GUEST EDITORIAL

As the successive issues of the Journal of Rock Mechanics and Tunnelling Technology appear and as we continue to move forward with rock engineering in India and throughout the world, it is instructive to ask in the context of rock mechanics and rock engineering, "What is the most important subject for future research?"

To answer this, we note firstly that the most important contribution, a rock engineer can make, is to provide a predictive capability — because without this there can be no basis for design. We must be able to predict the consequences of different engineering options and, to make the prediction, some kind of model is required. The model can be very simple, perhaps a model based solely on precedent practice, e.g. the new tunnel will behave like the previous one because the rock conditions are similar. On the other hand, the model might be very complicated, e.g. a fully-coupled thermo-hydro-mechanical discrete element numerical model (which we do not yet have!). In fact, all models currently used by rock engineers lie between these two extremes, and they all attempt to provide some form of predictive capability.

As the years have passed, the models have steadily become more complicated, and the number of parameters required to support them has also increased — to such an extent that it is not possible to obtain all the required supporting information for some of the models. For example, information on the size, shape and location of all fractures in the rock mass cannot be obtained. However, for the rock engineer to provide the required predictive capability, it is only necessary for the essence of the problem to be captured in the model. The model only has to be adequate; it is not necessary to model everything. Thus, the required variables, mechanisms, and parameters should be included without introducing unnecessary complexity. The conclusion is that we need to make some simplifications when characterizing rock properties.

For these reasons, I believe that the answer to the question in the first paragraph is "Rock characterization". We need to be able to characterize the rock in such a way that we can capture the essence of the engineering behaviour. Most of us are familiar with the RMR and Q classification systems developed by Bieniawski and Barton, and I note that the Journal has been publishing a series of articles on the RMi by Palmström, including the recent one in the May 2000 issue. However, I believe that the time is now ripe for a major research effort to establish the basic theory of rock mass classification for any rock engineering purpose, not just for tunnel support.

The subject of rock characterization was the theme of the first ISRM EUROCK symposium which I organized in Chester in the UK in 1992. It is also one of the main subject areas recommended recently for future development by the American Rock Mechanics Association (ARMA).

Moreover, I believe that rock characterization and rock classification in its widest interpretation is particularly relevant for Indian rock conditions where methods which enable one to rapidly and effectively assess rock masses for a variety of engineering purposes would be invaluable.

It is not easy to make advances in rock mechanics that are of major practical utility, but the human spirit is strong, even if we are uncertain at times. As Sir Rabindranath Tagore said in Fruit Gathering,

"In the wide water, in the blue sky, there is no line of a track…
And I ask my heart if its blood carries the wisdom of the unseen way."

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