ABSTRAK

Secara geografis, Indonesia menjadi negara kepulauan dengan tingkat bahaya gempa yang cukup tinggi. Gempa bumi merupakan peristiwa bergetarnya bumi karena pergerakan atau pergeseran lapisan batuan pada bumi secara tiba-tiba akibat pergerakan lempeng-lempeng tektonik. Setiap gempa bumi mempunyai pencatatan data yang disebut riwayat waktu gempa yang menjadi dasar dalam menghitung intensitas goyangan dan respon spektrum gempa. Salah satu pengukuran intensitas goyangan gempa adalah *Seismic Intesity Scale* (SIS) yang memperhitungkan akselerasi dan periode guncangan gempa dan digunakan untuk menentukan level intensitas guncangan gempa. Respon spektrum gempa yaitu grafik/plot getar struktur T, lawan respon-respon maksimum berdasarkan rasio redaman dan gempa tertentu. Data penelitian yang digunakan adalah riwayat waktu gempa tiruan non deagregasi yang didapat melalui Metode *Spectral Matching* dan penggunaan perhitungan program JMA-SIS yang kemudian divalidasi menggunakan peta PGA (*Peak Ground Acceleration*) dengan menggunakan metode NMSE (*Normalized Mean Square Error*). Hasil data perhitungan JMA-SIS digunakan untuk membuat peta wilayah gempa berdasarkan tingkat intensitasnya. Peta gempa tersebut dapat menjadi instrumen yang berarti dalam upaya mitigasi resiko bencana. Dari hasil penelitian yang dilakukan, didapatkan perhitungan nilai m-SIS dilakukan dalam tiga kondisi tanah yang berbeda, yaitu keras (SC), sedang (SD), dan lunak (SE). Hasil penelitian tersebut menunjukkan bahwa nilai intensitas maksimum terjadi pada kondisi tanah lunak (SE), sedangkan nilai intensitas minimum terjadi pada tanah keras (SC).

Kata kunci: Intensitas, Respon Spektrum, *Spectral Matching Method*, JMA-SIS, PGA (*Peak Ground Acceleration*).

ABSTRACT

Indonesia is a geographically diverse archipelago that has a significant frequency of seismic threats. An earthquake is the seismic shaking of the Earth caused by the abrupt displacement or rearrangement of rock formations resulting from the motion of tectonic plates. Each earthquake is accompanied by recorded data known as earthquake time history, which serves as the foundation for determining the strength of shaking and the reaction of the seismic spectrum. The Seismic Intensity Scale (SIS) is a measure of earthquake shaking intensity that considers the acceleration and duration of shaking. It is used to evaluate the level of intensity of earthquake shaking. The earthquake response spectrum is a graphical representation of the maximum structural vibration, T, that occurs during distinct earthquakes, taking into account damping ratios. The study utilizes the time history of non-deaggregated simulated earthquakes acquired by the Spectral Matching Method and JMA-SIS software computations. The accuracy of these data is subsequently confirmed by comparing them with the Peak Ground Acceleration (PGA) map using the Normalized Mean Square Error (NMSE) method. The JMA-SIS calculation data was utilized to generate a map delineating the earthquake area according to its intensity level. The seismic map can serve as a significant tool in endeavors to mitigate the risks associated with natural disasters. The research findings imply that the calculation of m-SIS values was performed under three distinct soil conditions: hard (SC), medium (SD), and soft (SE). The results indicate that the highest intensity value is observed in soft soil conditions (SE), whilst the lowest intensity value is observed in hard soil (SC).

Keyword: Intensity, Response Spectrum, Spectral Matching Method, JMA-SIS, PGA (Peak Ground Acceleration).