ABSTRAK

ANALISIS PERBANDINGAN KESTABILAN LERENG DISPOSAL TAMBANG TERBUKA BATUBARA MENGGUNAKAN PARAMETER KUAT GESER HASIL KONVERSI: N-SPT DAN KUAT TEKAN UNIAKSIAL

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Kestabilan lereng disposal merupakan salah satu aspek penting dalam kegiatan pertambangan karena berhubungan dengan keselamatan kerja dan keberlangsungan operasional tambang. Hasil analisis kestabilan lereng sangat dipengaruhi oleh metode penentuan parameter kuat geser yang dipakai. Penelitian ini dilakukan untuk membandingkan hsil analisis kestabilan lereng disposal menggunakan parameter kuat geser hasil konversi nilai *Standard Penetration Test* (N-SPT) dan parameter hasil konversi kuat tekan uniaksial (*Unconfined Compression Strength*), serta menentukan metode mana yang lebih representatif terhadap menggambarkan kondisi aktual lereng. Penelitian dilakukan menggunakan data pemboran geoteknik, nilai N-SPT, hasil pengujian UCS, geometri lereng disposal, monitoring prisma, dan observasi lapangan. Parameter kuat geser hasil konversi N-SPT didapat menggunakan persamaan Kumar dkk., (2016), sedangkan parameter qu-Cu didapat berdasarkan hubungan Moh-Coulomb. Analisis kestabilan lereng dilakukan dengan menggunakan metode *Limit Equilibrium Method* – Morgensten-price pada ke-16 lereng. Hasil penelitian menunjukkan bahwa metode N-SPT menghasilkan nilai faktor keamanan sebesar 2,265 – 4,550 dengan rata-rata sebesar 3,277, sedangkan metode qu-Cu menghasilkan nilai faktor keamanan sebesar 1,075-1,385 dengan rata-rata 1,160. Hasil *Paired Sample t-Test* menunjukkan adanya perbedaan yang signifikan antara kedua metode. Analisis CoV menunjukkan metode qu-Cu memiliki variasi yang lebih rendah dan lebih konsisten dibandingkan metode N-SPT. Selain itu, nilai Cohen's Kappa metode qu-Cu sebesar 0,587 (*Moderate Agreement*) lebih tinggi dibandingkan metode N-SPT sebesar 0,000 (*Slight Agreement*). Berdasarkan hasil analisis, monitoring prisma, dan kondisi aktual lapangan, metode qu-Cu dinilai lebih representatif untuk menggambarkan kondisi kestabilan lereng disposal.

Kata kunci : *kestabilan lereng, disposal, N-SPT, qu-Cu, faktor keamanan, Cohen's Kappa*

ABSTRACT

ANALISIS PERBANDINGAN KESTABILAN LERENG DISPOSAL TAMBANG TERBUKA BATUBARA MENGGUNAKAN PARAMETER KUAT GESER HASIL KONVERSI: N-SPT DAN KUAT TEKAN UNIAKSIAL

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Disposal slope stability is one of the important aspects of mining operations as it is related to workplace safety and operational continuity. The results of slope stability analysis are highly influenced by the method used to determine shear strength parameters. This study was conducted to compare the results of disposal slope stability analyses using shear strength parameters derived from the conversion of Standard Penetration Test (N-SPT) values and those obtained from the conversion of Unconfined Compressive Strength (UCS) values, as well as to determine which method is more representative of actual slope conditions. The study utilized geotechnical drilling data, N-SPT values, UCS test results, disposal slope geometry, prism monitoring data, and field observations. Shear strength parameters from N-SPT values were obtained using the empirical correlation proposed by Kumar et al. (2016), while the qu-Cu parameters were derived based on the Mohr-Coulomb relationship. Slope stability analyses were performed on 16 slope sections using the Limit Equilibrium Method with the Morgenstern–Price approach. The results indicate that the N-SPT method produced factor of safety values ranging from 2,265 – 4,550, with an average of 3,277, whereas the qu-Cu method produced factor of safety values ranging from 1,075 to 1,385, with an average of 1,160. The Paired Sample t-Test showed a significant difference between the two methods. The Coefficient of Variation (CoV) analysis indicated that the qu-Cu method had lower variability and was more consistent than the SPT-N method. Furthermore, the Cohen's Kappa value for the qu-Cu method was 0,587 (Moderate Agreement), which was higher than that of the SPT-N method, which yielded a value of 0,000 (Slight Agreement). Based on the stability analyses, prism monitoring results, and actual field conditions, the qu-Cu method was found to be more representative in describing the stability condition of the disposal slopes.

Keywords : slope stability, disposal, N-SPT, qu-Cu, factor of safety, Cohen's Kappa