

SIFAT FISIKA TANAH BERPOTENSI LIKUIFAKSI DI KAPANEWON SEWON DAN JETIS KABUPATEN BANTUL

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ABSTRAK

Likuifaksi merupakan fenomena hilangnya kekuatan lapisan tanah akibat getaran gempa bumi yang menyebabkan tanah kehilangan daya dukung dan berperilaku seperti fluida. Kabupaten Bantul termasuk wilayah yang pernah mengalami likuifaksi sehingga berpotensi terjadi kembali. Penelitian ini bertujuan untuk mengetahui karakteristik sifat fisik tanah pada wilayah berpotensi likuifaksi tinggi dan rendah serta korelasi indeks kematangan tanah dengan potensi likuifaksi. Penentuan sampel dilakukan secara *purposive sampling* di Kapanewon Sewon (indeks 0,00) dan Jetis (indeks 28,87) pada kedalaman 0–300 cm (Sewon) dan 0–200 cm (Jetis) dengan interval 50 cm. Parameter yang dianalisis meliputi tekstur, kadar lengas maksimum, C-organik, indeks plastisitas, daya hantar listrik (DHL), potensial redoks (Eh), ukuran butir (D50), dan indeks kematangan tanah (nilai-n). Hasil menunjukkan daerah dengan potensi likuifaksi tinggi, yaitu memiliki muka air tanah dangkal, dekat dengan sesar Opak, tekstur tanah didominasi pasir tertinggi 87,52%, kadar lengas maksimum yang tinggi, tanah tidak plastis, daya hantar listrik tertinggi 0,069 ms/cm, nilai Eh 300 mv. pada lokasi yang potensinya rendah memiliki muka air tanah dalam, indeks plastisitas tertinggi 21,7%, kadar lengas maksimum terendah 41,59%, daya hantar listrik terendah 0,061%, nilai Eh 291 mv. Kedua titik sampel tergolong tanah mentah yang mengindikasikan ikatan antarpartikel lemah dan mudah terdispersi saat jenuh air. Analisis regresi linier antara Nilai-n dan nilai median distribusi ukuran butir tanah (D50) menunjukkan korelasi tidak signifikan dengan nilai koefisien korelasi sampel -0,53 ($R^2=0,2827$) pada titik sampel Sewon dan 0,15 ($R^2=0,0233$) pada titik sampel Jetis. Pola regresi linear hubungan antara kedua variabel tersebut sangat lemah, sehingga pengaruhnya terhadap potensi likuifaksi bersifat indikatif dan memerlukan kajian lanjutan dengan mempertimbangkan variabel lain.

Kata Kunci: indeks kematangan tanah, likuifaksi, sifat fisika tanah, tanah aluvial.

PHYSICAL PROPERTIES OF SOILS WITH LIQUEFACTION POTENTIAL IN SEWON AND JETIS SUBDISTRICTS BANTUL REGENCY

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ABSTRACT

Liquefaction is a phenomenon in which soil layers lose their strength due to earthquake vibrations, causing the soil to lose its bearing capacity and behave like a fluid. Bantul Regency is among the areas that have previously experienced liquefaction and therefore has the potential for recurrence. This study aims to determine the physical characteristics of soil in areas with high and low liquefaction potential, as well as to examine the correlation between the soil maturity index and liquefaction potential. Samples were determined using purposive sampling in Kapanewon Sewon (index 0.00) and Jetis (index 28.87) at depths of 0–300 cm (Sewon) and 0–200 cm (Jetis) with a 50 cm interval. The parameters analyzed included texture, maximum moisture content, organic carbon (C-organic), plasticity index, electrical conductivity (EC), redox potential (Eh), particle size (D50), and soil maturity index (n-value). The results indicate that areas with high liquefaction potential are characterized by a shallow groundwater table, proximity to the Opak Fault, soil texture dominated by sand at a maximum of 87.52%, high maximum moisture content, non plastic soil, maximum electrical conductivity of 0.069 mS/cm, and an Eh value of 300 mV. At the location with low liquefaction potential, the groundwater table was deeper, with the highest plasticity index of 21.7%, the lowest maximum moisture content of 41.59%, the lowest electrical conductivity of 0.061%, and an Eh value of 291 mV. Both sampling points were classified as immature soils, indicating weak interparticle bonding and a tendency to disperse easily under saturated conditions. Linear and quadratic regression analyses between the n-value and the median particle size distribution (D50) showed no significant correlation, with sample correlation coefficients of -0.53 ($R^2 = 0.2827$) at the Sewon sampling point and 0.15 ($R^2 = 0.0233$) at the Jetis sampling point. The linear regression pattern between the two variables is very weak, indicating that its influence on liquefaction potential is only indicative and requires further investigation by considering additional variables.

Keywords: alluvial soil, liquefaction, soil maturity index, soil physical properties.