

SARI

Kecamatan Samigaluh merupakan salah satu daerah yang berpotensi mengalami bencana longsor, kondisi ini dipengaruhi oleh morfologi yang curam dan sifat keteknikan tanah lapukan breksi tuf dan breksi andesit serta dipicu oleh curah hujan yang tinggi. Oleh karena itu diperlukan penelitian tentang efek curah hujan terhadap potensi longsor pada sampel tanah yang berasal dari Kecamatan Samigaluh, Kulon Progo. Penelitian ini bertujuan untuk mengetahui perubahan sifat keteknikan tanah lapukan breksi andesit dan breksi tuf terhadap intensitas curah hujan yang berbeda-beda yang dapat menyebabkan longsor. Penelitian dilakukan dengan uji laboratorium yaitu sifat keteknikan tanah, uji *X-Ray Diffraction* (XRD) serta uji dengan eksperimen hujan buatan. Eksperimen ini dilakukan sebanyak 3 kali pada masing-masing tanah lapukan dengan intensitas hujan yang berbeda. Pengujian sifat keteknikan tanah dilakukan sebelum dan sesudah eksperimen. Pada kondisi awal hasil uji sifat keteknikan tanah lapukan breksi tuf adalah tekstur *silty loam*, kandungan air sebesar 68,4%, densitas total 1,44 gr/cm³, densitas kering 0,85 gr/cm³, *specific gravity* 2,7, batas cair 51,44%, batas plastis 41,89%, rasio pori 2,16%, porositas 68,31%, saturasi 85,4%, sudut geser 23,03° dan kohesi 24,52 kPa dengan kandungan mineral lempung kaolinit, sedangkan tanah lapukan breksi andesit menunjukkan tekstur yang sama, kandungan air sebesar 52,42%, densitas total 1,72 gr/cm³, densitas kering 1,13 gr/cm³, *specific gravity* 2,74, batas cair 52,41%, batas plastis 36,71%, rasio pori 1,42%, porositas 58,73%, saturasi 100,8%, sudut geser 26,1° dan kohesi 33,34 kPa dengan kandungan mineral lempung kaolinit yang lebih banyak jumlahnya dari tanah lapukan breksi tuf. Eksperimen intensitas curah hujan pada tanah lapukan breksi tuf dilakukan sebesar 26 mm/jam, 46 mm/jam dan 98 mm/jam. Keruntuhan lereng mengikuti hubungan linier intensitas curah hujan (x) terhadap waktu (y) dengan persamaan $y = -0,0212x + 3,5197$ dengan $R^2 = 0,9587$. Pada tanah lapukan breksi andesit eksperimen intensitas curah hujan dilakukan sebesar 12 mm/jam, 24 mm/jam, 58 mm/jam. Hubungan linier intensitas curah hujan (x) terhadap waktu (y) pada tanah ini adalah $y = -0,06x + 7,0106$ dengan $R^2 = 0,9721$. Sifat keteknikan tanah yang diuji kembali setelah eksperimen curah hujan menghasilkan perubahan berupa peningkatan kandungan air, densitas total, densitas kering, batas cair, batas plastis, saturasi sedangkan penurunan terjadi pada *specific gravity*, rasio pori, porositas, dan kuat geser tanahnya.

Kata Kunci : Sifat keteknikan tanah, intensitas curah hujan, eksperimen hujan buatan.

ABSTRACT

Samigaluh subdistrict is one of the potentially landslide areas, this condition is influenced by the highest morphology and engineering properties of the breccia tuff residual soil and andesite breccia and triggered by high rainfall. Therefore it is necessary to study the effects of rainfall on landslide potential in soil samples from Samigaluh subdistrict, Kulon Progo. The purpose of this research is to know the change of engineering properties of andesite breccia and tuff breccia from the different intensity of rainfall that can cause landslide. The research was carried out by laboratory test of soil engineering properties, X-Ray Diffraction (XRD) test and test with artificial rain experiment. This experiment was conducted 3 times on each soil with different rain intensity. Tests of soil engineering properties were carried out before and after the experiment. In the initial condition, the result from the engineering properties of the tuff breccia residual soil is silty loam texture, the water content is 68.4%, total density 1.44 gr/cm³, dry density 0.85 gr/cm³, specific gravity 2.7, liquid limit 51,44%, plastic limit 41,89%, pore ratio 2,16%, porosity 68,31%, saturation 85,4%, shear angle 23,03° and cohesion 24,52 kPa with kaolinite clay mineral content, for andesite breccia showed the same texture, has an initial condition of water content 52.42%, total density 1.72 gr/cm³, dry density 1.13 gr/cm³, specific gravity 2.74, liquid limit 52.41% plastic limit of 36,71%, pore ratio 1,42%, porosity 58,73%, saturation 100,8%, shear angle 26,1° and cohesion 33,34 kPa with kaolinite clay mineral abundance higher than tuff breccia. Experiments of rainfall intensity on tuff breccia residual soil were performed at 26 mm/h, 46 mm/hr and 98 mm/hr. Slope collapse follows the linear relationship of rainfall intensity (x) to time (y) with the equation $y = -0.0212x + 3,5197$ with $R^2 = 0.9587$. The experiment of rainfall intensity in andesite breccia residual soil were 12 mm/h, 24 mm/h, 58 mm/h. The linear relationship of rainfall intensity (x) to time (y) on this soil is $y = -0.06x + 7.0106$ with $R^2 = 0.9721$. The properties of soil engineering retested after rainfall experiments resulted in changes of increase in water content, total density, dry density, liquid limit, plastic limit, saturation, while the decrease occurred in specific gravity, pore ratio, porosity, and soil shear strength.

Keywords: Properties of soil engineering, rainfall intensity, artificial rain experiments.