

# iGrip webinar series on GEOSTRUCTURES

## Challenges in the Geotechnical Investigations of Hydroelectric Projects

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**Dr. R. Chitra** is working as Joint Director at Central Soil and Materials Research Station, Ministry of Water Resources, River Development and Ganga Rejuvenation, New Delhi. She has over 30 years of experience in the field of geotechnical engineering. Her experience in planning, guiding and execution of geotechnical investigation works for river valley projects has spread to over 335 projects within India and neighbouring countries such as Nepal,

Bhutan, Afghanistan and Myanmar. Her interests include hydropower development, earth and rockfill dams, problematic soils, risk assessment of dams, numerical modelling, ash containment systems, fly ash characterization, geosynthetics in water resources, artificial neural networks and quality control of hydro-electric projects. She has published over 235 technical papers in various international and national journals and conference proceedings. She is member in the expert committees of most of the dam safety review panel, major dam projects and irrigation projects. She is also member of various committees of national repute like BIS, IRC etc. and her contributions towards formulation, review and updation of various Indian Standard codes are substantial. She is a recipient of many awards from the geotechnical fraternity for her extraordinary contributions to the geotechnical engineering field.

### Abstract

Hydroelectric Projects are high risk projects which are normally safe, but any failure can be catastrophic. Every geotechnical design is to some extent hypothetical, and every construction job involving natural geologic materials such as earth and rock, is full of surprises and challenges. These challenges can come up at the most inconvenient time adding difficulties which might result in cost and time over-runs. India is fortunate to rank fifth amongst the world in the development of hydroelectric projects. Most of the Indian hydroelectric projects are located in the Himalayan region which pose serious problem of foundation instability due to fractures, faults, joints, bedding planes, cleavages, etc. The extent of geotechnical investigations required for a hydroelectric project is enormous as the area involved in the project is large leading to material variability. Geotechnical investigation has become challenging as most of the competent sites have been exhausted and a Geotechnical engineer has to judiciously blend the knowledge of the existing codes, practice manuals and his experience to develop an investigation plan to arrive at the required design parameter. This presentation discusses about some of the varied experiences gained while dealing with different hydroelectric project located in India and neighbouring countries.