



Editorial: Vision - 2040

India needs good thoughts. A humble input of ISRMTT is offered. Research efforts should be focussed on these ideas.

1. Tunnelling will be popular in highways, railways and hydro-electric projects. The efficiency of engineers in tunnelling is going to evolve cyclically with time but slowly, due to the law of negative change in the bio-entropy with time.
2. Tunnel boring machines will be very popular in the future.
3. The cost of underground storage may come down in comparison to cost of above-ground storage by perhaps 2030. Then underground structures may become affordable.
4. Underground storage of crude oil will pick up in the future, as it is governed by market forces. Furthermore, the shale gas production will start in India.
5. The underground storage for food grains is likely to pick up.
6. Underground metros will be popular in the mega cities.
7. Entire Himalaya should be declared as World Heritage. It will lead to the world integration.
8. The Himalaya will get developed as one of the best tourist resort of the world, because it is a most profitable world business. Infra-structure development in the Himalaya will be popular for tourism to enjoy the vast scenic beauty of entire Himalaya in the future.
9. Satellite may be launched to monitor the rates of movements of landslides and depth of debris for the landslide risk zonation, alongwith landslide lakes, burst of landslide dams, glacier lake bursts and flood disasters. All risk governance is the need of the time.
10. Greed in Himalaya should not be inspired to preserve the vast and most beautiful ecosystem. Be conservative in Himalaya.
11. Heterogeneity, weatherability and the erodibility of the rock mass will attract attention. Research should be done on heterogeneous and erodible rock masses.
12. Sky scrapers will be popular. New-planned-high-tech cities and safe solar cities are likely to be built as the modern business centres in India.
13. The software will become more powerful due to the fundamental researches in rock mechanics and so used extensively in the design offices. The laboratory and in situ facilities are likely to be developed for the polyaxial tests to get stress-strain relationships.
14. Rock mass is anisotropic, except at very high confining pressures. Rock mass behaves as discontinuum at the low confining pressure due to the critically oriented joint sets. So the choice of software is important, particularly in seismic conditions and ground water conditions.
15. Semi-empirical method is the best approach. Our attention should now be focused on the properties of the grouted rock mass.
16. The back analysis is likely to be the best method to infer design parameters of anisotropic rock masses, on the basis of monitored behaviour of the rock structure. The strength parameters for slopes are found to be much lower than those for tunnels and caverns due to longer lengths of rock joints in slopes.
17. Plan-and-design-while-you-go is the best approach.
18. The damage mechanics is likely to become popular in the near future.
19. Rock foundation engineering is going to evolve as it is the market need.
20. Education of rock mechanics and tunnel engineering is going to become very popular in the future, as it is the market need. The rock testing equipments are miraculous. The simple

practical knowledge and ideas should be protected from the vast anger of the peoples. The aim of education is to separate facts from fictions. Get rid of inferiority complex. Distance learning is the future mode of affordable higher education of high quality for the project engineers. Himalaya is the best laboratory in the world to learn rock mechanics, engineering geology and seismology etc.

21. Field-oriented courses in rock mechanics will have high demand.
22. Planetary rock mechanics is likely to evolve for mining and colonization of planets. Space tourism will come up later. The knowledge which is found correct on earth planet shall also be correct at universal level, for there is no isolation for the laws of the nature at both micro and macro levels. The laws of the nature are non-linear, universal and eternal as well as simple and most probable. The knowledge is bound to evolve with time.
23. Micro-tunnelling is likely to be popular in cities.
24. High dams save us from floods and generate electricity without increasing entropy. High dams may be popular in Bhutan and Nepal. Dams cannot be built without God's will. Large dam reservoirs appear to reduce seismicity locally due to distressing of earth plates by seepage inside the plate boundaries perhaps. High in situ stresses have not been recorded in the Himalaya. Earthquakes appear to reduce with time in Himalaya in intensity.
25. The peak of seismicity of the whole earth is nearly over and major earthquakes are not going to visit earth. Earthquake control would be possible in the future.
26. Slow intellectual research is better than fast artificial intelligence as it improves our understanding and also our intelligence. Our minds work on the principle of trial and error. The peaceful mind acts as an antenna for receiving the original and brilliant ideas from unknown source. The 21st century is the era of bio sciences and eco-engineering. Doctors hope to increase the life span of people to several hundred years.
27. It is time to search for the evolving inner happiness and lead the world to seek evolving happiness deeper within you and all healthy beings. The people will start coming to Indian saints for searching improvement, curing genetic diseases, regenerating aging cells as it detoxifies brains and bodies. It is a miracle!
28. We should work silently, sincerely and secretly under guidance of strong leading scientists or engineers like in the nature for the silent and spectacular success. The future belongs to the innovative engineers. Cooperation is the key to success.
29. We should adopt the time-tested international researches gradually in India. The path of self-reliance is very slow. The natural path of inter-dependence is fast. If the nature has given weakness, the nature will compensate us.
30. The scientific spirit should be nourished. We should grow our lines and not cut the lines of others. Ethics grows team spirit. Sentiments of friendship bring peace in the world (Veda). Internet and mobiles have made the world single family. But let us not be defenceless. Enmity among scientists and engineers and other leaders be diffuses. Big companies of India should evolve under strong leadership in the global corporations.
31. The leading scientists and engineers will be born in the world in the future also to solve problems of the people as in the past so in the future also. Leading scientists will conduct organized-field-oriented researches. The strong leaders inspire by organized and creative deeds. New inventions will revolutionize the whole world.
32. The multi-national corporations are going to enrich the poor and skilled nations. Only a strong leader is successful in making a nation rich. Leaderless people cannot be successful in becoming rich (Kathopanishad). A strong leader is the one who organizes people and knowledge (Rig Veda). Every crisis is an opportunity for a new business.
33. Make sure, no body escapes healthy global competition which brings out the best in us.
34. The sporting nations are on the top! The non-sporting nations are flop!!
35. Golden era is coming. The inner joy will change everything, but gradually. The nature first creates chaos and then creates new orderliness cyclically all of sudden e.g. the flowery spring season.

36. Saints say that final goal of life after God realization is evolution of brave-good-creative character (Veda and all religions).
37. There are 50% chances of meditating persons becoming more compassionate (U.S. study in 2013). Yoga is becoming popular world over.
38. The nature rewards gradually for good deeds only. This is true in the majority of cases. The faith moves mountains (Jesus Christ). The Japanese corporations are doing good deeds. They have longer life spans than any corporation of the developed countries of the world.
39. Herbal farming will pick up in the future. This will increase earnings of farmers many times. Herbal cosmetics would become world popular, without side effects.
40. The strong leaders should join multi-national corporations.

- Chairman and Editors, JRMTT