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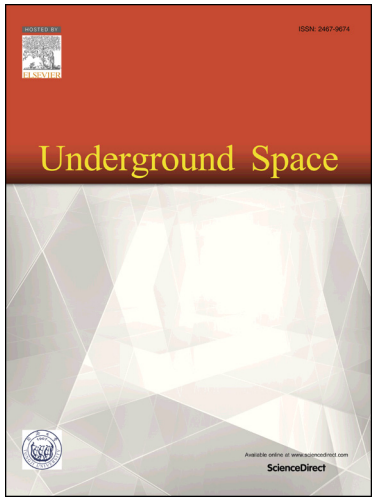

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Evaluation of rock mass deformability using empirical methods – A review

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ABSTRACT

Evaluation of rock mass deformability is an important but very challenging task in the analysis and design of underground structures in rock. Although various empirical (correlation) methods have been developed for determining the deformation modulus of rock masses, they come in many forms and are scattered in different sources. It is often difficult, time-consuming, or even impossible for a practitioner to find appropriate information to determine the deformation modulus of rock masses for a particular project. Therefore, this paper first provides a comprehensive review of the different empirical methods for determining the deformation modulus of rock masses. Then a comparative analysis and discussion is carried out on the accuracy and main issues of these methods. Since many of the empirical methods for determining the deformation modulus of rock masses need to use the deformation modulus of intact rock, the various empirical methods for estimating the deformation modulus of intact rock are also reviewed. In addition, this paper highlights the scale effect on rock mass deformability, the effect of confining stress on rock mass deformability, and the anisotropy of rock mass deformability. Overall this paper outlines the key aspects of rock mass deformability and provides the fundamental and essential information required for effective evaluation of rock mass deformability using the empirical methods.

Key words: Rock mass; Deformability; Empirical method; Scale effect; Stress effect; Anisotropy

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