JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY
WAKNAGHAT, P.O. – WAKNAGHAT,
TEHSIL – KANDAGHAT, DISTRICT – SOLAN (H.P.)
PIN – 173234 (INDIA) Phone Number- +91-1792-257999
(Established by H.P. State Legislature vide Act No. 14 of 2002)

One Week Online Workshop on "Disaster Risk Assessment"

A One Week Online Workshop on "Disaster Risk Assessment," was organized by the Centre for Structural Engineering and Disaster Management, Civil Engineering Department, Jaypee University of Information Technology (JUIT), Waknaghat, in partnership with Indian Institute of Technology, Mandi, and Indian Geotechnical Society, Shimla Chapter, from July 22–26, 2024. The program was successfully completed under the auspices of:

- ***Prof. Rajendra Kumar Sharma:*** Vice Chancellor, JUIT, Waknaghat, and Patron of the organized workshop.
- ***Prof. Ashok Kumar Gupta:*** Dean of Academics & Research, JUIT, Waknaghat, and Patron of the organized workshop, and President, Indian Geotechnical Society, Shimla Chapter,
- ***Prof. Ashish Kumar:*** HOD, Civil Engineering Department, and Chairperson, Center for Structural Engineering and Disaster Management, JUIT, Waknaghat, and Program Chair of the organized workshop.
- ***Dr. Sugandha Singh:*** Assistant Professor, Civil Engineering Department, and Member, Center for Structural Engineering and Disaster Management, JUIT, Waknaghat, and Program Convener of organized workshop.
- ***Dr. Shivang Shekhar:*** Assistant Professor, School for Civil and Environment Engineering, Indian Institute of Technology, Mandi (IIT Mandi) and Co–Convener of organized workshop.

The One Week Online Workshop on '**Disaster Risk Assessment**' comprised mainly of eminent speakers from renowned institutes who discussed various aspects of calculating hazard and risk of different types of hazards. The primary objective of the workshop was to teach the students, academics, and industry professionals, to conduct basic calculations of probability of occurrence of a hazard such as earthquakes, floods, landslide, etc., and further calculating the risk on infrastructure for each hazard. ***The workshop was organized to fulfill the capacity building target of the United Nation's Sustainable Development Goal number 11.*** Each day of the workshop covered a different type of hazard and covered a wide range of topics. Through

engaging lectures, interactive discussions, hands-on activities, and insightful guest presentations, participants were exposed to basic concepts required to calculate probabilistic hazard and risk assessment for each hazard. Each lecture was unique as the topics discussed are not taught as part of Civil Engineering or Architecture curriculum at any level. Since the need for conducting such hazards is absolutely necessary for Disaster Resilient Infrastructure, the participants appreciated the workshop to quite an extent.

Table-1 highlights the program schedule of the conducted STC including the names and organizations of the speakers along with the title of lectures (talks) delivered by them.

Table 1: Schedule for One Week Online Workshop on "Disaster Risk Assessment," July 22–26, 2024

Date	**Time**	**Events**
22-07-2024 (Earthquake)	2:15 PM	JUIT Video
	2:17 PM	Welcome of the participants by Dr. Sugandha Singh, Assistant Professor, Civil Engineering Department, JUIT, Waknaghat
	2:18 PM	Welcome of the participants by Dr. Ashok Gupta, Dean (Academics & Research), JUIT & President, IGS, Shimla; Dr. Ashish Kumar, HOD, Civil Engineering, JUIT.
	2:20 PM	About The Workshop presentation by Dr. Sugandha Singh, Convener of the Workshop
	2:30 PM	Expert Talk by ***Dr. Sugandha Singh, Assistant Professor,*** Civil Engineering Department, JUIT, Waknaghat, on ***'Probabilistic Seismic Hazard Analysis'***
	4:00 PM	Expert Talk by ***Dr. Shivang Shekhar, Assistant Professor,*** Indian Institute of Technology, Mandi on ***'Probabilistic Seismic Risk Assessment of Infrastructure Systems'***
23-07-2024 (Floods)	9:30 AM	Expert Talk by ***Dr. Saran Srikanth Bodda, Graduate Faculty,*** North Carolina State University, Raleigh, USA on ***'An Overview of External Probabilistic Risk Asseeessment'***
	11:00 AM	Expert Talk by ***Dr. Ankit Agarwal, Assistant Professor,*** Indian Institute of Technology, Roorkee on ***'Probabilistic Flood Hazard Analysis'***
24-07-2024 (Landslides)	9:30 AM	Expert Talk by ***Dr. Maheshreddy Gade, Associate Professor,*** Indian Institute of Technology, Mandi on ***'Earthquake–Induced Landslide Hazard Assessment'***

	11:00 AM	Expert Talk by ***Dr. Kala Venkata Uday, Associate Professor,*** Indian Institute of Technology, Mandi on ***'Landslide Risk Mitigation and Prediction.'***
	12:30 PM	Expert Talk by ***Dr. Tanmay Gupta, Assistant Professor,*** JUIT on ***'Post Landslide Assessments: Harnessing Innovative Techniques for Future Resilience'***
25-07-2024 (Fire and Industries)	9:30 AM	Expert Talk by ***Dr. P. Ravi Prakash, Assistant Professor,*** Indian Institute of Technology, Jodhpur on ***'Fire Safety in Structures: An Overview'***
	11:00 AM	Expert Talk by ***Dr. Sudheer Dwivedi, Joint Director,*** Disaster Management Institute, Madhya Pradesh on ***'Process Hazard Identification Techniques in Industries'***
26-07-2024 (Disaster Economics)	9:30 AM	Expert Talk by ***Dr. Subir Sen, Associate Professor,*** Indian Institute of Technology, Roorkee on ***'Economic Effects of Disasters: Three Different Cases'***
	11:00 AM	Valedictory Session
	11.30 AM	Short Quiz for awarding Certificate of Merit to the participants.

Feedback from participants has been overwhelmingly positive, with many expressing appreciations for the new knowledge gained throughout the workshop, and the expertise of the instructors. As we reflect on the achievements of this course, it is evident that education and training play a crucial role in driving positive advances towards a more disaster resilient future.

Table 2: Summary of participation Details in the Workshop

Total Number of Registered participants	105
Total Number of external participants	88

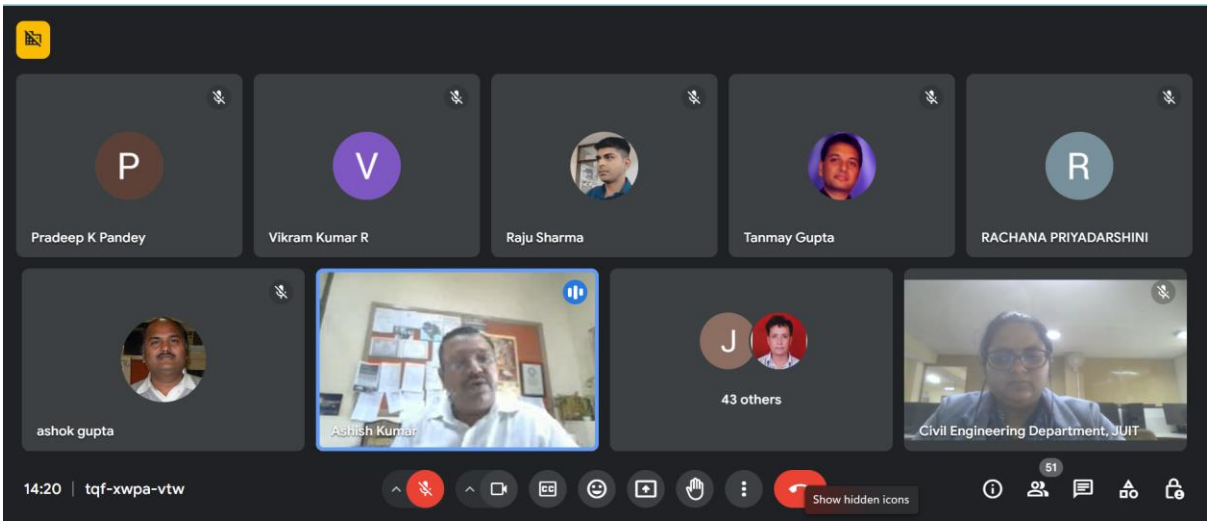
Other Salient Features

- Presentation slides of all lectures by the speakers for the workshop were shared beforehand by the organizing committee to the participants.
- Certificates of Merit are issued to all registered participants who scored more than 13 out 20 on the quiz conducted on the last day of the workshop.
- Certificates of participation are issued to all the remaining registered participants.
- Certificates of Appreciation are issued to all the listed speakers along with an appropriate honorarium.
- Feedback collected from participants on each day of the workshop for further improvement in conducting future workshops.
- Feedback collected from speakers for their input in conducting future workshops.

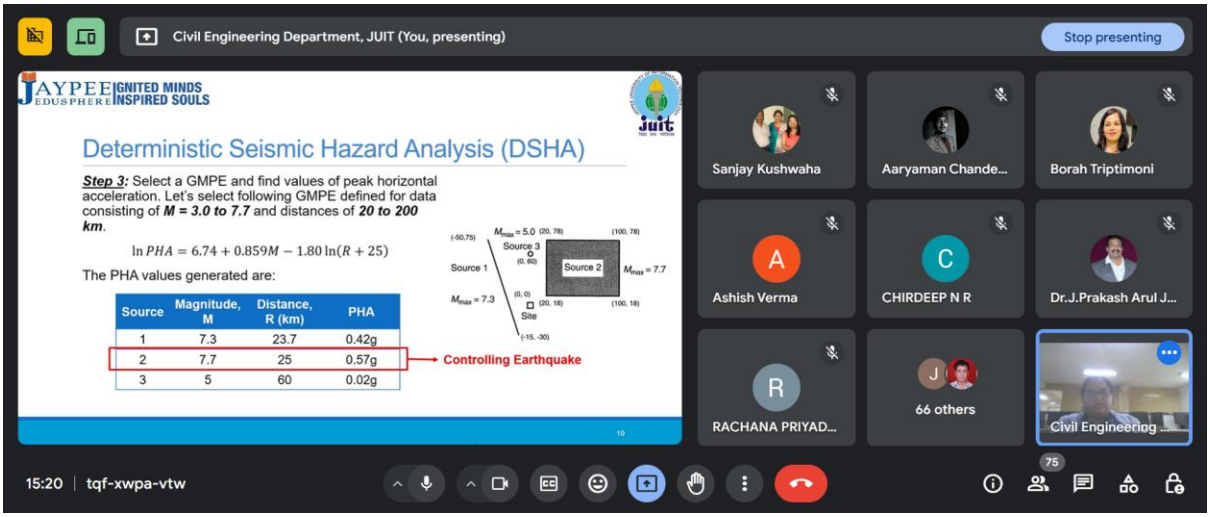
Event Flyer:

Event Photos:

Day 1:




Civil Engineering Department, JUIT (You, presenting)
Stop presenting
Probabilistic Seismic Hazard Analysis (PSHA)
PRESENTED BY:
DR. SUGANDHA SINGH, ASSISTANT PROFESSOR,
CIVIL ENGINEERING DEPARTMENT,
JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
Saurav Kumar
Ashish Kumar
ashok gupta
Pradeep K Pandey
Vikram Kumar R
Tanmay Gupta
Niraj Singh Parihar
51 others
Civil Engineering ...
14:33 | tqf-xwpa-vtw


Civil Engineering Department, JUIT (You, presenting)
Stop presenting
Deterministic Seismic Hazard Analysis (DSHA)
Step 3: Select a GMPE and find values of peak horizontal acceleration. Let's select following GMPE defined for data consisting of M = 3.0 to 7.7 and distances of 20 to 200 km.
$\ln PHA = 6.74 + 0.859M - 1.80\ln(R + 25)$
The PHA values generated are:
Source | Magnitude, M | Distance, R (km) | PHA
1 | 7.3 | 23.7 | 0.42g
2 | 7.7 | 25 | 0.57g
3 | 5 | 60 | 0.02g
Controlling Earthquake
Source 1
Source 2
Source 3
Site
Sanjay Kushwaha
Aaryaman Chande...
Borah Triptimoni
Ashish Verma
CHIRDEEP N R
Dr.J.Prakash Arul J...
RACHANA PRIYAD...
66 others
Civil Engineering ...
15:20 | tqf-xwpa-vtw

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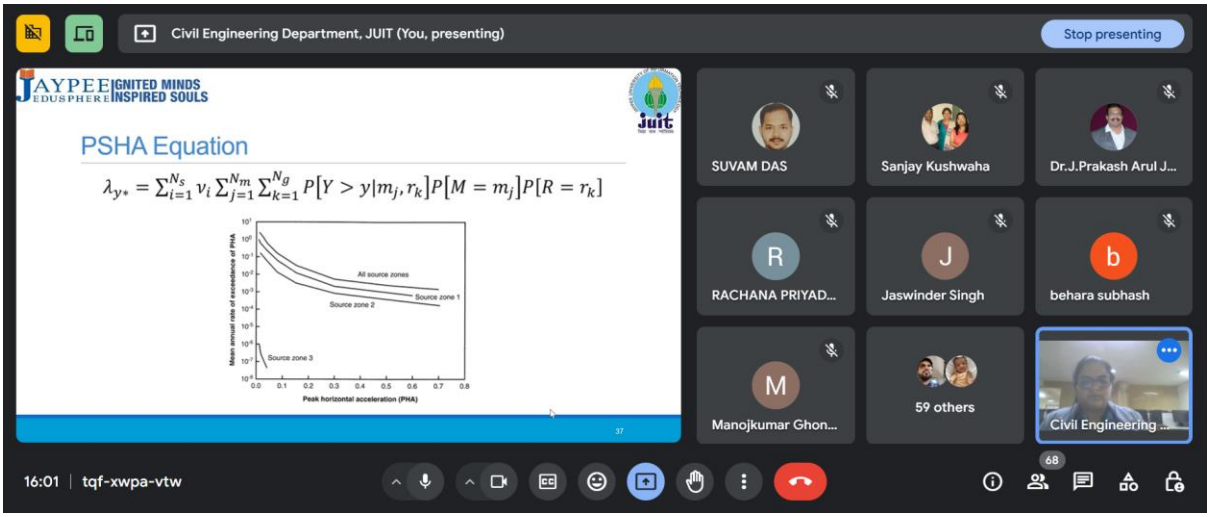

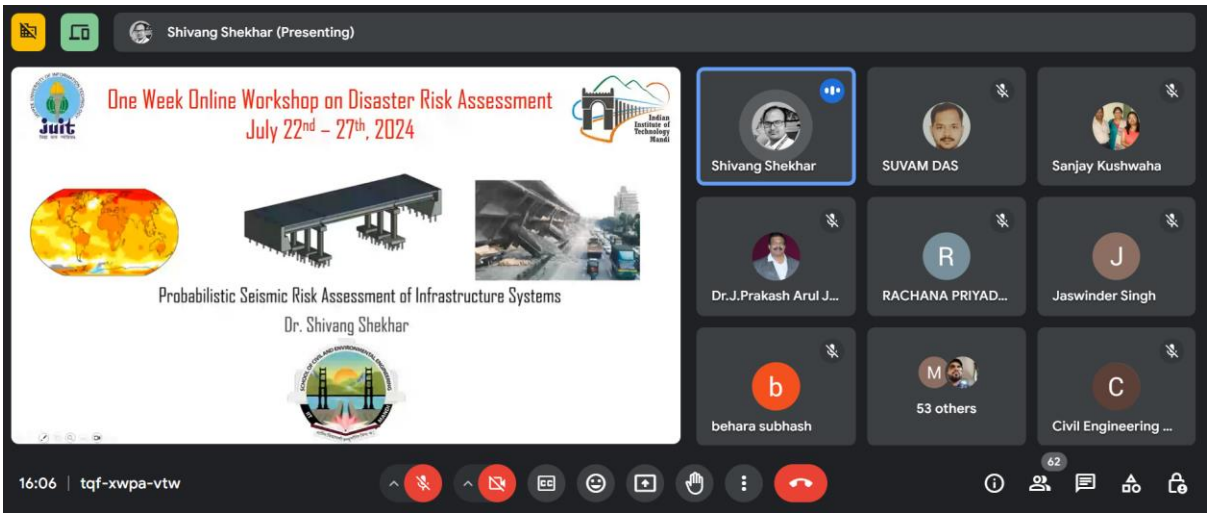

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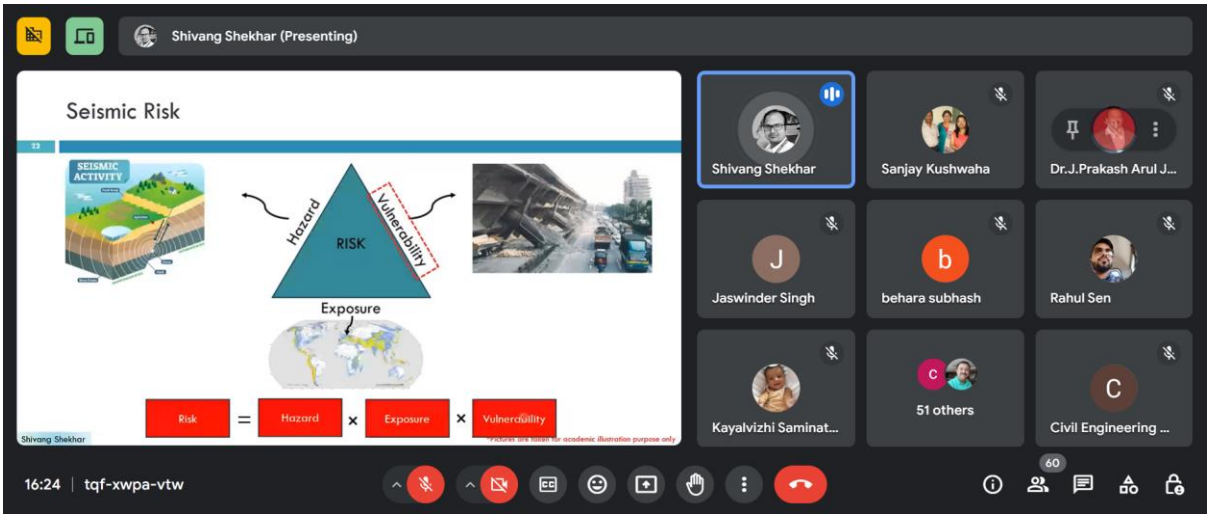
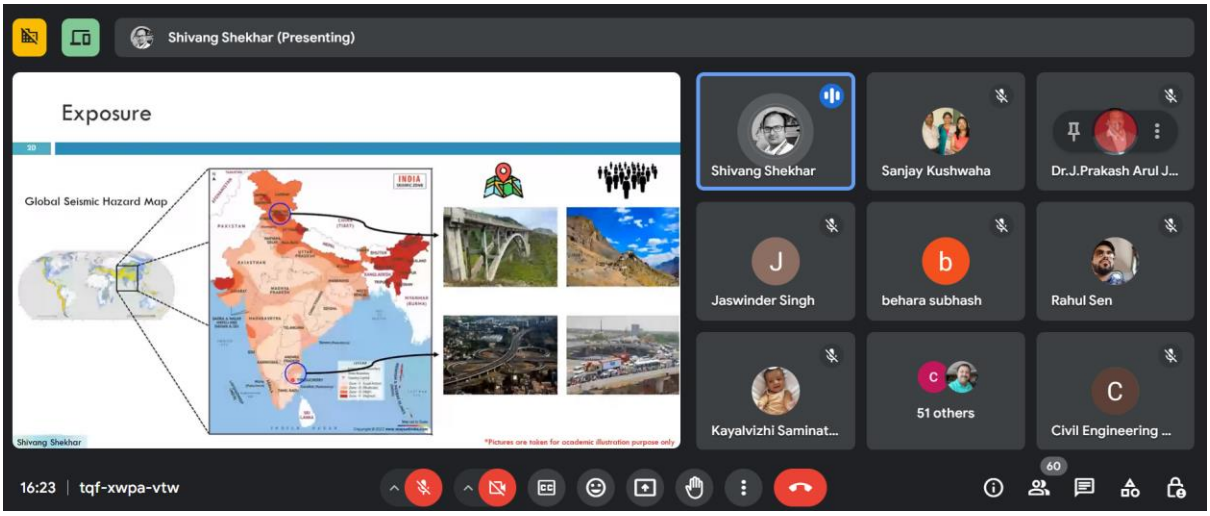
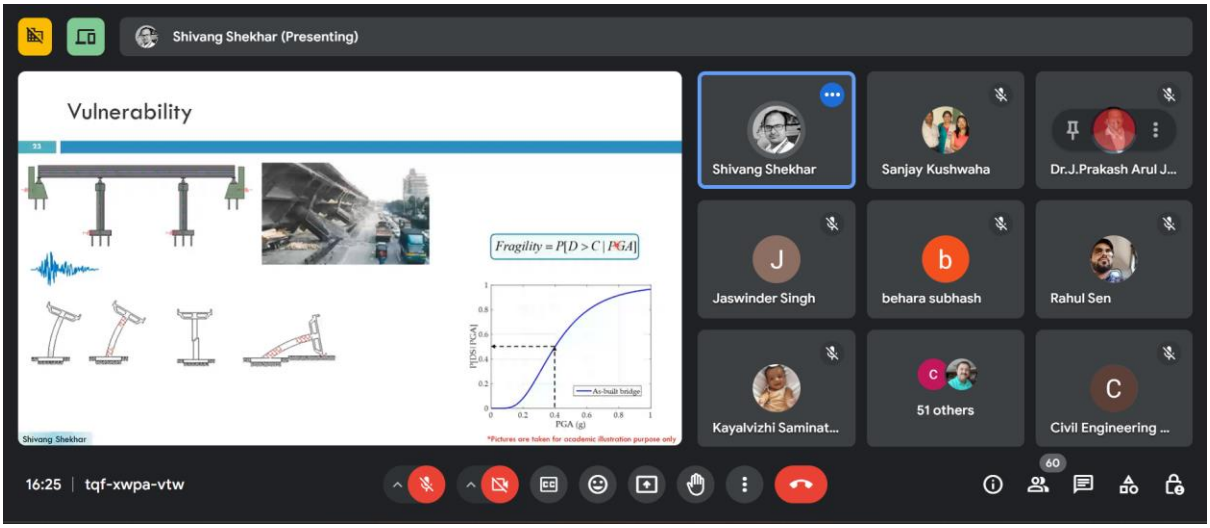
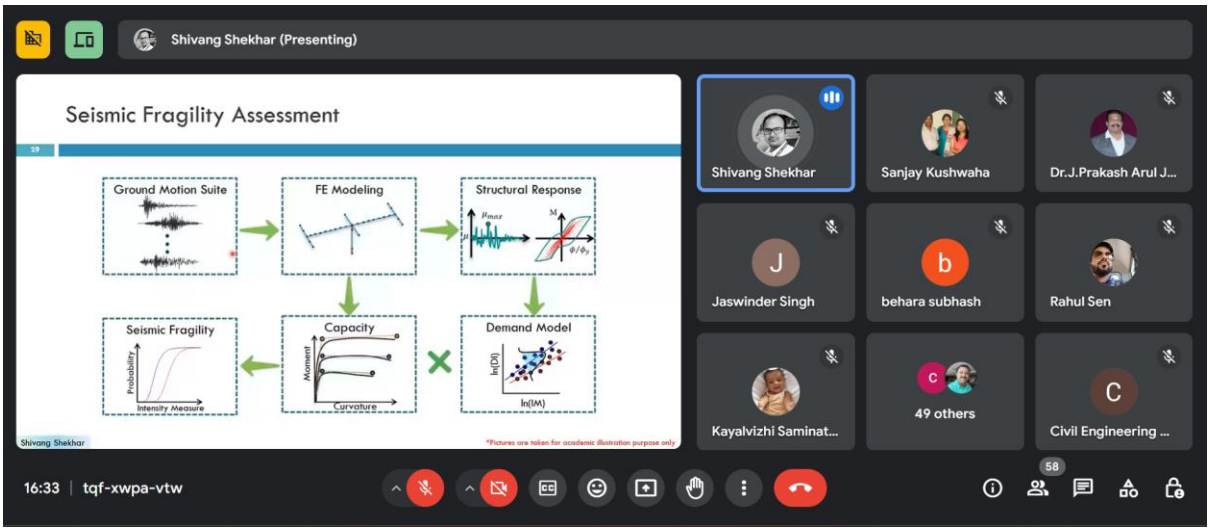
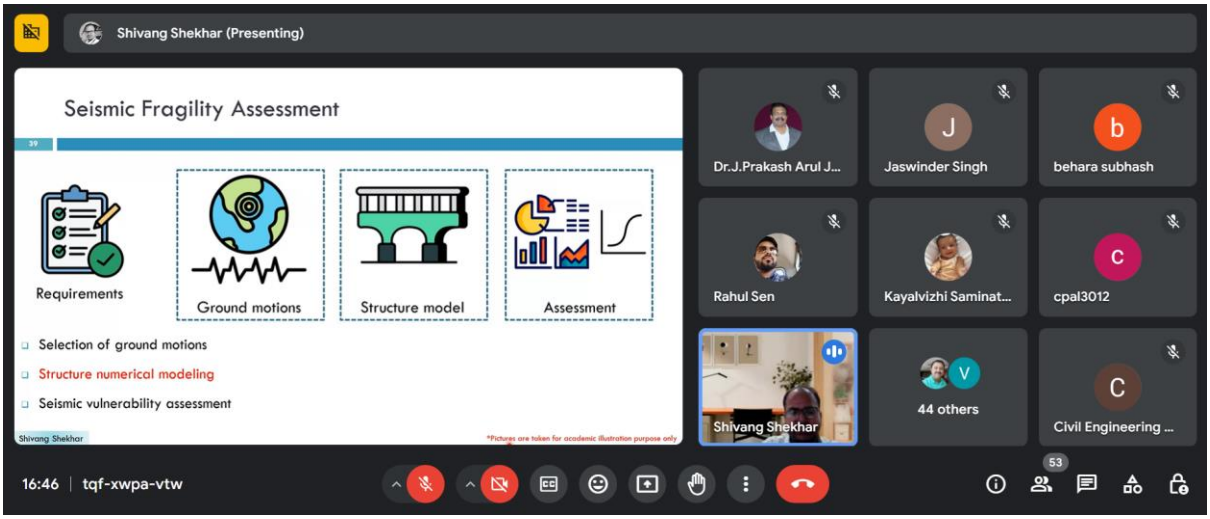
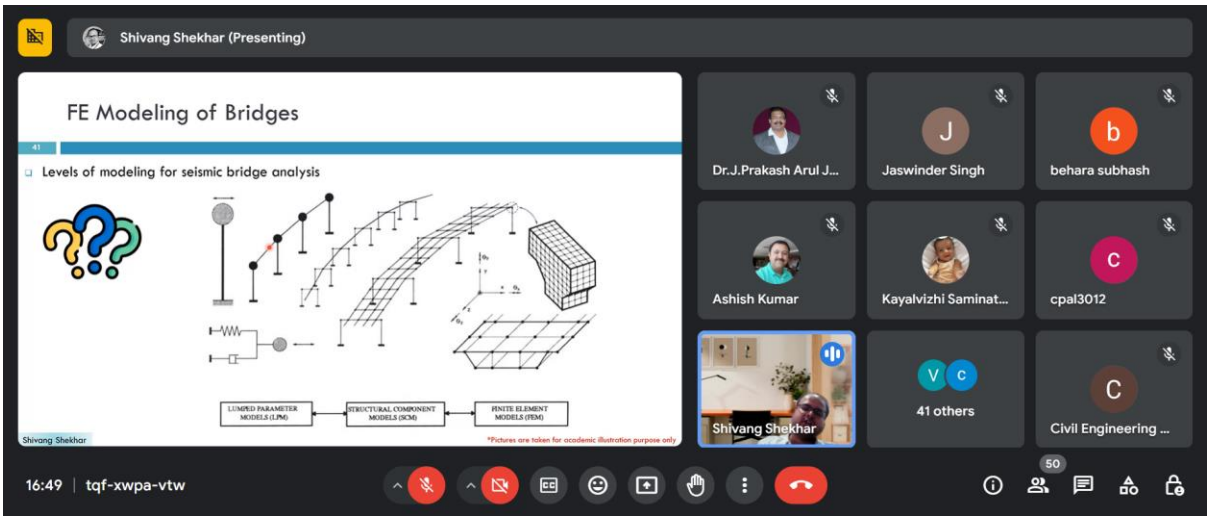


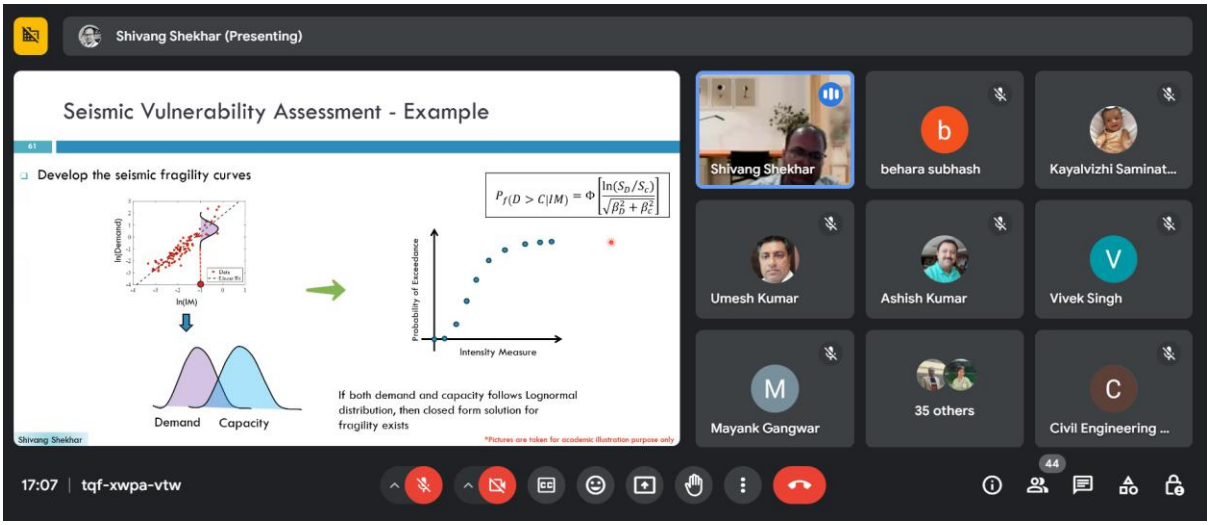


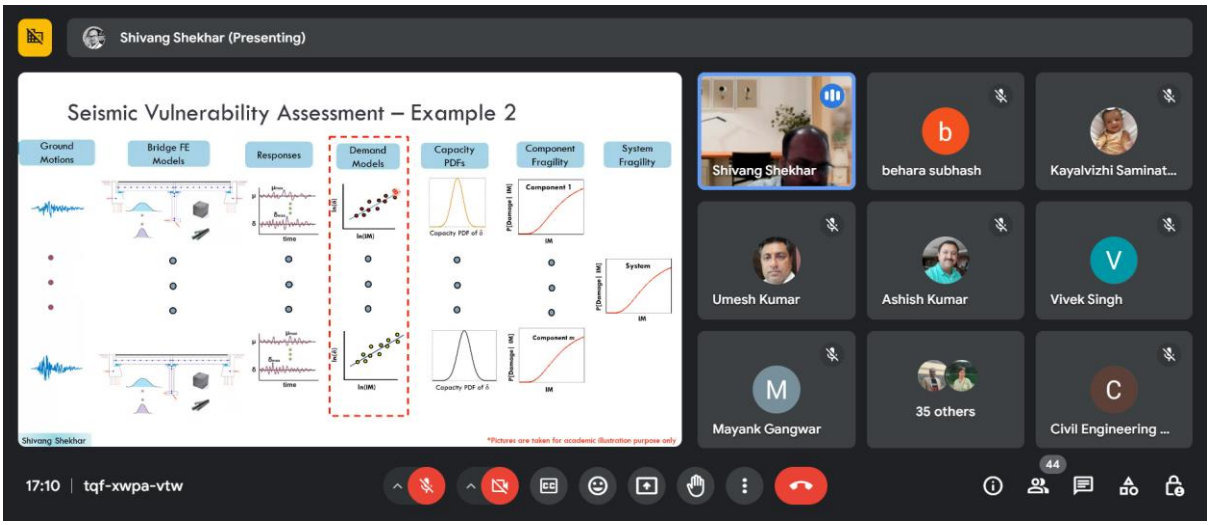

Shivang Shekhar (Presenting)
Vulnerability
Fragility = P[D > C | PGA]
Shivang Shekhar
Sanjay Kushwaha
Dr.J.Prakash Arul J...
Jaswinder Singh
behara subhash
Rahul Sen
Kayalvizhi Saminat...
51 others
Civil Engineering ...
16:25 | tqf-xwpa-vtw

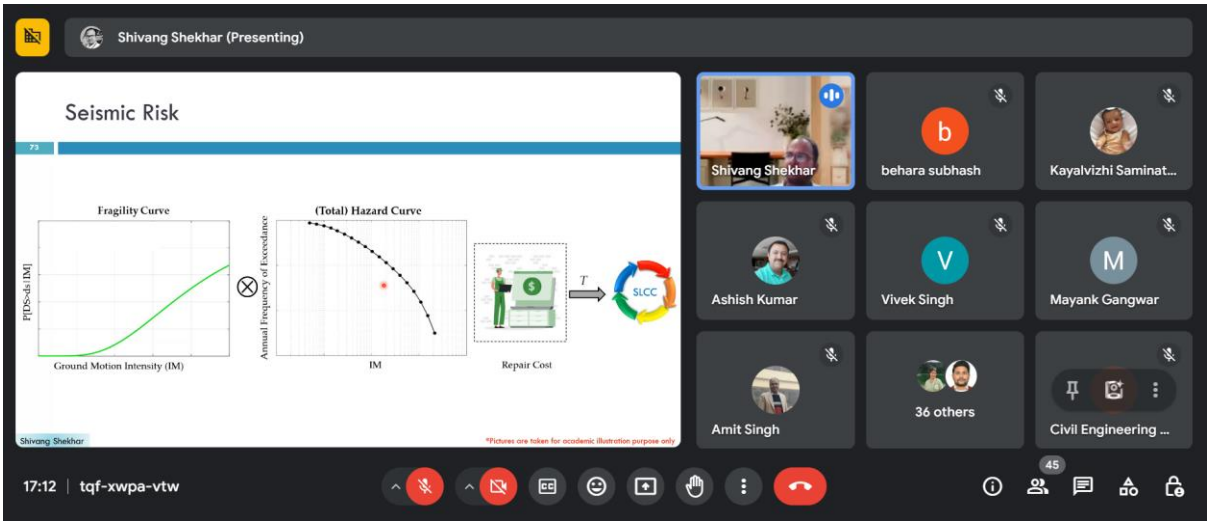

Shivang Shekhar (Presenting)
Seismic Fragility Assessment
Ground Motion Suite
FE Modeling
Structural Response
Seismic Fragility
Capacity
Demand Model
Shivang Shekhar
Sanjay Kushwaha
Dr.J.Prakash Arul J...
Jaswinder Singh
behara subhash
Rahul Sen
Kayalvizhi Saminat...
49 others
Civil Engineering ...
16:33 | tqf-xwpa-vtw

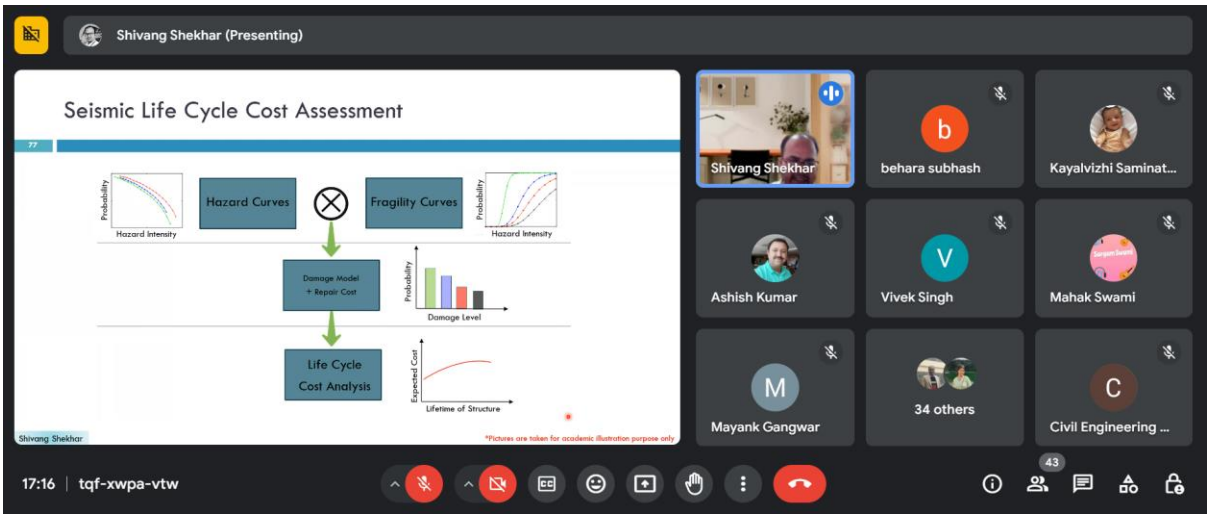

Shivang Shekhar (Presenting)
Seismic Fragility Assessment
Requirements
Ground motions
Structure model
Assessment
Selection of ground motions
Structure numerical modeling
Seismic vulnerability assessment
Dr.J.Prakash Arul J...
Jaswinder Singh
behara subhash
Rahul Sen
Kayalvizhi Saminat...
cpal3012
Shivang Shekhar
44 others
Civil Engineering ...
16:46 | tqf-xwpa-vtw

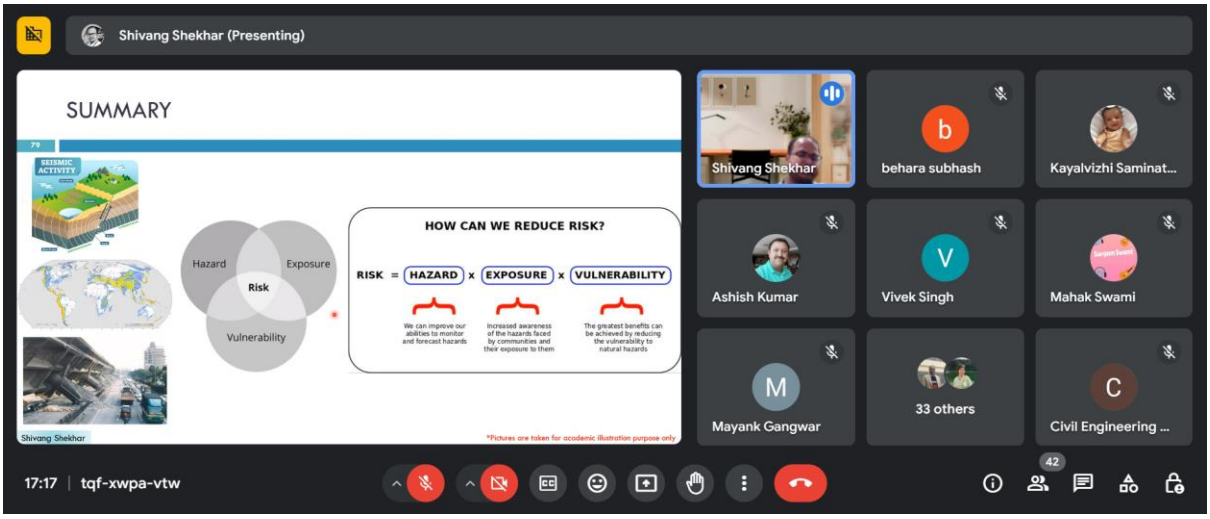

Shivang Shekhar (Presenting)
FE Modeling of Bridges
Levels of modeling for seismic bridge analysis
LUMPED PARAMETER MODELS (LPM)
STRUCTURAL COMPONENT MODELS (SCM)
FINITE ELEMENT MODELS (FEM)
Dr.J.Prakash Arul J...
Jaswinder Singh
behara subhash
Ashish Kumar
Kayalvizhi Saminat...
cpal3012
Shivang Shekhar
41 others
Civil Engineering ...
16:49 | tqf-xwpa-vtw


Shivang Shekhar (Presenting)
Seismic Vulnerability Assessment - Example
Develop the seismic fragility curves
$P_{f(D>C|IM)} = \Phi\left[\frac{\ln(S_D/S_C)}{\sqrt{\beta_D^2+\beta_C^2}}\right]$
ln(Demand)
ln(IM)
Probability of Exceedance
Intensity Measure
Demand
Capacity
If both demand and capacity follows Lognormal distribution, then closed form solution for fragility exists
*Pictures are taken for academic illustration purpose only
Shivang Shekhar
behara subhash
Kayalvizhi Saminat...
Umesh Kumar
Ashish Kumar
Vivek Singh
Mayank Gangwar
35 others
Civil Engineering ...
17:07 | tqf-xwpa-vtw
44


Shivang Shekhar (Presenting)
Seismic Vulnerability Assessment – Example 2
Ground Motions
Bridge FE Models
Responses
Demand Models
Capacity PDFs
Component Fragility
System Fragility
Component 1
System
Component m
ln(IM)
Capacity PDF of δ
IM
*Pictures are taken for academic illustration purpose only
Shivang Shekhar
behara subhash
Kayalvizhi Saminat...
Umesh Kumar
Ashish Kumar
Vivek Singh
Mayank Gangwar
35 others
Civil Engineering ...
17:10 | tqf-xwpa-vtw
44

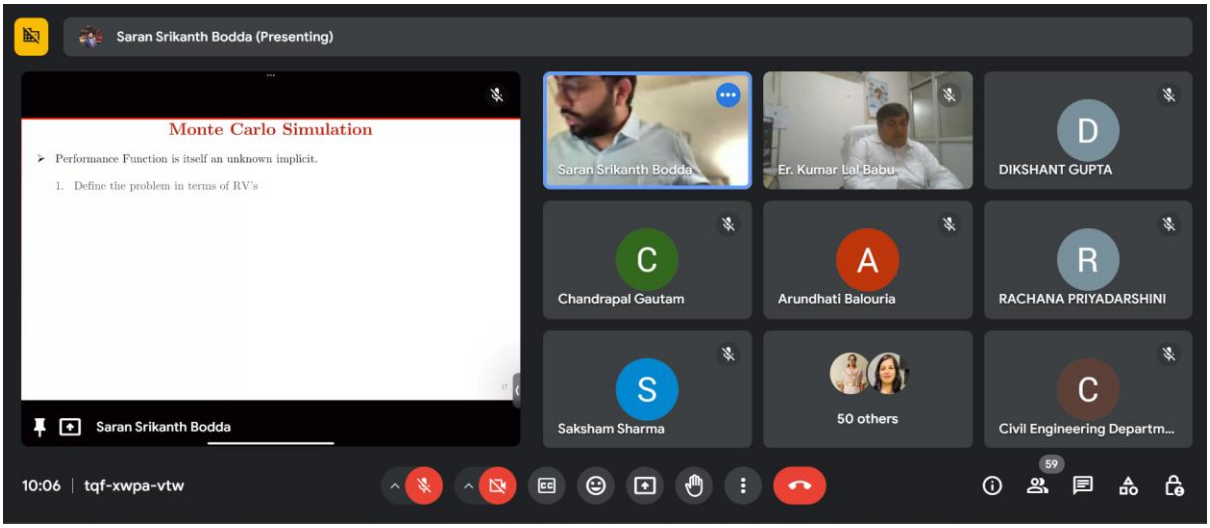

Shivang Shekhar (Presenting)
Seismic Risk
Fragility Curve
(Total) Hazard Curve
Ground Motion Intensity (IM)
IM
Repair Cost
SLCC
Shivang Shekhar
behara subhash
Kayalvizhi Saminat...
Ashish Kumar
Vivek Singh
Mayank Gangwar
Amit Singh
36 others
Civil Engineering ...
17:12 | tqf-xwpa-vtw

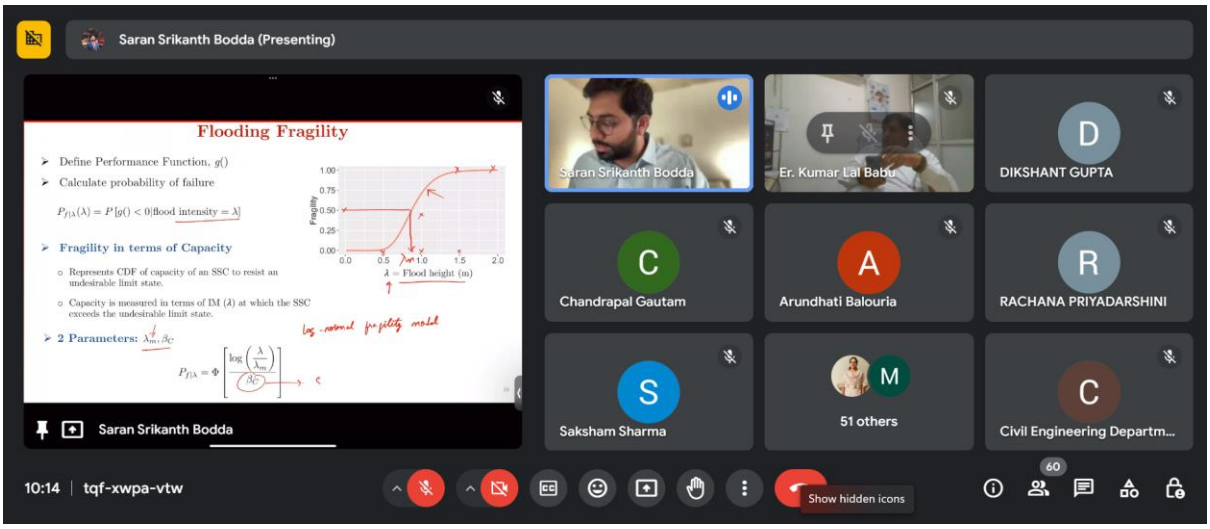

Shivang Shekhar (Presenting)
Seismic Life Cycle Cost Assessment
Hazard Curves
Fragility Curves
Damage Model + Repair Cost
Damage Level
Life Cycle Cost Analysis
Lifetime of Structure
Shivang Shekhar
behara subhash
Kayalvizhi Saminat...
Ashish Kumar
Vivek Singh
Mahak Swami
Mayank Gangwar
34 others
Civil Engineering ...
17:16 | tqf-xwpa-vtw

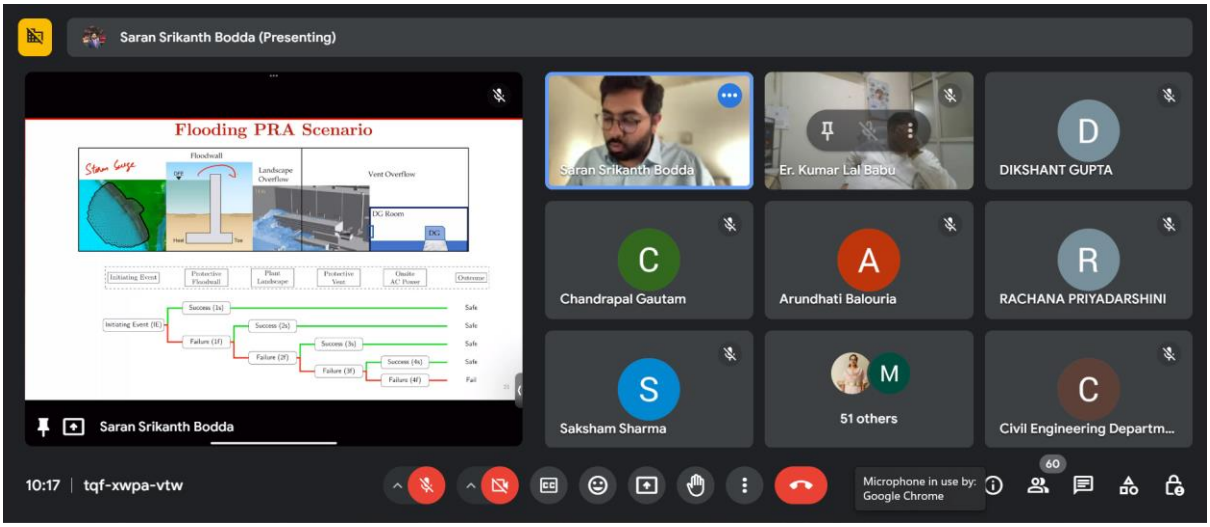

Shivang Shekhar (Presenting)
SUMMARY
HOW CAN WE REDUCE RISK?
RISK = HAZARD x EXPOSURE x VULNERABILITY
Hazard
Exposure
Risk
Vulnerability
Shivang Shekhar
behara subhash
Kayalvizhi Saminat...
Ashish Kumar
Vivek Singh
Mahak Swami
Mayank Gangwar
33 others
Civil Engineering ...
17:17 | tqf-xwpa-vtw

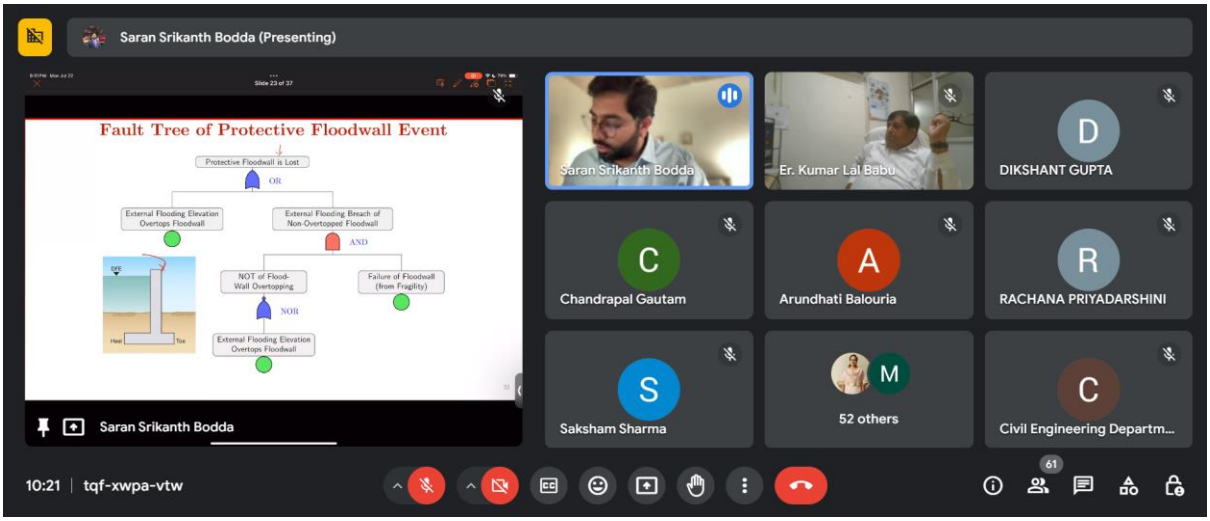

Shivang Shekhar (Presenting)
Multi-Hazard RESilient Infrastructure SysTems (MH-RESIST) Lab @ IIT Mandi
Dr. Shivang Shekhar
Team Leader
Team Members:
Chirdeep
Vivek
Mayank
Divesh
Vikram
Risk Assessment of Ageing Highway Bridges considering Climate Change and Geohazards
Resilience Enhancement of Ageing Highway Bridges using Optimal Retrofit Measures
Shivang Shekhar
behara subhash
Kayalvizhi Saminat...
Ashish Kumar
Vivek Singh
Mayank Gangwar
chandrashekhar k...
32 others
Civil Engineering ...
17:20 | tqf-xwpa-vtw

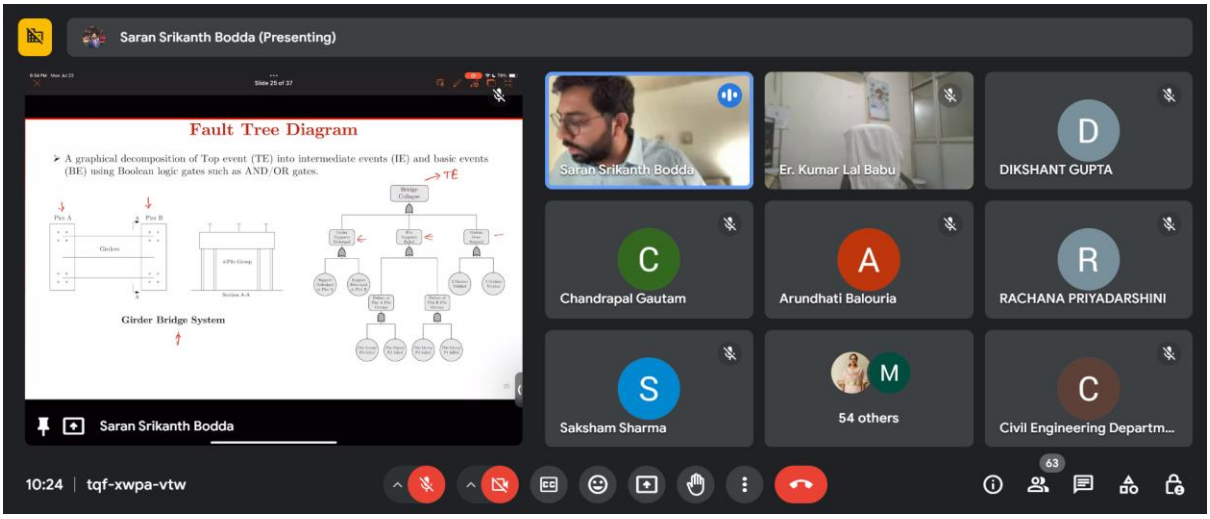
Day 2:

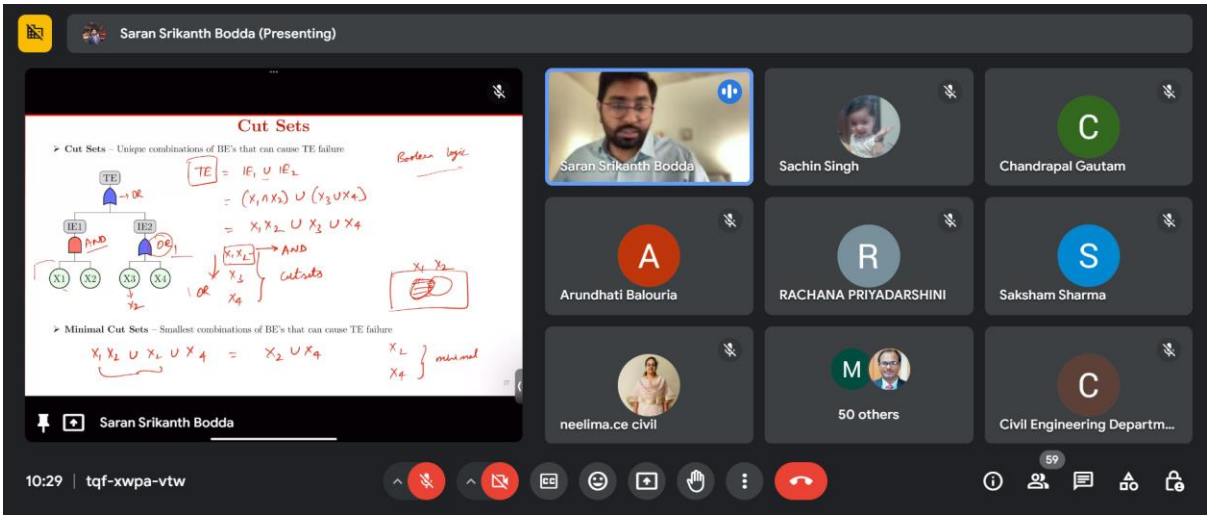

Saran Srikanth Bodda (Presenting)
Monte Carlo Simulation
Performance Function is itself an unknown implicit.
1. Define the problem in terms of RV's
Saran Srikanth Bodda
Saran Srikanth Bodda
Er. Kumar Lal Babu
DIKSHANT GUPTA
Chandrapal Gautam
Arundhati Balouria
RACHANA PRIYADARSHINI
Saksham Sharma
50 others
Civil Engineering Departm...
10:06 | tqf-xwpa-vtw

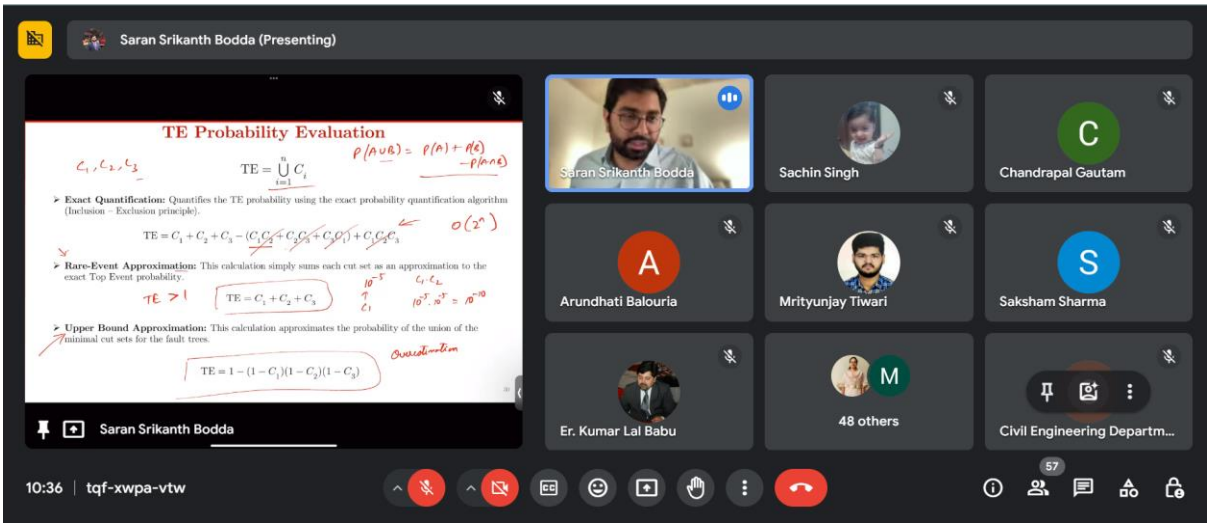

Saran Srikanth Bodda (Presenting)
Flooding Fragility
Define Performance Function, g()
Calculate probability of failure
Fragility in terms of Capacity
Represents CDF of capacity of an SSC to resist an undesirable limit state.
Capacity is measured in terms of IM (λ) at which the SSC exceeds the undesirable limit state.
2 Parameters:
log - normal fragility model
λ = Flood height (m)
Fragility
Saran Srikanth Bodda
Saran Srikanth Bodda
Er. Kumar Lal Babu
DIKSHANT GUPTA
Chandrapal Gautam
Arundhati Balouria
RACHANA PRIYADARSHINI
Saksham Sharma
51 others
Civil Engineering Departm...
10:14 | tqf-xwpa-vtw
Show hidden icons

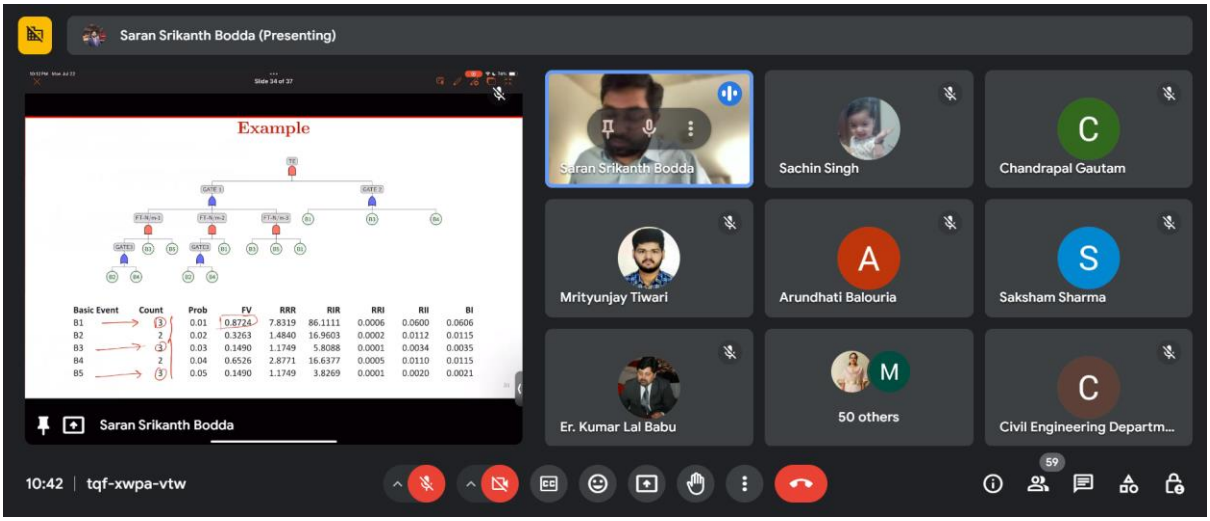

Saran Srikanth Bodda (Presenting)
Flooding PRA Scenario
Saran Srikanth Bodda
Er. Kumar Lal Babu
DIKSHANT GUPTA
Chandrapal Gautam
Arundhati Balouria
RACHANA PRIYADARSHINI
Saksham Sharma
51 others
Civil Engineering Departm...
Saran Srikanth Bodda
10:17 | tqf-xwpa-vtw
Microphone in use by: Google Chrome

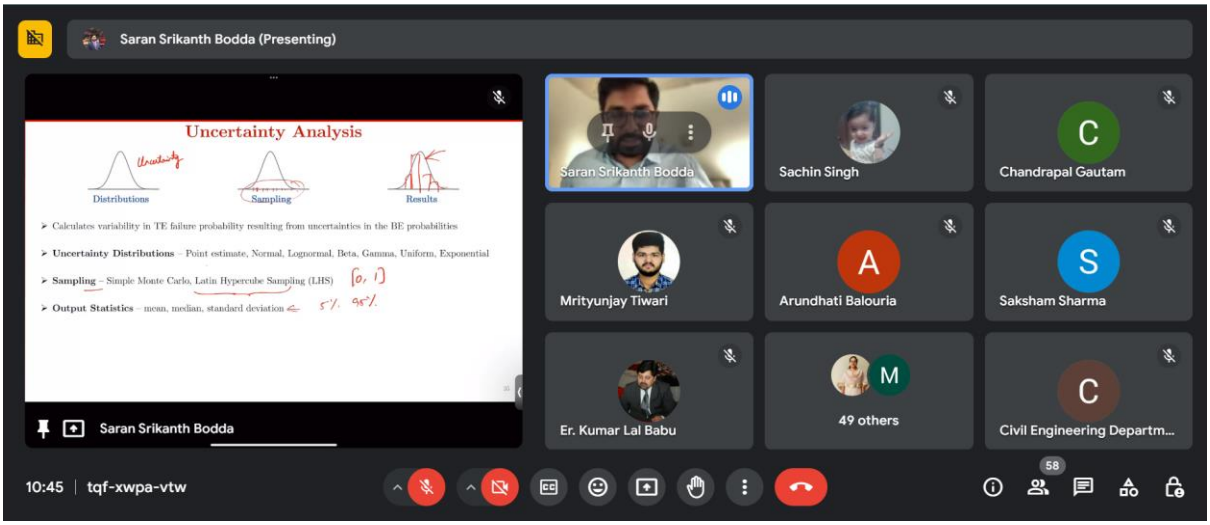

Saran Srikanth Bodda (Presenting)
Fault Tree of Protective Floodwall Event
Protective Floodwall is Lost
OR
External Flooding Elevation Overtops Floodwall
External Flooding Breach of Non-Overtopped Floodwall
AND
NOT of Flood-Wall Overtopping
Failure of Floodwall (from Fragility)
NOR
External Flooding Elevation Overtops Floodwall
Saran Srikanth Bodda
Saran Srikanth Bodda
Er. Kumar Lal Babu
DIKSHANT GUPTA
Chandrapal Gautam
Arundhati Balouria
RACHANA PRIYADARSHINI
Saksham Sharma
52 others
Civil Engineering Departm...
10:21 | tqf-xwpa-vtw

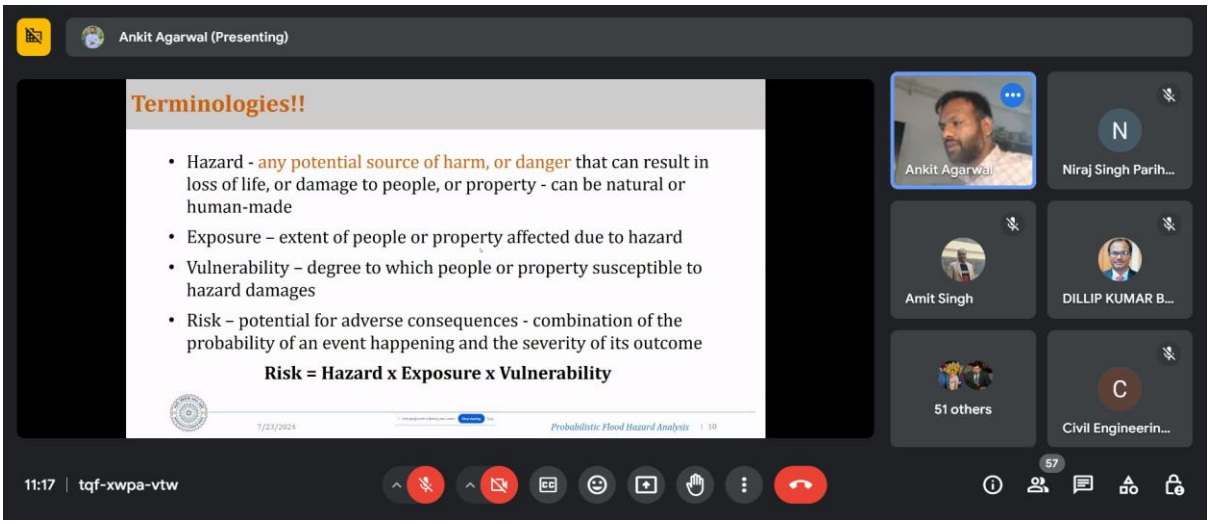

Saran Srikanth Bodda (Presenting)
Fault Tree Diagram
A graphical decomposition of Top event (TE) into intermediate events (IE) and basic events (BE) using Boolean logic gates such as AND/OR gates.
Girder Bridge System
Saran Srikanth Bodda
Saran Srikanth Bodda
Er. Kumar Lal Babu
DIKSHANT GUPTA
Chandrapal Gautam
Arundhati Balouria
RACHANA PRIYADARSHINI
Saksham Sharma
54 others
Civil Engineering Departm...
10:24 | tqf-xwpa-vtw
63


Saran Srikanth Bodda (Presenting)
Cut Sets
Cut Sets – Unique combinations of BE's that can cause TE failure
Minimal Cut Sets – Smallest combinations of BE's that can cause TE failure
Saran Srikanth Bodda
Saran Srikanth Bodda
Sachin Singh
Chandrapal Gautam
Arundhati Balouria
RACHANA PRIYADARSHINI
Saksham Sharma
neelima.ce civil
50 others
Civil Engineering Departm...
10:29 | tqf-xwpa-vtw
59


Saran Srikanth Bodda (Presenting)
TE Probability Evaluation
Exact Quantification: Quantifies the TE probability using the exact probability quantification algorithm (Inclusion – Exclusion principle).
Rare-Event Approximation: This calculation simply sums each cut set as an approximation to the exact Top Event probability.
Upper Bound Approximation: This calculation approximates the probability of the union of the minimal cut sets for the fault trees.
Saran Srikanth Bodda
Saran Srikanth Bodda
Sachin Singh
Chandrapal Gautam
Arundhati Balouria
Mrityunjay Tiwari
Saksham Sharma
Er. Kumar Lal Babu
48 others
Civil Engineering Departm...
10:36 | tqf-xwpa-vtw
57


Saran Srikanth Bodda (Presenting)
Example
Basic Event Count Prob FV RRR RIR RRI RII BI
B1 3 0.01 0.8724 7.8319 86.1111 0.0006 0.0600 0.0606
B2 2 0.02 0.3263 1.4840 16.9603 0.0002 0.0112 0.0115
B3 3 0.03 0.1490 1.1749 5.8088 0.0001 0.0034 0.0035
B4 2 0.04 0.6526 2.8771 16.6377 0.0005 0.0110 0.0115
B5 3 0.05 0.1490 1.1749 3.8269 0.0001 0.0020 0.0021
Saran Srikanth Bodda
Saran Srikanth Bodda
Sachin Singh
Chandrapal Gautam
Mrityunjay Tiwari
Arundhati Balouria
Saksham Sharma
Er. Kumar Lal Babu
50 others
Civil Engineering Departm...
10:42 | tqf-xwpa-vtw
59


Saran Srikanth Bodda (Presenting)
Uncertainty Analysis
Distributions
Sampling
Results
Calculates variability in TE failure probability resulting from uncertainties in the BE probabilities
Uncertainty Distributions – Point estimate, Normal, Lognormal, Beta, Gamma, Uniform, Exponential
Sampling – Simple Monte Carlo, Latin Hypercube Sampling (LHS)
Output Statistics – mean, median, standard deviation
Saran Srikanth Bodda
Saran Srikanth Bodda
Sachin Singh
Chandrapal Gautam
Mrityunjay Tiwari
Arundhati Balouria
Saksham Sharma
Er. Kumar Lal Babu
49 others
Civil Engineering Departm...
10:45 | tqf-xwpa-vtw


Ankit Agarwal (Presenting)
Terminologies!!
Hazard - any potential source of harm, or danger that can result in loss of life, or damage to people, or property - can be natural or human-made
Exposure – extent of people or property affected due to hazard
Vulnerability – degree to which people or property susceptible to hazard damages
Risk – potential for adverse consequences - combination of the probability of an event happening and the severity of its outcome
Risk = Hazard x Exposure x Vulnerability
Ankit Agarwal
Niraj Singh Parih...
Amit Singh
DILLIP KUMAR B...
51 others
Civil Engineerin...
11:17 | tqf-xwpa-vtw

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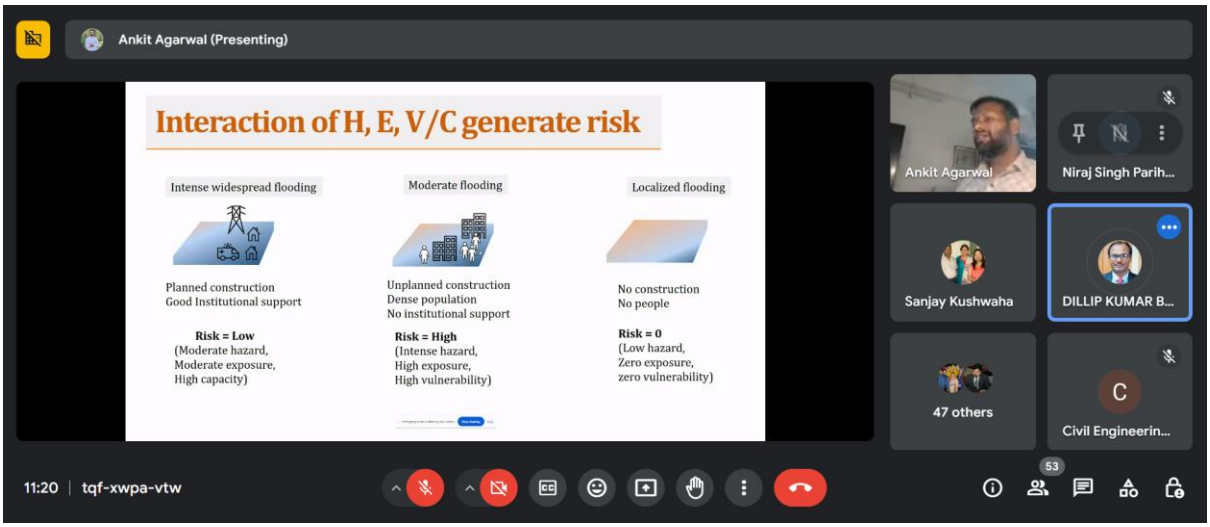
PIN – 173234 (INDIA) Phone Number- +91-1792-257999
(Established by H.P. State Legislature vide Act No. 14 of 2002)



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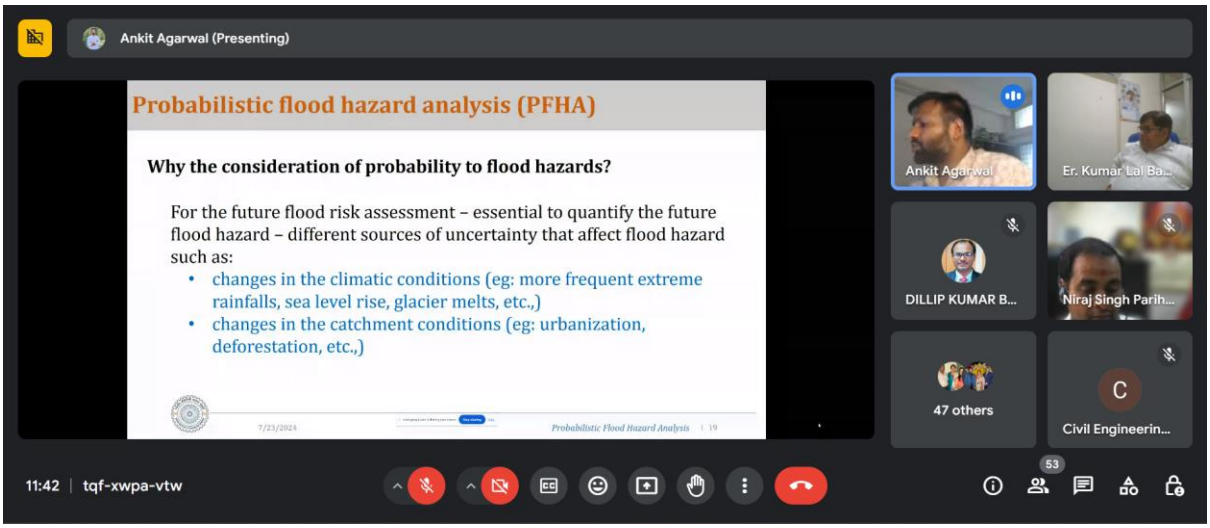
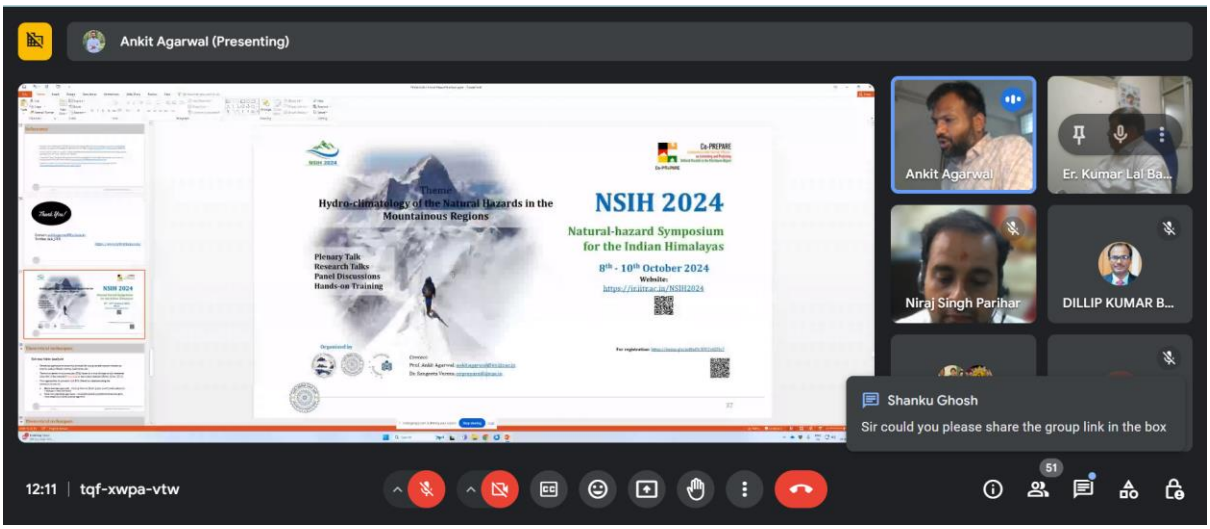
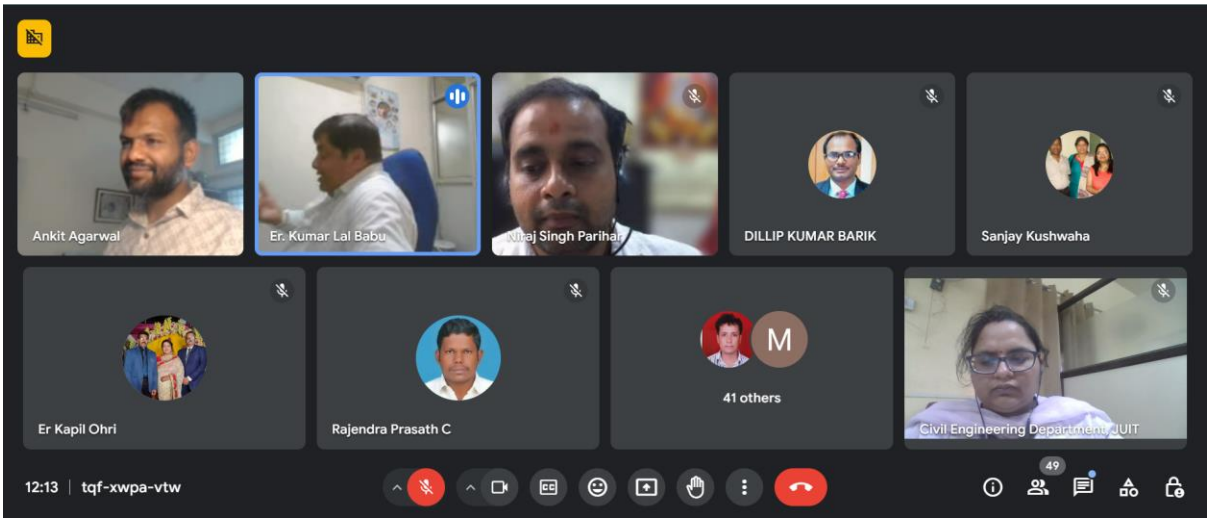
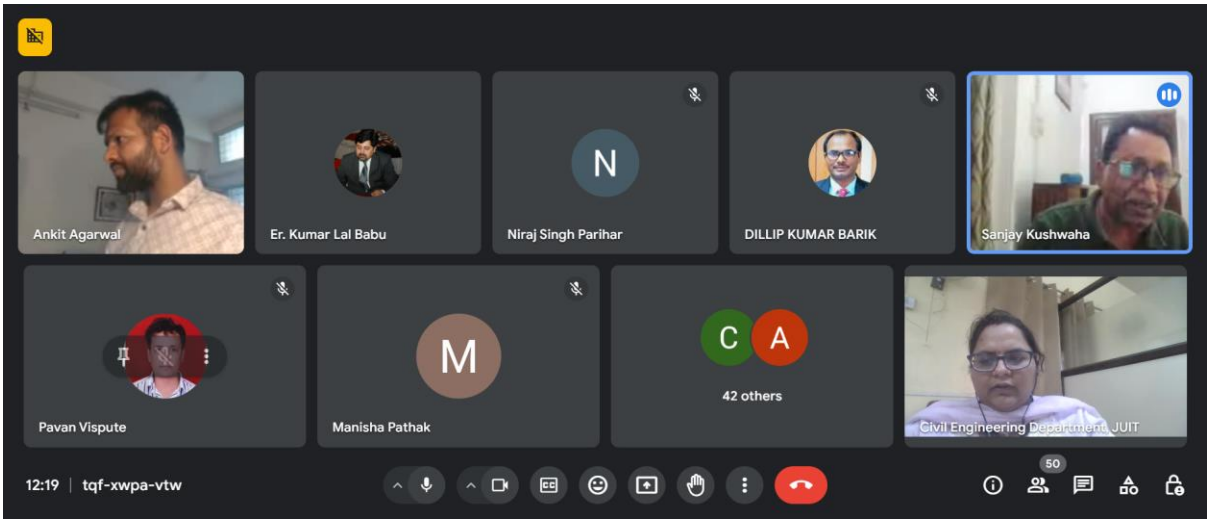
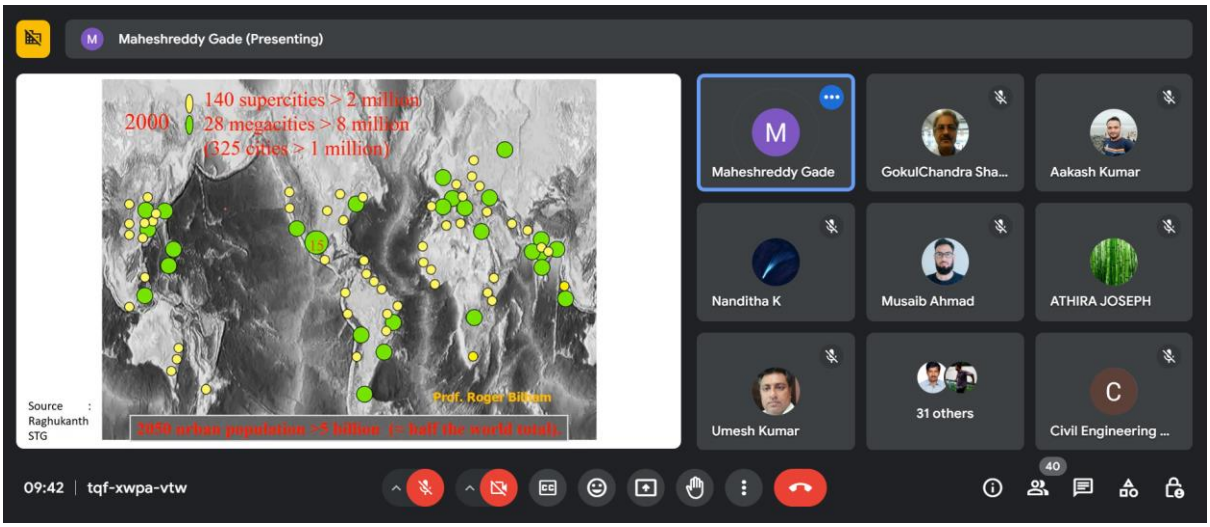


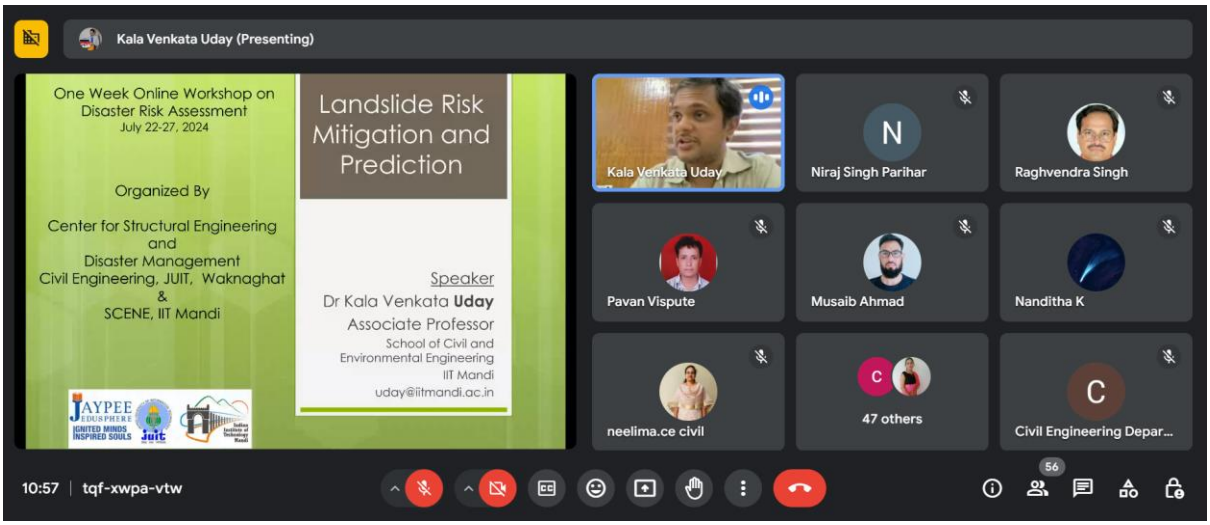


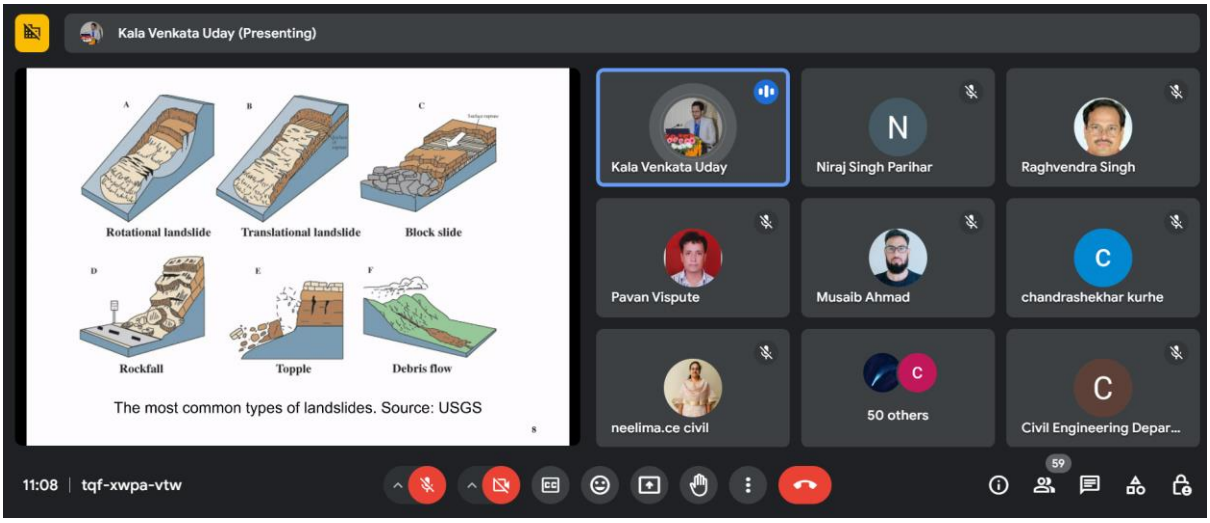

Ankit Agarwal
Er. Kumar Lal Babu
Niraj Singh Parihar
DILLIP KUMAR BARIK
Sanjay Kushwaha
Er Kapil Ohri
Rajendra Prasath C
M
41 others
Civil Engineering Department, JUIT
12:13 | tqf-xwpa-vtw
49

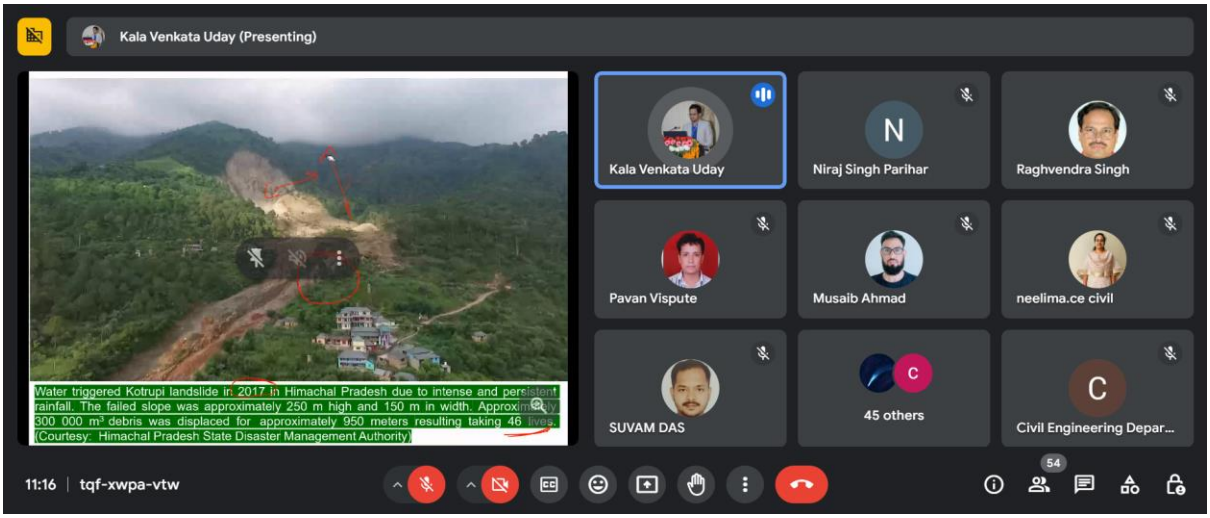

Ankit Agarwal
Er. Kumar Lal Babu
N
Niraj Singh Parihar
DILLIP KUMAR BARIK
Sanjay Kushwaha
Pavan Vispute
M
Manisha Pathak
C
A
42 others
Civil Engineering Department, JUIT
12:19 | tqf-xwpa-vtw
50

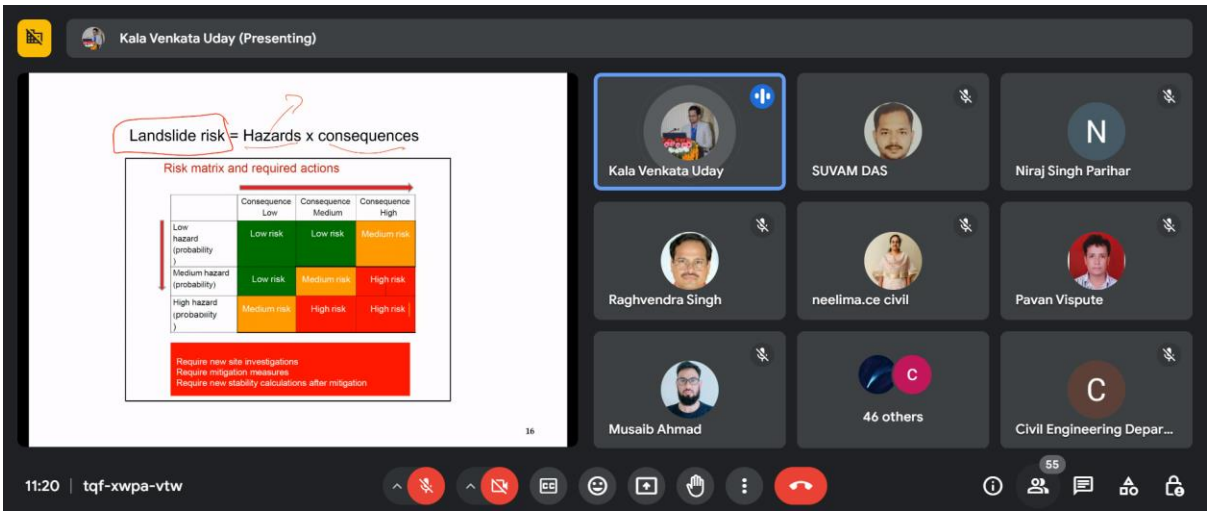
Day 3:

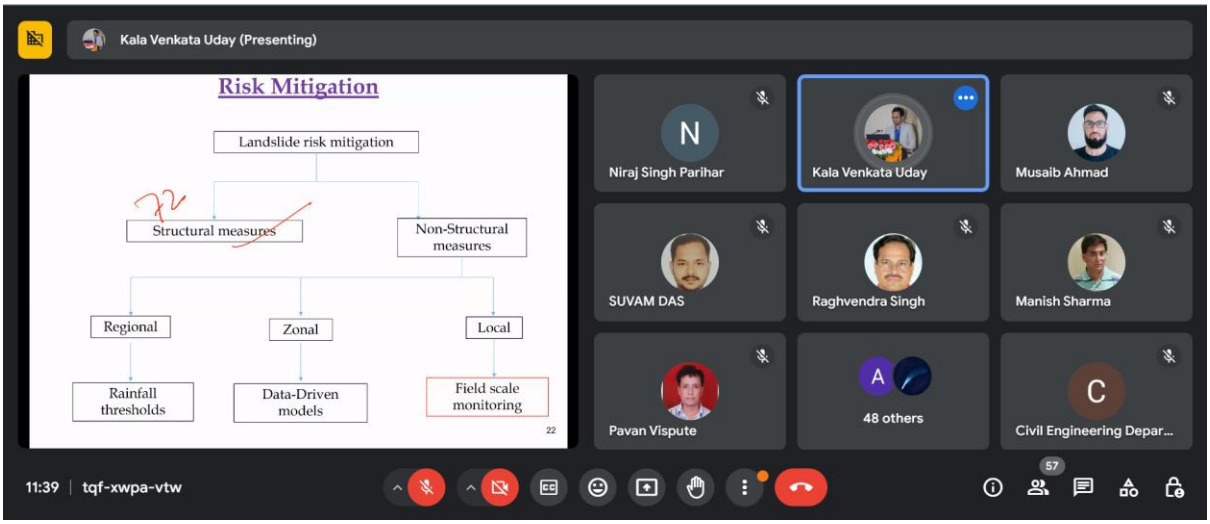

Maheshreddy Gade (Presenting)
140 supercities > 2 million
2000
28 megacities > 8 million
(525 cities > 1 million)
Source : Raghukanth STG
Prof. Roger Bilham
2050 urban population >5 billion (> half the world total)
Maheshreddy Gade
GokulChandra Sha...
Aakash Kumar
Nanditha K
Musaib Ahmad
ATHIRA JOSEPH
Umesh Kumar
31 others
Civil Engineering ...
09:42 | tqf-xwpa-vtw

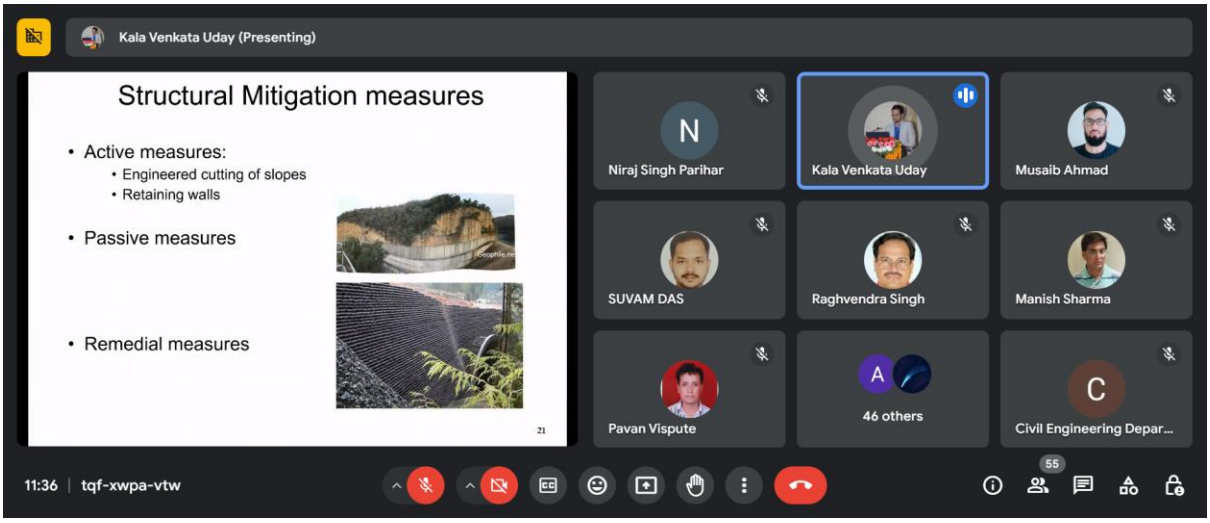

Kala Venkata Uday (Presenting)
One Week Online Workshop on Disaster Risk Assessment
July 22-27, 2024
Organized By
Center for Structural Engineering and Disaster Management
Civil Engineering, JUIT, Waknaghat
&
SCENE, IIT Mandi
Landslide Risk Mitigation and Prediction
Speaker
Dr Kala Venkata Uday
Associate Professor
School of Civil and Environmental Engineering
IIT Mandi
uday@iitmandi.ac.in
Kala Venkata Uday
Niraj Singh Parihar
Raghvendra Singh
Pavan Vispute
Musaib Ahmad
Nanditha K
neelima.ce civil
47 others
Civil Engineering Depar...
10:57 | tqf-xwpa-vtw

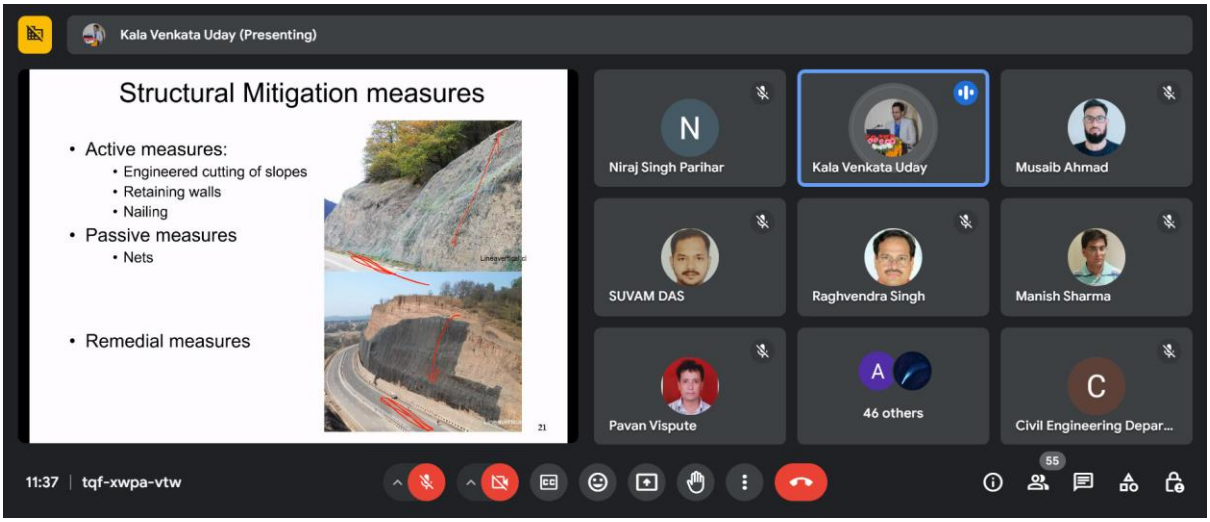

Kala Venkata Uday (Presenting)
Rotational landslide
Translational landslide
Block slide
Rockfall
Topple
Debris flow
The most common types of landslides. Source: USGS
Kala Venkata Uday
Niraj Singh Parihar
Raghvendra Singh
Pavan Vispute
Musaib Ahmad
chandrashekhar kurhe
neelima.ce civil
50 others
Civil Engineering Depar...
11:08 | tqf-xwpa-vtw

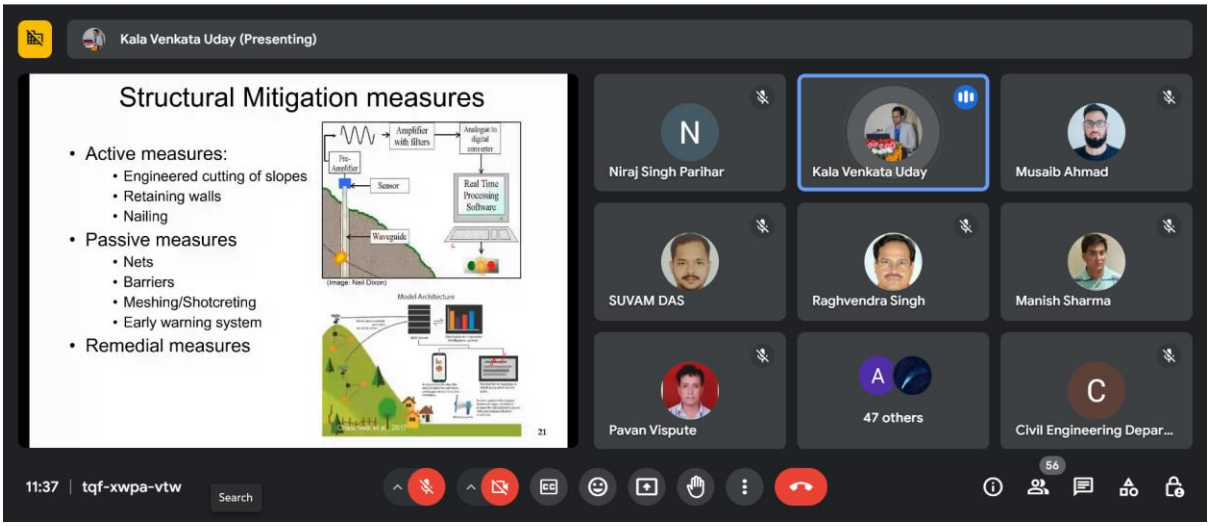

Kala Venkata Uday (Presenting)
Water triggered Kotrupi landslide in 2017 in Himachal Pradesh due to intense and persistent rainfall. The failed slope was approximately 250 m high and 150 m in width. Approximately 300 000 m³ debris was displaced for approximately 950 meters resulting taking 46 lives. (Courtesy: Himachal Pradesh State Disaster Management Authority)
Kala Venkata Uday
Niraj Singh Parihar
Raghvendra Singh
Pavan Vispute
Musaib Ahmad
neelima.ce civil
SUVAM DAS
45 others
Civil Engineering Depar...
11:16 | tqf-xwpa-vtw

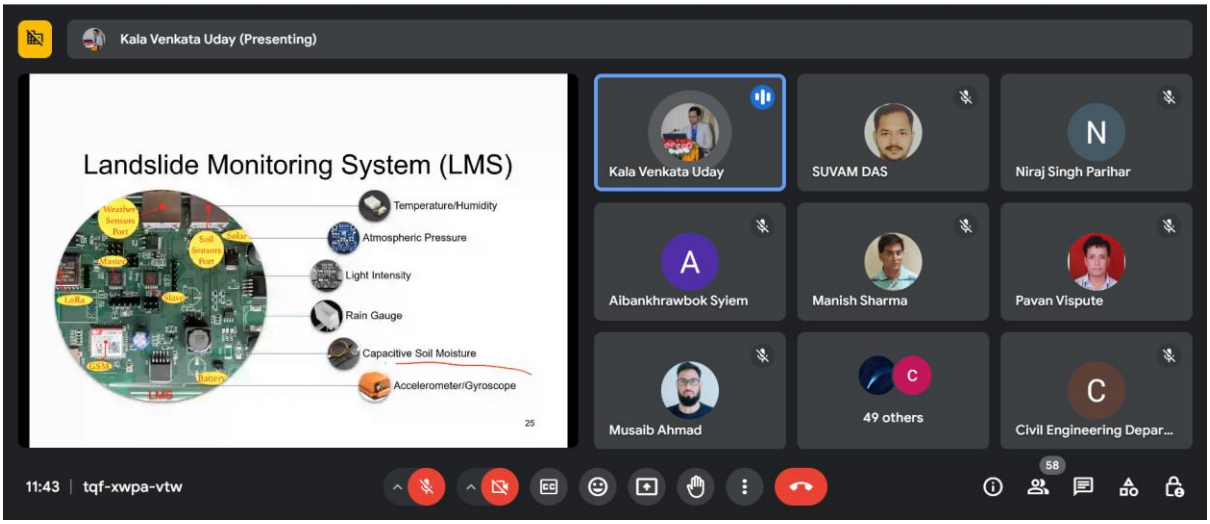

Kala Venkata Uday (Presenting)
Landslide risk = Hazards x consequences
Risk matrix and required actions
Consequence Low
Consequence Medium
Consequence High
Low hazard (probability)
Medium hazard (probability)
High hazard (probability)
Low risk
Low risk
Medium risk
Low risk
Medium risk
High risk
Medium risk
High risk
High risk
Require new site investigations
Require mitigation measures
Require new stability calculations after mitigation
16
Kala Venkata Uday
SUVAM DAS
Niraj Singh Parihar
Raghvendra Singh
neelima.ce civil
Pavan Vispute
Musaib Ahmad
46 others
Civil Engineering Depar...
11:20 | tqf-xwpa-vtw
55

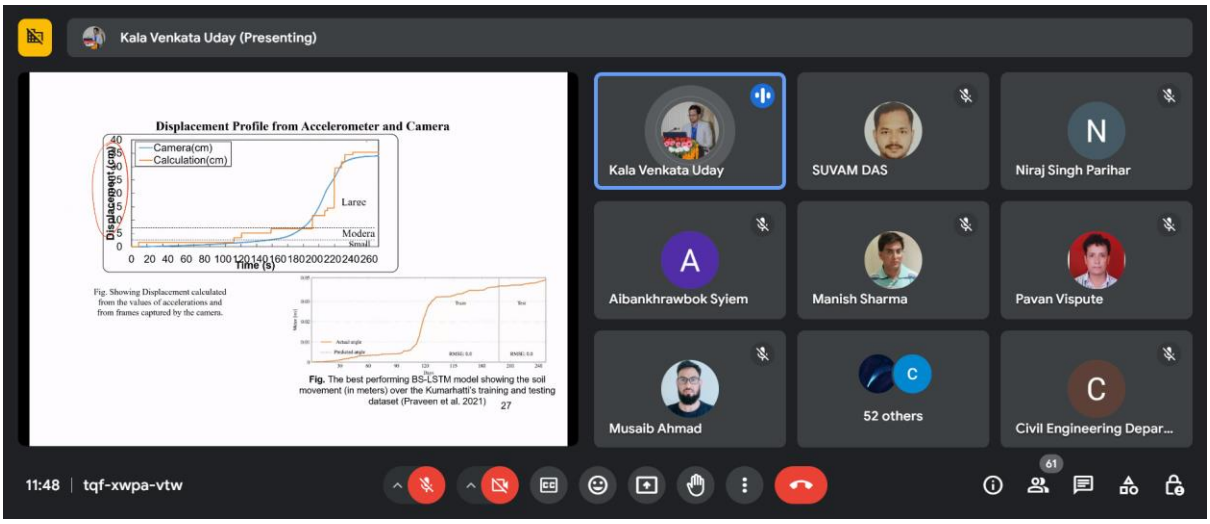

Kala Venkata Uday (Presenting)
Risk Mitigation
Landslide risk mitigation
Structural measures
Non-Structural measures
Regional
Zonal
Local
Rainfall thresholds
Data-Driven models
Field scale monitoring
22
Niraj Singh Parihar
Kala Venkata Uday
Musaib Ahmad
SUVAM DAS
Raghvendra Singh
Manish Sharma
Pavan Vispute
48 others
Civil Engineering Depar...
11:39 | tqf-xwpa-vtw
57

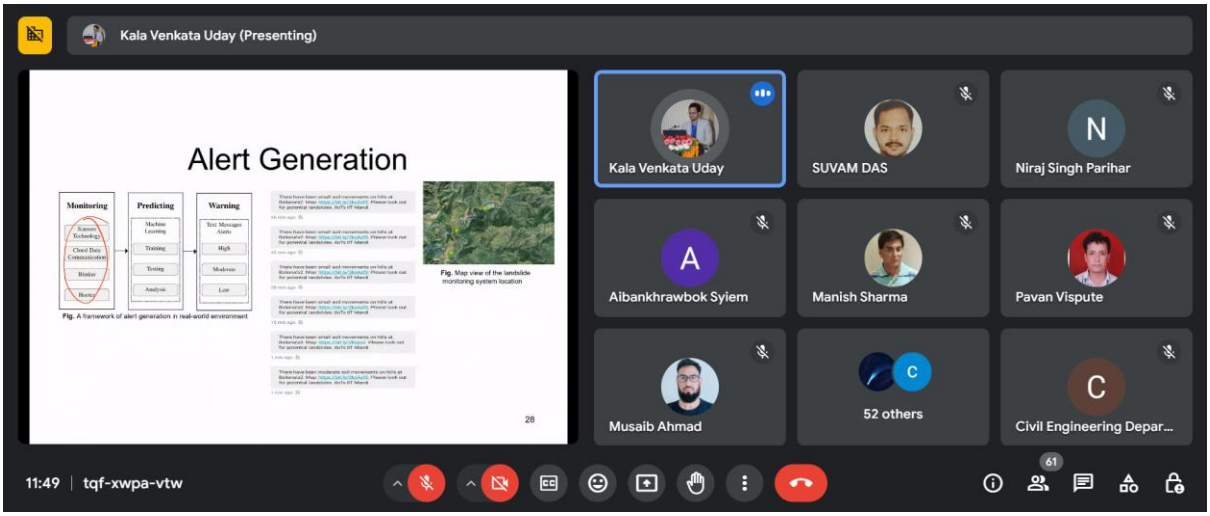

Kala Venkata Uday (Presenting)
Structural Mitigation measures
• Active measures:
• Engineered cutting of slopes
• Retaining walls
• Passive measures
• Remedial measures
21
N
Niraj Singh Parihar
Kala Venkata Uday
Musaib Ahmad
SUVAM DAS
Raghvendra Singh
Manish Sharma
Pavan Vispute
A
46 others
C
Civil Engineering Depar...
11:36 | tqf-xwpa-vtw
55

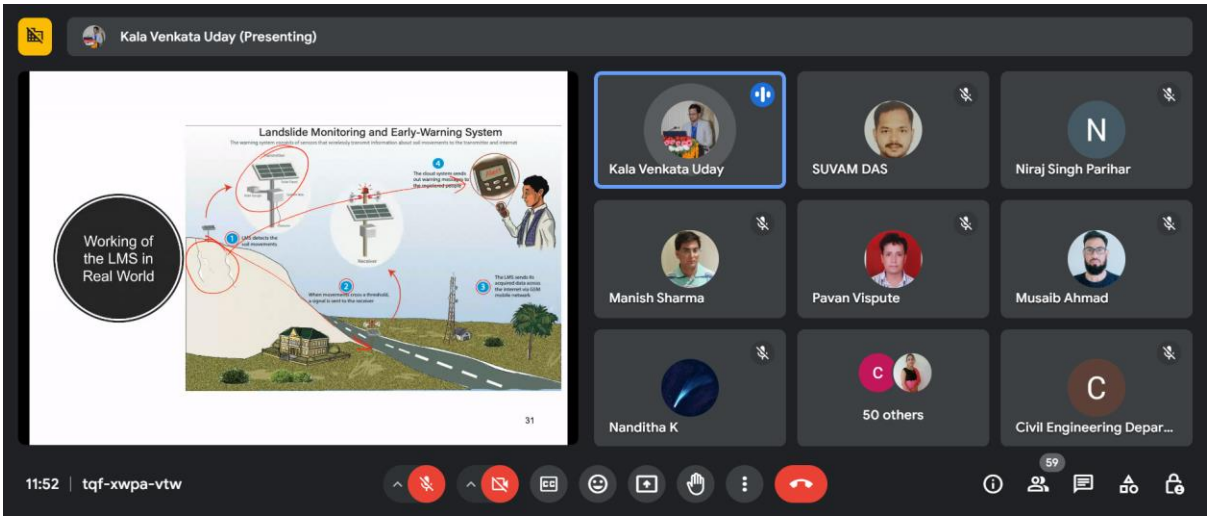

Kala Venkata Uday (Presenting)
Structural Mitigation measures
• Active measures:
• Engineered cutting of slopes
• Retaining walls
• Nailing
• Passive measures
• Nets
• Remedial measures
21
N
Niraj Singh Parihar
Kala Venkata Uday
Musaib Ahmad
SUVAM DAS
Raghvendra Singh
Manish Sharma
Pavan Vispute
A
46 others
C
Civil Engineering Depar...
11:37 | tqf-xwpa-vtw
55

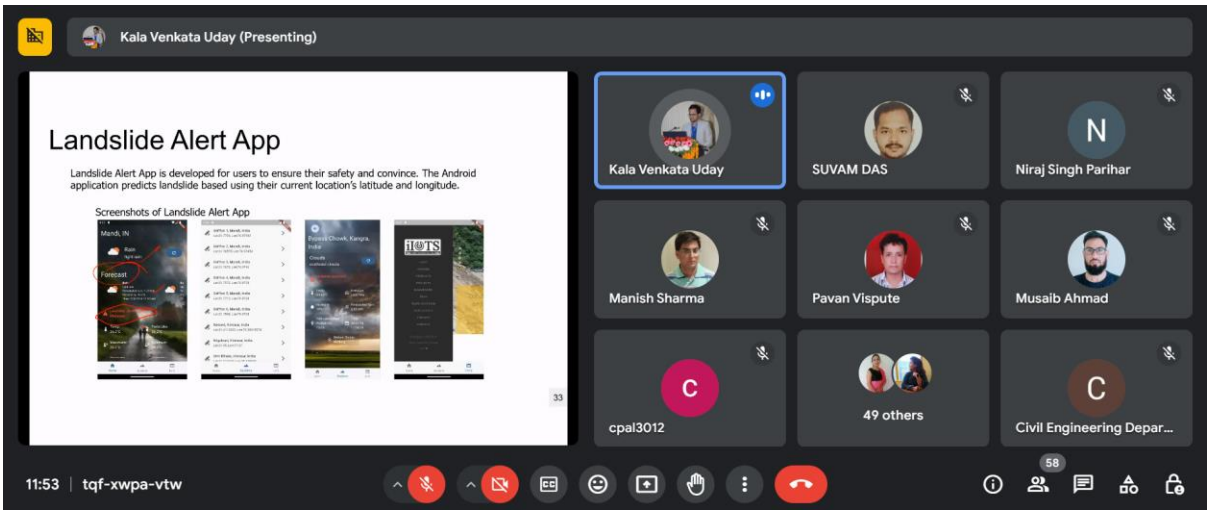

Kala Venkata Uday (Presenting)
Structural Mitigation measures
• Active measures:
• Engineered cutting of slopes
• Retaining walls
• Nailing
• Passive measures
• Nets
• Barriers
• Meshing/Shotcreting
• Early warning system
• Remedial measures
Niraj Singh Parihar
Kala Venkata Uday
Musaib Ahmad
SUVAM DAS
Raghvendra Singh
Manish Sharma
Pavan Vispute
47 others
Civil Engineering Depar...
11:37 | tqf-xwpa-vtw
Search

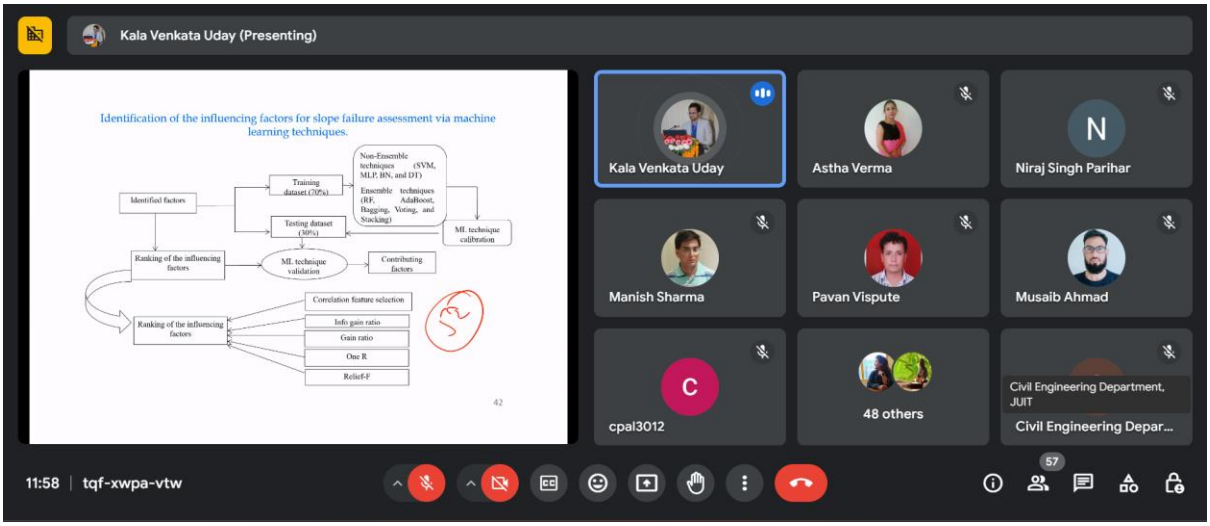

Kala Venkata Uday (Presenting)
Landslide Monitoring System (LMS)
Temperature/Humidity
Atmospheric Pressure
Light Intensity
Rain Gauge
Capacitive Soil Moisture
Accelerometer/Gyroscope
Kala Venkata Uday
SUVAM DAS
Niraj Singh Parihar
Aibankhrawbok Syiem
Manish Sharma
Pavan Vispute
Musaib Ahmad
49 others
Civil Engineering Depar...
11:43 | tqf-xwpa-vtw

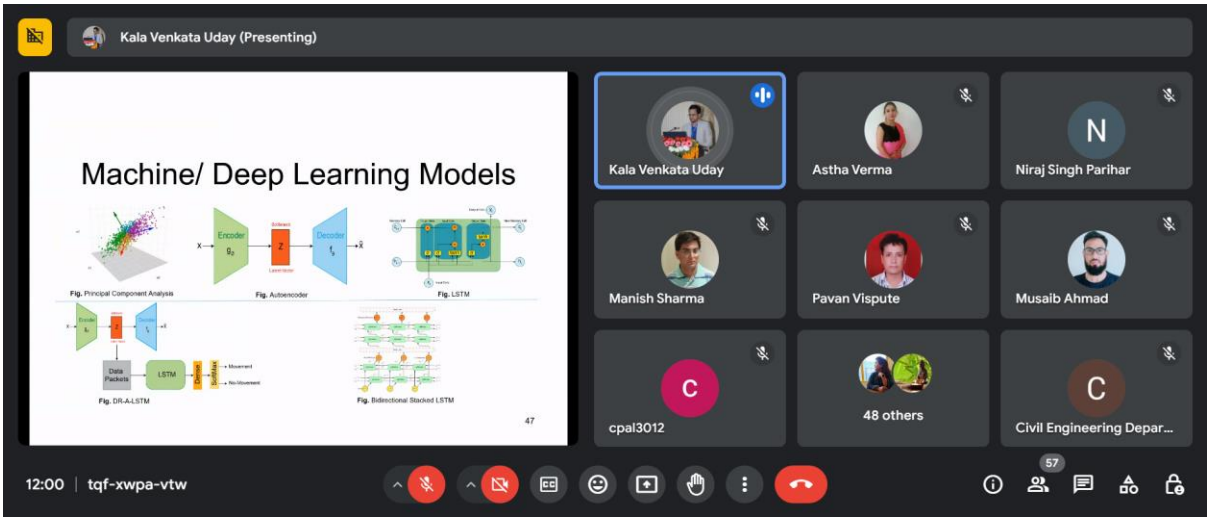

Kala Venkata Uday (Presenting)
Displacement Profile from Accelerometer and Camera
Camera(cm)
Calculation(cm)
Displacement (cm)
Time (s)
Fig. Showing Displacement calculated from the values of accelerations and from frames captured by the camera.
Fig. The best performing BS-LSTM model showing the soil movement (in meters) over the Kumarhatti's training and testing dataset (Praveen et al. 2021)
27
Kala Venkata Uday
SUVAM DAS
Niraj Singh Parihar
Aibankhrawbok Syiem
Manish Sharma
Pavan Vispute
Musaib Ahmad
52 others
Civil Engineering Depar...
11:48 | tqf-xwpa-vtw


Kala Venkata Uday (Presenting)
Alert Generation
Monitoring
Predicting
Warning
Fig. A framework of alert generation in real-world environment
Fig. Map view of the landslide monitoring system location
28
Kala Venkata Uday
SUVAM DAS
Niraj Singh Parihar
Aibankhrawbok Syiem
Manish Sharma
Pavan Vispute
Musaib Ahmad
52 others
Civil Engineering Depar...
11:49 | tqf-xwpa-vtw


Kala Venkata Uday (Presenting)
Landslide Monitoring and Early-Warning System
Working of the LMS in Real World
31
Kala Venkata Uday
SUVAM DAS
Niraj Singh Parihar
Manish Sharma
Pavan Vispute
Musaib Ahmad
Nanditha K
50 others
Civil Engineering Depar...
11:52 | tqf-xwpa-vtw


Kala Venkata Uday (Presenting)
Landslide Alert App
Landslide Alert App is developed for users to ensure their safety and convince. The Android application predicts landslide based using their current location's latitude and longitude.
Screenshots of Landslide Alert App
33
Kala Venkata Uday
SUVAM DAS
Niraj Singh Parihar
Manish Sharma
Pavan Vispute
Musaib Ahmad
cpal3012
49 others
Civil Engineering Depar...
11:53 | tqf-xwpa-vtw


Kala Venkata Uday (Presenting)
Identification of the influencing factors for slope failure assessment via machine learning techniques.
Identified factors
Training dataset (70%)
Testing dataset (30%)
Non-Ensemble techniques (SVM, MLP, RN, and DT)
Ensemble techniques (RF, AdaBoost, Bagging, Voting, and Stacking)
ML technique calibration
Ranking of the influencing factors
ML technique validation
Contributing factors
Correlation feature selection
Info gain ratio
Gain ratio
One R
Relief-F
42
Kala Venkata Uday
Astha Verma
Niraj Singh Parihar
Manish Sharma
Pavan Vispute
Musaib Ahmad
cpal3012
48 others
Civil Engineering Department, JUIT
Civil Engineering Depar...
11:58 | tqf-xwpa-vtw
57


Kala Venkata Uday (Presenting)
Machine/ Deep Learning Models
Fig. Principal Component Analysis
Fig. Autoencoder
Fig. LSTM
Fig. DR-A-LSTM
Fig. Bidirectional Stacked LSTM
47
Kala Venkata Uday
Astha Verma
Niraj Singh Parihar
Manish Sharma
Pavan Vispute
Musaib Ahmad
cpal3012
48 others
Civil Engineering Depar...
12:00 | tqf-xwpa-vtw
57

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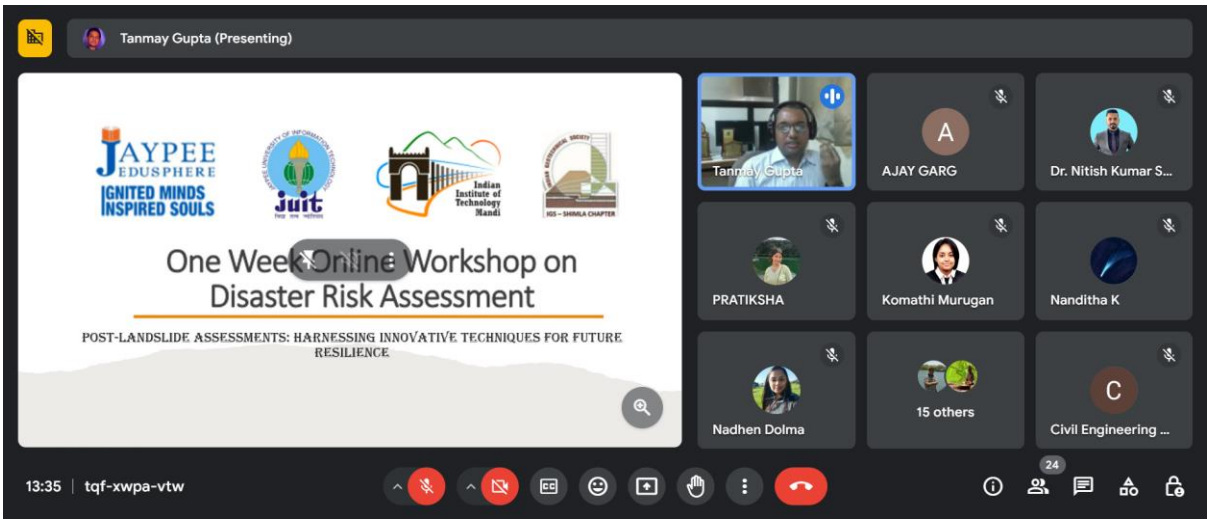
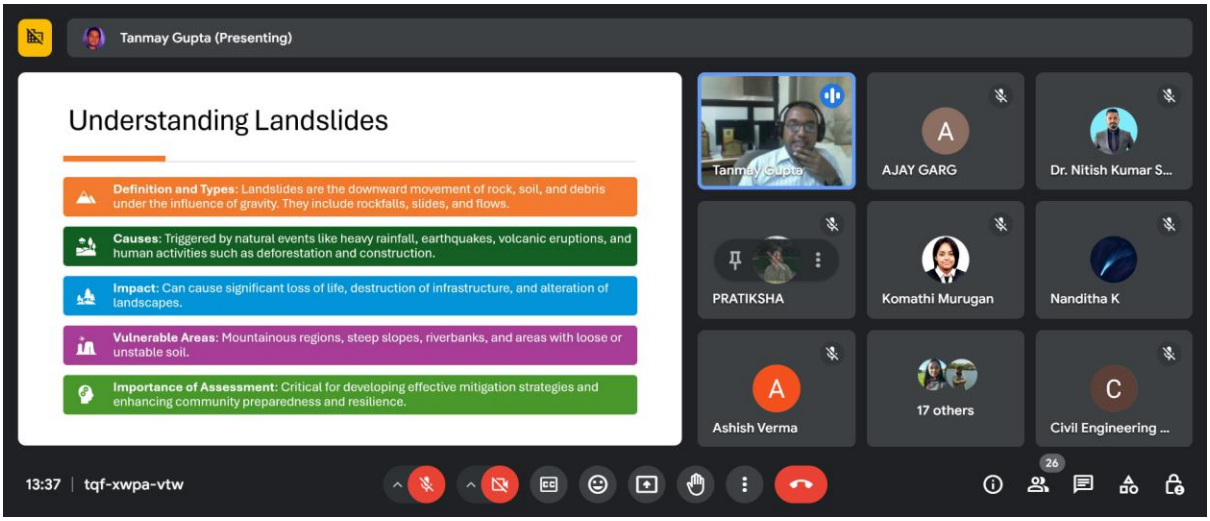
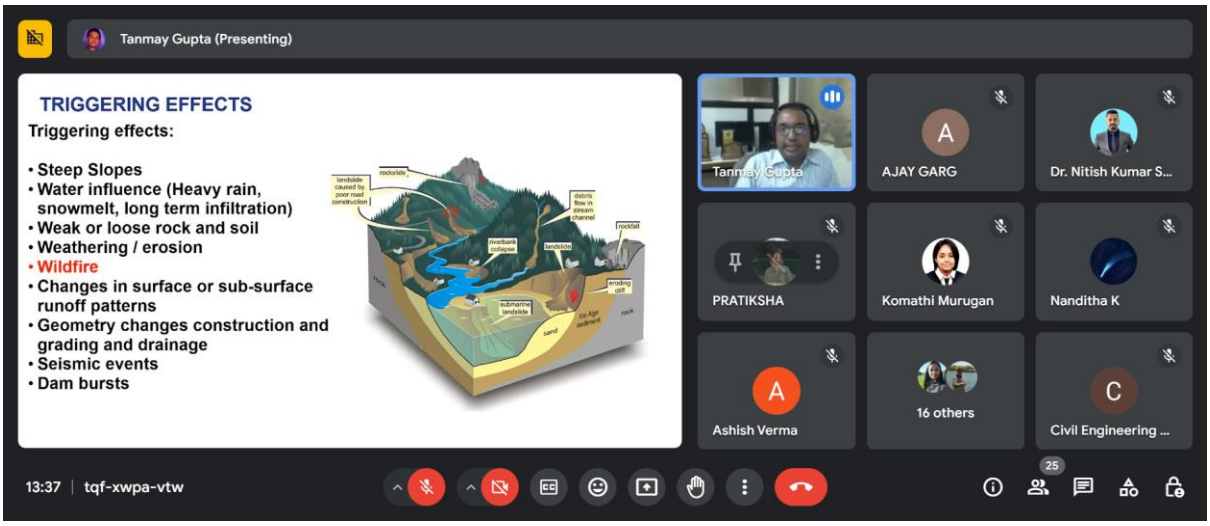
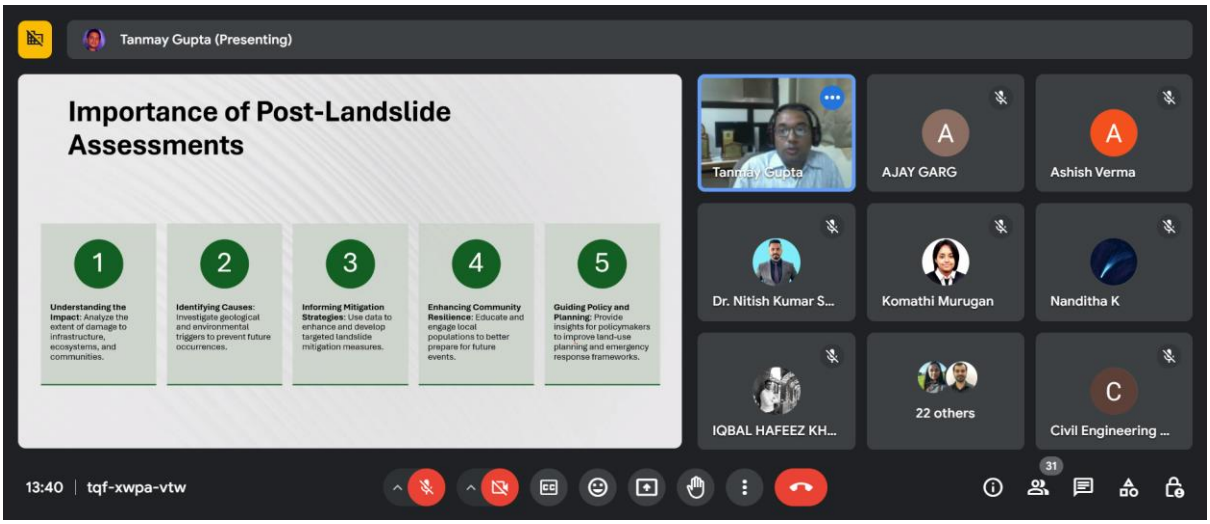
(Established by H.P. State Legislature vide Act No. 14 of 2002)

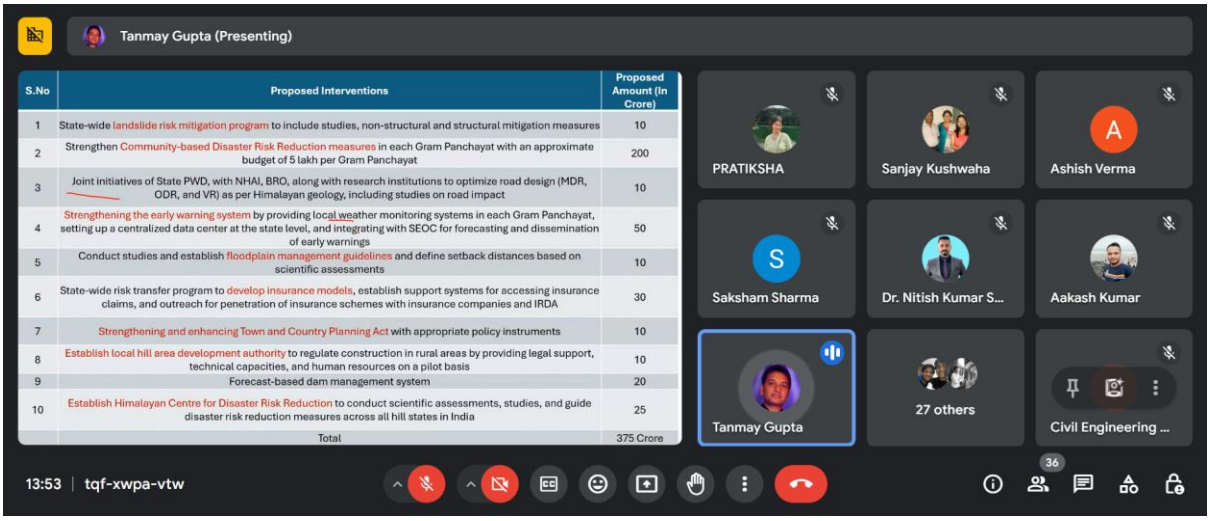


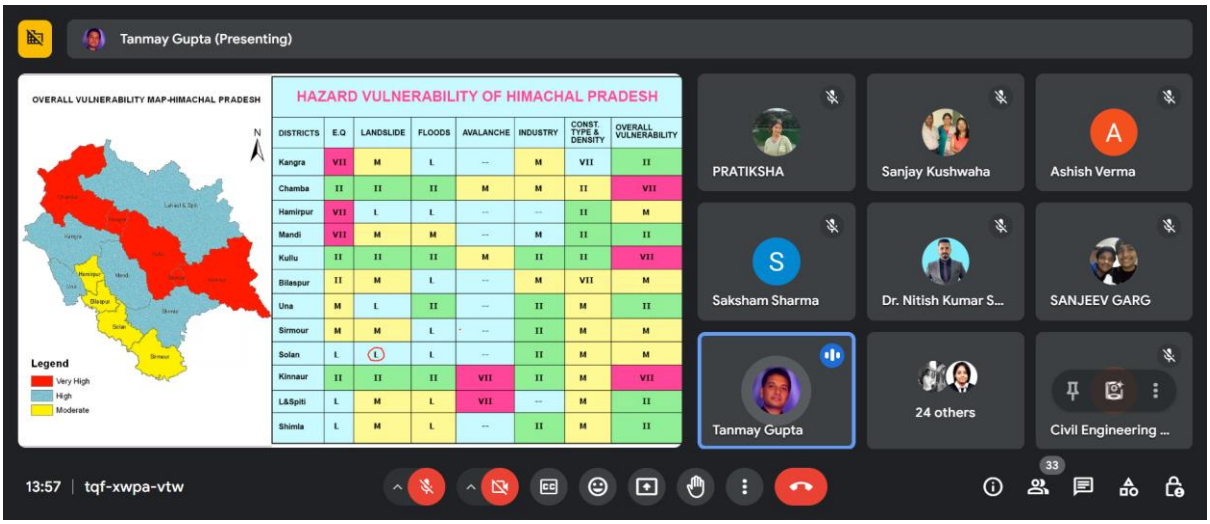



Tanmay Gupta (Presenting)
TRIGGERING EFFECTS
Triggering effects:
• Steep Slopes
• Water influence (Heavy rain, snowmelt, long term infiltration)
• Weak or loose rock and soil
• Weathering / erosion
• Wildfire
• Changes in surface or sub-surface runoff patterns
• Geometry changes construction and grading and drainage
• Seismic events
• Dam bursts
Tanmay Gupta
AJAY GARG
Dr. Nitish Kumar S...
PRATIKSHA
Komathi Murugan
Nanditha K
Ashish Verma
16 others
Civil Engineering ...
13:37 | tqf-xwpa-vtw

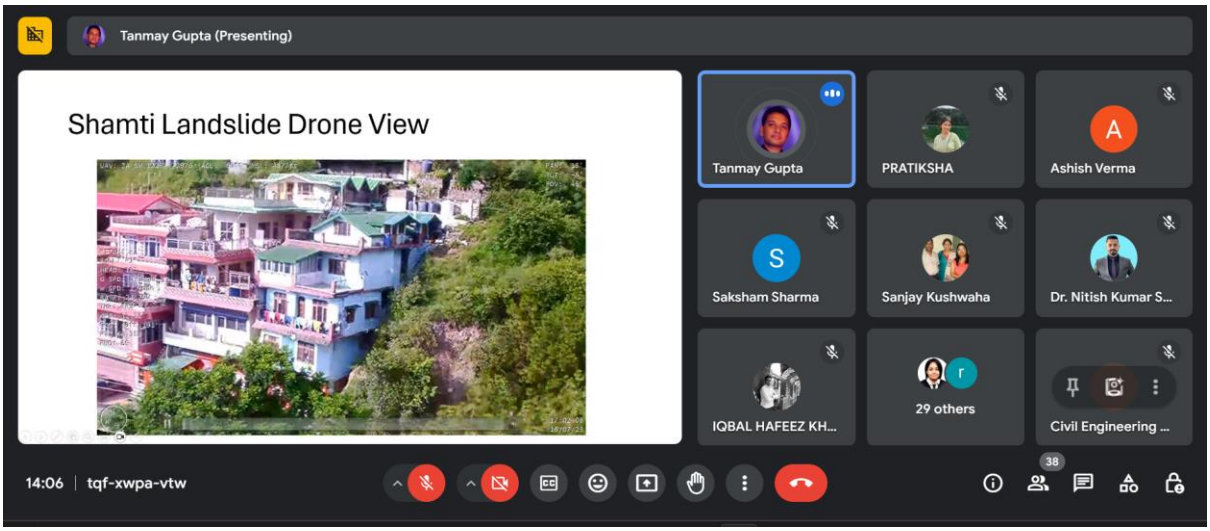

Tanmay Gupta (Presenting)
Importance of Post-Landslide Assessments
1
Understanding the Impact: Analyze the extent of damage to infrastructure, ecosystems, and communities.
2
Identifying Causes: Investigate geological and environmental triggers to prevent future occurrences.
3
Informing Mitigation Strategies: Use data to enhance and develop targeted landslide mitigation measures.
4
Enhancing Community Resilience: Educate and engage local populations to better prepare for future events.
5
Guiding Policy and Planning: Provide insights for policymakers to improve land-use planning and emergency response frameworks.
Tanmay Gupta
AJAY GARG
Ashish Verma
Dr. Nitish Kumar S...
Komathi Murugan
Nanditha K
IQBAL HAFEEZ KH...
22 others
Civil Engineering ...
13:40 | tqf-xwpa-vtw

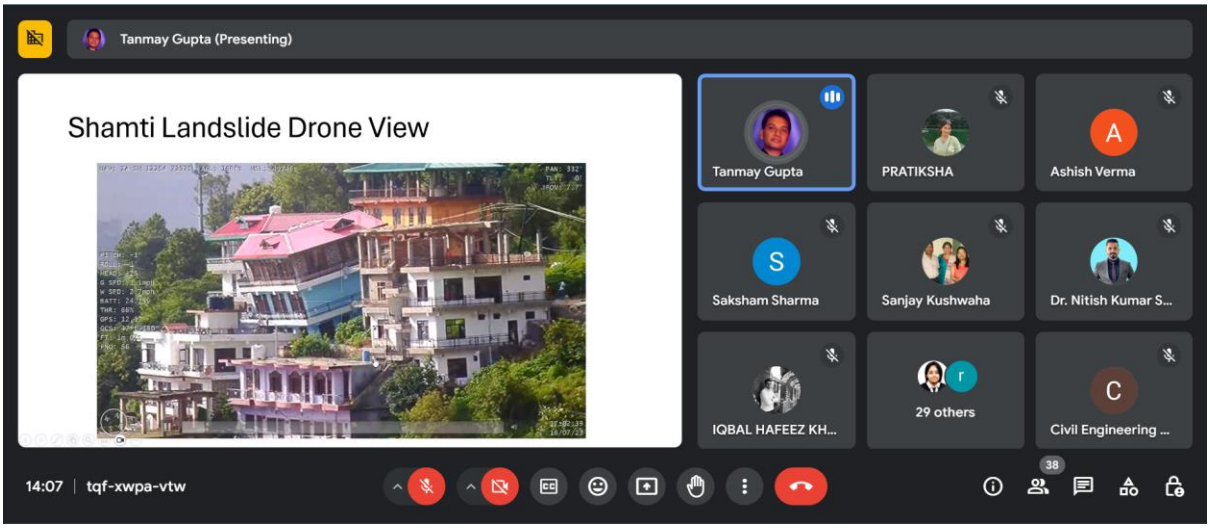

Tanmay Gupta (Presenting)
Unprecedented Rains 2023
State witnessed three different spells of very high precipitation during 7-11 July 2023 (Ist spell), 11-14 August 2023 (IInd spell) and 21-23 August 2023 (IIIrd spell) causing widespread damage across the State. From July 7th to 11th, 2023, Himachal Pradesh experienced intense monsoon activity, resulting in widespread, heavy to extremely heavy rainfall across most of the state.
Historically, during the monsoon season (June-September) from 1971-2020, the state averaged a rainfall of 734.4 mm. remarkably, in just four days, from July 7th to 11th, 2023, the state recorded 223 mm of rainfall, a staggering 436% above the typical amount of 41.6 mm for such a period
Tanmay Gupta
AJAY GARG
Ashish Verma
Dr. Nitish Kumar S...
Komathi Murugan
PRATIKSHA
IQBAL HAFEEZ KH...
23 others
Civil Engineering ...
13:41 | tqf-xwpa-vtw
32

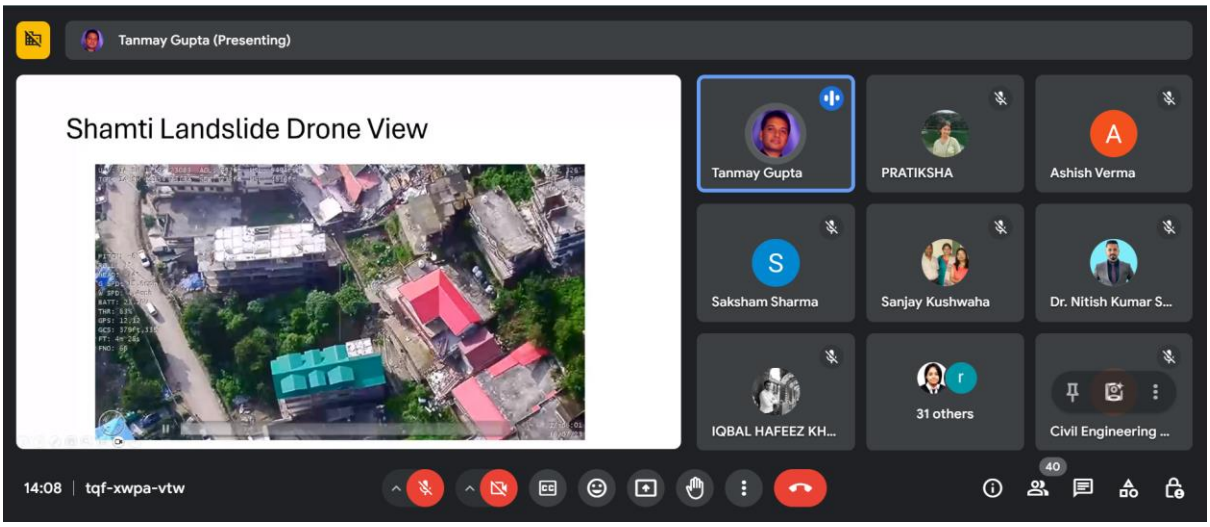

Tanmay Gupta (Presenting)
S.No
Proposed Interventions
Proposed Amount (In Crore)
1 State-wide landslide risk mitigation program to include studies, non-structural and structural mitigation measures 10
2 Strengthen Community-based Disaster Risk Reduction measures in each Gram Panchayat with an approximate budget of 5 lakh per Gram Panchayat 200
3 Joint initiatives of State PWD, with NHAI, BRO, along with research institutions to optimize road design (MDR, ODR, and VR) as per Himalayan geology, including studies on road impact 10
4 Strengthening the early warning system by providing local weather monitoring systems in each Gram Panchayat, setting up a centralized data center at the state level, and integrating with SEOC for forecasting and dissemination of early warnings 50
5 Conduct studies and establish floodplain management guidelines and define setback distances based on scientific assessments 10
6 State-wide risk transfer program to develop insurance models, establish support systems for accessing insurance claims, and outreach for penetration of insurance schemes with insurance companies and IRDA 30
7 Strengthening and enhancing Town and Country Planning Act with appropriate policy instruments 10
8 Establish local hill area development authority to regulate construction in rural areas by providing legal support, technical capacities, and human resources on a pilot basis 10
9 Forecast-based dam management system 20
10 Establish Himalayan Centre for Disaster Risk Reduction to conduct scientific assessments, studies, and guide disaster risk reduction measures across all hill states in India 25
Total 375 Crore
PRATIKSHA
Sanjay Kushwaha
Ashish Verma
Saksham Sharma
Dr. Nitish Kumar S...
Aakash Kumar
Tanmay Gupta
27 others
Civil Engineering ...
13:53 | tqf-xwpa-vtw
36

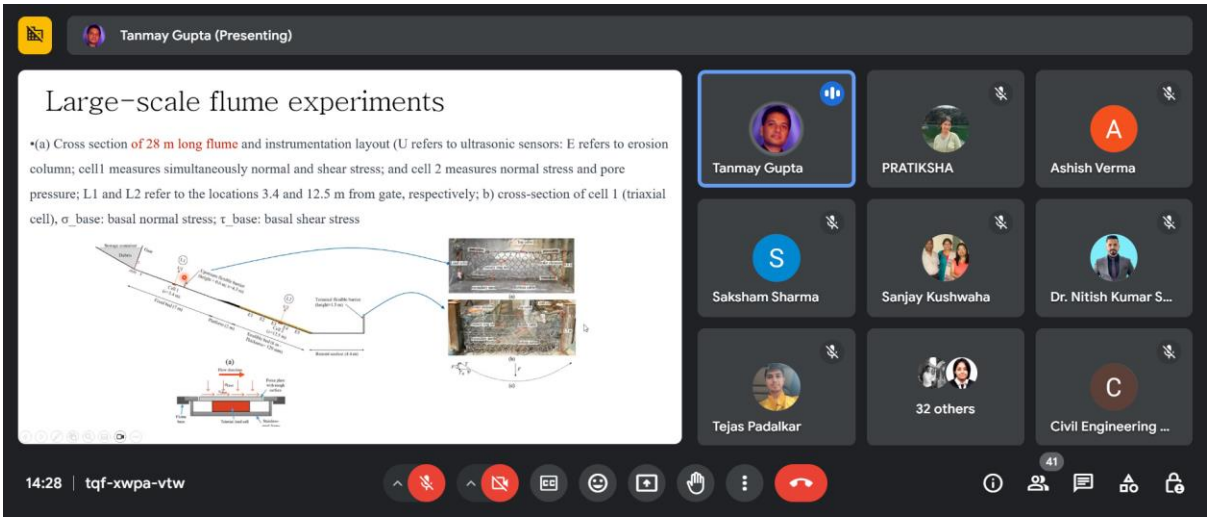


DISTRICTS	E.Q	LANDSLIDE	FLOODS	AVALANCHE	INDUSTRY	CONST. TYPE & DENSITY	OVERALL VULNERABILITY
Kangra	VII	M	L	--	M	VII	II
Chamba	II	II	II	M	M	II	VII
Hamirpur	VII	L	L	--	--	II	M
Mandi	VII	M	M	--	M	II	II
Kullu	II	II	II	M	II	II	VII
Bilaspur	II	M	L	--	M	VII	M
Una	M	L	II	--	II	M	II
Sirmour	M	M	L	--	II	M	M
Solan	L	L	L	--	II	M	M
Kinnaur	II	II	II	VII	II	M	VII
L&Spiti	L	M	L	VII	--	M	II
Shimla	L	M	L	--	II	M	II

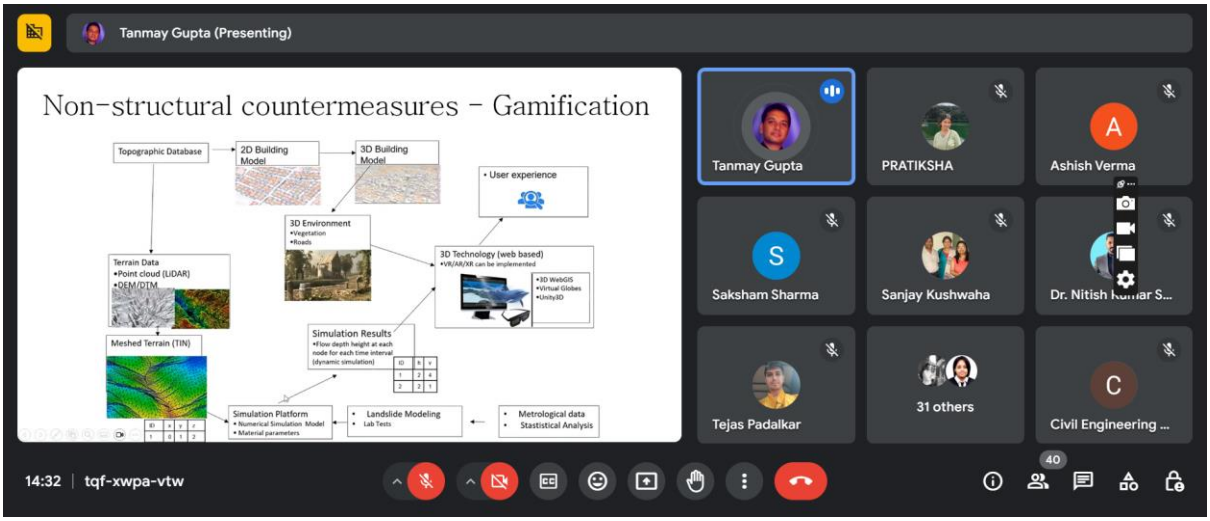



Tanmay Gupta (Presenting)
Shamti Landslide Drone View
Tanmay Gupta
PRATIKSHA
Ashish Verma
Saksham Sharma
Sanjay Kushwaha
Dr. Nitish Kumar S...
IQBAL HAFEEZ KH...
29 others
Civil Engineering ...
14:07 | tqf-xwpa-vtw

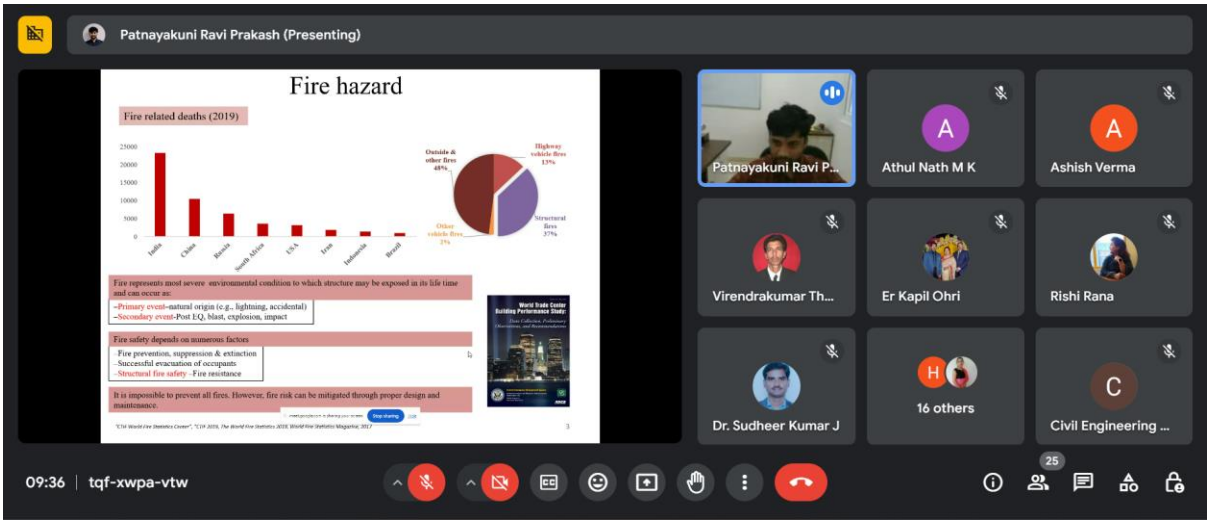

Tanmay Gupta (Presenting)
Shamti Landslide Drone View
Tanmay Gupta
PRATIKSHA
Ashish Verma
Saksham Sharma
Sanjay Kushwaha
Dr. Nitish Kumar S...
IQBAL HAFEEZ KH...
31 others
Civil Engineering ...
14:08 | tqf-xwpa-vtw

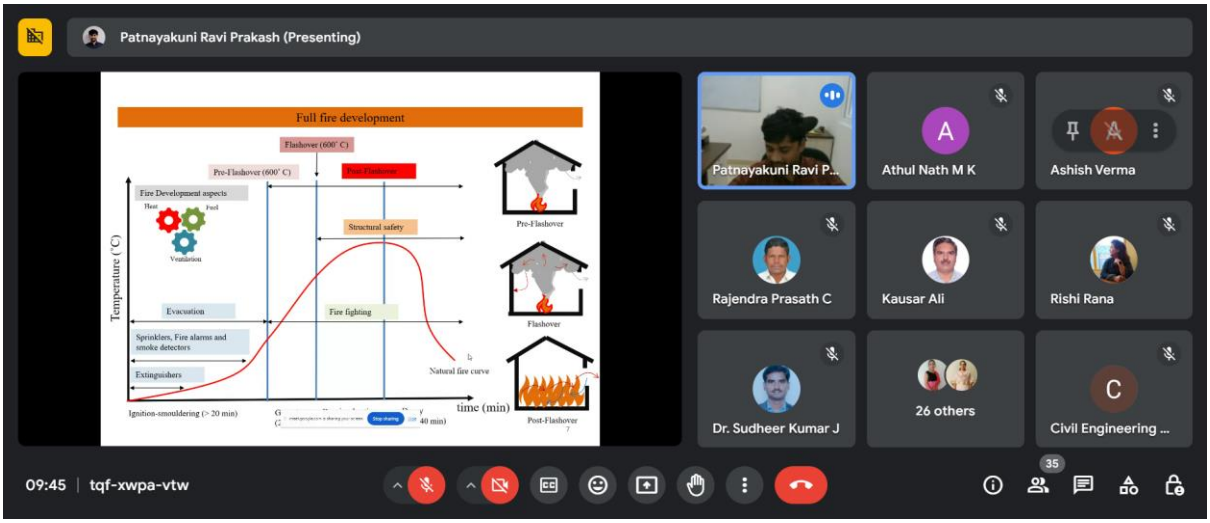

Tanmay Gupta (Presenting)
Large-scale flume experiments
•(a) Cross section of 28 m long flume and instrumentation layout (U refers to ultrasonic sensors: E refers to erosion column; cell1 measures simultaneously normal and shear stress; and cell 2 measures normal stress and pore pressure; L1 and L2 refer to the locations 3.4 and 12.5 m from gate, respectively; b) cross-section of cell 1 (triaxial cell), σ_base: basal normal stress; τ_base: basal shear stress
Tanmay Gupta
PRATIKSHA
Ashish Verma
Saksham Sharma
Sanjay Kushwaha
Dr. Nitish Kumar S...
Tejas Padalkar
32 others
Civil Engineering ...
14:28 | tqf-xwpa-vtw

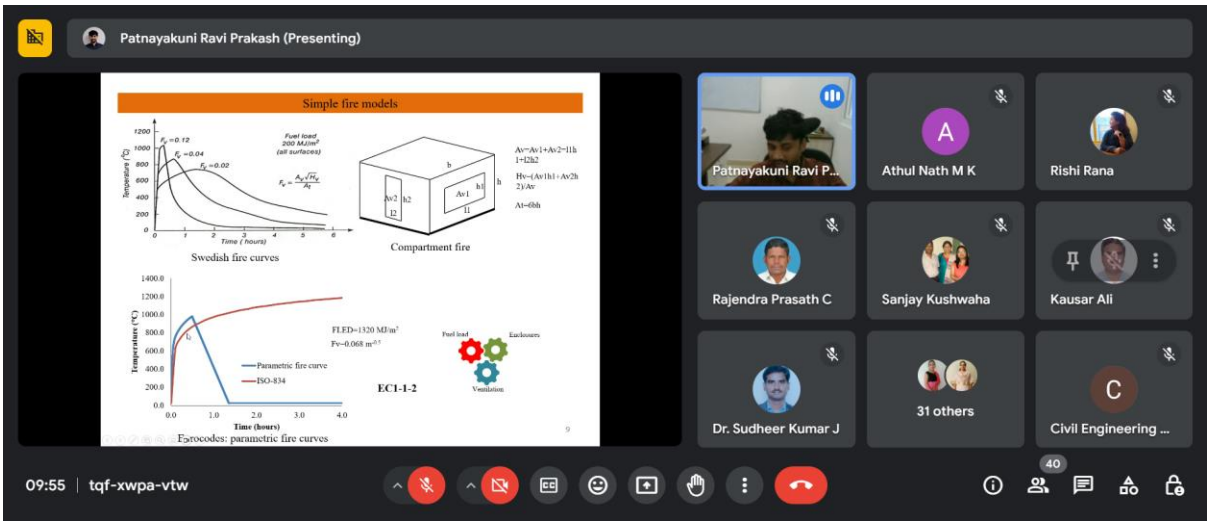

Tanmay Gupta (Presenting)
Risk Communication by Gamification
01 WP1: Creating realistic data
02 WP2: Creating realistic Flood simulations
03 WP3: Creating realistic Landslide simulations
04 WP4: Creating VR user experience
05 WP5: Creating Human Behavior
Tanmay Gupta
PRATIKSHA
Ashish Verma
Saksham Sharma
Sanjay Kushwaha
Tejas Padalkar
31 others
Civil Engineering ...
14:31 | tqf-xwpa-vtw


Tanmay Gupta (Presenting)
Non-structural countermeasures – Gamification
Topographic Database
2D Building Model
3D Building Model
User experience
3D Environment
Terrain Data
Point cloud (LiDAR)
DEM/DTM
3D Technology (web based)
Meshed Terrain (TIN)
Simulation Results
Simulation Platform
Landslide Modeling
Metrological data
Statistical Analysis
Tanmay Gupta
PRATIKSHA
Ashish Verma
Saksham Sharma
Sanjay Kushwaha
Tejas Padalkar
31 others
Civil Engineering ...
14:32 | tqf-xwpa-vtw

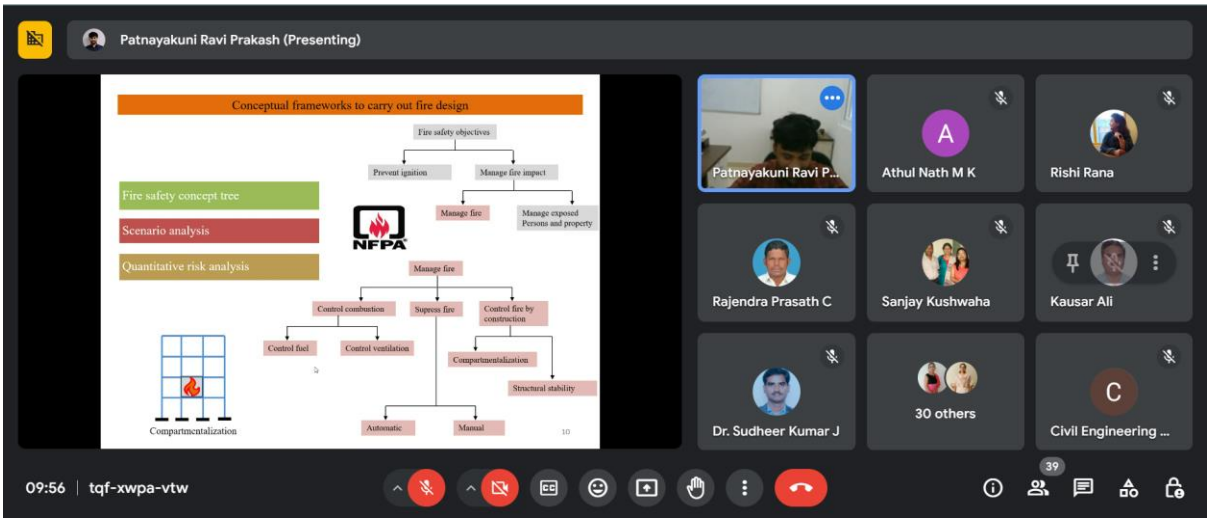
Day 4:

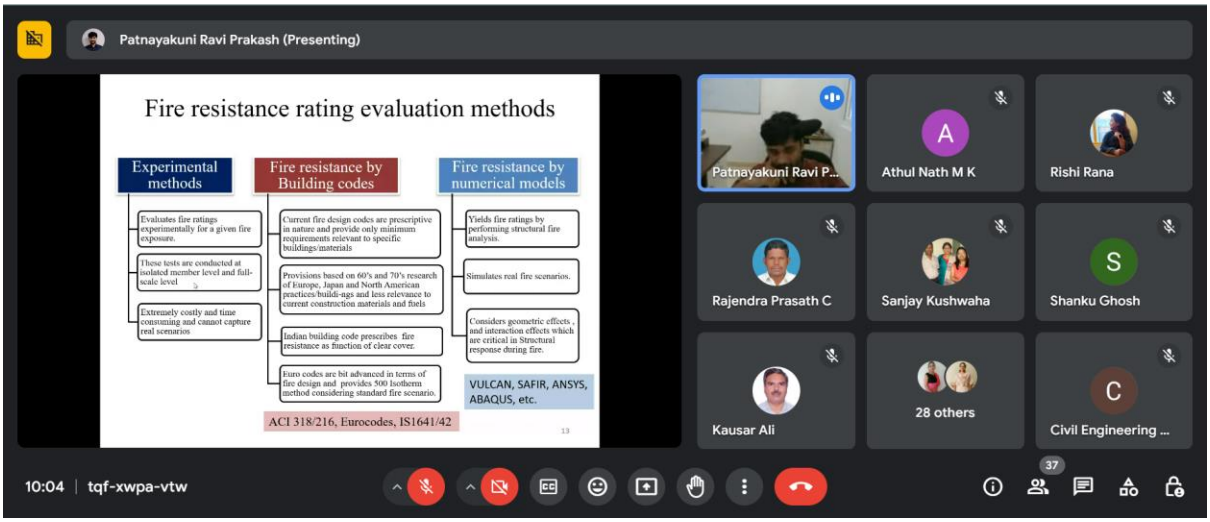

Patnayakuni Ravi Prakash (Presenting)
Fire hazard
Fire related deaths (2019)
Fire represents most severe environmental condition to which structure may be exposed in its life time and can occur as:
Primary event-natural origin (e.g., lightning, accidental)
Secondary event-Post EQ, blast, explosion, impact
Fire safety depends on numerous factors
Fire prevention, suppression & extinction
Successful evacuation of occupants
Structural fire safety - Fire resistance
It is impossible to prevent all fires. However, fire risk can be mitigated through proper design and maintenance.
Patnayakuni Ravi P...
Athul Nath M K
Ashish Verma
Virendrakumar Th...
Er Kapil Ohri
Rishi Rana
Dr. Sudheer Kumar J
16 others
Civil Engineering ...
09:36 | tqf-xwpa-vtw

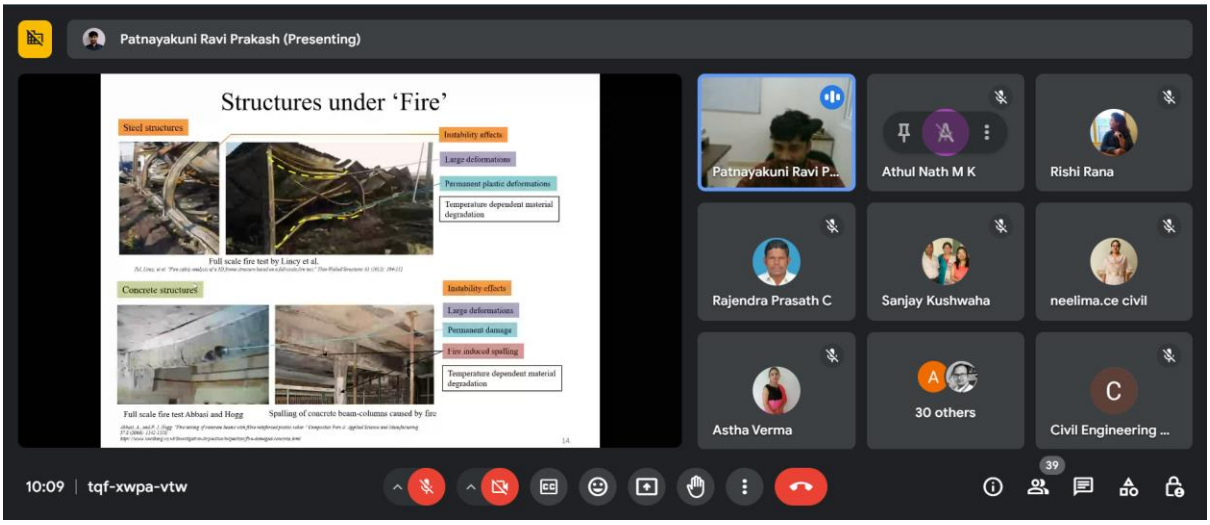

Patnayakuni Ravi Prakash (Presenting)
Full fire development
Flashover (600° C)
Pre-Flashover (600° C)
Post-Flashover
Fire Development aspects
Heat
Fuel
Ventilation
Structural safety
Evacuation
Fire fighting
Sprinklers, Fire alarms and smoke detectors
Extinguishers
Natural fire curve
Temperature (°C)
time (min)
Ignition-smouldering (> 20 min)
40 min)
Pre-Flashover
Flashover
Post-Flashover
Patnayakuni Ravi P...
Athul Nath M K
Ashish Verma
Rajendra Prasath C
Kausar Ali
Rishi Rana
Dr. Sudheer Kumar J
26 others
Civil Engineering ...
09:45 | tqf-xwpa-vtw
35

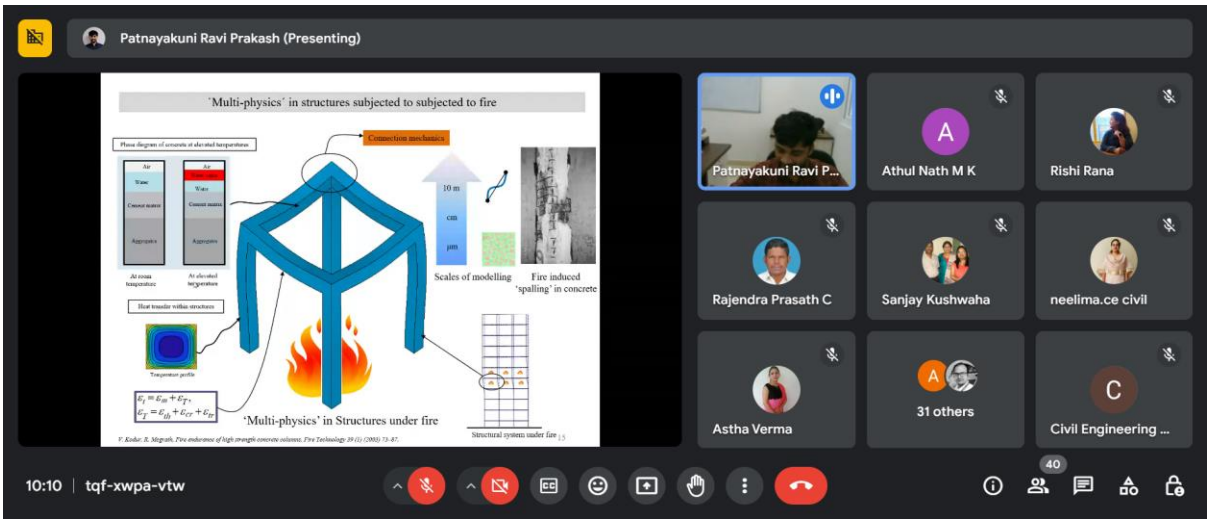

Patnayakuni Ravi Prakash (Presenting)
Simple fire models
Swedish fire curves
Compartment fire
Eurocodes: parametric fire curves
Parametric fire curve
ISO-834
EC1-1-2
Time (hours)
Temperature (°C)
Patnayakuni Ravi P...
Athul Nath M K
Rishi Rana
Rajendra Prasath C
Sanjay Kushwaha
Kausar Ali
Dr. Sudheer Kumar J
31 others
Civil Engineering ...
09:55 | tqf-xwpa-vtw
40

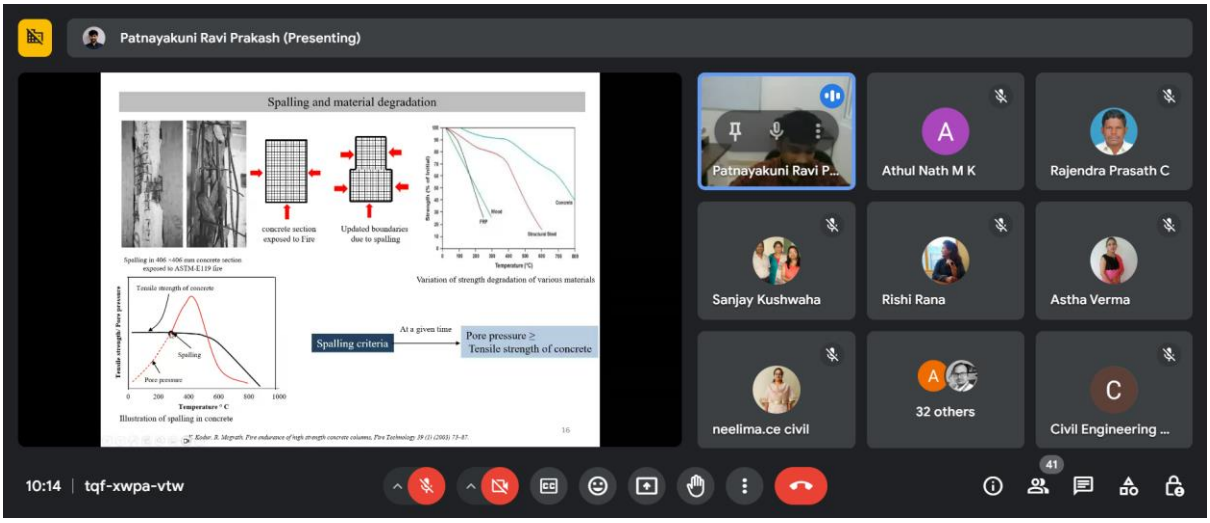
JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY
WAKNAGHAT, P.O. – WAKNAGHAT,
TEHSIL – KANDAGHAT, DISTRICT – SOLAN (H.P.)
PIN – 173234 (INDIA) Phone Number- +91-1792-257999
(Established by H.P. State Legislature vide Act No. 14 of 2002)

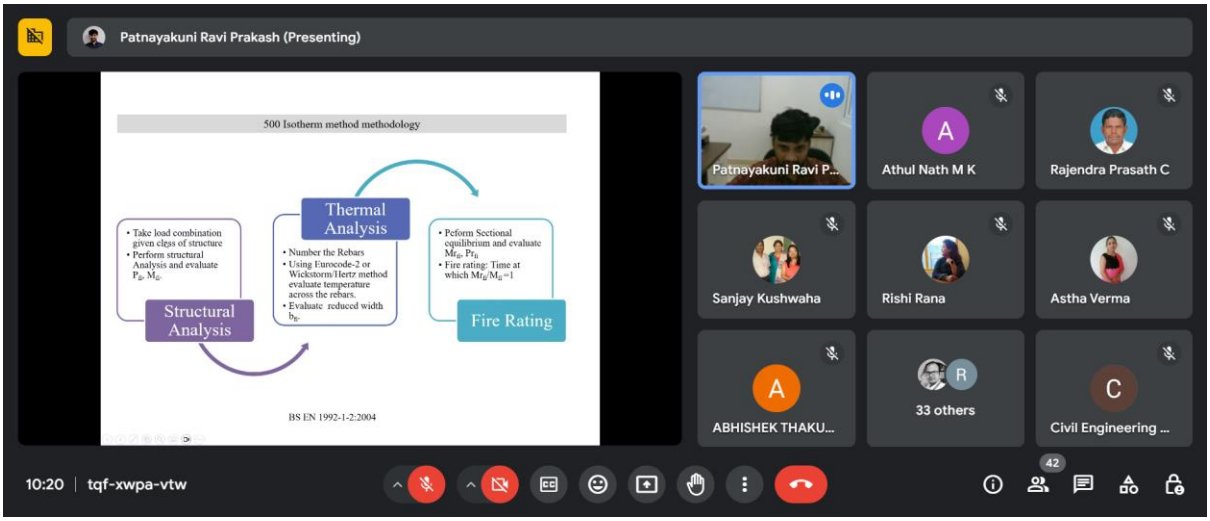


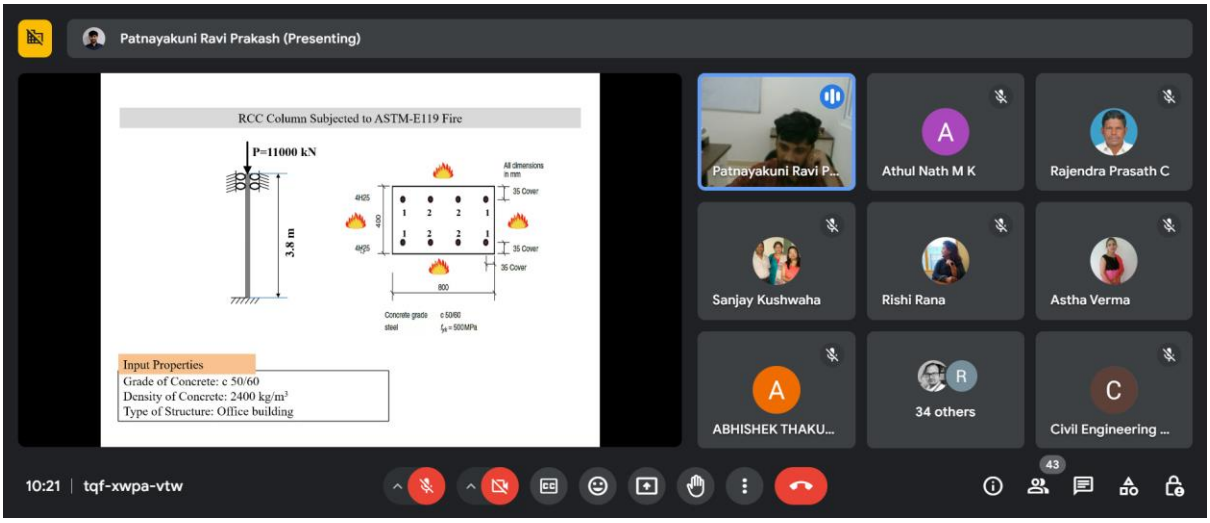


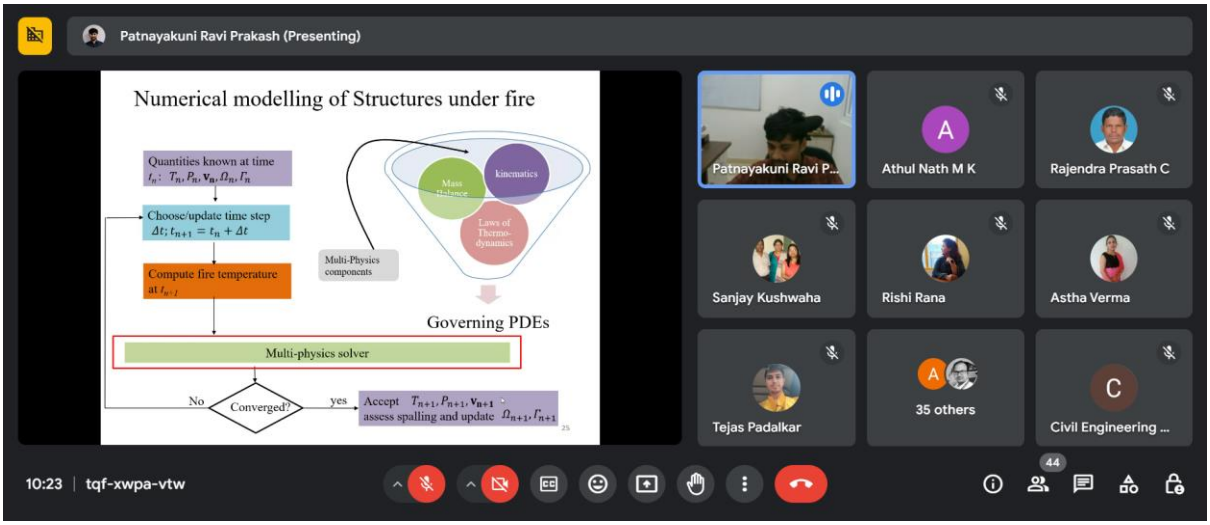

Patnayakuni Ravi Prakash (Presenting)
Structures under 'Fire'
Steel structures
Instability effects
Large deformations
Permanent plastic deformations
Temperature dependent material degradation
Full scale fire test by Lincy et al.
Concrete structures
Instability effects
Large deformations
Permanent damage
Fire induced spalling
Temperature dependent material degradation
Full scale fire test Abbasi and Hogg
Spalling of concrete beam-columns caused by fire
Patnayakuni Ravi P...
Athul Nath M K
Rishi Rana
Rajendra Prasath C
Sanjay Kushwaha
neelima.ce civil
Astha Verma
30 others
Civil Engineering ...
10:09 | tqf-xwpa-vtw

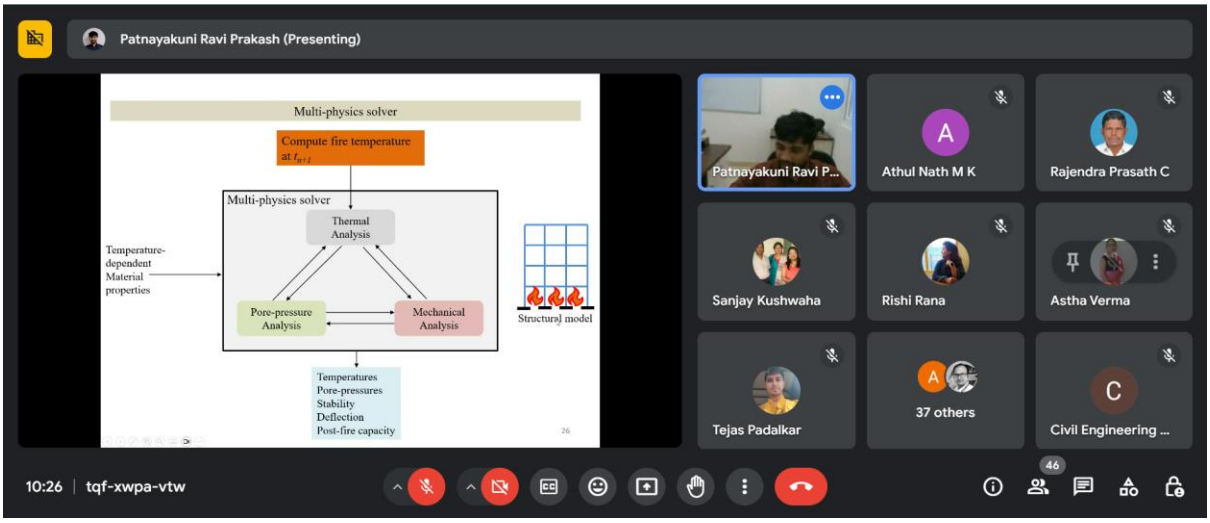

Patnayakuni Ravi Prakash (Presenting)
'Multi-physics' in structures subjected to subjected to fire
Connection mechanics
Scales of modelling
Fire induced 'spalling' in concrete
'Multi-physics' in Structures under fire
Patnayakuni Ravi P...
Athul Nath M K
Rishi Rana
Rajendra Prasath C
Sanjay Kushwaha
neelima.ce civil
Astha Verma
31 others
Civil Engineering ...
10:10 | tqf-xwpa-vtw

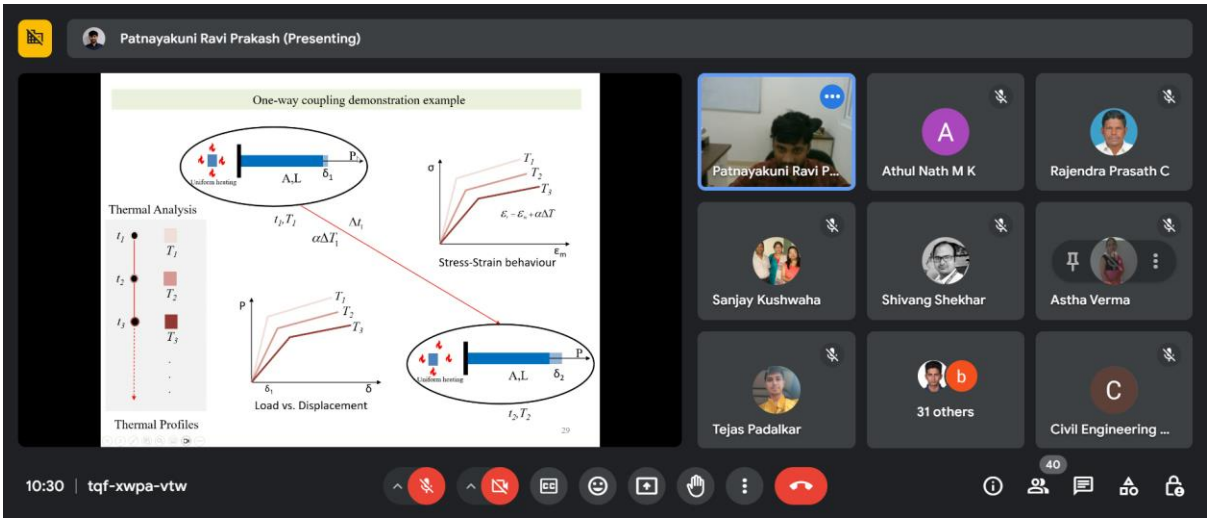

Patnayakuni Ravi Prakash (Presenting)
Spalling and material degradation
concrete section exposed to Fire
Updated boundaries due to spalling
Variation of strength degradation of various materials
Tensile strength of concrete
Spalling
Pore pressure
Temperature ° C
Illustration of spalling in concrete
Spalling criteria
At a given time
Pore pressure ≥ Tensile strength of concrete
16
Patnayakuni Ravi P...
Athul Nath M K
Rajendra Prasath C
Sanjay Kushwaha
Rishi Rana
Astha Verma
neelima.ce civil
32 others
Civil Engineering ...
10:14 | tqf-xwpa-vtw

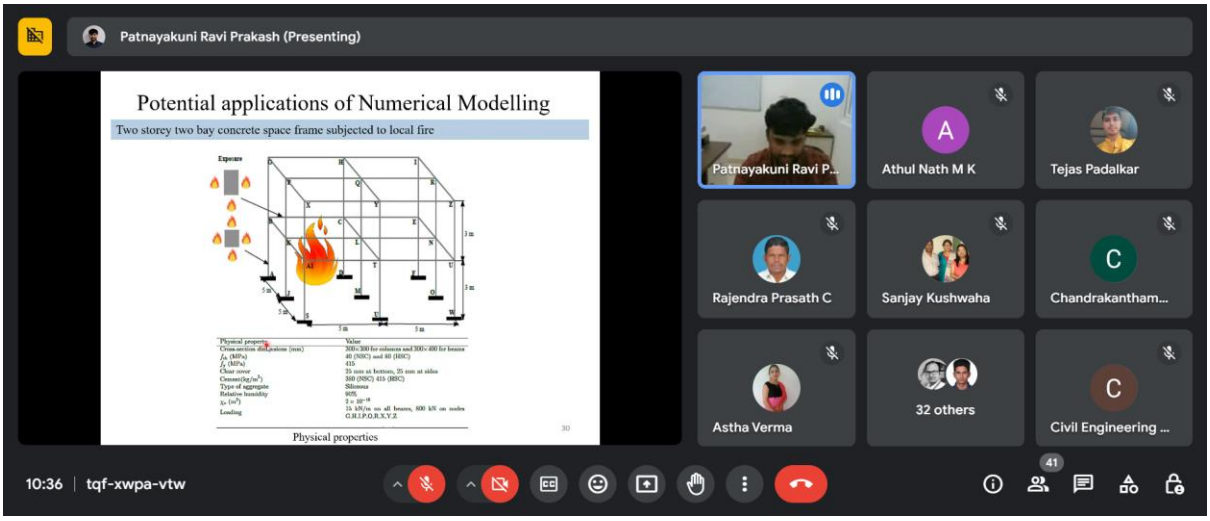

Patnayakuni Ravi Prakash (Presenting)
500 Isotherm method methodology
Take load combination given clgs of structure
Perform structural Analysis and evaluate
Structural Analysis
Thermal Analysis
Number the Rebars
Using Eurocode-2 or Wickstorm/Hertz method evaluate temperature across the rebars.
Evaluate reduced width
Peform Sectional equilibrium and evaluate
Fire rating: Time at which
Fire Rating
BS EN 1992-1-2:2004
Patnayakuni Ravi P...
Athul Nath M K
Rajendra Prasath C
Sanjay Kushwaha
Rishi Rana
Astha Verma
ABHISHEK THAKU...
33 others
Civil Engineering ...
10:20 | tqf-xwpa-vtw

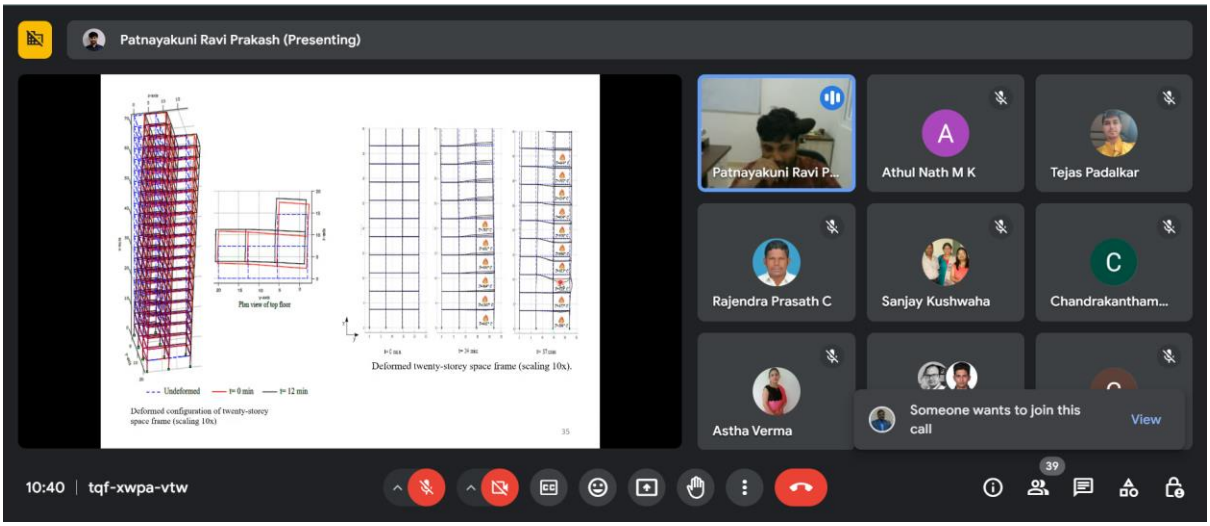

Patnayakuni Ravi Prakash (Presenting)
RCC Column Subjected to ASTM-E119 Fire
P=11000 kN
3.8 m
All dimensions in mm
35 Cover
800
Concrete grade c 50/60
Input Properties
Grade of Concrete: c 50/60
Density of Concrete: 2400 kg/m³
Type of Structure: Office building
Patnayakuni Ravi P...
Athul Nath M K
Rajendra Prasath C
Sanjay Kushwaha
Rishi Rana
Astha Verma
ABHISHEK THAKU...
34 others
Civil Engineering ...
10:21 | tqf-xwpa-vtw

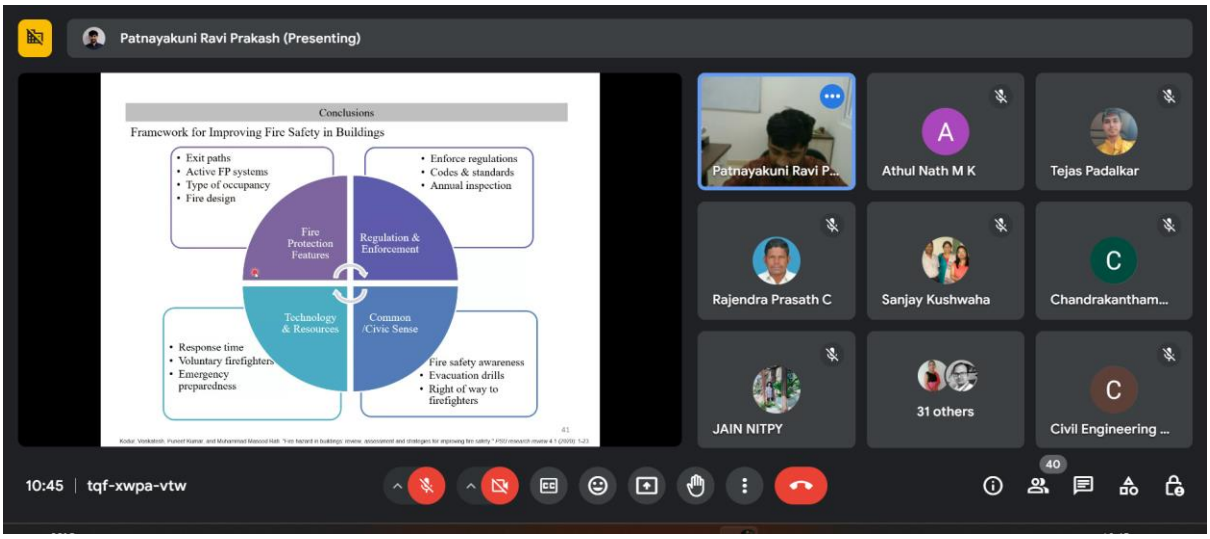

Patnayakuni Ravi Prakash (Presenting)
Numerical modelling of Structures under fire
Quantities known at time
Choose/update time step
Compute fire temperature
Multi-Physics components
Mass Balance
kinematics
Laws of Thermo-dynamics
Governing PDEs
Multi-physics solver
No
Converged?
yes
Accept
assess spalling and update
Patnayakuni Ravi P...
Athul Nath M K
Rajendra Prasath C
Sanjay Kushwaha
Rishi Rana
Astha Verma
Tejas Padalkar
35 others
Civil Engineering ...
10:23 | tqf-xwpa-vtw

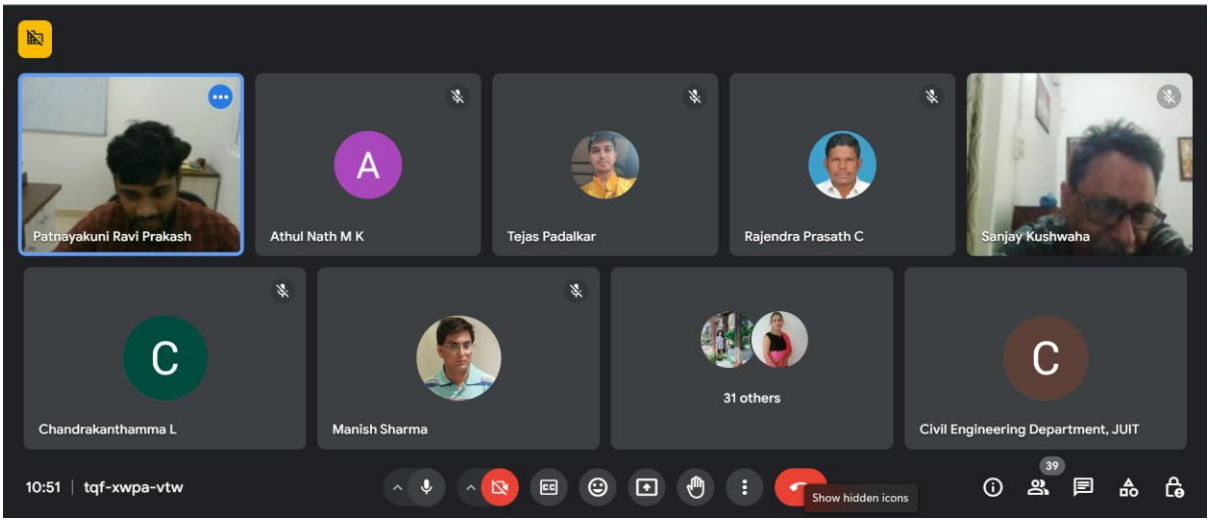

Patnayakuni Ravi Prakash (Presenting)
Multi-physics solver
Compute fire temperature at t_{n+1}
Multi-physics solver
Thermal Analysis
Temperature-dependent Material properties
Pore-pressure Analysis
Mechanical Analysis
Structural model
Temperatures
Pore-pressures
Stability
Deflection
Post-fire capacity
26
Patnayakuni Ravi P...
Athul Nath M K
Rajendra Prasath C
Sanjay Kushwaha
Rishi Rana
Astha Verma
Tejas Padalkar
37 others
Civil Engineering ...
10:26 | tqf-xwpa-vtw
46

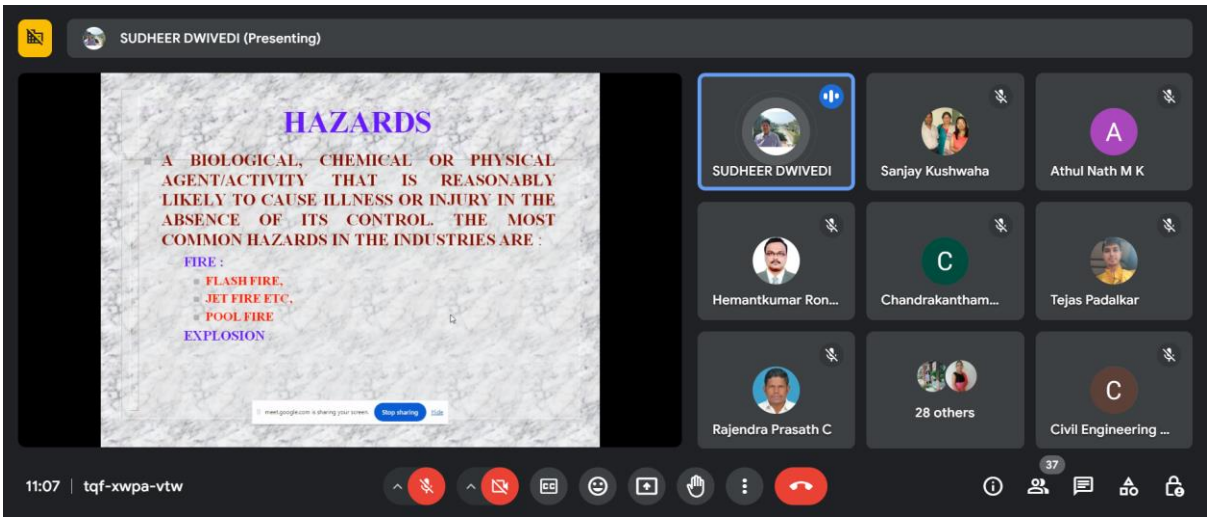

Patnayakuni Ravi Prakash (Presenting)
One-way coupling demonstration example
Thermal Analysis
Stress-Strain behaviour
Load vs. Displacement
Thermal Profiles
29
Patnayakuni Ravi P...
Athul Nath M K
Rajendra Prasath C
Sanjay Kushwaha
Shivang Shekhar
Astha Verma
Tejas Padalkar
31 others
Civil Engineering ...
10:30 | tqf-xwpa-vtw
40

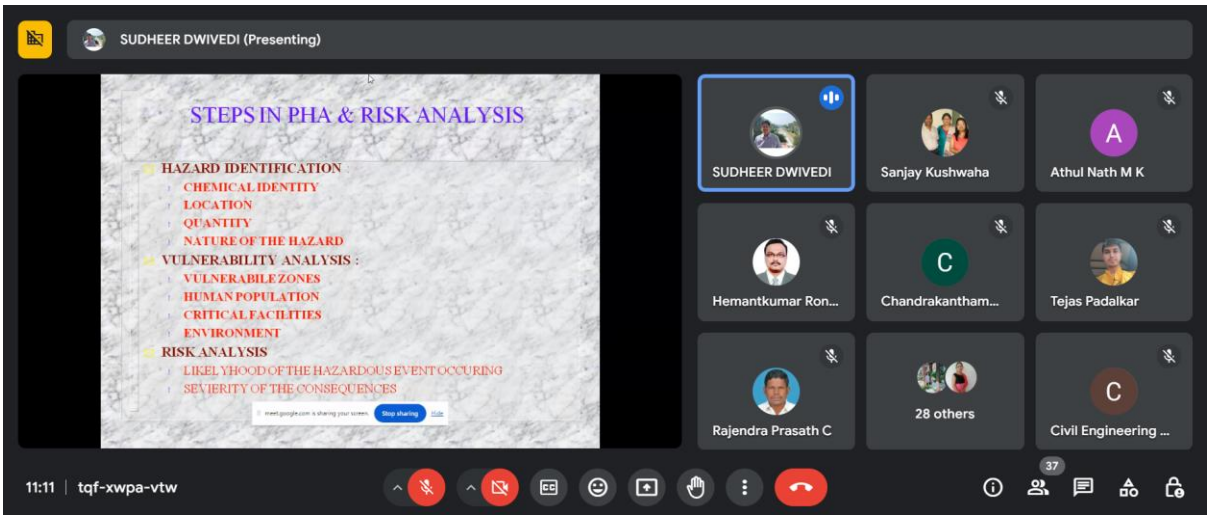

Patnayakuni Ravi Prakash (Presenting)
Potential applications of Numerical Modelling
Two storey two bay concrete space frame subjected to local fire
Physical properties
Patnayakuni Ravi P...
Athul Nath M K
Tejas Padalkar
Rajendra Prasath C
Sanjay Kushwaha
Chandrakantham...
Astha Verma
32 others
Civil Engineering ...
10:36 | tqf-xwpa-vtw

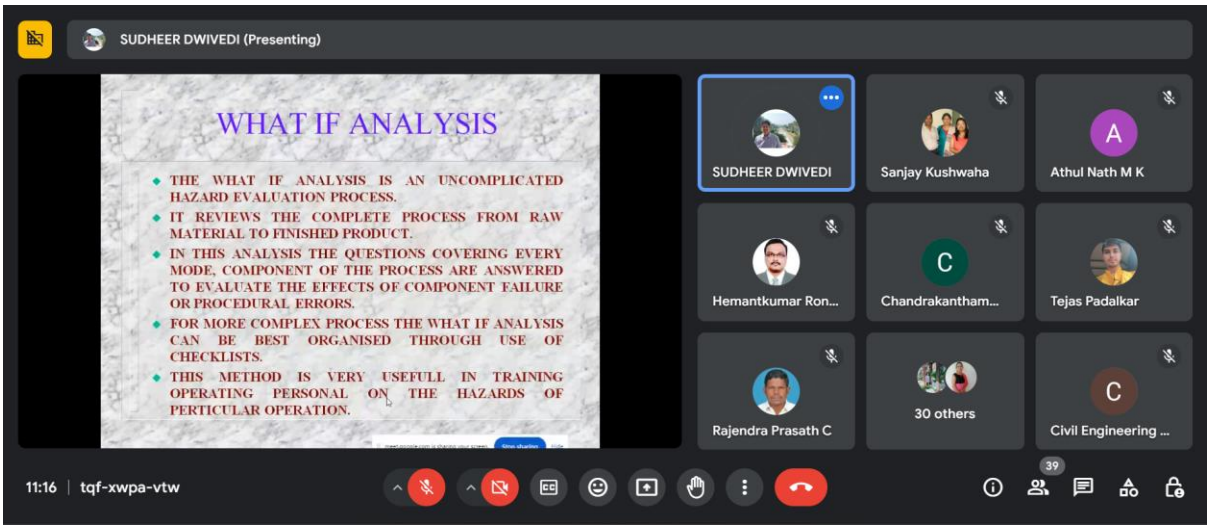

Patnayakuni Ravi Prakash (Presenting)
Plan view of top floor
Deformed twenty-storey space frame (scaling 10x).
Undeformed
Deformed configuration of twenty-storey space frame (scaling 10x)
Patnayakuni Ravi P...
Athul Nath M K
Tejas Padalkar
Rajendra Prasath C
Sanjay Kushwaha
Chandrakantham...
Astha Verma
Someone wants to join this call
View
10:40 | tqf-xwpa-vtw

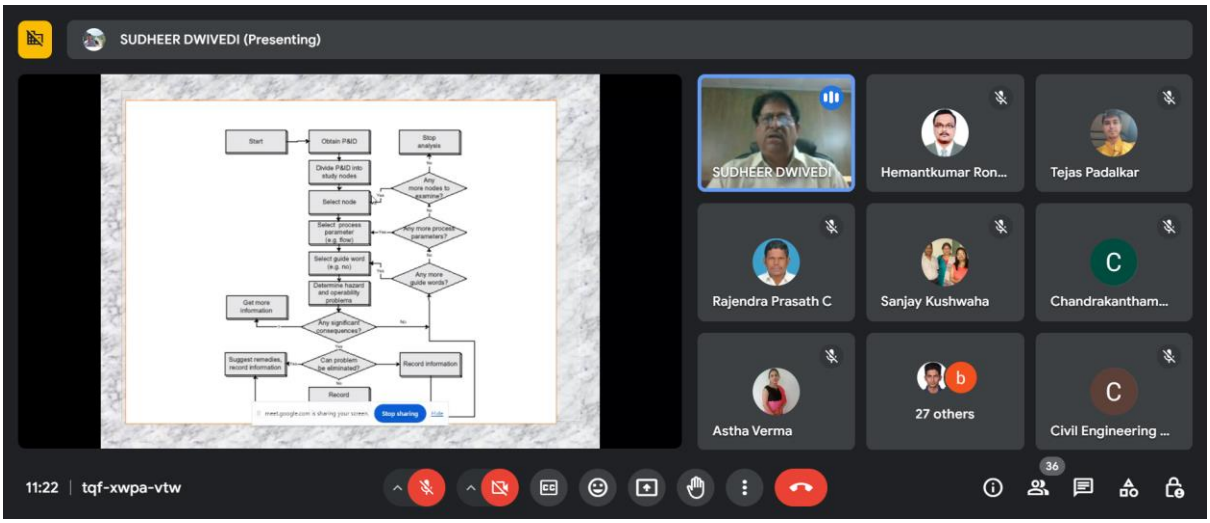

Patnayakuni Ravi Prakash (Presenting)
Conclusions
Framework for Improving Fire Safety in Buildings
• Exit paths
• Active FP systems
• Type of occupancy
• Fire design
Fire Protection Features
• Enforce regulations
• Codes & standards
• Annual inspection
Regulation & Enforcement
Technology & Resources
• Response time
• Voluntary firefighters
• Emergency preparedness
Common /Civic Sense
Fire safety awareness
• Evacuation drills
• Right of way to firefighters
Patnayakuni Ravi P...
Athul Nath M K
Tejas Padalkar
Rajendra Prasath C
Sanjay Kushwaha
Chandrakantham...
JAIN NITPY
31 others
Civil Engineering ...
10:45 | tqf-xwpa-vtw
40

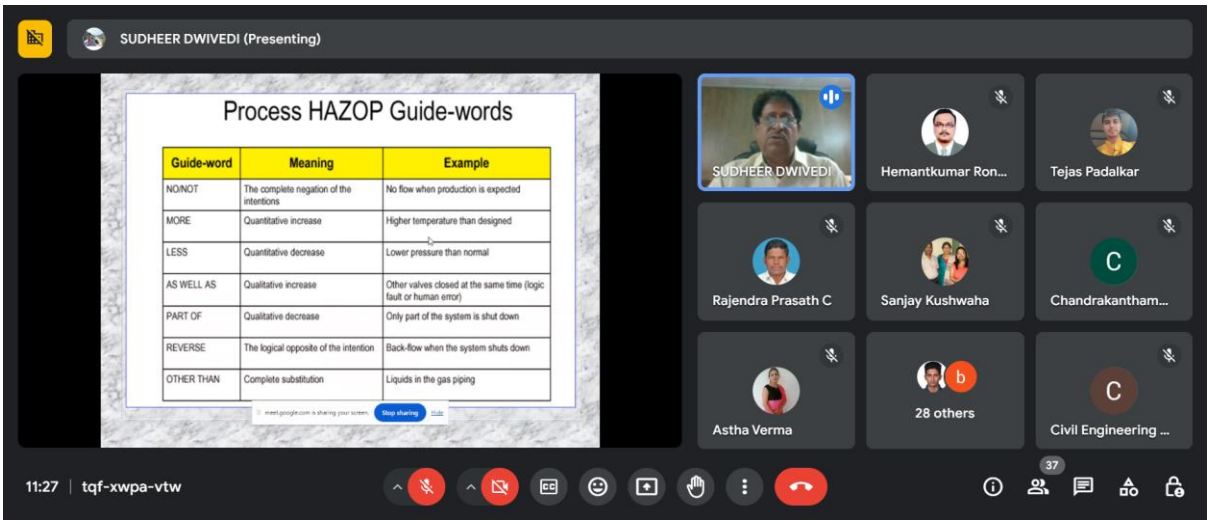

Patnayakuni Ravi Prakash
Athul Nath M K
Tejas Padalkar
Rajendra Prasath C
Sanjay Kushwaha
Chandrakanthamma L
Manish Sharma
31 others
Civil Engineering Department, JUIT
10:51 | tqf-xwpa-vtw
Show hidden icons
39

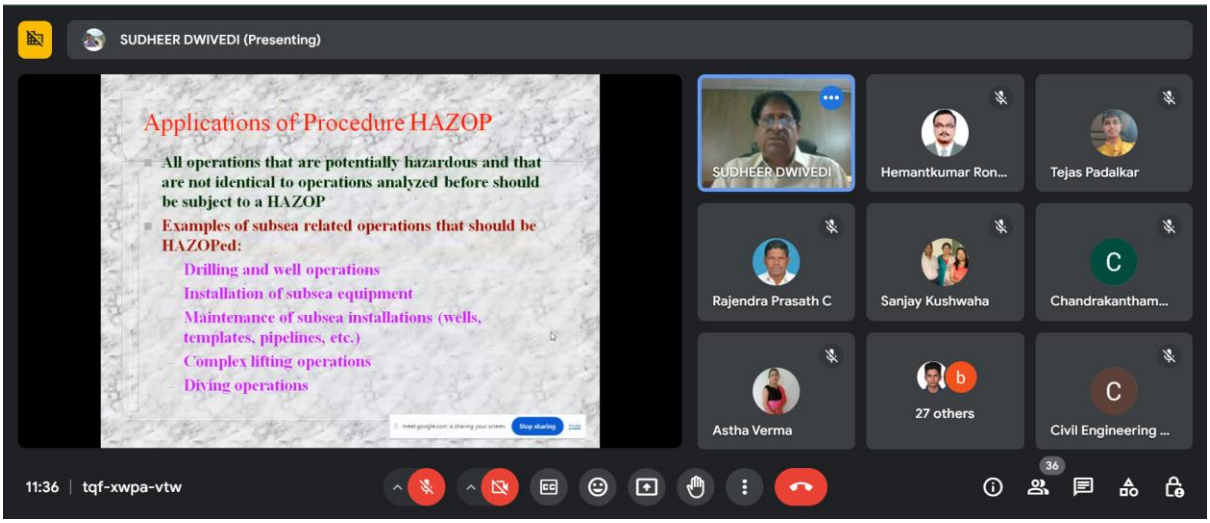

SUDHEER DWIVEDI (Presenting)
HAZARDS
A BIOLOGICAL, CHEMICAL OR PHYSICAL AGENT/ACTIVITY THAT IS REASONABLY LIKELY TO CAUSE ILLNESS OR INJURY IN THE ABSENCE OF ITS CONTROL. THE MOST COMMON HAZARDS IN THE INDUSTRIES ARE :
FIRE :
FLASH FIRE,
JET FIRE ETC,
POOL FIRE
EXPLOSION
SUDHEER DWIVEDI
Sanjay Kushwaha
Athul Nath M K
Hemantkumar Ron...
Chandrakantham...
Tejas Padalkar
Rajendra Prasath C
28 others
Civil Engineering ...
11:07 | tqf-xwpa-vtw

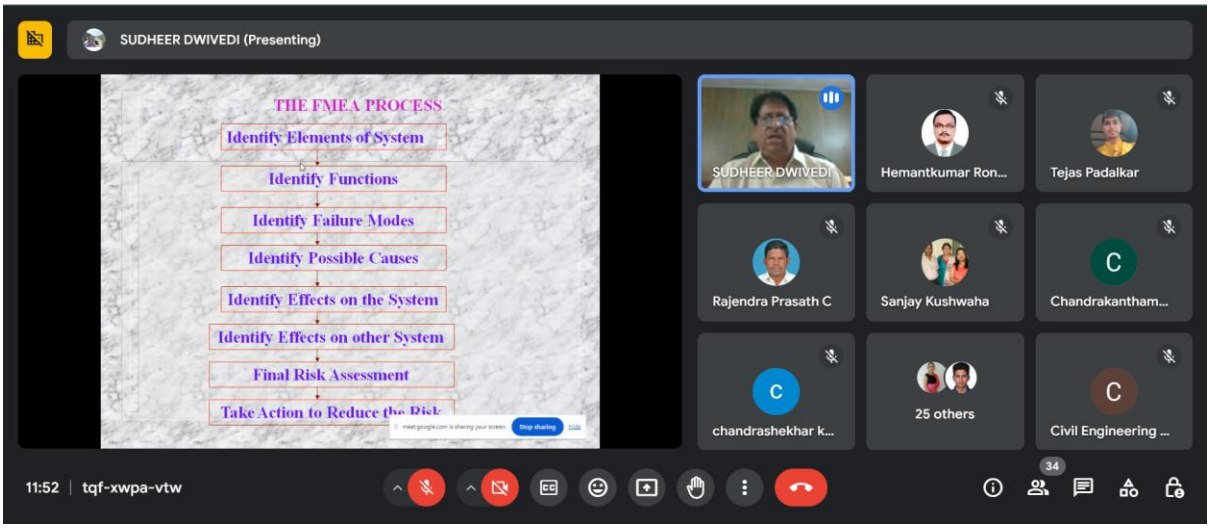

SUDHEER DWIVEDI (Presenting)
STEPS IN PHA & RISK ANALYSIS
HAZARD IDENTIFICATION
CHEMICAL IDENTITY
LOCATION
QUANTITY
NATURE OF THE HAZARD
VULNERABILITY ANALYSIS :
VULNERABILE ZONES
HUMAN POPULATION
CRITICAL FACILITIES
ENVIRONMENT
RISK ANALYSIS
LIKELYHOOD OF THE HAZARDOUS EVENT OCCURING
SEVIERITY OF THE CONSEQUENCES
SUDHEER DWIVEDI
Sanjay Kushwaha
Athul Nath M K
Hemantkumar Ron...
Chandrakantham...
Tejas Padalkar
Rajendra Prasath C
28 others
Civil Engineering ...
11:11 | tqf-xwpa-vtw


SUDHEER DWIVEDI (Presenting)
WHAT IF ANALYSIS
THE WHAT IF ANALYSIS IS AN UNCOMPLICATED HAZARD EVALUATION PROCESS.
IT REVIEWS THE COMPLETE PROCESS FROM RAW MATERIAL TO FINISHED PRODUCT.
IN THIS ANALYSIS THE QUESTIONS COVERING EVERY MODE, COMPONENT OF THE PROCESS ARE ANSWERED TO EVALUATE THE EFFECTS OF COMPONENT FAILURE OR PROCEDURAL ERRORS.
FOR MORE COMPLEX PROCESS THE WHAT IF ANALYSIS CAN BE BEST ORGANISED THROUGH USE OF CHECKLISTS.
THIS METHOD IS VERY USEFULL IN TRAINING OPERATING PERSONAL ON THE HAZARDS OF PERTICULAR OPERATION.
SUDHEER DWIVEDI
Sanjay Kushwaha
Athul Nath M K
Hemantkumar Ron...
Chandrakantham...
Tejas Padalkar
Rajendra Prasath C
30 others
Civil Engineering ...
11:16 | tqf-xwpa-vtw

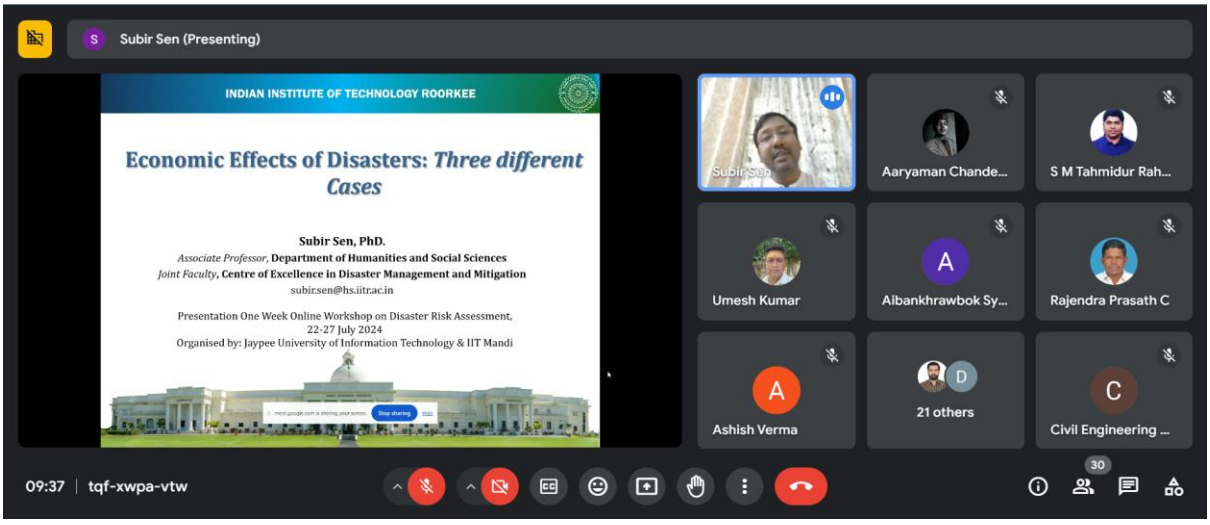

SUDHEER DWIVEDI (Presenting)
SUDHEER DWIVEDI
Hemantkumar Ron...
Tejas Padalkar
Rajendra Prasath C
Sanjay Kushwaha
Chandrakantham...
Astha Verma
27 others
Civil Engineering ...
11:22 | tqf-xwpa-vtw

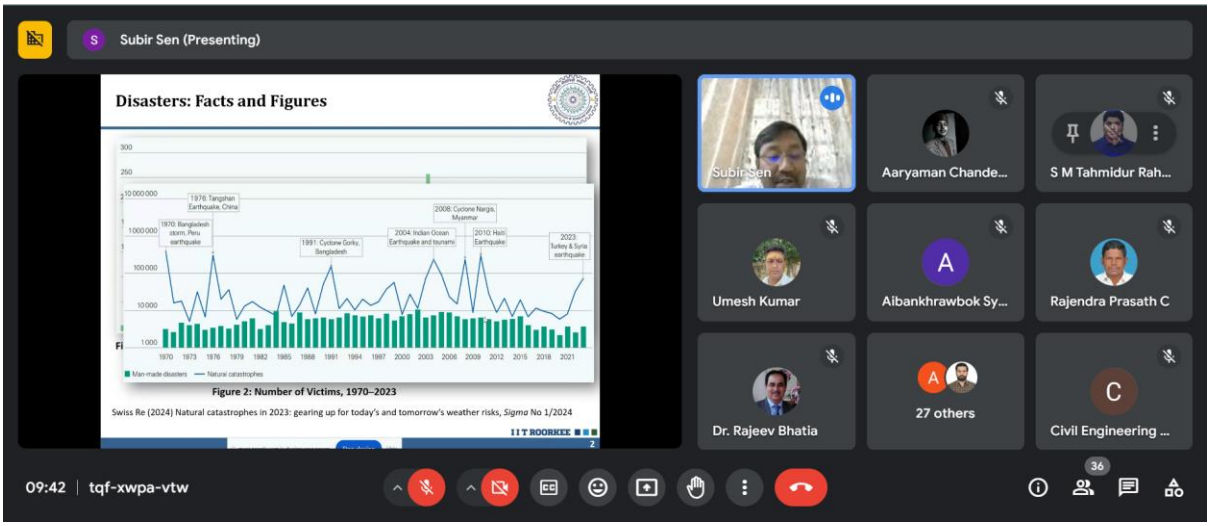

SUDHEER DWIVEDI (Presenting)
Process HAZOP Guide-words
Guide-word | Meaning | Example
NO/NOT | The complete negation of the intentions | No flow when production is expected
MORE | Quantitative increase | Higher temperature than designed
LESS | Quantitative decrease | Lower pressure than normal
AS WELL AS | Qualitative increase | Other valves closed at the same time (logic fault or human error)
PART OF | Qualitative decrease | Only part of the system is shut down
REVERSE | The logical opposite of the intention | Back-flow when the system shuts down
OTHER THAN | Complete substitution | Liquids in the gas piping
SUDHEER DWIVEDI
Hemantkumar Ron...
Tejas Padalkar
Rajendra Prasath C
Sanjay Kushwaha
Chandrakantham...
Astha Verma
28 others
Civil Engineering ...
11:27 | tqf-xwpa-vtw

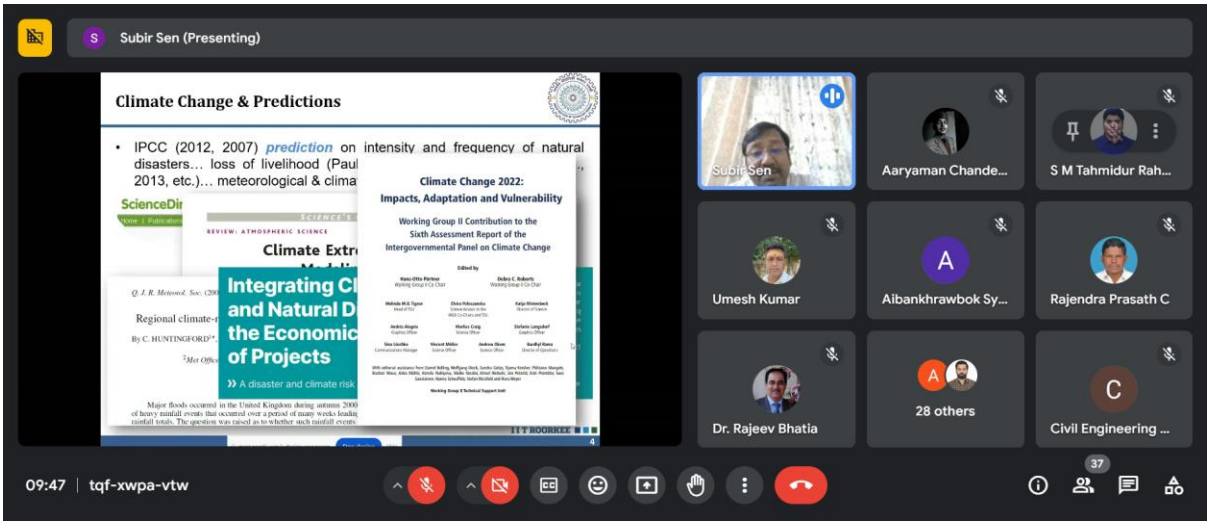

SUDHEER DWIVEDI (Presenting)
Applications of Procedure HAZOP
All operations that are potentially hazardous and that are not identical to operations analyzed before should be subject to a HAZOP
Examples of subsea related operations that should be HAZOPed:
Drilling and well operations
Installation of subsea equipment
Maintenance of subsea installations (wells, templates, pipelines, etc.)
Complex lifting operations
Diving operations
SUDHEER DWIVEDI
Hemantkumar Ron...
Tejas Padalkar
Rajendra Prasath C
Sanjay Kushwaha
Chandrakantham...
Astha Verma
27 others
Civil Engineering ...
11:36 | tqf-xwpa-vtw


SUDHEER DWIVEDI (Presenting)
THE FMEA PROCESS
Identify Elements of System
Identify Functions
Identify Failure Modes
Identify Possible Causes
Identify Effects on the System
Identify Effects on other System
Final Risk Assessment
Take Action to Reduce the Risk
SUDHEER DWIVEDI
Hemantkumar Ron...
Tejas Padalkar
Rajendra Prasath C
Sanjay Kushwaha
Chandrakantham...
chandrashekhar k...
25 others
Civil Engineering ...
11:52 | tqf-xwpa-vtw

Day 5:


Subir Sen (Presenting)
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE
Economic Effects of Disasters: Three different Cases
Subir Sen, PhD.
Associate Professor, Department of Humanities and Social Sciences
Joint Faculty, Centre of Excellence in Disaster Management and Mitigation
subir.sen@hs.iitr.ac.in
Presentation One Week Online Workshop on Disaster Risk Assessment,
22-27 July 2024
Organised by: Jaypee University of Information Technology & IIT Mandi
Subir Sen
Aaryaman Chande...
S M Tahmidur Rah...
Umesh Kumar
Aibankhrawbok Sy...
Rajendra Prasath C
Ashish Verma
21 others
Civil Engineering ...
09:37 | tqf-xwpa-vtw


Subir Sen (Presenting)
Disasters: Facts and Figures
Figure 2: Number of Victims, 1970–2023
Swiss Re (2024) Natural catastrophes in 2023: gearing up for today's and tomorrow's weather risks, Sigma No 1/2024
Subir Sen
Aaryaman Chande...
S M Tahmidur Rah...
Umesh Kumar
Aibankhrawbok Sy...
Rajendra Prasath C
Dr. Rajeev Bhatia
27 others
Civil Engineering ...
09:42 | tqf-xwpa-vtw


Subir Sen (Presenting)
Climate Change & Predictions
IPCC (2012, 2007) prediction on intensity and frequency of natural disasters... loss of livelihood (Paul 2013, etc.)... meteorological & clima
Climate Change 2022:
Impacts, Adaptation and Vulnerability
Working Group II Contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change
Integrating Cl and Natural D the Economic of Projects
A disaster and climate risk
Subir Sen
Aaryaman Chande...
S M Tahmidur Rah...
Umesh Kumar
Aibankhrawbok Sy...
Rajendra Prasath C
Dr. Rajeev Bhatia
28 others
Civil Engineering ...
09:47 | tqf-xwpa-vtw

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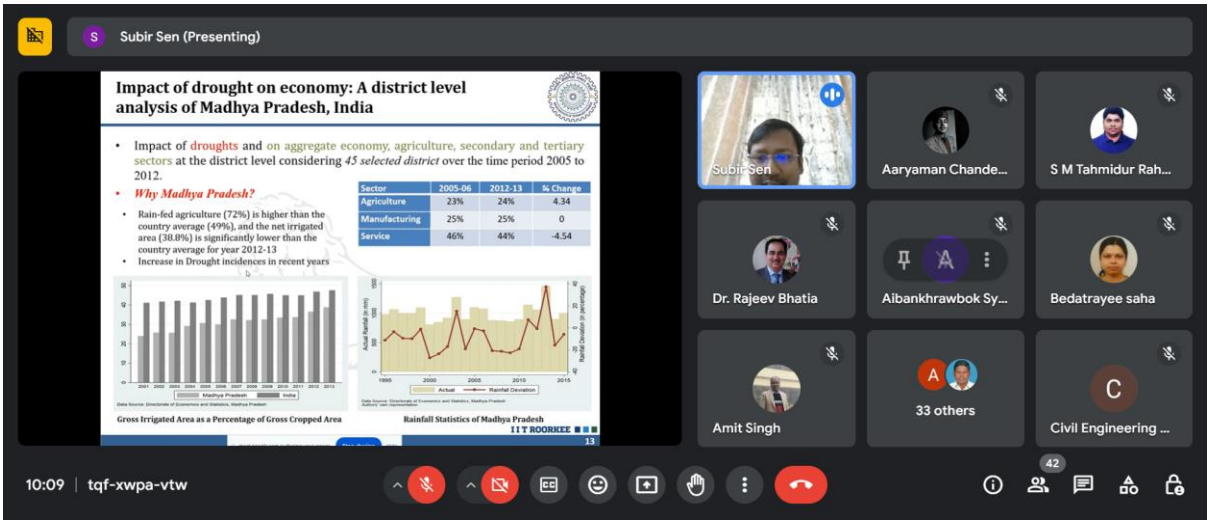
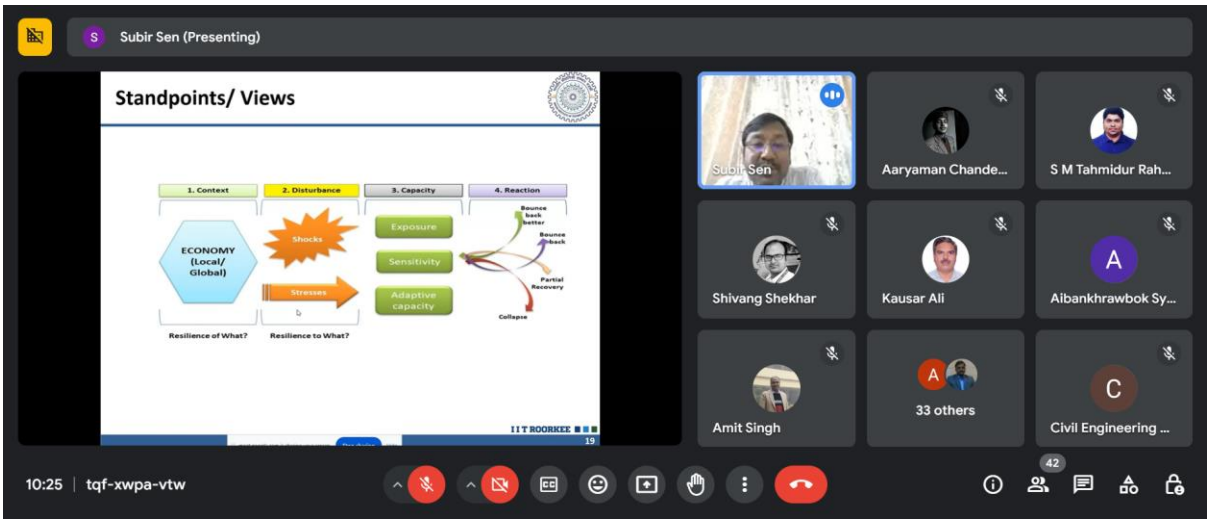
WAKNAGHAT, P.O. – WAKNAGHAT,
TEHSIL – KANDAGHAT, DISTRICT – SOLAN (H.P.)
PIN – 173234 (INDIA) Phone Number- +91-1792-257999
(Established by H.P. State Legislature vide Act No. 14 of 2002)





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