

ABSTRAK

IDENTIFIKASI KONDISI TANAH MENGGUNAKAN METODE HVSR (*HORIZONTAL TO VERTICAL SPECTRAL RATIO*) DAN *ELLIPTICITY CURVE* DI KECAMATAN PLUMPANG, KABUPATEN TUBAN

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Rangkaian gempa Pulau Bawean pada Maret 2024 menunjukkan tingginya potensi bahaya seismik di wilayah Jawa Timur bagian utara, termasuk Kecamatan Plumpang. Dilakukan penelitian untuk mengidentifikasi kondisi kerentanan tanah menggunakan metode *Horizontal to Vertical Spectral Ratio* (HVSr) serta inversi kurva *ellipticity* untuk mengidentifikasi parameter kondisi tanah. Data primer diukur menggunakan Seismograf Rakyat Indonesia (SRI). Parameter yang dianalisis meliputi frekuensi dominan (f_0), faktor amplifikasi (A_0), indeks kerentanan seismik (K_g), Peak Ground Acceleration (PGA), dan kecepatan gelombang geser rata-rata hingga kedalaman 30 m (V_{s30}).

Diperoleh hasil berupa nilai A_0 sebesar 0.9 - 3.5, nilai F_0 berada di rentang nilai 2 - 10,5 Hz, nilai K_g memiliki rentang 0.1 – 2.1, Nilai PGA akibat dari gempa acuan memiliki rentang nilai 18 - 38 gal dengan skala intensitas III-IV MMI. Hasil inversi *ellipticity curve* menghasilkan nilai V_{s30} sebesar 260 - 720 m/s yang mengidentifikasikan jenis Tanah Sedang (SD) dan Tanah Keras (SC). Parameter tersebut menunjukkan kondisi daerah penelitian memiliki amplifikasi yang rendah dengan ketebalan variatif tipis hingga sangat tebal dan memiliki kerentanan yang rendah.

Kata kunci: *Ellipticity Curve*, HVSr, Mikrotremor, V_{s30}

ABSTRACT

Identification of Soil Conditions Using the HVSR (Horizontal-to-Vertical Spectral Ratio) Method and Ellipticity Curve in Plumpang District, Tuban Regency

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The Bawean Island earthquake sequence in March 2024 indicated a high level of seismic hazard potential in the northern part of East Java, including Plumpang District. This study was conducted to identify soil vulnerability conditions using the Horizontal to Vertical Spectral Ratio (HVSR) method and ellipticity curve inversion to determine soil condition parameters. Primary data were acquired using the Seismograf Rakyat Indonesia (SRI). The analyzed parameters included the dominant frequency (f_0), amplification factor (A_0), seismic vulnerability index (K_g), Peak Ground Acceleration (PGA), and the average shear-wave velocity to a depth of 30 m (V_{s30}).

The results showed that the A_0 values ranged from 0.9 to 3.5, the f_0 values ranged from 2 to 10.5 Hz, the K_g values ranged from 0.1 to 2.1, and the PGA values generated by the reference earthquake ranged from 18 to 38 gal, corresponding to intensity levels of III–IV on the Modified Mercalli Intensity (MMI) scale. The ellipticity curve inversion produced V_{s30} values ranging from 260 to 720 m/s, indicating Medium Soil (SD) and Hard Soil (SC) site classes. These parameters indicate that the study area is characterized by low amplification, variable sediment thickness ranging from thin to very thick, and low seismic vulnerability.

Keywords: Ellipticity Curve, HVSR, Microtremor, V_{s30}