

ABSTRAK

GEOLOGI DAN STUDI PERBANDINGAN FAKTOR KEAMANAN BERDASARKAN HOEK AND BROWN DAN DATA PERGERAKAN *SLOPE STABILITY RADAR* DAERAH TANJUNG ENIM, KECAMATAN LAWANG KIDUL, KABUPATEN MUARA ENIM, PROVINSI SUMATRA SELATAN

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Lokasi penelitian terletak pada Zona 48S yang secara administratif berada di Daerah Tanjung Enim, Kecamatan Lawang Kidul, Kabupaten Muara Enim, Provinsi Sumatra Selatan. Analisis kestabilan lereng penting dalam tambang terbuka untuk mencegah longsor yang berdampak pada keselamatan, produksi, dan lingkungan. Kriteria Hoek and Brown serta *Slope Stability Radar* (SSR) merupakan pendekatan yang umum digunakan, namun kesesuaian antara keduanya belum dikaji secara komprehensif. Oleh karena itu, penelitian ini bertujuan untuk memetakan, menganalisis, dan mengkaji kondisi geologi serta studi perbandingan faktor keamanan berdasarkan Hoek and Brown dan data pergerakan *slope stability radar* (SSR). Metodologi yang digunakan dalam penelitian ini meliputi pemetaan geologi permukaan, pemetaan geologi teknik permukaan dan *monitoring slope stability radar*. Daerah penelitian secara geomorfologi disusun oleh bentuklahan asal antropogenik. Formasi Muara Enim dengan Satuan batulempung Muara Enim dan Satuan batupasir Muara Enim berumur Miosen akhir-Pliosen terendapkan di lingkungan pengendapan delta pada sublingkungan pengendapan *transitional lower delta plain*. Struktur geologi yang ditemukan berupa kekar yang memiliki tegasan utama berarah relatif timur laut-barat daya (NE-SW) dan utara-selatan (N-S). Hasil perbandingan nilai faktor keamanan (FK) dari pendekatan Hoek and Brown yang dikategorikan aman tidak selalu selaras dengan hasil pemantauan SSR. Nilai FK berdasarkan Hoek and Brown berkisar 1,301-1,382 termasuk kategori aman. Jenis perilaku deformasi lereng terdapat 2 tahap yaitu linear dengan nilai maksimum berkisar -3,82-0,54 termasuk kategori hijau dan progresif dengan nilai maksimum berkisar 1,16-14,71 termasuk kategori hijau, kuning dan merah. Kesesuaian FK dan SSR terjadi saat FK dalam kategori aman dan SSR menunjukkan pergerakan linear dengan kategori waspada hijau. Ketidaksesuaian terjadi jika FK aman, akan tetapi SSR menunjukkan pergerakan progresif dengan kategori waspada hijau, kuning, atau merah, yang menunjukkan potensi ketidakstabilan di lapangan.

Kata Kunci: Geologi, Hoek and Brown, *Slope Stability Radar*, Faktor keamanan, Muara Enim

ABSTRACT

GEOLOGY AND COMPARATIVE STUDY OF SAFETY FACTORS BASED ON HOEK AND BROWN AND SLOPE STABILITY RADAR MOVEMENT DATA TANJUNG ENIM AREA, LAWANG KIDUL SUB-DISTRICT, MUARA ENIM DISTRICT, SOUTH SUMATRA PROVINCE

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The research site is located in Zone 48S which is administratively located in Tanjung Enim Area, Lawang Kidul Subdistrict, Muara Enim Regency, South Sumatra Province. Slope stability analysis is important in open pit mining to prevent landslides that impact safety, production and the environment. Hoek and Brown criteria and Slope Stability Radar (SSR) are commonly used approaches, but the compatibility between them has not been comprehensively studied. Therefore, this research aims to map, analyze and assess geological conditions as well as a comparative study of safety factors based on Hoek and Brown and slope stability radar (SSR) movement data. The methodology used in this research includes surface geological mapping, surface engineering geological mapping and slope stability radar monitoring. The study area is geomorphologically composed by landforms of anthropogenic origin. The Muara Enim Formation with Muara Enim mudstone unit and Muara Enim sandstone unit of late Miocene-Pliocene age were deposited in a deltaic depositional environment in the transitional lower delta plain sub-environment. The geological structure found is in the form of kekar which has a main strike oriented relatively northeast-southwest (NE-SW) and north-south (N-S). The comparison results of the safety factor (FK) value from the Hoek and Brown approach which is categorized as safe are not always in line with the results of SSR monitoring. FK values based on Hoek and brown range from 1.301-1.382 including the safe category. There are 2 stages of slope deformation behavior, namely linear with maximum values ranging from -3.82 to -4.54 including the green category and progressive with maximum values ranging from 1.16 to 14.71 including the green, yellow and red categories. FK and SSR compatibility occurs when FK is in the safe category and SSR shows linear movement with green alert category. Discrepancies occur when the FK is safe, but the SSR shows progressive movement with green, yellow or red alert categories, indicating potential instability in the field.

Keywords: *Geology, Hoek and Brown, Slope Stability Radar, Factor of safety, Muara Enim.*