

ABSTRAK

Jalan lingkaran timur jatigede dibangun melalui daerah dengan morfologi perbukitan struktural, serta melalui batuan dan struktur geologi yang dapat mempengaruhi kestabilan konstruksi jalan dan lereng. Oleh karena itu perlu dilakukan evaluasi terhadap kondisi tersebut terhadap kestabilan trase jalan. Penelitian ini bertujuan untuk mengetahui karakteristik kondisi geologi teknik pada daerah penelitian, mengetahui kemampuan geologi teknik terhadap konstruksi jalan, menentukan tingkat kestabilan lereng pada trase jalan dan menentukan upaya mitigasi terhadap adanya ketidakstabilan lereng.

Metode yang digunakan dalam penelitian ini meliputi pengambilan data primer berupa pengamatan geologi serta pengambilan sampel batuan di lapangan, pengukuran nilai *Geological Strength Index (GSI)* pada batuan permukaan, pekerjaan laboratorium tanah dan batuan seperti uji *indeks properties*, UCS, uji *direct shear* dan *point load test*. Data sekunder berupa data perencanaan jalan lingkaran timur Jatigede dan peta geologi dari peneliti sebelumnya. Analisis yang dilakukan antara lain evaluasi kondisi geologi teknik dan analisis kestabilan lereng dan perkuatan lereng dengan metode *finite element* menggunakan RS2/Phase2 (*Rocscience*).

Berdasarkan kondisi morfologi, lereng pada daerah penelitian didominasi oleh zona lereng miring ($15-25^\circ$) dan zona lereng agak curam ($25-45^\circ$). Litologi batuan yang terdapat pada trase jalan lingkaran Timur Jatigede dari arah Utara ke Selatan yakni satuan batupasir, satuan breksi andesit, satuan batupasir-batulempung, satuan batuserpih, satuan tuf dan satuan andesit porfiri. Struktur geologi pada trase jalan tersebut antara lain adanya tiga perbukitan struktural berupa dua perlipatan antiklin dan satu perlipatan sinklin, serta adanya struktur sesar geser dekstral, sesar geser sinistral dan sesar turun. Dari segi kekuatan massa batuan berdasarkan pengukuran GSI (*geological strength index*) permukaan, daerah penelitian terletak pada zona batuan kualitas buruk sampai dengan batuan kualitas sangat buruk.

Analisis kestabilan lereng dilakukan di 8 lokasi longsoran yaitu di STA 2+000, STA 4+325, STA 4+575, STA 5+575, STA 13+275, STA 13+750, STA 14+050 dan STA 15+350, diperoleh lokasi yang terindikasi longsor memiliki nilai faktor keamanan (FS) lereng sebesar < 1 . Setelah dilakukan perbaikan dengan stabilisasi Geogrid dan perbaikan kemiringan lereng diperoleh FS lereng sebesar $> 1,5$. Pengaruh beban lalu lintas dan beban gempa di dalam analisis memberi dampak penurunan SRF pada masing-masing lokasi, namun yang terdampak kurang aman ada pada STA 5+575 dan STA 13+750 dimana nilai FS yang dihasilkan kurang dari yang disyaratkan yaitu $FS > 1,1$ (dengan beban gempa) sehingga dilakukan penanganan tambahan pada titik tersebut yaitu dengan perbaikan kemiringan lereng pada bagian sisi kiri jalan. Dari hasil analisis diperoleh nilai FS pada STA 5+575 dan STA 13+750 akibat beban gempa $FS > 1,1$, sehingga lereng tersebut pada kondisi stabil setelah perbaikan kemiringan.

Kata Kunci : Jatigede, jalan lingkaran timur, morfologi lereng, struktur geologi, GSI

ABSTRACT

The Jatigede East Ringroad is built through areas with structural hill morphology, as well as through rocks and geological structures that can affect the stability of road and slope construction. Therefore it is necessary to evaluate the condition of the road alignment stability. This study aims to determine the characteristics of geological engineering conditions in the study area, determine the geological engineering capabilities of road construction, determine the level of slope stability on the road alignment and determine mitigation measures against slope instability.

The method used in this study includes primary data collection in the form of geological observations and rock sampling in the field, measurement of Geological Strength Index (GSI) values on surface rocks, soil and rock laboratory work such as index properties, UCS, direct shear test and point load test. Secondary data in the form of Jatigede East Ringroad planning data and geological maps from previous researchers. The analysis carried out included evaluation of engineering geological conditions and analysis of slope stability and slope reinforcement using the finite element method using RS2 / Phase2 (Rocscience).

Based on morphological conditions, the slopes in the study area are dominated by sloping zone (15-25°) and rather steep zone (25-45°). The lithology of rocks found on the trajectory of the Jatigede East Ringroad from the North to the South are sandstone units, andesite breccia units, sandstone-clay units, shale units, tuff units and porphyry andesite units. The geological structure of the pathway includes three structural hills in the form of two anticline folds and one syncline fold, as well as the presence of a deformed shear fault structure, a sinistral shear fault and a normal fault. In terms of rock mass strength based on GSI (geological strength index) measurements, the study area is located in a zone of poor quality rock with very poor quality rock.

Slope stability analysis was carried out in 8 landslide locations, namely at STA 2+000, STA 4+325, STA 4+575, STA 5+575, STA 13+275, STA 13+750, STA 14+050 and STA 15+350, the location of the indicated landslide obtained has a value of safety factor (FS) slope of <1. After repairs with stabilization Geogrid and improvement of slope obtained FS slope of > 1,5. The effect of the traffic load and seismic load on the analysis has an impact on the decrease in FS in each location, but which is less safe at STA 5 + 575 and STA 13 + 750 where the resulting FS value is less than the required FS > 1, 1 (with seismic load) so that additional handling is carried out at that point, namely by repairing the slope of the slope on the left side of the road. From the analysis results obtained FS values on STA 5 + 575 and STA 13 + 750 due to seismic load FS > 1,1, so that the slope is in a stable condition after slope repair.

Keywords: Jatigede, East ringroad, slope morphology, geological structure, GSI