Geology underestimated in landslides

In landslide mitigation, the experiences from many previous examples of landslide occurrences have not been pursued, mainly because the core problem remained unattended. Although the challenges can be met with more rationally under constant supervision of geologists, unfortunately no permanent position of geologists is made available in various organizations that take up civil construction work and town planning. If serious review of such a situation is not tried, the grand slogan of Jai Vigyan would not serve its purpose at least in this perspective.

Before the spectacular Himalaya came into being from the forceful collision of India and Eurasia, there existed a vast stretch of shallow sea called ‘Tethys’. The central part of Himalaya in Uttar Pradesh has recently experienced tragic disastrous landslides. Plausibly the landslides have occurred primarily due to the worst ever cloud-burst and incessant rainfall. And there is no doubt that the heavy rains are far more conducive than other environmental imbalances (through mining activity and/or deforestation) for the present order of landslide incidences in Malpa and Ukhimath areas in Pithoragarh and Rudra Prayag districts. This is evident from the reports that in these landslide areas practically no measurable degree of man-made natural degradation has been imposed upon. In a situation like this, the primary influencing factor for the landslides lies with the geoenvironmental setting, which developed during past hundreds and millions of years when the Himalaya formed from the very complex folding, rupturing, faulting, jointing and thrusting of the then-existing marine sediments, owing to intense collision of the earth’s crust. These ultimately led to overall weakening of various competent sedimentary rock masses. Sometimes the tightly-held plains between the rocky beds of massive rock formation widen to an extent that weakening of the rock mass becomes inevitable. Such processes are likely to continue, since the Himalaya is still growing tall due to movement of the earth’s crust from north and south of the Himalaya.

Just as in most cases, the large-scale fissures and ruptures control the pattern of river and gorge valleys and channels, the intricate network of many other relatively small weak zones too allow rain water infiltration, by virtue of which the dissolution of minerals from the affected rocks takes place. By its continued process rocks lose coherence. During torrential rain such processes are accelerated to a great deal, causing fatal damages particularly in the inclined rock beds of more than 35°, because due to steepness the rock exposure tumbles down. There also appears a possibility that the violent and swift water flow through numerous interconnected pores and fissures within the rocks might have exerted powerful hydrostatic pressure for facilitating brittle failure of the rocks. Eventually, numerous rocks fell down and caused damage to villages and temporary damming of rivers. So, it warns us of possible dam burst and finally hazardous flash flood as well. It may be noted that all these are interlinked phenomena.

The landslide hazards can be prevented to a great extent through detailed geological study, provided it is done well in advance. Unfortunately, the geologists’ viewpoint on such tragedy are sought after the occurrence of major calamities, because during civil construction, including town planning, the geological boundaries, elements of bedding, type and nature of the rocks, lines of dislocations with a break in continuity, etc. are not properly singled out on the geological map or an aerial photograph of the concerned area. Particularly in mountainous regions all forms of the relief, the angle of inclination and the direction, possible exposure of turfs and tectonic lines are required to be shown on the topographic sheet of terrestrial survey, and it is also necessary to monitor ‘periodically’ the changes in geological structures.

Hence, it would be worthwhile if the geologists are placed in the concerned organizations undertaking various civil construction works and town planning. Besides, as a mark of commitment for the highly acclaimed slogan, Jai Vigyan, a concerted effort must be made to create an organization like Institute of Natural Hazard Research. At present, however, it is astonishing to note that there is no concern for coping with the landslide problem, since geological expertise is absent in the proposed government committee for assessing such natural hazards.

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Golden jubilee celebration at RRI – A brief report

Raman Research Institute (RRI) founded by the Nobel laureate Sir C. V. Raman in 1948 celebrated its Golden Jubilee on 7 November 1998 which also happened to be the 110th birth anniversary of the eminent scientist. Past students of Raman at RRI, those who nurtured the Institute and gave it a firm footing after Raman’s demise in 1970, research scholars at the Institute in the post-Raman era and admirers of Raman gathered to pay tributes to the founder of the Institute and reminisce the early days of the Institute and its present growth.
Jayaraman, the first associate and student of Raman at the Institute, gave a glimpse of the life and work at the Institute during the early days. He narrated how research was carried out and recalled Raman’s deep interest in nature, colour and his excitement at even a small discovery. M. G. K. Menon, a member of the RRI trust since its inception and its present Chairman, mentioned that Raman, in spite of many hurdles in life, represented science at its best and that in addition to creating an institution of excellence, had left behind his spirit of scientific excellence and integrity. Menon pointed out Raman’s firm insistence on the Institute he was building to be an autonomous body and hence not accepting any funds from the Government. He (Menon) admired the efforts of the successive directors of the Institute after Raman in maintaining the academic standards at RRI and added that if Raman was alive today, he would have been happy to see the Institute’s progress. G. Venkataraman, former director of ANURAG (DRDO) and former Vice Chancellor of Sri Sathya Sai Institute of Higher Learning, who has written a scientific biography of Raman (A Journey into Light), gave the keynote address. Apart from giving a short account of Raman’s life, Venkataraman brought out many points Raman had made in his convocation addresses to various universities and his lectures at different fora. The observations he made highlighted Raman’s deep concern and commitment to his students, his involvement in inspiring young talent by his lectures and his staunch nationalistic views about India’s capabilities. He cited the instance of Raman’s refusal to go to Delhi to receive the nation’s highest award ‘the Bharata Ratna’ from the President as he wanted to oversee the completion of one of his students thesis. Contrasting Raman’s views and practices with the prevailing situation in the country, he lamented that things were very disturbing and alarming. Satish Dhawan, former Chairman of the Space Commission and Chairman of RRI Council since the beginning, mentioned in his brief speech: ‘...His (Raman’s) vigorous and independent pursuit of science has left RRI a legacy of scientific research as a deeply felt aesthetic and joyous experience. Radhakrishnan and Kumar who followed Raman as Directors imbibe—each in his own way—the lessons of this legacy. RRI, though now largely funded by public funds, remains a vigorous and friendly place for science, with a character of its own.’ He thanked the Government of India for showing an admirable awareness of Raman’s legacy. S. Ramaeshan, former Director of the Indian Institute of Science and one who knew Raman intimately for a very long time, described some of the research work done by Raman’s students and presented figures about the number of papers published during Raman and post-Raman period. He also released the Memoirs of the Raman Research Institute (a compilation in 43 volumes of the papers published by the scientists at the Institute during the period 1949–1998). In his welcome address Kumar, the present Director, touched on the work done during the second phase of the Institute (post-Raman era) and the ongoing areas of research at the Institute. The function ended with a slide show on Raman’s life.