

**GEOLOGI DAN OPTIMASI GEOMETRI LERENG  
PADA TAMBANG TERBUKA *PIT X SITE* ASMI,  
KECAMATAN KAPUAS TENGAH,  
KABUPATEN KAPUAS, PROVINSI KALIMANTAN TENGAH**

**ABSTRAK**

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Daerah penelitian secara administratif terletak di Desa Barunang, Kecamatan Kapuas Tengah, Kabupaten Kapuas, Provinsi Kalimantan Tengah dalam area kerja PT. Pampersada Nusantara. Secara regional, daerah penelitian termasuk dalam fisiografi Cekungan Barito. Secara stratigrafi, daerah penelitian masuk dalam Formasi Tanjung berumur Eosen. Berdasarkan hasil pemetaan, daerah penelitian dibagi menjadi 2 bentuklahan asal dan 4 bentuklahan yaitu, bentuk asal antropogenik yang terdiri dari lahan galian tambang (A1), kolam tambang - *sump* (A2), dan lahan hasil timbunan tambang - disposal (A3), bentuklahan asal denudasional yaitu perbukitan bergelombang (D1). Stratigrafi daerah penelitian dari tua ke muda disusun oleh Satuan batulempung Tanjung berumur Eosen dan terendapkan secara tidak selaras di atasnya Endapan Disposal berumur Resen. Metode penambangan yang digunakan berupa metode penambangan terbuka (*open-pit mining*). Metode ini dapat menghasilkan lereng-lereng terjal yang memiliki potensi kelongsoran. Analisis kestabilan lereng perlu dilakukan guna memastikan lereng tambang yang aman dengan nilai Faktor Keamanan (FK)  $\geq 1,3$  pada kondisi statis, mengacu kepada KEPMEN ESDM No. 1827 K/30/MEM/2018 dengan pendekatan statis. Selain faktor keamanan, nilai ekonomis juga harus diperhatikan dengan melakukan pengoptimalan pada geometri lereng tambang untuk memperoleh nilai *stripping ratio* (SR) yang lebih optimal. Analisis dilakukan dengan menggunakan metode kesetimbangan batas berupa metode Morgenstern-Price dengan menggunakan kriteria keruntuhan Generalized Hoek-Brown yang memiliki parameter utama berupa *Geological Strength Index* (GSI), konstanta  $m_i$ , dan nilai *disturbance factor* (D). Optimasi dilakukan dengan mengubah nilai *single slope* dari setiap lereng. Pada sayatan A-A', *single slope* desain awal  $45^0$  diperoleh nilai FK 2,304 dan pengoptimalan *single slope* menjadi  $50^0$  diperoleh nilai FK 1,829. Pada sayatan B-B', *single slope* desain awal  $45^0$  diperoleh nilai FK 1,544 dan pengoptimalan *single slope* menjadi  $50^0$  diperoleh nilai FK 1,403. Pada sayatan C-C', *single slope* desain awal  $45^0$  diperoleh nilai FK 1,437 dan dinyatakan sudah optimal. Pada sayatan D-D', *single slope* desain awal  $45^0$  diperoleh nilai FK 1,437 dan dinyatakan sudah optimal. Pada sayatan E-E', *single slope* desain awal  $45^0$  diperoleh nilai FK 1,396 dan dinyatakan sudah optimal. Mengacu pada desain awal, nilai *stripping ratio* pada *pit x* adalah 12,52 dan pada desain hasil optimasi diperoleh nilai *stripping ratio* sebesar 10,25.

**Kata kunci:** Batubara, Faktor Keamanan, Formasi Tanjung, Stabilitas Lereng

**GEOLOGY AND OPTIMIZATION OF SLOPE GEOMETRY  
AT PIT X OPEN PIT MINE ASMI SITE,  
KAPUAS TENGAH SUB-DISTRICT,  
KAPUAS DISTRICT, CENTRAL KALIMANTAN PROVINCE**

**ABSTRACT**

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*The study area is administratively located in Barunang Village, Kapuas Tengah Sub-district, Kapuas Regency, Central Kalimantan Province within the work area of PT Pamapersada Nusantara. Regionally, the study area is included in the Barito Basin physiography. Stratigraphically, the study area is included in the Eocene-aged Tanjung Formation. Based on the mapping results, the study area is divided into 2 landforms of origin and 4 landforms, namely, anthropogenic origin consisting of mine excavation land (A1), mine pond - sump (A2), and mine dump - disposal land (A3), denudational origin landforms namely undulating hills (D1). The stratigraphy of the study area from old to young is arranged by the Eocene-aged Tanjung mudstone unit and deposited unconformably on top of the Resen-aged Disposal Deposits. The mining method used is open-pit mining. This method can produce steep slopes that have the potential for landslides. Slope stability analysis needs to be carried out to ensure safe mining slopes with a Safety Factor (FK) value  $\geq 1.3$  under static conditions, referring to KEPMEN ESDM No. 1827 K/30/MEM/2018. In addition to the safety factor, economic value must also be considered by optimizing the geometry of the mine slope. The analysis was carried out using the limit equilibrium method in the form of the Morgenstern-Price method using the Generalized Hoek-Brown collapse criterion which has the main parameters in the form of Geological Strength Index (GSI),  $m_i$  constant, and disturbance factor (D) values. Optimization was done by changing the single slope value of each slope. In incision A-A', the initial design single slope of  $45^{\circ}$  obtained an FK value of 2.304 and optimizing the single slope to  $50^{\circ}$  obtained an FK value of 1.829. At incision B-B', the initial design single slope of  $45^{\circ}$  obtained an FK value of 1.544 and optimizing the single slope to  $50^{\circ}$  obtained an FK value of 1.403. In the C-C' incision, the initial design single slope of  $45^{\circ}$  obtained an FK value of 1.437 and was declared optimal. In the D-D' incision, the initial design single slope of  $45^{\circ}$  obtained an FK value of 1.437 and was declared optimal. In the E-E' incision, the initial design single slope of  $45^{\circ}$  obtained an FK value of 1.396 and was declared optimal. Referring to the initial design, the stripping ratio value at pit x is 12.52 and the optimized design obtained a stripping ratio value of 10.25.*

**Keywords:** Coal, Safety Factor, Tanjung Formation, Slope Stability