Workshop on "Integrating Rock Mass Classification Techniques and Tunnelling Technology" (Half Day)

Introduction

An optimized geotechnical/geomechanical design approach includes empirical, analytical, seismic, and observational stages. Empirical and observational parts of a design are vital in initiation of the approach and in finalization of judgments for practice and design purposes containing the derivation of ground behavior, identification of ground hazards, determination of support systems, and characterization of ground's mechanical properties. Engineering classifications are main part of empirical and observational stages of the design for human made structures in ground; though, they have limitations in application. I-System is a classification as well as a characterization system for ground that is developed to cross the limitations involved with other classifications. It is comprehensively applicable for civil, mining, and oil & gas structures in ground including but not limited to abutments of bridges and dams, caverns, deep and shallow foundations, embankment and tailing dams, galleries, deep and shallow metro stations, mine stopes, open pits, shafts, slopes, trenches, tunnels, underground spaces and storages, wells, etc. It considers easily derivable geohydrological, geomechanical, geometrical, geophysical, geostructural, geotechnical, and dynamic properties and configuration of ground in relation to the structure together with the method of excavation and construction. It is first published in 2019 based on 22 years' research and verification in design and construction of underground, semi-surface, and surface works in rock and soil; however, since then further developments as well as improvements and clarifications are made. Providing a solution to engineers in their challenges with complicated ground conditions is the key perception and approach in development of this all-in-one classification and characterisation system for ground in accord with real condition by inclusion of almost 27 important and determinative ground parameters to deliver design parameters and practical recommendation/s for sustainable design and practice. Also, it has been in mind to provide a trusted utility for empirical part of design. In development of this system, drawbacks and limitations of other classifications (e.g., RMR and Q) are properly addressed and consequently resolved (Bineshian, 2019, 2021). This comprehensive classification and characterisation system for ground including rock and soil named "Index of Ground-Structure" or "I-System" in short form in which "I" stands for "Index". It is conceptually different from any existing classifications due to its wide range of input, its applicability for varieties of ground conditions and structures, and its comprehensiveness in providing accurate and precise prediction of ground behavior based on several geomechanical hazards (failure mechanisms) studied in course of development. I-System is not an RQD-based system and it is not a modification to any existing classifications. It is the first ever classification, which is applicable for rock and soil that considers ground's problematical and structural configurations, opening's scale effect, earthquake's negative effect, and excavation technique's impact. Besides, it is first ever classification that carefully provides prediction for special ground behavior including but not limited to Squeezing, Swelling, and Heaving (SSH), Time Dependent (TD), Visco-elasto Plastic (VP), fully plastic, gravity driven (GD), and Burst Prone (BP) condition.

Topics :

➢ System: Index of Ground-Structure; a comprehensive classification and characterisation system for ground including rock and soil for underground, semi-surface, and surface structures

➢ TM: I-System's Tunnelling Method; an all in one hybrid tunnelling method for tunnels under any condition in any medium

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