Guest Editorial

The recent devastating catastrophe in Uttarakhand, India has given fillip to the ongoing never ending discussion on the actual reasons for such extreme disasters. This tragedy was certainly triggered by extreme rains which occurred, 2-3 weeks in advance of what is normal monsoon season for this region. The region witnessed heavy record breaking downpour in the form of cloud burst. There may be multiple reasons behind such catastrophe like breaching of a moraine-dammed lake in the higher reaches or due to landslides in the higher reaches triggering debris flow etc. Overall, landslides contributed greatly to the damages in communications and hampering rescue and relief operations. Whatever might have happened on that fateful day but the fury was certainly augmented by the landslides.

In our country, till date, some research institutes are carrying out scattered efforts to analyse the landslide hazards. Landslide analysis is too complex and needs systematic studies. In India, we have not been able to assess the hazards, vulnerabilities and risks of landslides in a holistic and comprehensive manner. To begin with, an inventory of major landslides which have occurred in past 15 to 20 years in the region should be prepared.

A timely systematic programme of detailed engineering, geological, geotechnical, hydro-geological and hydro-meteorological investigation, instrumentation, modelling and real-time monitoring will be extremely helpful in early warning of landslides. The risks of landslides can be reduced significantly through a combination of structural and non-structural measures. One of the key measures of managing land use in upper reaches is to stabilise higher slopes from ravelling failures which needs serious consideration. The package of measures to be adopted for landslide risk mitigation would depend on the unique site conditions of specific landslides. For national landslide hazard and risk assessment programmes to be successful, it is imperative that highly trained professionals man the mapping teams. Hence training and capacity building is the need of the hour.

In this context, ISRMTT should take lead in holding training programmes for enhancing the capacity of Geological Institutes in the concerned region. Some of the topics for training could be field oriented engineering geological, geo-morphological, hydro-geological, hydro-metereological mapping at large scale, GIS based integration and analysis of thematic maps, geotechnical characterization of slopes and stability analysis in terms of total and effective stress and strengthening of problematic slopes etc. The article on monitoring of Jhakri landslide in Bari area in this issue throws some light on instrumental monitoring of landslides.

Numerical methods of analysis are widely used in the field of rock engineering. Numerical methods represent the most versatile and complex group of computational methods used in the field of rock engineering. Numerical analysis can be used to carry out qualitative analysis to understand the behaviour of rock mass or the failure mechanisms. Parametric and sensitivity analysis can be carried out for comparison and better qualitative assessment. However, the suitability and applicability of a numerical method must be ascertained based on the objectives of the study. If the rock mass is sparsely jointed with relatively big sizes of excavation then continuum analysis should be carried out and finite element or finite difference method will be suitable. However, if the average spacing of joints is closer and the rock mass is blocky having discontinuities like shear zones etc then a discontinuum analysis

is preferable and Distinct Element Method will be suitable. Improper selection of numerical methods gives misleading results which must be avoided.

Inadequate geological investigations can lead to lot of avoidable problems in tunnel construction. Continuous joints and shears can define large blocks with little or nothing to hold them in place once the tunnel excavation has been completed. It is important to identify the locations of blocks with the potential for falling out in order to provide support during cautious excavation. For large diameter tunnels in particular, this requires an assessment of the potential before construction begins, mapping during construction, and control of drift size and round length to ensure against complete exposure of an unstable block in a single round. Hence a properly planned geological investigation can save lot of time and expenditure in tunnel construction.

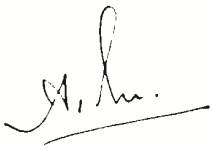
I take great pleasure in informing that Indian Society for Rock Mechanics and Tunnelling Technology (ISRMTT) in association with Jaypee University of Information Technology (JUIT) successfully organised Indorock-2013: Fourth Indian Rock Conference from 29-31 May 2013 at JUIT campus, Waknaghat, Dist Solan, H.P. The conference included 11 technical themes. A special session on "Landslide Hazard Mitigation" was also organised with the support of Department of Science and Technology (DST).

The conference focussed on the following themes.

1. Landslide Hazard Mitigation and Slope Stability
2. Geophysical Investigations
3. Geological Investigations
4. Laboratory and In-situ Testing
5. Underground Design, Construction Techniques and Management
6. Rock Engineering
7. Recent Developments in Tunnelling Techniques
8. Numerical Modelling and Instrumentation
9. Case Studies and Other Relevant Topics related with Rock and Rock Masses

The conference was attended by 200 delegates from 50 organisations. Technical papers included research studies, research reviews and case histories. A total of 70 technical papers including 9 keynote addresses pertaining to various conference themes were published in the conference proceedings. The conference was attended by tunneling fraternity from India, Bhutan, Italy, Norway and Germany.

I think the time ahead is challenging and we must rise to the occasion and provide suitable inputs as is expected.



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