

ABSTRAK

Telah dilakukan penelitian kerentanan seismik dan karakteristik dinamik tanah di Kota Yogyakarta menggunakan data mikrotremor. Penelitian ini dilakukan untuk memetakan sebaran nilai faktor amplifikasi tanah (A_g), frekuensi dominan (f_g), indeks kerentanan seismik (K_g), percepatan tanah maksimum (PGA), *ground shear strain* (γ), ketebalan lapisan (h) dan kecepatan gelombang geser sampai kedalaman 30 meter (V_{s30}) yang dapat menunjukkan tingkat kerentanan suatu daerah terhadap bahaya gempa bumi. Pengukuran mikrotremor dilakukan dengan seismometer tiga komponen TDS 303. Data tersebut dianalisa dengan metode *Horizontal to Vertical Spectral Ratio* (HVSr). Perhitungan PGA dilakukan dengan menggunakan persamaan Kanai untuk kejadian gempa bumi 27 Mei 2006 dengan magnitudo 6.3Mw dan NERA.

Hasil penelitian menunjukkan bahwa sebaran nilai faktor amplifikasi tanah (A_g) berkisar antara 1.69 sampai 6.48, frekuensi dominan (f_g) berkisar antara 0.62 Hz sampai 3.4 Hz, indeks kerentanan seismik (K_g) berkisar antara 0.65 sampai 18.43, percepatan tanah maksimum (PGA) Kanai berkisar antara 338.11 gal sampai 868.74 gal, *ground shear strain* (γ) berkisar antara 0.0002 sampai dengan 0.0028, ketebalan lapisan (h) berkisar antara 22 m sampai 64 m dan kecepatan gelombang geser sampai kedalaman 30 meter (V_{s30}) berkisar antara 185 m/dt sampai dengan 265 m/dt.

Nilai K_g , PGA, γ , relatif tinggi dan V_{s30} relatif rendah di daerah penelitian pada umumnya terdapat di daerah bagian selatan dari Kota Yogyakarta di wilayah Kecamatan Kotagede, Umbulharjo, Mergangsan dan Mantriweron yang mengalami kerusakan parah. Hasil penelitian menunjukkan adanya hubungan antara tingkat kerusakan dengan indeks kerentanan seismik, *ground shear strain*, PGA dan V_{s30} sebagaimana ditunjukkan peta tingkat kerentanan seismik.

Kata kunci : *mikrotremor, PGA, indeks kerentanan seismik, ground shear strain, HVSr*

ABSTRACT

Seismic vulnerability and ground dynamic characteristic research based on Microtremor has been conducted in Yogyakarta City. This study was conducted to map the distribution of ground amplification factor (A_g), Dominan frequency (f_g), Vulnerability index (K_g), Peak ground acceleration (PGA), Ground shear strain (γ), Shear velocity until 30 meters depth (Vs30) and the thickness of the sedimen layer (h), which indicated the level of the vulnerability of a region to the earthquake hazard. Data of the research using three-component seismometer type TDS 303. The method to analyze data using Horizontal to vertical Spectral Ratio (HVSr). In this study the analyzed earthquake is Yogyakarta earthquake May, 27, 2006. Peak ground acceleration in ground surface layer was calculated using Kanai empirical equation for Yogyakarta earthquake event with moment magnitude 6.3 and NERA software.

The result of this research shows us that, distribution of ground amplification factor (A_g) value ranged from 1.69 to 6.48, dominant frequency (f_g) 0.62 Hz to 3.4 Hz, vulnerability index (K_g) ranged from 0.65 to 18.35, Peak ground acceleration (PGA) 338.11 gal to 868.74 gal, ground shear strain (γ) ranged from 0.0002 to 0.0028, shear velocity until 30 meters depth (Vs30) ranged from 185 m/dt to 265 m/dt and the thickness of the sedimen layer (h) ranged from 22 m to 64 m.

High value of K_g , PGA, γ , and low value of Vs30 commonly contained in Southern of Yogyakarta City that are Kotagede, Umbulharjo, Mergangsan and Mantrijeron districts, which suffered the heavy damage level. It shows the relationship of vulnerability index (K_g), peak ground acceleration (PGA), ground shear strain (γ), shear velocity until 30 meters depth (Vs30) with the damage level which showed with the vulnerability level map.

Keyword : Microtremor, peak ground acceleration, seismic vulnerability index, ground shear strain, HVSr