Summary Report

of

One Week Faculty Development Program

on

Innovative Approaches in Dynamics of Soils and Structures

21st July 2025 – 25th July 2025

Organized by

Department of Civil Engineering

Harcourt Butler Technical University, Kanpur

DAY 1 – INAUGURATION AND TECHNICAL SESSIONS

TECHNICAL SESSION SPEAKERS:

1. **Prof. Chinmoy Kolay, IIT Kanpur - Hybrid Simulation: An Advanced Experimental Technique for Assessing Multi-Natural Hazard Performance of Structural Systems**
2. **Dr. Rajib Saha, NIT Agartala- Earthquake Geotechnical Physical Experimental Studies**

The inaugural day of the One Week Online Faculty Development Program (FDP) on "Innovative Approaches in Dynamics of Soils and Structures," organized by the Department of Civil Engineering, Harcourt Butler Technical University (HBTU), Kanpur, commenced on July 21, 2025. This FDP serves as a collaborative platform to explore advanced interdisciplinary approaches and recent innovations in geotechnical and structural dynamics. The event began with a formal welcome address delivered by Dr. Kavita Tandon, Assistant Professor at HBTU Kanpur and Co-Convenor of the FDP, who introduced the program's objectives, themes, and its vital role in addressing contemporary challenges in infrastructure resilience, sustainability, and earthquake-resistant design.

The inaugural session was graced by Hon'ble Vice Chancellor Prof. Samsher, Pro Vice Chancellor Prof. Dipteek Parmar, and Guest of Honour Prof. Vinay Pratap Singh. Prof. Singh, in his address, emphasized the need for dynamic analysis in modern civil engineering and applauded the FDP for integrating research with advanced experimental and computational techniques. The program schedule was officially introduced, highlighting expert lectures and technical sessions planned throughout the week, covering domains such as nonlinear geomaterial behavior, hybrid structural systems, wind-soil-structure interaction, real-time hybrid simulations, and coupled thermo-hydro-mechanical modeling.

The first technical session of the day featured Prof. Chinmoy Kolay from the Department of Civil Engineering, IIT Kanpur, who delivered a highly engaging and insightful lecture on "Hybrid Simulation: An Advanced Experimental Technique for Assessing Multi-Natural Hazard Performance of Structural Systems." Prof. Kolay introduced the concept

of hybrid simulation and its evolution as an experimental methodology that integrates physical substructures with numerical modeling in real-time. He presented various applications where hybrid simulation was applied for seismic, wind, and tsunami hazard scenarios. The lecture explored the strengths of this technique in evaluating structural performance under multi-hazard loading and discussed its critical role in addressing complex Soil–Structure Interaction (SSI) problems. Participants gained exposure to benchmark case studies, validation methods, and control algorithms that enable the accurate execution of hybrid simulation in laboratory environments. The lecture concluded with a discussion on future challenges and research prospects in this emerging field.

The second technical session was delivered by Prof. Dr. Rajib Saha, Professor and Dean of Academic Affairs at NIT Agartala, who presented his extensive research on the behavior and design of Combined Pile-Raft Foundation (CPRF) systems under combined and seismic loading. Prof. Saha began by contextualizing the growing need for robust foundation systems in response to urban vertical expansion and seismic vulnerability. He discussed CPRF as a hybrid foundation system offering significant resistance to differential settlement and dynamic loading. His presentation covered several decades of experimental and numerical research, including case studies from international projects such as the Messeturm building in Germany.

Prof. Saha elaborated on interaction phenomena such as raft-soil, pile-soil, and pile-raft interplay, and presented failure envelopes derived from physical modeling and shake table testing. He highlighted the importance of settlement control, creep piling, and capacity estimation techniques based on IS 19117:2025 code. His discussion on coupled VMH loading and pile-soil-structure interaction under seismic excitation provided valuable insights into the dynamic response of foundations. The session was well appreciated by the participants and moderators alike, and Prof. Saha assured that presentation materials would be shared along with recordings. The session concluded with engaging Q&A interactions and acknowledgment of the lecture’s depth by fellow experts.

Overall, Day 1 of the FDP set a high academic standard and provided participants with a deep understanding of both experimental and practical challenges in dynamic geotechnical and structural systems. The sessions emphasized the interdisciplinary essence of the FDP and laid the groundwork for continued exploration in the upcoming days. The organizing team reiterated the importance of feedback submissions and announced the next session scheduled for July 22, 2025.

DAY 2 – TECHNICAL SESSIONS SPEAKERS

1. **Prof. Sumanta Haldar, IIT Bhubaneshwar - Integrated Soil-Fluid-Structure Interaction Modeling of Bottom-Fixed and Floating Offshore Renewable Energy Converters**
2. **Dr. Deepu S P, College of Engineering Trivandrum - Seismic Vulnerability Assessment of Bridges**
3. **Dr. Mitesh Surana, IIT Ropar - Floor Acceleration Estimation for Seismic Design of Secondary Systems in Buildings**

The second day of the One Week Online Faculty Development Program (FDP) on 'Innovative Approaches in Dynamics of Soils and Structures,' organized by the Department of Civil Engineering, HBTU Kanpur, brought forward a multi-dimensional perspective on dynamic interactions within geotechnical and structural systems. The day was marked by insightful lectures from esteemed faculty members across premier institutions, each contributing unique dimensions to the central theme. A key focus of the day was the integration of fluid and soil-structure interaction modeling, particularly in offshore energy infrastructures, which was presented in a comprehensive manner. The challenges involved in bottom-fixed and floating systems in dynamic marine environments were explored through coupled simulation approaches. This discussion set a context for participants to understand the importance of multidisciplinary modeling in resilient infrastructure design.

The second day of the Faculty Development Program (FDP) on "Innovative Approaches in Dynamics of Soils and Structures" unfolded with three power-packed sessions focusing on real-world geotechnical challenges, advanced modeling approaches, and innovative simulation tools for dynamic analysis. With expert lectures from leading researchers, the day provided comprehensive insight into the interplay between soil, structure, and dynamic forces. The day began with an engaging lecture by Prof. Sumanta Haldar, IIT Bhubaneshwar, on "Integrated Soil-Fluid-Structure Interaction Modeling of Bottom-Fixed and Floating Offshore Renewable Energy Converters." Prof. Haldar meticulously explained the complexities and critical challenges involved in modeling the

dynamic behavior of offshore structures subjected to combined wave, current, and soil interaction effects. He delivered a detailed exposition on the necessity of accounting for hydrodynamic forces, seabed-soil behavior, and structural responses within a unified modeling framework. Using coupled FEM-CFD techniques, he illustrated how offshore energy systems demand integrated solutions to ensure long-term resilience and safety. His session bridged fundamental theory with advanced simulation, helping participants appreciate the multi-physics complexity involved in marine infrastructure design.

The session provided participants with a comprehensive understanding of how such integrated modeling enhances the reliability, safety, and efficiency of offshore infrastructure. Real-world examples and recent case studies were presented, showcasing successful applications and the importance of such interdisciplinary analysis in addressing sustainability and resilience in marine engineering. Participants appreciated the speaker's clarity in conveying complex numerical and physical interactions, which stimulated thoughtful discussion during the Q&A segment.

This session set a strong tone for the day by underlining the **interdisciplinary nature of geotechnical, structural, and ocean engineering**, emphasizing its growing relevance in the context of global energy transformation initiatives.

The second technical session of Day 2 was delivered by Dr. Deepu S P, a faculty member from the College of Engineering Trivandrum, who brought a focused lens on the seismic vulnerability assessment of bridge structures—a crucial aspect in transportation infrastructure, especially in seismically active zones.

Dr. Deepu began by explaining the importance of understanding seismic behavior in bridges due to their critical role in post-disaster connectivity and emergency response. He discussed the fragility of various bridge typologies, the vulnerability of piers, bearings, and expansion joints, and the potential for progressive collapse when subjected to earthquake excitations.

Using both empirical fragility functions and analytical techniques including nonlinear static pushover and incremental dynamic analysis, Dr. Deepu showcased how engineers can predict the performance of bridge structures under seismic loads. He also explained methods to evaluate damage indices and assign performance levels under different ground motion intensities. Real-world case studies, including bridge failures from past Indian and global earthquakes, were shared to emphasize practical relevance. What stood out in the session was the detailed treatment of site-specific seismic hazard, soil-structure interaction, and retrofit strategies for existing bridges. Participants were engaged with examples and visuals that clarified complex concepts, and the session sparked fruitful discussion around regional infrastructure resilience. This session added immense value to the workshop by linking theoretical modeling with practical infrastructure safety, particularly in the domain of lifeline engineering.

The final technical session of Day 2 was led by Dr. Mitesh Surana from IIT Ropar, who addressed a highly focused and practically significant topic: the estimation of floor accelerations for the seismic design of secondary and non-structural systems in buildings. Dr. Surana began the session by distinguishing between primary structural systems and secondary or non-structural components (e.g., mechanical equipment, piping, and façade systems) and emphasized how damage to the latter often results in significant economic losses and operational disruption following earthquakes. He introduced the concept of floor response spectra (FRS) as a design tool to capture the amplification of ground motion at different floor levels due to dynamic interaction with the building structure. The core of the lecture focused on various approaches for estimating floor accelerations, ranging from simplified empirical models to more refined analytical methods involving nonlinear time history analysis. Dr. Surana explained the influence of structural characteristics—such as natural frequency, mode shapes, and damping—on the amplification of floor accelerations. He also discussed the role of building height, mass distribution, and seismic input characteristics in shaping floor response.

Special attention was given to current codal provisions and limitations within design standards like ASCE 7 and IS codes, followed by recommendations for improving seismic safety of secondary systems, particularly in critical facilities such as hospitals and

data centers. Real-life examples and simulation outputs demonstrated how underestimating floor accelerations could lead to failure of essential non-structural systems, even when the primary structure remains intact.

DAY 3 – TECHNICAL SESSIONS SPEAKERS and INTERACTION SESSION

1. **Dr. Arnab Banerjee, IIT Delhi - Metamaterial: Towards Enhanced Vibration Control**
2. **INTERACTION SESSION – FUN ACTIVITIES AND NETWORKING SESSION**

As the FDP progressed into its third day, the sessions continued to offer a rich blend of advanced technical knowledge and participant-driven engagement. Day 3 of the FDP was marked by a highly insightful expert lecture followed by an exciting and interactive afternoon session, designed to encourage collaboration, creativity, and reflection among the participants.

Prof. Arnab Banerjee delivered an enlightening and technically robust session on the fundamentals and frontier applications of metamaterials in civil engineering. The lecture began by introducing the participants to the fascinating world of metamaterials, defined as artificially engineered materials with properties not found in naturally occurring substances. He explained core concepts such as negative stiffness, bandgap theory, and wave propagation attenuation, particularly how these phenomena can be manipulated to achieve dynamic response control in engineering systems. The lecture emphasized the role of locally resonant structures and periodic inclusions in metamaterials that enable them to inhibit or redirect seismic and vibratory waves. Prof. Banerjee also showcased various engineering applications of metamaterials, including:

a. Earthquake-resilient structural systems.
b. Ground vibration mitigation in urban and industrial zones.
c. Isolation systems for precision instruments and critical facilities.

He presented real-life experimental validations and ongoing research case studies, supported by illustrations and simulation results. Participants gained insight into fabrication techniques of these materials and the multidisciplinary knowledge (from physics, mechanics, and materials science) required for their development. This session not only expanded the participants' understanding of metamaterials but also inspired them to consider integrating such innovations in geotechnical and structural design

projects. The engaging delivery, supported by visual demonstrations and technical depth, earned enthusiastic praise from the attendees.

Interaction Session: 3:30 PM – 5:00 PM

Theme: Tech Meets Trivia + Reflections and Takeaways + Technical Crossword Challenge

The post-lunch interaction session was a special mid-week highlight, tailored to foster engagement, light-hearted competition, and collaborative learning among the FDP participants. The session was divided into three creative sub-events:

1. Tech Meets Trivia Quiz

This exciting event featured a 20-question interactive quiz hosted via Google Forms, covering both technical concepts from previous FDP sessions and fun trivia related to the history and scope of civil engineering. The quiz included moderate to challenging questions on soil-structure interaction (SSI), structural dynamics, metamaterials, and historical milestones in civil engineering. Participants were encouraged to attempt the quiz within a stipulated time, and their enthusiasm and performance added a competitive spark to the learning environment. Winners were identified based on accuracy and speed, and their names were shortlisted for felicitation during the valedictory ceremony.

2. Technical Crossword Challenge

A first-of-its-kind FDP activity, the Technical Crossword Challenge engaged participants in solving a custom-designed puzzle composed of terminology from soil dynamics, structural behavior, and modeling techniques. The puzzle not only tested their technical vocabulary but also reinforced their retention of concepts discussed in expert lectures throughout the week.

3. Reflections and Takeaways

In this reflective segment, each participant was invited to share:

a. One key technical insight or concept they found most impactful so far.

b. One practical application or teaching idea they planned to implement in their academic or research work.

These reflections were collected through a shared platform and visualized as a Word Cloud, allowing everyone to appreciate the collective learning and emerging themes. This activity fostered self-assessment, peer learning, and deeper engagement with the FDP content.

The third day of the FDP provided an exceptional mix of cutting-edge technical knowledge and creative academic interaction. Prof. Arnab Banerjee's insightful lecture offered a futuristic view into the potential of metamaterials, while the interaction session allowed participants to connect, collaborate, and reflect in a meaningful and enjoyable way. As the program moved past its midpoint, the energy and curiosity among the participants remained high. Day 3 proved to be a vibrant and enriching part of the overall FDP journey.

DAY 4 – TECHNICAL SESSIONS SPEAKERS

1. **Dr. Aniket Desai, NIT Calicut- The MASW Method: Basics, Applications and Associated Uncertainties**
2. **Dr. Soukat Kumar Das, NIT Rourkela, Dynamics of Granular media**

The fourth day of the One Week Online Faculty Development Program (FDP) on "Innovative Approaches in Dynamics of Soils and Structures," organized by the Department of Civil Engineering, Harcourt Butler Technical University (HBTU), Kanpur, offered a rich blend of experimental insights, analytical methods, and computational innovations. This day highlighted practical strategies to analyze, simulate, and monitor structural and geotechnical systems under dynamic conditions. The day's sessions were crafted to engage participants with progressive methodologies, showcasing how theory meets practical implementation in soil and structural dynamics.

The first session of Day 4 of the Faculty Development Program (FDP) on Innovative Approaches in Dynamics of Soils and Structures began with an in-depth and intellectually stimulating lecture by Dr. Aniket Desai from NIT Calicut. His topic, "The MASW Method: Basics, Applications and Associated Uncertainties," brought to light the critical importance of surface wave-based geophysical testing in site characterization and subsoil investigation.

Dr. Desai commenced the session by introducing the fundamentals of the Multichannel Analysis of Surface Waves (MASW) technique, explaining its origin, principle of wave propagation, and theoretical background. The emphasis was on how surface waves can be harnessed to estimate shear wave velocity profiles (Vs), which are vital for dynamic site response analysis and seismic design applications. He elaborated on the step-by-step methodology of conducting MASW, including data acquisition through geophones and active sources, transformation of time-domain data into frequency-domain dispersion curves, and subsequent inversion to obtain subsurface profiles. His explanation was complemented with field setups and case studies, making the topic accessible even to those less familiar with geophysical methods.

A major highlight of the session was the detailed discussion on applications of MASW in civil engineering, including:

a. Site classification as per seismic codes (e.g., IS 1893)
b. Liquefaction potential analysis
c. Assessment of soil stiffness for foundation design
d. Monitoring of ground improvement techniques

Dr. Desai also addressed the limitations and uncertainties associated with MASW, such as spatial variability, signal attenuation, ambient noise interference, and constraints in resolution at greater depths. He presented best practices to minimize these uncertainties, such as careful array design, use of appropriate filters, and integrating MASW with other geophysical or geotechnical methods for holistic site interpretation. Participants appreciated the session for its clarity, scientific rigor, and the relevance of the MASW method in modern geotechnical investigations. The lecture set a strong foundation for the rest of the day's discussions and reinforced the FDP's objective of promoting cutting-edge, application-driven solutions in soil dynamics.

The second and concluding session of Day 4 of the Faculty Development Program on “Innovative Approaches in Dynamics of Soils and Structures” was delivered by Dr. Soukat Kumar Das from NIT Rourkela. His lecture on “Dynamics of Granular Media” offered a deep, fascinating, and research-oriented insight into one of the most complex and intriguing areas of soil mechanics and geotechnical dynamics. Dr. Das opened the session with a lucid explanation of the behavior of granular materials under dynamic loading. He emphasized the uniqueness of granular media due to their discrete particulate nature, leading to phenomena that differ fundamentally from traditional continuum mechanics.

Key topics explored during the session included:

a. Dilatancy in granular assemblies and how it affects shear strength and volume changes under cyclic loading.
b. Force chains and their role in transmitting stress within a granular mass.

c. Jamming transition – a condition where granular materials behave like solids under certain density and force constraints.
d. The influence of particle shape, size distribution, and inter-particle friction on dynamic behavior.

One of the highlights of Dr. Das's presentation was his discussion on Discrete Element Method (DEM), a numerical modeling approach that treats particles as individual interacting bodies. He elaborated on how DEM can simulate micro-mechanical behavior, offering granular-level insights into phenomena such as shear band formation, energy dissipation, and dynamic settlement. The session stood out for its exceptional balance between theoretical rigor and relatable analogies. Dr. Das used everyday life examples—such as crowd movement, packing of grains, and fluidization of sands—to intuitively explain complex phenomena like jamming and dilatancy. These examples helped the participants better visualize and internalize abstract concepts. Further, he showcased results from experimental and numerical studies conducted in his research group, demonstrating how granular dynamics impact real-world problems like earthquake-induced settlements, vibration isolation, and railway ballast behavior.

The session concluded with an engaging Q&A round, where participants discussed practical challenges and research directions in dynamic modeling of granular soils. Participants commended the session for its clarity, originality, and scholarly depth. Dr. Das's lecture not only expanded the understanding of dynamic soil behavior but also inspired new research ideas among faculty and scholars interested in soil-structure interaction and advanced computational modeling.

Day 4 received exceptional feedback from attendees, with multiple participants praising the technical depth, practical relevance, and clarity of the sessions. Many appreciated the speakers' ability to break down complex topics into understandable segments. The interactive Q&A segments further encouraged dialogue between experts and participants, enhancing learning outcomes. In conclusion, Day 4 of the FDP effectively demonstrated how innovative technologies, experimental validation, and data-centric modeling are transforming the landscape of geotechnical and structural engineering. The sessions

empowered participants with both theoretical insights and practical frameworks to address dynamic challenges in soil and structural systems. The day not only met but exceeded the learning objectives set out by the FDP committee, reinforcing the program's aim to promote interdisciplinary and future-ready engineering education.

DAY 5 – TECHNICAL SESSIONA NAD VALEDICTORY SESSIONS

TECHNICAL SESSIONS SPEAKERS

1. **Dr. Akil Ahmed, Professor JMI - Seismic Performance Evaluation of Semi-Rigid Jointed Steel Frames with Soil-Structure Interaction Under Near Field Earthquakes**
2. **Dr. Krishanu Roy, Senior Lecturer, University of Waikato- Earthquake-Resilient Multi-Storey Modular Buildings: The Next Generation of Modular Construction in New Zealand**
3. **Prof. Chen Hiroshima University, Japan, Seismic Performance Enhancement of Building Structures Adopting Damped Spine Frame System**

The fifth and final day of the One Week Online Faculty Development Program (FDP) on "Innovative Approaches in Dynamics of Soils and Structures" organized by the Department of Civil Engineering, Harcourt Butler Technical University (HBTU), Kanpur, concluded successfully on July 25, 2025. The sessions conducted on this day offered deep academic insight and advanced practical knowledge to all participants, further enriching the holistic understanding of the subject matter.

The first session of Day 5 of the Faculty Development Program commenced with a highly informative and research-intensive lecture by Dr. Akil Ahmed, an esteemed professor from Jamia Millia Islamia, New Delhi. His session focused on the seismic performance of semi-rigid jointed steel frames, a critical topic for engineers working in earthquake-prone regions. The presentation particularly emphasized the need to consider soil-structure interaction (SSI) in structural analysis, especially under near-field earthquake scenarios, which are characterized by strong pulses and high-intensity ground motions. Dr. Ahmed elaborated on the behavior of semi-rigid joints and their nonlinear characteristics during seismic loading. He pointed out that conventional fixed-base models often fail to represent the actual behavior of structures during seismic events, especially when the flexibility of both the joints and the supporting soil is not accounted for. Through detailed parametric studies and simulation models, he demonstrated how joint stiffness, soil type, and earthquake characteristics influence key seismic

performance parameters such as inter-story drift, base shear, ductility, and energy absorption capacity.

The session concluded with practical recommendations for incorporating SSI effects and joint flexibility into design and analysis methodologies for steel frame structures. Dr. Ahmed's comprehensive presentation, supported by real-case studies and numerical simulations, offered valuable insights for both academic researchers and practicing engineers involved in seismic design. Participants appreciated the clarity, depth, and applicability of the session, which effectively bridged theoretical concepts with practical engineering applications.

The second session of Day 5 was delivered by Dr. Krishanu Roy, a distinguished academic from the University of Waikato, New Zealand. His talk focused on the emerging field of modular construction and its evolving application in developing earthquake-resilient multi-storey buildings. Dr. Roy introduced participants to New Zealand's advanced modular construction techniques, emphasizing their efficiency, sustainability, and seismic performance advantages.

Through illustrative case studies and technical insights, Dr. Roy demonstrated how modular structural systems are being designed to withstand earthquake forces by incorporating high-performance joints, base isolation, and energy-dissipating mechanisms. He highlighted the benefits of prefabrication, rapid assembly, and quality control in off-site construction, which are transforming the construction industry, particularly in seismically active regions like New Zealand.

The session offered valuable knowledge on modern design methodologies and performance-based engineering practices tailored to modular buildings. Participants greatly appreciated the international perspective, futuristic outlook, and its relevance to sustainable and resilient infrastructure development. Dr. Roy's lecture contributed significantly to the interdisciplinary discourse of the FDP by bridging construction innovation and earthquake engineering.

The final technical session of the FDP was delivered by Prof. Chen from Hiroshima University, Japan, who presented cutting-edge research on improving the seismic

resilience of buildings using the **Damped Spine Frame (DSF)** system. His lecture emphasized the importance of structural damping and energy dissipation in high-rise buildings subject to earthquake-induced forces. Prof. Chen discussed the core concept of the Damped Spine Frame, which integrates a central spine equipped with damping mechanisms to control lateral displacements and reduce structural vibrations during seismic events. Through detailed analytical models and experimental validations, he showcased the superior performance of DSF systems compared to traditional lateral load-resisting systems.

The lecture also highlighted real-world implementations and seismic performance evaluations conducted in Japan, offering participants a rare glimpse into advanced structural innovations rooted in earthquake-prone environments. Prof. Chen's insights on structural control and adaptive design captivated the audience, reinforcing the importance of integrating damping technologies into modern construction practices for enhanced seismic safety.

VALEDICTORY SESSION

The Valedictory Session of the One Week Online Faculty Development Program (FDP) on “Innovative Approaches in Dynamics of Soils and Structures,” organized by the Department of Civil Engineering, Harcourt Butler Technical University (HBTU), Kanpur, was held on 25th July 2025. This session marked the culmination of a successful and intellectually vibrant academic event that brought together researchers, academicians, and professionals from across India and abroad. The FDP witnessed the registration of 114 participants, out of which 74 were paid registrations, reflecting the broad reach and relevance of the program.

The session was graced by the presence of Prof. Vinay Pratap Singh, Dean, School of Engineering, and Prof. Deepesh Singh, Chairman and Head of the Department of Civil Engineering, HBTU Kanpur. Both dignitaries addressed the gathering and appreciated the quality, diversity, and practical orientation of the sessions conducted throughout the week. They emphasized the value of such training programs in enhancing faculty development and academic excellence.

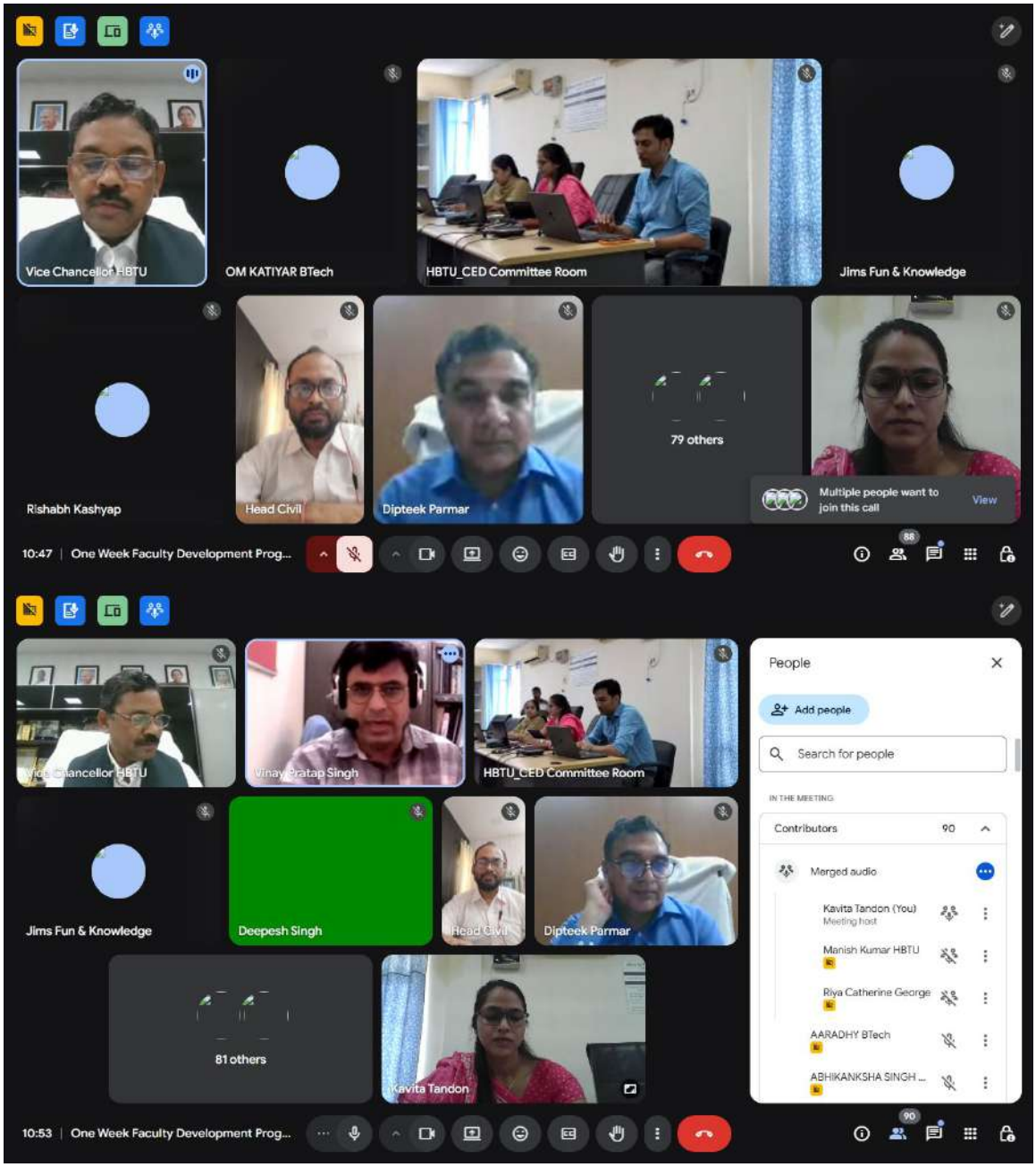
The program began with Dr. Kavita Tandon, Convener of the FDP, presenting the aims and objectives behind organizing the event. She highlighted the need for multidisciplinary learning in the domains of soil and structural dynamics, the integration of experimental and numerical techniques, and the significance of understanding dynamic soil-structure interaction under complex loading conditions. She emphasized how the FDP was designed to bridge theoretical knowledge with practical application and expose faculty and researchers to recent innovations and future directions in the field. This was followed by Dr. Riya Catherine George, Faculty Coordinator, who gave a detailed session-wise summary of the entire FDP. She outlined the contributions of distinguished speakers from premier institutions including IIT Kharagpur, IIT Ropar, IIT Delhi, IIT Bhubaneswar, NIT Rourkela, College of Engineering Trivandrum, Jamia Millia Islamia, Hiroshima University (Japan), and University of Waikato (New Zealand). Each session brought forth unique insights into contemporary research and technological advancements in geotechnical and structural dynamics. The winners of the technical quiz and crossword challenge, conducted during the Interaction Session, were then announced

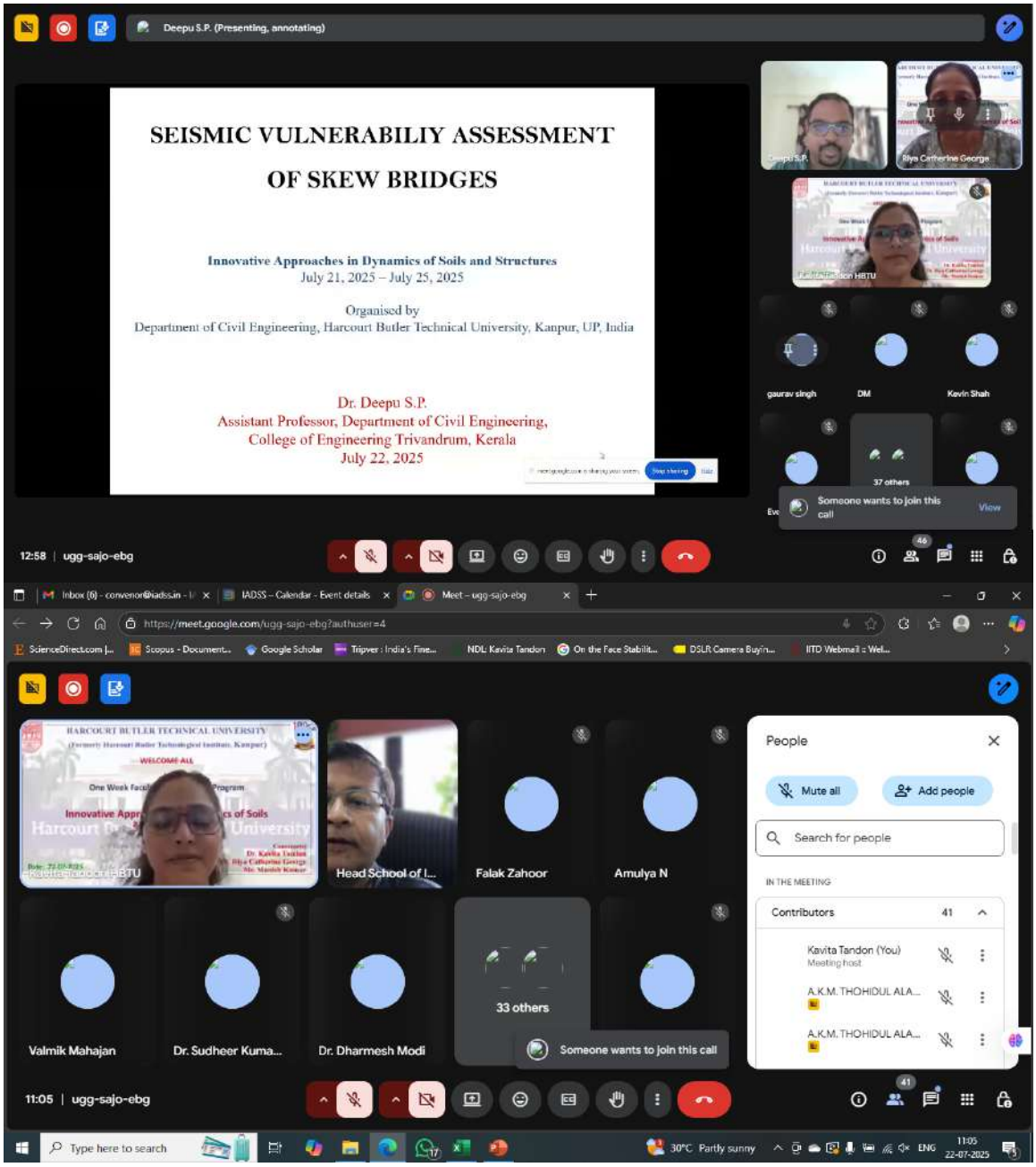
by Mr. Manish Kumar, Assistant Professor and Organizing Committee Member. E-certificates of recognition were presented to the winners and all eligible participants as a token of appreciation for their engagement and enthusiasm.

The Vote of Thanks was delivered by Prof. Deepesh Singh, Chairman and Head of the Department, who acknowledged the efforts of the organizing team, the contributions of all the expert speakers, and the active participation of attendees that made the FDP a remarkable success. The session concluded with a heartfelt note of thanks by Dr. Kavita Tandon, expressing deep gratitude to the management of HBTU Kanpur, invited speakers, coordinators, participants, and technical staff for their unwavering support. She emphasized the importance of continued collaboration and lifelong learning in tackling complex civil engineering challenges of the future.

GLIMPSES OF THE FDP

INNOVATIVE APPROACHES IN DYNAMICS OF SOILS AND STRUCTURES




Deepu S.P. (Presenting, annotating)
SEISMIC VULNERABILIY ASSESSMENT
OF SKEW BRIDGES
Innovative Approaches in Dynamics of Soils and Structures
July 21, 2025 – July 25, 2025
Organised by
Department of Civil Engineering, Harcourt Butler Technical University, Kanpur, UP, India
Dr. Deepu S.P.
Assistant Professor, Department of Civil Engineering,
College of Engineering Trivandrum, Kerala
July 22, 2025
Riya Catherine George
gaurav singh
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Kevin Shah
37 others
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Contributors 41
Kavita Tandon (You)
Meeting host
A.K.M. THOHIDUL ALA...
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Valmik Mahajan
Dr. Sudheer Kuma...
Dr. Dharmesh Modi
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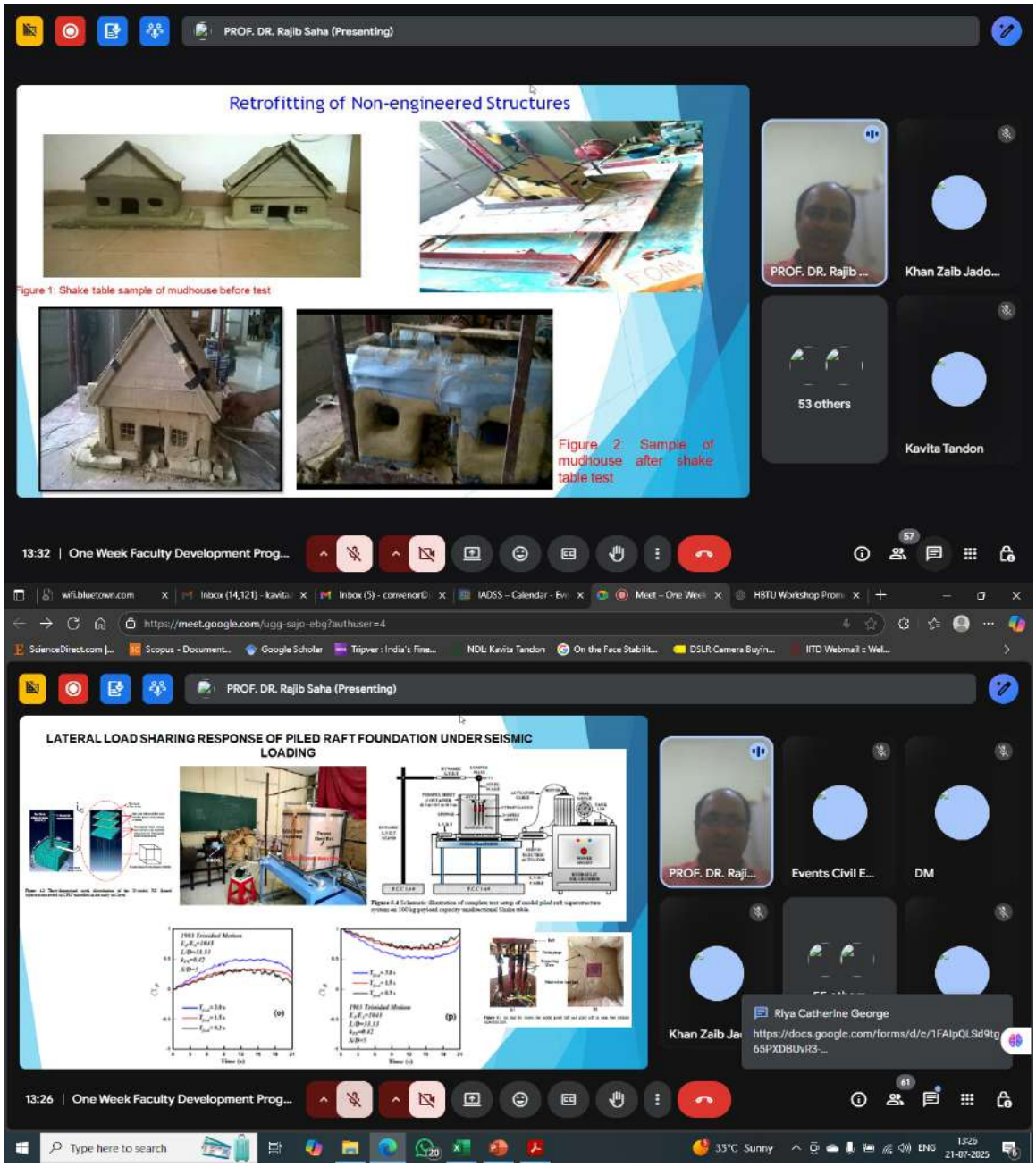
PROF. DR. Rajib Saha (Presenting)
Retrofitting of Non-engineered Structures
Figure 1: Shake table sample of mudhouse before test
Figure 2: Sample of mudhouse after shake table test
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Kavita Tandon
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PROF. DR. Rajib Saha (Presenting)
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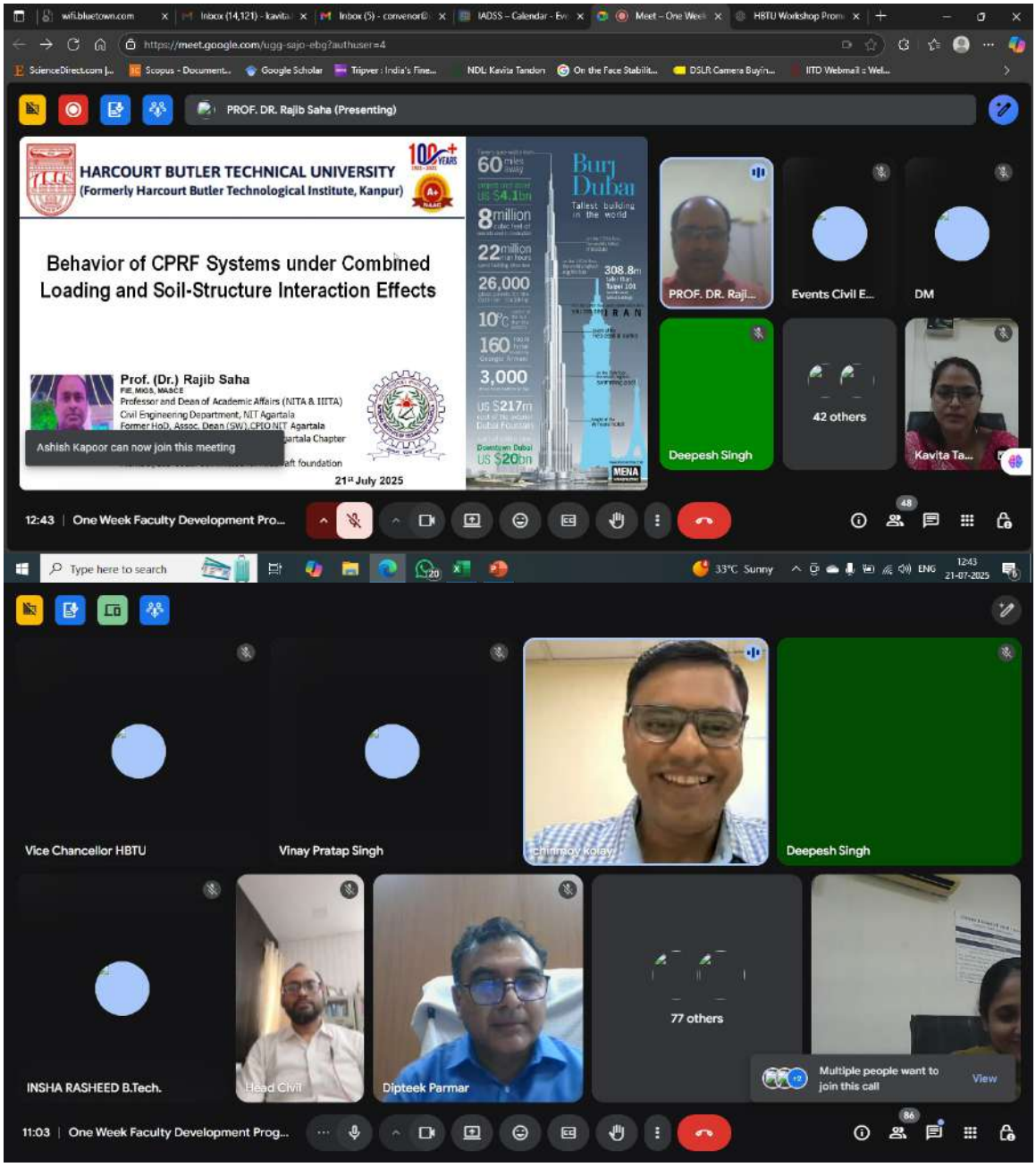
PROF. DR. Rajib Saha (Presenting)
HARCOURT BUTLER TECHNICAL UNIVERSITY
(Formerly Harcourt Butler Technological Institute, Kanpur)
Behavior of CPRF Systems under Combined Loading and Soil-Structure Interaction Effects
Prof. (Dr.) Rajib Saha
Professor and Dean of Academic Affairs (NITA & IIITA)
Civil Engineering Department, NIT Agartala
Ashish Kapoor can now join this meeting
21st July 2025
Burj Dubai
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Vice Chancellor HBTU
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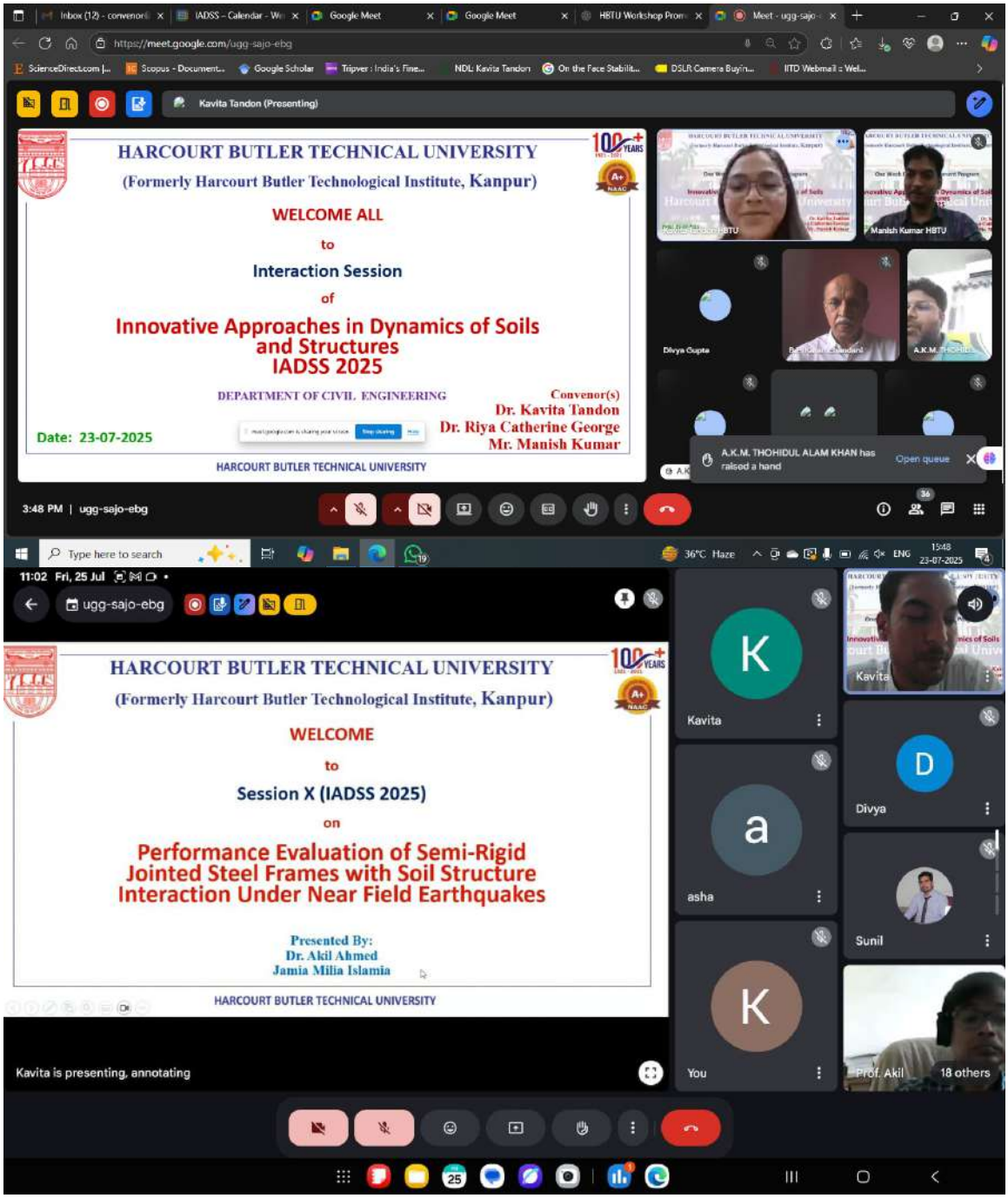
Kavita Tandon (Presenting)
HARCOURT BUTLER TECHNICAL UNIVERSITY
(Formerly Harcourt Butler Technological Institute, Kanpur)
WELCOME ALL
to
Interaction Session
of
Innovative Approaches in Dynamics of Soils and Structures
IADSS 2025
DEPARTMENT OF CIVIL ENGINEERING
Convenor(s)
Dr. Kavita Tandon
Dr. Riya Catherine George
Mr. Manish Kumar
Date: 23-07-2025
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(Formerly Harcourt Butler Technological Institute, Kanpur)
WELCOME
to
Session X (IADSS 2025)
on
Performance Evaluation of Semi-Rigid Jointed Steel Frames with Soil Structure Interaction Under Near Field Earthquakes
Presented By:
Dr. Akil Ahmed
Jamia Milia Islamia
HARCOURT BUTLER TECHNICAL UNIVERSITY
Kavita is presenting, annotating
Kavita
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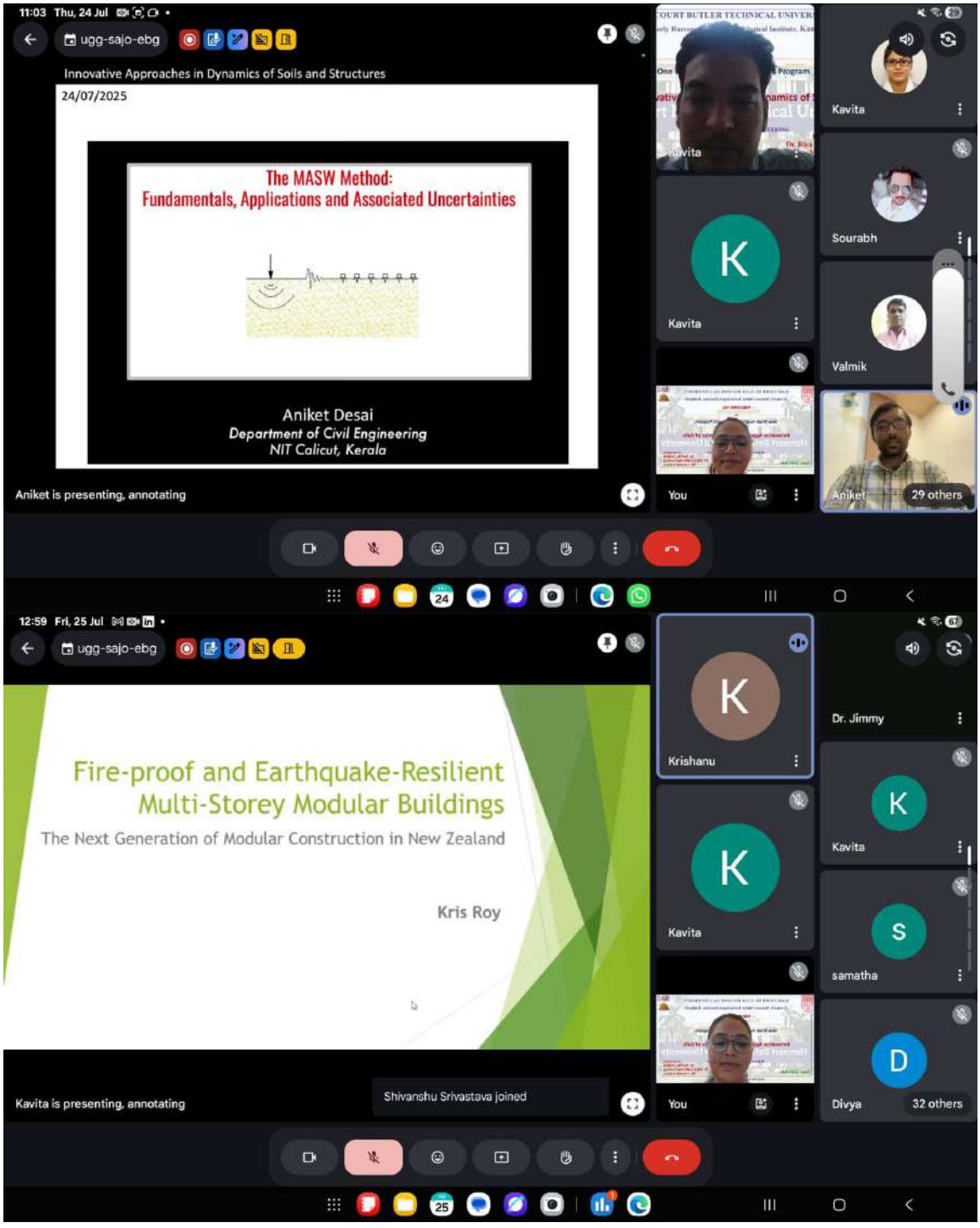
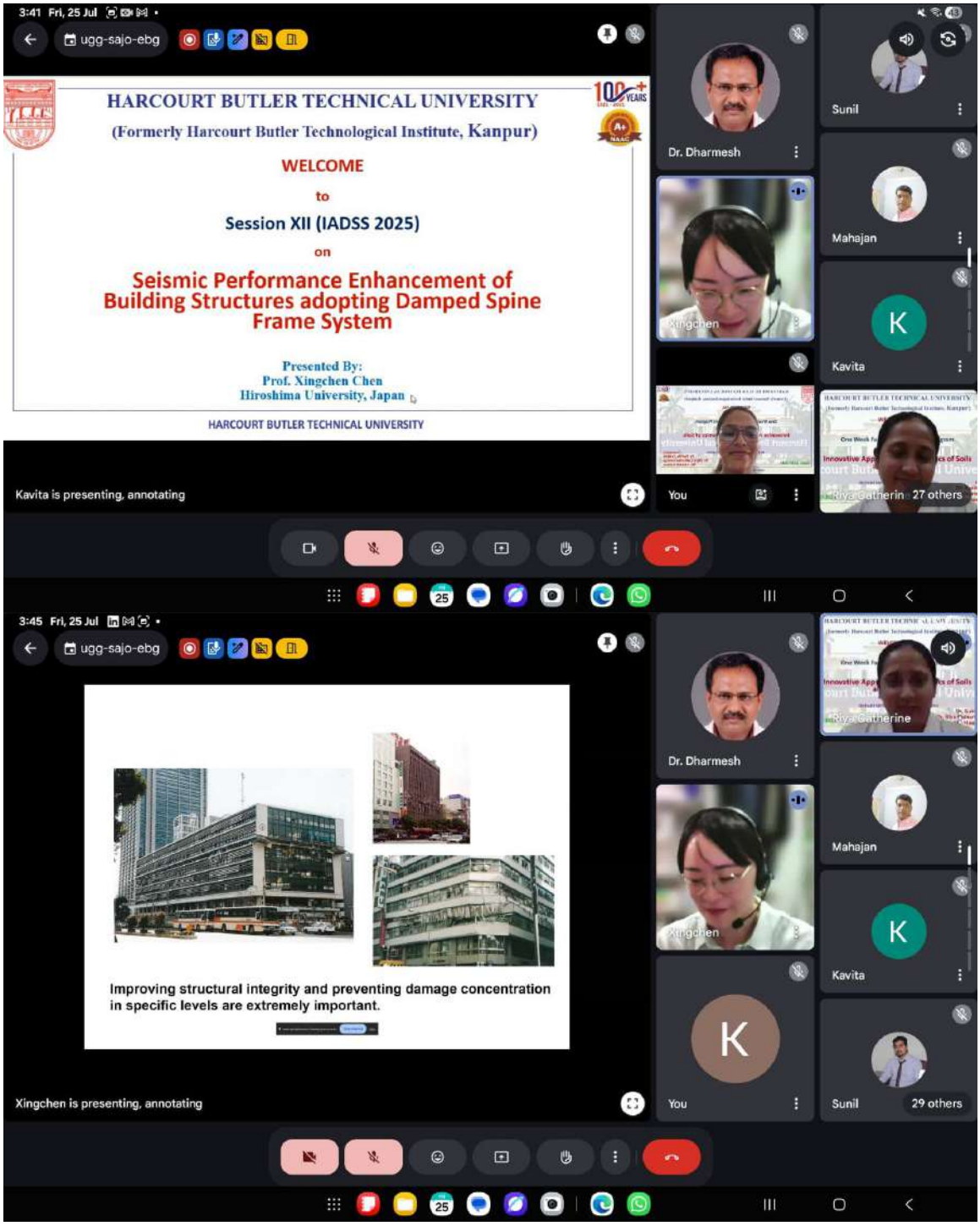
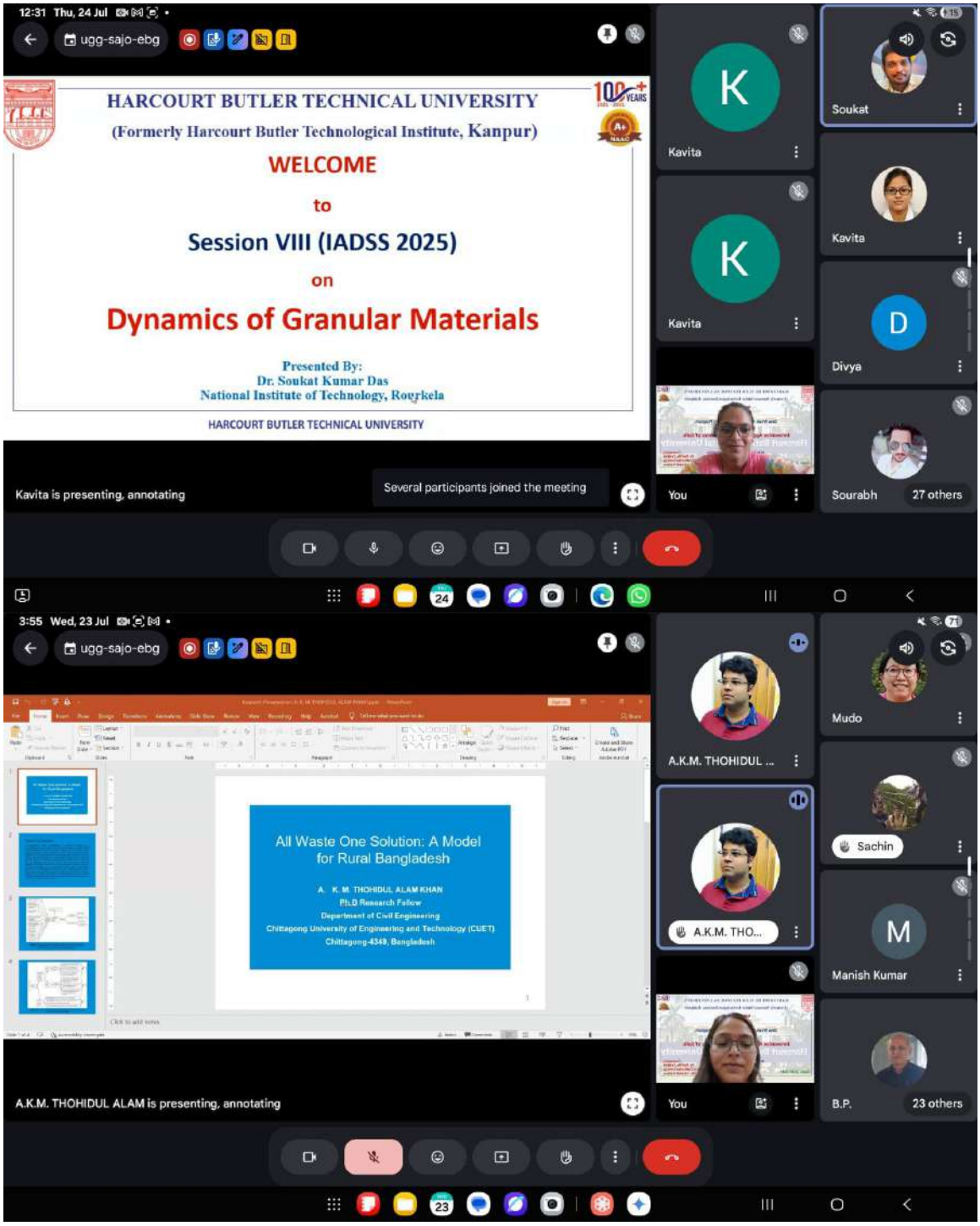
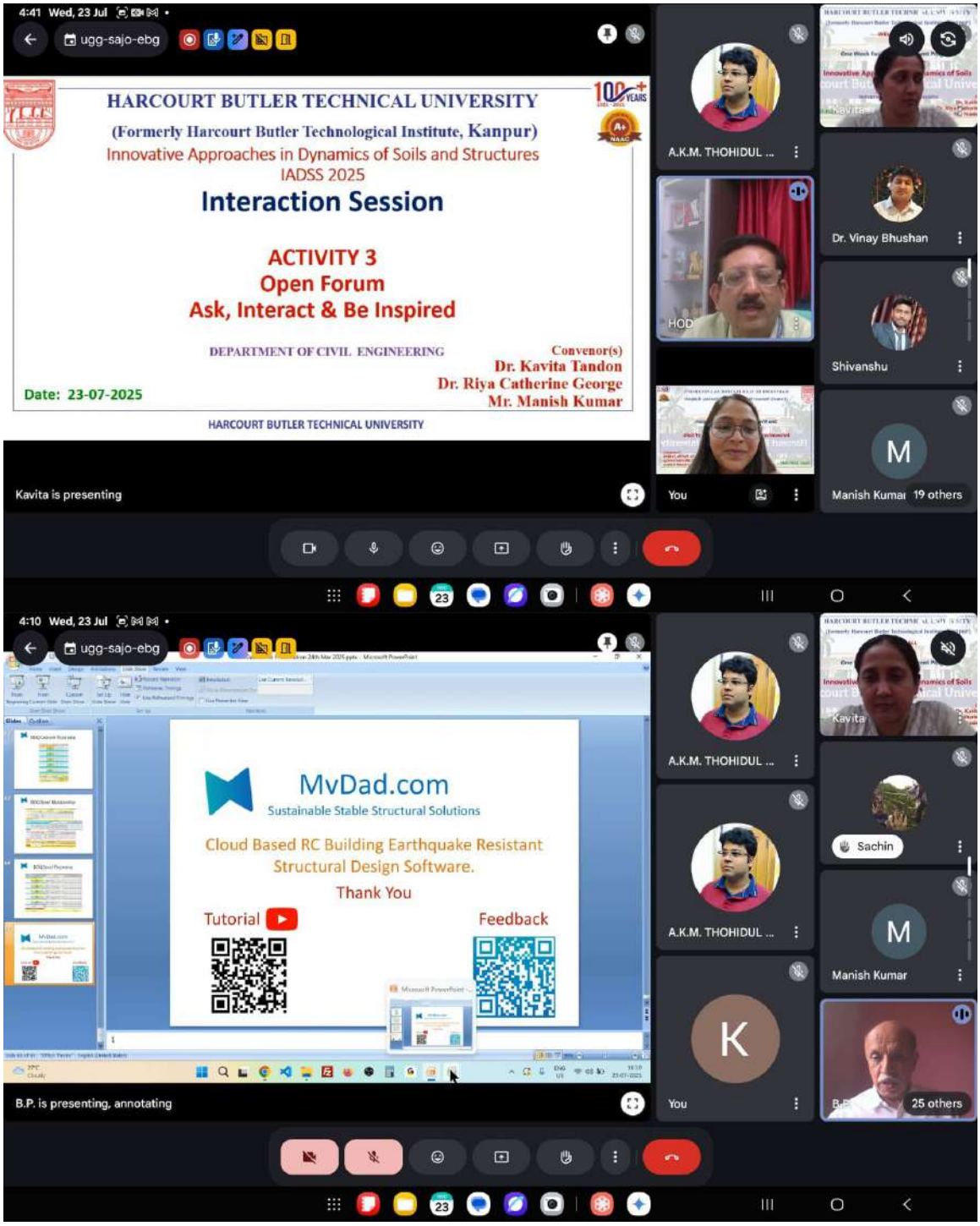
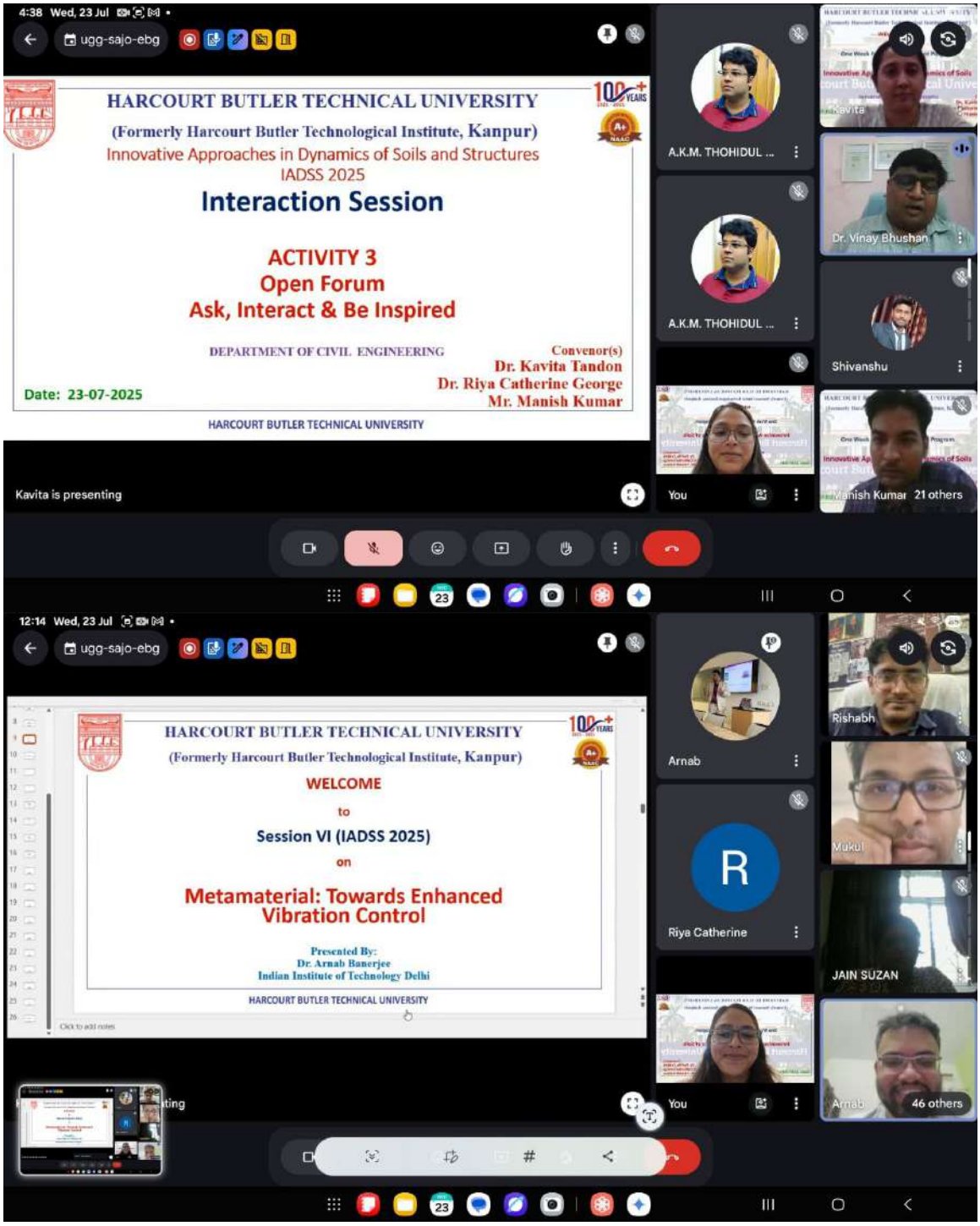
Prof. Akil
18 others

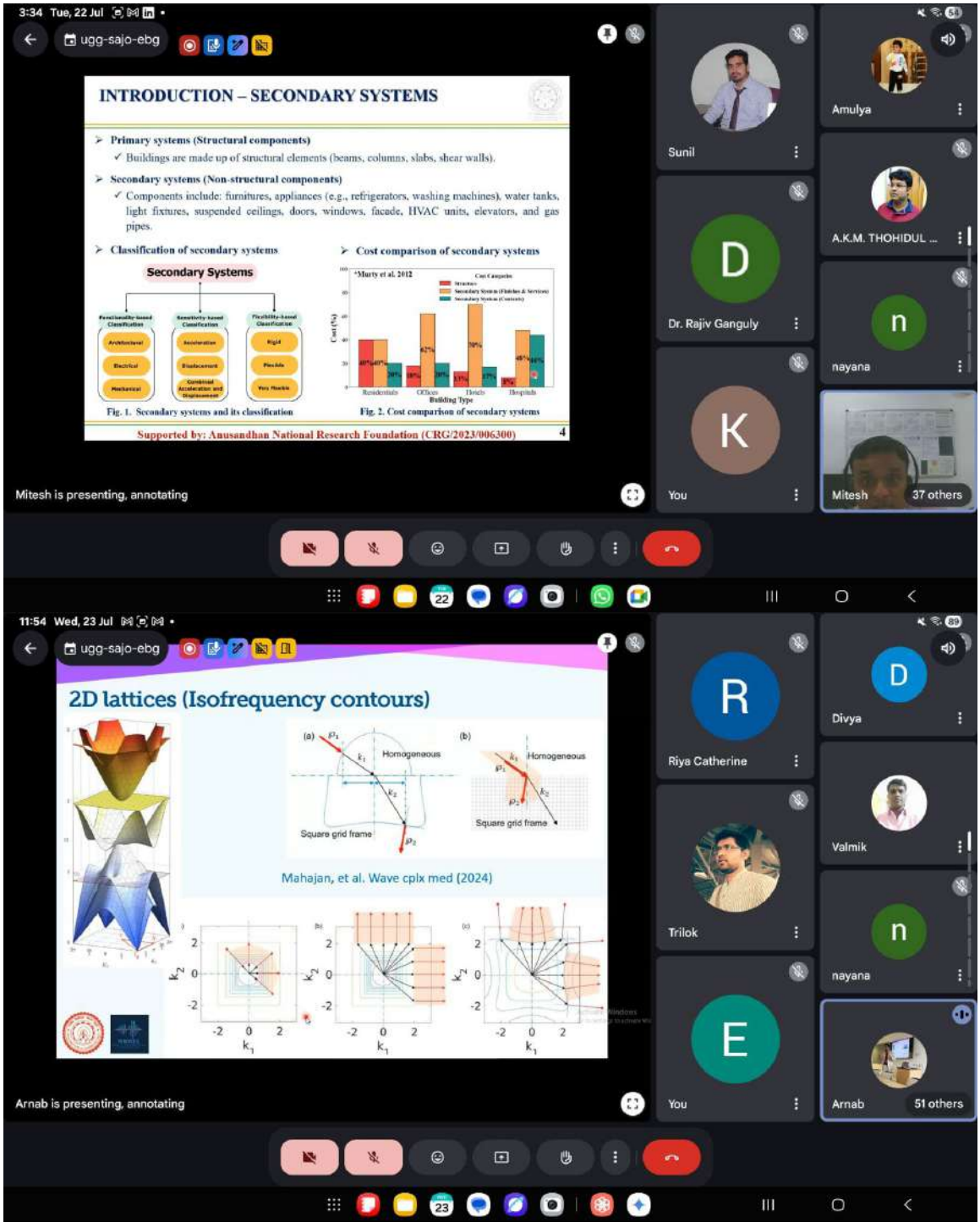

11:03 Thu, 24 Jul
ugg-sajo-ebg
Innovative Approaches in Dynamics of Soils and Structures
24/07/2025
The MASW Method:
Fundamentals, Applications and Associated Uncertainties
Aniket Desai
Department of Civil Engineering
NIT Calicut, Kerala
Aniket is presenting, annotating
Kavita
Sourabh
Valmik
You
Aniket
29 others
12:59 Fri, 25 Jul
ugg-sajo-ebg
Fire-proof and Earthquake-Resilient
Multi-Storey Modular Buildings
The Next Generation of Modular Construction in New Zealand
Kris Roy
Kavita is presenting, annotating
Shivanshu Srivastava joined
Krishanu
Dr. Jimmy
Kavita
samatha
Divya
32 others
You

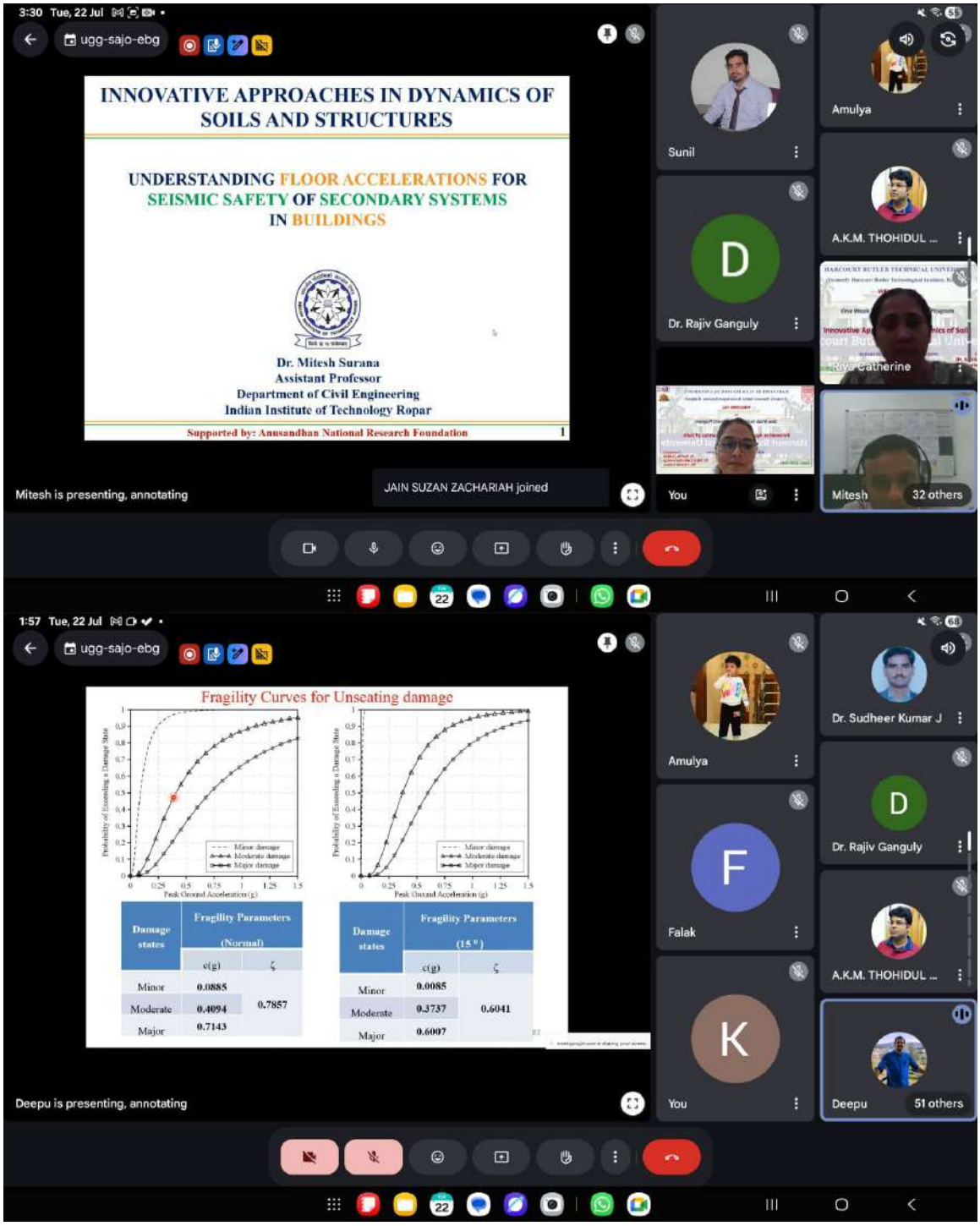

3:41 Fri, 25 Jul
ugg-sajo-ebg
HARCOURT BUTLER TECHNICAL UNIVERSITY
(Formerly Harcourt Butler Technological Institute, Kanpur)
WELCOME
to
Session XII (IADSS 2025)
on
Seismic Performance Enhancement of Building Structures adopting Damped Spine Frame System
Presented By:
Prof. Xingchen Chen
Hiroshima University, Japan
HARCOURT BUTLER TECHNICAL UNIVERSITY
Kavita is presenting, annotating
Dr. Dharmesh
Sunil
Xingchen
Mahajan
Kavita
You
Riya Catherin
27 others
3:45 Fri, 25 Jul
ugg-sajo-ebg
Improving structural integrity and preventing damage concentration in specific levels are extremely important.
Xingchen is presenting, annotating
Dr. Dharmesh
Riya Catherine
Xingchen
Mahajan
Kavita
You
Sunil
29 others


12:31 Thu, 24 Jul
ugg-sajo-ebg
HARCOURT BUTLER TECHNICAL UNIVERSITY
(Formerly Harcourt Butler Technological Institute, Kanpur)
WELCOME
to
Session VIII (IADSS 2025)
on
Dynamics of Granular Materials
Presented By:
Dr. Soukat Kumar Das
National Institute of Technology, Rourkela
HARCOURT BUTLER TECHNICAL UNIVERSITY
Kavita is presenting, annotating
Several participants joined the meeting
Soukat
Kavita
Kavita
Divya
You
Sourabh
27 others
3:55 Wed, 23 Jul
ugg-sajo-ebg
All Waste One Solution: A Model for Rural Bangladesh
A. K. M. THOHIDUL ALAM KHAN
Ph.D Research Fellow
Department of Civil Engineering
Chittagong University of Engineering and Technology (CUET)
Chittagong-4349, Bangladesh
A.K.M. THOHIDUL ALAM is presenting, annotating
A.K.M. THOHIDUL ...
A.K.M. THO...
Mudo
Sachin
Manish Kumar
You
B.P.
23 others


4:41 Wed, 23 Jul
ugg-sajo-ebg
HARCOURT BUTLER TECHNICAL UNIVERSITY
(Formerly Harcourt Butler Technological Institute, Kanpur)
Innovative Approaches in Dynamics of Soils and Structures
IADSS 2025
Interaction Session
ACTIVITY 3
Open Forum
Ask, Interact & Be Inspired
DEPARTMENT OF CIVIL ENGINEERING
Convenor(s)
Dr. Kavita Tandon
Dr. Riya Catherine George
Mr. Manish Kumar
Date: 23-07-2025
HARCOURT BUTLER TECHNICAL UNIVERSITY
Kavita is presenting
A.K.M. THOHIDUL ...
HOD
You
Dr. Vinay Bhushan
Shivanshu
M
Manish Kumar
19 others
4:10 Wed, 23 Jul
ugg-sajo-ebg
MvDad.com
Sustainable Stable Structural Solutions
Cloud Based RC Building Earthquake Resistant
Structural Design Software.
Thank You
Tutorial
Feedback
B.P. is presenting, annotating
A.K.M. THOHIDUL ...
A.K.M. THOHIDUL ...
K
You
Kavita
Sachin
M
Manish Kumar
25 others


4:38 Wed, 23 Jul
ugg-sajo-ebg
HARCOURT BUTLER TECHNICAL UNIVERSITY
(Formerly Harcourt Butler Technological Institute, Kanpur)
Innovative Approaches in Dynamics of Soils and Structures
IADSS 2025
Interaction Session
ACTIVITY 3
Open Forum
Ask, Interact & Be Inspired
DEPARTMENT OF CIVIL ENGINEERING
Convenor(s)
Dr. Kavita Tandon
Dr. Riya Catherine George
Mr. Manish Kumar
Date: 23-07-2025
HARCOURT BUTLER TECHNICAL UNIVERSITY
Kavita is presenting
A.K.M. THOHIDUL ...
A.K.M. THOHIDUL ...
Dr. Vinay Bhushan
Shivanshu
You
Manish Kumar
21 others
12:14 Wed, 23 Jul
ugg-sajo-ebg
HARCOURT BUTLER TECHNICAL UNIVERSITY
(Formerly Harcourt Butler Technological Institute, Kanpur)
WELCOME
to
Session VI (IADSS 2025)
on
Metamaterial: Towards Enhanced Vibration Control
Presented By:
Dr. Arnab Banerjee
Indian Institute of Technology Delhi
HARCOURT BUTLER TECHNICAL UNIVERSITY
Arnab
Rishabh
Mukul
R
Riya Catherine
JAIN SUZAN
You
Arnab
46 others


3:34 Tue, 22 Jul
ugg-sajo-ebg
INTRODUCTION – SECONDARY SYSTEMS
Primary systems (Structural components)
Buildings are made up of structural elements (beams, columns, slabs, shear walls).
Secondary systems (Non-structural components)
Components include: furnitures, appliances (e.g., refrigerators, washing machines), water tanks, light fixtures, suspended ceilings, doors, windows, facade, HVAC units, elevators, and gas pipes.
Classification of secondary systems
Secondary Systems
Cost comparison of secondary systems
Fig. 1. Secondary systems and its classification
Fig. 2. Cost comparison of secondary systems
Supported by: Anusandhan National Research Foundation (CRG/2023/006300)
4
Mitesh is presenting, annotating
Sunil
Amulya
Dr. Rajiv Ganguly
A.K.M. THOHIDUL ...
nayana
You
Mitesh
37 others
11:54 Wed, 23 Jul
ugg-sajo-ebg
2D lattices (Isofrequency contours)
Homogeneous
Square grid frame
Mahajan, et al. Wave cplx med (2024)
Arnab is presenting, annotating
Riya Catherine
Divya
Valmik
Trilok
nayana
You
Arnab
51 others


3:30 Tue, 22 Jul
ugg-sajo-ebg
INNOVATIVE APPROACHES IN DYNAMICS OF SOILS AND STRUCTURES
UNDERSTANDING FLOOR ACCELERATIONS FOR SEISMIC SAFETY OF SECONDARY SYSTEMS IN BUILDINGS
Dr. Mitesh Surana
Assistant Professor
Department of Civil Engineering
Indian Institute of Technology Ropar
Supported by: Anusandhan National Research Foundation
1
Mitesh is presenting, annotating
JAIN SUZAN ZACHARIAH joined
Sunil
Amulya
Dr. Rajiv Ganguly
A.K.M. THOHIDUL ...
Riya Catherine
You
Mitesh
32 others
1:57 Tue, 22 Jul
ugg-sajo-ebg
Fragility Curves for Unseating damage
Peak Ground Acceleration (g)
Minor damage
Moderate damage
Major damage
Damage states
Fragility Parameters (Normal)
c(g)
ζ
Minor
0.0885
Moderate
0.4094
0.7857
Major
0.7143
Damage states
Fragility Parameters (15°)
c(g)
ζ
Minor
0.0085
Moderate
0.3737
0.6041
Major
0.6007
Deepu is presenting, annotating
Amulya
Dr. Sudheer Kumar J
Dr. Rajiv Ganguly
Falak
A.K.M. THOHIDUL ...
You
Deepu
51 others