SARI

Jalan Raya Ponorogo – Pacitan yang melewati Desa Gemaharjo dan sekitarnya, Kecamatan Tegalombo, Kabupaten Pacitan, Provinsi Jawa Timur merupakan akses penghubung antara Kabupaten Ponorogo dan Kabupaten Pacitan. Banyaknya kasus bencana tanah longsor di sekitar sisi ruas jalan tersebut setiap tahunnya, menyebabkan sering terputusnya akses antara dua kabupaten tersebut. Untuk mengetahui kondisi geologi teknik serta pengaruhnya terhadap kerawanan gerakan massa tanah pada daerah tersebut diperlukan pembuatan peta. Metode yang digunakan dalam penelitian ini adalah pemetaan geologi teknik (litologi, geomorfologi, struktur geologi, tingkat pelapukan dan kualitas massa batuan) serta analisis berupa uji sifat indeks tanah dan uji geser langsung (*direct shear*). Hasil dari pemetaan geologi didapatkan bahwa daerah penelitian tersusun atas satuan litologi satuan intrusi andesit, satuan batupasir dan satuan lava andesit, pada aspek geomorfologi tersusun atas perbukitan intrusi berlereng curam (16 – 35 ^{o}), satuan punggungan aliran lava berlereng agak curam (8 – 16 ^{o}) dan satuan punggungan aliran lava berlereng miring (4 – 8 ^{o}) serta pada aspek struktur geologi arah gaya yang berkembang adalah barat daya – timur laut. Hasil dari pemetaan geologi teknik didapatkan bahwa daerah penelitian berdasarkan tingkat pelapukannya terbagi atas tiga satuan yaitu, satuan lapuk tinggi, satuan lapuk sedang dan satuan lapuk rendah, sedangkan kualitas massa batuannya berdasarkan klasifikasi GSI terbagi menjadi empat satuan yaitu, satuan kualitas massa batuan baik, satuan kualitas massa batuan sedang, satuan kualitas massa batuan buruk dan satuan kualitas massa batuan sangat buruk. Satuan geologi teknik pada daerah penelitian terbagi menjadi tiga yaitu, satuan geologi teknik A, B, dan C yang secara berurutan memiliki kemiringan lereng miring – agak curam, litologi andesit, tingkat pelapukan sedang – tinggi, struktur geologi minim dan kualitas massa batuan sedang (GSI 45 – 50); kemiringan lereng agak curam – curam , litologi andesit, tingkat pelapukan sedang – tinggi, kualitas massa batuan sedang – buruk (GSI 50 – 30), dan memiliki kondisi struktur geologi yang kompleks; kemiringan lereng agak curam – curam , litologi didominasi andesit dan batupasir, tingkat pelapukan sedang – tinggi, kualitas massa batuan sangat buruk buruk (GSI 55 – 10), dan memiliki kondisi struktur geologi yang kompleks berupa kekar dan sesar. Penyusunan peta melalui pengamatan titik kejadian gerakan massa dan metode deterministik didapatkan dua zona kerentanan berdasarkan pengamatan titik kejadian gerakan massa di lapangan dan nilai *safety factor* (FS) yang nilainya didapatkan dari hasil uji tanah dan analisis kesetimbangan batas melalui *software Rocscience Slide 6*, yaitu : zona tingkat kerawanan tinggi dengan nilai FS sebesar 0,662;1,674;1,154;1,123 dan 2,545 dengan 26 kejadian longsor serta zona tingkat kerawanan menengah dengan nilai FS sebesar 1,688 dengan 3 kejadian longsor.

Kata kunci : Jalan Raya Ponorogo - Pacitan, gerakan massa tanah, kondisi geologi teknik, analisis kesetimbangan batas, *safety factor*, zona kerentanan gerakan tanah

ABSTRACT

The Ponorogo - Pacitan Highway that passes through Gemaharjo Village and its surroundings, Tegalombo District, Pacitan Regency, East Java Province is a connecting access between Ponorogo Regency and Pacitan Regency. There are many cases of landslides around the side of the road section every year, causing frequent cuts in access between the two districts. To find out the engineering geology conditions and its effect on the vulnerability of soil mass movements in the area, it is necessary to produce a map. The methods used in this study are engineering geological mapping (lithology, geomorphology, geological structure, weathering rate and rock mass quality) as well as analysis in the form of soil index properties tests and direct shear tests. The results of the engineering geological mapping found that the research area was composed of andesite intrusion lithology units, sandstone units and andesite lava units, in the geomorphological aspects composed of steep marbled intrusion hills (16 - 35 ^{o}), rather steep lava flow ridge (8 - 16 ^{o}) and inclined lava flow ridge (4 - 8 ^{o}) and in the aspect of geological structure the direction of the developing force was southwest – northeast. The results of the engineering geological mapping found that the research area based on the level of weathering was divided into three units, namely, high weathered units, medium weathered units and low weathered units, while the quality of rock masses based on the GSI classification was divided into four units, namely, units of good rock mass quality, medium rock mass quality units, poor rock mass quality units and very poor rock mass quality units. The engineering geological conditions in the study area are divided into three units, namely, engineering geological units A, B, and C which respectively have an inclined slope – slightly steep, andesite lithology, medium – high weathering levels, minimal geological structure and medium rock mass quality (GSI 45 – 50); the slope of the slope is rather steep – steep , andesite lithology, medium – high weathering rate, medium – poor quality of rock mass (GSI 50 – 30), and has complex geological structure conditions; the slope of the slope is rather steep – steep, the lithology is dominated by andesite and sandstone, the weathering rate is medium – high, the quality of the rock mass is very poor (GSI 55 – 10), and has complex geological structure conditions in the form of joints and faults. The preparation of the map through the deterministic method obtained two vulnerability zones based on the safety factor (FS) value whose value was obtained from the results of soil tests and limit equilibrium method through the Rocscience Slide 6 software, namely: High Vulnerability Zones with FS values of 0.662;1.674;1,154;1,123 and 2.545 with 26 landslide events and Moderate Vulnerability Zones with FS value of 1,688 with 3 landslide events.

***Keywords**: Ponorogo - Pacitan Highway, soil mass movement, engineering geological conditions, limit equilibrium method, safety factor, soil movement vulnerability zone*