

Relationship of microcrack pattern and the shear strength of granitic rock

ABSTRACT

Granitic rock can be found in abundance at the Banjaran Titiwangsa main range as the most dominant geology. The granitic slope with the fracture surface has produced the microcrack pattern that can affect the stability of the slopes at the Pos Selim area, which is located at the Banjaran Titiwangsa. The relationship of the microcrack pattern and the shear strength of the granitic rock is investigated as to know the behavior of the crack pattern with the shearing force. The granitic samples are collected at Pos Selim area which is identified as grade II slightly weathered conditions. The samples which are then tested using rock shear box test are applied with increasing normal load of 5, 10, 20, 30, and 40 kN, respectively. The microcrack pattern is observed using SEM image. The analysis of SEM image shows that the behavior of microcrack starts from the crack initiation with the small point at the center. The microcrack length extends into a larger crack and transverse from the center toward the side of the sample. When stress increases, the microcrack length tends to also increase until it reaches the peak point. Finally, further addition of shear stress will result in a decrease of microcrack length. The relationship of microcrack length and the shear stress is in the form of polynomial curve with second order ($R^2 = 0.955$). In conclusion, based on the relationship of microcrack pattern and shear strength, the highest shear stress is 6 MPa producing the 200 μm of microcrack length.

Keyword: Microcrack pattern; Granitic rock; Shear strength