Analisis Data Mikrotremor dengan Menggunakan Parameter Frekuensi Natural dan Amplifikasi Tanah untuk Mikrozonasi Risiko Bencana Gempa Bumi di Area Penelitian “ASR”, Sulawesi Selatan = Microtremor Data Analysis Using Natural Frequency Parameters and Soil Amplification for Microzonation of Earthquake Risk in the âASRâ Research Area, South Sulawesi

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Abstrak

Sulawesi Selatan tercatat mengalami gempa signifikan dan merusak sebanyak dua kali pada tahun 2018. Peristiwa dua gempa bumi tersebut mengakibatkan kerusakan infrastruktur antara lain dua masjid, satu gedung sekolah, satu rumah dan satu jembatan mengalami kerusakan ringan. Hal ini disebabkan minimnya penelitian mengenai karakteristik dinamika tanah sebagai langkah awal dalam perencanaan pembangunan infrastruktur. Dalam penelitian ini dilakukan analisis data mikrotremor di Sulawesi Selatan untuk mengetahui karakteristik dinamika tanah berdasarkan parameter frekuensi natural (fo) dan amplifikasi tanah (Ao) yang diperoleh dari metode HVSR. Parameter tersebut digunakan sebagai parameter dasar dalam perhitungan estimasi kedalaman batuan dasar (h), indeks kerentanan seismik (Kg), peak ground acceleration (PGA), intensitas gempa bumi maksimum dan ground shear strain (GSS). Berdasarkan hasil penelitian, karakteristik dinamika tanah menunjukkan sifat dinamis elastis sampai elastoplastis dengan rentang nilai GSS sebesar 1.41×10-6 sampai 3.36×10-4, sehingga fenomena terburuk akibat pergerakan tanah yang dapat terjadi adalah keretakan tanah dan terjadinya penurunan tanah. Berdasarkan hasil analisis indeks kerentanan seismik (Kg), peak ground acceleration (PGA), intensitas gempa bumi maksimum, kecepatan rata-rata gelombang geser Vs30 dan ground shear strain (GSS), area penelitian termasuk dalam wilayah dengan kerentanan bencana gempa bumi yang relatif rendah. Namun, pada bagian timur area penelitian tingkat kerentanan terhadap bencana gempa bumi relatif tinggi.

.....South Sulawesi experienced two significant and destructive earthquakes in 2018. The two earthquakes caused damage to infrastructure, including two mosques, one school building, one house and one bridge, which suffered minor damage. This is due to the lack of research on the characteristics of soil dynamics as the first step in planning infrastructure development. In this study, microtremor data analysis was conducted in South Sulawesi to determine the dynamics characteristics of the soil based on natural frequency parameters (fo) and soil amplification (Ao) obtained from the HVSR method. These parameters are used as basic parameters in calculating the estimated bedrock depth (h), seismic vulnerability index (Kg), peak ground acceleration (PGA), maximum earthquake intensity and ground shear strain (GSS). Based on the results of the study, the dynamics characteristics of the soil show elastic to elastoplastic dynamic properties with a GSS value range of 1.41×10-6 to 3.36×10-4, so that the worst phenomenon due to soil movement that can occur is soil cracking and subsidence. Based on the analysis of seismic vulnerability index (Kg), peak ground acceleration (PGA), maximum earthquake intensity, average shear wave velocity Vs30 and ground shear strain (GSS), the research area is included in an area with relatively low earthquake vulnerability. However, in the eastern part of the research area the level of vulnerability to earthquakes is relatively high.