Mr. Hariom Saraswat and Ms. Shefali Mhaldar. The technical team constituted of Mr. Nikhil Thakur, Mr. Nijin Mambrol and Mr. Rameez Rahman.

The main aim of this multidisciplinary topic includes solutions to present day problems such as scarcity of construction materials, non-availability of land, energy crisis, carbon sequestration, effect of climatic conditions on strength and stability of soil structures, disposal and management of industrial by products, design and functioning of landfills, solid waste management, waste water and sludge, treatment, soil and ground water contamination and many more. Therefore this FDP aims at dissemination and sharing knowledge on various areas of research related to Environmental Geotechnology.

There were total of 13 expert speakers from various IITs, NITs and Goa College of Engineering and one session was from Art of living.

The course contents of the session included introduction to Environmental Geotechnology, Municipal Solid Waste Landfills. Seismic behavior, Geotechnical aspects and treated techniques, sustainable soil stabilization technique, Environmental friendly Bio-retention systems, soil contamination and remediation of contaminated sites. A few snapshots of the sessions are given below:

21st June 2021 - Inaugural Session



21st June - Session 1 - Dr. DN Singh, IIT Bombay

Environmental Geotechnology

Dr. D. N. Singh (DNS)
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ATAL Academy
Online faculty development program
National Institute of Technology Goa

June 21, 2021

❖ Various Geoenvironmental Issues

- Excessive mining (of minerals)
- Ground water depletion
- Siltation of agricultural lands
- Soil erosion
- Coastal waste dumping

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Key Considerations:

- Use the concepts pertaining to **Circular Economy** in order to create an online exchange for realizing the source value embedded in IBPs.
- **Technology as an enabler to:**
 - bridge the gap between the creator and user of IBPs.
 - generate data based inputs to the industry.
 - promote transparency
- **Livelihood generation – foster environmental entrepreneurship/multiplier effect.**
- **Convert 'waste' to 'wealth': Mitigate effects on the climate change.**

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CeGRain
Centre for Geoenvironmental Research and Innovation
<http://www.cegrain.org/>

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Dr. DN Singh, IIT Bombay gave a talk on *introduction to Environmental Geotechnology*. He spoke on the 17 sustainable development goals. The various geotechnical issues such as excessive mining, ground water depletion, siltation of agricultural lands and coastal waste dumping were explained in depth in the lecture. His lecture also included about the industrial byproduct for sustainable infrastructure development.

21st June - Session 2 - Dr. Munesh K Chandel, IIT Bombay

The screenshot shows a Zoom meeting interface with a presentation slide. The slide title is "Landfill Mining" and the presenter is Dr. Munesh K Chandel, Associate Professor at the Environmental Science and Engineering Department, Indian Institute of Technology Bombay, Mumbai - 400756, INDIA. The slide also features the IIT Bombay logo.

The screenshot shows a Zoom meeting interface with a presentation slide titled "Principal Drivers for Landfill Mining". The slide lists the following points:

- The potential of the landfill mining depends on the resource and energy recovery from the lying resources in landfill.
- Through the previous studies, we can easily define the principle drivers for the Landfill mining. They can be classified in following categories:
 - 1: Waste to Energy
 - 2: Waste to Materials
 - 3: Waste to Land
 - 4: Environmental Issues

The screenshot shows a Zoom meeting interface with a presentation slide titled "Technology for Waste Excavation and Processing". The slide lists various technologies categorized into:

- Excavation**
 - Trackhoe and backhoe excavators
 - Bulldozers
 - Grappling Hoes
- Screens**
 - Trommel
 - Vibrating
 - Disc/star
- Size Reduction/Shredding**
 - Hammermills - vertical and horizontal shaft
 - Shear shredder
 - Grinders - roller, disc-mill, ball mill
 - Rotary, guillotine and scissors-type shears
 - Flail mill
 - Knife mill
- Ferrous Metal Separators**
 - Overband magnets
 - Drum magnets
 - Head pulley magnets
- Non-Ferrous Metal Separators**
 - Eddy current separators
- Air Technologies**
 - Drum separators
 - Windshifter
 - Air knife
 - Air classifiers
- Handling Equipment**
 - Front-end loaders
 - Grapples
 - Conveyors
 - Forklifts

The screenshot shows a Zoom meeting interface with a presentation slide titled "Case study for Landfill mining in India: Waste characteristics and potential valorization". The slide includes a diagram of a waste processing flow and a pie chart showing the composition of waste excavated from an Indian dumpsite. The diagram shows the process from "Mulund Dumpsite" through "Excavation" to "Sorting" and "Material Recovery". The pie chart shows the composition of waste excavated from an Indian dumpsite, with categories like "Paper/Cardboard", "Plastic", "Metal", "Glass", "Textile", "Food", "Other".

A lecture on *landfill mining* was conducted by Dr. Munesh K Chandel, IIT Bombay. He explained about the various principal drivers for landfill mining which include the waste to energy, waste to materials, waste to land and environmental issues. The technology for waste excavation and processing was explained in detail in the lecture. Dr. Munesh also explained about waste characterization and potential valorization using a case study for landfill mining in India.

21st June 2021 - Session 3 - Dr. Brajesh Kumar Dubey, IIT Kharagpur

ATAL Academy
Viewing Brajesh Dubey's slide
Environmental Geotechnology

Resource Recovery from Waste Materials-How to Incorporate Circular Economy Approaches?

Brajesh Kumar Dubey, PhD, FIE, C.Eng
Associate Professor – Environmental Engineering & Management
Organized by: Department of Civil Engineering, National Institute of Technology - Goa
21st – 25th June 2021
Department of Civil Engineering, Indian Institute of Technology, Kharagpur

What is a circular economy?

- A circular economy is a systemic approach to economic development designed to benefit businesses, society, and the environment.
- In contrast to the 'take-make-waste' linear model, a circular economy is regenerative by design and aims to gradually decouple growth from the consumption of finite resources.
- A circular economy aims to redefine growth, focusing on positive society-wide benefits. It entails gradually decoupling economic activity from the consumption of finite resources, and designing waste out of the system.

Source: <https://www.circular-economy.com/2018/02/21/what-is-a-circular-economy/>

Identification of treatment technologies

Biological / Chemical Conversion		Thermal Conversion		
Composting <ul style="list-style-type: none">• Windrow• Aerated static pile• In Vessel• Vermicomposting	Anaerobic digestion <ul style="list-style-type: none">• One stage digestion• Two stage digestion	Incineration <ul style="list-style-type: none">• Mass burning system• Refuse derived Fuel• Fluidized bed• Modular incinerator	Gasification <ul style="list-style-type: none">• Co-Current fixed bed• Counter current fixed bed• Fluidized bed• Entrained flow• Plasma gasifier	Pyrolysis <ul style="list-style-type: none">• Fixed bed method• Electrically heated auger method• Rotating cone method• Fluidized bed
Compost Fertilizer	Sludge Biogas Energy	Powdered Ash Construction material	Gas/Oil Syngas Electricity	Solid Char

Loop the waste into energy sector Hydrothermal Carbonization - Future of waste to energy

IT Kharagpur researchers develop 'zero loss' process for wet municipal solid waste management

Siddim Researcher turns organic municipal solid waste into a coffee-scented coal

Hari Bhaktha Sharma - Future CM (Carbonization Man)

A lecture on *resource recovery from waste materials on how to incorporate circular economy application* was conducted by Dr. Brajesh Kumar Dubey, IIT Kharagpur. He explained about the circular economy which is a systematic approach to economic development designed to benefit business, society and the environment. Decoupling the natural resource use and environmental impact from economic growth were highlighted in the lecture.

22nd June 2021 - Session 1 - Dr.Sudha Goel, IIT Kharagpur

Treatment options for managing Municipal Solid Waste (MSW)

Sudha Goel, Ph.D.
Associate Professor (Environmental Engineering)
Civil Engineering Dept. and SESE, IIT Kharagpur

For
ATAL FDP on
Environmental Geotechnology
Department of Civil Engineering
NIT Goa, Goa
22 June 2021

Treatment options and thumb rules

	Low Moisture Content	High Moisture Content
Low Organic Content	Landfilling	Composting
High Organic Content	Incineration/Combustion	Bioogas or biofuels

- Minimum organic content (as TOC) for compost as end product should be 12% by wet weight and moisture content should be 15 to 25% (See standards on slides 75 and 76)
- For combustion and biofuel generation, minimum organic content (as TOC) should be 25% to 50% by dry weight
- For combustion, moisture content should be far less than 50%, minimum calorific value should be 1790 kcal/kg and minimum plant capacity should be 300 tons/day (Dev, 2001)
- Biofuel can be generated when solids concentration is >5% which means moisture content <95% (TTY, 1993).

Different types of composting processes

Windrow:

- Dimensions are 3 to 4 m wide, 2 m high and tens of m in length
- Turn 1 or 2 times/wk in open field for 4 to 5 weeks, turning provides oxygen and maintains high biodegradation rates
- 2 to 8 weeks in open fields is sufficient for stabilization
- High temp inside pile as biodegradation results in generation of heat
- Organic matter is converted to biomass and CO₂
- Off-gases of NH₃ and H₂S can be objectionable

Static pile (Aerated)

- No turning, air blown into pile

In-vessel

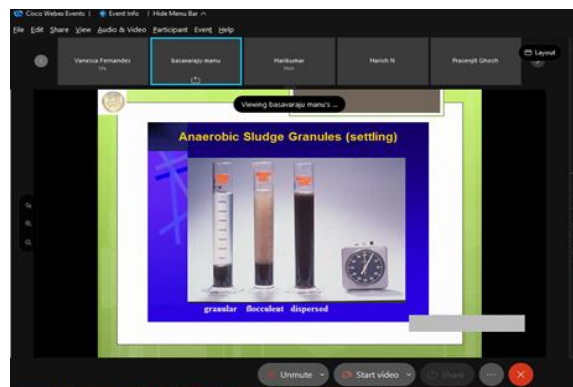
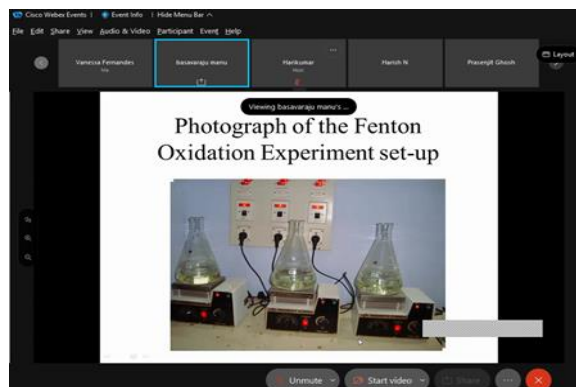
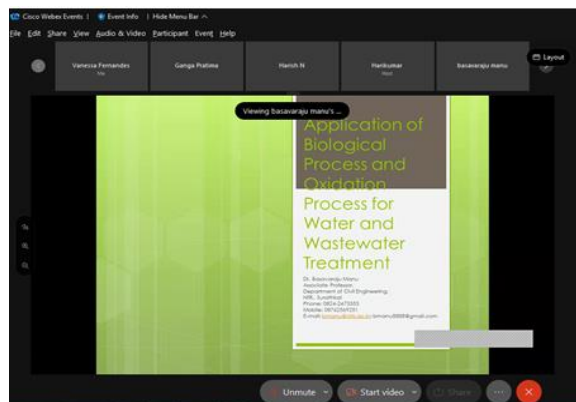
- Plug-flow or dynamic (agitated or CSTR type or mixed)
- Popular now because
 - Greater control over process and odor
 - Faster throughput, less detention time (1 to 2 wks)
 - Lower labor costs
 - Smaller area requirements

Curing time in all systems remains 4 to 12 weeks TTY, 1993

Uttarpara – MSW composting plant

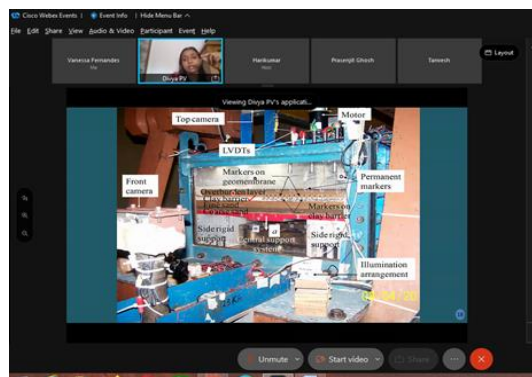
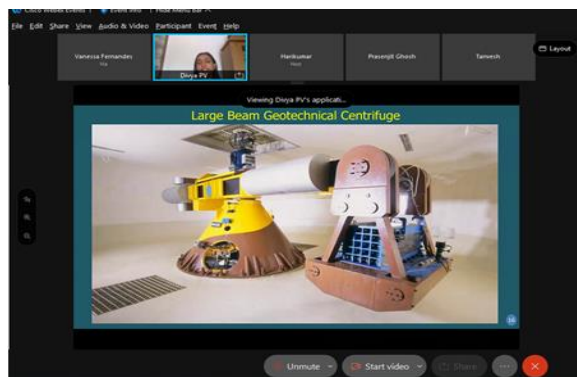
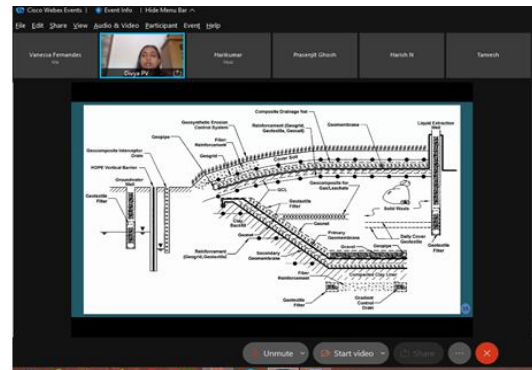
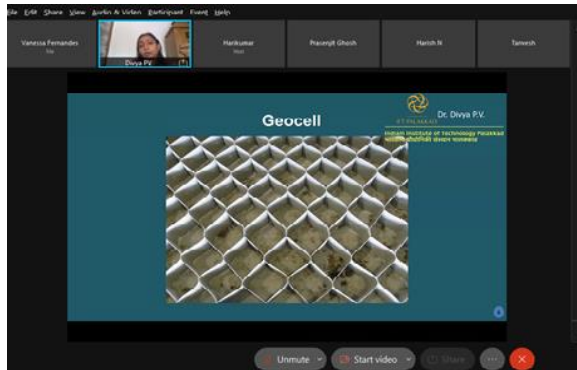
Dr. Sudha Goel, IIT Kharagpur conducted a session on *treatment option for managing the municipal solid waste*. Different treatment option in India for municipal solid waste management were explained in detail. She also explained about the different types of composting processes such as Windrow, Static pile or aerated and vermicomposting. A case study in Uttarpara of the MSW composting plant was explained.

22nd June 2021 - Session 2 - Dr.B Manu, NITK Surathkal



A lecture on *application of biological process and oxidation process for water and waste water treatment* was delivered by Dr. B Manu, NITK Surathkal. He explained about the different waste water treatment techniques for physiochemical process, biological process and sequential process. Fenton oxidation experiment and the factors influencing the fentons oxidation was elaborated in detail in the lecture.

22nd June 2021 - Session 3 - Dr. Divya P V, IIT Palakkad



Dr. Divya P V, IIT Palakkad conducted a session on *applications of Geosynthetics in landfills*. She explained about the different types of Geosynthetics and its applications in landfills. The large beam geotechnical centrifuge at IITB was also demonstrated.

23rd June 2021 - Session 1 - Dr. V V Kulkarni, NIT Silchar

Presented at Vihangraj V. Kulkarni's Technology Goa, India

Online Faculty Development Program on
ENVIRONMENTAL GEOTECHNOLOGY

Production of composite clay bricks: A value-added solution to hazardous sludge through effective heavy metal fixation

Vihangraj V. Kulkarni, PhD
Assistant Professor
Department of Civil Engineering
National Institute of Technology Silchar
Assam - 788010
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Subject motivation

BATTERY REGENERATION

Lead batteries are vital to achieving the Sustainable Development Goals

Lead-acid coated PV ribbons are used globally in energy storage projects.

Lead-sheathed sub-sea cables are vital for offshore wind farms.

Production of fired bricks

Mining → Storage → Size Reduction → Screening → Forming and Cutting → Drying → Coating or Glazing → Firing and Cooling → Storage and Shipping

Characterization of LABS

Metal	Disposal limit ^a (mg/kg)	LABS, total metal (mg/kg)	TCLP limit ^b (mg/kg)	TCLP of LABS (mg/kg)
Pb	300	1822	5	20.83
Fe	15721	16.57	16.57	
Cu	400	175	1	0.314
V	1215	1	3.78	
Mn	200	155	5	1.530
Mg	4124	8.6	8.6	
Mn	300	0.82	0.82	
Cr	300-400	ND	5	ND
Al	4800	13.24	13.24	
Co	425	1.25	1.25	
Ca	65712	36.79	36.79	
Zn	500	110	5	1.16

Characterization

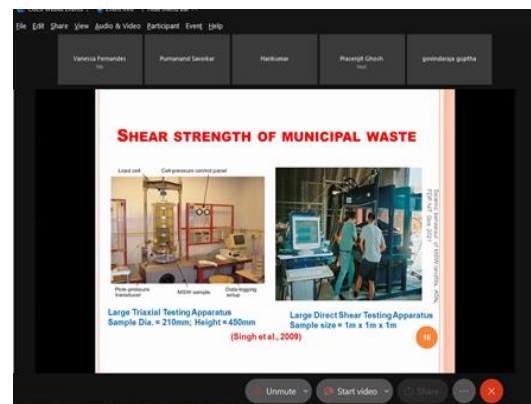
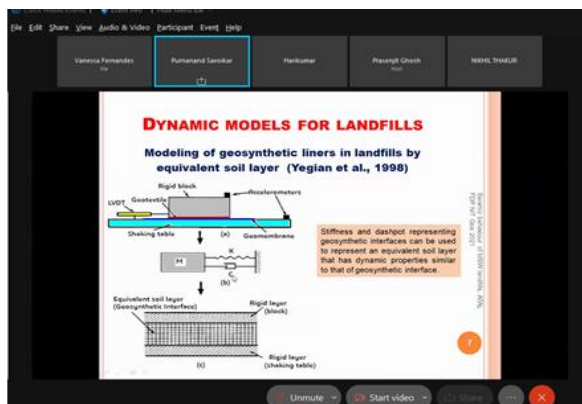
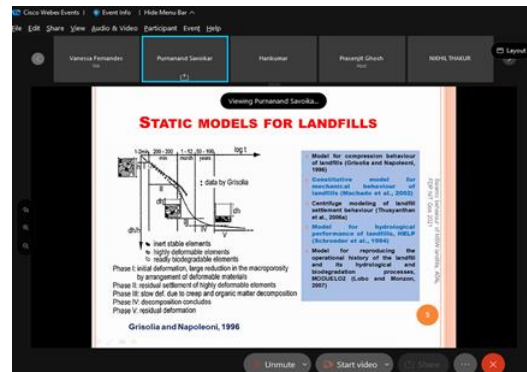
- Total metal, TCLP
- Spectroscopy analysis
- BCR extraction
- Particle size & metals
- Risk assessment

Utilization

- Brick casting & firing
- Effect of firing temp.
- Engineering properties
- Color changes and standard compliance
- Environmental considerations (TCLP)

A lecture on *production of composite clay bricks: A value added solution to hazardous sludge through effective heavy metal fixation* was conducted by Dr. V V Kulkarni, NIT Silchar. He highlighted that the lead batteries are vital for achieving the sustainable development goals. The production of bricks were explained in detail in the lecture. The characterization of LABS was explained based on collection and utilization.

23rd June 2021 - Session 2 - Dr. Purnanand Savoikar, GCE, Goa



Dr. Purnanand Savoikar delivered a lecture on *Seismic behavior of municipal solid waste landfills*. He explained about the static and dynamic models for landfills, characterization of MSW landfill properties under seismic conditions. Seismic stability analysis of MSW landfills using Pseudo static and Pseudo dynamic approach was also discussed. Case studies of failure of landfills were also highlighted in the lecture.

23rd June 2021 - Session 3 - Dr. Prashanth J, NIT Silchar

Viewing Prashanth J's appl...

BIO-RETENTION SYSTEMS- STORMWATER MANAGEMENT PRACTICES

Dr. Prashanth J.
Assistant Professor
Department of Civil Engineering
National Institute of Technology Silchar

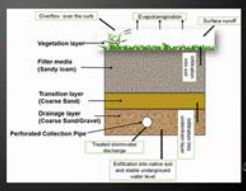
BIORETENTION SYSTEMS

- Bioretention facilities are less cost intensive than traditional structural stormwater conveyance systems.
- Bio-retention is the process in which contaminants and sedimentation are removed from influent.
- Annual maintenance is required for the overall success of bioretention systems.



METHODOLOGY

- Grass buffer layer
- Mulch layer
- Vegetation layer
- Filter media
- Drainage layer
- Perforated collection pipe



DESIGN CONSIDERATIONS

- Design Objectives (Quality / Volume / Flow / Recharge)
- Media Specifications / Consistency
- Sizing
- Offline / Flow-Through Systems
- Pretreatment
- Unique configurations / designs (costs)
- Custom Application (Bacteria / Metals / Oil and Grease)

A lecture on *bioretention systems-storm water management* practices was conducted by Dr. Prashanth J, NIT Silchar. He explained about the different methodologies to be adopted in a bioretention system. By implementing a bioretention system pollutant can be filtered and also improves the runoff quality. The different properties of the bioretention soil medium were also explained in detail.

24th June 2021 - Session 1- Dr.B Janaki Ramaiah, IIT Tirupati

The slide features the ATAL logo and the text: "Fact. on Environmental Geotechnology", "Geotechnical Aspects of MSW Landfills: Case Studies from India", "by Dr. B. Janaki Ramaiah, Dept. of Civil & Environmental Engineering, IIT Tirupati, janakiram@iitp.ac.in, +91-9811148232". It also mentions "Organized by: Dept. of Civil Engineering, NIT Goa" and "Lecture delivered online on 24th June 2021".

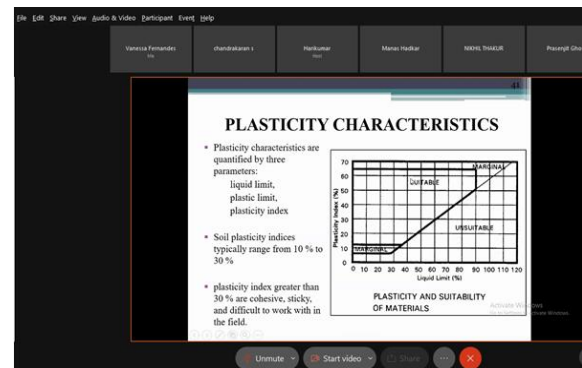
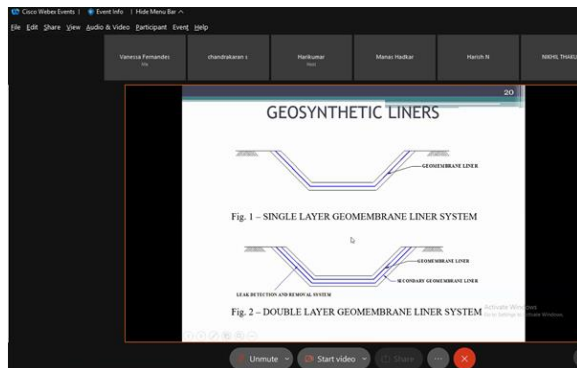
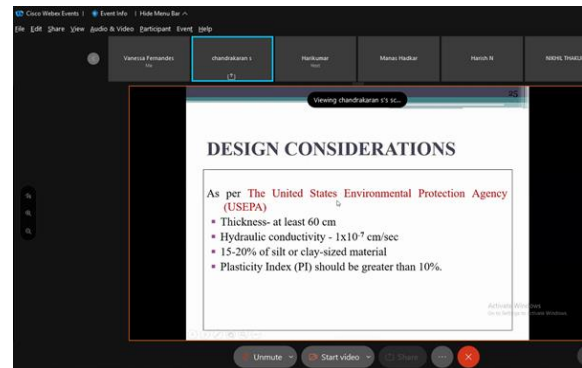
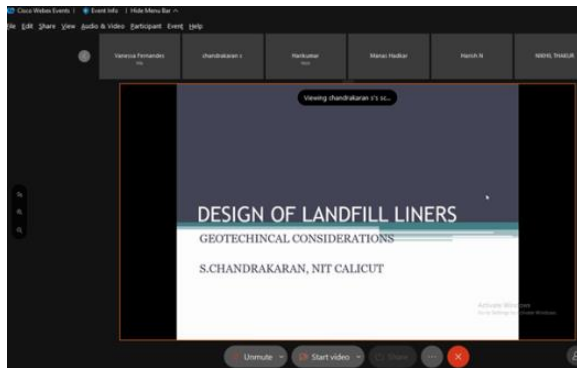
The slide discusses the stability and integrity of MSW landfills under ground shaking. It states: "Stability and integrity of MSW landfills must be ensured strong ground shaking." and "Seismic Analysis and design of waste containment facilities Requires the cyclic/dynamic properties of all the materials". A diagram shows a cross-section of a landfill with "MSW" and "waste mass" layers. Text notes: "MSW forms the largest mass of a waste disposal (landfill) system." and "Seismic response of a landfill is largely influenced/governed by dynamic properties of emplaced waste mass."

The slide includes two photographs of vertical cuts in a landfill. The text reads: "Field Visits – Observations", "Near Vertical Cuts remain stable at some other locations", and "Reinforcing effect from Fibrous Materials (Plastics, Textiles, Wires, Ropes etc)".

The slide discusses the use of Cone Penetration Tests (CPT) in MSW landfills. It states: "Cone Penetration Tests – MSW Landfills", "Early attempts to explore the use of CPT in MSW landfills dates back to 1980s (At a landfill in France, Cartier and Baldit 1983)", "Not enjoying as much popularity as in case of sands, silts and clays", "Difficulties in pushing cone through stiff objects", "Unavailability of correlations between CPT parameters and engineering properties of solid waste", and "Very limited studies were conducted in exploring the use of CPT in MSW landfills." It also lists "22 landfills located at 10 different countries (Brazil, China, France, Germany, Italy, Poland, Portugal, Spain, UK and USA)."

Geotechnical aspects of MSW landfill lecture was conducted by Dr. B Janaki Ramaiah, IIT Tirupati. Case studies from India explaining the engineering properties of MSW landfills were explained. Cone penetration test on MSW landfills was elaborated in detail in the lecture. Also the surface wave methods for detecting the landfill profile was discussed in the session.

24th June 2021 - Session 2 - Dr. S Chandrakaran, NIT Calicut



Dr. S Chandrakaran, NIT Calicut delivered a lecture on design of landfill liners, in which he highlighted the design criteria to be taken into account, in the design of liners and leachate collection systems in the landfill.

24th June 2021 - Session 3 - Dr. Arvind Kumar Jha, IIT Patna

The slide features logos for ANTE, ATAL, and AICTE. It mentions 'AICTE Training and Learning (ATAL) Academy sponsored 5 days Q1* - 24th, June, 2021 Online-RTIP mode' and 'ENVIRONMENTAL GEOTECHNOLOGY'. The presenter is identified as Dr. Arvind Kumar Jha, Assistant Professor, Department of Civil and Environmental Engineering, Indian Institute of Technology (IIT) Patna, Bihar, India. The date '24th June, 2021' is also displayed at the bottom.

The slide discusses 'Heaving and premature pavement failures in lime treated subgrades containing sulfates led to questioning the validity of calcium based stabilization.' It includes two photographs: one showing a road surface and another showing a cross-section of a subgrade. A caption reads: 'Typical damage to a highway pavement due to sulfate induced swelling (Farrin, 2006)'. Below the images, it states: 'Possibility of sulfate induced problems in soils may occur in two ways: 1. Presence of sulphate minerals in natural form 2. Migration of sulphate contaminating fluid/water/liquid by any means'.

The slide lists several points: 'Gypsum is the most common sulfate minerals present in the soil and is due to the relatively low solubility (2.6 gm/L) level compared to Na₂SO₄ (488 gm/L) and MgSO₄ (260 gm/L) (Barkat et al., 1999; Kota et al., 1996; Puppala et al., 2003)'. It also notes that gypsum was found to extend over more than 20% of the land surface on the earth (Solis and Zhang, 2008), that approximately 15 million tons of gypsum waste plasterboard is generated annually, and that the use of plasterboard gypsum as a construction material causes the formation of 'Artificially Induced Gypseous Soil' (Kutub and Saha, 2015). An SEM image of gypsum soil is shown with the caption 'Gypsoous soil (http://imggep.org/view/2466)'. A chemical structure diagram of a gypsum crystal is also visible.

The slide provides the chemical formulas: 'Column = [Ca₄(Al(OH)₆)]₂4H₂O²⁺' and 'Sulfate = [(SO₄)₂(H₂O)]²⁻'. It details the 'Mechanism of Heave Formation', mentioning 'Two mechanisms associated with extensive swelling due to the ettringite and thaumasite are: Crystal Growth Theory (spicochemical formation of ettringite and the anisotropic growth of the crystals) Hunter (1988): sulfate on the lime stabilized soil affects only in the long-term pozzolanic reaction, indicating no immediate formation of ettringite. Hydration or Water Absorption Theory (expansion caused by absorption of water more than 32 mole of the original formula by ettringite crystals). Moore and Taylor (1969) reported that tight electrical charge balance already existing between columns and channels, a significant amount of additional water molecules (above the 32 moles of the original formula), could not possibly be absorbed by the crystal structure, while satisfying charge neutrality.'

A lecture on *Sulphate contamination of calcium based stabilized soils* was delivered by Dr. Arvind Kumar Jha, IIT Patna. He explained about the different mechanism of lime stabilization . SEM images of soil treated with lime content at different curing periods was shown. The different problem with sulfate bearing/Gypseous soil was explained in detail.

25th June 2021 - Session 1 - Dr.KG Guptha ,GCE,Goa

Viewing Dr. K. G. Guptha's Sl...

CIVIL ENGINEERING APPLICATIONS OF WASTE TYRES

- Dr. K G Guptha
- Professor and Head, Civil Engg
- Goa College of Engineering, Farmagudi- 403401, Goa
- Ph. No:9422061953,
- e-mail: kgg@gce.ac.in

SNIPPET-1 YOU CAN NOT BURY THE TYRES

Whole tires will trap air and methane gas which makes the tire constantly push back on the soil around it. Since the pressure above the tire is significantly less than the pressure below it, the tire will eventually rise itself to the surface.

SPECIAL PROPERTIES OF RUBBER IN COMPARISON WITH SOIL

Properties of rubber (taken from CMA 14249-2002 (CWA, 2002))

1. Compacted density 2.3-4.8 kN/m³ compared to soil at 15-6-19.5 kN/m³
2. Compacted dry unit weight 1/3 that of soil
3. Compressibility 3 times more compressible than soil
4. Density 1/3 to 1/2 less dense than granular fill
5. Durability Non-biodegradable
6. Earth pressure Low compared to soil or sand, up to 50% less
7. Friction characteristics Higher compared to soil
8. Horizontal stress On weak base: lower than with conventional backfill
9. Modulus in elastic range 1/10 of sand 10. Permeability Greater than 10 cm/s
11. Poisson's ratio 0.2-0.3 corresponding to Ko values of 0.3-0.4
12. Specific gravity 1.14-1.27 kg/m³ compared to soil at 2.20-2.80 kg/m³
13. Thermal insulation 8 times more effective than gravel
14. Unit weight Half the typical unit weight of gravel
15. Vertical stress On weak base: smaller than granular backfill are already being used as a fill in roadway embankments (Minnesota Pollution

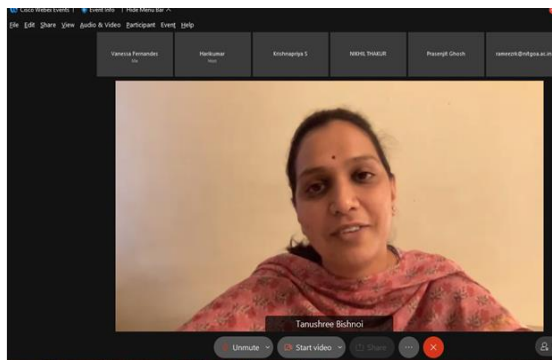
ADVANTAGES OF CRMB OVER BITUMINOUS ROADS

Table 1: Advantages of CRMB over Bitumen

Disadvantages of Bitumen	Advantages of CRMB
Adverse to Excessive Heat Bitumen melts as softening values are lower than the surface temperature of the road. The softening point of plain bitumen is a maximum of 50 degrees Celsius.	Higher softening values as the softening point of CRMB is a minimum of 65 degrees Celsius.
Overloading Bitumen-based roads crack under heavy loads due to lower elasticity i.e. maximum elasticity of 10.	CRMB has an elastic recovery which is over a minimum 60%. This helps in improving the road's load carrying capacity by nearly doubling it.
Effect of Water Once bitumen encounters water, it loses its property.	By introducing rubber, CRMB ensures that it reduces the effect of water by nearly 25%.
Oxidization Higher rates of oxidization as the oils available in bitumen get evaporated.	Given that rubber is a bad conductor of heat, it absorbs the oil and substantially delays the process of oxidization.

Dr. KG Guptha, GCE, Goa delivered a session on *Civil engineering application of waste tyres*. He explained the issues related to dumping of rubber tyres in soil and the different methods by which waste tyres could be made useful in different applications. A study on environmental degradation of rubber grids was also presented.

25th June 2021 - Session 2 - Mrs Tanushree Bishnoi, Art of living



A lecture on *stress relief through breath work and meditation* was conducted by Mrs. Tanushree Bishnoi, Art of living. She demonstrated the different breathing exercises and stretching techniques.

The 5 day online faculty development program concluded with the valedictory session on 25th June 2021 at 1 pm.

AICTE Training and Learning (ATAL) Academy sponsored
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ENVIRONMENTAL GEOTECHNOLOGY
21st - 25th June 2021

The Team

www.nitgoa/EG2021

The graphic features three logos at the top: AICTE (All India Council of Technical Education) on the left, ATAL (AICTE Training and Learning) in the center, and NIT Goa (National Institute of Technology Goa) on the right. Below the logos, the text 'The Team' is centered above a grid of 18 circular portraits of the program's participants and organizers. The portraits are arranged in three rows: the top row has one portrait, the middle row has eight portraits, and the bottom row has nine portraits. The background of the graphic is a colorful, wavy pattern in shades of yellow, orange, and pink.