

# Indo-Nepal Webinar for Geotechnical Excellence

Theme: Hydro Tunnelling in Himalayas



**Jointly organized by:**

**Indian Geotechnical Society (IGS) and  
Nepal Geotechnical Society (NGS)**



**Date:** 6 April 2024, Saturday

**Time:** 6:30 PM (Indian time)

6:45 PM (Nepal time)

## Background:

The Indian Geotechnical Society (IGS) and Nepal Geotechnical Society (NGS) are teaming up for a special webinar on "Indo-Nepal Webinar for Geotechnical Excellence." This webinar aims to foster cooperation between the geotechnical communities of India and Nepal. By sharing knowledge, expertise, and experiences, both the societies seek to enhance geotechnical practices and promote excellence in the field. This collaborative effort signifies a commitment to advancing geotechnical engineering and addressing common challenges faced by the construction industries in the region.

### "Indo-Nepal Webinar for Geotechnical Excellence"

Jointly organized by

**Indian Geotechnical Society (IGS) and Nepal Geotechnical Society (NGS)**

## Objectives:

- Increase awareness and understanding of geotechnical engineering issues at an international level.
- Enhance networking opportunities for geotechnical professionals and researchers.
- Identify of potential areas for collaboration and future joint endeavors.
- Dissemination of valuable knowledge and expertise to support the advancement of geotechnical engineering practices.
- Work as per the concept of MOU signed between IGS and NGS in IGC 2023, Roorkee

# Presenters Short Bio:

## Mr. Arvind Kumar Mishra

Mr Mishra is a well-known professional in the Hydro power development in India and Bhutan. He devoted 46 years in the Design Engineering, Construction Management and Contracts Management of major Hydro power projects. Mr Mishra did his Bachelor's degree in civil engineering in year 1977 from Jiwaji university and thereafter did his MTech in Soil Mechanics and Foundation Engineering from IIT Delhi. Mr Mishra is Life Member/Fellow/Associate Member of prestigious Institutions/ professional bodies of the world.



On 17th December'23 he has been conferred by the **His Majesty The King of Bhutan** the highest civilian award at Thimphu on 116th National Day of Bhutan, for his outstanding contributions in the development of hydro power projects in Bhutan. Mr Mishra has authored around 40 Technical papers which have been deliberated and published in the proceedings of the conferences/seminars.

## Dr. Gyanendra L Shrestha

Dr. Gyanendra L Shrestha is a Senior Consultant specializing in Geotechnical, Tunnel, and Hydropower Engineering. Currently engaged in Hydro Lab and various projects financed by the World Bank and the Asian Development Bank across multiple countries, Dr. Shrestha brings extensive expertise to his role. He holds a PhD in Tunnel Engineering from the Norwegian University of Science and Technology, NTNU, Norway, and an MSc in Geotechnical Engineering from the University of Birmingham, United Kingdom. Before joining NEA Engineering Company, Dr. Shrestha gained valuable experience at the Lower Modi Hydropower Project and several other hydropower initiatives. His core competencies encompass site investigation, geotechnical design parameter recommendation, bearing capacity and settlement calculations employing geotechnical software. Additionally, he specializes in tunnel stability analysis and support design, utilizing empirical, analytical, and numerical modeling techniques. Dr. Shrestha possesses comprehensive knowledge in hydropower development, spanning from planning to commissioning. His skill set encompasses site selection, design, construction supervision, troubleshooting, as well as management and quality control of civil, tunnel, and hydropower projects. He has contributed significantly to the field through numerous publications in peer-reviewed international journals, national journals, and magazines. Furthermore, he is the author of the book "Rock Engineering Handbook on Design of Tunnel and Other Underground Structures."



# Abstract of Presenters:

## Title of presentation:

Analysis of highly fragile deep slopes and dam abutments in Himalaya

**Mr. Arvind Kumar Mishra**

## About the Topic

Present talk details about design of piles driven in cohesionless soil, linear versus non-linear analysis for fragile dam abutments and risk assessment of aged concrete gravity dam subjected to material deterioration under seismic excitation. Most of the technical problems now a days are being reported in the above mentioned 3 categories simply because piling proposed in poor ground to handle the weak ground for placing the dam foundations, need a re-look into the conceptual aspects. In this regard, Punatsangchhu-1 HEP in Bhutan, where 4mm movement on an average observed in the right abutment in a month. Consultant WAPCOS has proposed piling on the right abutment side including the concrete blocks which may be coming up on the right abutment side. Similar to above, the present design practice primarily based on

Linear analysis is no more supportive to fragile rock mass where the law of proportion is not valid due to the non-linearity. Therefore, now, in most of the slopes abutting the Concrete dams need correction. This correction may come through the nonlinear analysis. Apart from the above, the risks assessment of aged concrete dams subjected to the deterioration of material with age when subjected to seismic excitation for which the dam was originally designed, will not behave in the manner it was expected due to deterioration of concrete with time. Such dams now need a relook so that risks assessment is made in advance in case dam fails. In my opinion all the above mentioned topics are relevant for re looking into the conceptual designs.



## Title of presentation:

Tunneling in Nepal Himalaya and Associated Risks

**Dr. Gyanendra L Shrestha**

## About the Topic

Use of underground space is not new in Nepal. The early generations used underground caverns and tunnels of smaller dimensions for shelter and tombs, to extract the minerals/metals for tools and coins and irrigation purposes. First underground structures are more than 2,000 years old in Mustang Nepal. Those were used for shelter and tombs. In Arghali Palpa 400 years old irrigation tunnel is still in use. Similarly, Churia road tunnel was constructed more than 100 years ago.

In Nepal, Tunnel and underground space is used for; Hydropower projects, Drinking Water Supply Tunnels, Irrigation Tunnels, Sewerage Tunnels, Road/Highway Tunnels, Mining Tunnels, Religious and museum. At present, most of the tunnel and underground structures in Nepal are being constructed mainly for hydropower projects. Pharping was the first hydropower project in Nepal constructed more than 100 year ago. However, use of tunnel and underground cavern were used first time in Nepal for Tinau hydropower project in Butwal in 1974. As of January 2024, about 400 km tunnels have been constructed in Nepal. Out of them 320 km tunnels are for hydropower projects. Tunnel squeezing, in-situ stress condition, water ingressing, shear zone, over-break are some of the challenges encountered time and again while tunneling in Nepal Himalaya.



# Program schedule:

Date: April 6, 2024

Nepal Time	Indian Time	Title	Remarks
6:45 PM	6:30 PM	Welcome and program brief	Program Moderator (NGS)
6:50 PM	6:35 PM	IGS Introduction	Dr. Anil Joseph, IGS President
6:55 PM	6:40 PM	NGS Introduction	Dr. Mandip Subedi, NGS President
7:00 PM	6:45 PM	Lecture 1	Expert representing IGS
7:25 PM	7:10 PM	Lecture 2	Expert representing NGS
7:50 PM	7:35 PM	Q/A	
8:05 PM	7:50 PM	Invitation to GeoMandu 2024	Prof. Dr. Netra Prakash Bhandary, GeoMandu 2024, Chair
8:10 PM	7:55 PM	Concluding Remarks	IGS

## Registration:

Link: <https://shorturl.at/tyCL5>

