Enhancing Raiseboring Stability Assessments through Back Analysis of Overbreak

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ABSTRACT

Raiseboring is a widely used method for drilling shafts in mining and civil engineering projects. However, ensuring the stability and safety of the shafts remains a critical challenge. Increasingly, there is a requirement for shafts, raises and orepasses to be excavated at deeper depths, where higher stresses are present and may present stability issues. Excessive overbreak presents challenges during the excavation of raise in terms of safety, schedule, and the intended life of the raise. A thorough geotechnical investigation remains the starting point in understanding the geotechnical risks to raisebore projects.

Empirical raiseboring stability assessments are widely used in the industry and form the starting point in shaft investigations. These methods have been greatly enhanced by the addition of raisebore performance data in recent years due to the improvement in post excavation scanning technologies.

In this study, we have back analysed the stability of several raisebored shafts that have experienced overbreak and added to previously published design charts by Edelbro et all (2019) and others. Our methodology integrates geotechnical review of the initial assessment parameters and in situ conditions, material properties and the post excavation performance of the raisebored shaft.

Data obtained from scans of raisebore walls and temporary face has been used to conduct back analysis of raise stability and calibration of empirical and numerical models. This data has been used to increase the understanding of different rock masses during and after raiseboring excavation and adds to the confidence in assessment of reliability (probability of failure/success) of raisebored shafts.