

ABSTRAK

Gempa bumi merupakan salah satu bencana alam yang sering terjadi di Daerah Istimewa Yogyakarta (DIY), termasuk Kabupaten Sleman. Hal ini disebabkan karena Kabupaten Sleman berada di dekat Sesar Opak. Oleh karena itu, diperlukan upaya mitigasi untuk meminimalisir dampak gempa bumi, salah satunya melalui pemodelan guncangan tanah berdasarkan karakteristik *site* lokal. Karakterisasi *site* merupakan upaya untuk mengukur perilaku gelombang seismik pada suatu lokasi tertentu berdasarkan sifat geofisika dekat permukaan. Karakterisasi *site* didasarkan pada nilai V_{s30} USGS. Pemodelan guncangan tanah ini bertujuan untuk memperkirakan nilai kecepatan gelombang geser rata-rata hingga kedalaman 30 m (V_{s30}), Kedalaman 1000 m ($Z_{1.0}$), kedalaman 2,5 km ($Z_{2.5}$), PGA dan *spectra acceleration* di batuan dasar dan permukaan berdasarkan karakteristik *site* lokal.. Metode yang digunakan untuk memodelkan menggunakan metode *Deterministic Seismic Hazard Analysis* (DSHA) dengan skenario terburuk gempa bumi dari Sesar Opak yang diolah menggunakan *Software OpenQuake*. Hasil menunjukkan bahwa V_{s30} di Kabupaten Sleman didominasi nilai yang relatif rendah (180 m/s). Nilai PGA relatif tinggi di batuan dasar mencapai 0,65 g sedangkan PGA di permukaan tanah mencapai 0,75 g. Nilai *spectral acceleration* (0,2) relatif tinggi di batuan dasar mencapai 1,5 g sedangkan *spectra acceleration* (0,2) di permukaan mencapai 1,8 g. Nilai *spectral acceleration* (1,0) relatif tinggi di batuan dasar mencapai 0,4 g sedangkan nilai *spectral acceleration* (1,0) di permukaan mencapai 0,88 g. Nilai amplifikasi PGA dan nilai amplifikasi *spectral acceleration* (0,2) tertinggi 1,36 serta nilai amplifikasi *spectral acceleration* (1,0) tertinggi 2,98. Hal ini mengakibatkan beberapa daerah di Kabupaten Sleman memiliki kerawanan yang tinggi terhadap bencana gempa bumi sehingga cenderung memberikan respon guncangan yang lebih besar.

Kata Kunci: Gempa Bumi, Guncangan Tanah, Kabupaten Sleman, Kecepatan Gelombang Geser V_{s30} , PGA.

ABSTRACT

Earthquakes are one of the natural disasters that frequently occur in the Special Region of Yogyakarta (DIY), including Sleman Regency. This is due to the proximity of Sleman Regency to the Opak Fault. Therefore, mitigation efforts are needed to minimize the impact of earthquakes, one of which is through modeling ground shaking based on local site characteristics. Site characterization is an effort to measure the behavior of seismic waves at a specific location based on near-surface geophysical properties. Site characterization is based on the V_{s30} value from USGS. The purpose of this ground shaking modeling is to estimate the average shear wave velocity up to a depth of 30 m (V_{s30}), the depth of 1000 m ($Z_{1.0}$), the depth of 2,5 km ($Z_{2.5}$), PGA, and spectral acceleration at the bedrock and surface based on local site characteristics.. The method used to model is the Deterministic Seismic Hazard Analysis (DSHA) method with the worst-case earthquake scenario from the Opak Fault processed using OpenQuake Software. The results show that V_{s30} in Sleman Regency is dominated by relatively low values (180 m/s). The PGA value is relatively high at the bedrock, reaching 0,65 g, while PGA on the ground surface reaches 0,75 g. The spectral acceleration value (0,2) is relatively high at the bedrock, reaching 1,5 g, while spectral acceleration (0,2) on the surface reaches 1,8 g. The spectral acceleration value (1,0) is relatively high at the bedrock, reaching 0,4 g, while the spectral acceleration value (1,0) on the surface reaches 0,88 g. The PGA amplification value and the highest spectral acceleration amplification value (0,2) are 1,36, and the highest spectral acceleration amplification value (1,0) is 2,98. This indicates that several areas in Sleman Regency are highly vulnerable to earthquakes, resulting in a tendency to experience larger shaking responses.

Keywords: *Earthquake, Ground Shaking, Sleman Regency, Shear Wave Velocity V_{s30} , PGA.*