

Abstract

The weathering process of rocks in tropical regions such as Indonesia is a challenge in the field of engineering geology because in the tropics weathering on rock material will be faster due to dense vegetation, climate, and high rainfall. In engineering geology, the weathering process becomes a very important issue especially in the field of slope stability because the rock weathering process often results in a design plan and building structures that are typical. The weathering process generally changes the rock's engineering properties so as to reduce the carrying capacity of the rock to the stability of a slope. This study discusses the field characteristics and laboratory characteristics of each degree of weathering of andesite breccia rocks, the effect of weathering degrees on their engineering properties, and the stability of andesite breccia rock slopes. Rock sampling is based on the ISRM 1978 classification which will then be tested for engineering properties and petrographic analysis in the laboratory. In total there are 10 sampling and observation points and 4 rock slopes that are considered necessary to make a stability analysis because the slope is on the side of the road that if it experiences slope failure can cut off transportation access in the area. Analysis of rock slope stability using the Hoek Brown collapse method, kinematics analysis, and Slope Mass Rating. The results showed that the andesitic breccia rock unit had six degrees of weathering with different engineering characteristics, the effect of rock weathering degree on rock engineering properties had a positive relationship to porosity and water content and had a negative relationship to dry density, wet density, specific gravity and rock strength. Based on the analysis of slope stability using rockscience slide 6.0, the results show that the slope with a high degree of weathering has a low FS value of 1.08 and the slope with a low weathering degree has a high FS value > 1.5. Based on the Slope Mass Rating (SMR) analysis the slope reinforcement method can be applied to slopes with FS <1.5 in the form of spot / systematic bolting

Keywords : Weathering degree, Factor of Safety, Slope Mass Rating

Sari

Proses pelapukan batuan pada daerah tropis seperti Indonesia menjadi tantangan tersendiri dalam bidang geologi teknik karena di daerah tropis pelapukan pada material batuan akan lebih cepat dikarenakan vegetasi yang lebat, iklim, dan curah hujan yang tinggi. Dalam geologi teknik, proses pelapukan menjadi masalah yang sangat penting terutama dalam bidang kestabilan lereng karena proses pelapukan batuan sering menghasilkan rencana desain dan struktur bangunan menjadi khas. Proses pelapukan umumnya merubah sifat-sifat keteknikan batuan sehingga menurunkan daya dukung batuan terhadap kestabilan suatu lereng. Penelitian ini membahas tentang karakteristik lapangan dan karakteristik laboratorium dari masing-masing derajat pelapukan batuan breksi andesit, pengaruh derajat pelapukan terhadap sifat-sifat keteknikannya, dan kestabilan lereng batuan breksi andesit. Pengambilan sampel batuan berdasarkan klasifikasi ISRM 1981 yang selanjutnya akan dilakukan pengujian sifat keteknikan dan analisis petrografi di laboratorium. Total ada 10 titik pengambilan sampel dan pengamatan serta 4 lereng batuan yang dianggap perlu dilakukan analisis kestabilannya dikarenakan lereng tersebut berada pada samping jalan yang apabila mengalami keruntuhan lereng dapat memutus akses transportasi pada daerah tersebut. Analisis kestabilan lereng batuan menggunakan metode keruntuhan Hoek Brown, analisis kinematika, dan *Slope Mass Rating*. Hasil penelitian menunjukkan bahwa satuan batuan breksi andesit memiliki enam tingkat derajat pelapukan dengan karakteristik keteknikan yang berbeda, pengaruh derajat pelapukan batuan terhadap sifat keteknikan batuan memiliki hubungan yang positive terhadap porositas dan kandungan air serta memiliki hubungan yang negative terhadap densitas kering, densitas basah, specific gravity, dan kekuatan batuan. Berdasarkan analisis kestabilan lereng dengan menggunakan perangkat lunak *Rockscience slide 6.0* didapatkan hasil bahwa lereng dengan derajat pelapukan yang tinggi memiliki nilai FK yang rendah yaitu 1.08 dan lereng dengan derajat pelapukan yang rendah memiliki nilai FK yang tinggi > 1.5 . Berdasarkan analisis *Slope Mass Rating* (SMR) metode perkuatan lereng yang dapat diterapkan untuk lereng dengan $FK < 1.5$ berupa *spot/systematic bolting*

Kata kunci : Derajat pelapukan, faktor keamanan, *Slope Mass Rating*