

**Arahan Pengelolaan Lereng *Silt Cake* Pada Disposal Area Berdasarkan Analisis
Kestabilan Lereng di Tambang Andesit PT. Tarabatuh Manunggal, Desa Cikutamahi,
Kecamatan Cariu, Kabupaten Bogor, Provinsi Jawa Barat**

Sintha Kusuma Wardhani
114210050

INTISARI

PT. Tarabatuh Manunggal merupakan perusahaan pertambangan andesit yang berlokasi di Desa Cikutamahi, Kecamatan Cariu, Kabupaten Bogor, Jawa Barat. Kegiatan produksi menggunakan sistem tambang terbuka tipe kuari tipe side hill, menghasilkan berbagai jenis agregat, termasuk washed sand yang proses pengolahannya menghasilkan limbah berupa silt cake yang ditimbun di area disposal, seiring waktu membentuk lereng yang membutuhkan analisis geoteknik untuk menjamin kestabilannya dengan mempertimbangkan keterbatasan lahan disposal.

Penelitian ini bertujuan mengevaluasi tingkat kestabilan lereng silt cake dan memberikan rekomendasi pengelolaan lereng guna mencegah gerakan massa. Metode penelitian meliputi pengumpulan data, survei dan pemetaan, pengambilan sampel, analisis laboratorium, serta pengolahan data dengan pemodelan geometri lereng untuk menghitung faktor keamanan (FK). Hasil analisis menunjukkan bahwa kestabilan lereng dipengaruhi oleh geometri lereng, sifat fisik dan mekanik material silt cake, kondisi iklim, dan aktivitas manusia. Lereng yang terlalu curam berpotensi mengalami penurunan faktor keamanan yang dapat mengganggu operasional tambang dan berdampak pada lingkungan sekitarnya.

Berdasarkan sifat fisik, lereng utara memiliki berat isi $20,02 \text{ N/cm}^3$ dan kadar air 23,07%, sedangkan lereng selatan memiliki berat isi $19,91 \text{ N/cm}^3$ dan kadar air 25,16% dengan nilai permeabilitas masing-masing $6,681 \times 10^{-6} \text{ m/s}$ (utara) dan $1,250 \times 10^{-6} \text{ m/s}$ (selatan), serta porositas yang tergolong kurang baik, yaitu 41,01% dan 42,07%. Dari sisi mekanik, lereng utara memiliki kohesi 66,58 kPa dan sudut geser dalam $29,79^\circ$, sementara lereng selatan memiliki kohesi 36,47 kPa dan sudut geser dalam $37,74^\circ$.

Analisis stabilitas menunjukkan bahwa kedua lereng tergolong stabil, dengan nilai faktor keamanan (FK) bervariasi tergantung kondisi beban. Lereng utara memiliki FK 4,368 tanpa beban dan 3,409 dengan beban kombinasi, sedangkan lereng selatan 2,724 tanpa beban dan 2,285 dengan beban kombinasi. Rekomendasi pengelolaan lereng diantaranya rekayasa geometri, pembangunan saluran drainase, dan penanaman vegetasi dan pendekatan institusi. Rekayasa geometri menurunkan FK lereng utara menjadi 1,817 dengan jumlah 3 jenjang dan ketinggian tiap jenjang 10 m serta kemiringan 50° dan meningkatkan FK lereng selatan menjadi 2,439 dengan jumlah 3 jenjang dan tinggi tiap jenjang 10 m serta kemiringan 30° , keduanya masih dalam kategori stabil.

Kata Kunci : Pertambangan, Kestabilan Lereng, Faktor Keamanan, Janbu yang disederhanakan

***Slope Management Guidelines for Silt Cake in the Disposal Area Based on Slope Stability
Analysis at the Andesite Mine of PT. Tarabatuh Manunggal,
Cikutamahi Village, Cariu Sub-district, Bogor Regency, West Java Province***

Sintha Kusuma Wardhani

114210050

ABSTRACT

PT. Tarabatuh Manunggal is an andesite mining company located in Cikutamahi Village, Cariu District, Bogor Regency, West Java. The production activity uses an open-pit mining system with a side-hill quarry type, producing various types of aggregates, including washed sand. The processing of this washed sand generates waste in the form of silt cake, which is stockpiled in a disposal area. Over time, this forms slopes that require geotechnical analysis to ensure their stability, especially considering the limited disposal area.

This study aims to evaluate the stability level of the silt cake slopes and provide slope management recommendations to prevent mass movement. The research methods include data collection, surveying and mapping, sampling, laboratory analysis, and data processing using slope geometry modeling to calculate the factor of safety (FoS). The analysis results indicate that slope stability is influenced by slope geometry, the physical and mechanical properties of the silt cake material, climatic conditions, and human activities. Slopes that are too steep have the potential to reduce the safety factor, which may disrupt mining operations and impact the surrounding environment.

Based on physical properties, the northern slope has a unit weight of 20.02 N/cm³ and a moisture content of 23.07%, while the southern slope has a unit weight of 19.91 N/cm³ and a moisture content of 25.16%. The permeability values are 6.681×10^{-6} m/s (north) and 1.250×10^{-6} m/s (south), with relatively poor porosity levels of 41.01% and 42.07%, respectively. From a mechanical perspective, the northern slope has a cohesion of 66.58 kPa and an internal friction angle of 29.79°, while the southern slope has a cohesion of 36.47 kPa and an internal friction angle of 37.74°.

Stability analysis shows that both slopes are categorized as stable, with safety factor (FoS) values varying depending on load conditions. The northern slope has an FoS of 4.368 without load and 3.409 under combined load, while the southern slope has an FoS of 2.724 without load and 2.285 under combined load. Slope management recommendations include slope geometry engineering, construction of drainage channels, vegetation planting, and institutional approaches. The geometry engineering reduces the FoS of the northern slope to 1.817 with three benches, each 10 meters high and a slope angle of 50°, and increases the FoS of the southern slope to 2.439 with three benches, each 10 meters high and a slope angle of 30°—both still classified as stable.

Keywords: Mining, Slope Stability, Safety Factor, Simplified Janbu