Analisis Kestabilan Lereng Dinamis pada Bencana Tanah Longsor di Desa Cijedil, Kecamatan Cugenang, Kabupaten Cianjur, Jawa Barat = Analysis of Dynamic Slope Stability on Landslide Disaster in Cijedil Village, Cugenang District, Cianjur Regency, West Java

Butar-Butar, Raymondito Sadatigor, author

Abstrak

Tanah longsor merupakan bencana yang sangat berpotensi di Kabupaten Cianjur karena selama periode 2012 – 2022 terdapat 194 catatan kejadian tanah longsor yang terjadi di wilayah tersebut. Pada 21 November 2022, Desa Cijedil, Kecamatan Cugenang mengalami bencana tanah longsor setelah gempa bumi dengan kekuatan 5,6 SR. Penelitian dilakukan di lokasi kejadian tanah longsor, tepatnya di Desa Cijedil, Kecamatan Cugenang. Penelitian dilakukan dengan tujuan menganalisis kondisi kestabilan lereng dan menganalisis pengaruh gempa bumi terhadap kestabilan lereng di lokasi penelitian. Penelitian ini membutuhkan data berupa berat volume tanah, ukuran butir tanah, batas plastis tanah, batas cair tanah, sudut geser dalam tanah, kohesi tanah, muka air tanah, dan nilai peak ground acceleration. Metode kesetimbangan batas Morgenstern-Price, Bishop, dan Janbu digunakan guna mendapatkan variasi nilai faktor keamanan dalam kestabilan lereng. Analisis regresi linier dimanfaatkan untuk menentukan kuat atau tidaknya hubungan gempa bumi terhadap nilai faktor keamanan pada lereng. Nilai faktor keamanan statis pada Lereng Cijedil menggunakan metode Morgenstern-Price, Bishop, dan Janbu secara berturut – turut, yaitu 1.297 (stabil), 1.304 (stabil), dan 1.280 (stabil), sedangkan pada Lereng Shinta, yaitu 1.428 (stabil), 1.43 (stabil), dan 1.324 (stabil). Nilai faktor keamanan dinamis pada Lereng Cijedil dengan ketiga metode yang sama, yaitu 0.589 (tidak stabil), 0.596 (tidak stabil), dan 0.570 (tidak stabil), sedangkan pada Lereng Shinta, yaitu 0.599 (tidak stabil), 0.602 (tidak stabil), dan 0.584 (tidak stabil). Pengaruh gempa bumi terhadap kestabilan lereng diketahui melalui simulasi kenaikkan gempa bumi dalam bentuk koefisien seismik horizontal sebesar 0.05 sebanyak 20 kali. Berdasarkan analisis regresi linier sederhana, analisis koefisien korelasi, dan analisis koefisien determinasi di kedua lereng penelitian, nilai koefisien seismik horizontal memiliki hubungan dan pengaruh yang kuat terhadap nilai faktor keamanan pada kedua lereng daerah penelitian.

.....Landslides are a significant potential disaster in Cianjur Regency, as there have been 194 recorded landslide incidents in the area from 2012 to 2022. On November 21, 2022, Cijedil Village in Cugenang Sub-district experienced a landslide following a 5.6 magnitude earthquake. A study was conducted at the landslide site, specifically in Cijedil Village, Cugenang Sub-district, aiming to analyze the stability conditions of the slopes and the impact of earthquakes on slope stability at the research location. This study required data on soil bulk density, soil grain size, soil plastic limit, soil liquid limit, soil internal friction angle, soil cohesion, groundwater level, and peak ground acceleration. The limit equilibrium methods of Morgenstern-Price, Bishop, and Janbu were used to obtain varying safety factor values for slope stability. Linear regression analysis was utilized to determine the strength of the relationship between earthquakes and the safety factor values of the slopes. The static safety factor values for the Cijedil Slope using the Morgenstern-Price, Bishop, and Janbu methods were 1.297 (stable), 1.304 (stable), and 1.280 (stable), respectively, while for the Shinta Slope, they were 1.428 (stable), 1.43 (stable), and 1.324 (stable). The

dynamic safety factor values for the Cijedil Slope using the same three methods were 0.589 (unstable), 0.596 (unstable), and 0.570 (unstable), while for the Shinta Slope, they were 0.599 (unstable), 0.602 (unstable), and 0.584 (unstable). The impact of the earthquake on slope stability was determined through a simulation of increased earthquake activity in the form of a horizontal seismic coefficient of 0.05 applied 20 times. Based on simple linear regression analysis, correlation coefficient analysis, and determination coefficient analysis for both research slopes, the horizontal seismic coefficient has a strong relationship and influence on the safety factor values of both research slopes.