Paul Marinos
the 2010 Jahns Distinguished Lecturer

Dr Paul Marinos has been named the 2010 Jahns Distinguished Lecturer. The Association of Environmental & Engineering Geologists (AEG) and the Engineering Geology Division of the Geological Society of America (GSA) jointly established the Richard H. Jahns Distinguished Lectureship in 1988 to commemorate Jahns and to promote student awareness of engineering geology trough a series of lectures offered at various locations around the country. Richard H. Jahns (1915 – 1983) was an engineering geologist who had a diverse and distinguished career in academia, consulting and government.

Μεταξύ των 6 θεμάτων διαλέξεων που παρουσιάστηκαν στις ΗΠΑ, ακολουθεί η περίληψη της διάλεξης που θα δοθεί στον Τομέα Υδατικών Πόρων και Περιβάλλοντος

Rock mass characterization; a vehicle to translate Geology into the design of Engineering Structures

The integration of site geology with engineering requirements is the basis of Engineering Geology. Despite the record of case histories and the development of field and laboratory investigation techniques, there continues to be a need to describe site geology in terms appropriate for the analyses of deformation and stability of ground *in situ.* Two developments hold the potential to improve such description: the characterization of soil and rock, and the wider use of numerical modeling. Methods of characterization can now be tested with the aid of numerical analyses, and the suitability of the predictions they lead to can be tested with site instrumentation.

Since the attempt by Terzaghi in 1946 to describe the characteristics of rock masses, numerous rock mass classifications have been developed and the best known are those of Barton et al (1974) and Bieniawski (1976). These classification systems played an important role in tunnel design before the development of the numerical models. They continue to play an important role in providing initial estimates of the range of problems likely to be encountered and of solutions that can be considered and also in estimating rock mass properties for input into numerical models.

Hoek and Brown (1980) considered that more detailed rock mass property information would be required, as numerical modelling became more readily available and more widely used in design. They set out to develop a failure criterion and a classification system, the Geological Strength Index (GSI), specifically for the purpose of designing tunnels, slopes or foundations in rocks (Hoek and Marinos 2000). Here the geological character of rock material, together with a visual assessment of the mass that forms, are used as a direct input for the selection of parameters relevant for the prediction of rock mass strength and deformability. Where anisotropy is not a dominant factor, this approach enables a rock mass to be considered as a mechanical continuum without losing the influence that its geology has on its mechanical properties. The Geological Strength Index has thus considerable potential for use in rock engineering because it permits the manifold aspects of rock to be quantified, enhancing geological logic and reducing engineering uncertainty.

A detailed description of GSI is presented with suggestions for its use and discussion on its limitations. One of the advantages of the index is that the geological reasoning it embodies allows adjustments of its ratings to cover a wide range of rock masses and conditions including complex rock masses with lithologic variety.

A number of examples from designs of engineering structures conclude the presentation.