

● G X

● 建築

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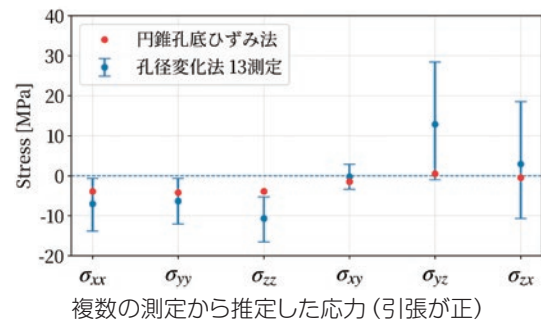
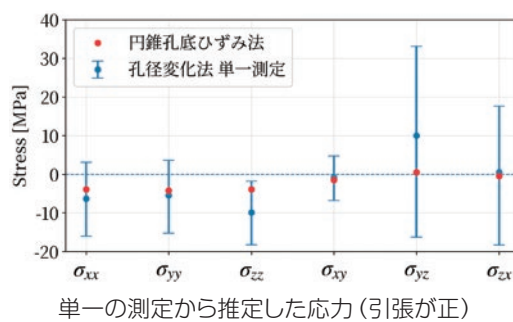
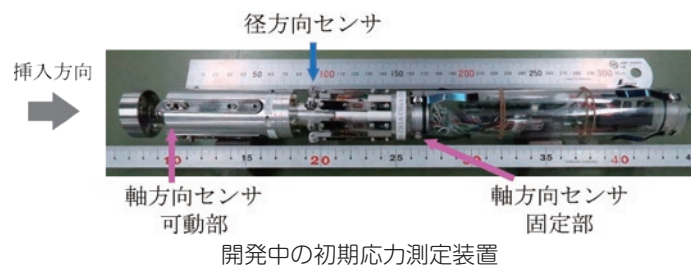
● D X

孔径変化法による初期応力測定結果を用いた 応力推定の信頼度評価

Reliability Evaluation of Stress Estimation Based on Initial Stress Measurement Results Using the Borehole Deformation Method

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概要

近年、山岳トンネル設計に数値解析が用いられることがあり、解析結果はトンネル周辺岩盤の初期応力に大きく依存することが知られている。しかし、初期応力を実測し設計に反映した事例は少ない。本研究では、筆者らが開発中の孔径変化法に基づく初期応力測定装置を用い、廃道トンネルにおいて複数回の現場測定を実施した。得られた変位に対してベイズ推定を適用し、1測定から推定した応力と、複数測定を統合して推定した応力について、平均値と95%HDIを比較した。その結果、応力の平均値は両方で概ね一致し、複数測定を統合した推定結果では95%HDIが縮小することで、応力推定の信頼度が向上することを確認した。

In recent years, numerical analysis has been used in the design of mountain tunnels, and it is well known that the analysis results depend heavily on the initial stress of the rock mass surrounding the tunnel. However, few cases have incorporated field-measured initial stress into actual designs. In this study, multiple field measurements were conducted in a disused tunnel using an initial stress measurement device based on the borehole diameter variation method, which is currently under development. Bayesian estimation was applied to the obtained displacements, and the mean values and 95% HDI were compared for stresses estimated from a single measurement and those estimated by integrating multiple measurements. The results confirmed that the mean stress values were generally consistent between both approaches, and that the 95% HDI narrowed in the estimates derived from integrating multiple measurements, thereby improving the reliability of the stress estimates.