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Martin, R. J., Boyd, P. J., Noel, J. S., and Price, R. H. (1993) "The Influence of Strain Rate And Sample Inhomogeneity On The Moduli And Strength Of Welded Tuff" Proceedings of 34th U.S. Symposium on Rock Mechanics (USRMS), 28-30 June, Madison, Wisconsin, 1993.

Abstract

A series of constant strain rate, unconfined compression experiments was performed on saturated welded tuff specimens collected from Busted Butte near Yucca Mountain, Nevada. Twenty specimens were loaded to failure at strain rates ranging from 10^{-9} s^{-1} to 10^{-3} s^{-1} , under ambient pressure and temperature conditions. The strength of the specimens showed a continuous decrease with decreasing strain rate between 10^{-9} s^{-1} and 10^{-5} s^{-1} . At the highest strain rate, 10^{-3} s^{-1} , strengths were less than those observed at 10^{-5} s^{-1} , likely due to hydrofracturing within the specimen at rapid loading rates. Reduction in strength, corresponding to the decrease in strain rate, is explained in terms of stress corrosion cracking. A detailed examination of six specimens tested at a strain rate of 10^{-9} s^{-1} , using acoustic wave velocities and CT scans, shows a correlation between the nature of the microstructure of the specimens and the observed strengths and elastic moduli.

Contact NER for more information.
