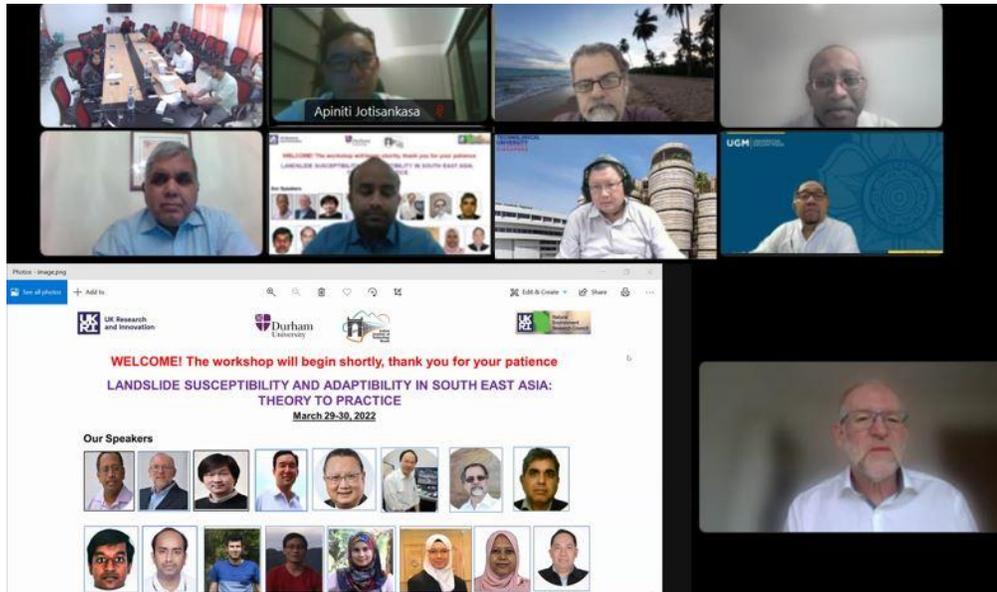


**International Workshop**  
**on**  
**Landslides Susceptibility and Adaptability in South-East Asia: Theory to Practice**  
**March 29- 30, 2022**

A two-day international workshop on the theme “Landslides Susceptibility and Adaptability in South-East Asia: Theory to Practice” was jointly organized by IIT Mandi India and Durham University UK. The workshop was organized as a part of the project “Understanding Landslide Susceptibility and Adaptability in South-East Asia (SEAL)” funded by UKRI-NERC grant. About 350 participants from more than 25 countries covering six continents registered and more than 214 participants attended online including 20 participants attended in person at IIT Mandi. The sessions were enriched by the felicitous presentations by renowned speakers and marked overwhelming presence of students, early career researchers and practicing engineers from India, UK, Canada, Singapore, Malaysia, Thailand, Vietnam, Australia, Brazil and many other countries.



Panelists and participants during the opening ceremony

The workshop begins with a welcome note by Dr. Ashutosh Kumar IIT Mandi followed by a brief update on the SEAL project by Prof. Ashraf Osman from Durham University, UK. Prof. Osman reiterated the need for actions agreed during the COP-26 (UNFCCC) Glasgow UK for the adaptation and resilience measures in Southeast Asia. He also briefed on the similar projects such as CACTUS, iModel and Japan e-ASIA being undertaken by Durham University.

In the first session, Professor David Toll from Durham University presented the application of numerical modelling in analyzing slopes by incorporating the concepts of unsaturated soil mechanics. Based on the experiences of understanding the slopes of Singapore, Malaysia and Nepal, he emphasized that a low intensity rainfall for longer periods is more catastrophic to the stability of soil slopes compared to short spells of very high intensity rainfall. Dr Anthony Leung from HKUST presented detailed study of plant hydromechanical behaviour and its effect on soil reinforcement. He discussed the effect of different plant species on changing the hydromechanical behaviour of soil and provides stability to the slopes. Later, Dr. Apiniti Jotisankasa from Kasetsart University presented on Bio-Slope engineering approach which is a hybrid approach for sustainable slopes and practically employed in some projects in Thailand.

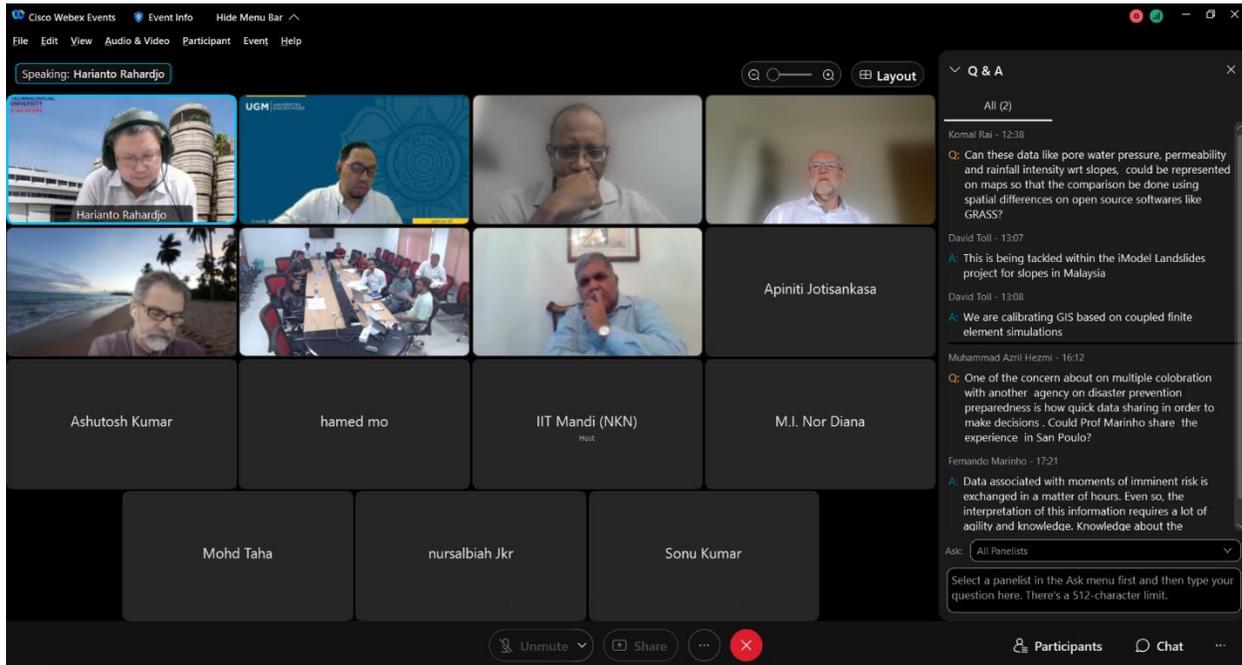
Second session was focused on experience sharing from the different parts of the world. Professor Harianto Rahardjo from NTU discussed on the role of unsaturated soil mechanics in development of slope susceptibility map considering the impacts of climate change. He also briefed on some practical applications of an interesting concept of Geo-barrier system in Singapore. Professor Fernando Marinho from university of Sao Paulo a brief overview of the monitoring services in the risk areas in São Paulo. Professor Sai Vanapalli from University of Ottawa discussed the importance of considering the unsaturated state of soil while analysing the infrastructure resting on soil slope more particularly for expansive soils available in arid and semi-arid regions of the world. The session ended with a panel discussion on the way forward for the geotechnical engineering community to tackle the challenges of the climate and its impact of civil engineering infrastructure. Panelists stressed the need for understanding the adverse impacts of climate change and unanimously reiterated the importance of unsaturated soil mechanics in providing future solutions to cope up with the pressing geotechnical problems.



Panelists during the panel discussion

The first session of second day focused on the studies undertaken under the SEAL project where Dr. Sravan Muguda from Durham University presented on the use of water treatment residue for developing a capillary barrier system, which is followed by Dr. Ashutosh Kumar from IIT Mandi. Dr. Kumar briefed on the process of wetting and drying of unsaturated soils associated with the climate change and showcased the water barrier system developed by IIT Mandi. Later Dr. Hamed Moghaddasi from University of

Starthclyde discussed the numerical modelling strategies for the modelling of unsaturated slope under rainfall infiltration using FLAC2D. The landslide vulnerability assessments specific to regulations in Malaysia were presented by the following speakers Dr. Nor Diana Mohd Idris from UKM on social vulnerability assessment for landslide hazards in Malaysia, thereafter, Mr. Van Thang from Gunma University, Japan presented the analysis of slopes in Kajang, Malaysia.



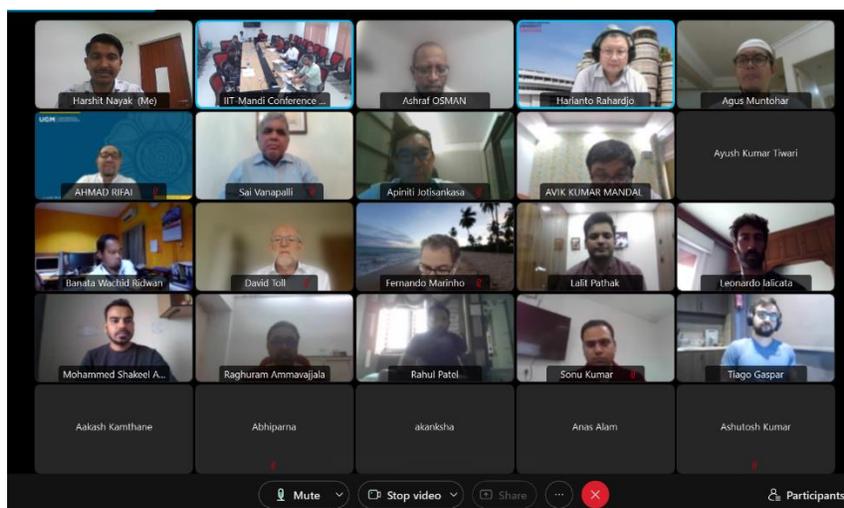
Interaction with the panel members

The second session was focused on the regulations related to landslide where Ms. Nursalbiah from JKR- Department of Public work, Malaysia presented an insight on National Slope Master Plan on monitoring and remedial works, her presentation was followed by the presentation by Dr. Mastura Azmi from Universiti Sains Malaysia, where very useful tools on implementation of manual for landslide vulnerability index and risk classification for Critical Infrastructure (CI) in Malaysia were discussed. Lastly, Dr. Ahmad RIFA'I from Gadjah Mada University (UGM), Indonesia presented some important regulatory mechanisms and systems specific to Indonesia to deal with the problem of landslides.

On successful completion of the workshop, Prof. David Toll and Prof. Ashraf Osman from Durham University, UK and Dr. Ashutosh Kumar from IIT Mandi thanked the panelists and participants for their overwhelming participation and interactive responses during the presentations and extended their best wishes for any such events in future.



Participants attending the session at IIT Mandi and the organizing team



Participants during photo session

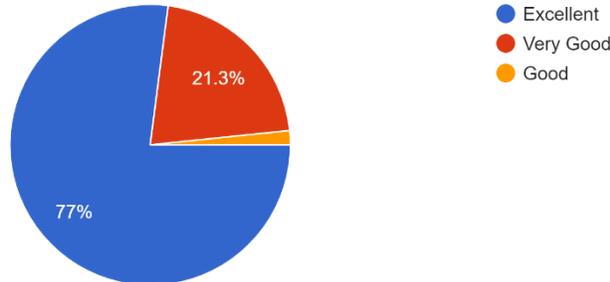
List of Speakers:

1. Prof. Ashraf Osman, Durham University, UK
2. Dr. Anthony Leung, HKUST, Hong Kong
3. Dr. Apiniti Jotisankasa, Kasetsart University, Thailand
4. Prof. Harianto Rahadjo, NTU, Singapore
5. Prof. Fernando Marinho, University of Sao Paulo, Brazil
6. Prof. Sai Vanapalli, University of Ottawa, Canada
7. Dr. Sravan Muguda, Durham University, UK
8. Dr. Ashutosh Kumar, IIT Mandi, India
9. Dr. Hamed Moghaddasi, University of Starthclyde UK
10. Dr. Nor Diana Mohd Idris, UKM Malaysia
11. Mr. Van Thang, Gunma University, Japan
12. Ms. Nursalbiah, JKR- Department of Public work, Malaysia
13. Dr. Mastura Azmi, Universiti Sains Malaysia, Malaysia
14. Dr. Ahmad RIFA'I, Gadjah Mada University (UGM), Indonesia

## Feedback:

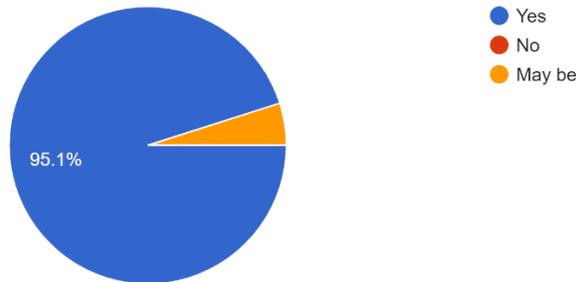
How would you rate our Speakers ?

122 responses



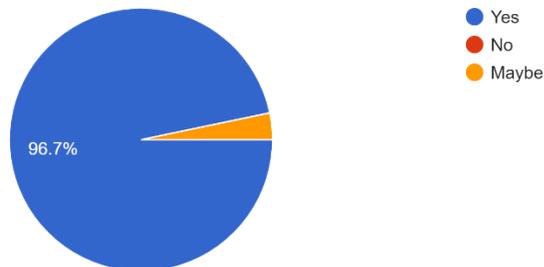
Did you find this workshop useful for your profession benefits ?

122 responses



Do you think the technique demonstrated during this workshop would help you in better understanding the slope and its behaviour under the event of rainfall?

122 responses



## Few comments from the participants:

Interesting, comprehensive sessions of the days which provided useful exposure regarding the application of "Principles of Unsaturated Soil Mechanics" for the "Slope Stability Analysis" in case of "Susceptibility of Rainfall Induced Landslide".

Being a practice engineer in construction field the first thing to understand the soil/ geotechnical behaviour before starting any construction, hence it was too much fruitful for me and for my organisation, please.

Thanking you for organising such a great technical webinar. 🙏🙏🙏🙏🙏



UK Research  
and Innovation



Durham  
University



UNIVERSITI  
KEBANGSAAN  
MALAYSIA  
The National University  
of Malaysia



It helps me get more knowledge about this field, especially I am a abroad study in Master's student on Engineering Geology - Geotechnical Engineering in Taiwan, my interesting in geological uncertainty, geotechnical survey, random field and landslide. If you have more event online or offline relate, please send me an invite for participate. It is very pleasure for me. Thank you all!

It enhances the analysis of Slopes in different region of the world. Previously, I only used to know about the Taylor's method, many more which are applicable in Indian Region only but now I have know about many methods of analysis. So by this way it help me to gain as much of knowledge in the field of Geotechnical Engineering. Thankyou

Everything was fine and we learnt a lot from this knowledge full activity. I am thankful to all the presenters. I have no feedback because everything was smooth & very attractive.