

ABSTRAK

ANALISIS POTENSI LIKUEFAKSI SERTA PENURUNAN TANAH BERDASARKAN DATA *STANDARD PENETRATION TEST* (SPT) DI DESA TRIHANGGO DAN SEKITARNYA, KABUPATEN SLEMAN, DIY

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Kota Yogyakarta mengalami peristiwa likuefaksi seperti yang terjadi pada gempa Bantul tahun 2006. Informasi potensi likuefaksi dan penurunan tanah penting sebagai bentuk mitigasi, terutama pada wilayah yang belum dianalisis secara detail, seperti daerah penelitian di jalur pembangunan jalan tol Yogyakarta–Solo, tepatnya di Desa Trihanggo dan sekitarnya, Kabupaten Sleman. Daerah ini secara geologi terdiri dari endapan Gunung api Merapi berumur Kuartar dengan kondisi litologi berpasir dan muka air tanah (MAT) yang dangkal. Oleh karena itu, analisis potensi likuefaksi dan penurunan tanah diperlukan sebagai bentuk mitigasi, dan sesuai dengan standar nasional Indonesia SNI 8460:2017 (Badan Standardisasi Nasional, 2017) yang menjadi amanat dalam perencanaan infrastruktur. Penelitian ini memakai data uji *standard penetration test* (SPT) dari 78 titik bor. Analisis dilakukan dengan *simplified method* untuk memperoleh nilai faktor keamanan terhadap likuefaksi, *Liquefaction potential index* (LPI) dan perhitungan penurunan tanah menggunakan metode Yoshimine dkk., 2006. Hasil dianalisis disajikan dalam bentuk tabel, grafik, peta, dan model tiga dimensi (3D) untuk menggambarkan sebaran litologi dan potensi likuefaksi terhadap kedalaman. Dari 78 titik bor, 46 titik tidak berpotensi likuefaksi, 11 titik potensi rendah, 8 titik potensi menengah, 8 titik potensi tinggi, dan 5 titik potensi sangat tinggi. Zona potensi sedang hingga sangat tinggi dari potensi likuefaksi, dominan berada di Tirtoadi dan Sariharjo, yang memiliki MAT dangkal. Potensi likuefaksi umumnya muncul pada litologi pasir, pasir lanauan, dan kerikil pasiran. Penurunan tanah menunjukkan 76 titik dengan potensi rendah dan 2 titik berpotensi menengah yang berada di wilayah Tirtoadi, dengan nilai maksimum sebesar 17.49 cm.

Kata kunci: MAT, Litologi, Potensi likuefaksi, Penurunan tanah

ABSTRACT

ANALYSIS OF LIQUEFACTION POTENTIAL AND SETTLEMENT BASED ON STANDARD PENETRATION TEST (SPT) DATA IN TRIHANGGO VILLAGE AND ITS SURROUNDINGS, SLEMAN DISTRICT, DIY

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The city of Yogyakarta experienced liquefaction events such as the one that occurred in the Bantul earthquake in 2006. Information on the potential for liquefaction and land subsidence is important as a form of mitigation, especially in areas that have not been analyzed in detail, such as the research area on the Yogyakarta-Solo toll road construction path, precisely in Trihanggo Village and its surroundings, Sleman Regency. This area geologically consists of Quaternary-age deposits of Merapi volcano with sandy lithological conditions and shallow groundwater (MAT). Therefore, the analysis of the potential for liquefaction and land subsidence is needed as a form of mitigation, and in accordance with the Indonesian national standard SNI 8460:2017 (National Standardization Agency, 2017) which is a mandate in infrastructure planning. This study uses standard penetration test (SPT) data from 78 drill points. The analysis was carried out using a simplified method to obtain the value of safety factors for liquefaction, Liquefaction potential index (LPI) and soil subsidence calculation using the method of Yoshimine et al., 2006. The analyzed results are presented in the form of tables, graphs, maps, and three-dimensional (3D) models to illustrate the lithological distribution and liquefaction potential to depth. Of the 78 drill points, 46 points have no liquefaction potential, 11 low potential points, 8 medium potential points, 8 high potential points, and 5 very high potential points. The medium to very high potential zone of liquefaction potential, dominantly is in Tirtoadi and Sariharjo, which have shallow MAT. Liquefaction potential generally appears in sand lithology, silt sand, and sandy gravel. Land subsidence shows 76 points with low potential and 2 points with medium potential in the Tirtoadi area, with a maximum value of 17.49 cm.

Keywords: Groundwater, Lithology, Liquefaction potential, Settlement