GEOLOGI DAN ANALISIS STABILITAS LERENG *HIGH WALL, SIDE WALL, LOW WALL* PADA TAMBANG TERBUKA, DESA GUNUNG KEMBANG, KECAMATAN MERAPI TIMUR, KABUPATEN LAHAT, PROVINSI SUMATERA SELATAN

ABSTRAK

Secara administratif daerah penelitian terletak pada Desa Gunung Kembang, Kecamatan Merapi Timur, Kabupaten Lahat, Provinsi Sumatera Selatan. Secara geografis terletak pada koordinat UTM (*Universal Transverse* Mercator) zona 48S dengan X: 348835-350035 dan Y: 9589005-9589305. Area penelitian memiliki luasan sebesar 1,8 km^2 dan masuk kedalam Formasi Muara Enim, dengan litologi penciri daerah penelitian berupa batulempung, batupasir, batuserpih, dan batubara. Berdasarkan hasil pemetaan permukaan dan pengamatan lapangan, daerah penelitian dibagi menjadi 3 bentuk asal dan 5 bentuk lahan yaitu, bentuk asal antropogenik yang terdiri dari kolam tambang (A1), lahan bukaan tambang (A2), dan lahan galian tambang (A3), bentuk asal denudasional yaitu perbukitan terkikis (D1), dan bentuk asal Struktural yaitu perbukitan homoklin (S1). Stratigrafi daerah penelitian dari tua ke muda disusun oleh satuan batuserpih Muara Enim, satuan batupasir Muara Enim, dan satuan batulempung Muara Enim yang diendapkan pada kala Miosen Tengah-Miosen Akhir (N14-N16) pada lingkungan pengendapan *Transitional Lower Delta Plain* (Horne, 1978). Batubara pada lokasi penelitian menjadi daya tarik bagi perusahaan energi untuk menambangnya, dimana metode *open-pit* dipilih sebagai metode penambangan batubara pada lokasi penelitian. Metode *open-pit* ini kemudian menghasilkan lereng-lereng pada daerah penelitian yang disebut sebagai lereng *high wall, side wall,* dan *low wall.* Mengacu kepada KEPMEN ESDM No. 1827 K/30/MEM/2018 lereng *high wall, side wall,* dan *low wall* tersebut diharapkan memiliki nilai SF (*Safety Factor)* ≥1,3 pada kondisi statis dan ≥1,05 pada kondisi dinamis. Terdapat 881 kecelakaan tambang di Indonesia sepanjang tahun 2013 sampai 2021, sehingga perlu dilakukan analisis terkait stabilitas lereng untuk memastikan lereng tambang yang aman. Berdasarkan hasil analisis stabilitas lereng menggunakan metode kesetimbangan batas pada kondisi jenuh dan statis, didapatkan SF (*Safety Factor*) lereng *high wall* 1,355(GLE/Morgenstern-price); 1,362(Spencer), lereng *side wall* 1,350(GLE/Morgenstern-price); 1,364(Spencer), dan lereng *low wall* 1,488 (GLE/Morgenstern-price);1,488(Spencer). Sedangkan pada kondisi jenuh dan dinamis oleh beban gempa didapatkan nilai SF (*Safety Factor*) lereng *high wall* 1,219 (GLE/Morgenstern-price);1,218 (Spencer), lereng *side wall* 1,084 (GLE/Morgenstern-price);1,093(Spencer), dan lereng *low wall* 1,164(GLE/Morgenstern-price);1,157 (Spencer).

Kata kunci: Beban Gempa, Muara Enim, *Safety Factor,* Stabilitas Lereng.

GEOLOGY AND SLOPE STABILITY ANALYSIS OF HIGH WALL, SIDE WALL, AND LOW WALL IN OPEN-PIT MINE, GUNUNG KEMBANG VILLAGE, EAST MERAPI DISTRICT, LAHAT REGENCY, SOUTH SUMATRA PROVINCE

ABSTRACT

Administratively, the research area is located in Gunung Kembang Village, East Merapi District, Lahat Regency, South Sumatra Province. Geographically, it is situated at UTM (Universal Transverse Mercator) coordinates Zone 48S, with X: 348835-350035 and Y: 9589005-9589305. The research area covers an area of 1.8 km² and is within the Muara Enim Formation, characterized by lithologies such as shale, sandstone, siltstone, and coal. Based on surface mapping and field observations, the research area is divided into 3 origin forms and 5 landforms, namely anthropogenic origin forms consisting of mining ponds (A1), mining open areas (A2), and mining excavation areas (A3); denudational origin forms include eroded hills (D1), and structural origin forms comprise homoclinic hills (S1). The stratigraphy of the research area, from old to young, consists of the Muara Enim shale unit, Muara Enim sandstone unit, and Muara Enim shale unit, deposited during the Middle to Late Miocene (N14-N16) in a Transitional Lower Delta Plain depositional environment (Horne, 1978). Coal in the research location is attractive to energy companies for mining, where the open-pit method is chosen as the mining method for coal in the research area. This open-pit method results in slopes in the research area referred to as high walls, side walls, and low walls. Referring to Ministerial Decree No. 1827 K/30/MEM/2018, these high walls, side walls, and low walls are expected to have a Safety Factor (SF) ≥1.3 under static conditions and ≥1.05 under dynamic conditions. There were 881 mining accidents in Indonesia from 2013 to 2021, highlighting the need for slope stability analysis to ensure safe mining slopes. Based on slope stability analysis using the limit equilibrium method under saturated and static conditions, the SF values for high walls are 1.355 (GLE/Morgenstern-price) and 1.362 (Spencer); for side walls are 1.350 (GLE/Morgenstern-price) and 1.364 (Spencer); and for low walls are 1.488 (GLE/Morgenstern-price) and 1.488 (Spencer). Meanwhile, under saturated and dynamic conditions with seismic loads, the SF values for high walls are 1.219 (GLE/Morgenstern-price) and 1.218 (Spencer); for side walls are 1.084 (GLE/Morgenstern-price) and 1.093 (Spencer); and for low walls are 1.164 (GLE/Morgenstern-price) and 1.157 (Spencer). Keywords: Seismic Load, Muara Enim, Safety Factor, Slope Stability.

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