

ABSTRAK

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Penelitian ini menganalisis stabilitas lereng di area lapangan tembak Kopassus, yang mengalami indikasi kelongsoran sehingga merusak pagar dan jalan aspal di sekitar lereng. Tujuan penelitian ini adalah untuk mengevaluasi *safety factor* (SF) lereng sebelum dan setelah diperkuat dengan *soil nailing*, serta mengkaji pengaruh variasi panjang, jarak spasi, dan diameter lubang bor terhadap nilai *safety factor* (SF) lereng, dan menentukan kombinasi nail yang optimal. Analisis stabilitas dilakukan dengan menggunakan metode *limit equilibrium* melalui program komputer, berdasarkan data sekunder dari proyek penanganan longsor di Ciliwung. SF lereng sebelum perkuatan adalah $1,16 \leq 1,5$, sehingga memerlukan perkuatan tambahan. Dari 125 variasi *soil nailing* yang diuji, 61 variasi memiliki SF statik $\geq 1,5$ (antara 1,50 hingga 1,67) dan SF gempa $\geq 1,1$ (antara 1,17 hingga 1,29). Hasil penelitian menunjukkan bahwa semakin besar diameter lubang bor dan semakin panjang nail, maka SF meningkat, sedangkan semakin besar jarak spasi, SF menurun. Kombinasi optimal diperoleh dengan jarak spasi 2 meter, panjang nail 11 meter, dan diameter lubang bor 175 mm, yang menghasilkan total panjang nail sebesar 39 m/m dan volume *grout* sebesar 0,93 m³/m, dengan SF kondisi statik sebesar 1,54 dan SF kondisi gempa sebesar 1,19.

Kata Kunci: Stabilitas Lereng, Safety Factor, Soil Nailing

ABSTRACT

His study analyzes the slope stability in the Kopassus shooting range area, where signs of landslides have damaged the fence and asphalt road near the slope. The purpose of this research is to evaluate the slope's safety factor (SF) before and after reinforcement with soil nailing, as well as to examine the effect of variations in length, spacing, and borehole diameter on the slope's safety factor (SF) and to determine the optimal nail combination. The stability analysis was conducted using the limit equilibrium method through a computer program, based on secondary data from the landslide management project in Ciliwung. The slope's SF before reinforcement was $1.16 \leq 1.5$, indicating the need for additional reinforcement. Out of 125 soil nailing variations tested, 61 variations achieved a static SF ≥ 1.5 (ranging from 1.50 to 1.67) and an earthquake SF ≥ 1.1 (ranging from 1.17 to 1.29). The results showed that increasing the borehole diameter and nail length increases the SF, while increasing the nail spacing decreases the SF. The optimal combination was obtained with a spacing of 2 meters, a nail length of 11 meters, and a borehole diameter of 175 mm, resulting in a total nail length of 39 m/m and grout volume of 0.93 m³/m, with a static SF of 1.54 and an earthquake SF of 1.19.

Keywords: Slope Stability, Safety Factor, Soil Nailing