

ANALISIS EFEKTIVITAS DINDING PENAHAN TIPE BERONJONG DENGAN KOMBINASI GEOGRID DALAM PENANGGULANGAN LONGSOR

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Abstrak

Pembangunan dinding penahan tanah di ruas jalan Panduman–Sucopangepok, Kecamatan Jelbuk, diperlukan untuk mencegah terjadinya longsor serta menjaga keberlanjutan fungsi jalan sebagai akses utama masyarakat. Salah satu metode yang digunakan adalah dinding penahan tipe gabion, yang bersifat ekonomis, ramah lingkungan, dan efektif untuk stabilisasi lereng. Gabion bekerja berdasarkan berat sendiri, namun stabilitasnya dapat ditingkatkan melalui penambahan material geosintetik seperti geogrid. Penelitian ini bertujuan untuk mengevaluasi stabilitas gabion dengan dan tanpa geogrid, baik pada konfigurasi tegak maupun miring, serta menentukan variasi panjang dan jarak geogrid yang paling efektif. Hasil analisis menunjukkan bahwa konfigurasi gabion tegak dengan geogrid sepanjang 3 meter dan jarak vertikal 1 meter memberikan faktor keamanan tertinggi, yakni 2,21 terhadap guling dan 3,60 terhadap geser. Namun, pada konfigurasi miring, gabion tanpa geogrid justru lebih stabil, dengan nilai faktor keamanan 2,24 (guling), 1,60 (geser), 1,75 (lereng), dan daya dukung 15,11. Oleh karena itu, konfigurasi gabion miring tanpa geogrid lebih direkomendasikan, kecuali dilakukan penyesuaian arah pemasangan geogrid.

Kata Kunci: Dinding penahan; Gabion; Geogrid; Longsor; Stabilitas

ANALYSIS OF THE EFFECTIVENESS OF GABION RETAINING WALLS COMBINED WITH GEOGRID IN LANDSLIDE MITIGATION

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Abstract

The construction of retaining walls along the Panduman–Sucopangepok road segment in Jelbuk District is essential to prevent landslides and ensure the continued function of this road as a vital access route for the local community. One commonly used method is the gabion retaining wall, known for its cost-effectiveness, environmental friendliness, and efficiency in slope stabilization. Gabions rely on their self-weight to resist lateral soil pressure, and their stability can be further enhanced by adding geosynthetic materials such as geogrid. This study aims to evaluate the stability of gabion walls with and without geogrid reinforcement, in both vertical and inclined configurations, and to determine the most effective geogrid spacing and length. The analysis results show that a vertical gabion configuration with 3-meter-long geogrid spaced at 1 meter yields the highest safety factors, with 2.21 against overturning and 3.60 against sliding. However, in inclined configurations, gabions without geogrid demonstrated greater stability, with safety factors of 2.24 (overturning), 1.60 (sliding), 1.75 (slope), and a bearing capacity of 15.11. Therefore, the inclined gabion configuration without geogrid is more recommended, unless adjustments are made to the geogrid installation direction.

Keywords: Retaining wall; Gabion; Geogrid; Landslide; Stability