

### Keynote speaker Topic 3

#### Mr. Yogendra Deva

##### Profile

Head-Geology, Indo Canadian Consultancy Services  
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Date of Birth: 20 July, 1951  
Nationality: Indian

##### Titles

2011-present: IAEG Vice President for Asia  
2005-2012: Secretary of IAEG India National Group  
2003-2004: Editor of IAEG India National Group (Indian  
Society of Engineering Geology)  
1994-1998: Joint Secretary of IAEG India National Group

##### Position Held

2009-2015: Indo Canadian Consultancy Services Ltd. Noida (Head-Geology)  
1977-2009: Geological Survey of India (Geologist, Sr. Geologist, Director)

##### Research Interests

Practicing Engineering Geologist. DPR and construction stage engineering geological investigations of over 100 hydropower, irrigation and communication projects in India, Nepal, Bhutan, Myanmar, Democratic Republic of Congo, Indonesia, Rwanda, Tanzania.  
Over forty technical papers in India/ International Conferences. As Editor of IAEG India National Group, edited Seminar Volumes, Journal of Engineering Geology of IAEG Indian National Group, Constitutional amendments, etc.

##### Education

1974: M.Sc. Applied Geology, University of Delhi  
1974-1977: Research Scholar/ Lecturer, Geology Department, University of Delhi



#### Abstract

#### Natural damming in the India Himalaya and its Impact on Hydropower Development

Occurring as a prominent convex arc of mountain chain in north India, the 2400 km long Cenozoic mobile belt of the Himalaya is the product of collision between the Indian and Asian plates.

The Main Himalayan Belt is host to major hydropower development in India that, at present, is focused in the Lesser Himalaya bound between the Main Central Thrust and Main Boundary Thrust, and is stepping out in to the Higher Himalaya north of the Main Central Thrust. The investigation and implementation of the hydropower projects in this belt are governed by complex geotechnical implications arising out of unique site specific lithological and tectonic models. Not very infrequently, many of the project sites have come across natural dams with silted up lakes posing serious foundation and tunneling problems.

Generally, the low bearing capacity and saturated nature of the lacustrine deposits lead to seriously adverse foundation conditions including liquefaction potential, and extremely difficult or even insurmountable problems in the construction and maintenance of subsurface structures like tunnels. It is, therefore, advisable to stay away from exceptionally thick alluvial deposits in wide valleys and, if that is unavoidable, to study and explore such a site thoroughly. This is not always possible and, if unavoidable, adversely influences the techno-economic parameters of the project.

In particular, some of the major hydroelectric projects in Indian Himalaya that faced the geotechnical investigation and construction challenge include the 390 MW Dul Hasti Project across the Chenab River in Jammu & Kashmir, 780 MW Nyamjang Chhu Project across the Nyamjang Chhu River in Arunachal Pradesh and 300 MW Baspa-II Project across the Baspa River in Himachal Pradesh.

The presentation takes a critical look at the phenomena of natural damming in the Himalaya and its engineering geological and geotechnical implications with special reference to Dul Hasti, Nyamjang Chhu and Baspa-II Hydroelectric Projects.