

ABSTRAK

EVALUASI GEOMETRI LERENG DESAIN *DISPOSAL* TAHUNAN PADA TAMBANG TERBUKA, KEC. LOA KULU, KAB. KUTAI KARTANEGARA, KALIMANTAN TIMUR

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Kestabilan lereng *disposal* merupakan aspek penting dalam pertambangan batubara karena kelongsoran dapat menimbulkan kerugian material dan nonmaterial. Lereng *disposal* yang tersusun atas material *overburden* berpotensi tidak stabil akibat pengaruh geometri lereng, kondisi material, curah hujan, dan beban alat berat. Penelitian ini bertujuan menganalisis kestabilan desain lereng *disposal* serta memberikan rekomendasi geometri yang sesuai.

Analisis dilakukan menggunakan metode kesetimbangan batas dengan pendekatan Morgenstern-Price dan kriteria keruntuhan Mohr-Coulomb pada perangkat lunak *Slide 6.0*. Data yang digunakan meliputi topografi aktual, desain *disposal* 2026, parameter geoteknik berupa kohesi, sudut geser dalam, dan berat isi, serta data koefisien seismik dan data bor.

Lokasi penelitian tersusun atas bentukasal antropogenik, denudasional, dan fluvial. Bentukasal antropogenik meliputi bukaan tambang, *disposal*, dan kolam pengendapan; bentukasal denudasional berupa dataran berlereng landai hingga curam; sedangkan bentukasal fluvial berupa rawa. Satuan batuan mencakup batulempung, batupasir, dan timbunan *disposal* pada lingkungan pengendapan *transitional lower delta plain*. Hasil analisis kestabilan lereng pada sayatan A-A', B-B', C-C', D-D' timur, D-D' barat, E-E', dan F-F' menghasilkan faktor keamanan berturut-turut 1,74; 1,40; 1,195; 1,557; 1,575; 1,322; dan 0,970. Setelah optimasi melalui peningkatan elevasi dan rekayasa sudut lereng, nilai faktor keamanan meningkat menjadi 1,367; 1,30; 1,313; 1,34; 1,323; 1,32; dan 1,333. Hasil optimasi menunjukkan seluruh lereng memenuhi kriteria kestabilan yang dipersyaratkan.

Kata kunci: *Disposal, Faktor Keamanan, Geologi, Kestabilan Lereng*

ABSTRACT

EVALUATION OF ANNUAL DISPOSAL SLOPE GEOMETRY DESIGN IN AN OPEN-PIT MINE, KUTAI KARTANEGARA, EAST KALIMANTAN

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Disposal slope stability is an important aspect of coal mining because slope failure can result in both material and nonmaterial losses. Disposal slopes composed of overburden material may become unstable due to slope geometry, material conditions, rainfall, and heavy-equipment loads. This study aims to analyze the stability of the disposal slope design and provide appropriate slope geometry recommendations.

The analysis was conducted using the limit equilibrium method with the Morgenstern–Price approach and the Mohr–Coulomb failure criterion in Slide 6.0 software. The data used included current topographic data, the 2026 disposal design, geotechnical parameters consisting of cohesion, internal friction angle, and unit weight, as well as seismic coefficient and borehole data.

The study area consists of anthropogenic, denudational, and fluvial landforms. Anthropogenic landforms include mine openings, disposal areas, and settling ponds; denudational landforms comprise gently to steeply sloping terrain; while fluvial landforms consist of swamps. The lithological units include claystone, sandstone, and disposal fill deposited within a transitional lower delta plain environment. Slope stability analyses of sections A–A', B–B', C–C', eastern D–D', western D–D', E–E', and F–F' yielded factors of safety of 1.74, 1.40, 1.195, 1.557, 1.575, 1.322, and 0.970, respectively. Following optimization through elevation adjustment and slope-angle modification, the factors of safety increased to 1.367, 1.30, 1.313, 1.34, 1.323, 1.32, and 1.333, respectively. The optimization results indicate that all slopes satisfy the required stability criteria.

Keywords: Disposal, Geology, Safety Factor, Slope Stability