



Dr. R. Venugopala Rao
Advisor
Energy Infratech Private Limited

PROFILE

Dr. R. Venugopala Rao has professional experience of around 24 years in the Rock Mechanics, Numerical Modeling, Stress Analysis and Support Design for tunnels, Caverns, 3D modeling of Rock slopes and dams, Soil Mechanics, Fluid Mechanics, Structural analysis and Structural Dynamics. His Domain of Expertise:

- Constructed Rock ledge to hold 130T EOT crane saving about 4 months time and Rs 2 Cores.
- Constructed a 60m long drift in overburden to anchor concrete dam in to Rock
- Responsible for Analysis and design of UG Structures like caverns, Tunnels etc and Stress Analysis of Dams and other Hydraulic structures for static and dynamic loading
- Prepared detailed design drawings for powerhouse, HRT and preliminary construction drawings for Dam for Malana II Project.
- Developed design methodology for underground excavations under low stress conditions. Normal design principle uses failure envelopes to estimate the length of rock bolts. Under low stress regime, rock mass do not fail, but the excavations are unstable due to opening and sliding of joints.
- Developed optical deformation monitoring system for three dimensional rock mass movements in underground excavations first time in India.
- The back analysis for Desilting chambers which predicted few millimeters of movement due to filling of chambers against unstable phenomenon predicted by M/s Golder Associates, Canada. Management has went ahead based on our recommendations and the chambers are in operation and the additional movement was found to be only 4mm by instrumentation observations.
- Successfully designed the support system for Tala Powerhouse, taking into account of roof failure and subsequent rock bolt failure in walls. The support system suggested working satisfactorily and the performance matched with those of instrumentation observations. Optimization of support systems based on excavation sequence.
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Professional Highlights



Numerical Modeling Section, National Institute of Rock Mechanics, Kolar Gold Fields
Scientist & Head (1996-2005)

Headed a key project consultancy division of numerical modeling and instrumentation of UG workings. Handling projects worth Rs. 20.0 million and Rs. 10.0 million in individual capacity. Improved the department annual cash flow from 1.5 million to 13 million per annum. Involved in laboratory and in situ investigation programs for UG excavations for hydropower development. Stress Analysis and Support Design for tunnels, caverns for Hydro electric power projects using state of the art software like UDEC, 3DEC, BEFE, FLAC. Performance evaluation of support systems of underground excavation using advanced instrumentation like 3D optical deformation monitoring, extensometers, peizometers, Loadcells etc. First to introduce Optical deformation monitoring using Industrial grade total station for UG excavations in India. Introduced concepts like joint deformations, force induced in support systems to design support system for UG excavations. Stability analysis of natural rock slopes and dams using 3D modeling including earthquake effects. Stability and subsidence problems associated with coal mining. Developing Boundary Element Software for Underground Space Structures funded by National Committee of Central water commission of Government of India.

Civil Engineering Department, Indian Institute of Technology, Kanpur
Research Associate (1990 - 1995)

Civil Engineering Department, Bapatla Engineering College, Bapatla, AP
Lecturer & Head Geotechnical Division (1986 - 1989)

Educational Qualification

Ph. D. (Civil Engineering)

Indian Institute of Technology, Geotechnical Engineering

M. Tech. (Civil Engineering)

Indian Institute of Technology

B. Tech. (Civil Engineering)

JNTU College of Engineering, Andhra Pradesh

Memberships

Indian Geotechnical Society (LM-874)

International Society for Rock Mechanics Member

International Tunneling Association