



Jadavpur University

07 October 2026

Treading the Path of Civil Engineering

Arindam Dey

Geotechnical Engineering Division

Department of Civil Engineering

& School of Interdisciplinary Studies and Sustainability

IIT Guwahati



SiSAS

Academic Pathway

- Bachelor of Engineering (B.E.)
 - ❖ Jadavpur University, Kolkata
- Master of Technology (M.Tech.)
- Doctor of Philosophy (Ph.D.)
 - ❖ Indian Institute of Technology Kanpur
 - Beams on elastic foundations (unreinforced and reinforced)
 - Beams on viscoelastic foundations (unreinforced and reinforced)
 - Lumped parameter modelling (4-parameter Burger model) in reinforced foundation beds
 - Inverse analysis and optimization to assess parameters of Burger model
- Post-Doctoral Research (PDF)
 - ❖ Structural and Geotechnical Laboratory, University of Molise, Italy
 - Structural health monitoring of full-scale instrumented contiguous pile retaining wall
 - Finite element modelling to assess ambient vibration response of full-scale retaining wall



UNIVERSITÀ
DEGLI STUDI
DEL MOLISE



Professional Pathway

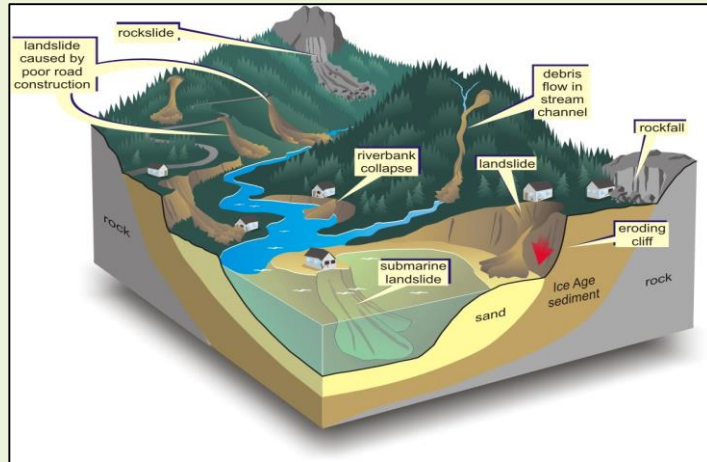
Period	Position Held	Institute/Organization
May 2009 – Aug 2009	Project Engineer	Department of Civil Engineering, IIT Kanpur
Aug 2009 – Nov 2009	Senior Project Associate	Department of Civil Engineering, IIT Kanpur
Dec 2009 – Feb 2011	Post-Doctoral Researcher	StreGa Laboratorio, University of Molise, Campobasso, Italy
Mar 2011 – May 2011	Associate Professor	Department of Civil Engineering, BBDNITM, Lucknow
Jun 2011 – Jan 2019	Assistant Professor	Department of Civil Engineering, IIT Guwahati
Jan 2019 – Present	Associate Professor	Department of Civil Engineering, IIT Guwahati
Jul 2021 – Apr 2026	Associated Faculty	Centre for Disaster Management and Research (CDMR), IIT Guwahati
Apr 2026 – Present	Associated Faculty	School of Interdisciplinary Studies and Sustainability (SiSAS), IIT Guwahati
March 02 – 23, 2026	Visiting Research Fellow	Faculty of Environmental, Life, Natural Science and Technology, Okayama University, Japan

Failures are the Pillars of Success



Failures

- Slope instability, Landslides, Rockfalls, Mudflows



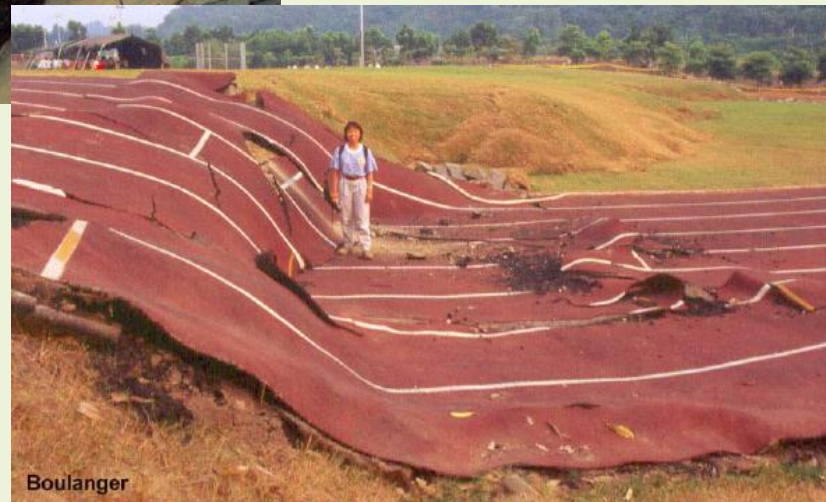
Failures

- Sinking and Tilting of building foundations



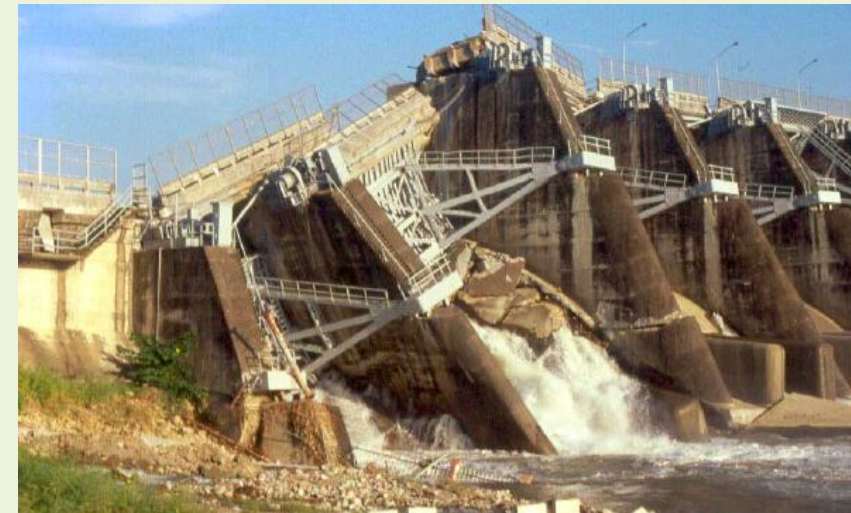
Failures

- Failure by earthquakes and liquefaction



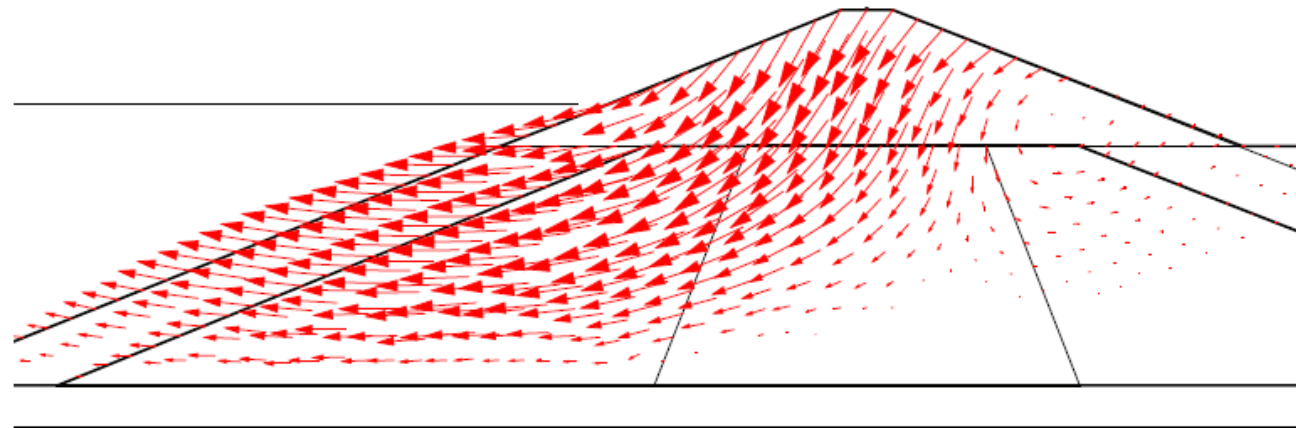
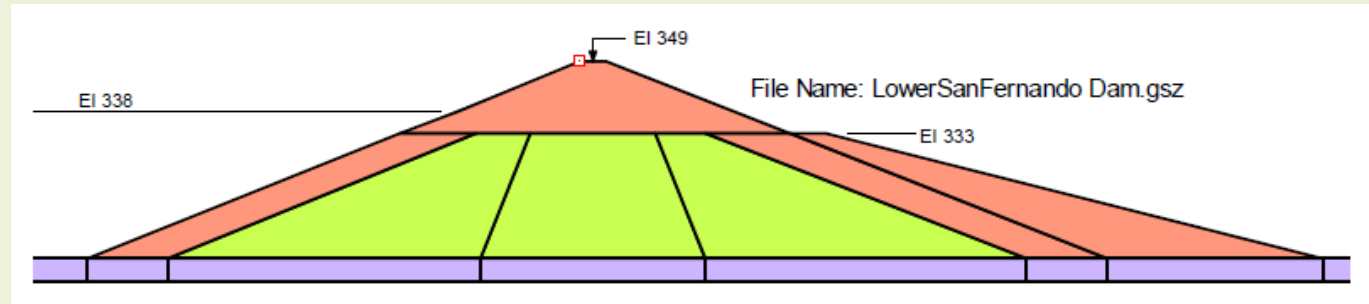
Failures

- Failure of bridge piers and abutments



Failures

- Dam and Reservoir Failure**



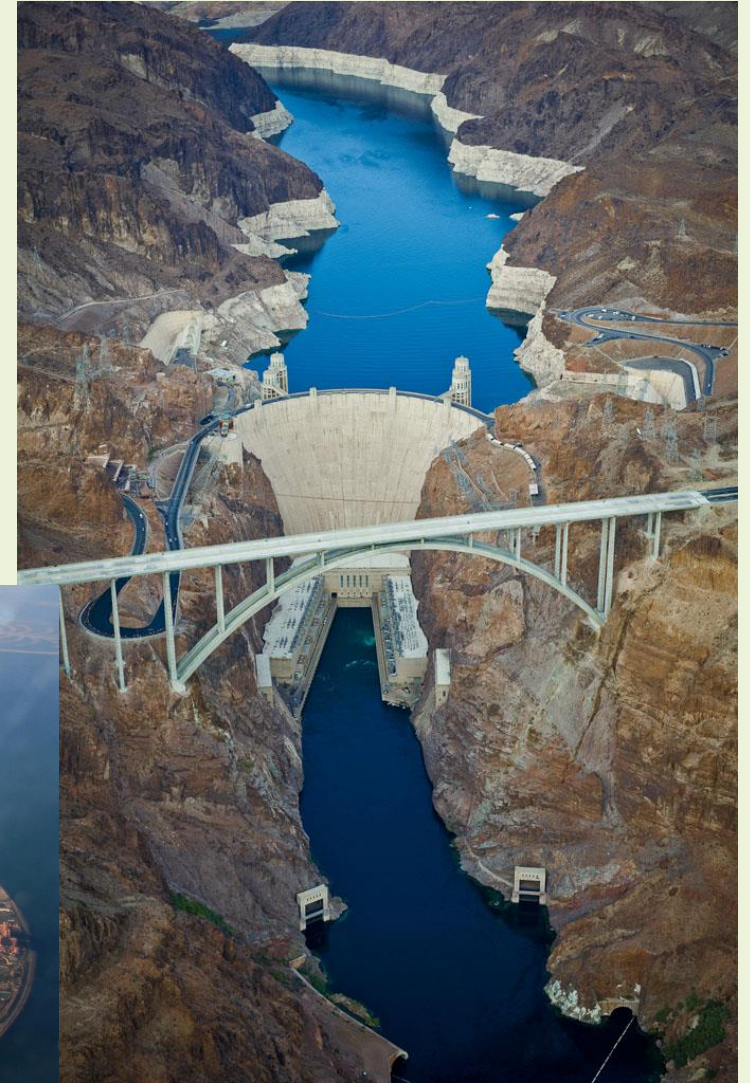
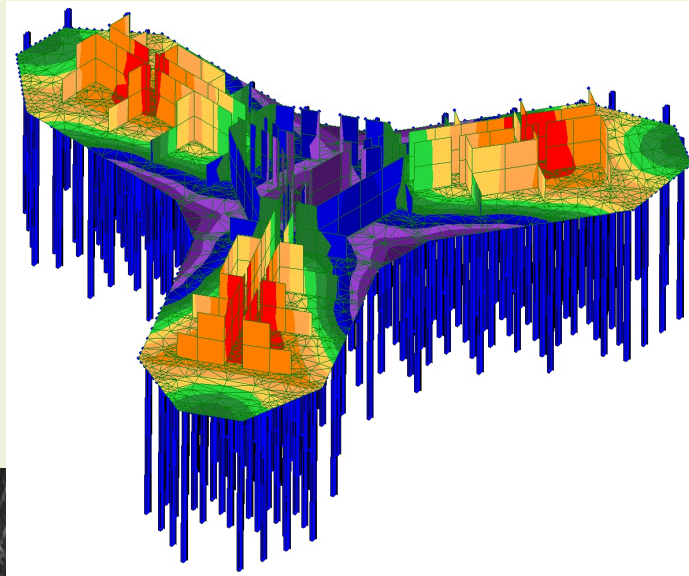
Failures

- Failure of port structures and wharves



Comprehensive Knowledge

- Helps to create marvels of infrastructure



Infrastructures and Marvel Infrastructures



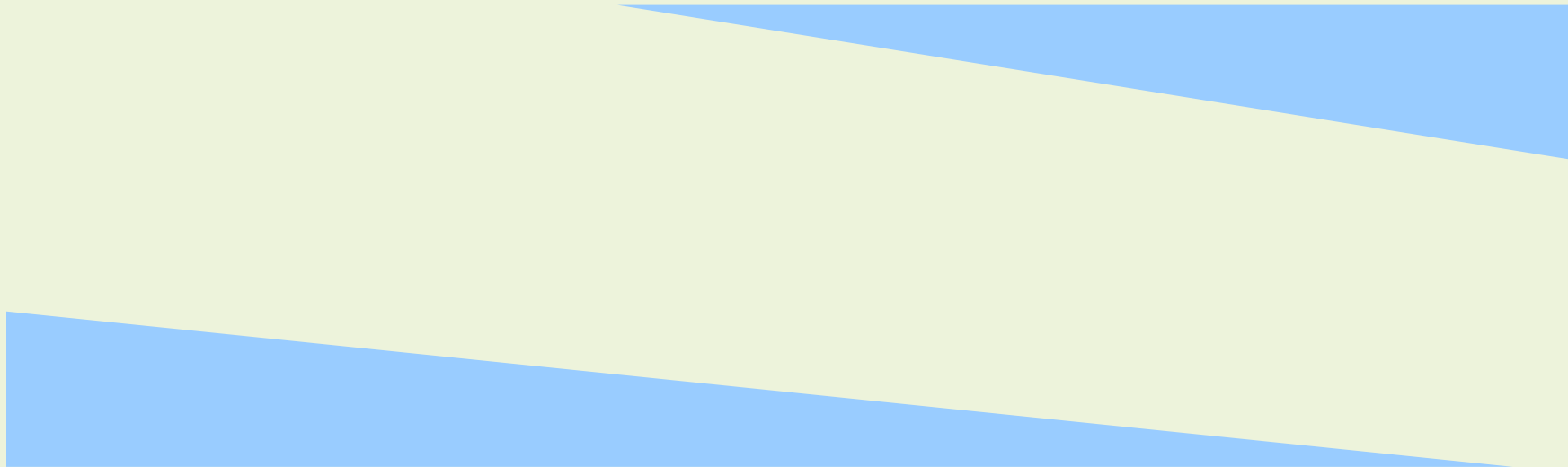
Roman Aqueducts 312 BC



Specializations in Civil Engineering

- **Structural Engineering**
- **Geotechnical Engineering**
- **Water Resources Engineering and Management**
- **Transportation Systems Engineering**
- **Environmental Engineering**
- **Infrastructure Engineering and Management**
- **Earth System Science and Engineering**

Areas of Specialization



Structural Engineering

Structural Engineering

- Analysis and Design of
 - ❖ Buildings
 - ❖ Bridges, Flyovers
 - ❖ Industrial components
 - ❖ Dams
 - ❖ Towers
- Structures
 - ❖ Engineered
 - All mentioned above
 - ❖ Non-engineered
 - Predominantly rural housing
 -

Saraighat Bridge



(Google image, 2018)

Saraighat Bridge...

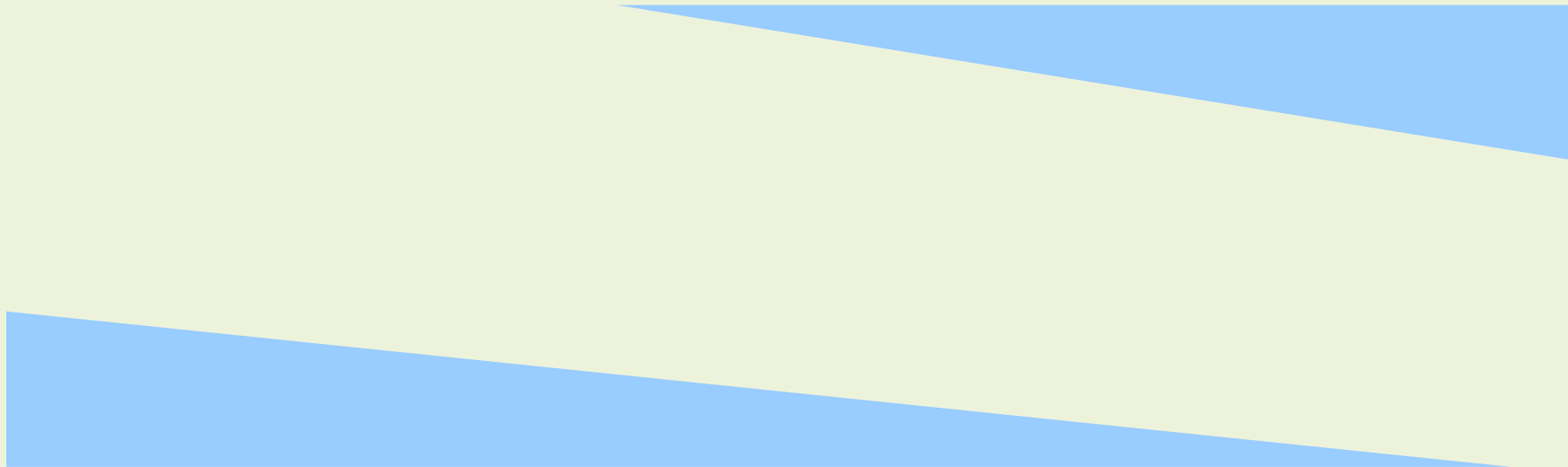


Hirakud Dam



(Google
image, 2015)

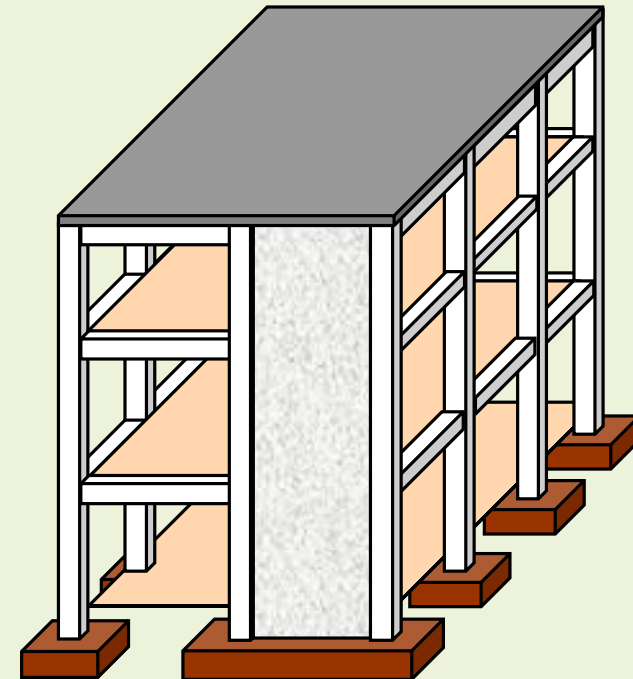
Areas of Specialization



Geotechnical Engineering

Geotechnical Engineering

- Classification of soils
 - ❖ Sand, clay, silt, rocks
 - Sub-classifications
- Behaviour of soil
 - ❖ Soil Mechanics
 - Stress, strain, plasticity
- Foundations of structures
 - ❖ Behaviour of underlying soil



Geotechnical Engineering...

- Behaviour of soil below a structure



Sandy and Clayish Mud

Clays soil of different
stiffness

Stiff Soil and Rocks

(Google image, 2015)

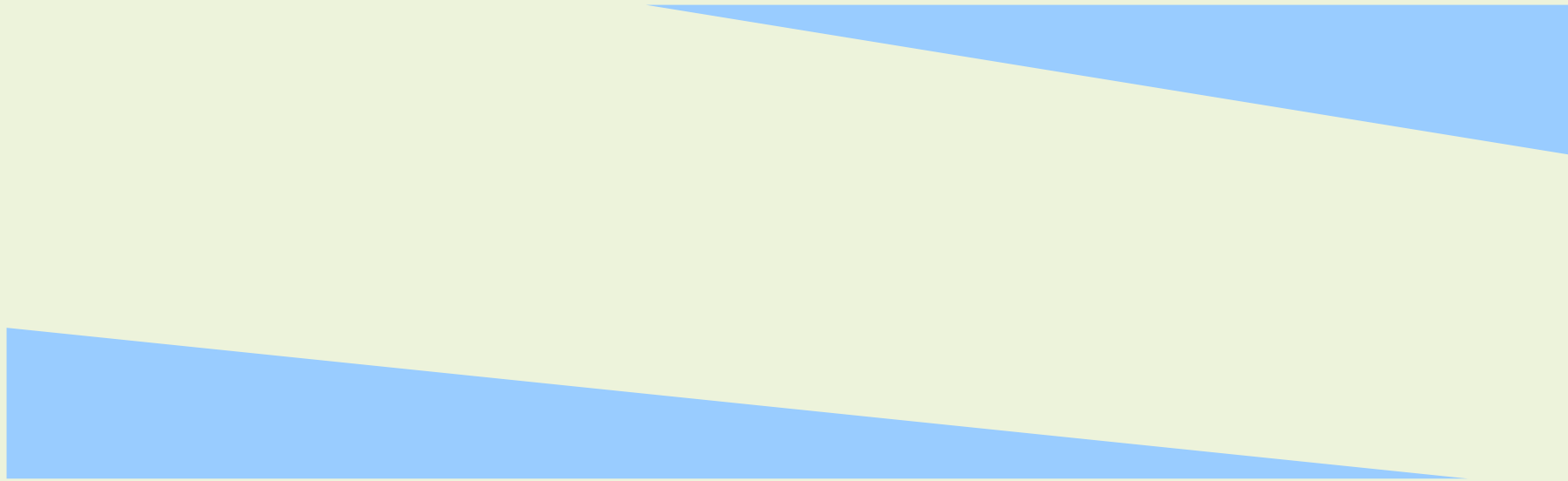
Geotechnical Engineering...

- Geotechnical Structures
 - ❖ Embankment
(2001 Bhuj earthquake)



(Murty, 2001)

Areas of Specialization



Water Resources
Engineering and Management

Water Resources Engineering

- Hydro-meteorology
 - ❖ Study of Rainfall
 - Flow in river catchment areas
 - ❖ Climate change
- River Engineering
 - ❖ Open Channel Flow (Hydraulics)
 - ❖ Floods
 - ❖ Hydro-electric Power!
- Ground Water Engineering
 - ❖ Depletion of groundwater is:
 - Burgeoning problem of this century!
 - ❖ Sub-surface flow

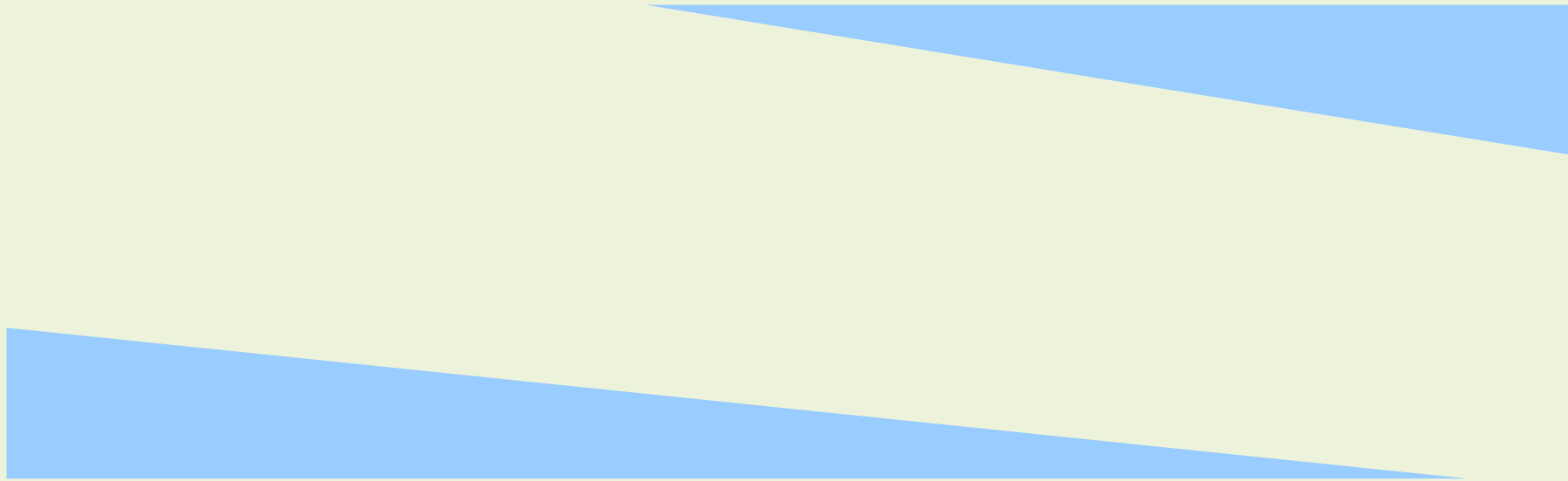
Water Resources Engineering...

- Three Gorges Dam



(Google image,
2015)

Areas of Specialization



Transportation
Engineering

Transportation Engineering

- Traffic Engineering
 - ❖ Modeling of traffic flow (Statistics!!)
 - Urban
 - Rural
 - Geometry
 - ❖ Planning
 - ❖ Intelligent Transport System
- Pavement Engineering
 - ❖ Pavement materials
 - ❖ Analysis and design
 - Bituminous road surface
 - Concrete pavements
- Tracks and High Speed Railways
- Airport pavements

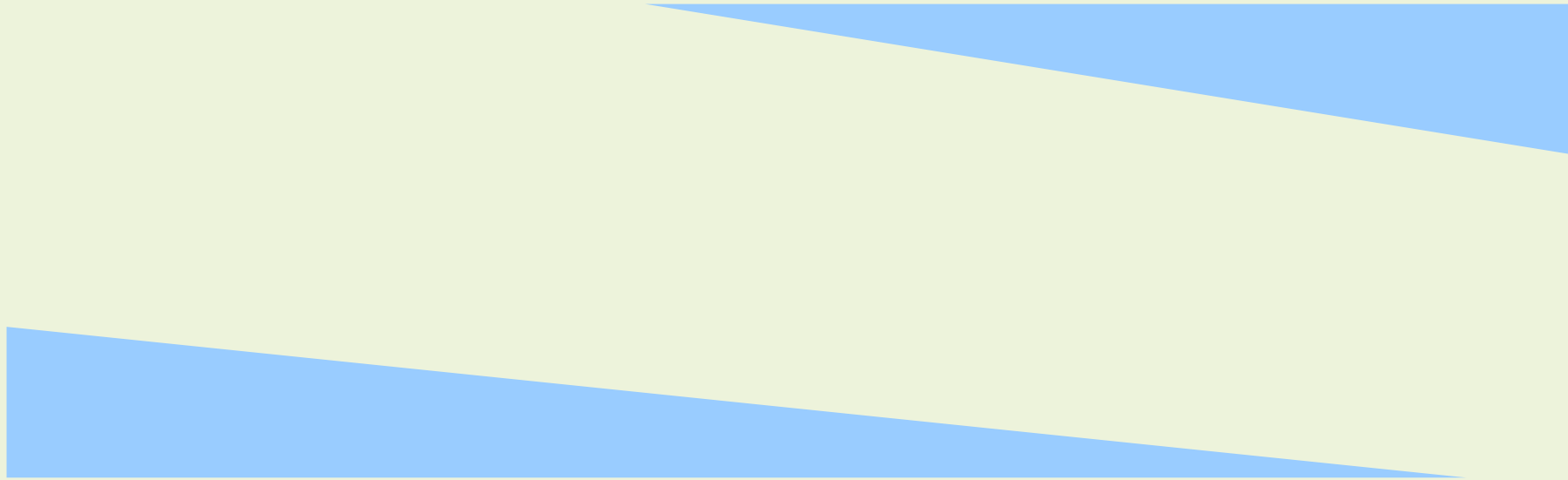
Transportation Engg...

- Alignment



(Google
image,
2015)

Areas of Specialization

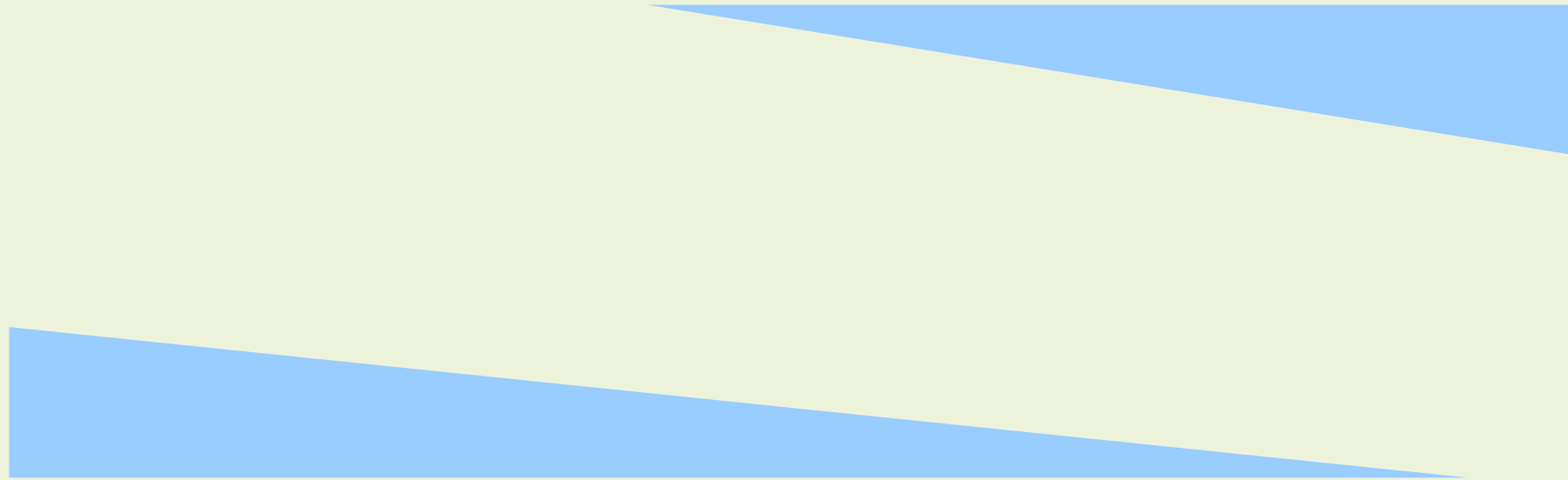


Environmental
Engineering

Environmental Engineering

- Environmental Science
 - ❖ Ecology
- Drinking Water
- Waste Product Engineering
 - ❖ Waste water
 - Sewage, industrial waste
 - ❖ Solid waste
 - Households, industries
 - ❖ Air pollution
 - Ash, smoke, exhausts
- Design of Treatment Plants
 - ❖ Capacity, demand

Areas of Specialization

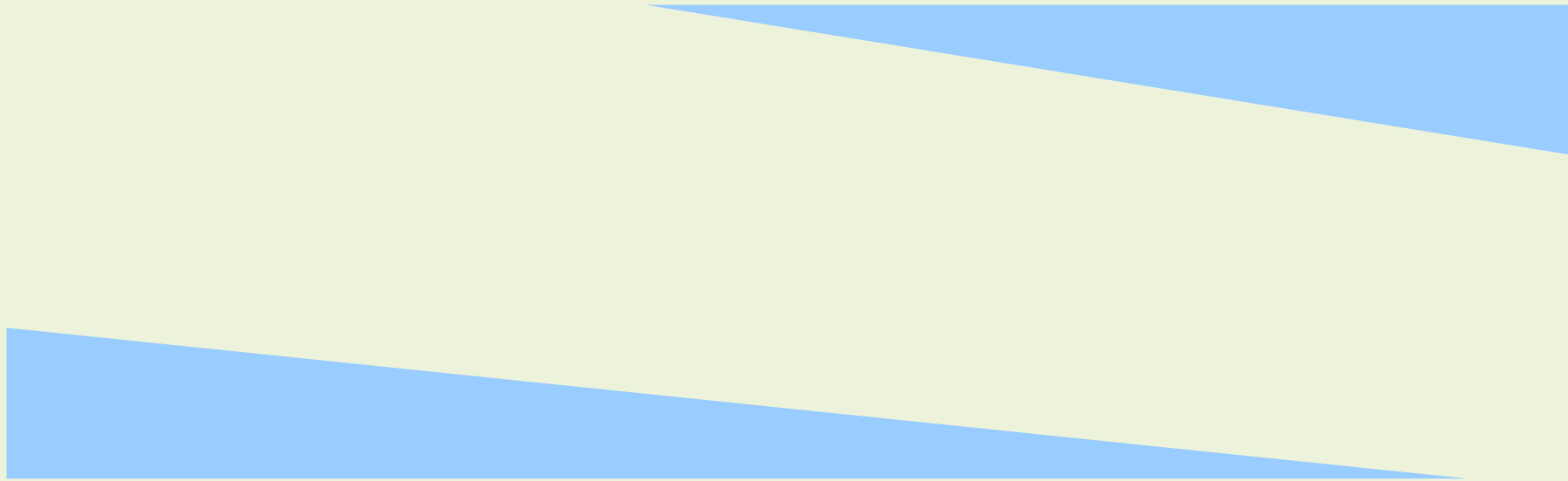


Earth System
Science and Engineering

Earth System Science and Engineering

- Remote Sensing
 - ❖ Satellite data
 - Imagery
 - ❖ Global Positioning System
 - Technological advance!!
- Seismology
- Hydrocarbon Exploration
- Climate Change

Areas of Specialization

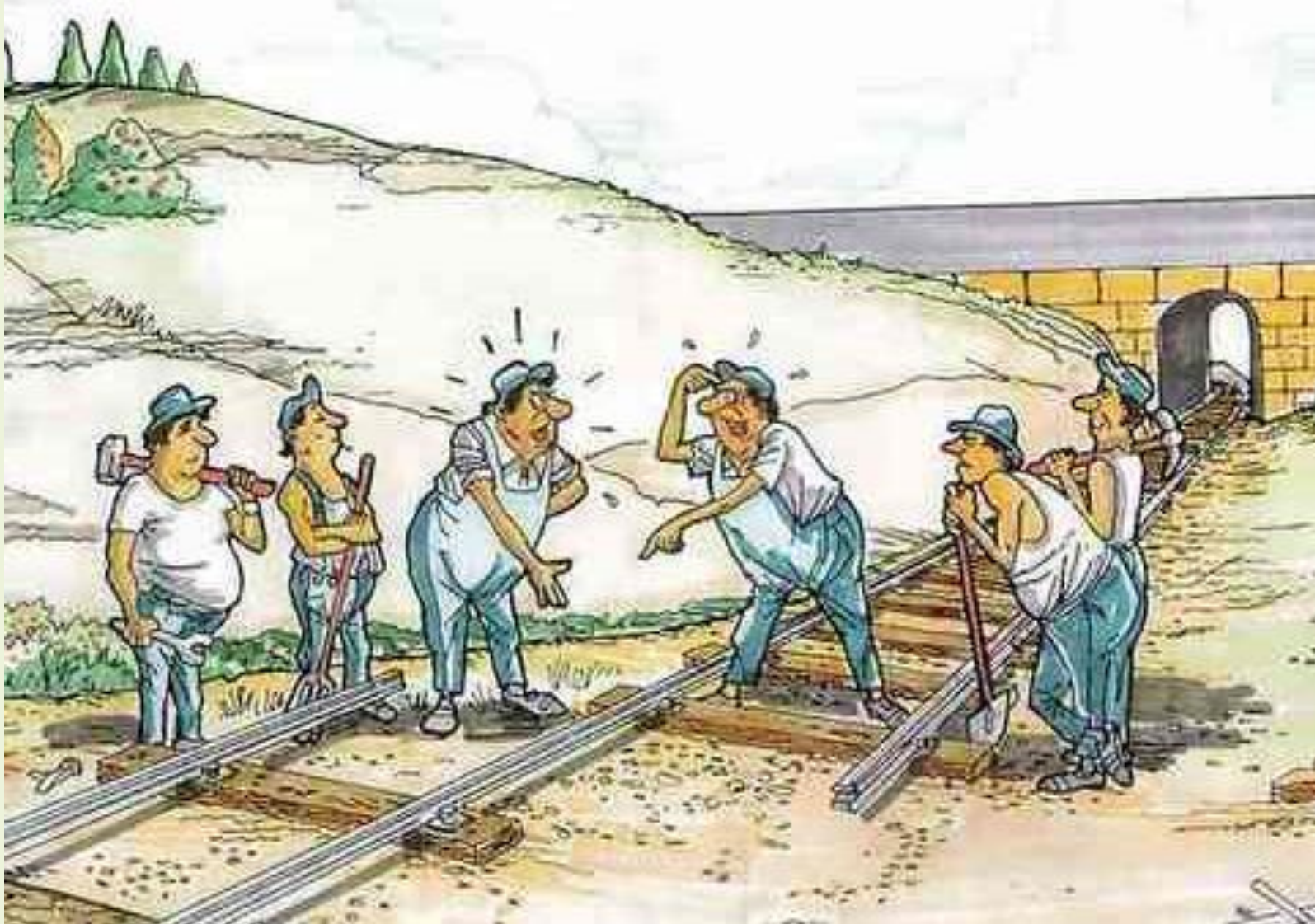


Infrastructure
Engineering and Management

Infrastructure Engineering and Management

- Planning of Infrastructure
- Project Management
 - ❖ Time and expenditure
- Construction Methods and Equipment Management
- Safety Management in Construction

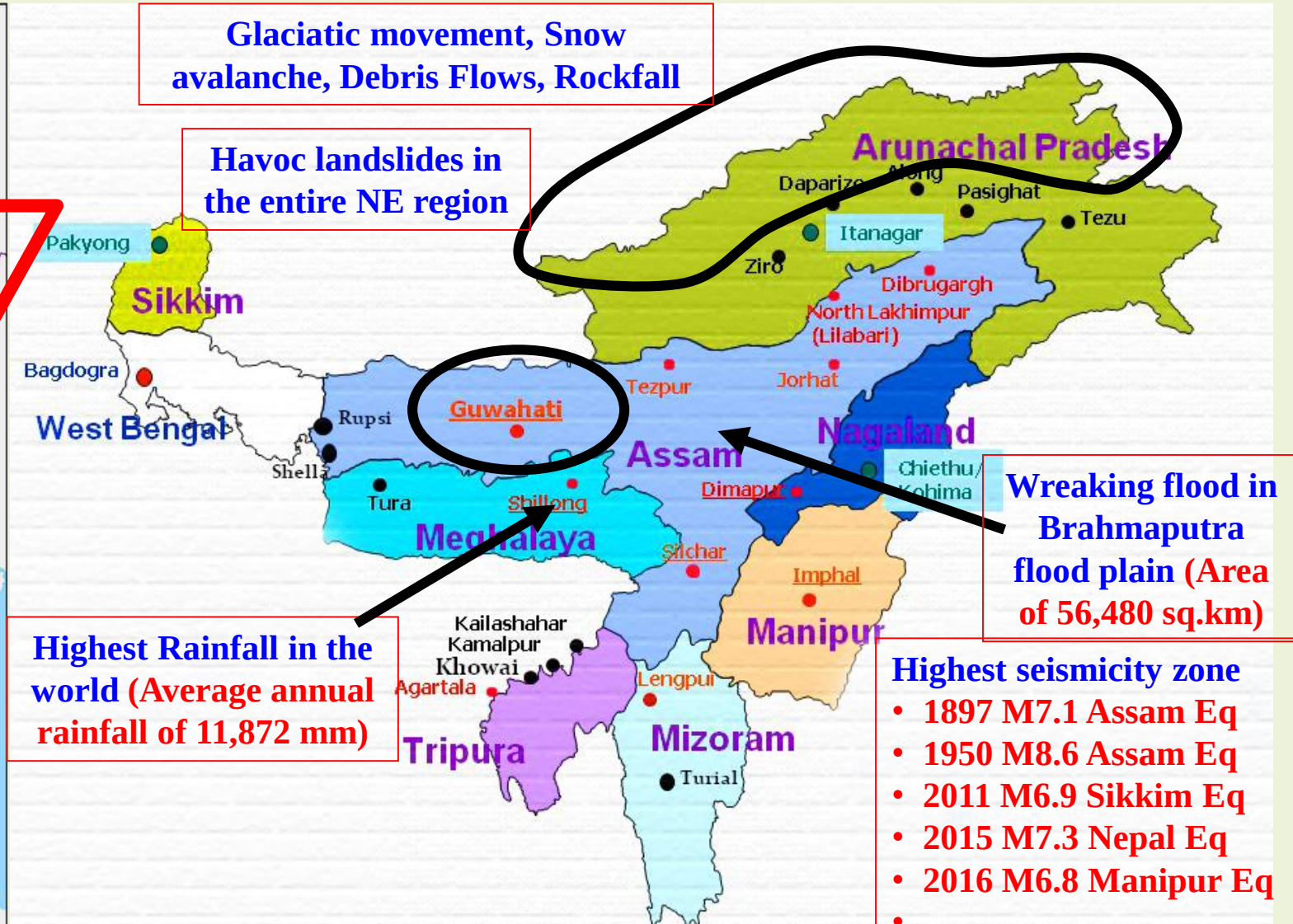
TEAMWORK and COORDINATION

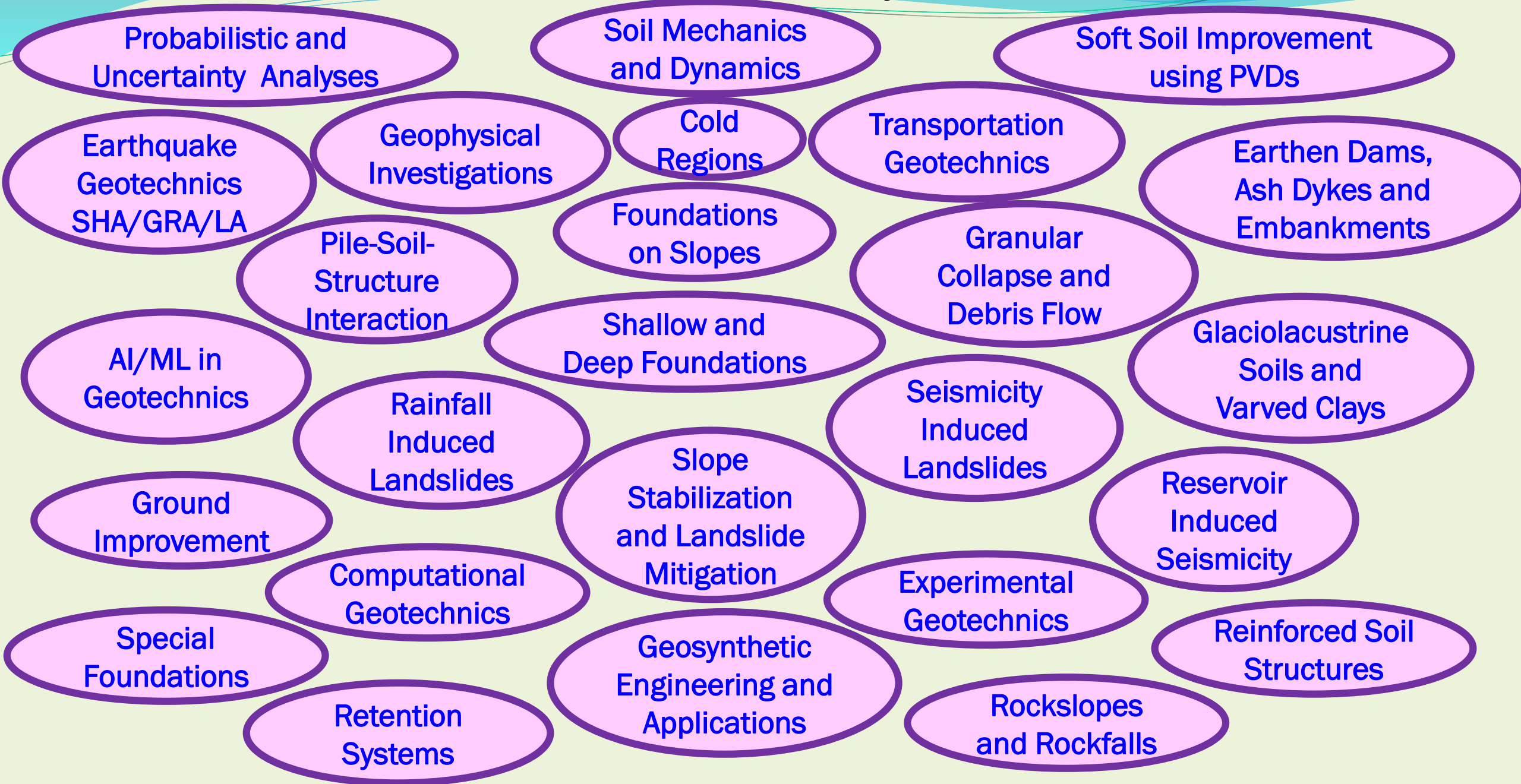


TEAMWORK and COORDINATION

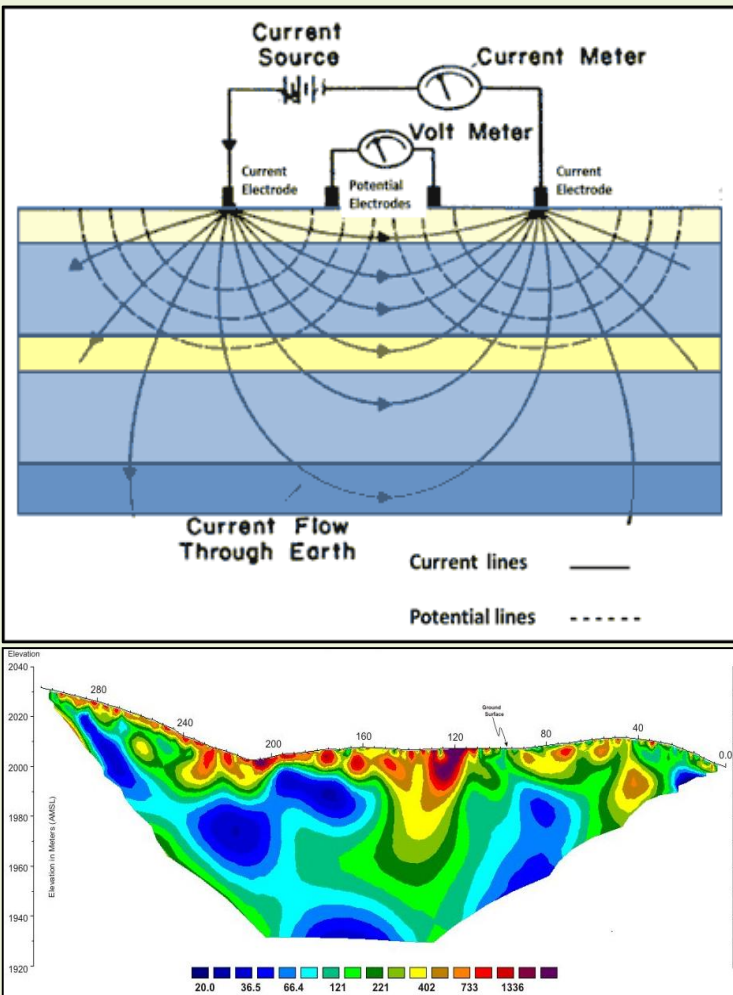


Geographical Location of IIT Guwahati in NE India

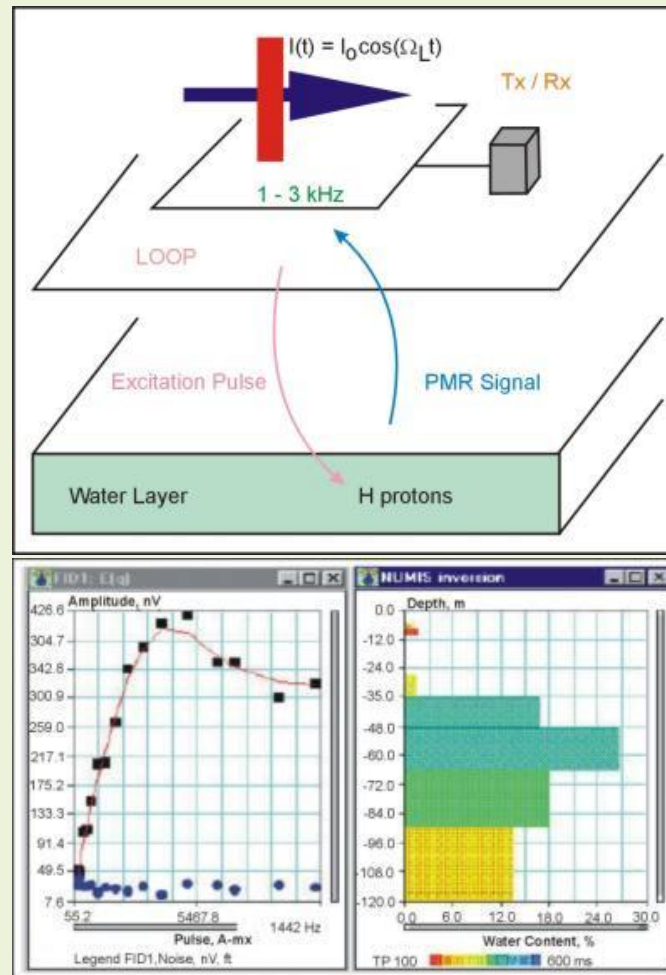




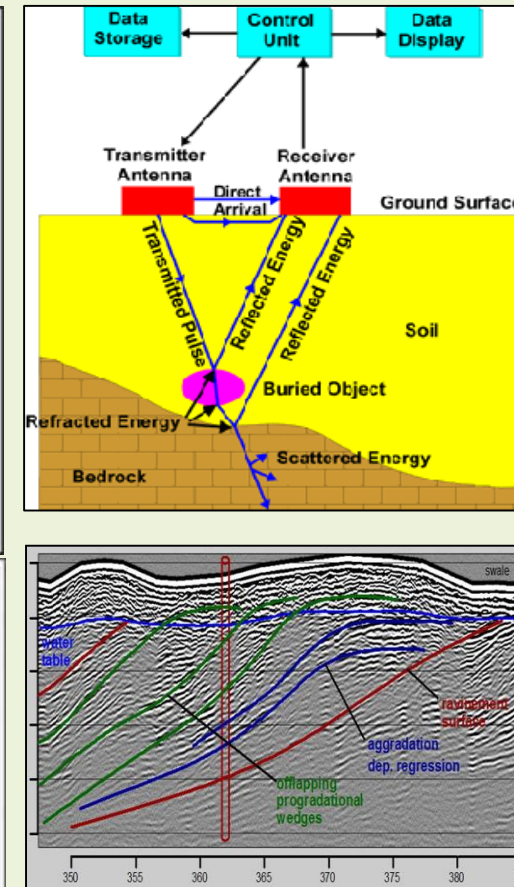
Various Types of NDT Geophysical Surveys



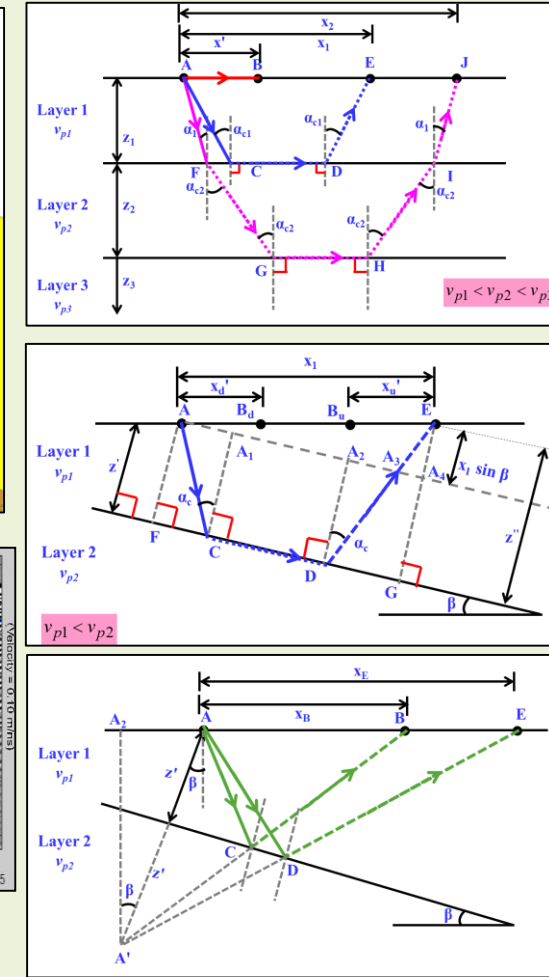
Electrical Resistivity Tomography (ERT)



Nuclear/Proton Magnetic Resonance (NMR/PMR)



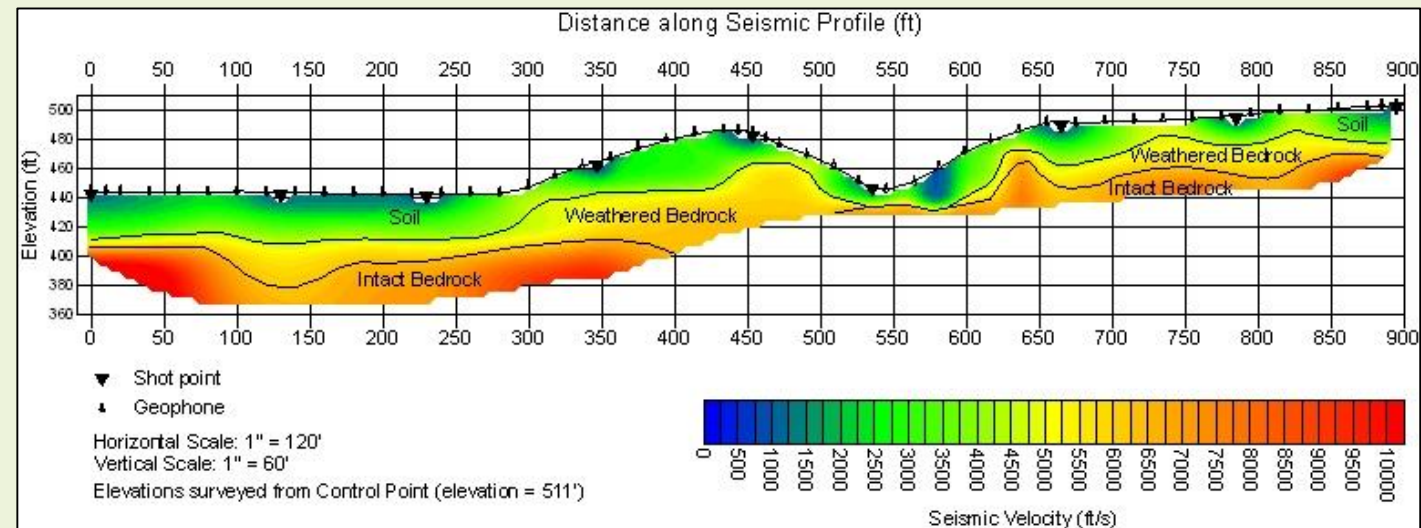
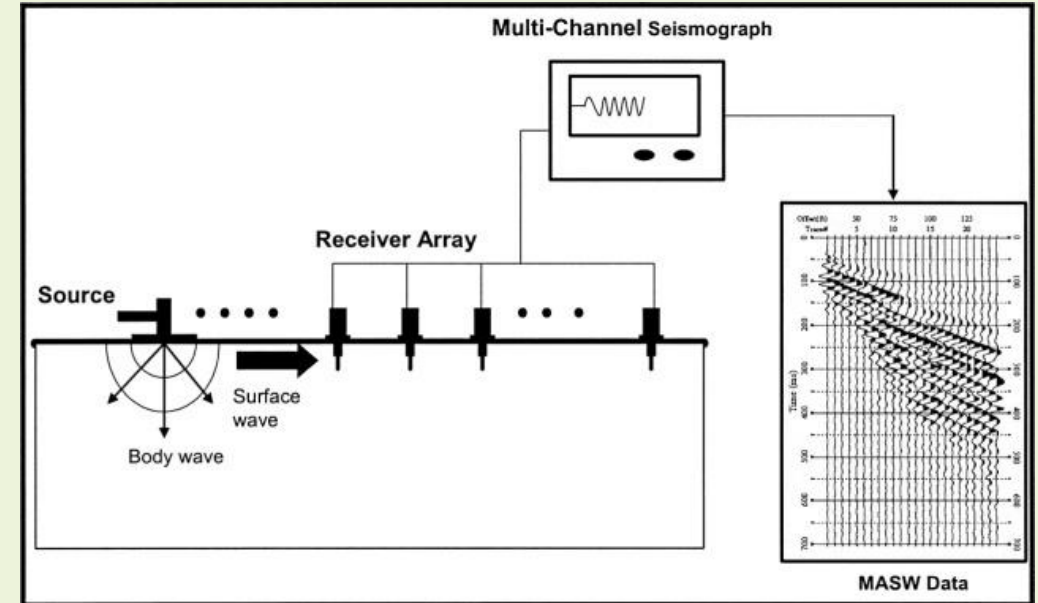
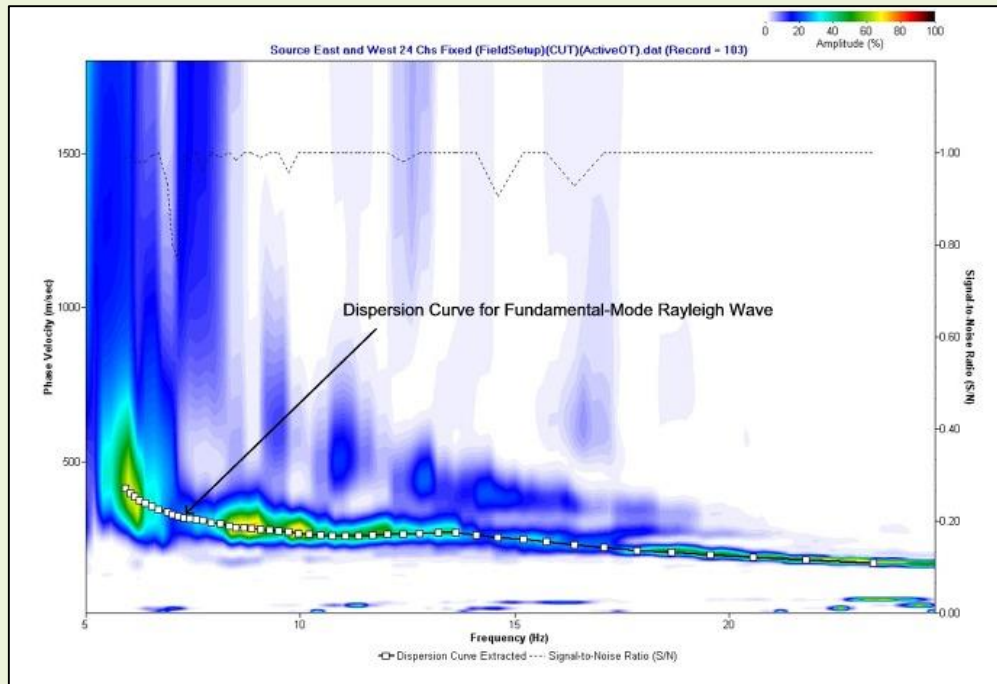
Ground Penetrating Radar (GPR)



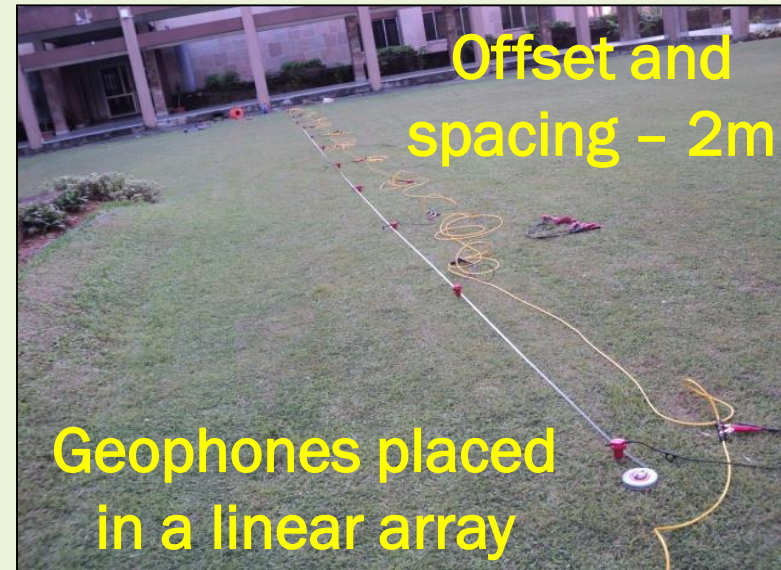
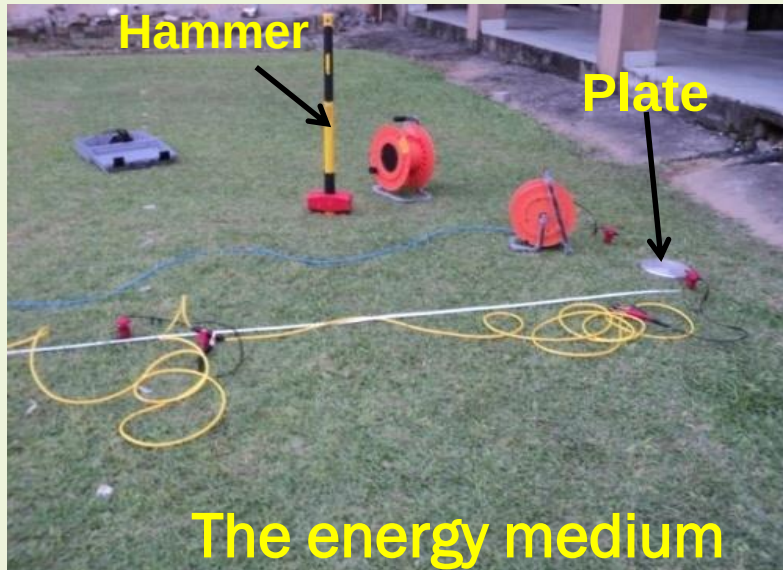
Seismic Refraction and Reflection Surveys

Multichannel Analysis of Surface Waves (MASW) Surveys

- Shear wave velocity profiling of soil substrata
- Operates on the dispersive capacity of soils



MASW Survey Components

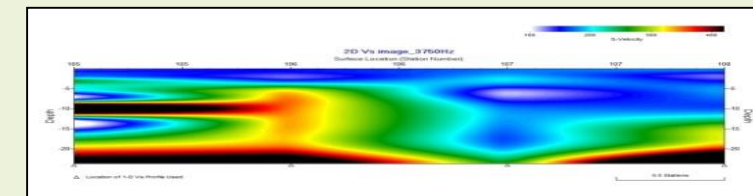
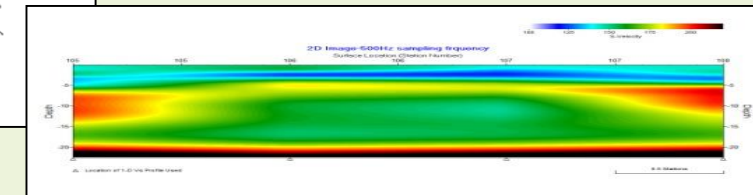
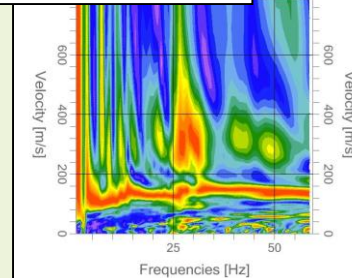
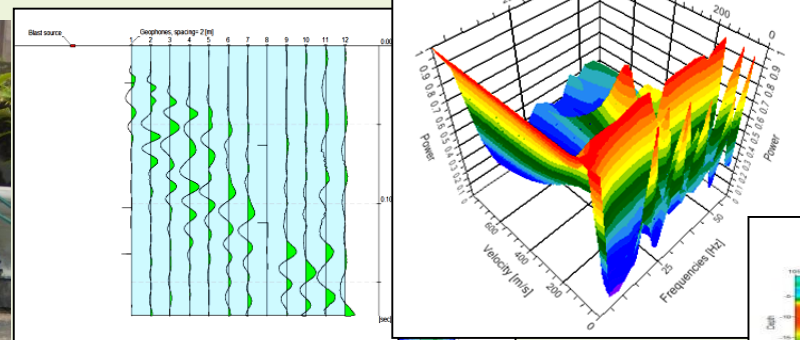
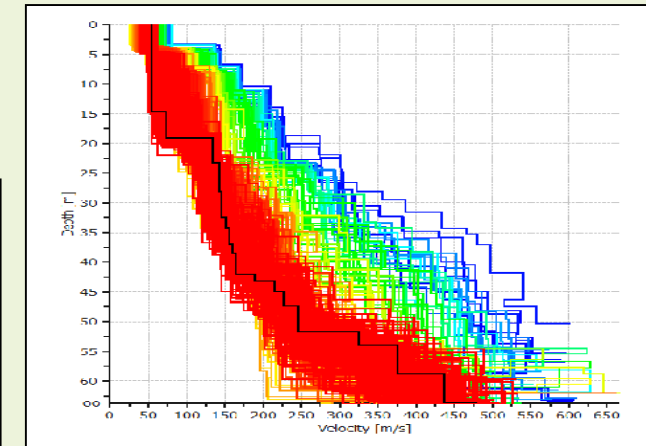


Subsurface Profiling using Active MASW Survey

- MASW (Multichannel Analysis of Spectral Waves)
 - ❖ Seismic exploration technique using NDT
 - ❖ Soil stratigraphy and shear wave velocity profile (1D, 2D or 3D)
- Active MASW Survey
 - ❖ Impact source using sledgehammer or automated drop weight
 - ❖ Depth of investigation: 20-30m with good resolution

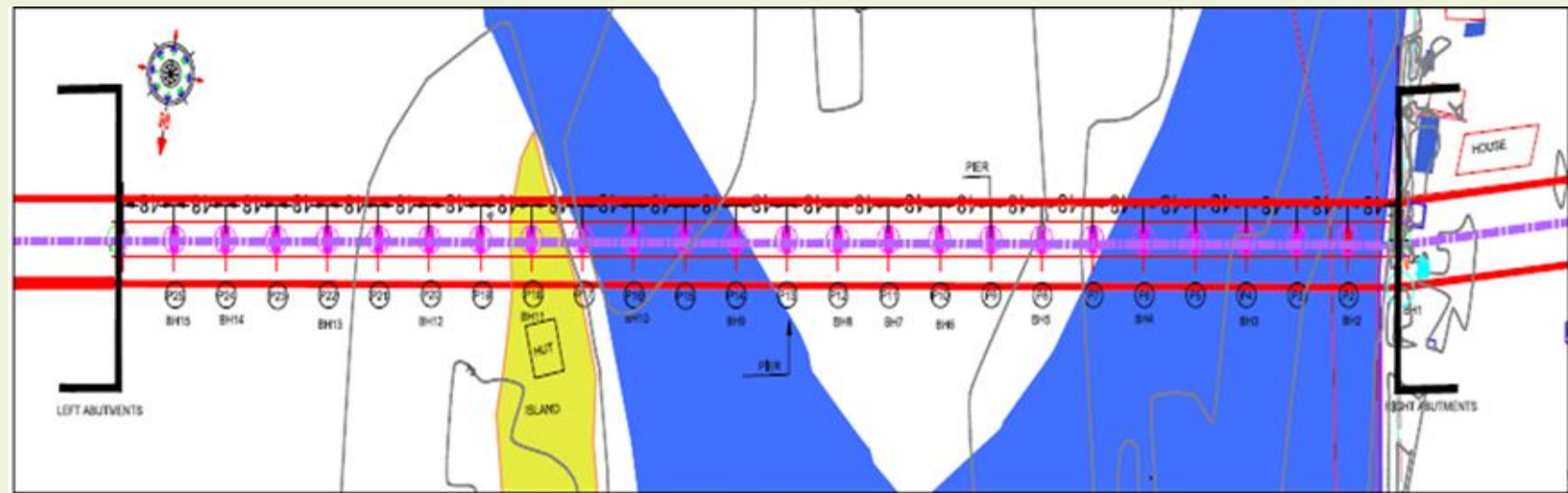


Jumrik



MASW Survey at a Bridge Site

- A new 4-lane (1.2 km) carriageway bridge over Jiya-Bharali River bed
 - ❖ National Highway and Infrastructure Development Corporation Limited (NHIDCL)
 - ❖ Located in Tezpur District, Assam state
 - ❖ Connects NH-52A and NH-37
 - Project completed with Simplex Infrastructures Ltd

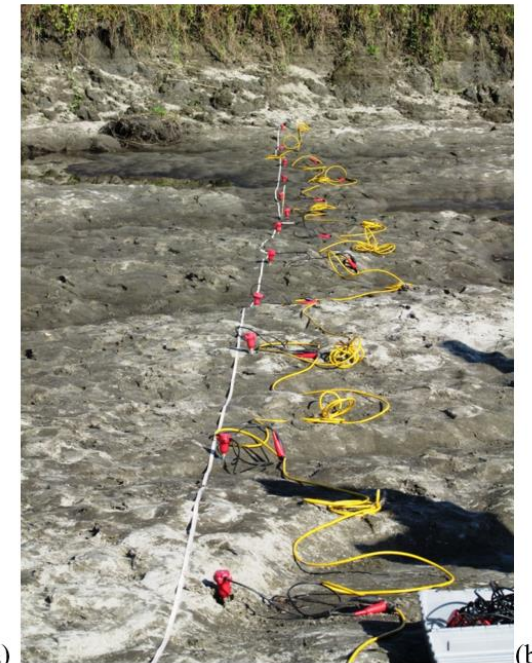


MASW Survey at a Bridge Site

- Superstructure span 1.2 km - 24 Piers
- 2 Abutments
 - ❖ Pier spacing 48 m
- MASW test - Active mode
 - ❖ 10 kg sledge hammer impact as seismic source
 - ❖ 4.5 Hz Geophones
- Piers 1- 4
 - ❖ Submerged under river water
- Roll Along method of Active MASW test
 - ❖ Shifting equipment from pier to pier with a 12 m overlap



(a)



(b)



Jumrik



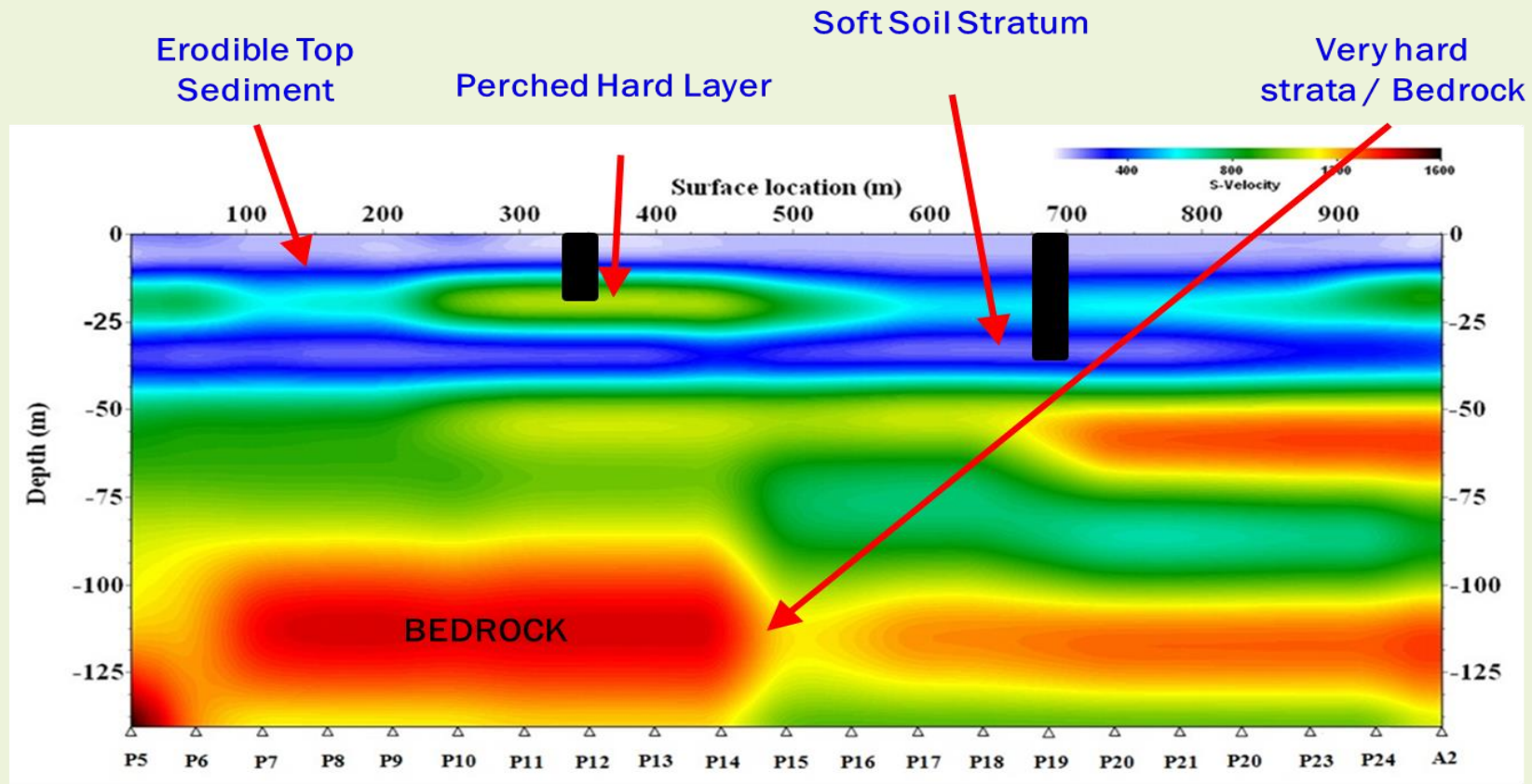
Madhulatha



Rana



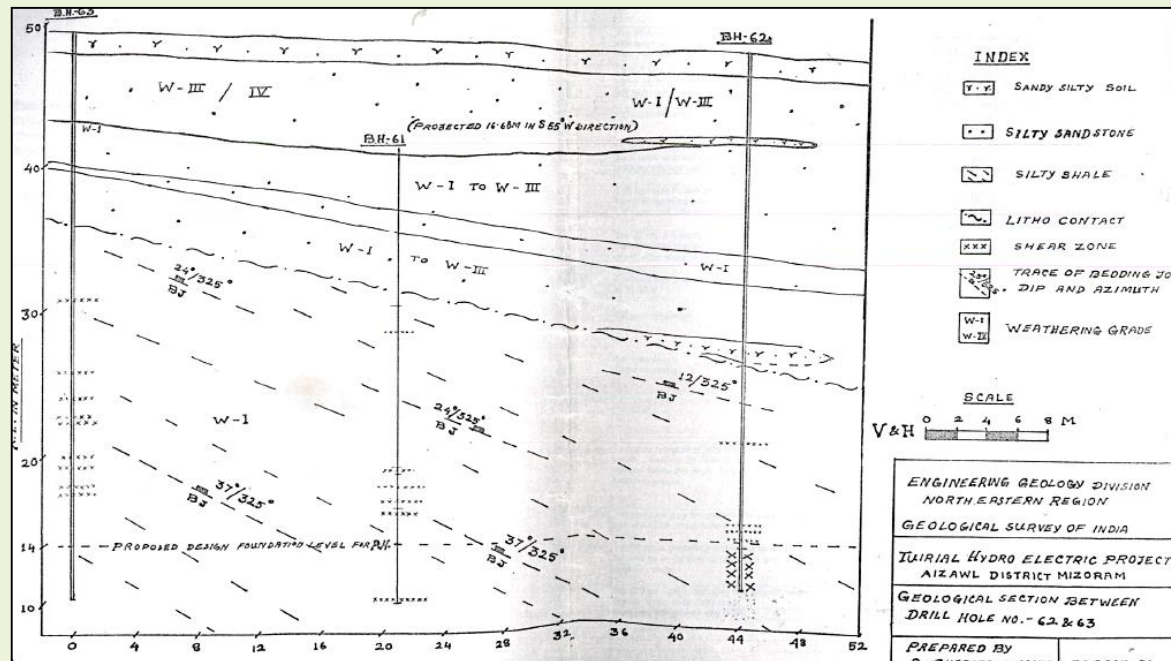
Chiranjib



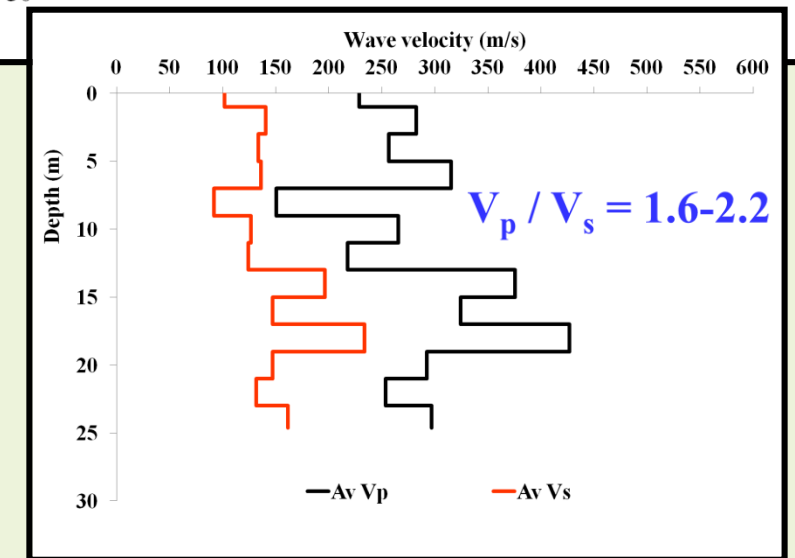
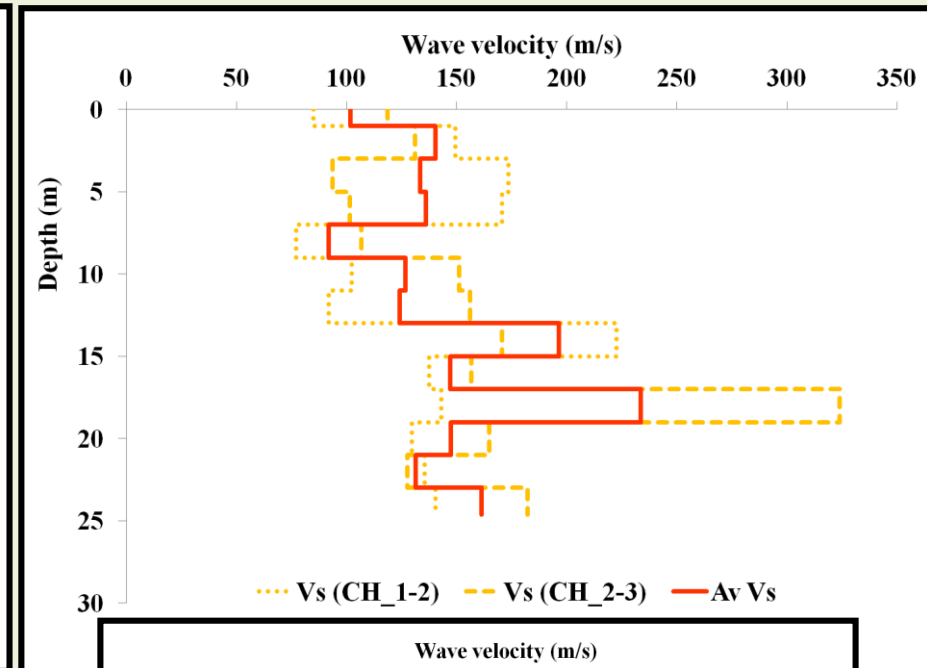
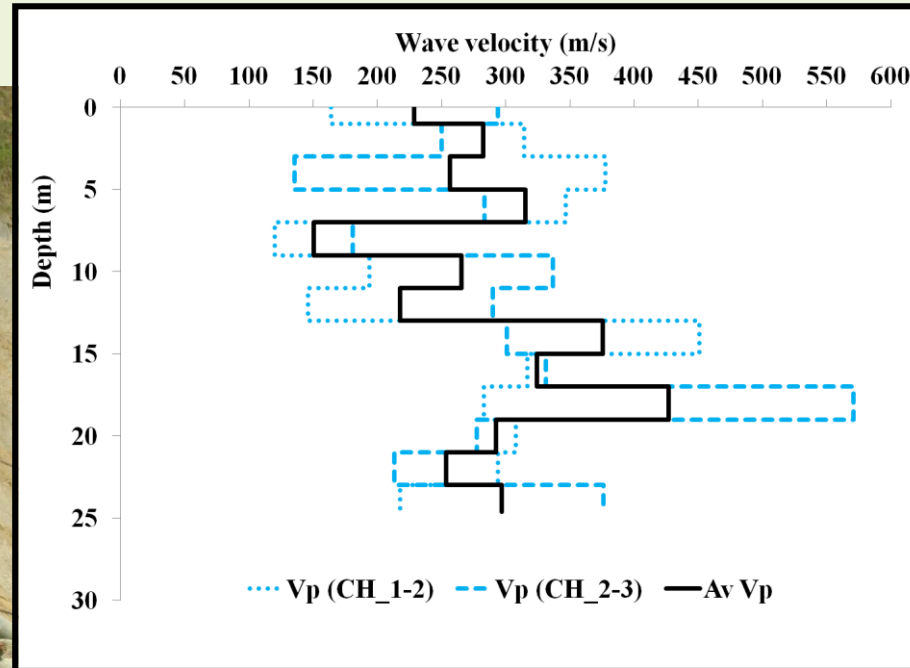
2-D shear wave velocity profile obtained from a roll-along active MASW conducted along the alignment of the proposed bridge over Jia-Bharali (P5-A2)



Tuirial Hydroelectric Power Plant Project, Mizoram

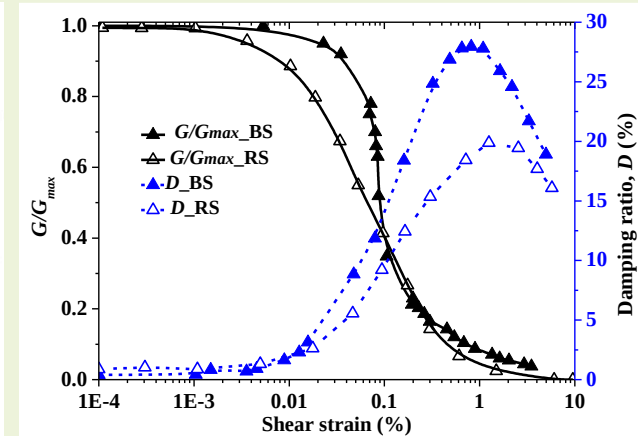
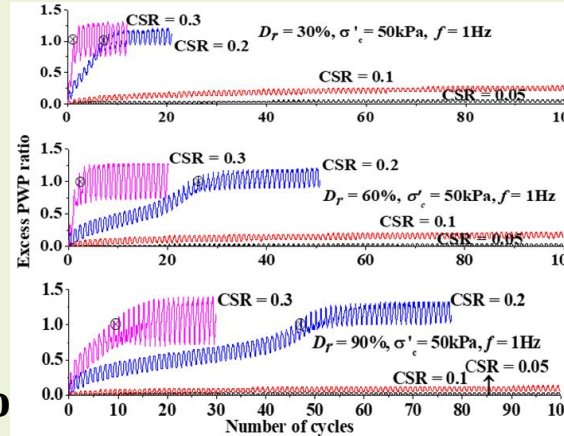


Tuirial Hydroelectric Power Plant Project, Mizoram

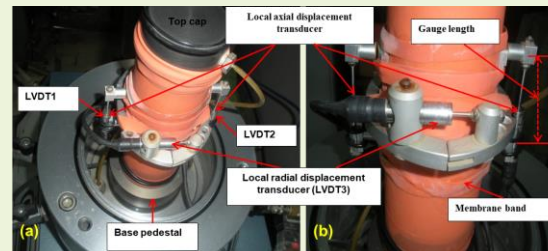
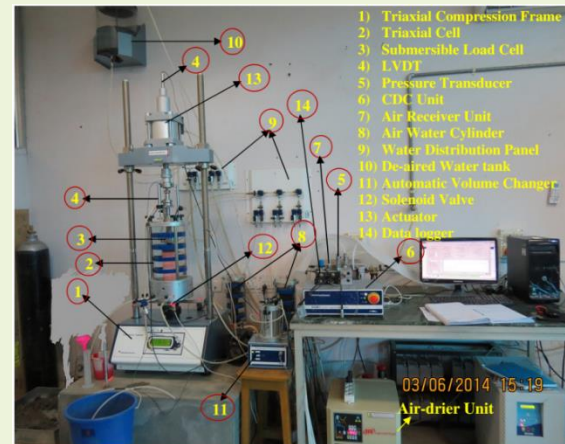
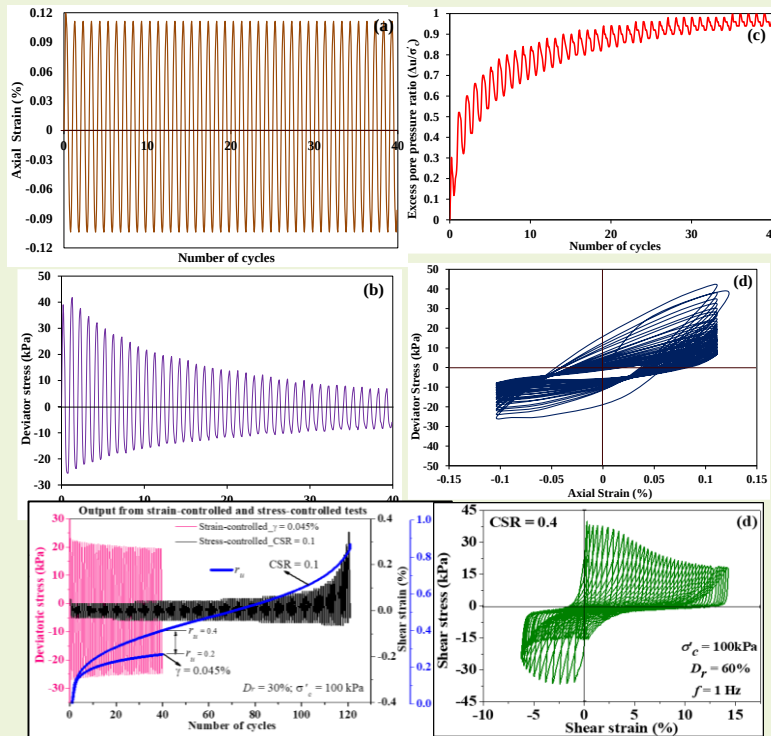


Dynamic Response of Typical Soils of NE India

- Cyclic Triaxial tests
 - ❖ Strain and Stress controlled tests
 - Shear modulus degradation
 - Evolution of damping ratio
 - Liquefaction potential evaluation



Shiv



Liquefaction Criteria for Saturated BS

➤ BS ($D_r = 30\%-90\%$) liquefy under the following optimum conditions

❖ $PGA \geq 0.36g$

❖ $CSR \geq 0.3$

❖ $\gamma_{max} > 0.5\%$

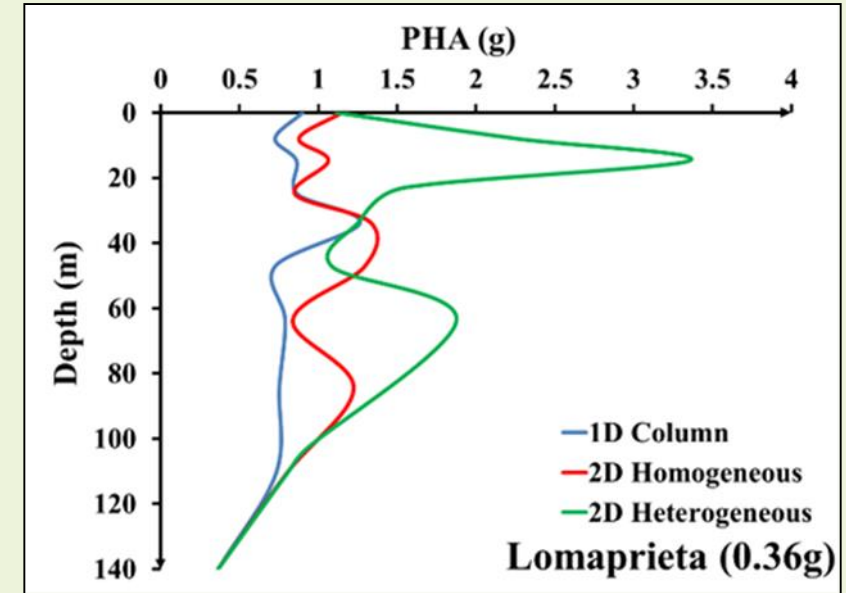
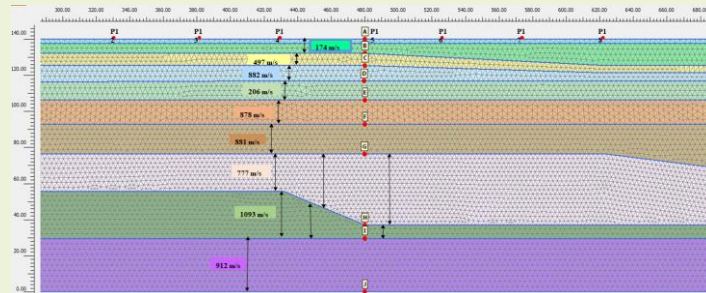
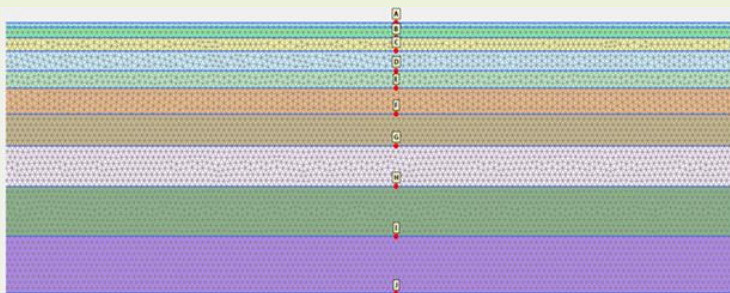
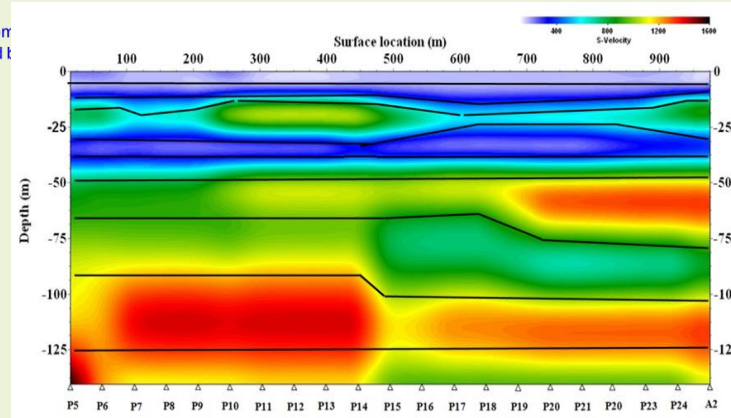
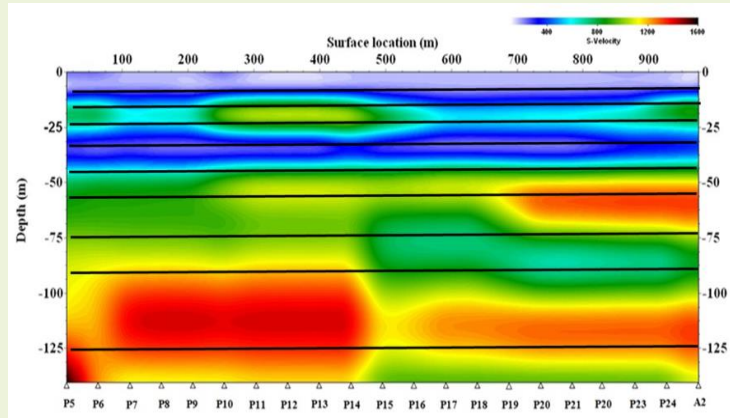
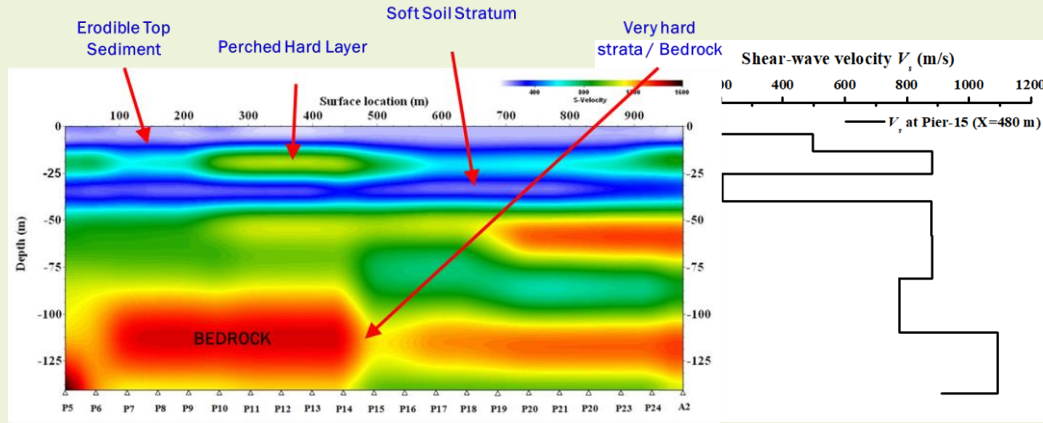
❖ Limiting value of $\gamma = 0.5\%$ is to be adopted for liquefaction evaluation study for BS soil at loose condition

❖ Limiting value of $\gamma = 1.0\%$ is to be adopted for liquefaction study for BS soil at dense condition

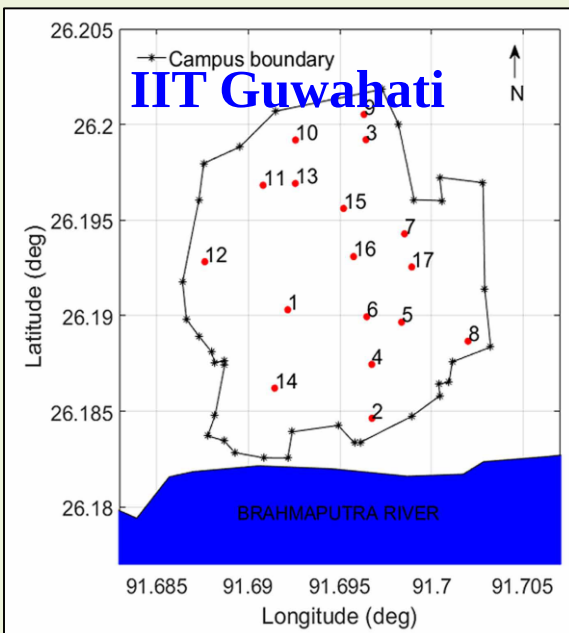
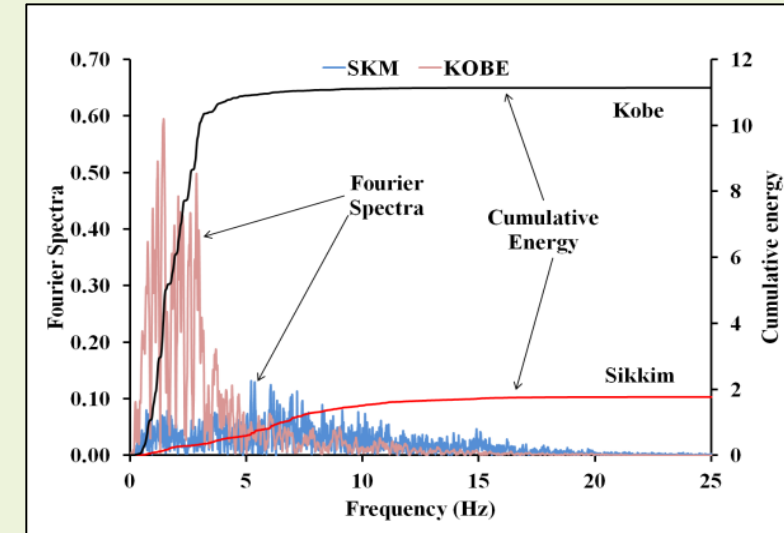
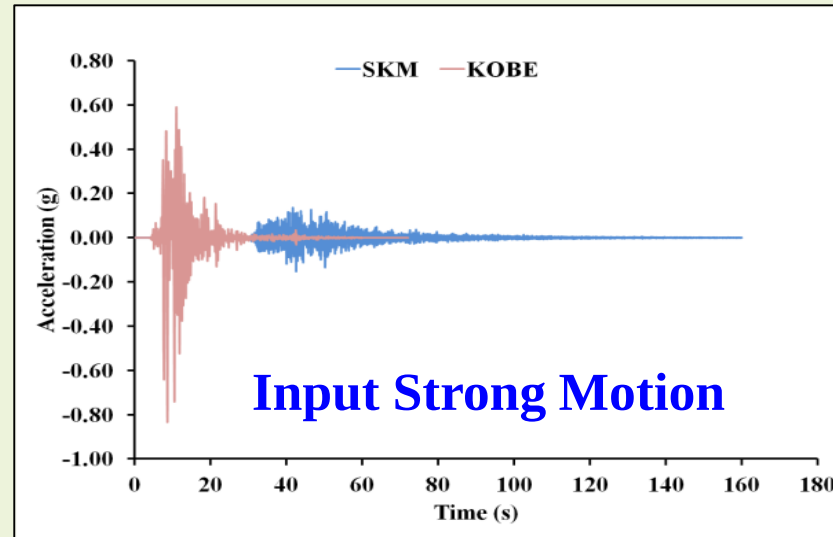
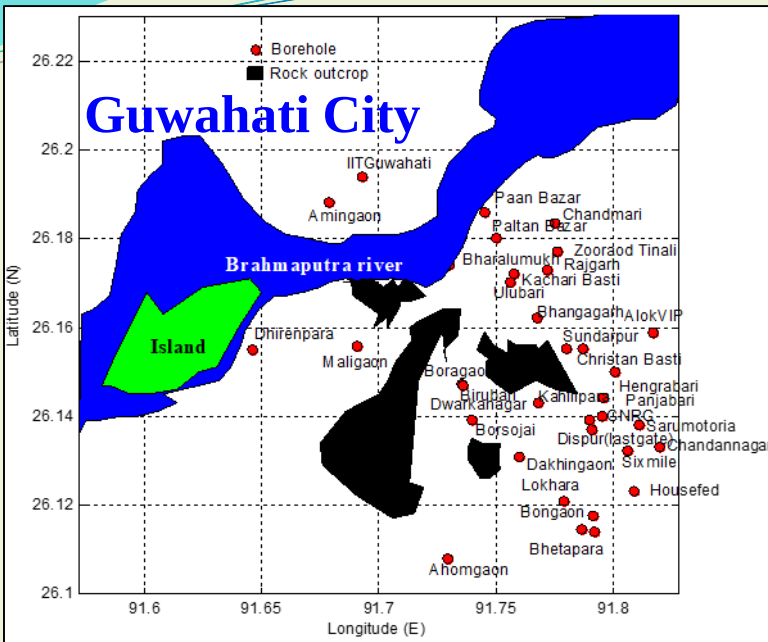


Madhulatha

Representation of Subsurface 1-D and 2-D GRA Models



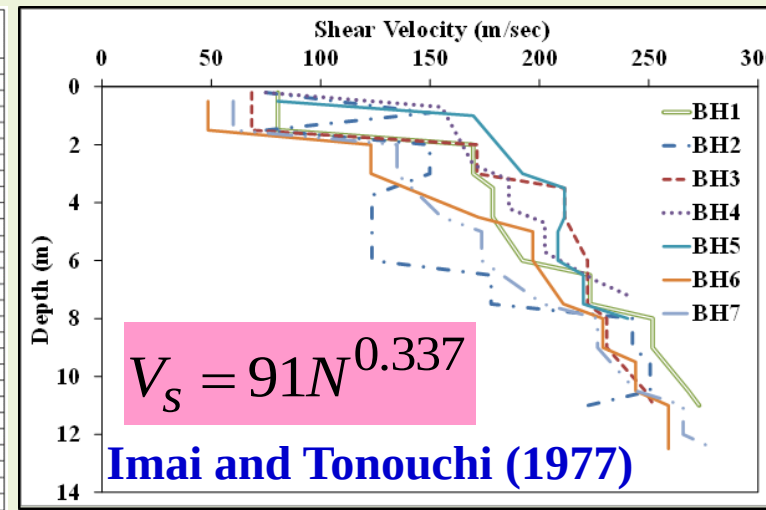
GRA of Guwahati City and IIT Guwahati



Typical Borehole Profile

Layer No.	Thickness (m)	Soil Type	Depth (m)	Field Density (kN/m ³)	Average Field Density (kN/m ³)	SPT N-Value	Shear Wave Velocity, v_s (m/s)	Average v_s (m/s)
1	0.75	Clay	0.75		18.9			78.23
2	0.75		1.5			6	136.5	
3	0.5		2	18.9				147.5
4	1		3		19.05	4	138.3	151.2
5	1.5		4.5			7	164	
6	0.5		5	19.2				138
7	1		6		18.4	2	112	112
8	1.5		7.5			2	112	
9	0.5		8	17.6				138
10	1		9			7	164	185.3
11	1.5		10.5		18.55	15	206.7	
12	0.5		11	19.5				192
13	1		12			9	177	174
14	1.5		13.5		19.25	8	170.75	
15	0.5	Sand	14	19				209
16	1		15			27	247.1	248.5
17	1.5		16.5		19.35	28	250	
18	0.5		17					245.7
19	0.5		17.5	19.7				
20	0.5		18			25	241.5	244.3
21	1.5		19.5		19.65	27	247.1	
22	0.5		20	19.6				262.8
23	1		21			40	278.5	282.6
24	1.5		22.5		20.05	44	286.7	
25	0.5		23	20.5				296.7
26	1		24		21.05	55	306.8	315.5
27	1.5		25.5			66	324.3	
28	0.5		26	21.6				324.3

V_s Profile



Fourier and Energy Spectra



Devdeep

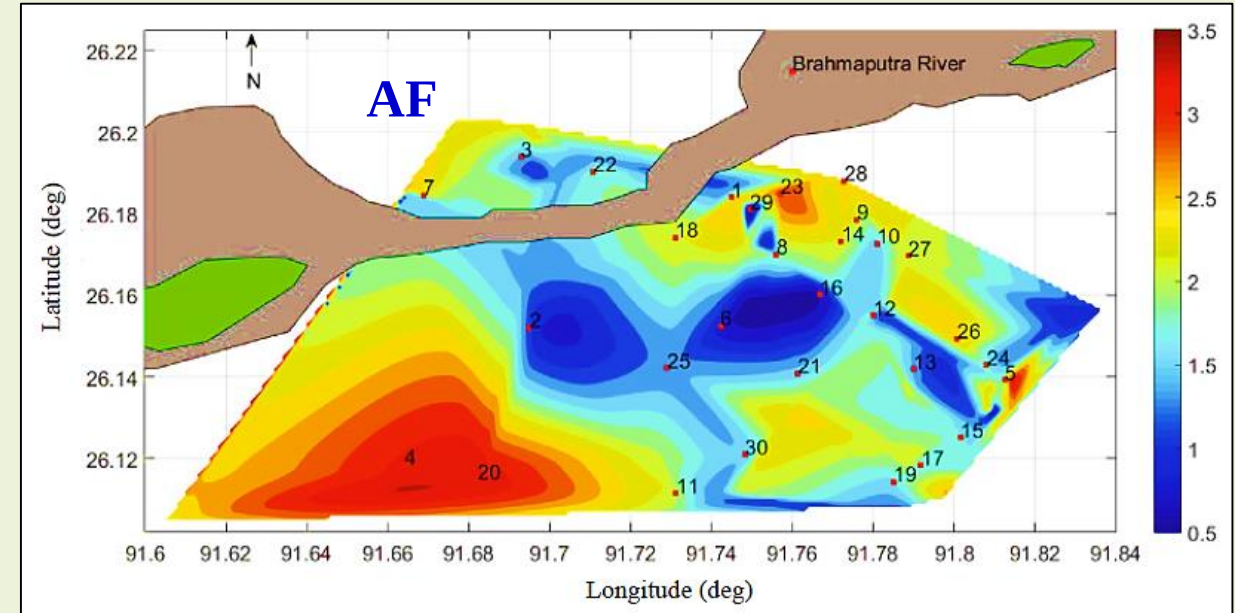
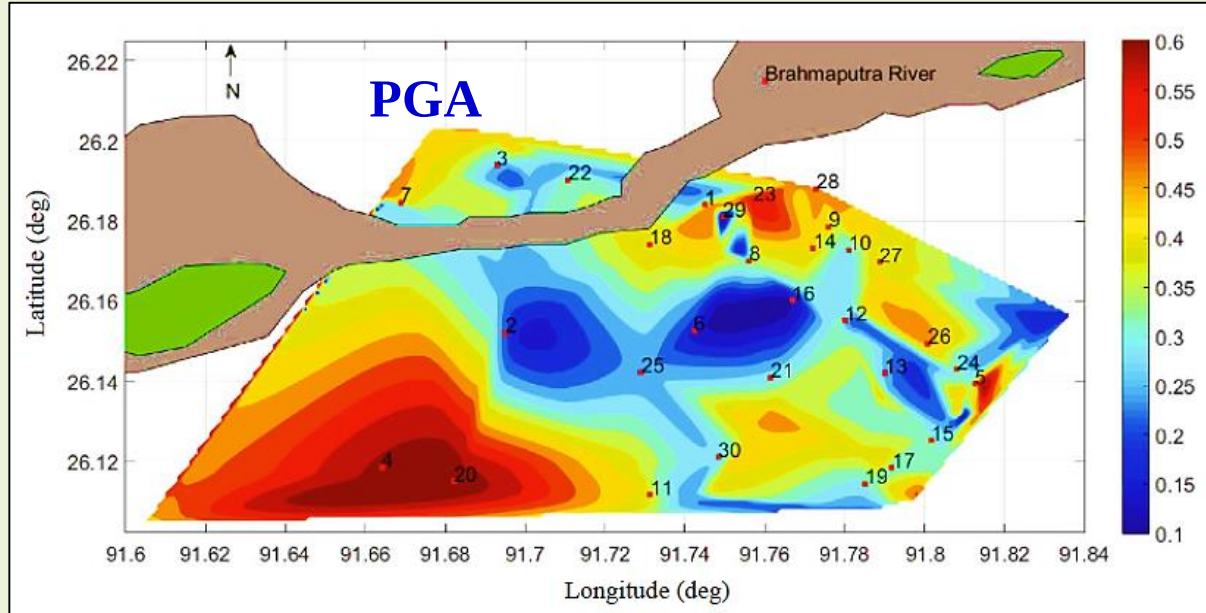
Shiv

Typical PGA and AF Contour Map of Guwahati City

- Manifestation of Local Site Effects due to varying geology
 - ❖ Local Amplification and Attenuation of bedrock motion



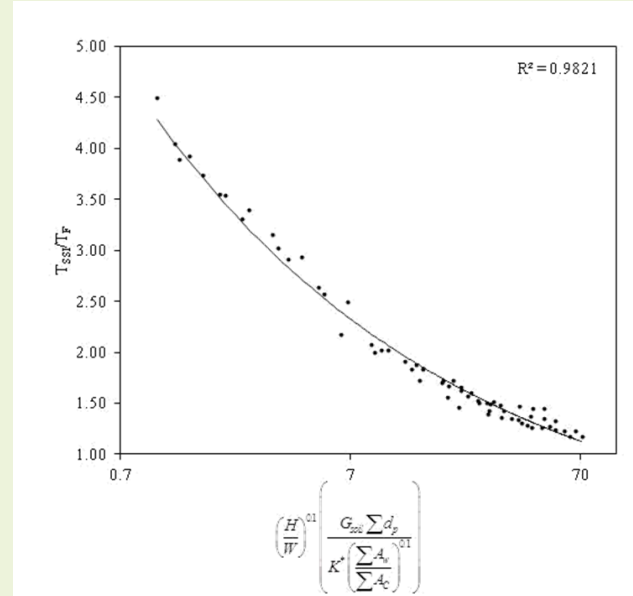
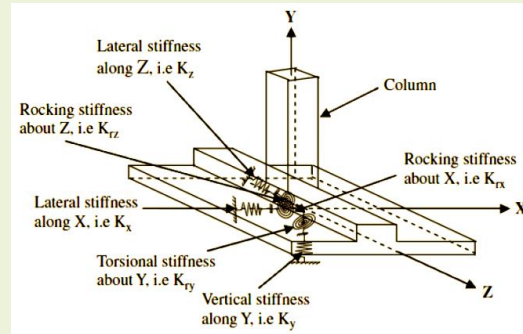
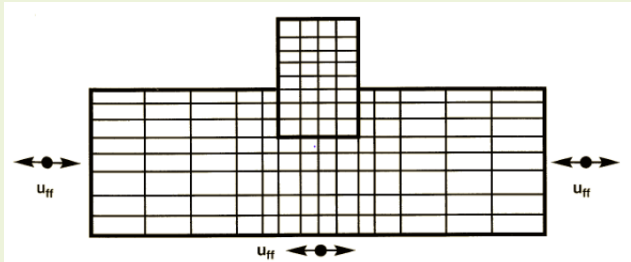
Shiv



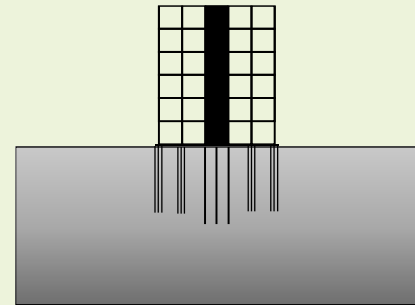
Nepal Eq: PBRA = 0.18g

Seismic Soil-Structure Interaction

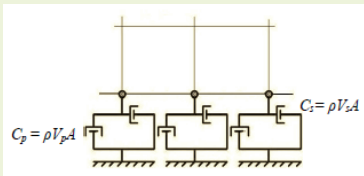
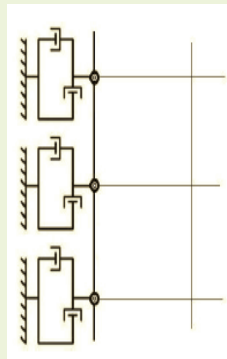
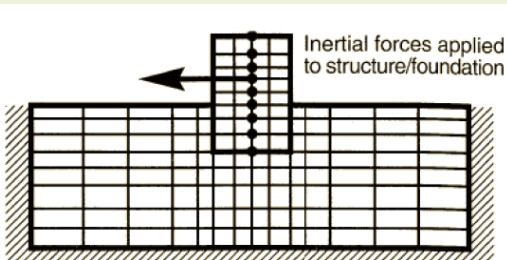
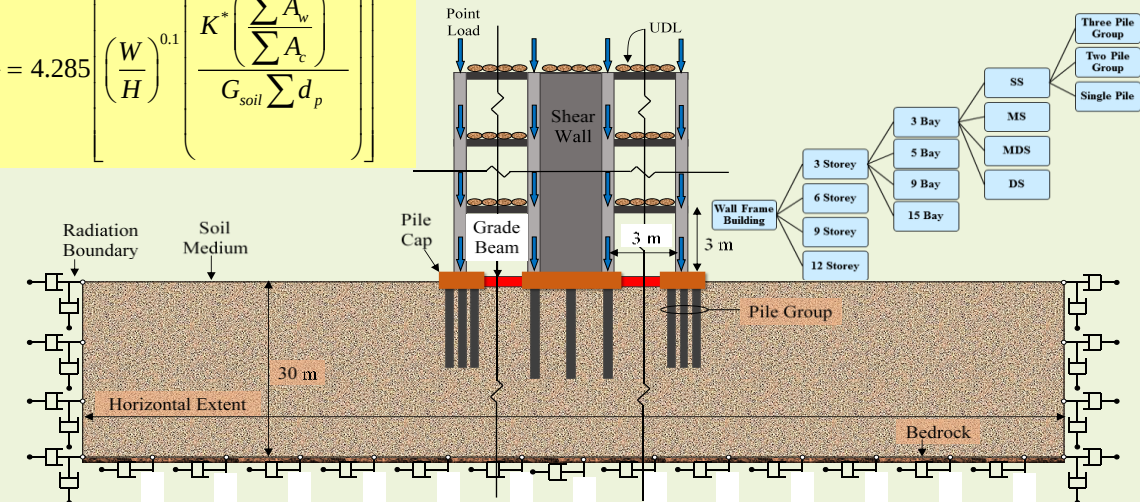
- Soil-Structure Interaction
 - ❖ Seismic analysis of integral abutment RC bridges
 - ❖ Seismic behavior of RC wall-framed buildings
 - ❖ Kinematic and Inertial interaction of building foundations



Nishant



$$\frac{T_{SSI}}{T_F} = 4.285 \left(\frac{W}{H} \right)^{0.1} \left(\frac{K^* \left(\frac{\sum A_w}{\sum A_c} \right)^{0.1}}{G_{soil} \sum d_p} \right)^{0.314}$$



Rainfall Induced Landslide Hazard of Guwahati City

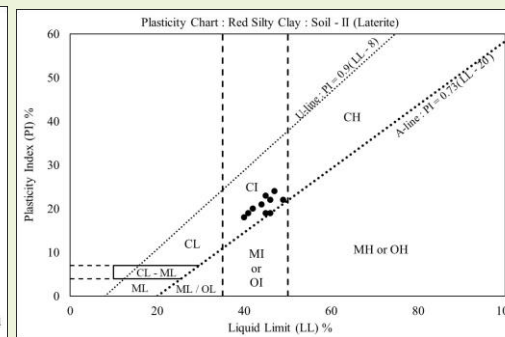
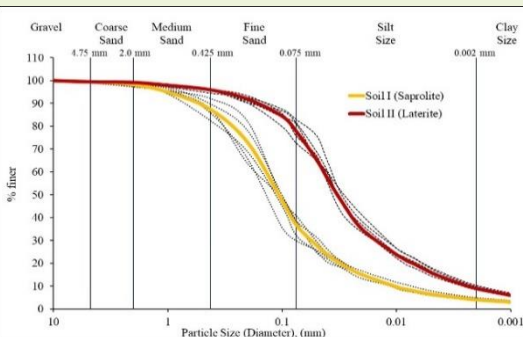
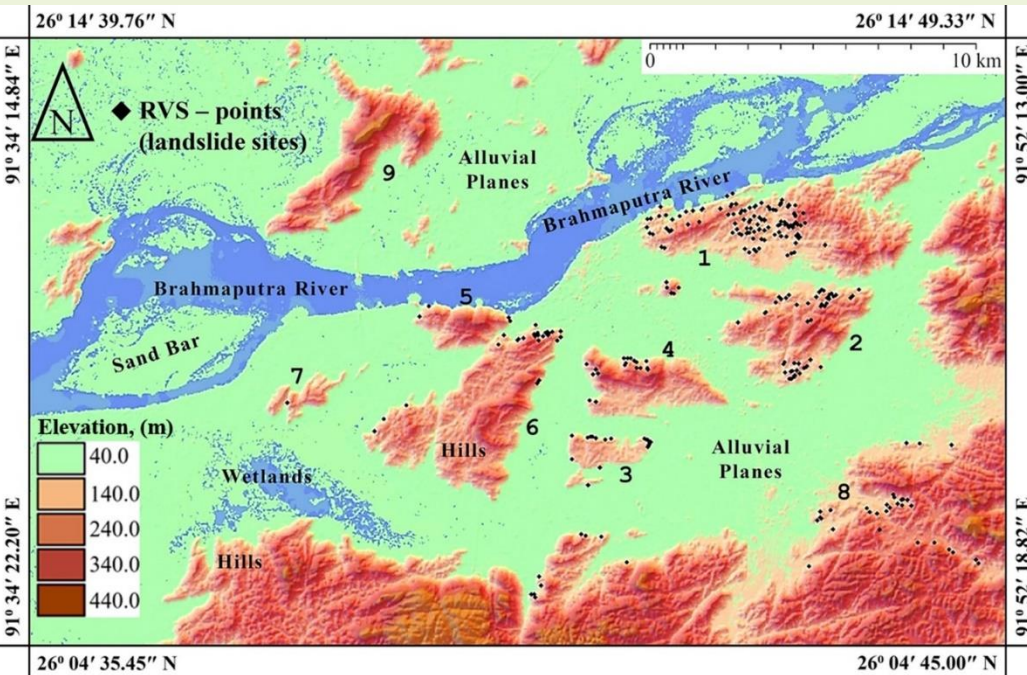
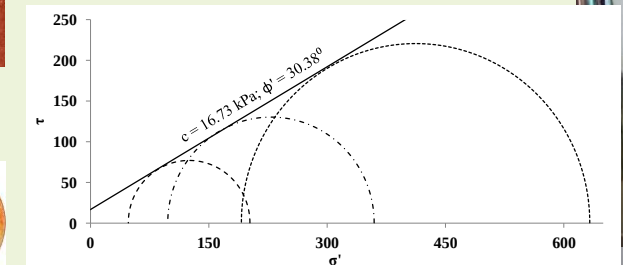
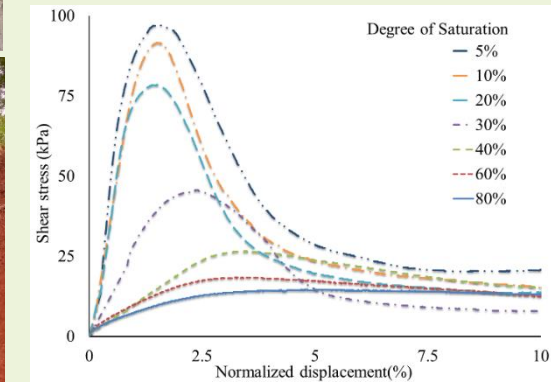
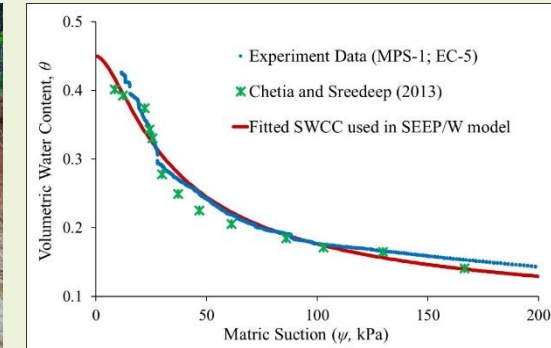
Study area and characterization of hillslope soils



Chiranjib

8 major hill series:

- (1) Nabagraha and Sunsali hill series
- (2) Japorigog hill
- (3) Sonaighuli and Jutikuchi hill series
- (4) Narakashur hill
- (5) Nilachal hill
- (6) Fatasil hill
- (7) Jalukbari hill
- (8) Khanapara hill
- (9) Agyathuri hills



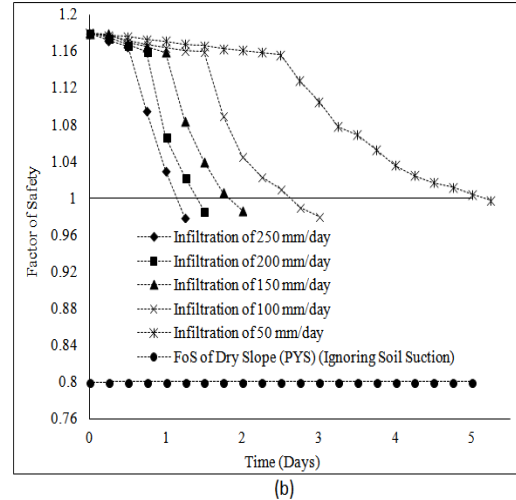
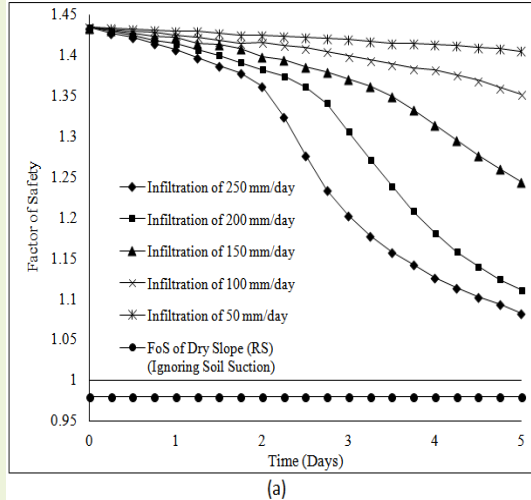
Rainfall Induced Landslide Hazard of Guwahati City

Local-scale deterministic slope stability analysis

Applied Infiltration

Five different rates of infiltration

- 50 mm/day
- 100 mm/day
- 150 mm/day
- 200 mm/day
- 250 mm/day



Landslide Analysis Approaches

Crozier and Glade (2005)

Local scale

- Single Landslide
- Stability Analysis

Carrara et al. (1996)

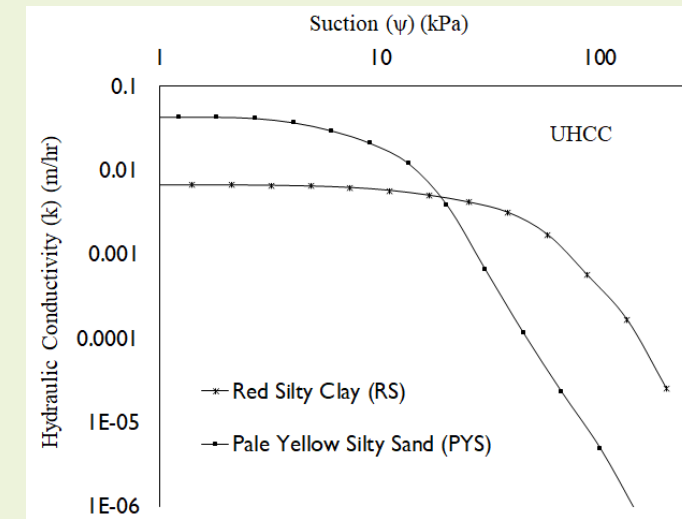
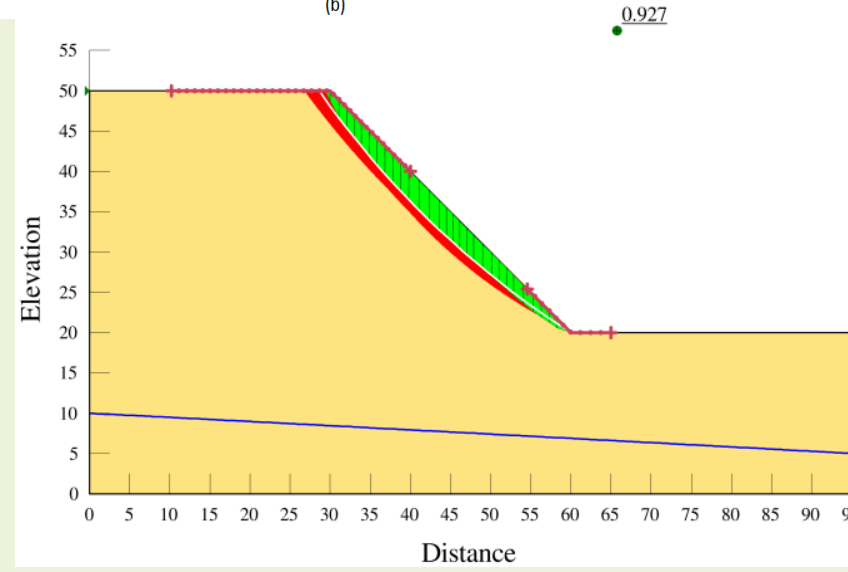
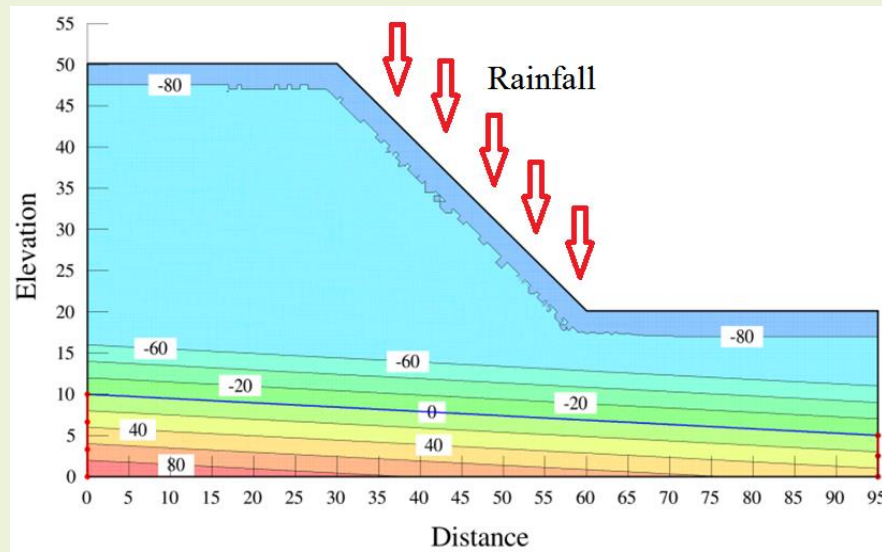
- Qualitative
 - Descriptive Prediction
 - Geological Appraisal
- Quantitative
 - Stability Analysis

Regional scale

- Greater Spatial Extent
- Susceptibility Analysis

Soeters and Van Western (1996)

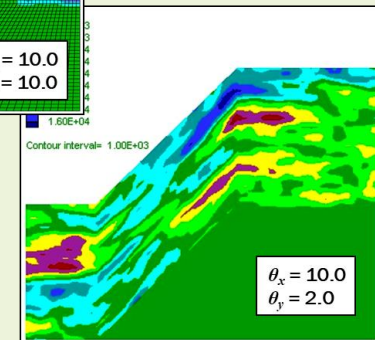
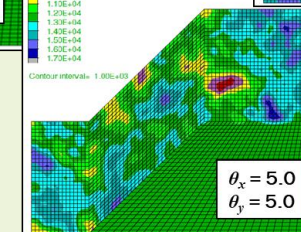
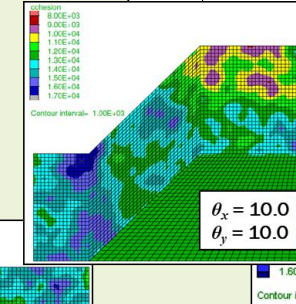
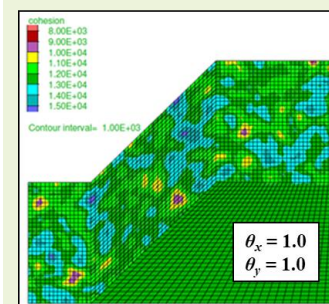
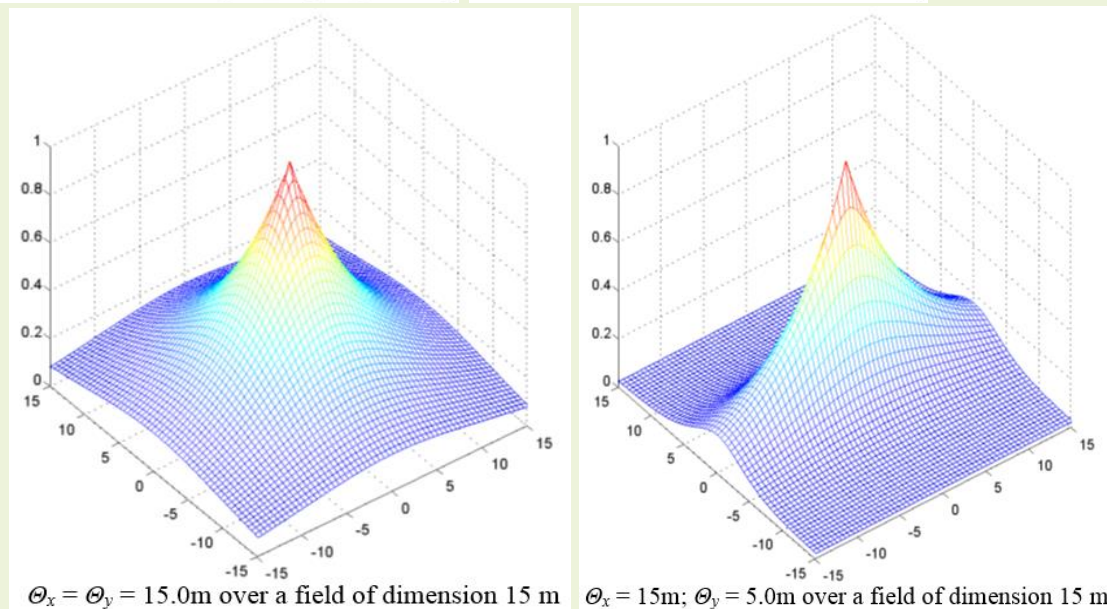
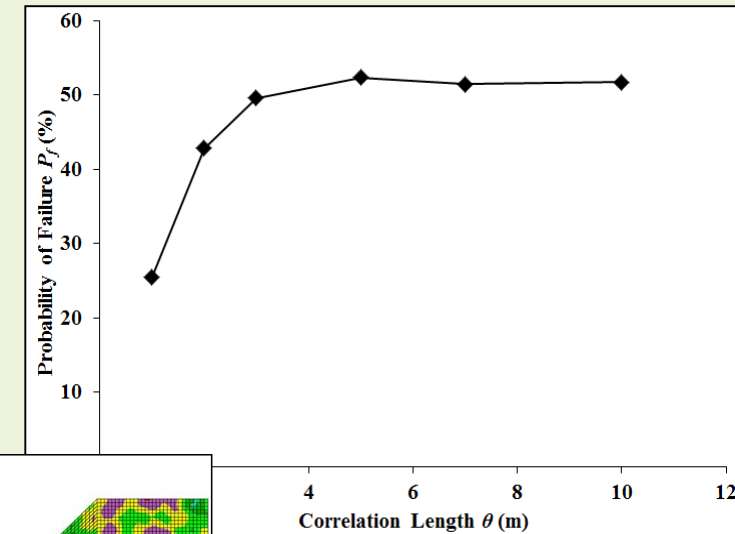
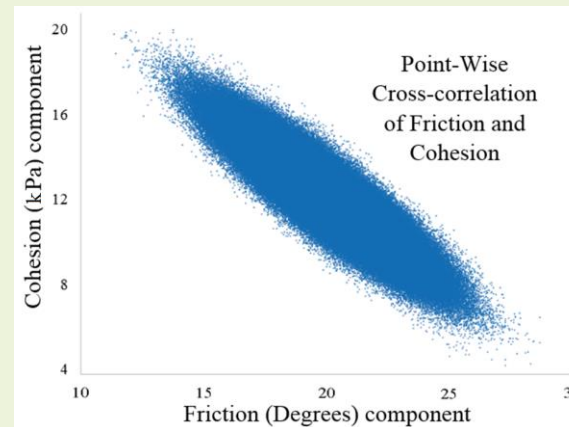
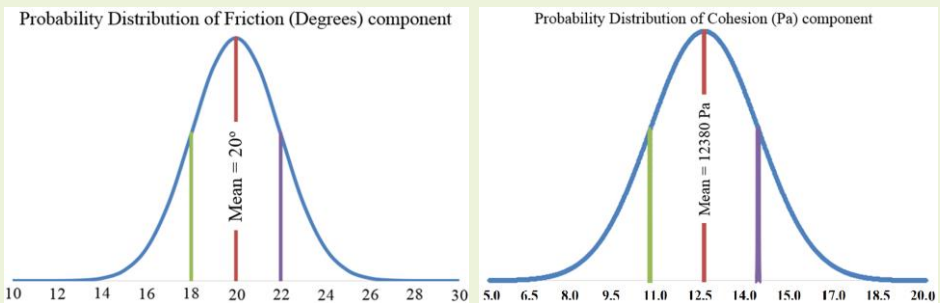
- Inventory-based
- Heuristic
- Statistical
- Deterministic



Rainfall Induced Landslide Hazard of Guwahati City

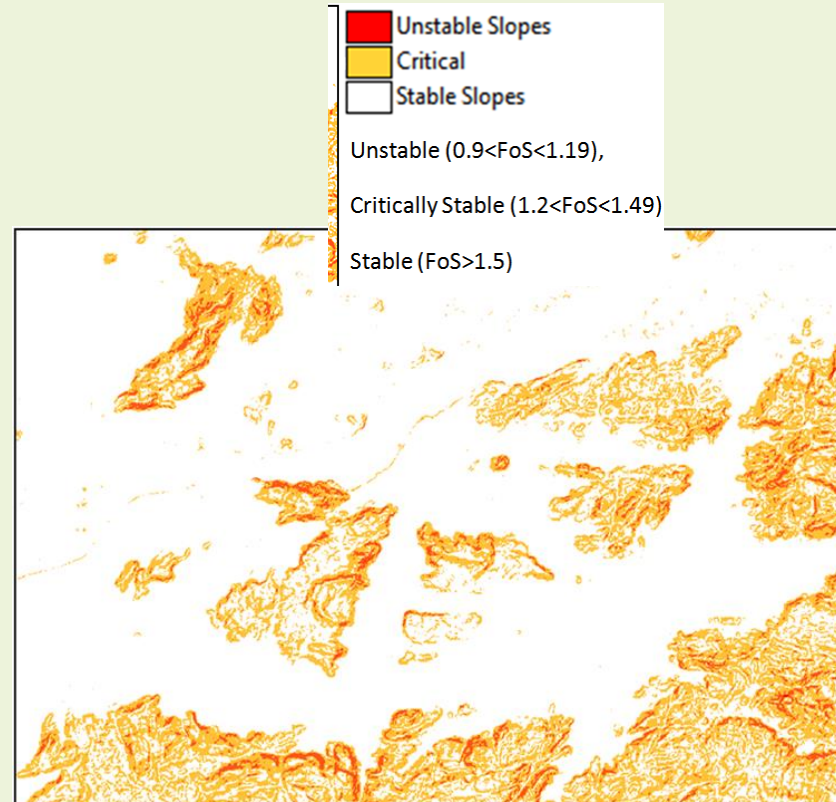
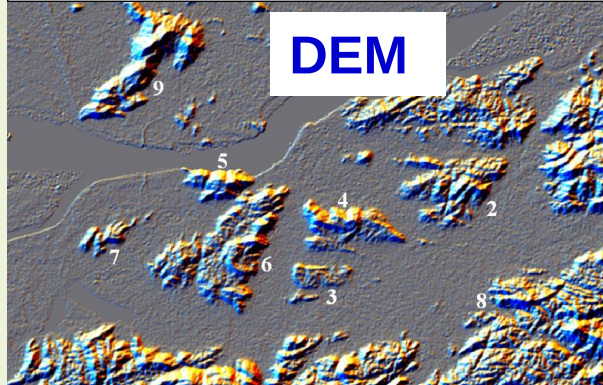
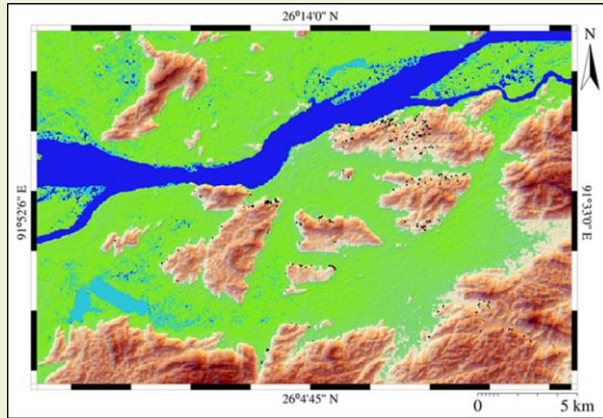
- Local-scale probabilistic slope stability analysis

- ❖ Application of Random Field for soil parameters for catering uncertainty in soil parameters

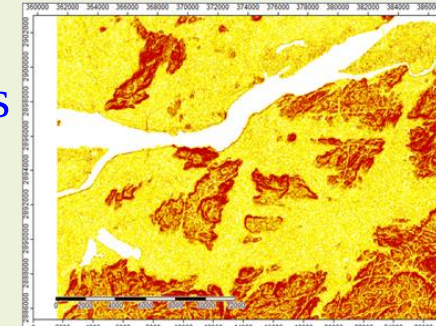


Landslide Susceptibility and LHZ of Guwahati City

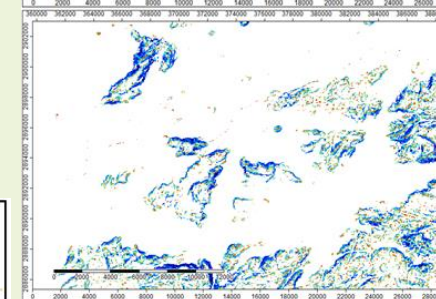
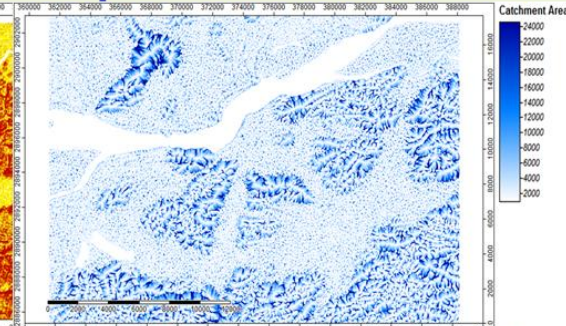
- Regional Scale Stability Analysis
 - ❖ Landslide Hazard Zonation and Landslide Susceptibility Studies
 - SHALSTAB, TRIGGRS, SINMAP, Physically Based Models
 - GIS platform for Digital Elevation Models (DEM)



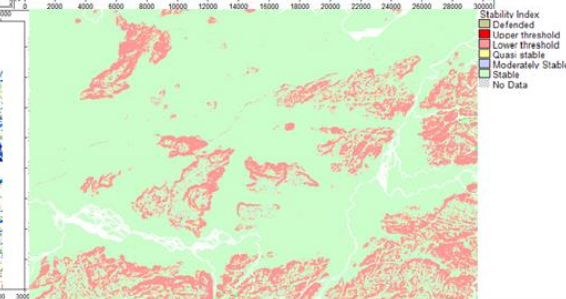
Slope Map



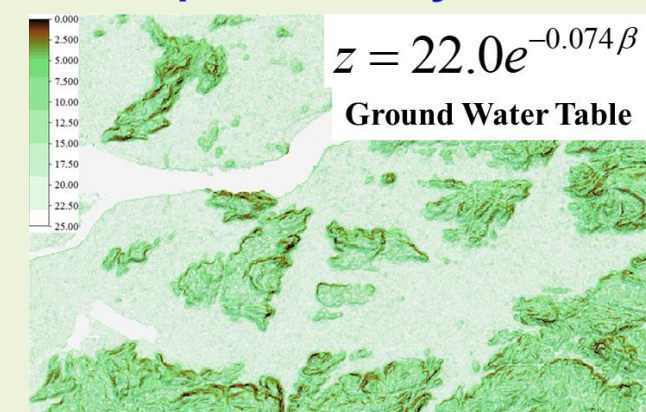
Map of Catchment Area



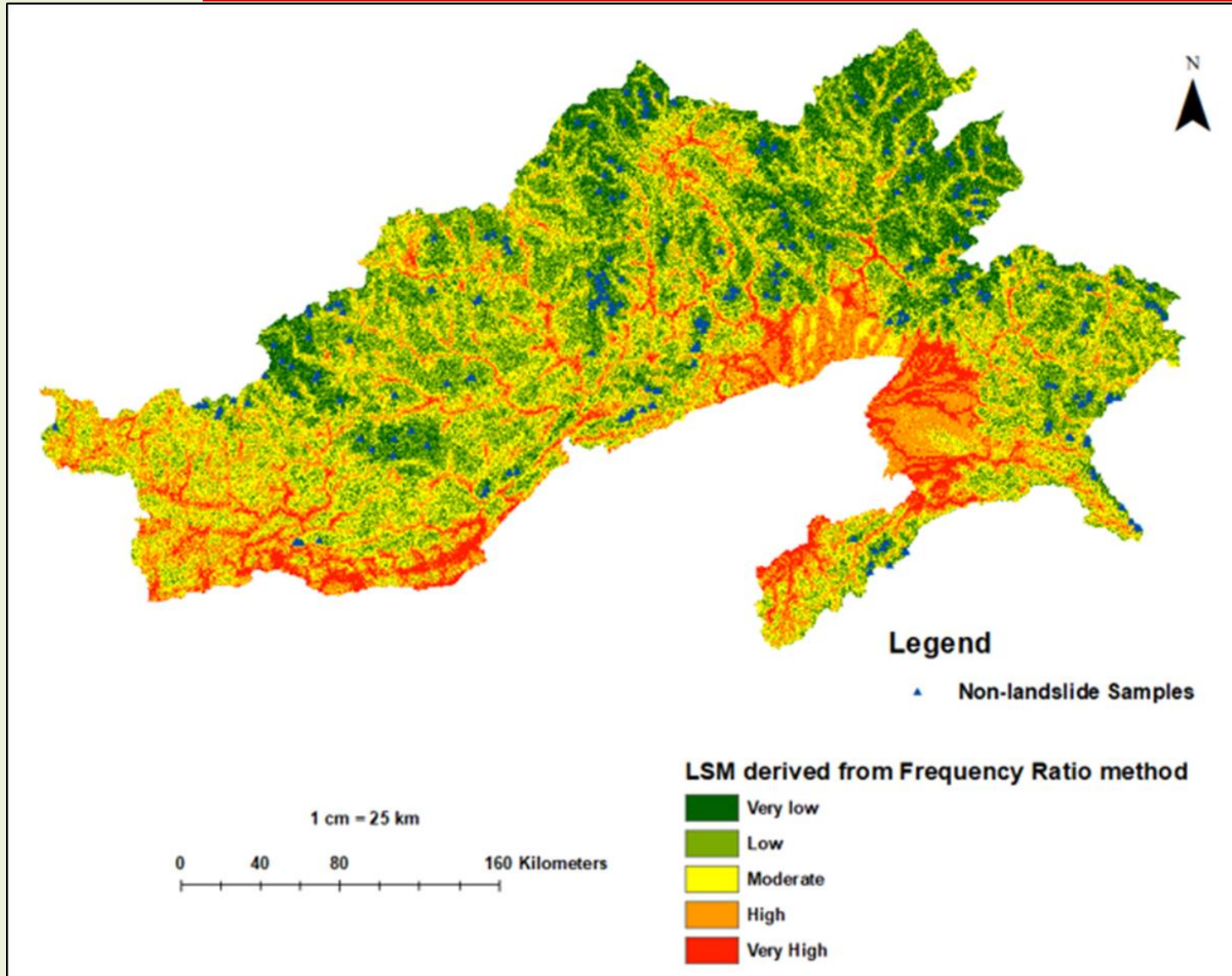
Steady-State Recharge Map



Map of Stability Index



Rainfall Induced Landslide Hazard Map of Arunachal Pradesh



- Way forward
 - ❖ Consideration of collated multi-hazard scenarios to develop a comprehensive hazard zonation maps of the areas
 - Flood
 - Rainfall
 - Seismicity
 - Rockfall and Debris flows
 - Anthropogenic activities
 - Glaciatic effects and snow avalanches in the northern parts

Forensic Analysis of Landslide and Mitigation

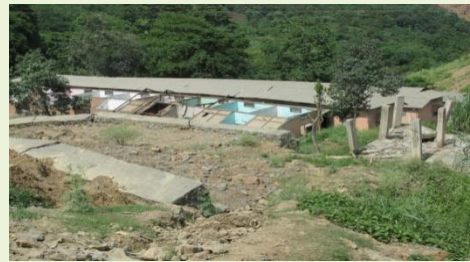
- Calcom Cement Plant, Umrangso, Assam



Priyanka

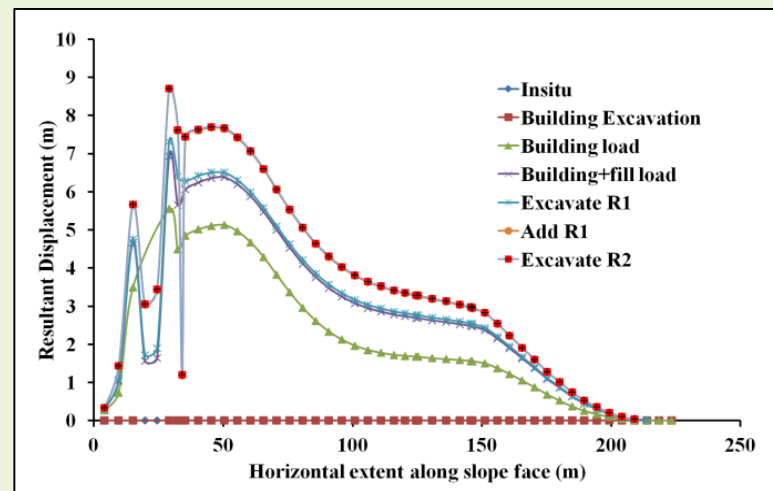
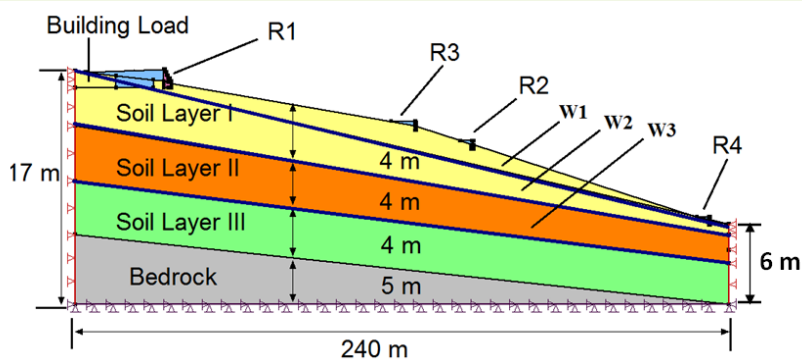
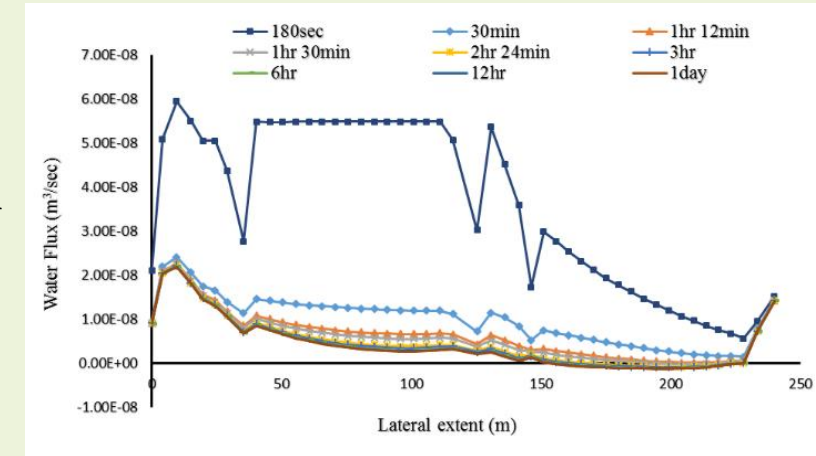


Ruplekha

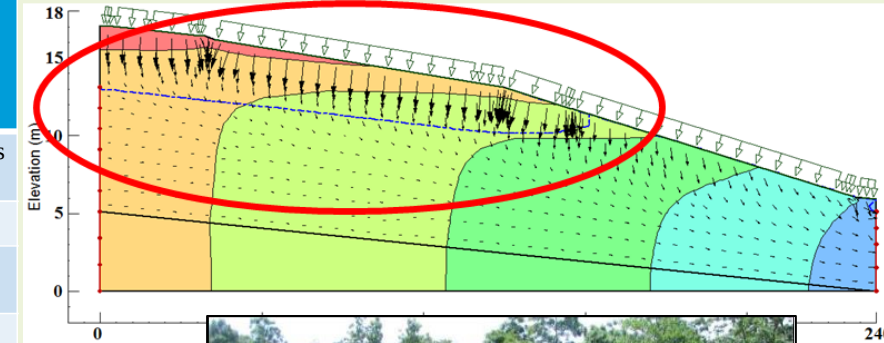


Forensic Analysis of Landslide and Mitigation

- Approximate model based on available nearby borehole data
 - Sequential construction simulated in FE model
 - Water Table depth at failure location was unknown

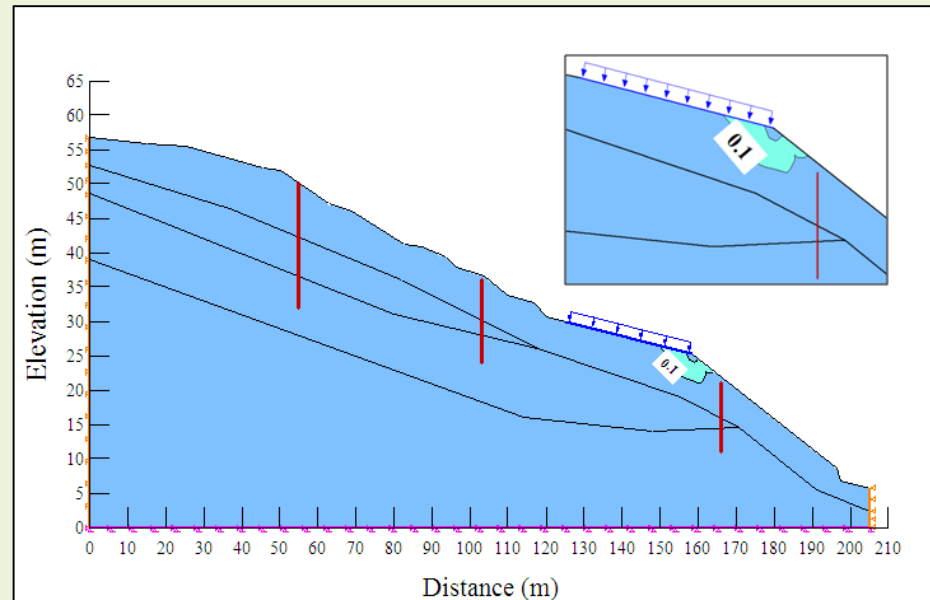
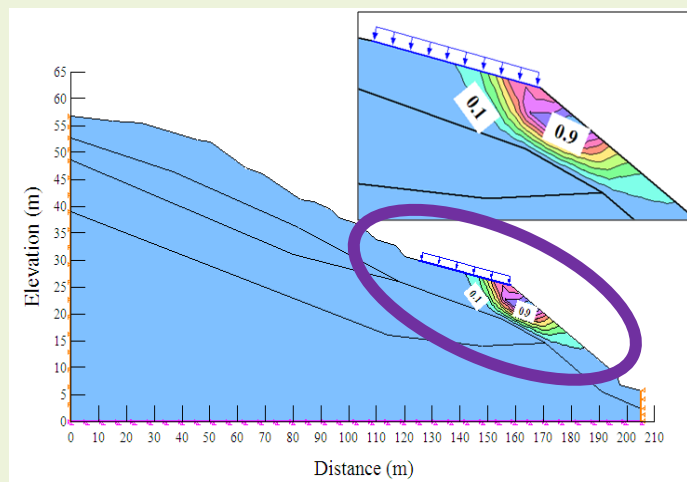
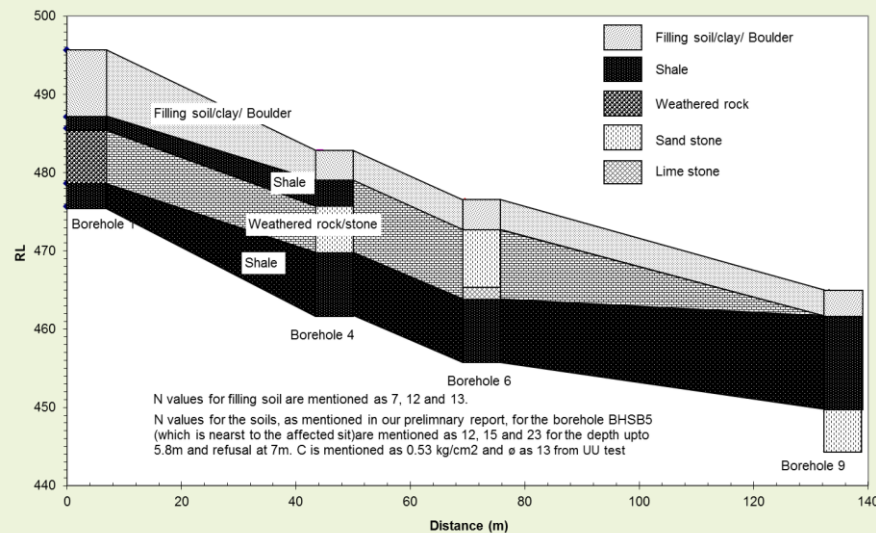
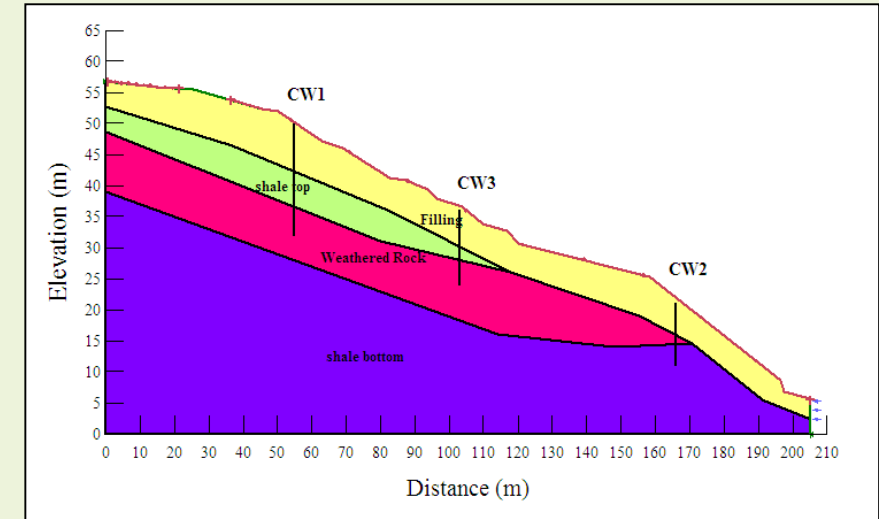
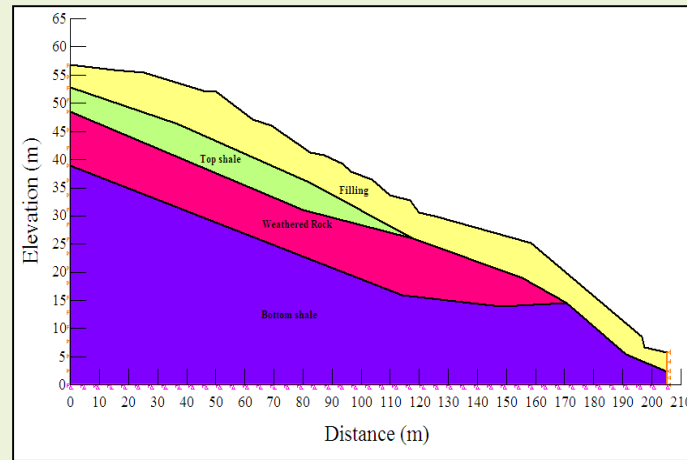
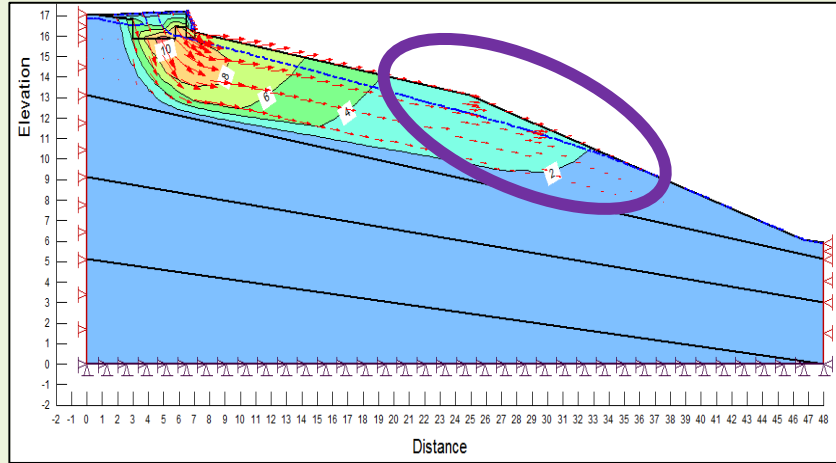


Sl. No.	Stage of construction	Dry	Water level at a ht. of 17m (W ₁)	Water level at a ht. of 13m (W ₂)	Water level at a ht. of 9m (W ₃)
		FoS Values	FoS Values	FoS Values	FoS Values
1	In-situ	2.112	1.411	1.588	1.511
2	Building foundation excavation	2.1	1.373	1.577	1.513
3	Imposition of building load	0.976	0.821	0.793	0.769
4	Filling back of foundation	0.967	0.850	0.802	0.774
5	Excavation for R1	1.015	0.875	0.825	0.805
6	Construction and backfilling of R1	0.985	0.838	0.798	0.785
7	Excavation for R2	1.373	0.817	1.065	1.025
8	Construction and backfilling of R2	1.344	0.752	0.967	1.007
9	Excavation for R3	1.288	1.029	1.035	0.975
10	Construction and backfilling of R3	1.294	1.024	0.984	0.959



Forensic Analysis of Landslide and Mitigation

- Mismatch with field displacement in approximate model



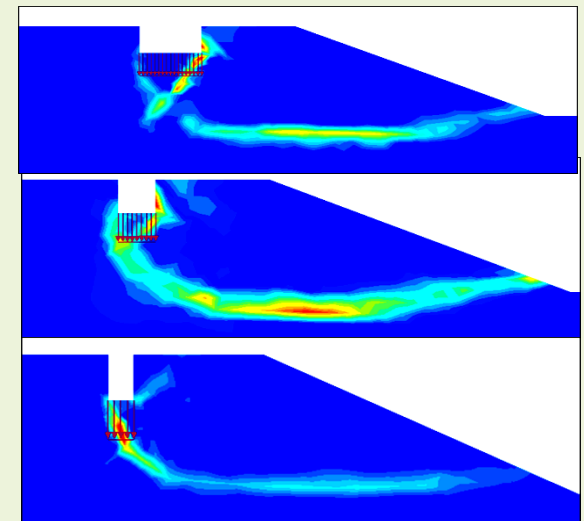
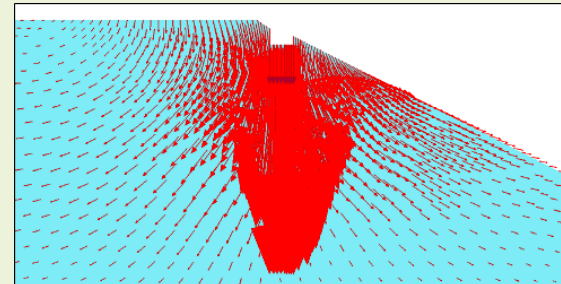
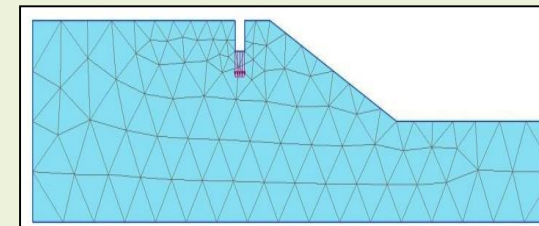
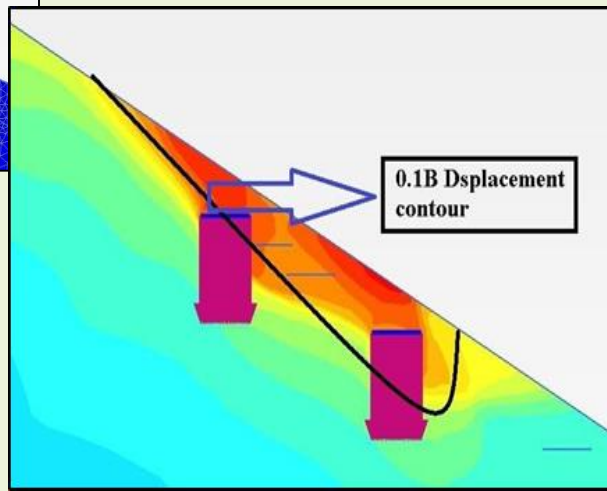
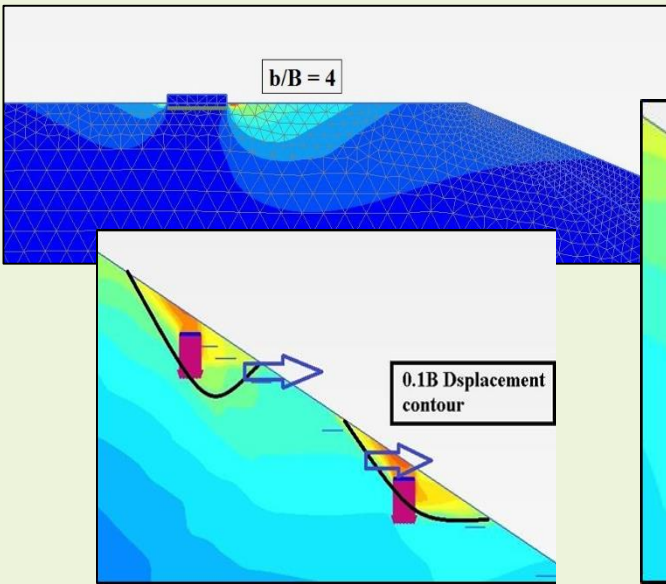
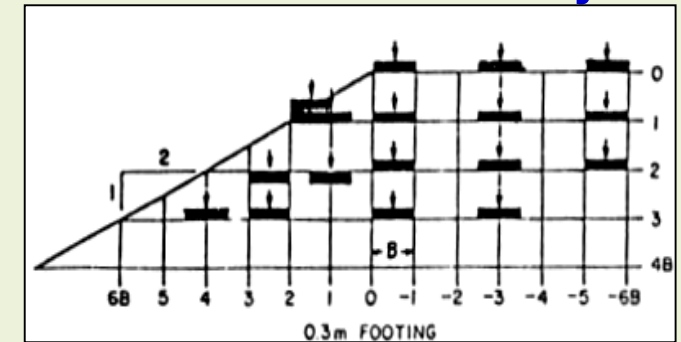
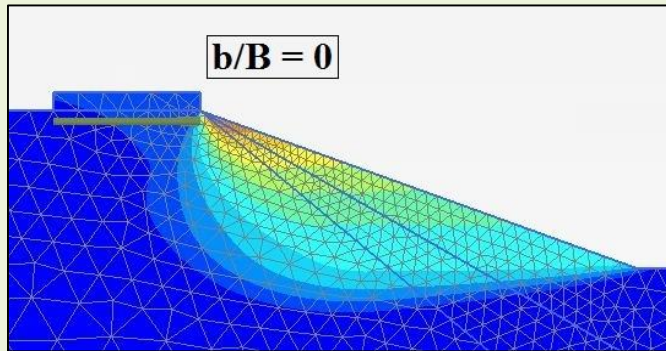
Response of Foundations on Slopes

- Static and seismic behavior of foundations on slopes
 - ❖ FE Analysis to identify the evolution of failure mechanism

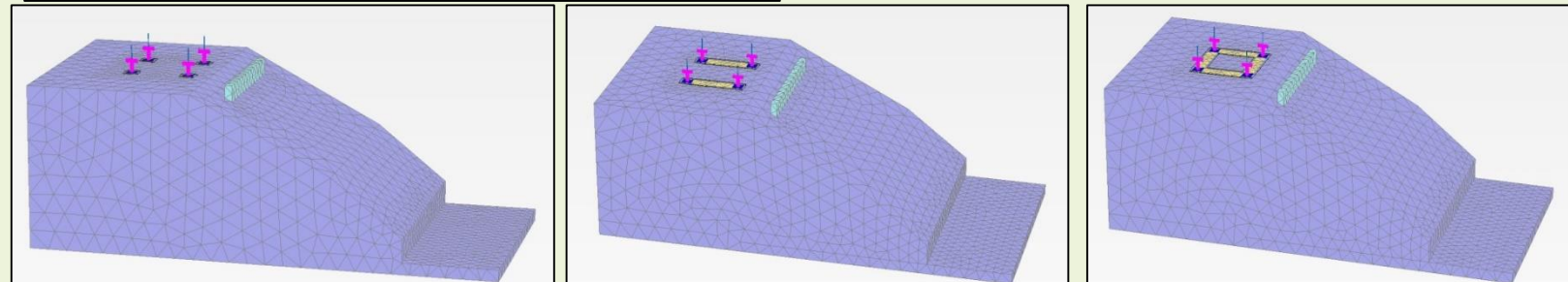
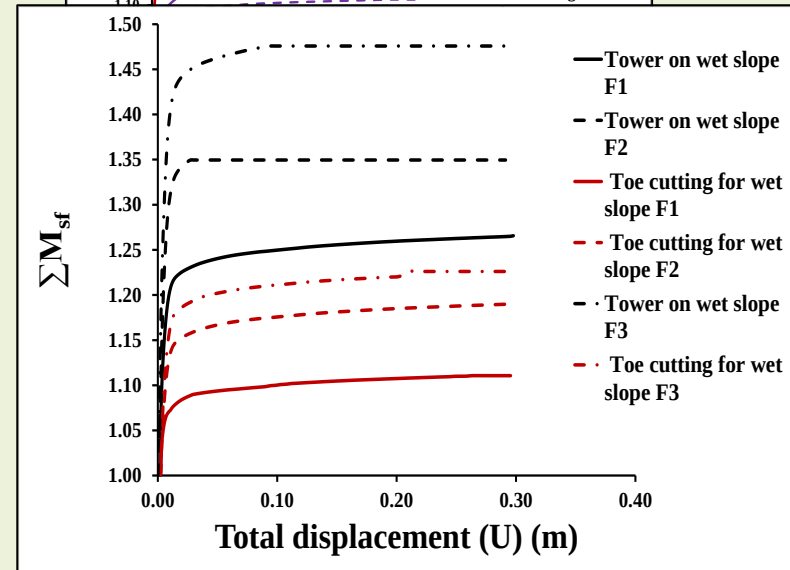
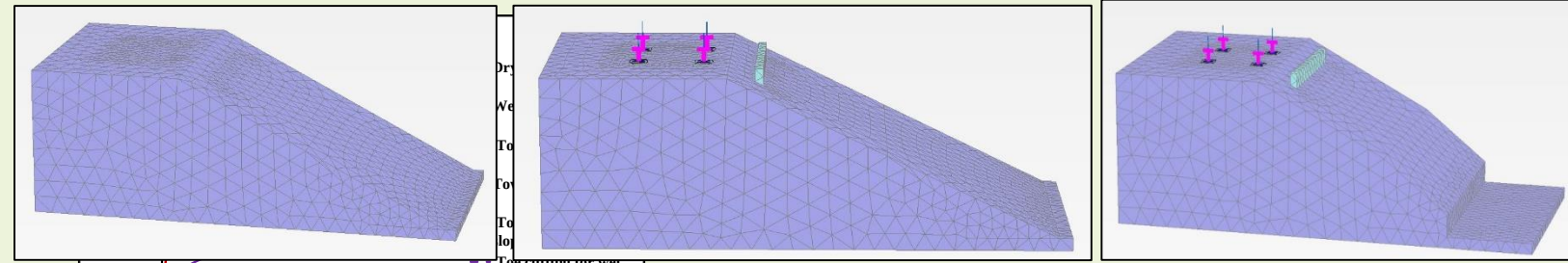
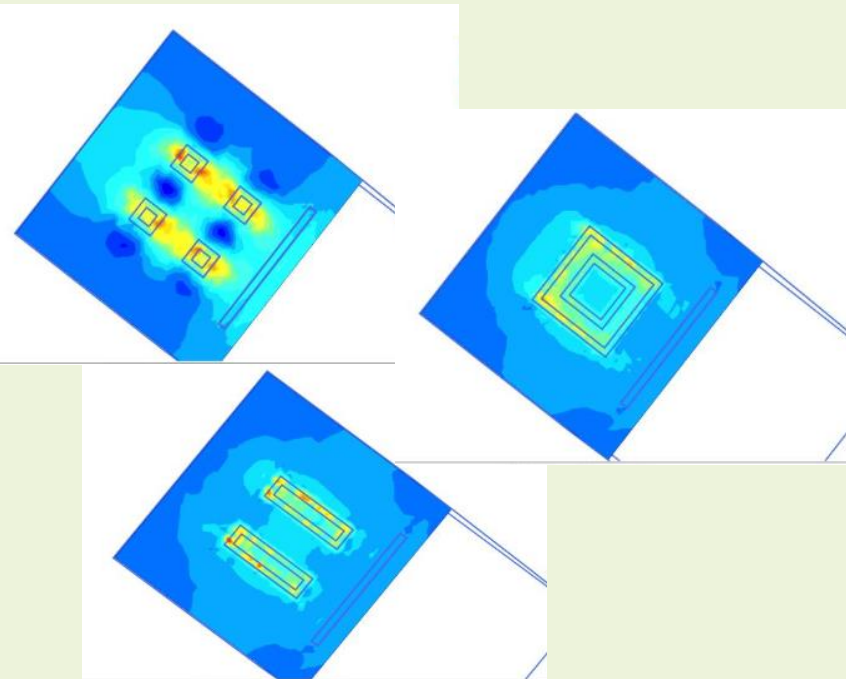
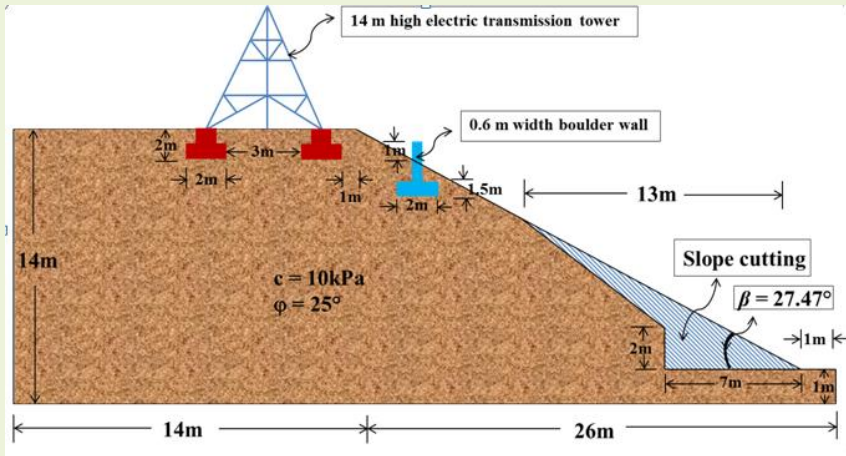


Rana

Abhijit



AEGCL Transmission Tower on Disturbed Slope, Sarusajai

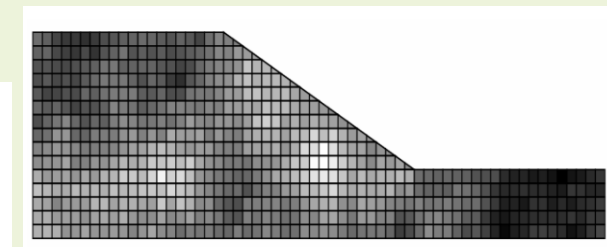
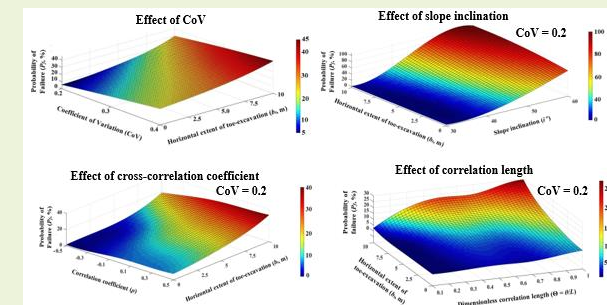
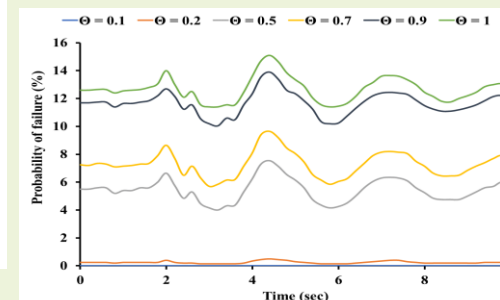
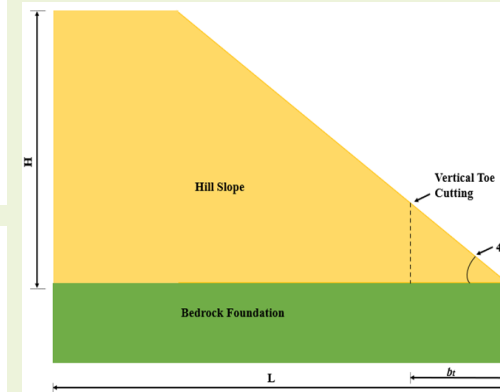
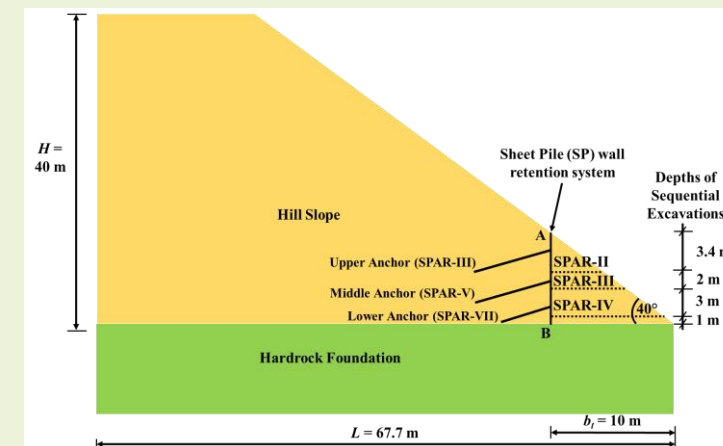
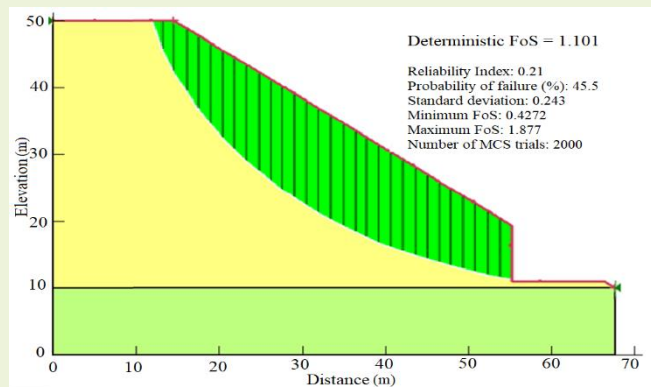
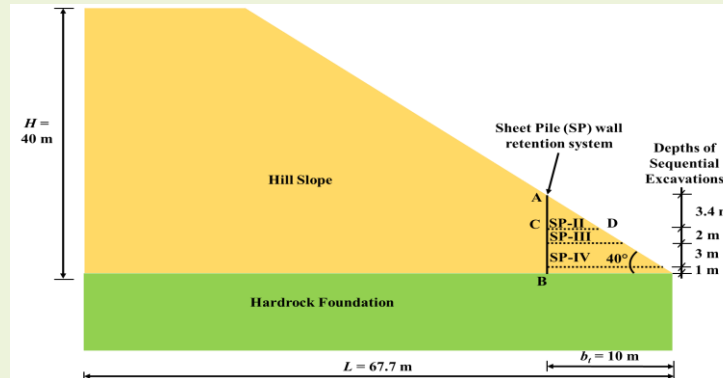
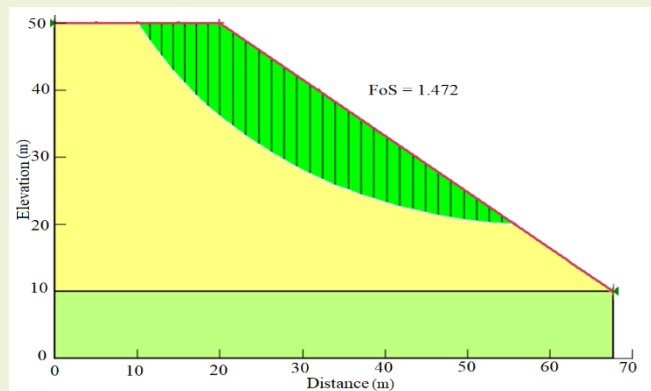


Probabilistic Stability Assessment of Toe-Excavated Hillslopes

- Consideration of uncertainties and variabilities
 - ❖ Slope stability assessment and mitigation
 - ❖ Random FE and Probabilistic assessment

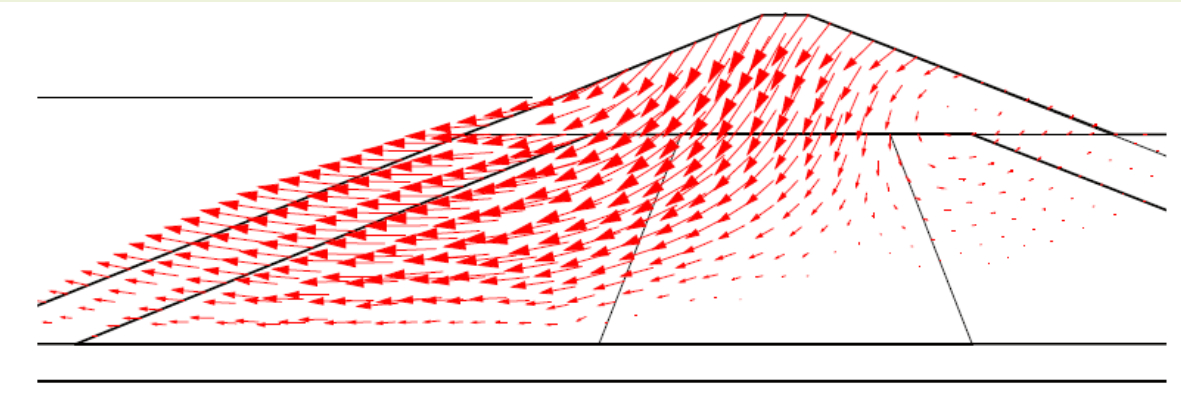
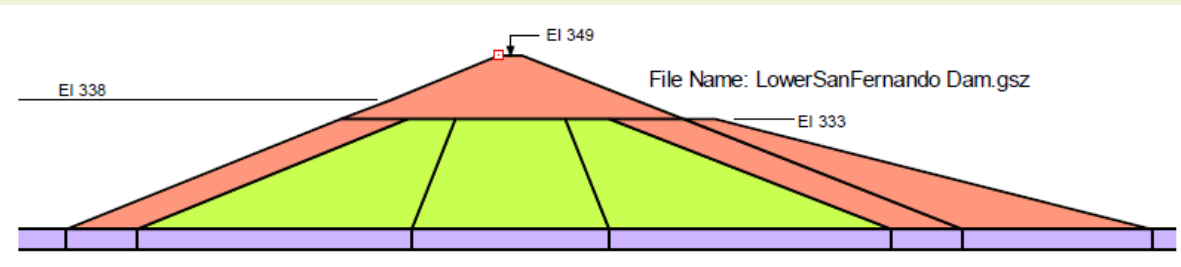


Rubi

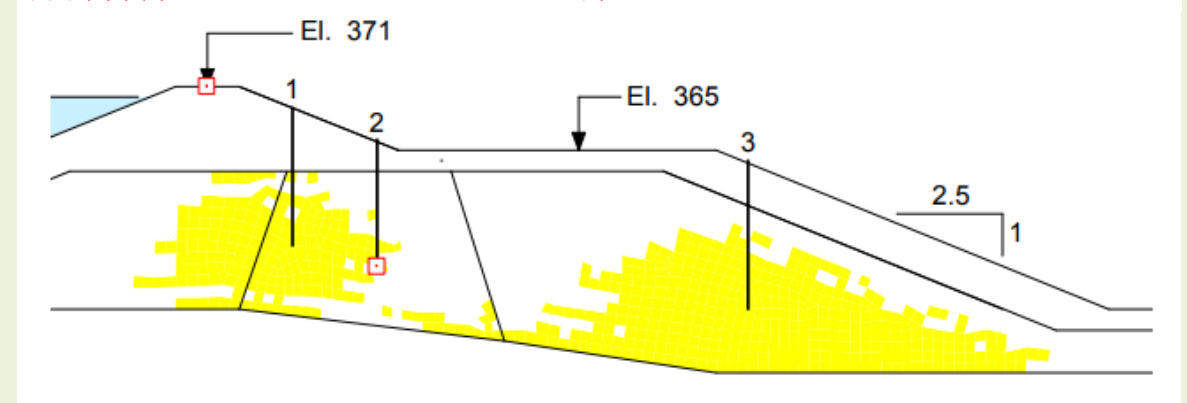
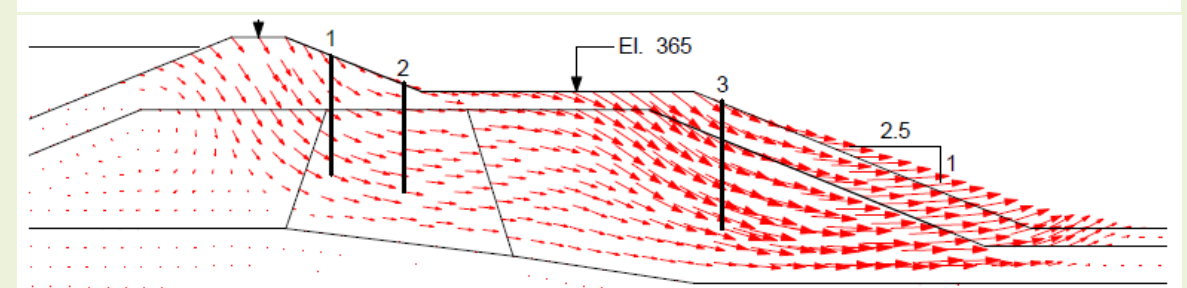
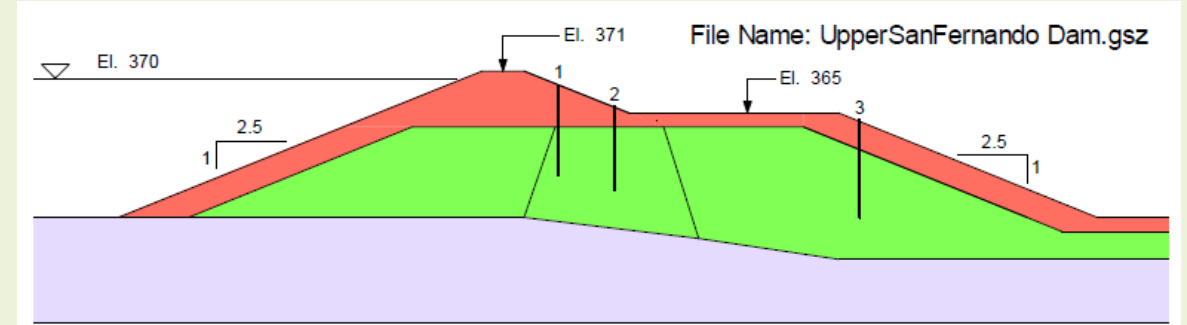


Geotechnical Engineering of Earthen Dams and Embankments

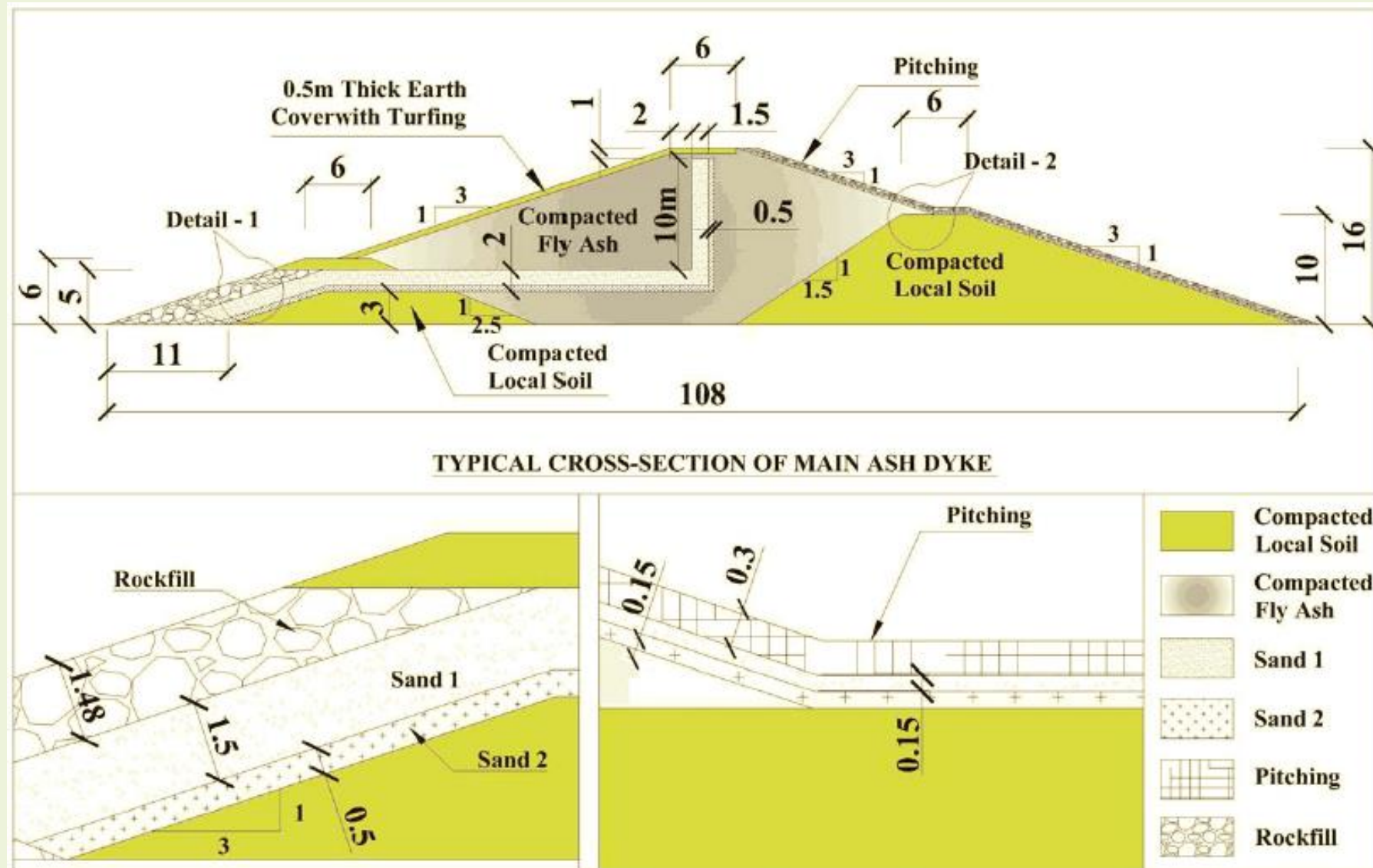
- Curious case of San Fernando Dam Failure due to 1971 San Fernando Earthquake



Proper drainage is absolute necessity



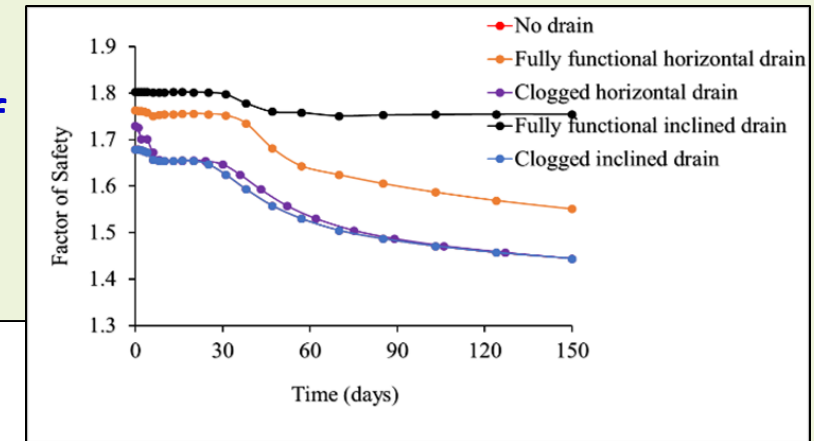
Stability of Ash Dyke, NTPC, Bongaigaon, Assam



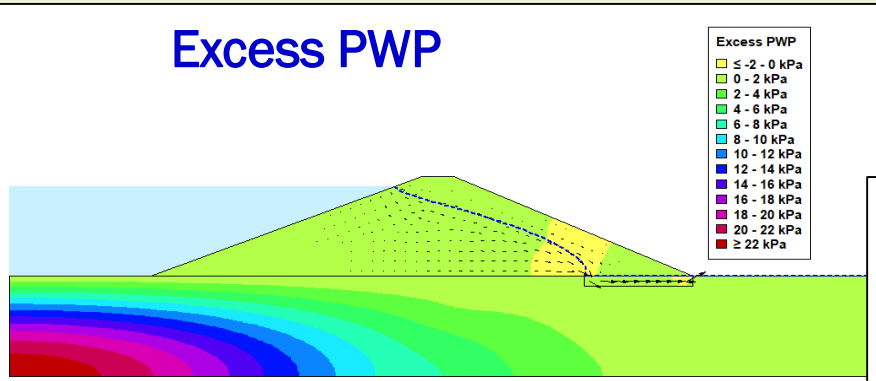
Clogging of Drainage Blanket of an Earthen Dam/Dyke

- Clogging of drainage blanket jeopardizes the geohydraulic stability of earthen dam

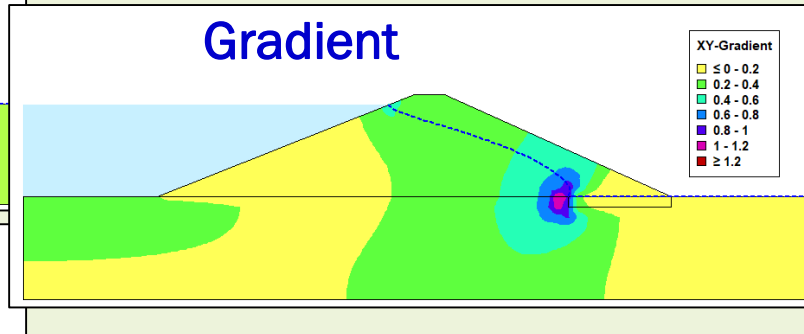
Long-term reduction of FoS of d/s face due to reservoir rise-up



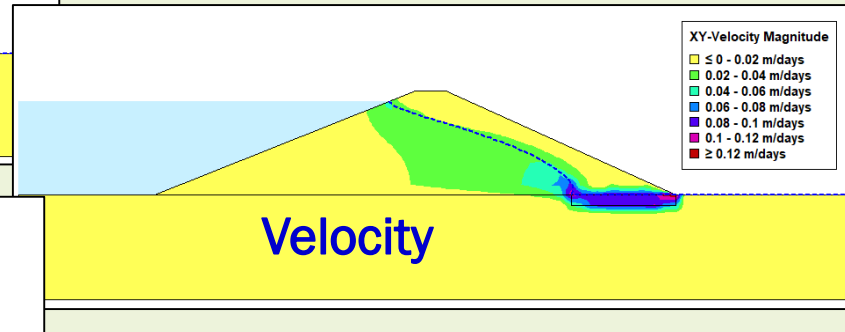
Excess PWP



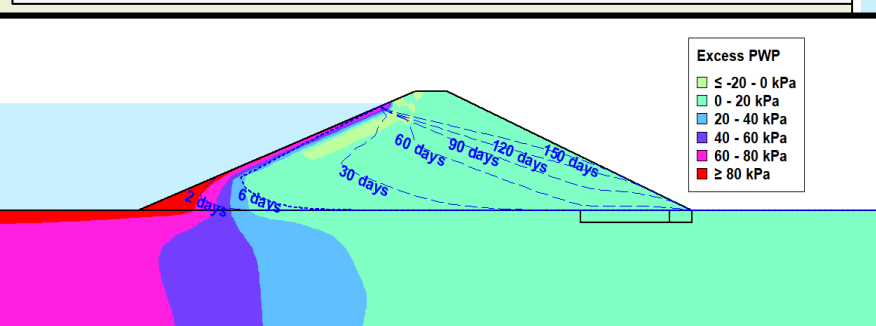
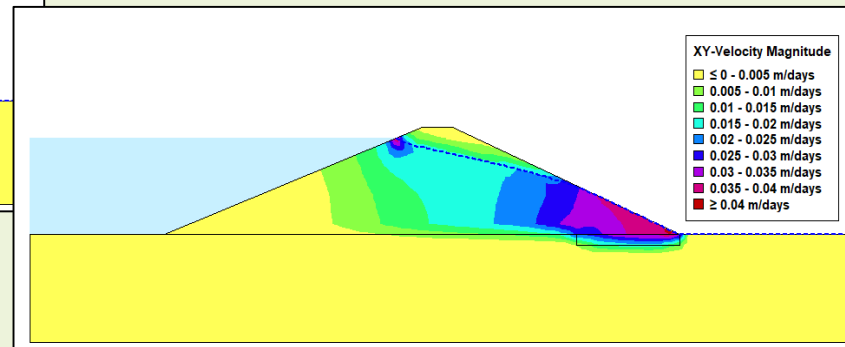
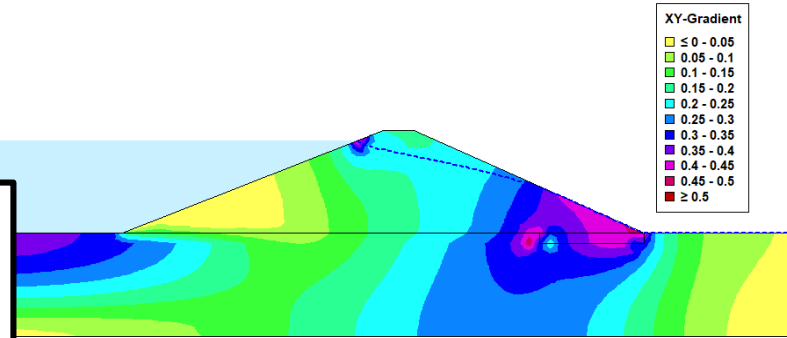
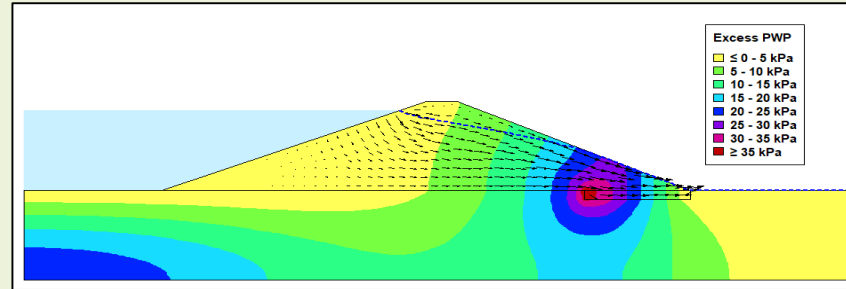
Gradient



Velocity

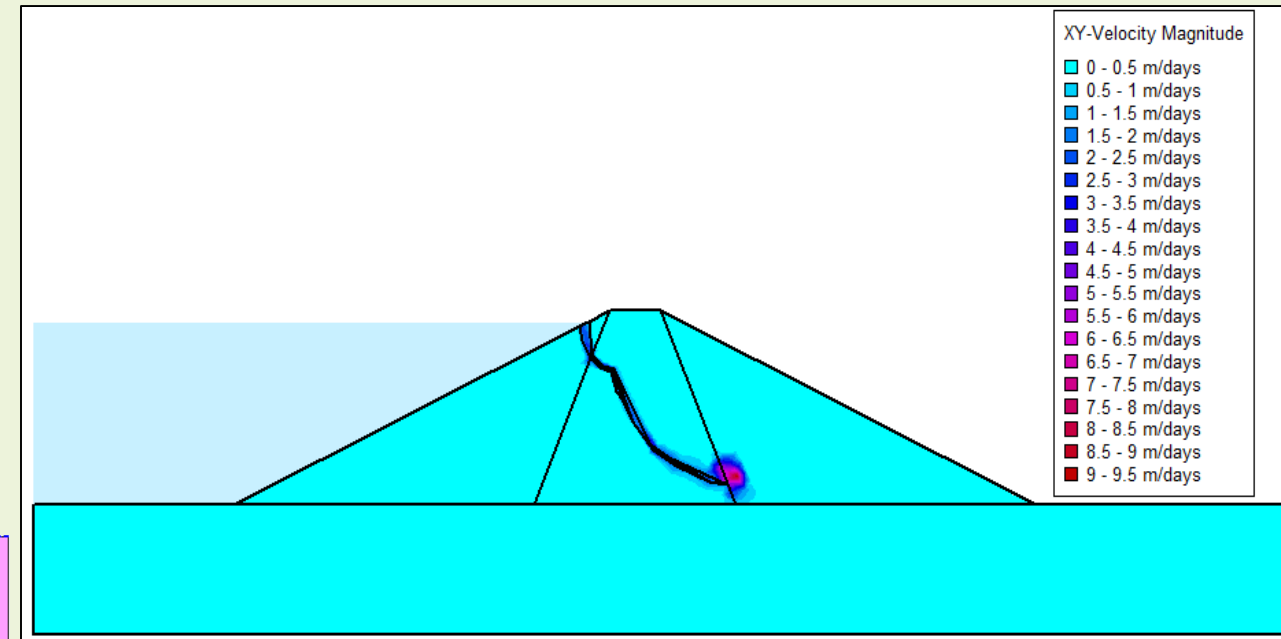
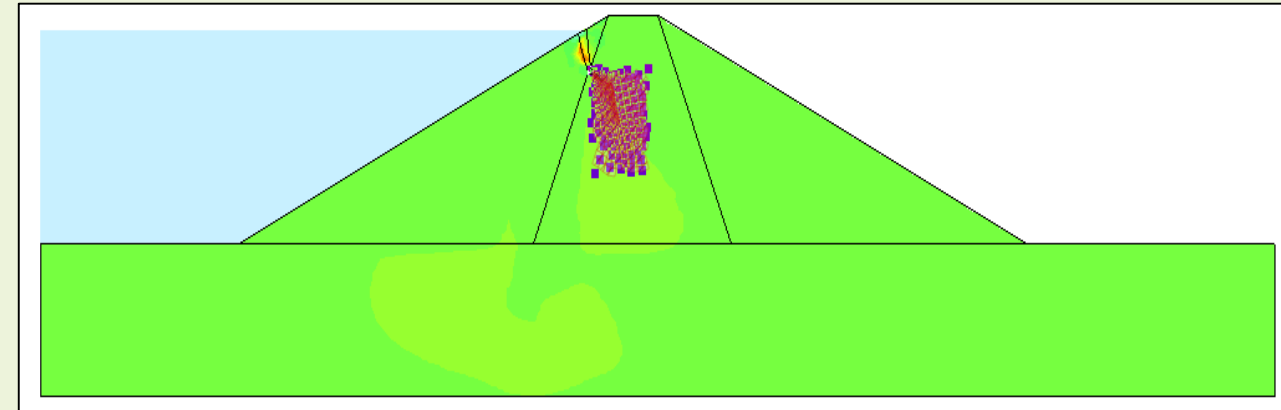
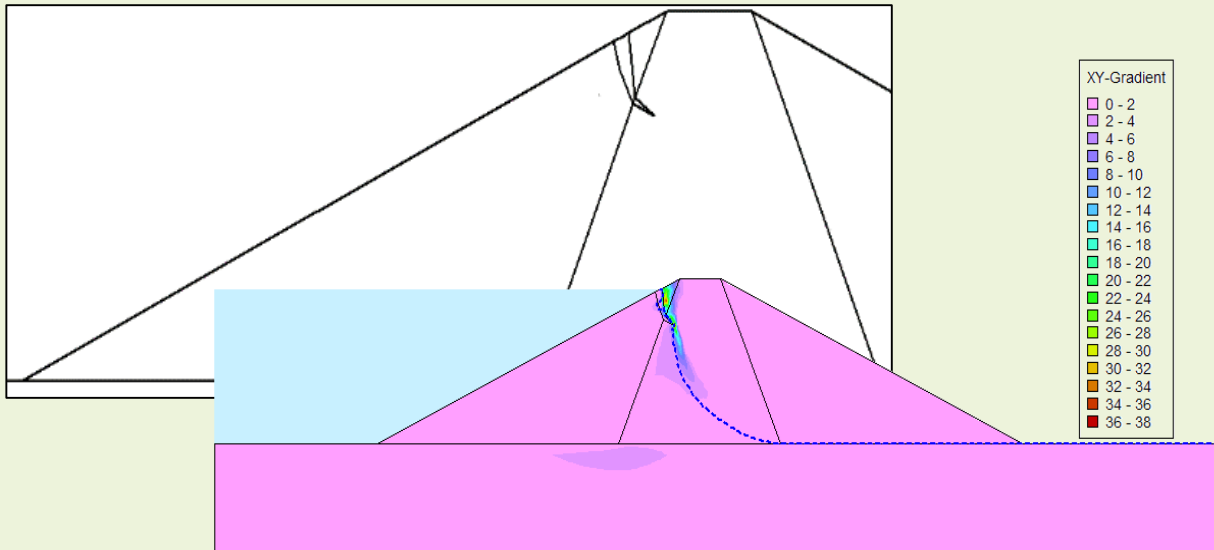
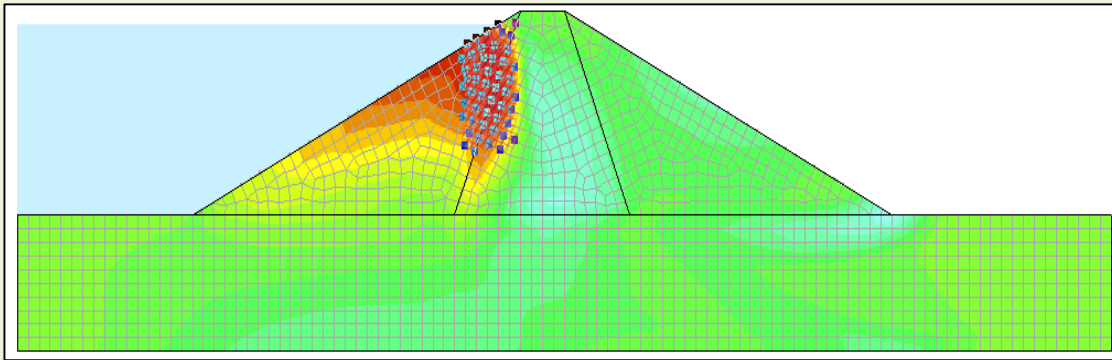


Long-term rise of phreatic surface



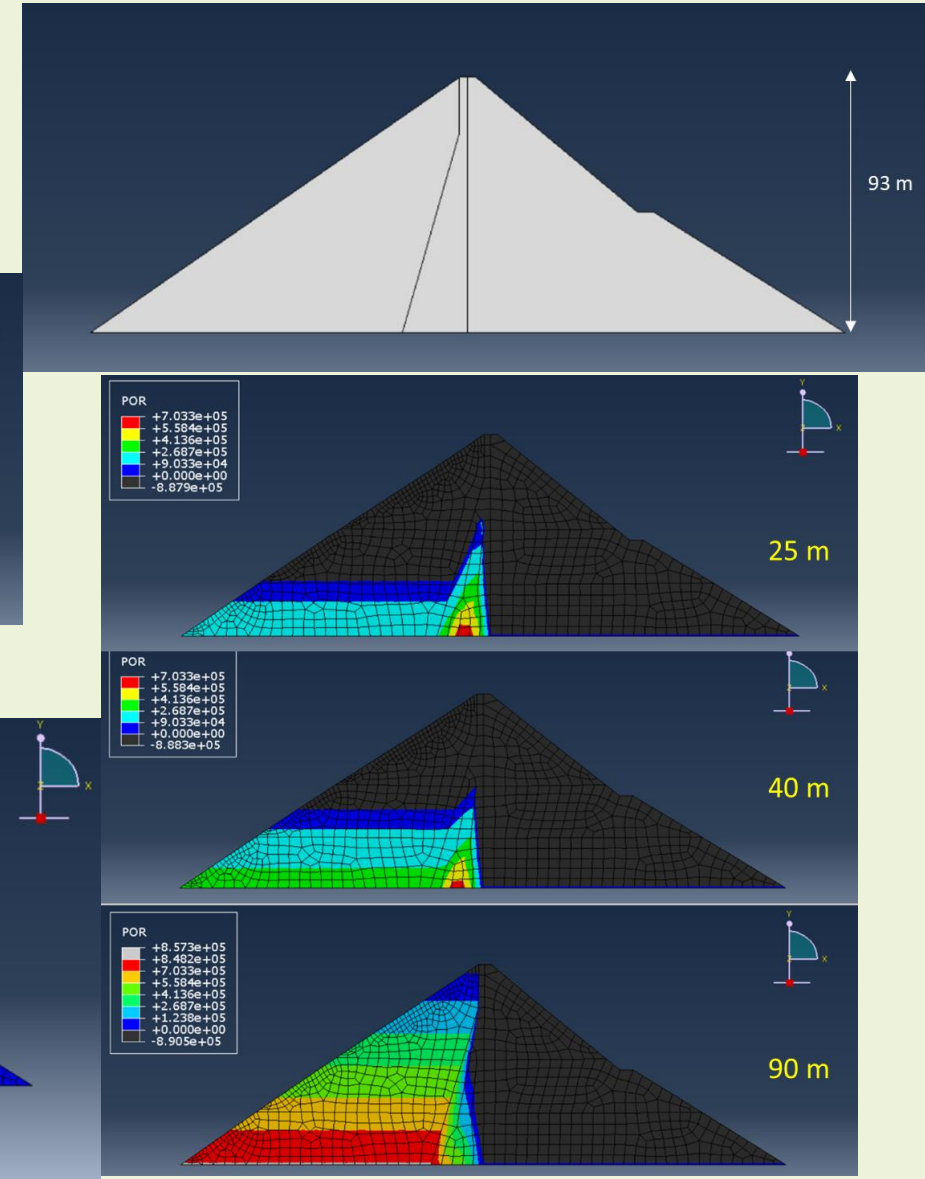
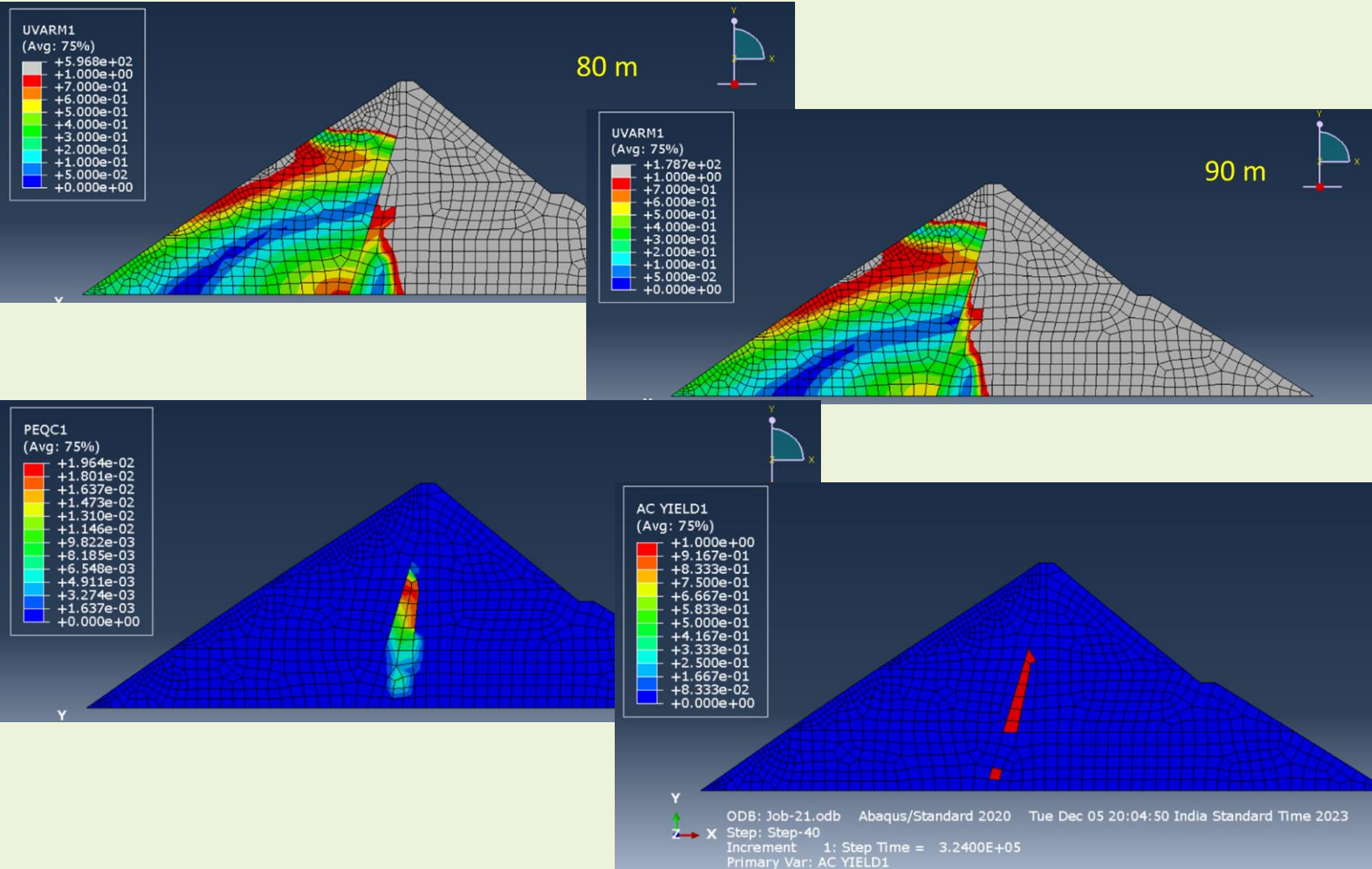
Core-Cracking of Zoned Earthen Dams

- Location of initiation of cracking
- Path of propagation of cracking



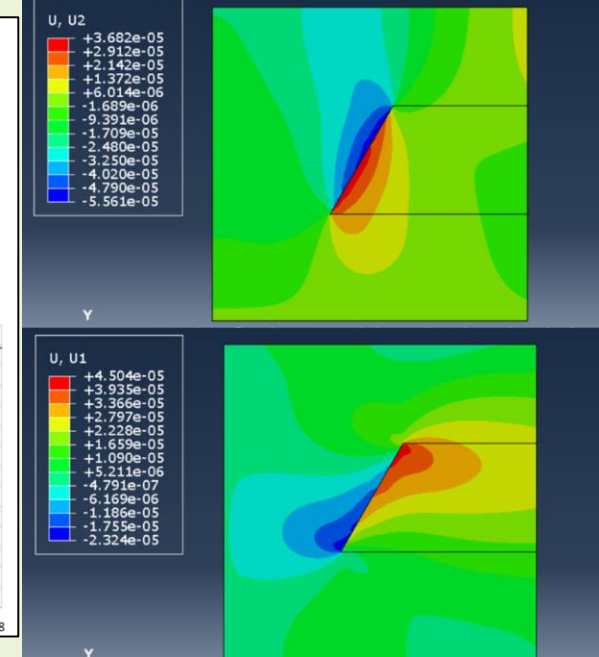
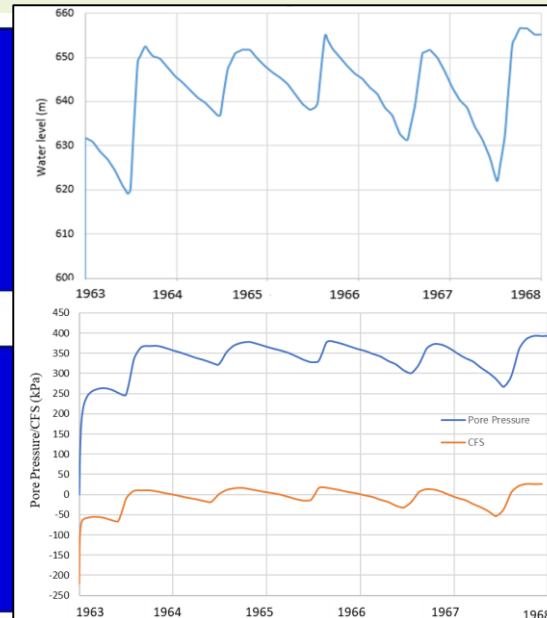
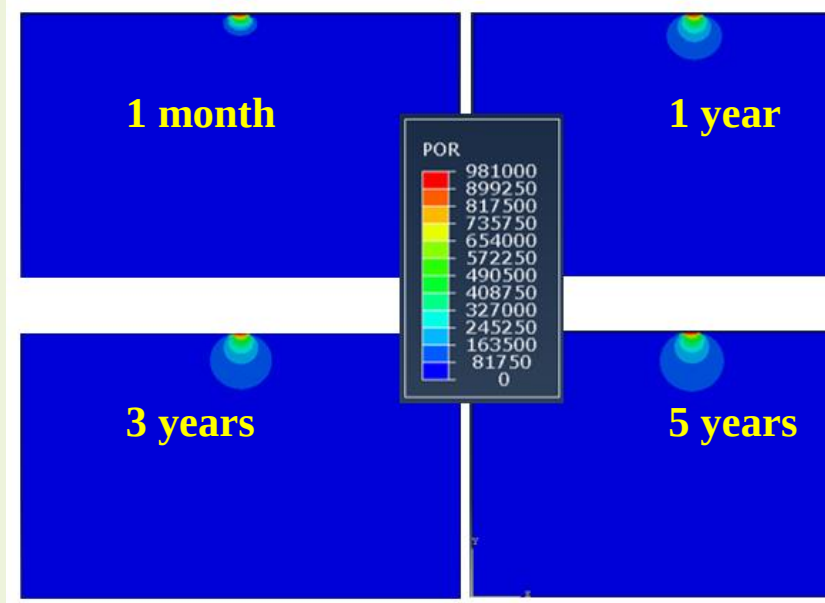
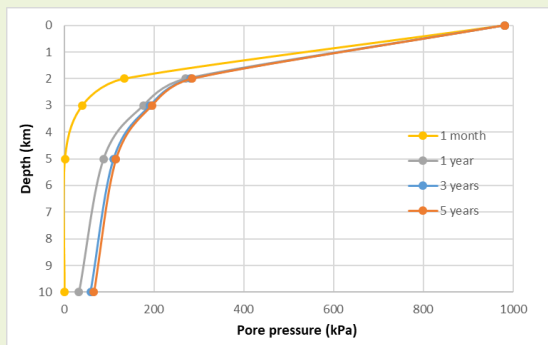
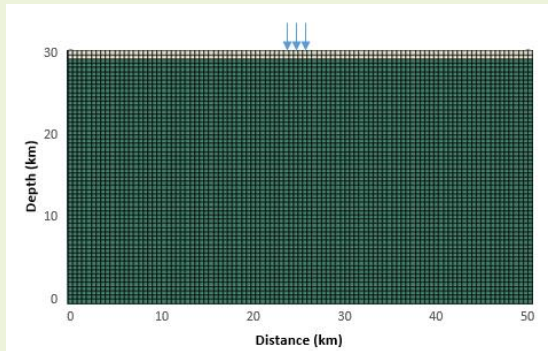
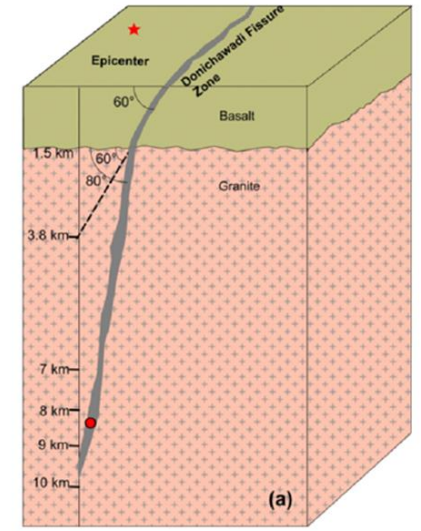
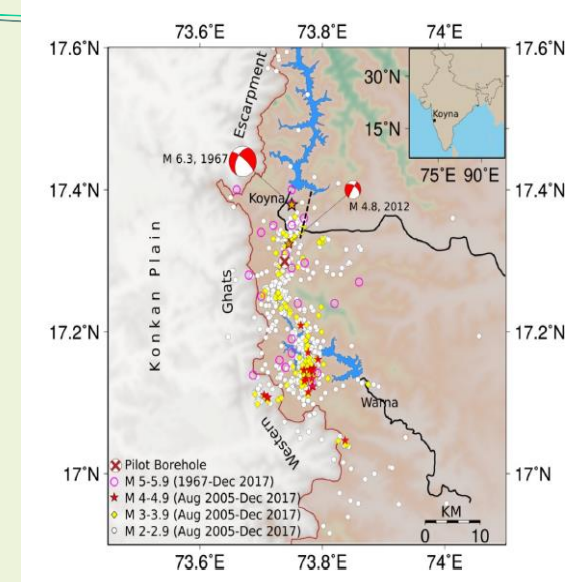
Hydraulic Fracturing of Earthen Dam

- Abaqus XFEM to analyse core-cracking of Koyna dam



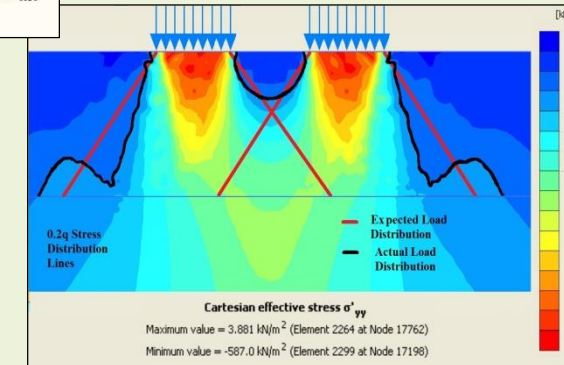
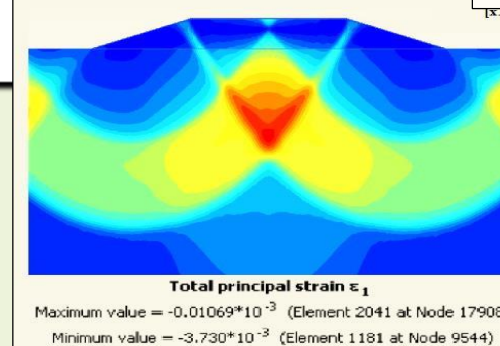
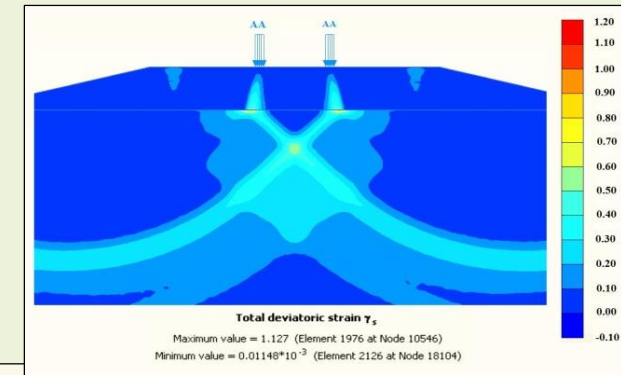
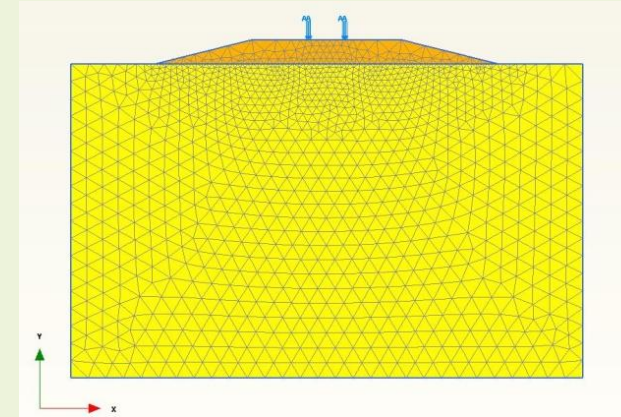
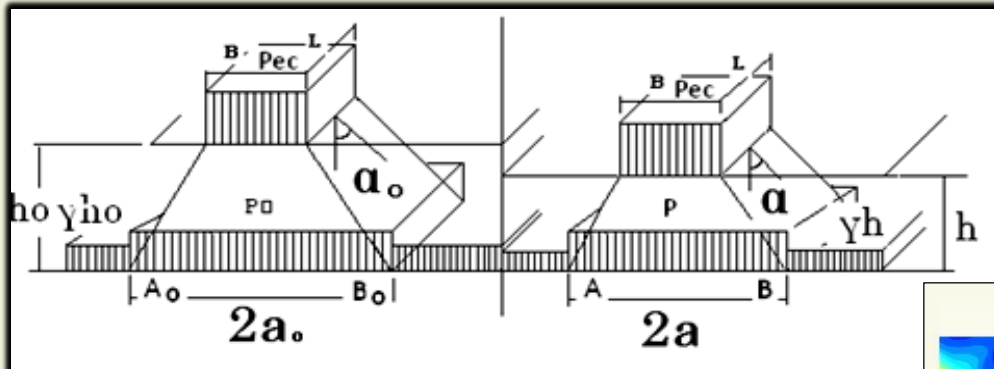
Reservoir Induced Seismicity

- Koyna-Warna reservoir induced seismicity
 - ❖ M6.3 1967, M4.8 2012, ...
 - ❖ Consideration of linear poroelasticity
 - Mechanical behaviour of fluid-saturated porous media



Unreinforced Unpaved Roads

- Unreinforced unpaved roads
 - ❖ Unpaved roads resting on c- ϕ subgrade
 - ❖ Improvisation over Giroud and Noiray's technique
 - ❖ Finite element analysis using PLAXIS
 - ❖ Finite element based design of unpaved road
 - ❖ Percentage improvement using geosynthetics



Lokesh



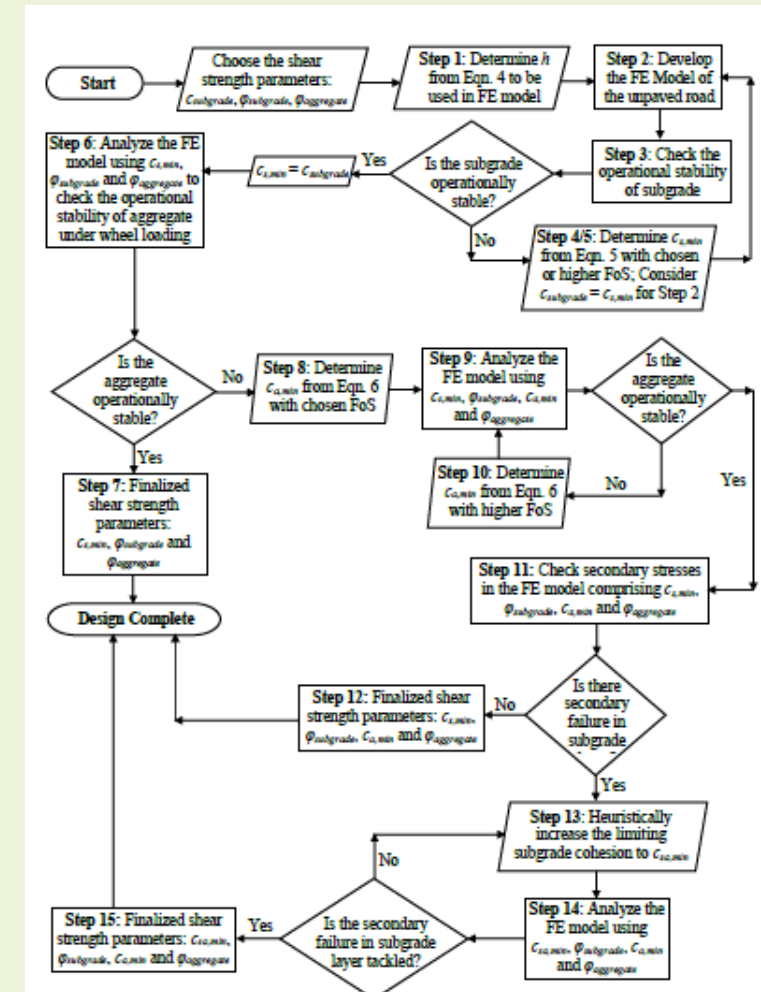
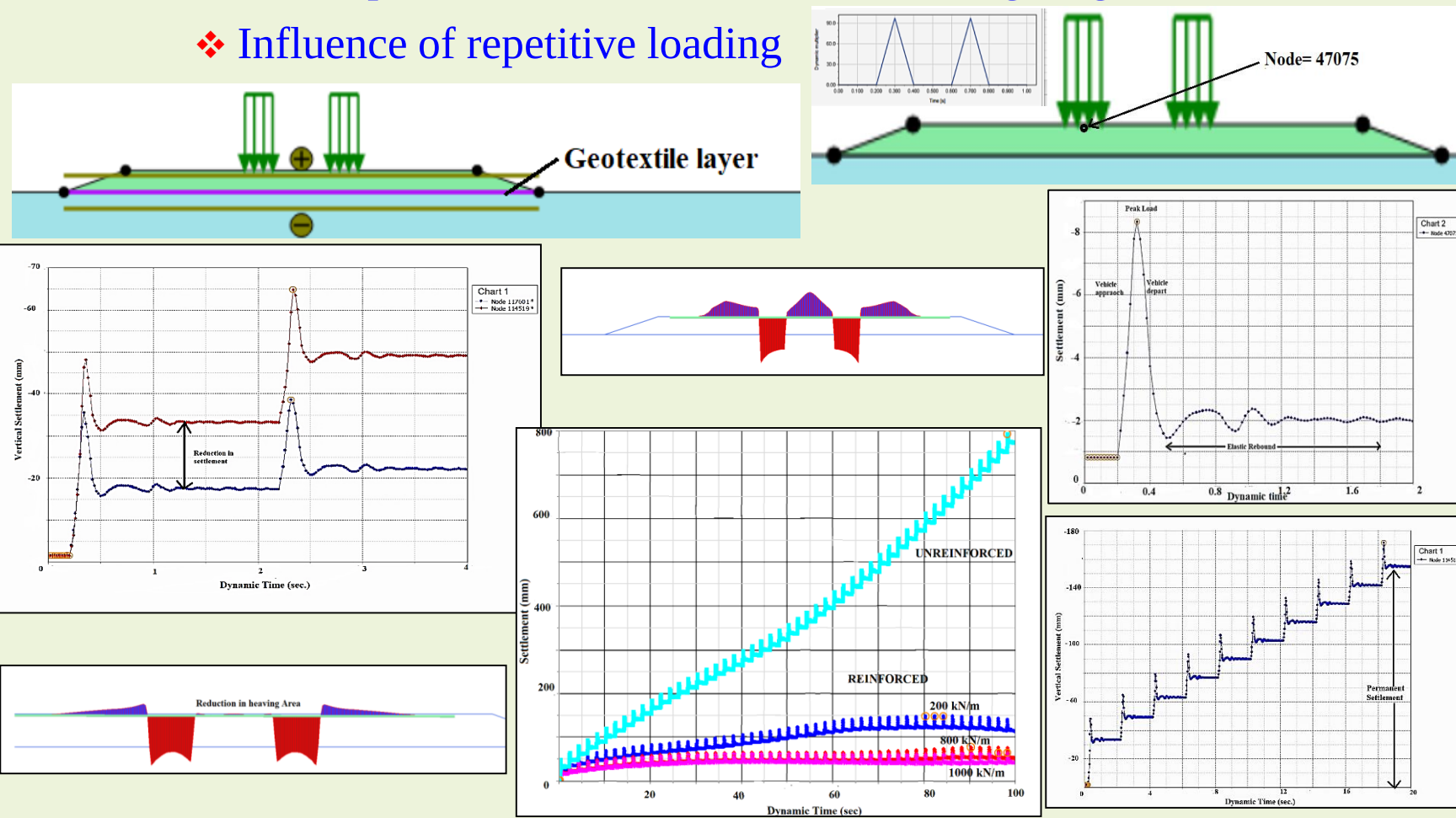
Shivraj

Geosynthetic Reinforced Unpaved Roads



Nayan

- Design of geosynthetic reinforced unpaved roads
 - Development of Finite Element based design algorithm
 - Influence of repetitive loading



Soft Ground Improvement using Preloading with PVDs

- Accelerated consolidation through radial drainage and excess PWP dissipation

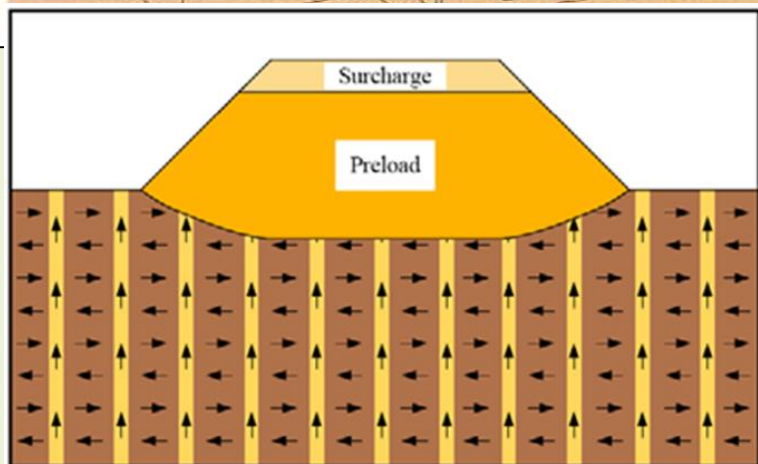
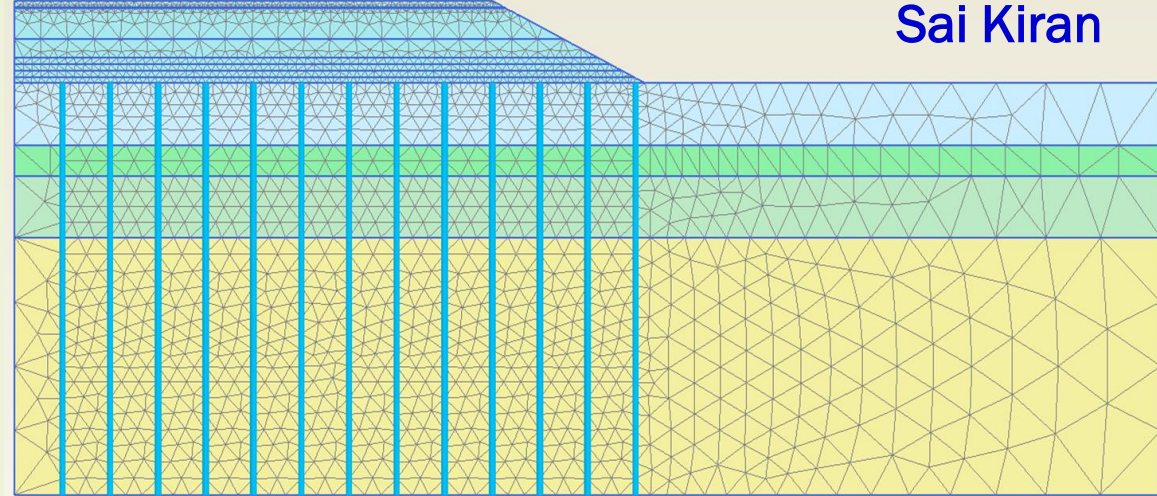
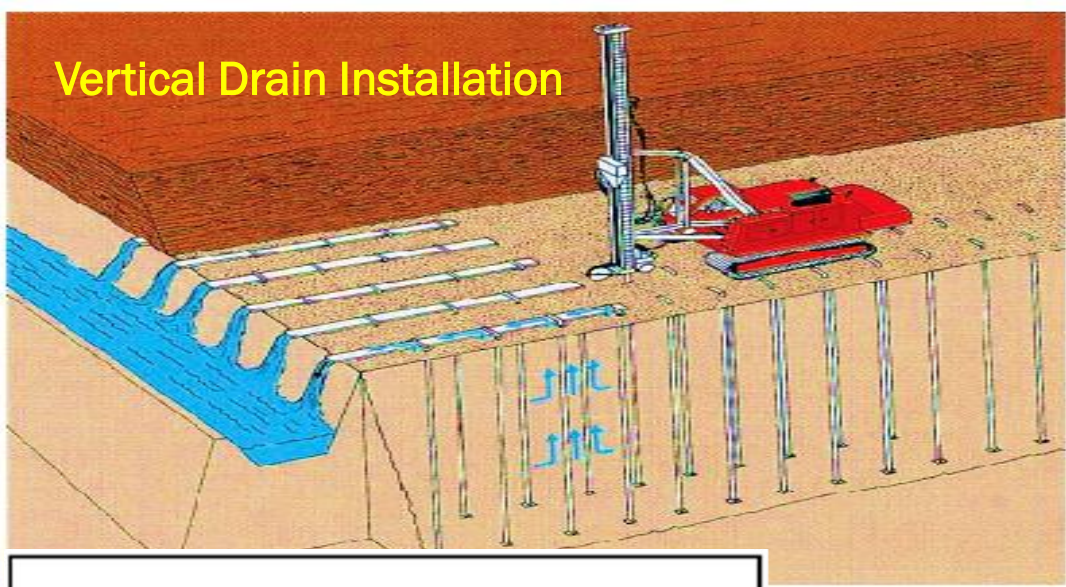


Sai Kiran



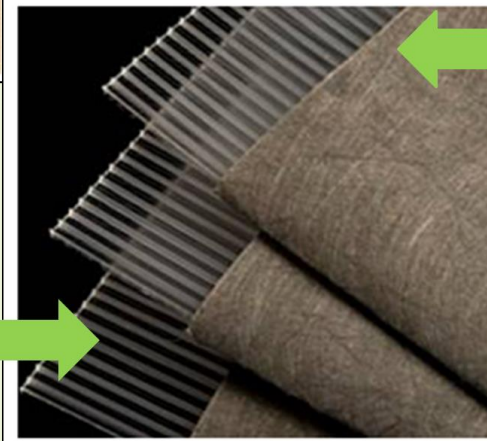
Rajesh

Vertical Drain Installation



Plastic Core

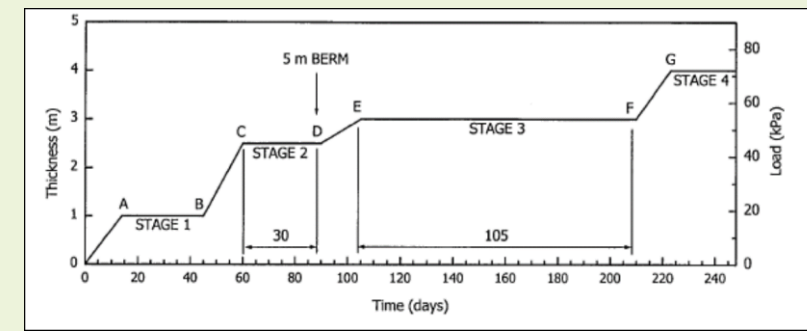
Central core for to allow water to flow



Filter Sleeve

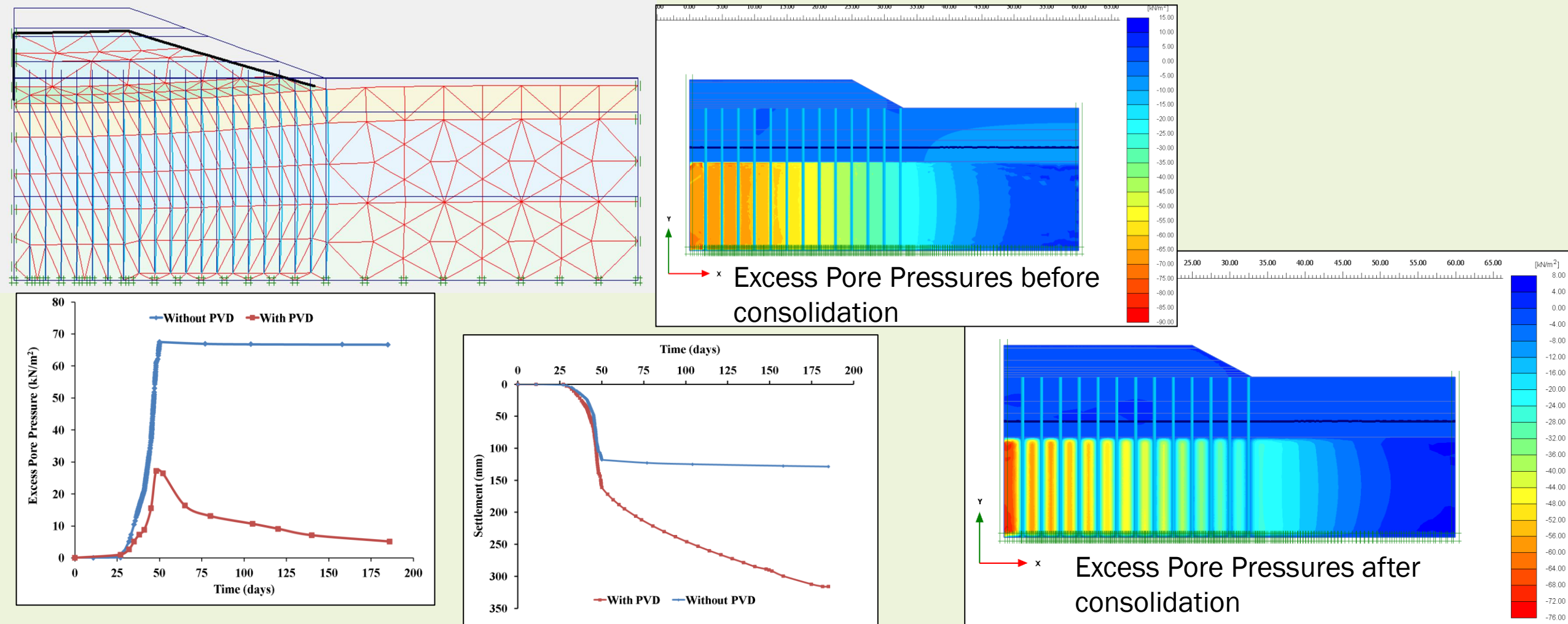
Filter jacket to prevent entry of soil particles

Typical PVD (Global Synthetics 2010)



Soft Ground Improvement using Preloading with PVDs

- Typical observations of ground improvement through PVD and Preloading



Heritage Railway Station, Udaipur, Agartala

- Application of preloading and PVD for developing of railway yard in a ditch marshland



Heritage Railway Station, Udaipur, Agartala

- Application of preloading and PVD for developing of railway yard in a ditch marshland



Case Study: Hillslope Reclamation Project

2020: Landslide-induced partial cliff collapse due to toe erosion by River Teesta in Sikkim



Aerial view of the site



Gabion retention and GRS wall for reclamation

Case Study: Hillslope Reclamation Project



GRS wall: Before collapse (Near completion)

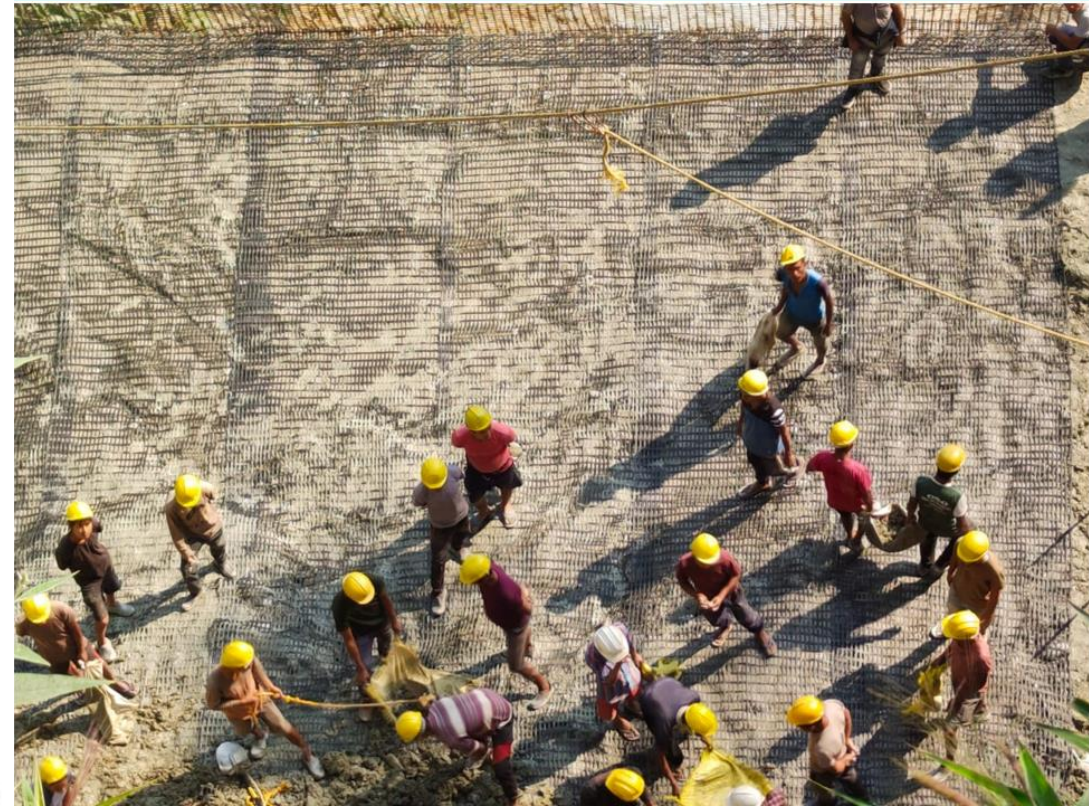


GRS wall: After collapse

M_w 3.5



Glimpses from Construction Period

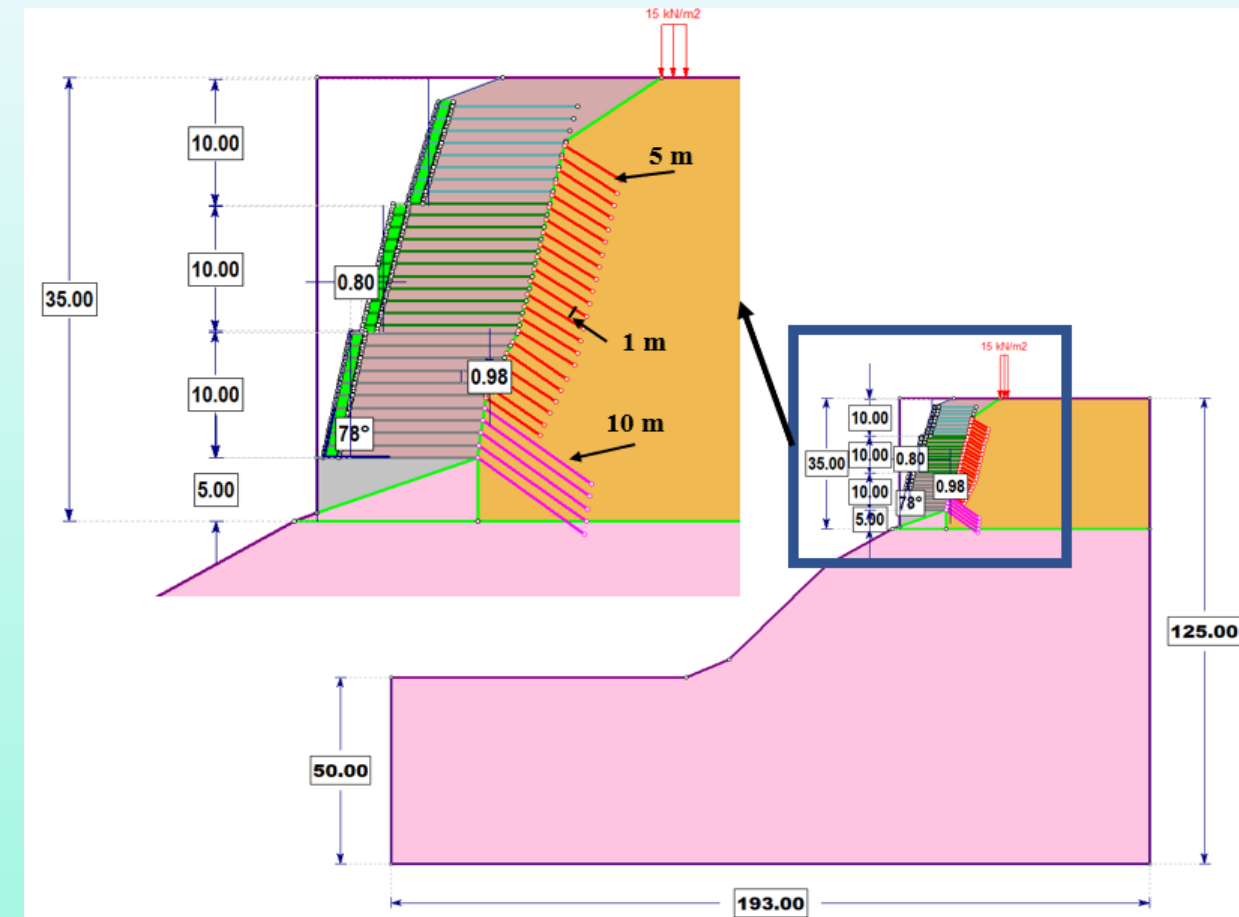


Numerical Modelling of Proposed Reclamation

Material Specifications

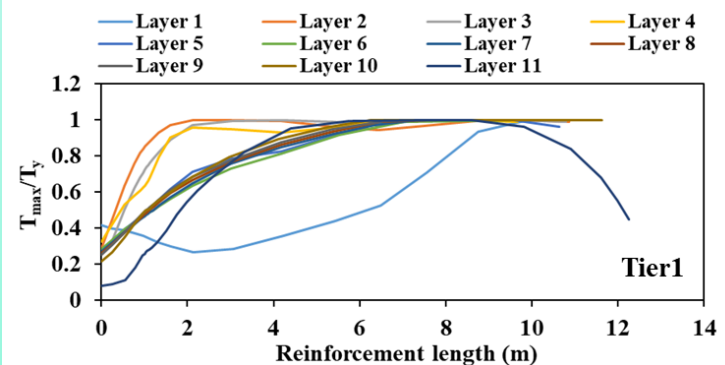
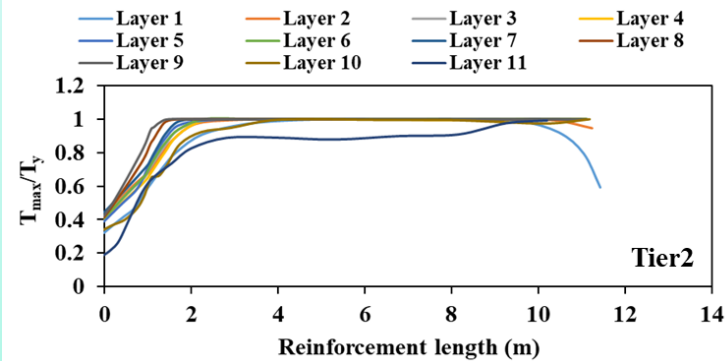
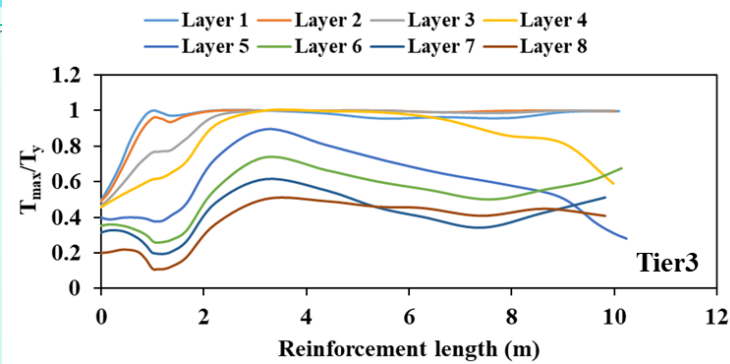
Material Name	Unit weight (kN/m ³)	Poisson's ratio	Young's Modulus (MPa)	Angle of internal friction (°)	Cohesion (kPa)
Retained fill	19	0.3	192	50	40
Foundation	20	0.2	192	33	100
Concrete Pedestal	24	0.15	1.58×10^4	45	750
Reinforced Soil	18	0.3	312	32	0
Geocell Fascia	18	0.3	468	32	33

Reinforcement type	Ultimate tensile strength (kN/m)	Reduction factor	Allowable design strength (kN/m)
GG-TT	100	1.786	56
GG-MT	200	1.961	102
GG-BT	250	1.667	150
EA-BT	200	-	-
EA-Surface	50	-	-



Numerical Model: Rocscience RS2 Platform

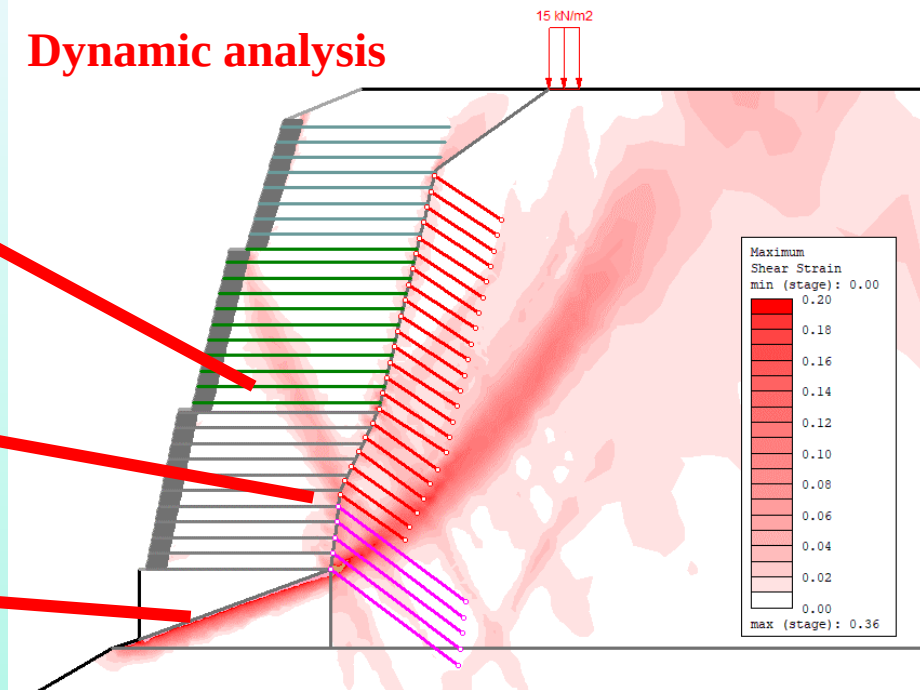
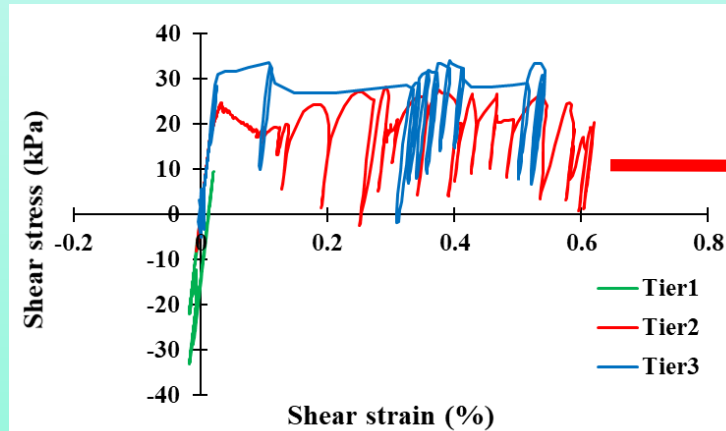
Shear Strain Concentrations: Collapse Mechanism



Conjugate failure line passing through several reinforcement layers of bottom two tier

Exceedance of connection capacity

Potential failure of the plum concrete pedestal



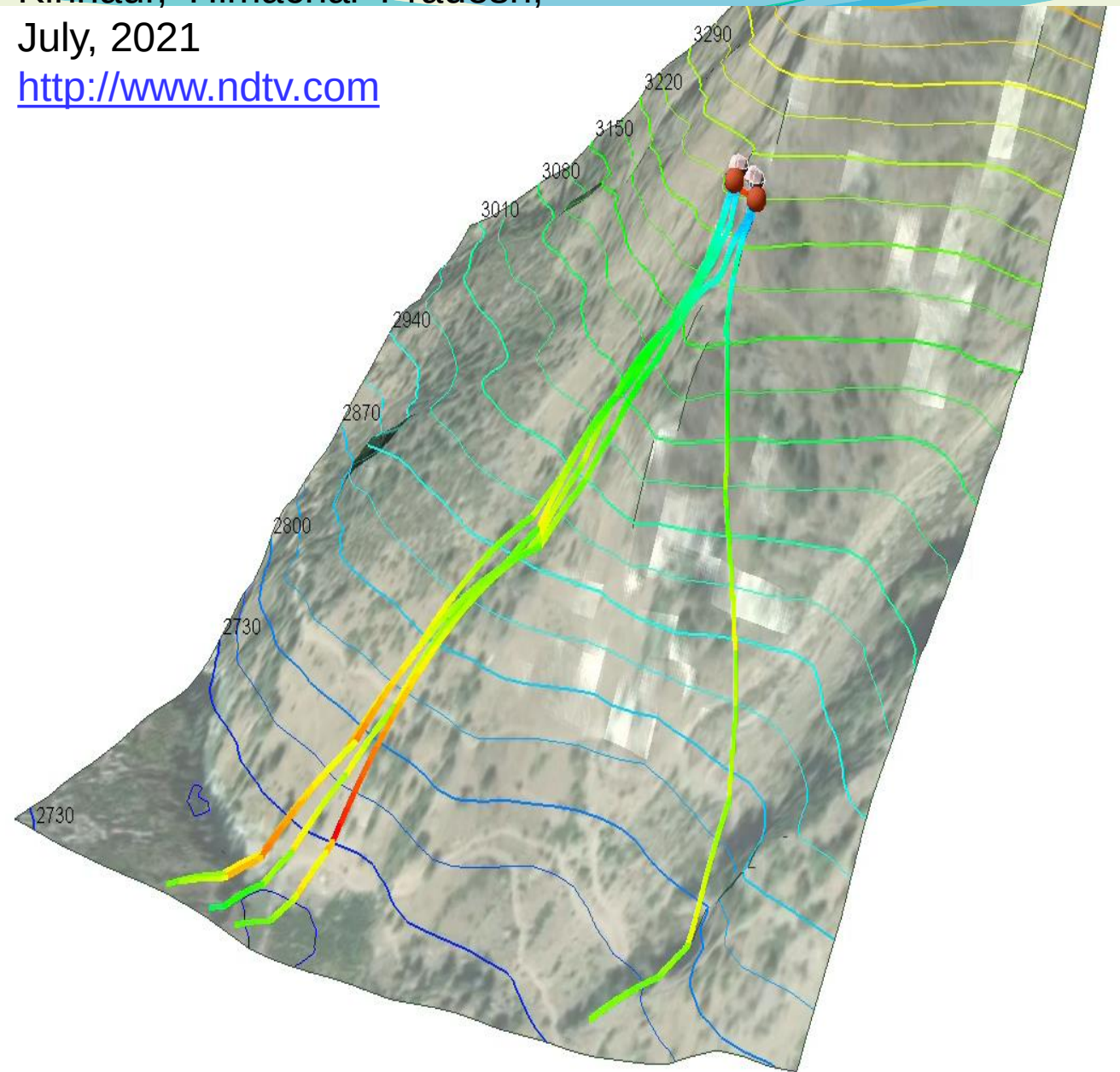
Tiers 2 and 3: Significant strain accumulation without sufficient increase in stress

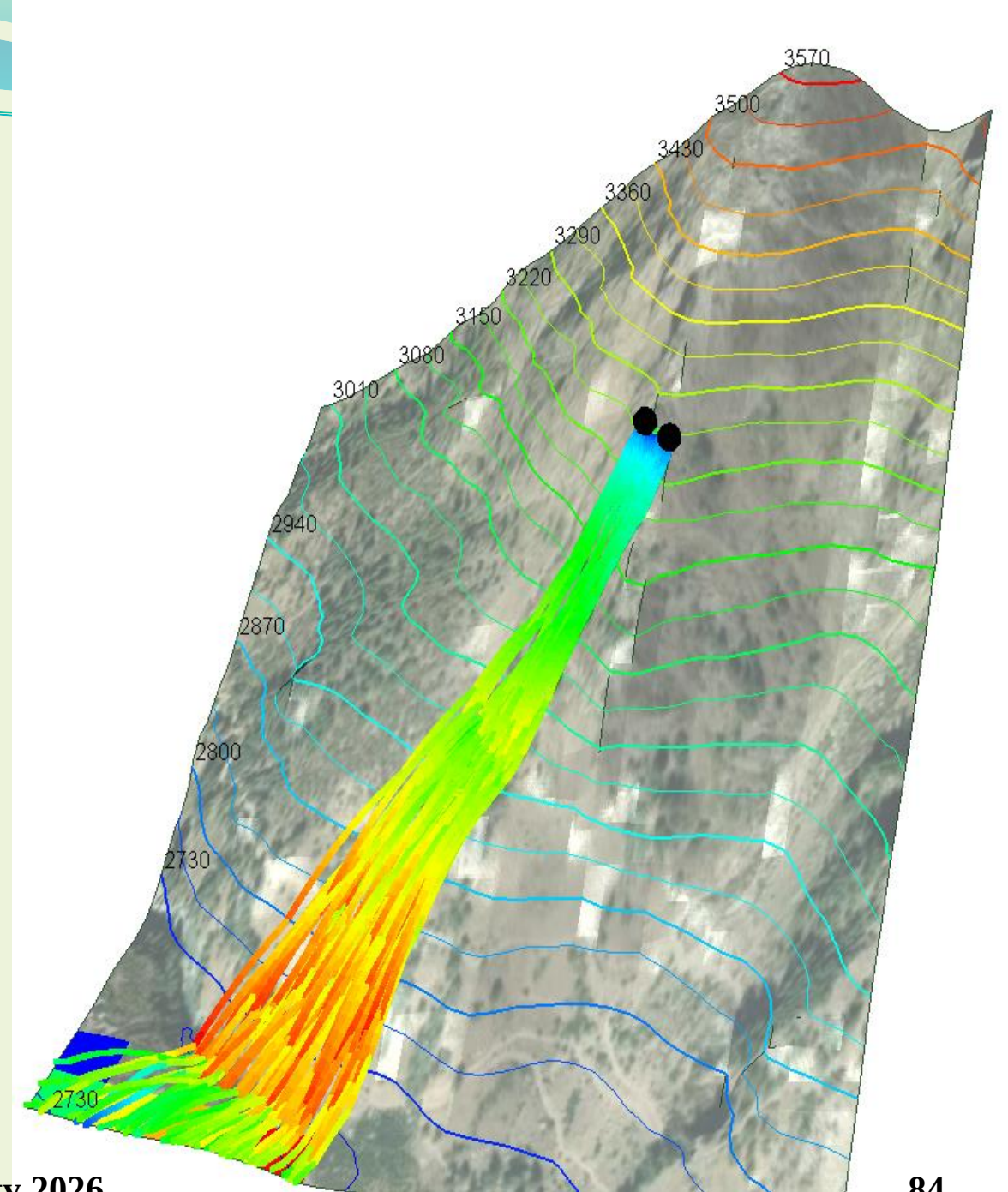
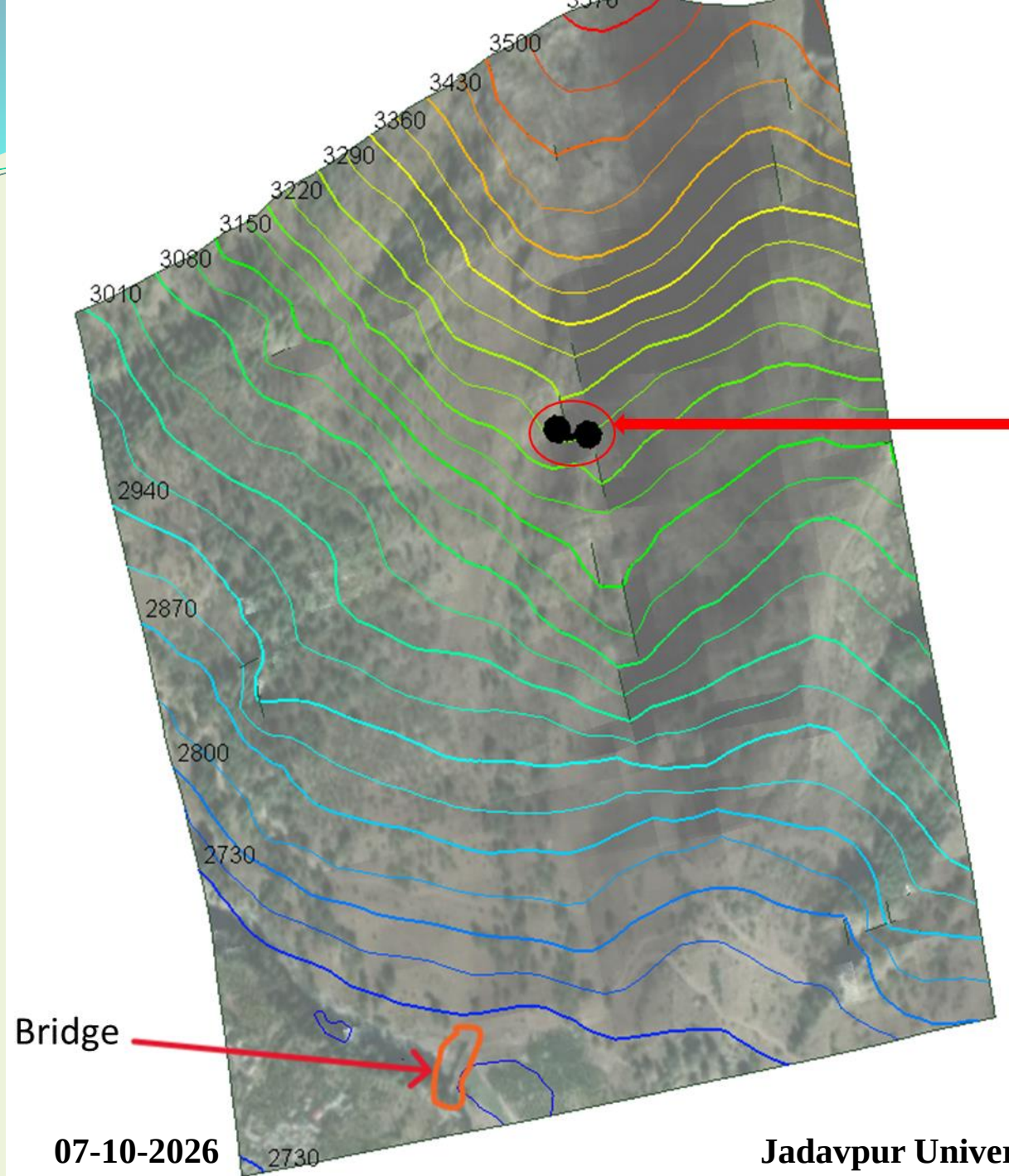
Cascading collapse of upper tiers due to mobilization in lower tier



Kinnaur, Himachal Pradesh,
July, 2021

<http://www.ndtv.com>





Civil Engineers are Builders

They are the Architects of the Society

Career Options

- Industry

Career Options

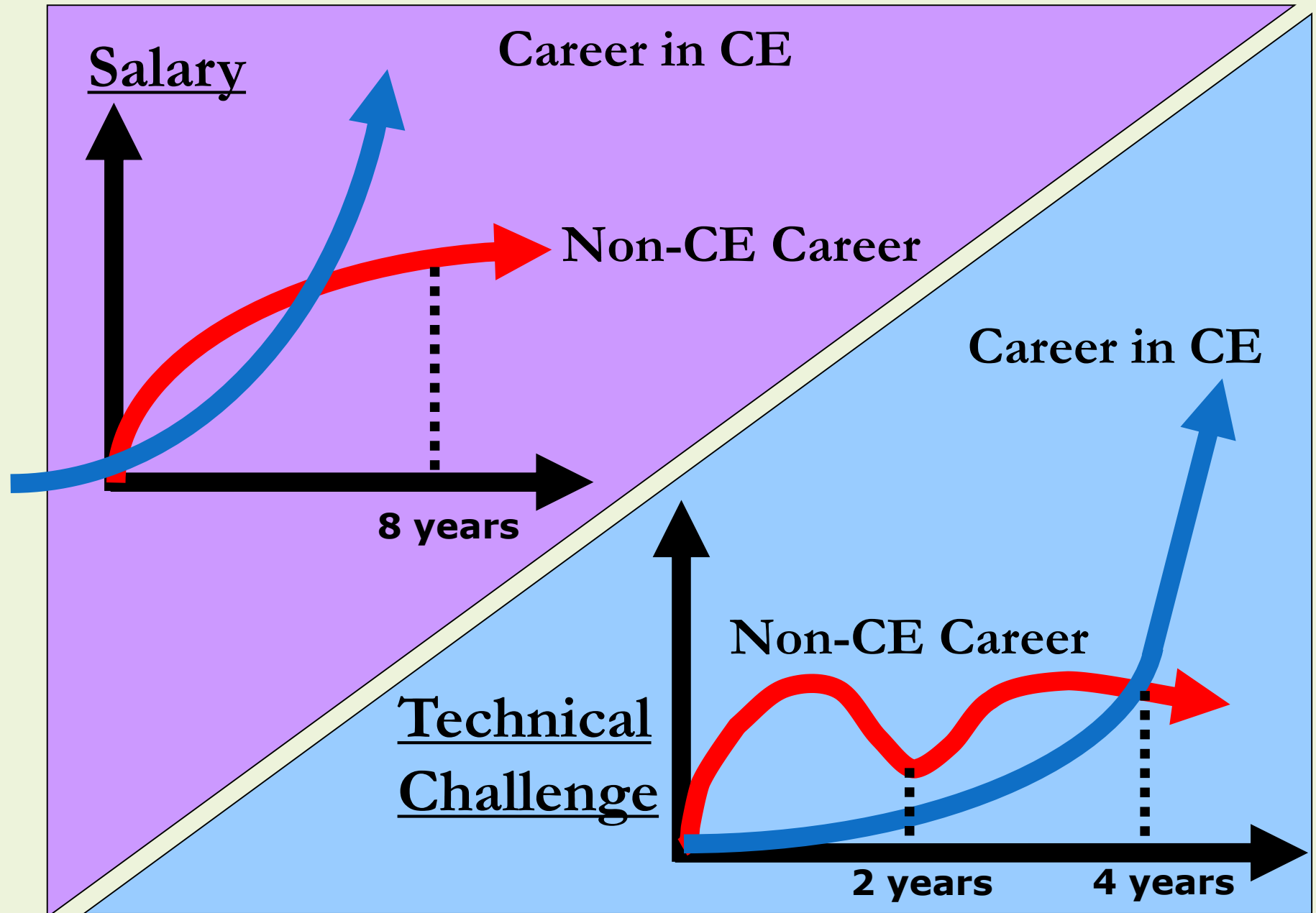
- ❖ Consultant in any specialization
- ❖ Construction/execution
- ❖ Planning
- ❖ **India needs good and competent engineers!!**

- Academics and Engineering Services

- ❖ Teaching and Research
- ❖ **India needs good teachers and researchers!!**

- Entrepreneurship

- ❖ Industrial stint
- ❖ Maintenance of quality
- ❖ Enormous potential
- ❖ **India needs good entrepreneurs!!**

Career Options...

(Murty, 2003)

Where are we with the advent and rise of AI?

Further Interaction and Information

Webpage

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CIVIL ENGINEERING**

**Indian Institute of
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Projects
Professional Memberships
Computational Skills

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B.E. (Civil) 2003 - Jadavpur University, Kolkata
M.Tech. (Geotechnical Engineering) 2005 - IIT Kanpur
Ph. D. (Geotechnical Engineering) 2009 - IIT Kanpur

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IIT Kanpur	Project Engineer	May'09 - Aug'09
IIT Kanpur	Senior Project Associate	Aug'09 - Nov'09
University of Molise, Italy	Post Doctoral Researcher	Nov'09 - Feb'11
BBDNITM	Associate Professor	Mar'11 - May'11
IIT Guwahati	Assistant Professor	June'11 - Jan'19
IIT Guwahati	Associate Professor	Jan'19 - Present

• Researchgate

**Arindam Dey** 

PhD · Professor (Associate) at Indian Institute of Technology Guwahati
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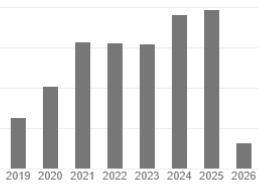
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☐ Influence of digital elevation models on the simulation of rainfall-induced landslides in the hillslopes of Guwahati, India	71	2020

Some Glimpses of the IIT Guwahati Campus





Thank You for Patient Hearing



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