

Abstract

The objective of this study is to experimentally determine the effect of elevated temperatures on the compressive strengths and elasticity of Tak granite. Failure strengths are determined for various temperatures and confining pressures. The confining stresses are maintained at 0, 3, 7, to 12 MPa using a polyaxial load frame. The specimens are prepared to obtain rectangular block specimens with nominal dimensions of $5 \times 5 \times 10 \text{ cm}^3$. The testing temperatures are varied from 273 to 773 K (0–500°C). The results indicate that the uniaxial compressive strength and Brazilian tensile strength decrease with increasing temperatures which can be best described by power equations. The triaxial test results suggest that the cohesion decreases as the temperature increases while the internal friction angle tends to be independent of the temperature. The elastic modulus also decreases with increasing temperature. The rock strength can be well described in terms of the distortional strain energy density as a function of the mean strain energy density at failure for various temperatures and confining pressures.