

INTISARI

Penelitian ini dilakukan di area Pit 1 PT. Manambang Muara Enim, yang berlokasi di Kabupaten Muara Enim, Sumatera Selatan, dengan tujuan untuk menganalisis kondisi kestabilan lereng tambang terbuka berdasarkan data geologi permukaan dan karakteristik massa batuan. Metode yang digunakan meliputi pemetaan struktur geologi permukaan, pengukuran kekar dan sesar, evaluasi kualitas massa batuan menggunakan *Geological Strength Index* (GSI), analisis kinematika untuk mengidentifikasi potensi tipe keruntuhan, serta perhitungan Faktor Keamanan (FK) menggunakan metode kesetimbangan batas. Hasil pemetaan menunjukkan bahwa area penelitian tersusun atas Formasi Muara Enim dengan litologi dominan berupa batulempung, batulanau, batupasir, dan batubara. Struktur geologi yang paling dominan dijumpai adalah sesar turun, dan terdapat struktur lain seperti sesar naik dan lipatan. Struktur geologi ini memengaruhi persebaran dan kualitas massa batuan, terutama di sekitar zona-zona sesar, yang cenderung mengalami penurunan nilai GSI. Analisis kinematika mengidentifikasi adanya potensi keruntuhan berupa longsoran guling (*toppling*) dan baji (*wedge failure*) pada beberapa zona lereng, namun tidak ditemukan indikasi kelongsoran bidang atau longsoran busur. Nilai Faktor Keamanan pada seluruh sayatan yang dianalisis berada di atas standar minimum yang ditetapkan dalam Kepmen ESDM 1827 K/30/MEM/2018 baik untuk *overall slope* maupun *intermediate slope*, dengan nilai FK > 1,25. Berdasarkan hasil tersebut, seluruh lereng pada area penelitian dinyatakan berada dalam kondisi stabil dan aman terhadap potensi longsoran. Dengan demikian, penelitian ini tidak memberikan rekomendasi desain ulang lereng karena tidak ditemukan indikasi kegagalan geoteknik yang signifikan. Hasil penelitian ini diharapkan dapat menjadi referensi bagi kegiatan operasional dan pemantauan lereng secara berkala untuk mendukung aktivitas pertambangan yang aman dan berkelanjutan.

Kata kunci: kestabilan lereng, faktor keamanan, GSI, analisis kinematika, tambang terbuka, PT Manambang Muara Enim

ABSTRACT

This research was conducted in the Pit 1 area of PT. Manambang Muara Enim, located in Muara Enim Regency, South Sumatra, with the objective of analyzing the slope stability conditions of the open-pit mine based on surface geological data and rock mass characteristics. The methods applied include surface geological structure mapping, measurement of joints and faults, evaluation of rock mass quality using the Geological Strength Index (GSI), kinematic analysis to identify potential failure types, and calculation of the Factor of Safety (FoS) using the limit equilibrium method. The geological mapping results indicate that the study area is composed of the Muara Enim Formation, predominantly consisting of claystone, siltstone, sandstone, and coal. The most prominent geological structure observed is normal faulting, along with other features such as reverse faults and folds. These structures influence the distribution and quality of the rock mass, particularly around fault zones, which tend to exhibit decreased GSI values. Kinematic analysis identified potential failure types such as toppling and wedge failure in several slope zones; however, there were no indications of planar or circular failure. The calculated Factor of Safety in all analyzed cross-sections exceeds the minimum standard set by the Indonesian Ministry of Energy and Mineral Resources Regulation No. 1827 K/30/MEM/2018 for both overall slopes and intermediate slopes, with FoS values greater than 1.25. Based on these findings, all slopes in the study area are considered stable and safe from potential landslides. Consequently, no redesign of the slope geometry is recommended in this study, as no significant geotechnical instability was identified. The results of this research are expected to serve as a reference for ongoing mining operations and routine slope monitoring to support safe and sustainable mining activities.

Keywords: slope stability, factor of safety, GSI, kinematic analysis, open-pit mining, PT. Manambang Muara Enim