Charting the Future of Rock Mass Classification in Geotechnical Engineering

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ABSTRACT

Rock mass classification has long been a cornerstone of geotechnical and mining engineering, providing essential insights into the behaviour and properties of rock masses for a wide range of civil and mining engineering applications. Over the years, various classification systems have been developed and refined to categorize rock masses based on their geological, geomechanical, and engineering characteristics. As we look toward the future, several exciting trends and developments promise to shape the landscape of rock mass classification, enhancing its accuracy, applicability, and utility in engineering projects worldwide. Machine learning and AI algorithms are revolutionizing rock mass classification by processing vast amounts of data and identifying complex patterns. Predictive models can be developed to anticipate rock mass behaviour under various conditions, leading to more precise engineering solutions. These data-driven approaches can also account for real-time changes in rock mass properties during construction or mining operations. In addition, Future rock mass classification systems will place a greater emphasis on sustainability and environmental impact assessments. Engineers will need to evaluate the long-term consequences of excavation and construction on rock masses, including their stability and ecological effects. Classification systems will evolve to incorporate parameters related to sustainability, aiding in responsible engineering practices. The other point that was considered in this study is the efforts which are underway to harmonize and standardize rock mass classification systems on a global scale. This standardization will enhance communication among engineers and geologists working across borders and on international projects. A unified classification system will facilitate knowledge sharing and improve the consistency of engineering practices.