

National Institute of Rock Mechanics (NIRM),

The National Institute of Rock Mechanics (NIRM), a premier centre for research in applied and basic rock mechanics was registered under the Societies Registration Act. in July, 1998 with headquarters in Kolar, Karnataka. It has been carrying out quality research work and extending its R&D support to the mining, hydroelectric and civil construction projects including tunneling. NIRM integrates theory and practice to provide specialised services of rock mechanics/rock engineering.

The Institute has the ISO-9001: 2008 accreditation for its R&D services in the following broad disciplines: Engineering Geology, Engineering Geophysics, Geotechnical Engineering, Fracture Mechanics & Materials Testing, Engineering Seismology, Numerical Modelling, Rock Blasting & Excavation Engineering, Mine Design & Ground Control, Microseismics & Automation, Engineering, and Dimensional Stone Technology.

NIRM has the following human resources under its control:-

Sl.No.	Posts	Sanctioned Strength	Existing Strength
1	Director	1	1
2	Scientists – (Group IV)	44	39
3	Scientific Staff-(Group III)	18	17
4	Technical Staff-(Group II)	7	7
5	Supporting Staff-(Group I)	3	3
6	Administrative Staff	13	9
	Total	86	76

11.11 The Budgetary position of NIRM is as follows:-

Particulars	(Rs. in Crores)				
	RE 2008-09	Actual 2008-09	BE 2009-10	RE 2009-10	BE *2010-11
Recurring Expenditure	492.06	395.57	637.38	630.30	604.95
Non-Recurring Expenditure	47.00	0.0	250.00	0.0	0.0
Total	539.06	395.57	887.38	630.30	604.95

* proposed

NIRM has signed MOUs with three industry majors for taking up different projects including DPR preparations for new upcoming projects. Major projects executed during the year include :-

Malshejghat hydroelectric project, Maharashtra

A pump storage scheme (PSP) to generate 600 MW (2 x 300 MW) hydro power. During this year NIRM initiated field investigations with preliminary geological survey and borehole logging.

Strata classification for new terminals at Chennai airport

The field and laboratory investigation by using seismic refraction and compressive strength testing was carried out for construction of new terminal at Chennai airport.

Resistivity imaging for oil storage cavern near Padur, Karnataka

Geophysical investigation was carried out to locate and decipher the character and nature of in-situ fracture zones, delineate major geological anomalies, and to determine the depth to groundwater table and perched aquifers in the area earmarked for constructing large underground caverns for the storage of crude oil and natural gas by the India Strategic Petroleum Reserve Limited (ISPRL).

Geophysical survey for Kumaradhara small HEP

NIRM carried out geophysical survey including seismic refraction and electrical resistivity imaging survey along the tunnel alignment for Head Race Tunnel (HRT). As no geological anomalies were seen in the subsurface, the strata appeared to be good for driving the HRT.

In-situ stress measurement at Pala Maneri and Pipalkoti-Vishnugad hydel Projects, Uttarakhand

The deepest ever hydrofracturing test was conducted in India, at a depth of 324 m at Pala Maneri Hydroelectric in the Uttarakasi district of Uttarakhand. Stress measurement was done by lowering the hydrofrac tool using NQ size drill rods (commonly used for wireline drilling) by using tailor-made tools.

Post-failure Deformation Mechanism for Coal

Post failure deformation behaviour of coal is crucial for designing pillars in underground coal mines. The entire process of recursive fracture initiation process leading to complete destruction of coal block was simulated in the laboratory scale testing on sample.

Stability Analysis of Cut Slopes using Numerical Modeling

Numerical modeling using 3DEC software was used to analyse the stability of the left and right abutments cut slopes for Koteshwar Hydroelectric Project. Major and minor principal. Based on the magnitudes of displacements it was recommended to install cable anchors of 120 tons capacity at a spacing 10 m x 10 m without pre-tensioning on the right abutment slopes.

Strata monitoring at Tala hydroelectric project, Bhutan

About 150 instruments were monitored at power house complex, surge shaft and pressure shaft and the cavern was undergoing both time-dependent deformations and stress-induced deformations.

Blast Design for Jilling-Langalota Mines

NIRM carried out field investigations in 3 phases and optimised the blast design parameters using image processing software and by random physical boulder count.

Blast impact studies on the existing hydro power plant structures

THDC is making excavations for a second machine hall cavern at a distance of about 130 m from the existing transformer hall for future power generation. Trial blasts were organized at the working places and it was recommended that blasting shall not be carried out at distances less than 30 m from the structures.

Design of a 250 m deep extensometer

NIRM Scientists have designed a deep hole multi-point borehole extensometer that was installed at 250 m over a working longwall panel of Singareni Collieries Co Ltd (SCCL), in Ramagundam (Andhra Pradesh). It will monitor the strata deformation and caving behaviour over the goaf as the longwall extraction progresses.

Design of safe method of working in mines

NIRM suggested the method of work and the support systems for wide stall method of partial extraction at GDK-8A incline, in SCCL and at Tummalapalle mine of Uranium Corporation of India.

MoU between NIRM and other Organizations

NIRM has entered into the following MoU

- MoU between THDC and NIRM
- MoU between HCC and NIRM
- MoU between SEW and NIRM

Training Courses

The Institute has been conducting training courses in "Application of Numerical Modelling Techniques to Underground Excavations and Slopes" from 1st to 8th April, 2009 for THDC and on "Application of Rock Mechanics Principles to Tunnelling" from 12th to 18th August, 2009 for Druk Green Power Corporation Ltd., Bhutan and also for SEW Infrastructure Ltd. at their project site at Chuzhachen, Sikkim (07-10 November 2009).