

Indian Society of Engineering Geology

Draft Policy Document on Capacity Building in the Field of Engineering Geology

Introduction

Indian Society of Engineering Geology (ISEG) was founded about half a century ago in Kolkata. It was inaugurated on 15th October 1965 by Dr. K. L. Rao, the then Union Minister of Irrigation and Power with Dr. D. N. Wadia, a doyen of Indian Geology the Founder President. The Society commenced its journey with the aim to promote the study and practice of Engineering Geology and allied sciences in the country.

In fact, the Society, over the years, has 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 Geotechniques before the world. Since beginning, the aims and objectives of the Society as included in the constitutions are:

- To promote the study of the subject of Engineering Geology and allied sciences and their application.
- To disseminate knowledge and provide a forum for discussion of all disciplines by holding periodical meetings, seminars and symposia.
- To publish a quarterly Journal of Engineering Geology.
- To accept any gift, donation or subscription towards the fulfillment of any of the objectives of the Society.
- To aid or receive aid from any other Society, Association, Company, Firm, Corporation or person intended to promote any of the objectives of the Society or to subscribe to any fund or Society that the council may from time to time consider deserving.
- To pay out the assets and funds of the Society all costs, charges and expenses incidental to the formation and incorporation of the Society and to the promotion, management and conduct of the business and objectives of the Society.
- To do all such other acts and things as are incidental or conducive to the attainment of the above objectives or any of them.

It observed from the above that one of the prime objectives of the society since beginning has been to promote the study of Engineering Geology and allied sciences and to disseminate the knowledge and provide a forum for discussions of all discussions by holding periodic meetings,

workshops, seminars and Symposia regularly. The Society has been fulfilling this objective to great extent by conducting workshops and seminars and symposia at regular intervals including those at international scale.

Background

Most civil engineering works are founded on rock or soil and are constructed wholly or in part out of rock and soil materials. The safety and economy of an engineering work largely depends on the design of structure to suit best to geological environment in which it is located. The mutual inter-relationship between the two disciplines of geology and engineering gave birth to the applied specialist science of engineering geology. Engineering Geology thus may be defined **“the branch of earth science that user geological information combined with the practice and experience to assist the engineer in the solution of problems in which such knowledge may be applicable.** According to Boyd Dawkin **“Geology stands to civil engineering in the same relation as faith to work.”**

In early stages, Engineering Geology in the country developed with the growth of Geological Survey of India (GSI) which was only institution in the country with expertise in this discipline for a period of over 130 years. During the period from 1851 to 1945 the application of geology in engineering practices developed along with the Geological Survey of India that pioneer in this field. The first recorded advice on engineering geology was tendered by Thomas Oldham, the first Director of G.S.I in 1852 (just a year after its commencement) for a railway alignment between Calcutta and Patna. The same officer investigated the proposed extension of the railway line in Raniganj Coal Fields in 1859. He also studied the feasibility of tunnel below the river Indus in 1868. To his credit also goes the well documented observations of the Cachar earthquake of 1869, which still remain a classic work in the field geoseismology. He was also the first scientist to have completed to catalogue of Indian earthquakes from contributions to the end of 1869. By the close of the 19th century, the survey's engineering geological activities had expanded and covered investigations on landslides (Birehi-Ganga 1884), examination of suitability of dam sites (Manikarive dam in Mysore state and Bhavani dam in Madras state 1888-89) and building foundations (government house in Nainital 1895-96). R.D.Oldham's original and classic work on the Great Assam earthquake (1897) laid the foundations of modern seismology.

In the early parts of 20th century, the engineering geological studies and advice by the Survey registered a steady increase. This really paved the way for the creation of a specialist cell within the Survey, the Engineering Geology and Groundwater Division in 1945 soon after the war was over.

The science of Engineering Geology gained recognition and attained its due role with the increased activities of dam building after independence in 1947.

As stated earlier, Geological Survey of India was almost sole custodian of expertise in Engineering Geology up to early eighties when development of water resources and infrastructure was in government domain. GSI had during this long period had developed a strong infrastructure for training its manpower in the field of Engineering Geology and nobody ever thought of capacity building outside GSI. However, the situation started changing when public sector organizations like NHPC, NJPC and some of the state governments entered the field and started developing their own expertise in the field rather than solely depending on GSI.

But the picture really started changing after the entry of private sector in the field of power and infrastructure by the end of 20th century with a view to provide necessary push to development activities that has slowed down due to funds constraints in the government sector. This created sudden boom in this field.. In the mean time declining trend had been noticed the growth of engineering geology due to certain departmental policies in GSI. However, increased demand for engineering geologists due to boom resulting from privatisation and lack of interest by GSI in this field resulted in great demand for engineering geologists in the country and trained and experienced manpower in desired numbers was not available. This resulted in the situation that people entered the field and tried to learn while working. This resulted in lack of quality in work in many cases as the manpower in the field lacked orientation in general..

ISEG Proposal

Since one of the prime objective of the ISEG was to promote the study of the subject of Engineering Geology and allied sciences and their application and .disseminate knowledge and provide a forum for discussion of all disciplines by holding periodical meetings, seminars and symposia, it was thought by the by the previous councils that it vwas time for ISEG with expertise in engineering geology and other allied fields to step in with the objective of capacity building in this field by conducting short orientation programmes of 2-3 days durations for professionals working in the field. The main objectives of these short duration courses was to

familiarise these professionals with basic elements of engineering geology and allied subjects like landslides and slope stability aspects, geophysical explorations, drilling, rock mass classification, elements of rock and soil mechanics and certain engineering aspects of water resources and infrastructural projects.

Keeping these objectives in view two orientation courses of two days duration were conducted by the society in 2009 and 2012 at New Delhi and Faridabad respectively. The first short orientation course conducted by the society at New Delhi was attended by 44 working professionals from different organizations including public sector organizations like NHPC and SJVNL engaged in the fields of power and infrastructure development. The topics including introduction to engineering geology, elements of rock mechanics, preparation of DPRs for hydroelectric projects, elements of rock mechanics, drilling techniques etc were covered by eminent engineers and geologist from NHPC, NIRM, GSI and private organizations like AIMIL, etc. this orientation programme was highly popular among the participants.

Encouraged by response to its first orientation and appreciation for the same, the society organized another orientation programme at Faridabad in 2012. Like earlier, this programme saws also attended by participants from different organization. The topics covered during this programme included elements of rock mechanics, overview of Engineering Geology, geophysical explorations, landslides and slope stability, drilling technology and certain case histories. This programme also included hands on exercises also. The speakers included eminent persons from NHPC, GSI, AIMIL, and other private organizations active in engineering geology and other allied fields.

Encouraged by overwhelming response and appreciation received for conduction of two orientation programmes, it is proposed that as a part of fulfillment of its objective of disseminating the knowledge and building capacity on the field of engineering geology may conduct the orientation programmes at regular intervals and contribute in the development in infrastructure and power sectors in the country. In fact it should be included as one of the principal objectives of the society. In this connection it is proposed that:

- Organisation of Orientation Programmes for working professionals engaged in the field of engineering geology and other allied fields at regular intervals, preferably every alternate year may be included in the policy statement of the Society.
- The orientation programmes may be of short duration not exceeding three days.
- It may be organized in Delhi or NCR depending upon the facilities available.

- Efforts may be made to organize the programme jointly with either public sector or private sector organization active in the field of civil construction or infrastructure development so that resources are shared and organization becomes slightly easier.
- Efforts may be made to include hands on experience like rock mass classification and RQD determination from rock exposures in Delhi or Faridabad.
- Introduction to engineering geology, drilling technology, geophysical explorations, optimization of explorations at different stages of projects, basics of rock and soil mechanics, rock mass classification and study of landslide should form part of every programme. However, if possible, efforts may be made to include SPT, DCPT, liquefaction potential assessment and case histories in the programme depending on availability of time and suitable speakers.