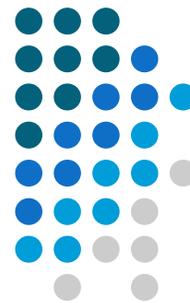




ISEG NEWS

Bridging Communication Gap.....Dissipating Information



NHPC Ltd
Pioneers in Hydropower Development



Geological Survey of India



Mineral Exploration Corporation Limited

Council 2013-2014

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GSI, Hyderabad

Editorial



Bridging the communication gap is the motto of ISEG Newsletter and therefore we are here once again to achieve this. Communication is effective only when the receiver understands and appreciates what the sender wants to convey. In organizations, however, communication integrates people from top to bottom and from side to side. Many misunderstandings can be overcome through effective communication.

Through this Newsletter we

shall reiterate the aims and objectives of ISEG and would also encourage the geologists and engineers to come closer and bridge the gap to successfully complete projects for benefit of their organizations and the country. The new ISEG team led by a dynamic President and the Secretary has taken charge and are supported by other office bearers and a vibrant council. We are fortunate to have some of the best experts with us in this term. We have set up ambitious targets for ourselves and

hope to achieve all of them. An important task before the committee is to start taking action for organizing the Golden Jubilee celebrations of ISEG in 2015 which includes a grand International Conference at New Delhi. As Editor I can assure that no stone will be left unturned in setting up the tone and do the work religiously.

We are aiming to bring out Newsletter Bi-annually in

.....Continued on Page 5

Message From Secretary



Indian Society of Engineering Geology, founded on 15 October 1965 at Kolkata, under the able guidance of Dr. D.N. Wadia, the Founder President of the Society and the doyen of Indian Geology, has just completed forty eight years of its existence. The Society has a Mission to promote the study of Engineering Geology and allied sciences, effectively served as a formidable bridge between the geologists and engineers; has provided a vibrant platform for discussing and debating a host of geotechnical problems and state-of-the-art technologies; and projected the Nation's achievements in the field of Geotechnique before the world. As the Society is

heading towards its successful and dedicated service of fifty years, it is quite but natural that we, the members, lovers and well-wishers of the Society aspire to celebrate its Golden Jubilee in October, 2015 in a befitting manner, knowing fully well that we cannot bask in past glory forever and survive on sermons of achievements of our ancestors.

The Executive Council of the Society for the term 2013-14, which took over with effect from 1st January, 2013 profusely acknowledge all Members of the Society for bestowing confidence and unanimously electing the new body. The Council also places on re-

cord its sincere gratitude to Shri Yogendra Deva, Past Secretary, who served the Society immensely for the last one decade. With the continued blessings and interaction with seniors of the Society, we maintain legacy, transparency in our actions and promise to discharge our duties to meet high expectations of all Members. After all, new brooms sweep better.

Shri Imran Sayeed, Editor is planning a few changes in Society's publications to get recognition and indexing and reinforce status of peer reviewed journal. Hopefully, Members like them well.

.....Continued on Page 5

"Effectiveness of knowledge through research (E) is $E = mc^2$, where m is mass of knowledge and c is communication of knowledge by publications"

-Z. T. Bieniawski



Message From the President



Nagpur
April 30th, 2013

ISEG was launched in 1965 to look after the interests of emerging specialist in India and since then it has done a yeoman's service in the field of engineering geology. Over the years the subject has made rapid strides particularly in the last couple of decades and ISEG through various publications, workshops and seminars has tried to bring together the knowledge and experiences of engineering geologists and engineers. This has also brought the two related specializations in engineering geology and the geotechnical engineering on common platform on many occasions.

The new council has taken over from January 2013 and I consider myself fortunate to lead a vibrant team of experts for this term. The website of the society has been recast to make it more dynamic and interactive. Similarly the separate website for Journal of Engineering Geology (www.joegindia.com) will be on air from next month i.e., May 2013. New guidelines and template for submission of technical papers for the Journal of Engineering Geology published by the society have been framed and are available on Journal website.

The road map for the new team is set and everybody is contributing in achieving the goals. One of the tasks before the new council is to plan and organize the International Event scheduled for 2015 to celebrate the Golden Jubilee of the society. In this regard a strong organizing committee will be constituted which will start formally functioning from July 2013. That will give us two years before the International Conference.

The Editorial Board for the Journal of Engineering Geology has been reconstituted to bring international representation as well as members from the engineering discipline. We are looking at further development of engineering geology in India by bring in more geotechnical inputs from soil and rock mechanics. Moreover the society needs to expand its base and invite representation from the mining industry as well as from academic institutions. Our international counterpart, IAEG's "Bulletin of Engineering Geology and the Environment" regularly includes a number of papers on varied topics in engineering geology, geotechnique, soil mechanics, rock mechanics, groundwater contamination, geo-hazards and so on. Therefore, Indian Society of Engineering Geology will not only go deeply into the subject and improve the quality of engineering geological work but will also expand its horizons in the next couple of years. The availability of time is limited and in this period only all the targets are to be achieved. As such we will try to organize council meetings on quarterly basis in a highly structured manner so that discussions are meaningful and lead to logical conclusions. In this regard, I seek cooperation from all concerned.

I congratulate the editor and his team for bringing out the new look newsletter. It is hoped the good work continues in website launch and journal schedule also. The encouragement given by the Secretary in the endeavor is thankfully acknowledged. Feedback from members is most valuable and will be earnestly sought always.

Dr. Gopal Dhawan
President
Indian Society of Engineering Geology (ISEG)

**ISEG NEW
WEBSITE
LAUNCHED**

Indian Society of Engineering Geology
(ISEG) has launched a new look website .

For details please visit isegindia.org

**NEW WEBSITE FOR
JOURNAL OF ENGINEERING GEOLOGY
ANNOUNCED**



An additional website featuring Journal of Engineering Geology, a premier publication of Indian Society of Engineering Geology (ISEG) is under construction.

This website is scheduled to be launched during May'2013.

AN INTRODUCTION TO ISEG COUNCIL FOR 2013-14 TERM



Dr. Gopal Dhawan
President
CMD, MECL, Nagpur

**M Tech. (Applied Geology), IIT-Roorkee (formerly University of Roorkee)
Ph. D, Indian School of Mines, Dhanbad**

In his 33 years long career, he was associated with engineering geological & geotechnical studies of numerous hydroelectric projects of NHPC in India and abroad. He was one of the pioneers in India who applied modern rock mass classifications (RMR & Q systems) in Engineering Geological Mapping. As Executive Director (Geo-Tech & PID), NHPC (Jan 2008- May, 2012), he headed Engg. Geology & Geotech, Project Investigation Divisions at Corporate office, Faridabad along with various Survey & Investigation Projects of NHPC. Dr. Dhawan has published and presented around 30 technical papers/keynote addresses in various National and International Journals, Symposia, Seminars etc. He is a recipient of Jawaharlal Nehru Birth Centenary Research Award (2004) by CBIP, India and Outstanding contribution Award (2008) by ISRM, India for his contributions in the fields of Engineering Geology, Rock Mechanics & Tunneling Technology.

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Dr. Prabhas Pandey
Vice President
Additional Director General (Retd), GSI

M.Sc., Ph.D.

He has vast experience in the field of Engineering Geology, Earthquake Geology & Seismotectonics. Presently he is Chairman of Task Force of Experts for Landslide Studies in India under NDMA and Expert Group for "Active Fault Mapping", under Ministry of Earth Sciences. He is also member of various high level expert and advisory committees on seismic design, earthquake and landslide hazard related issues constituted by Ministry of Earth sciences and Department of Science and Technology, Government of India. He is also member of Editorial Advisory Board of Indian Journal of Geosciences, GSI.

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Dr. Manoj Verma
Vice President
Technical Director, Geodata Engineering

**BE (Civil Engineering), Punjab Engineering Collage
M. Tech (Rock Mechanics), IIT-Delhi
PhD (Rock Mechanics), IIT-Roorkee (formerly University of Roorkee)**

He holds prestigious position of Vice President on the global board of International Society of Rock Mechanics (ISRM) for the term 2011-15. Earlier he also held the position of Director (Tunnelling & Geotechnical) at Halcrow in India. He also worked as Vice Chairman of Global Tunnelling Group with Golder Associates. He holds a vast experience in planning and design stages of several tunnels and rock caverns for design of support systems, rock mass classification, instrumentation, shotcrete technology and in-situ testing. Having published more than 70 technical and research papers in national and international journals he has delivered over 100 technical talks in India and abroad. Dr Verma is currently involved with several tunnelling projects in the Himalayas, especially for rail and highway tunnels.

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V. K. Gupta
Vice president
Regional Executive Director (Hydro), NTPC Ltd

**BE (Civil), Delhi University
M. Tech (Structural Engineering), IIT Delhi**

He has more than 34 years of experience in the field of planning, design and execution of Hydro power projects. Prior to his present assignment, he also worked as Executive Director (Hydro Engineering) for more than seven and half year. Before joining NTPC in Dec' 2004, he worked in NHPC, a premier organization in field of Hydro Power development for a period of 25 years involved with the designing and engineering of several prestigious hydropower projects of the country.

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Prasanta Misra
Joint Secretary
Director (Geology), GSI, New Delhi

MSc (Geology), Calcutta University

Highly experienced engineering geologist having more than 30 years of experience in over 25 water resources development, communication and miscellaneous projects in Himalayan & Peninsular India and in Bhutan from feasibility to post construction stages. Also has investigation experience of multi storied building complex, defence installations, urban development, landslides etc. Presently supervising the clearance of DPRs of hydro power projects in India.

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M. Raju
Secretary
Director (Geology), GSI, Kolkata

M.Sc. (Geology), Andhra University

After joining GSI in 1980, working in Engineering Geology for last 32 years has carried out geotechnical investigation of large number of water resources projects in the Himalayas and peninsular India including Srisailem, Nagarjunaasagar hydroelectric projects. Earlier he was associated with landslide hazard studies for 3 years in NE India. Was also Guest Faculty at GSI Training Institute. Presently monitoring Engineering Geology investigations being carried out in neighbouring countries and landslide activities of GSI.

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Ashok Kumar
Treasurer
Director, GSI, Kolkata

**M. Sc. (Ap. Geol.), IIT-R (Formerly Roorkee University)
M. Phil (Geol), Punjab Univ.1979**

Having 28 years of professional experience in geotechnical investigations of hydropower, irrigation & communication projects in India, Nepal and Bhutan. He also has experience in coal exploration in Raniganj Coalfield. Has published about 30 papers. Currently supervising geotechnical investigations in West Bengal, Orissa, Bihar, Jharkhand, Sikkim and Andaman & Nicobar Islands besides landslide studies in Sikkim & Darjeeling Himalayas.

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Dr. Saibal Ghosh
Joint Secretary
Senior Geologist, GSI, Kolkata

**M.Sc. (Applied Geology), IIT, Kharagpur
M.Tech. (Applied Geology), IIT, Kharagpur
Ph.D., University of Twenty, Netherlands**

He joined GSI in 1994. He has been associated with geotechnical investigations of various hydroelectric projects in the north-east (Assam, Meghalaya, Arunachal Pradesh and Mizoram) and in the eastern Himalayas of India (Sikkim, Darjeeling) & Bhutan as a consultant engineering geologist and landslide expert for the last 18 years. He has published several research articles in various national and international peer-reviewed journals.

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Rahul Khanna
Joint Editor
Deputy Manager (Geology), Project Investigation Division, NHPC Ltd, Faridabad

M. Tech (Applied Geo.), IIT-Roorkee (formerly Univ. of Roorkee), 1996

Professional experience of about 16 years in areas of engineering geology, remote sensing, GIS and hydro-geology. Worked for 4 years as Project Scientist at UP Remote Sensing Applications Centre, Lucknow prior to joining NHPC Ltd in 2001 at Siang Basin Projects, Arunachal Pradesh. Involved with geotechnical investigation work for preparation of DPR's of Siang and Subansiri basin projects. As Site Geologist at Dibang Project (3000MW), Arunachal Pradesh worked for DPR investigation and post DPR works. Involved in preparation of PFR's of 10 projects of Dibang valley in Arunachal under Prime Minister 50,000 MW initiative. As project geologist at Parbati HE Project, stage-III (520MW) involved with construction stage geotechnical work. Presently working in PID for Design & Engg. consultancy work of Mangdechhu HE Project, Bhutan (720MW) and rock mechanics testing at geotechnical laboratory.

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Imran Sayeed
Editor
Chief (Geology), NHPC Ltd, Faridabad

**M. Sc. (Geology), AMU
M. Phil (Geology), AMU; PG Diploma in Hydrogeology, AMU**

More than 27 years of experience in engineering geological and geotechnical work for hydropower, road and railway tunnels in NHPC Ltd. Prepared DPR's of several hydropower projects viz., Kotli Bhel-1A, 1B & 1I, Lakhwar Vyasi, Mangdechhu and Parbati stage-II. Preconstruction stage investigations of Dibang Project in Arunachal & Mangdechhu HE Project in Bhutan. Associated with construction stage geotechnical work of Uri stage-I in J & K, Dhauiganga in Uttarakhand, Parbati stage II & III in HP and Mangdechhu Project in Bhutan. Presently looking after the work of Construction Material Survey, Pre-construction stage investigation work of Chamkarchhu HE Project, Bhutan and D & E consultancy work awarded by MHPA for Mangdechhu HE Project, Bhutan. He has published several research papers in national and international journals and given technical lectures in various conferences including recently held International symposium of Geological society of America Charlotte, N.C., USA during October 2012.

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Dr. V. M. Sharma
Past President
Director, AIMIL

**B. Tech. IIT, Kharagpur, 1961
M.E., Roorkee University (Now IIT-Roorkee),
Ph. D. IIT, Delhi**

He is a well known expert in the field of instrumentation and rock mechanics related to water resources and other civil engineering projects. He has been the Director of CSMRS, New Delhi for 6 years. Published over 250 papers and edited/co-edited 10 books. He has been on the Editorial Boards of several journals and Fellow of the Indian National Academy of Engineering. Delivered keynote address at many national/international conferences. He is the Honorary Fellow of the Indian Geotechnical Society and member of ISSMGE, ISRM and IAEG.

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Yogendra Deva
Past Secretary
ICCS Ltd. (Bhilwara Group)/Former Director, GSI

M.Sc. (Applied Geology), Delhi University, 1974

A career Engineering Geologist since 1977 having worked for projects in Central, South, Northern and North-eastern India, entire Himalayan belt from J&K to Arunachal Pradesh, neighbouring countries like Nepal, Bhutan and Myanmar, and Africa (Congo). Over forty scientific papers. Currently working for clients mainly in Arunachal Pradesh, Himachal Pradesh, Uttarakhand, Odisha, Nepal & Congo. Serving ISEG Council since 1983-84.

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AN INTRODUCTION TO ISEG COUNCIL FOR 2013-14 TERM (Contd...)



Dr. Y.P. Sharda
Council Member
SNC Lavalin, Noida/Former Director, GSI

**MSc, (Geol) IIT, Bombay
PhD, Delhi University**

Joined Geological Survey of India in 1976 and worked in the fields of Engineering Geology, Landslide and Seismotectonics in different regions. Headed the DPR and Landslides Divisions of GSI at New Delhi. Left GSI in 2008 after obtaining voluntary retirement and has been working as Senior Specialist (Engineering Geology) in SNC Lavalin Engineering India Ltd since then and involved in several projects in India and abroad.

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N.K. Mathur
Council Member
General Manager (Geotech), Project Investigation Division, NHPC Ltd, Faridabad

MSc (Geology), Jammu University, 1978

Having started his professional carrier with Irrigation Department, Gujarat, he was associated with medium irrigation schemes and the prestigious 'Sardar Sarovar Project'. He joined NHPC in 1985 and since then has been associated with construction stage geotechnical investigations at large hydropower projects viz., Chamara Stage I (540 MW) and Teesta Stage V (520 MW) and Subansiri Lower (2000 MW). At present Sri Mathur is holding charge of General Manager and looking after Geotechnical investigation of various hydroelectric projects in India, Bhutan and Myanmar.

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S.K. Kar
Council Member
Suptd. Geologist, GSI, Kolkata

**MSc (Geology), 1975
PG Diploma in Environmental & Ecology**

Born in January 1954, he joined GSI in 1977. Extensively worked in Quaternary Geology, Geomorphology, Environmental Geology, Medical Geology and Geothermal energy-related programmes; Worked on IGCP-454 & 581 related to Medical Geology and river basin evolution respectively.

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S. Kannan
Council Member
General Manager (Geology), Hydro Headquarter, GMR Energy Ltd, New Delhi

M. Sc (Geology),

He has more than 30 years of professional experience in Engineering Geology, out of which 25 years in Hydro Projects. Working in GMR since 2007, he looks after all geological works pertaining to hydro electric projects of the Group located at Himachal Pradesh, Uttarakhand, Arunachal Pradesh and Nepal. Prior to this assignment, he worked for over 22 years at NHPC, involved in Engineering Geological and Geotechnical work of various hydropower projects in different stages of development such as Subansiri Lower in Arunachal, Teesta valley projects in West Bengal, Dhauliganga & Goriganga project in Uttarakhand.

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Bhuvanesh Kumar
Council Member
Sr. Manager (Geology), NTPC Ltd, Noida

M. Sc (Geology), IIT-Roorkee (formerly University of Roorkee), 1989

Worked till 1995, as Senior Research Fellow at WIHG, Dehradun, in a DST Project on Structural mapping, Landslides and slope stability. He joined Jaiprakash Associates as resident project geologist at Baspa hydropower project. He also worked for Karcham -Wangtoo, Nathpa-Jhakri, Dul-Hasti & Baglihar projects involved with geo-technical Investigations, tunnelling, rock supports, Slope Stability Studies and Concrete Dams. There he worked in close association with many international consultants and institutes including NGI Norway, Coyne Et Bellier, France, & Lahmeyer International GmbH. He joined Hydro Engineering, NTPC Limited in 2005 and worked on DPR investigations & Geotechnical aspects of various hydro projects viz., Rupsibagar Khasiabara, Kol Dam, Tapovan Vishnugad & Amochhu Reservoir, Bhutan.

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U. V Hegde
Council Member
Executive Director - Lanco Infratech Ltd., Gurgaon

M. Sc (Applied Geology), Karnataka University, 1979

Possess about 32 years of experience in Engineering Geology & Geotechnical field mainly dealing with hydroelectric projects. Prior to joining Lanco Infratech Ltd, was working in GMR Ltd for 3 years as Associate Vice President and in NHPC Ltd, a Public Sector undertaking for more than 27 years. Having long experience in the field of Engineering Geology, Geophysics, Construction Material Survey and other related activities in the field of investigation, construction, operation & maintenance stage of Hydroelectric Projects mainly of Himalayan region spanning from J&K in North to Arunachal Pradesh & Manipur in Northeast including Nepal and Bhutan.

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Akhouri Bishwapriya
Council Member
Senior Geologist, GSI, Patna

M. Sc (Geology), Delhi University, 1998

Joined GSI, Lucknow in 2000 and pursuing Engineering Geology since 2004. Have been associated with several hydroelectric and communication projects in Kumaon & Garhwal Himalayas and Irrigation projects in South UP. Carried out PFR studies of 22 small HE schemes and DPR stage investigations for several HE schemes in Himalayas. Also worked in Bhutan at Punasangchu HE projects. Published six scientific papers. Currently working at State Unit-Bihar, GSI, Patna involved with Seismic Microzonation studies of Patna town since 2011.

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Jaydip Mukherjee
Council Member
Senior Geologist, GSI, Kolkata

M.Sc. (Geology), University of Calcutta, 1988

Engineering Geologist having over 18 years of professional experience in investigations of water resource development projects in Peninsular India and the Himalayas from pre-feasibility to post-construction stages. Also having experience in investigations of multistoried building complexes, bridge sites, river linking projects and site specific landslides. Has published twenty six papers in reputed journals of India. Involved with compilation of GSI publications viz., Inventory of Landslides of NW Himalayas and a comprehensive case history of geotechnical investigation of Rengali Dam Project, Angul District, Orissa.

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Arindom Chakraborty
Council Member
Deputy Manager (Geology), Engg. Geology Division, NHPC, Faridabad

**M.Tech (Applied Geology), IIT Roorkee (formerly Univ. of Roorkee), 2000
MBA (Marketing), Sikkim Manipal University, 2009**

About 12 years Experience in the field of Geological/Geotechnical Investigations for hydropower Projects. Currently working with NHPC Limited as Deputy Manager (Geology). Worked for PFR and DPR stage investigation of Tawang-I and Tawang-II, Subansiri Middle HE Projects in Arunachal Pradesh, PFR of eight hydropower projects of Subansiri Basin, Arunachal Pradesh. Preconstruction stage geological investigations of URI-II (240 MW), DPR and construction stage investigations of Nimmo-Bazgo (45 MW), Construction Stage geological monitoring of Chutak HEP (44 MW).

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Dr. K.R.K. Prasad
Council Member
Director (Geology), GSI, Hyderabad

He joined Geological Survey of India as Geologist in 1979 and completed 34 years of service. For the last 28 years he is engaged in geotechnical investigations comprising feasibility, pre-construction and construction stage investigations of several river valley projects, road bridges, coastal based nuclear power stations, power houses and tunnels. Carried out investigations for more than 200 projects in varied geological milieu encompassing terrains - Archaean to Recent. He has published more than 100 research papers. Presently, supervising and guiding the work of engineering geology projects in Andhra Pradesh. In the year 2008 functioned as Joint Organizing Secretary for the 3 days seminar of ISEG held at Hyderabad, Andhra Pradesh.

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Whatever their origins and training, engineering geologists contribute to the task of providing a level of understanding of ground conditions that ensures the engineering works are constructed to estimates of time and cost. In addition, such works should not fail as the result of any misunderstanding or lack of knowledge about the nature of the ground conditions. Engineering failures may cost lives and cause injuries, will certainly cost money, and will result in consequential delay. To prevent such failures and incidents occurring, the influence of the geology of the site on the design and construction of the engineering work must be determined, understood and clearly explained.

- David George Price

Parbati Hydropower Project, Stage-III (520MW), Himachal Pradesh

Glimpses from Parbati HE Project, stage-III located in Kullu district of Himachal Pradesh having installed capacity of 520MW. This project is being executed by NHPC Ltd, India's premier hydropower utility. The project is to be commissioned shortly.



Raise Borer at Surge Shaft



Underground Powerhouse cavern under construction in Dolomitic Limestone of Larji group.

Editorial (Contd. From Page 1)

April and October and Journal in June and December by combining two quarterly numbers. Therefore, an appeal is being made to contribute technical papers for the journal and short articles for the newsletter. We shall place great emphasis on original work however small it may be. This team will also try to achieve highest standards of scientific ethics and moral values. It is suggested that wherever required, references must be given for previous work. We want to enlighten our young readers and convey the importance of original work and inculcate the habit of giving references. This imparts great strength to the research.

During my attendance to International Conference organized by Geological Society of America in November 2012 at Charlotte in USA, a question was asked regarding the difference between "Engineering Geology and Geological Engineering". I think I amicably explained to the delegate who asked this question but the same has been lingering at the back of mind. Many engineering geologists have believed that preparation of a good map and development of geological sections showing broad rock types is enough from their side. Undoubtedly this is the core ac-

tivity but the same needs to be supplemented by further investigations, tests and geotechnical analysis. This is the crux of Baseline Geotechnical Reports that are in vogue these days. We have made tremendous progress in geotechnical evaluation of structures when compared to earlier days but it should be noted that rock mechanics and modeling techniques particularly with the advancement of software engineering and IT have made spectacular progress in the last decade. Now it is possible to simulate the ground conditions more accurately and come out with workable and reliable solutions. It is for the engineering geology to take this gauntlet and come to those expectations for the input data. However, it is pertinent to add in the end that whatever intensive investigation or analysis we may carry out, the end result to a large extent also depends in the manner in which the works are being executed. Of late there has been great emphasis on investigations but construction stage geological monitoring and back up is equally important.

With kind regards

Imran Sayeed
Editor

Message From Secretary (Contd.. From Page 1)

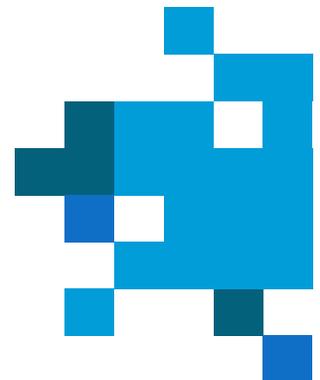
The art of progress is to preserve order amid change and to preserve change amid order. All are welcome to contribute to ISEG journals and publications. It is said that if anyone wishes that he would not be forgotten as soon as he is out of the scene, he should either write things worth reading or do things worth writing. It is need of the hour as there are more reviews than views available. The trouble with our younger authors is that they are all in the sixties. And the Society needs visionaries as vision ignites the minds.

ISEG has to address many jobs at its hand instantly. The first and foremost is streamlining and standardizing ISEG publications and releasing them in time; Revamping ISEG website, the face of the ISEG, with innovative and interactive stuff; Necessary efforts to get advertisements in the website; Increasing membership base and readership base of the Society; Preparations for IAEG Symposium at Beijing, China in September, 2013; Preparations for ISEG Golden Jubilee Conference in October, 2015; Preparations for 'National Workshop on Contemporary practices in Engineering Geology and Geohazards' at Hyderabad on 14 June,

2013. I can only say all these cannot be accomplished without active support of its members, and I wish everyone with one Paper, at least.

Your innovative ideas, suggestions are sincerely solicited to effectively conduct the ISEG so as to meet aspirations of its Members.

(M. RAJU)
Secretary, ISEG
geolraju@gmail.com



LANDSLIDE – IMPEDEMENT TO DEVELOPMENT OF HILLY REGION

Prasanta Misra, Director
Pushp Lata, Senior Geologist
 Geological Survey of India, New Delhi

Our country experiences multiple types of natural hazards like, earthquakes, landslides, floods, drought and to some extent tsunamis that cause loss of life and property. Floods, droughts, landslides generally occur in particular period of the year, while some, like earthquake and tsunamis cannot be foreseen implying immediate warning for preparedness cannot be issued. Fortunately, for landslides advisories can be issued as these are generally associated with monsoons. Landslide is the major hazard as hundreds of slides occur every year. Though, individual landslide affects a very little area, but the cumulative effect and loss supercedes the other hazards.

Globally, it is reported that landslides account for nearly 1000 deaths every year with property damage to the tune of about US \$ 4 billion. Major brunt of the calamity, however is, borne by developing countries, like India, where the population pressure has pushed people to occupy places prone to hazards. Nearly 15% area (~0.49 million km²) of our country is prone to various degrees of landslide hazard. Generally, these areas experience frequent landslides during monsoon. Besides, numerous landslides are generated/triggered by earthquakes having their epicenter in the landside prone region. Apart from human fatalities, loss of livestock, land resources, damage to property, disruption of vital routes for days together, results in colossal economic losses and pose immense hardships to general masses and civic administration.

India, a country with over a billion populations, is fast developing and needs vast amount of energy solutions for her fast-growing industries. Apart from harnessing the power from coal and natural gas, India nowadays is vastly dependent on hydropower potential of the rivers and tributaries of Himalaya and other parts of Extra-Peninsular tract, where numerous hydropower projects are planned/coming up. Consequently, massive infrastructural developments are in progress in these areas. New townships, roads, important installations are coming up rapidly within the fragile mountainous regions. To keep pace with this development, better understanding of the nature and causes of mass movement within this fragile terrain and predictive modeling of known distressed zone/slides/ avalanche is absolutely necessary so that probabilities of any such disaster and extent of damage to lives and property can be minimized or better still prevented.

In earlier days, post hazard/disaster studies of landslide has generally been carried out, but considering the development, thrust has been given on pre- hazard/disaster studies in addition to post hazard studies. The following studies are carried out by GSI- Nodal Agency for perspective developmental planning as well as to mitigate the landslide hazard.

Pre hazard landslide studies:

- Landslide Hazard Zonation (LHZ) on Macro Scale (1:50,000/25,000) of the hilly area including important

road corridors.

- Landslide Hazard Zonation on Meso Scale (1:10,000/5,000) on the thickly populated towns / localities in the landslide prone hilly terrain
- Public awareness generation

Post hazards landslide studies:

- Site specific studies of landslide (1: 2,000 /1,000scale) and preliminary appraisal on the occurrences of landslides
- Real time monitoring of conspicuous, devastating, recurring landslides and development of Early Warning System with the help of instrumentation.
- Preparation of landslide inventory.

Landslide Hazard Zonation

LHZ on macro scale is basic requirement/tool to demarcate the vast landslide prone areas into different degrees on susceptibility to landslides. Several thematic maps with rating of different units are being prepared and superposed to demarcate different zones on the degree of susceptibility to landslides. Different workers have followed different methodologies for this purpose. BIS code is better than others as it considers a number of factors facilitating landslides. In this code, total rating 10 have been assigned for six thematic maps. These are lithology (2), structure (2), slope morphometry (2), relative relief (1), land use & land cover (2), hydrological conditions (1). The different zones on the basis of assigned rating have been delineated which are:

Very Low Hazard Zone (VLHZ)	< 3.5
Low Hazard Zone (LHZ)	3.5-5.0
Moderate Hazard Zone (MHZ)	5.1-6.0
High Hazard Zone (HHZ)	6.1-7.5
Very High Hazard Zone (VHHZ)	>7.5

Due to some difficulties faced in implementation of this code, GSI has attempted to modify the code for better matching with the landslide incidences at ground. In this modified code a total rating of 14 with 10 factors has been considered. These are lithology (2), structure (2), slope morphometry (2), relative relief (1), land use (1), land cover (1), rainfall (1), hydrological condition (1), landslide incidence (2) & slope erosion (1). The different zones (with ratings) are:

Very Low Hazard Zone (VLHZ)	< 4.9
Low Hazard Zone (LHZ)	4.91-7.0
Moderate Hazard Zone (MHZ)	7.1-8.4
High Hazard Zone (HHZ)	8.5-10.5
Very High Hazard Zone (VHHZ)	>10.5

After carrying out the landslide hazard zonation on macro scale, the vulnerable i.e., the very high and high hazard zones may be undertaken on large scale such as LHZ on meso scale (1:10,000/5,000) for detail study, depending upon the requirement. However, LHZ on meso scale is being carried out in the towns/ thickly populated localities to delineate the localized vulnerable areas and to suggest slope containing measures. This study is also required for extension of urban agglomeration in the hilly terrain. Since, there is no code in this regard; GSI has proposed the following parameters for the LHZ on meso scale considering the demand for this study. The factors with ratings (total 16) considered are lithology (2), intact strength of slope material / shear strength (1), structure (2), slope morphometry (2), relative relief (1), erosion condition (1), landuse (1), landcover (1), rainfall (1), hydrogeological conditions (1), stability status of slope / landslide incidence (2), seismicity (1). The different landslide susceptible zones with ratings are:

Very Low Hazard Zone (VLHZ)	< 5.60
Low Hazard Zone (LHZ)	5.60—< 8.0
Moderate Hazard Zone (MHZ)	8.0— < 9.60
High Hazard Zone (HHZ)	9.60—<12.0
Very High Hazard Zone (VHHZ)	>12.0

Generation of public awareness

Public awareness plays a vital role in reducing the impact of the hazard in landslide prone areas. For this purpose, GSI carries out contact programmes in collaboration with the disaster management cells of the state government in landslide prone states. In these, mechanism of landslides, identification of slide prone areas, to do the needful before, during and after the occurrence of landslide are described to the local authorities through PowerPoint presentations along with supply of posters, booklets etc.

Site specific studies of landslide

In post disaster studies, preliminary appraisal on the occurrence of landslides are being carried out to know the tentative causative factors and to suggest short term remedial measures. Depending upon the nature and effect of the landslide, detailed site specific study is carried out. Geological mapping of the landslide showing morphometry, different zones on the degree

of devastation, zone of depletion and accumulation, run out distance, nature and type of slide, nature of soil/rock, determination of engineering properties of soil, rock samples, analysis of structural discontinuities of rocks, drawing of tentative dangerous slip circle for soil/ overburden slides, study of wedge/ planar failure in rock slides etc. are carried out to decipher the causative factors as well as to work out the remedial measures.

Real time monitoring of devastating, recurring landslides and development of Early Warning System with instrumentation.

Some devastating landslides are of recurring type and cause tremendous damages during monsoons year after year in the localities or NH/SH and other important roads where the supply lines remain cut off for days together. Development of early warning system for these types of slides is necessary to save life, property and to overcome other constraints. A no. of organizations including GSI, are being engaged in such type of studies. For this purpose, the required work is similar to that of site specific study of landslide. In addition, determination of depth of overburden is also required preferably through geophysical surveys substantiated by drilling. Further, instruments like piezometers, inclinometers are to be installed in the drill holes to monitor the fluctuation of piezometric head and movement. Besides, installation of rain gauge is also required to quantify the rainfall- the triggering factor. A threshold value for the slide to initiate can be derived from correlation and computation of these above three data sets and an early warning can be issued for the consequent events. Moreover, the causative factors for this slide could be known very well including depth of movement from the instrumentation and this will help to give proper ameliorative measures as long term solutions.

Inventory

Inventory of the landslides is being prepared for landslides which have direct bearing on the human set up. This will help to know the history of the area as well as for preparation of landslide hazard and risk Zonation maps and future developmental activities.

Landslide Studies for Hydro Power Projects



Most of the hydropower Projects presently under various stages of development are located in the Himalayas. This region is characterized by several active and passive landslide zones of varying size, form and nature.

Projects involving large reservoirs are very vulnerable to landslide activity therefore planning and implementation of such projects having large dams and storage requires detailed study of landslides in the reservoir rim area.

Presence of active landslides in the reservoir area is threatening to the stability of dams.

A well planned reservoir mapping schedule is very necessary for mapping such active landslides. The initial studies should be done using satellite data but a more comprehensive field mapping schedule is must to make an inventory of landslide, in order to determine its severity and size.



National Workshop on “ Contemporary practices in Engineering Geology and Geohazards”

Hyderabad, 14th June, 2013

Organized By Indian Society of Engineering Geology
In association with Geological Survey of India, Southern Region

The Workshop

The Indian Society of Engineering Geology in association with Geological Survey of India, Southern Region proposes to organize one day National Workshop “ Contemporary practices in Engineering Geology and Geohazards” at Hyderabad on 14th June 2013 addressing all the relevant themes as mentioned below. The proposed Workshop assumes great importance at this juncture when the country is going through a hydropower and infrastructure development boom. In this context, the 50,000 MW hydropower initiative of Government of India is of particular significance.

The Proceedings

The National Workshop is open to Registered Delegates and Proceedings would be in the form of invited lectures from distinguished experts in the discipline, oral presentations from the authors of scientific papers on theme as enumerated followed by discussions. Poster Presentations are also being planned at the venue of the seminar.

Themes

- Principles, practices and futuristic trends in Engineering Geology for investigation, construction and post construction stage water resources and hydroelectric projects.
- Rock Mass Characterization.
- Geotechnical inputs for underground caverns, tunnels and support measures.
- Engineering properties of soils, rocks, laboratory testing, in-situ testing and support measures.
- Seismic hazards: Seismic Hazard Zonation, Active Fault Study, Seismic Observatories, Micro earthquake monitoring, Paleoseismicity, Seismotectonics etc.
- Case studies of slope instability and other Geohazards and their mitigation.
- Research and Development activities in the field of Engineering Geology.
- Dependable Detailed Project Reports.

Call for Papers

Extended Abstracts followed by full papers are invited on the themes enumerated duly adhering to time schedule and format prescribed. The extended abstract may be submitted immediately, limited to 1000 words. Relevant drawings and photographs may also be added, if needed. After obtaining approval of the extended abstract by the organizing committee, Full Paper may be submitted. The Abstracts will be published in the abstract volume, which will be released at the time of the workshop and Full Papers are scheduled to be published subsequently in the ISEG’s Journal of Engineering Geology, copies of which will be sent to the authors at a later date. All Extended Abstracts and Full Papers must be submitted in a CD or online through email to : india.seg@gmail.com with a copy to sayeedimran2009@gmail.com and geolraju@gmail.com

Key Dates

- 14.05.2013: Last Date for submission of Extended Abstracts
- 25.05.2013: Acceptance of Extended Abstracts
- 07.06.2013: Submission of Full Papers
- 14.06.2013: Technical Session of Workshop

Registration Fee

Every Delegate, ISEG, non-ISEG members, including authors of papers for participation in the National Workshop will pay a Registration Fee of Rs 1,000/- through a Demand Draft or online fund transfer to ISEG. Cash payment towards the Registration fee is also accepted at the venue.

(For details please visit the website of ISEG – “ www.isegindia.org “)

NOTIFICATION

In accordance of Article 21 of “Articles of Association” of the Indian Society of Engineering Geology, the Regional Centre of Delhi NCR was started functioning from the year 2010 for one year term with a nominated Council. Subsequently, the term was made for two years from the term 2011-12, making similar to the ISEG two year term. The Executive Council functioned during the period. After completion of the term, Shri Imran Sayeed, the Convener of the Delhi NCR Regional Centre gave a notice, calling for nominations for the Executive Council for the term 2013-14. As there was no response even after extended period, the President of the ISEG, with the powers vested with the Council vide Article 10.8 and 10.9(a) has nominated five Life Members of the Society and all of them conveyed their consent through e- mail.

With this background, I am pleased to declare the following office bearers for the Executive Council of ISEG Delhi NCR Regional Centre for the term 2013-14 with immediate effect:

Convener	Shri R. N. Mishra (LM-1349)	Director (Civil), SJVNL Ltd., Shimla.
Co- Convener	Shri N. K. Mathur (LM-1112)	General Manager (Geotech), NHPC Ltd, Fbd
Treasurer	Shri B. D. Patni (LM-1307)	Chief (Geology), NHPC Ltd., Faridabad
Council Member-1	Shri Prasanta Misra (LM-1179)	Director, GSI, EPE Division, DGC0, New Delhi
Council Member-2	Shri Ranjit Rath (LM-1361)	Senior Manager (Geology), EIL, New Delhi

The Executive Council of ISEG- Delhi, NCR Regional Centre for the term 2013-14 may commence functioning with a feedback to the Secretary, ISEG.

Secretary, ISEG

Notice First General body Meeting of ISEG for the term 2013-14

The new Executive Council of the Indian Society of Engineering Geology for the term 2013-14 has taken over the charge with effect from 1st January, 2013. In accordance to the Article 16.1 of Articles of Association, the First General (Body) Meeting shall be held within six months of incorporation of the Council.

ISEG proposes to organize a National Workshop on ‘Contemporary practices in Engineering Geology and Geohazards’ at Hyderabad on 14 June, 2013. Taking advantage of likely presence of a large number of ISEG members at the Workshop venue, it is proposed to hold the First General (Body) Meeting of the ISEG for the term 2013-14 at the same venue, Hotel Swagath Grand, Nagole, Hyderabad immediately after the Concluding Session of the Workshop.

All ISEG Members and Executive Council Members are requested to kindly make it convenient to attend and take part in the National Workshop and the following First General Meeting of the ISEG.

It is further requested to kindly propose any issues to be included in the Agenda for discussion in the meeting.

**Secretary,
ISEG**



Construction Material Survey– Challenges faced at Shwezaye Hydroelectric Project, Myanmar

Rahul Khanna, Deputy Manager (Geology)
Vinita Singh, Deputy Manager (Research)
NHPC Ltd, Faridabad

Exploration for construction material for a hydroelectric Project has always been a very daunting task.

Shwezaye hydroelectric project located on Chindwin river near Monywa town in Saging province of Myanmar has been investigated by NHPC Ltd, India's premier hydropower company. The project has installed capacity of 880MW. The Detailed Project Report has been submitted during April'2012.

The project is located on NE-SW trending magmatic arc. The area is represented by a peniplain where the volcanic craters and solidified vents/plugs stand out conspicuously within the sediments of Pegu group of tertiary age and recent alluvium. Near and within the project area, Ayeyarwaddy formation consisting of consolidated mud, sand, tuff and/ or conglomerate along with alluvium are also present.

In such a terrain where in numerous quantity of soft sediments and alluvium is present, exploration for hard rock which can be



Satellite imagery was utilized at Shwezaye project in order to identify craters, vents and plugs where abundant quantity of hard rock, such as basalt and other pyroclastic rocks was distributed in otherwise soft sediments of Ayeyarwaddy formation and recent alluvium.

utilized as rock fill material as well as coarse aggregates was very difficult. However, by use of satellite imagery, volcanic craters and plugs/vents were identified within the close vicinity of project area. Subsequently, by detailed topographic survey followed by detailed geological mapping on 1:500 scale and test pitting, exact quantity of suitable material was established.

Impervious soil could be located in cultivated land or

plain areas coming under submergence. Huge quantity of sand is deposited as river shoal and sand bars along the course of Chindwin river.

Samples were tested in the laboratories of both India and Myanmar to establish the quality.

Hague Court Upheld India's Right on NHPC's 330MW Kishanganga Project in Jammu & Kashmir

The International Court of Arbitration at Hague on 18th February 2013 upheld India's right to divert water for the 330 MW Kishanganga Hydroelectric Project (KHEP) of NHPC Limited, India's premier hydropower company.

The award of the International Court of Arbitration has allowed India to divert water from the Kishanganga river for power generation by the project in the manner envisaged.

The 330 MW Kishanganga Hydroelectric Project is a run-of-the-river hydroelectric scheme located 5 km north of Bandipora

in Jammu and Kashmir, India and work is progressing in full swing.

The project involves construction of 37m high concrete faced rock fill dam, an underground powerhouse and a 16km long head race tunnel, a major portion of which is under excavation by double shield tunnel boring machine (TBM). A maximum gross head of 697 m is proposed to be utilized to generate 1350 Million Units of energy, in a 90% dependable year.

(Source: nhpcindia.com)



Advertisement on ISEG websites

In order to maintain the website so as to meet the ever increasing demands of its Members, it is proposed to invite advertisements from related organizations to be published in the ISEG website

Rate

An amount of Rs 20,000/- will be charged to this service for a total period of five years.

**Add US\$ 20 for overseas advertisements

Note

1. The advertisement would be carried for five year from the date of its posting on the website.
2. The advertisements would be posted as abridged version, i.e Logo and Tagline, if any.
3. The advertisement logo would be hyperlinked to the advertiser's webpage/website.

Advertisement material

The material may be sent as soft copy along with a hard copy in colour.

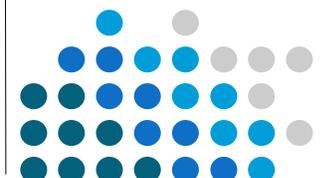
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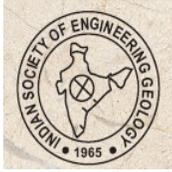
The fee is non-refundable, may be paid directly to the ISEG account as per details given below.

- (a) Demand Draft, drawn in favour of the 'Indian Society of Engineering Geology', payable at UCO Bank, Lucknow.
- (b) Payments may also be made through Bank Transfer on line as detailed below.

Name of the Bank: UCO Bank, GSI Branch, Aliganj, Lucknow
Name of account : "INDIAN.SOC.OF.ENG"
Account No.: 90330200000045
IFSC Code No. : UCBA0002024

Like every cloud has silver lining, the logos will also be displayed in all subsequent issues of ISEG News, and on the cover page of Journal of Engineering Geology during the period of validity.





ISEG Membership

- Admission fee (one time)
New Members : Rs. 1000/-
 - Institutional/Associate Membership (Annual) : Rs. 2000/-
 - Individual Membership
- (i) Annual Membership : Rs. 500/-
- (ii) Life Membership
- For age < 35 years : Rs. 5000/-
For age 35-50 years : Rs. 4000/-
For age > 50 years : Rs. 3000/-

Membership Forms available at
www.isegindia.org



IAEG Membership

Annual Membership

Members with Bulletin : 29 Euros
(Receive Newsletter also)

Members without Bulletin : 4 Euros
(Receive Newsletter only)

Associate Members : 150 Euros
(Receive Bulletin + Newsletter)

Note : The dues may be paid in INR by demand draft in favor of "Indian Society of Engineering Geology", payable at Lucknow.



Recommendations of ISEG One Day Workshop on "Optimizing Geotechnical Investigations for Hydropower Projects" New Delhi, 08 December 2012

S, Kannan
GMR, New Delhi

Indian Society of Engineering Geology had organized a one-day Workshop on "Optimizing Geotechnical Investigations for Hydropower Projects" on Saturday 08 December 2012 at Conference Hall of the AIMIL Ltd, Naimex House, Mathura Road, New Delhi. Several eminent experts of the country on the above subject participated in the workshop. The workshop witnessed presentations from regulatory authorities such as GSI, CWC and CSMRS, followed by presentations from various power developers. An open session with presentations from authors and delegates was also undertaken. The workshop concluded with the panel discussion. The recommendations of the workshop are framed and presented below:

The hydropower developer needs advice, support and encouragement from the Government and its technical and financial institutions, particularly during the DPR Stage. The Government (through its nodal agency – the Central Electricity Authority), by lending a helping hand, can accelerate much needed hydropower generation in the country.

After Presentations and detailed deliberations on the issues related with geological investigations for hydropower projects amongst experts following recommendations were finalized for consideration by Central Electricity Authority (CEA):

1. Interim presentation to a Joint Committee of CEA, GSI, CWC and CSMRS

When the DPR Stage geological and geotechnical investigations proceeds to a level where a preliminary site specific geological model gets evolved and main geological issues are properly identified, the developer or agency entrusted with preparation of DPR shall make a presentation to a Joint Committee of CEA, GSI, CWC and CSMRS. The presentation should encompass regional and project geology, preliminary layout, information on type of dam being contemplated and investigation, testing program together with schedule. Proposed investigation plan for preparation of DPR should be vetted by joint committee who would also make suggestions for additional explorations or tests if necessary for preparation of bankable DPR.

This procedure would avoid suggestions for more investigations after submission of DPR or at a later date and would facilitate smooth clearances.

2. Waivers while accepting DPR for detailed examination

Waivers, if any, due to site conditions as explained during presentation of investigation plan to joint committee may be allowed while submission of DPR provided they do not affect the feasibility or overall cost of the project.

3. Techno-Economic Clearance (TEC)

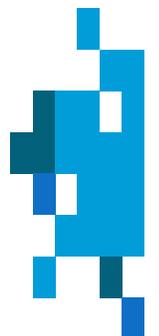
The TEC is awarded only as per existing guidelines. However, some investigations and confirmatory tests which are not unduly crucial to project feasibility and costs involved could be taken up after submission of DPR or TEC but before the tender stage. The project layout should not be changed or modified after these supplementary investigations which shall be confirmatory in nature.

4. Judicious moderation of exploration programme

While the house emphasized for investigation according to relevant BIS codes, it was also agreed that optimization is required while working out details of geological investigations vis-à-vis site specific conditions and engineering layouts.

Future of Engineering Geology

Enormous developmental activities are taking place in the metropolitan cities. Underground metro railways have a great future and so is urban underground space technology. Therefore a new branch Urban Engineering Geology is taking shape. This field is full of inputs from basic geology, geotechnical properties of soil and rock besides environmental geology. Groundwater preservation, artificial recharge and contamination studies are also gaining huge significance as the cities are hard pressed to support growing population.



70MW BUDHIL HYDROELECTRIC POWER PROJECT, HIMACHAL PRADESH, DEVELOPED BY LANCO INFRATECH

Bablu Ghosh , Sr. Geologist
U.V . Hegde, Executive Director
Lanco Infratech Ltd, Gurgaon, Haryana

Budhil Hydroelectric Project having installed capacity of 70 MW (2X35 MW) has been developed by M/S Lanco Infratech Limited in Chamba district of Himachal Pradesh on Budhil nala, a major tributary of River Ravi, utilising gross head of 252m. The project comprises of 61.5m high concrete gravity dam from its deepest foundation level across Budhil nala, 6.26km long Head Race Tunnel (HRT) having finished dia 4m, 80m deep surge shaft, underground power house of 43m (L) X 14.9m (W) X 35m (W) and 170m long Tail Race Tunnel (TRT).

Geologically the project area is located in the Lesser Himalayan belt in older folded cover sequence, overprinted by Himalayan fold-thrust movements belonging to Meso-Proterozoic to Neo-Proterozoic sequence of Chamba Formation & Neo-Proterozoic to early Cambrian sequence rocks of Manjir Formation and Saloni Formation. The project is located south of the Main Central Thrust (MCT). The general layout is given in Fig.1.

Dam site is located in a narrow gorge where dark grey calc arenites, phyllite with veins of quartz and calcite belonging to Saloni Formation are exposed on steep abutments. Quartzite bands having quartz veins/shear seams were encountered at the foundation of the dam. The overburden depth in the river bed was in the order of 17m to 23m as per DPR prediction. Deep channel carved out in strong quartzite rock was also found towards left abutment in the river bed. The right abutment was more jointed which required intensive grouting.

Quartzite, phyllitic quartzite, quartzitic phyllite with bands of phyllite along with occasional shear zones/seams etc were the tunnel media in this project. The rock formation generally a strong media, well foliated and striking N60°W-S60°E to E-W and dipping 30° to 50° towards NE and North direction. The general trend of foliation plane was oblique and perpendicular direction to the tunnel alignment. The cover above tunnel varied from 63m to 450m. The tunnelling media were mainly good to fair category of rock. During excavation of HRT, problems like heavy ingress of water seepage (even up to 40 lt/sec), over breaks/loose fall/wedge failures etc. were encountered at a very few places. The HRT was excavated through four numbers of adits. There were two critical faces having lead length of 1.9km and 1.7km between Adit 3 & 4. On an average 70m of monthly progress per critical face were achieved with highest progress of 120m per month/face. Electrical operated Schaeff loaders were deployed in the critical faces for faster mucking & also for smoke-

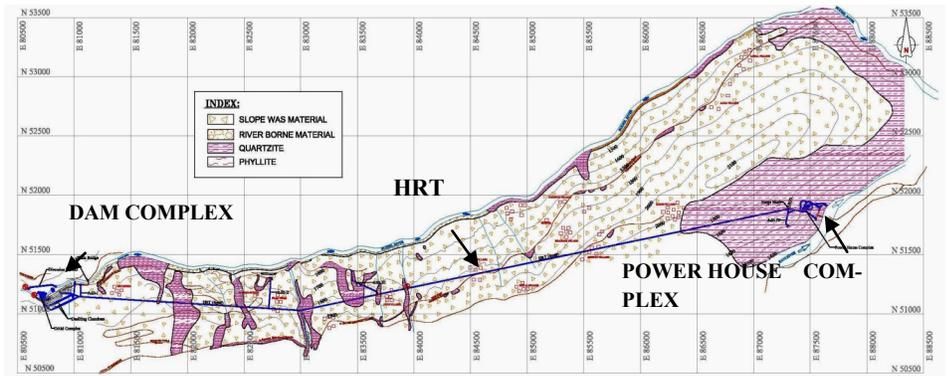


Fig-1: Project Layout Map



Fig-2: Downstream view of Concrete Dam

less operation. The support installed in HRT comprised of spot rock bolting, pattern bolting of 2m length, wire mesh and shotcrete at places, with steel ribs support provided in weak rock mass. By about 10% of poor to very poor rock mass encountered in the total length of tunnelling.

The surge shaft having 8.5m dia was excavated through quartzite rock where in rock bolt and shotcrete were provided as support measures. The vertical pressure shaft of 3m dia having 363.50m length was excavated through good to very good category rock of quartzite.

The underground powerhouse complex is located on the right bank of Ravi River and has been excavated in fair to good quartzite, phyllitic quartzite with bands of phyllite at places.

Crown portion has been supported by alternate 6m to 7.5m long 25mm to 32mm dia rock bolts respectively @1.5m C/C spacing, 200mm thick shotcrete along with welded wire mesh. Wall portion has been supported by 7.5m long rock bolt @1.5m C/C spacing and 150mm thick shotcrete along with welded wire mesh. Transformer and switchyard are located outside on left bank of Ravi

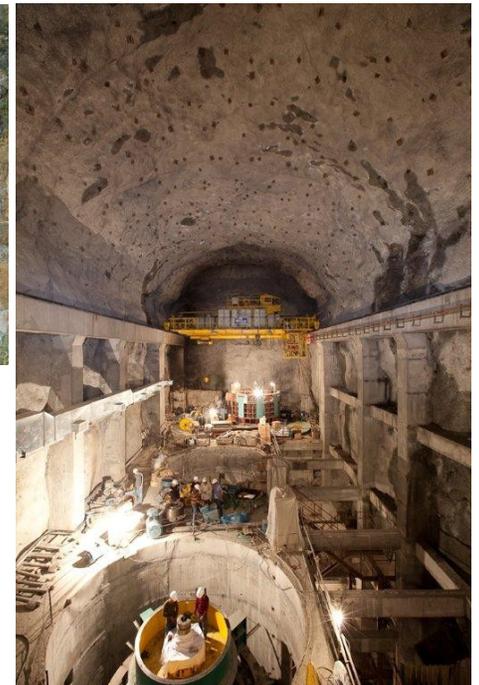
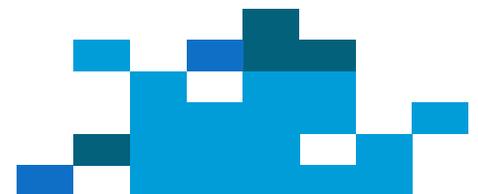


Fig-3: View of Machine Hall during construction

River, opposite to powerhouse.

This project was taken up for actual construction after all clearance, land acquisition etc. during 2007 and the first unit out of the two was spun on 31st December 2011. In spite hostile terrain, weather conditions and also local disruption of work at times, the project was executed in about 4.5years effective construction period.





ISEG NEWS

(A Biannual Newsletter of ISEG)

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Further information on ISEG website: isegindia.org
For Journal of Engineering Geology: joegindia.com

Newsletter Designed by Editorial Team, ISEG:
(Imran Sayeed & Rahul Khanna)

ANNOUNCEMENT

50 Glorious Years of ISEG

ISEG Golden Jubilee International Geotechnical Conference
New Delhi, October 2015

In order to commemorate 50 years of establishment of Indian Society of Engineering Geology an International Conference is planned during October' 2015 at New Delhi.

The Conference aims at deliberations on practice and research on a wide range of geotechnical, engineering geological and environmental aspects that are of particular significance in the 21st Century. The Conference assumes great importance at this juncture when the country is going through a hydropower and infrastructure development boom. In this context, the 50,000 MW hydropower initiative of the Government of India is of particular significance. IAEG affiliation is expected for the event.

OBITUARY

Shri Sambhu Nath Chaturvedi

Director General (Retd.), GSI

Shri Sambhu Nath Chaturvedi took over the charge of Director General of the Geological Survey of India on 28th January, 1993 and continued to discharge his duties till his superannuation on 31 July, 1993. Born on 5th July 1935, Shri Chaturvedi obtained his Postgraduate degree in Geology in 1954 from Lucknow University. He joined Geological Survey of India in 1956. He conducted and guided geological investigation on major Irrigation, Power and Communication Projects in both extra-peninsular and peninsular terrains in J & K, Punjab, HP, UP, Bihar, Orissa, Sikkim and Rajasthan. We lost the great luminary in geology in April 2013 when Shri Chaturvedi passed away in Lucknow.

He made major contributions as an Engineering Geologist on Bhakra & Beas Projects in Punjab, Ramganga and Obra Projects in UP, Ranapratapsagar and Mahi Projects in Rajasthan, Salal and Chenani Projects in J & K, Upper Kolab Project in Orissa & Durgavati in Bihar. He was promoted to the post of Director in 1979 and as Dy. Director General in 1987 and was in-charge of Geological Operation in North-

ern Region and North-Eastern Region. He was promoted as Sr. Dy. Director General in May, 1992 and had been acting as Director General of Geological Survey of India since 1st September, 1992.

Shri Chaturvedi was also deputed as an expert to Syria, Arab Republic and Algeria. He also participated in the IAEG Congress in Spain in 1978 and served as a member of international Commission on Site Investigation. He visited Canada in connection with Chamara Hydel Project of Himachal Pradesh.

Shri Chaturvedi also represented Govt. of India in the ESCAP/UNDR0 Regional Symposium on International decade on National Disaster at Bangkok - Thailand in 1991. He was editor of the "Journal of Indian Society of Engineering Geology" and also its Vice- President. He had a large number of technical reports covering various engineering Geology assignments and had contributed about 24 scientific papers in national and international Seminars/Conferences.

M. Raju



ISEG TO LAUNCH ADDITIONAL WEB SITE FOR JOURNAL OF ENGINEERING GEOLOGY

ISEG will launch another additional website www.joegindia.com exclusively featuring "The Journal of Engineering Geology" during May 2013. The work for construction of this website is under progress. The website aims to function as technical publication face of the ISEG, having a direct link with the main website of the ISEG, www.isegindia.org

Here authors can directly upload their articles for publication in the journal. This site will also show the list of Contents along with abstract of technical papers published in the latest issue of the Journal of Engineering Geology.

The sites aims to be interactive and future plan is to publish the complete Journal in electronic form with facility of downloading published articles on payment of a nominal fee.