

INTISARI

Gempa Bantul tahun 2006 di Daerah Istimewa Yogyakarta menimbulkan korban jiwa, kerusakan, dan fenomena lain yang menyertainya seperti longsor dan likuefaksi. Fenomena likuefaksi muncul beberapa lokasi di Kabupaten Bantul, Sleman, dan Klaten. Saat ini, kerentanan likuefaksi di wilayah tersebut khususnya Kabupaten Bantul, Kabupaten Sleman dan Kotamadya Yogyakarta telah dipetakan oleh Badan Geologi secara regional dan oleh beberapa peneliti lain melalui mikrozonasi. Pemetaan tersebut berdasarkan tinjauan faktor kegempaan dan geologi, litologi, elevasi muka air tanah. Klasifikasi peta tersebut berdasarkan zona kerentanan, nilai *liquefaction potential index* (LPI), dan nilai *liquefaction severity index* (LSI).

Dalam penelitian ini, dilakukan pengukuran dan pemetaan fluktuasi kedalaman muka air tanah sebagai salah satu faktor yang mempengaruhi probabilitas likuefaksi. Kedalaman muka air tanah hasil survei tersebut digunakan sebagai *input* analisis likuefaksi dengan metode Idriss dan Boulanger 2008. *Cyclic stress ratio* diperoleh dari analisis *site response* secara nonlinier pada setiap titik. Nilai LPI dan LSI hasil analisis digunakan sebagai dasar klasifikasi penyusunan peta mikrozonasi.

Hasil pengukuran kedalaman muka air tanah selama periode Februari 2022 sampai dengan Desember 2022, kedalaman muka air tanah paling dangkal sebesar 0.30 m. Kedalaman muka air tanah paling dalam berada sebesar 11.70 m. Nilai fluktuasi terbesar sebesar 7.40 m. Nilai fluktuasi terkecil sebesar 0.25 m. Mengacu pada kriteria kedalaman muka air tanah Youd dkk. (1979), seluruh daerah penelitian memiliki potensi kerentanan likuefaksi antara rendah sampai dengan sangat tinggi baik ditinjau pada saat muka air paling dalam maupun muka air paling dangkal. Berdasarkan analisis faktor keamanan terhadap likuefaksi, nilai LPI dan nilai LSI cenderung lebih besar di wilayah kabupaten Bantul sisi barat dan sisi tenggara. Pada kondisi muka air paling dangkal, nilai LPI dan LSI cenderung membesar ke arah timur semakin dekat dengan zona sesar Opak. Klasifikasi LPI pada kondisi muka air paling dalam yaitu rendah sampai tinggi dan pada kondisi muka air paling dangkal yaitu rendah sampai sangat tinggi. Klasifikasi LSI pada kondisi muka air paling dalam yaitu sangat rendah sampai menengah dan pada kondisi muka air paling dangkal yaitu sangat rendah sampai tinggi.

Kata kunci: likuefaksi, *liquefaction potential index*, *liquefaction severity index*, muka air tanah, *site hazard analysis*, *site response analysis*

ABSTRACT

The 2006 Bantul earthquake in the Special Region of Yogyakarta caused casualties, damage and other accompanying phenomena such as landslides and liquefaction. The liquefaction phenomenon appeared in several locations in Bantul, Sleman and Klaten Regencies. Currently, the liquefaction vulnerability in the area, especially Bantul Regency, Sleman Regency and Yogyakarta Municipality, has been mapped by the Geological Agency regionally and by several other researchers through microzonation. The mapping is based on a review of seismic factors and geology, lithology, ground water level. The map classification is based on vulnerability zones, liquefaction potential index (LPI) values, and liquefaction severity index (LSI) values.

In this research, measurement and mapping of fluctuations in the depth of the groundwater table were carried out as one of the factors that influence the probability of liquefaction. The depth of the groundwater table from the survey was used as input for liquefaction analysis using the Idriss and Boulanger 2008 method. The cyclic stress ratio was obtained from non-linear site response analysis at each point. The LPI and LSI values resulting from the analysis are used as the basis for the classification of microzonation maps.

Based on the groundwater table survey results during the period February 2022 to December 2022, the shallowest depth of the groundwater table is 0.30 m. The deepest depth of the groundwater table is 11.70 m. The biggest fluctuation value is 7.40 m. The smallest fluctuation value is 0.25 m. Referring to the groundwater table criteria, Youd et al. (1979), all study areas have low to very high potential liquefaction susceptibility both in terms of the deepest and shallowest groundwater table. Based on liquefaction safety factor analysis, the LPI and LSI values tend to be higher in the western and southeastern sides of Bantul district. At the shallowest water table conditions, the LPI and LSI values tend to increase eastward closer to the Opak fault zone. The classification of LPI in the deepest water level conditions is low to high and in the shallowest water surface conditions, namely low to very high. The LSI classification for the deepest water level is very low to medium and the shallowest water level is very low to high.

Keywords: liquefaction, liquefaction potential index, liquefaction severity index, groundwater table, site hazard analysis, site response analysis