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**Analisis Kestabilan Lereng Sidewall Pit E PT Lautan Hutan Lestari Dengan Metode Slope Mass Rating
(SMR) dan Kesetimbangan Batas**
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INTISARI

Penelitian ini dilakukan pada lereng *sidewall pit* E PT Lautan Hutan Lestari, Kabupaten Barito Utara, Kalimantan Tengah. Penelitian bertujuan untuk mengidentifikasi kondisi geologi teknik dan karakteristik massa batuan, mengevaluasi tingkat kestabilan lereng, serta menentukan optimasi geometri lereng yang memenuhi kriteria faktor keamanan minimum. Metode yang digunakan meliputi pemetaan geologi teknik, analisis petrografi, pengukuran diskontinuitas dengan metode *scanline*, klasifikasi massa batuan menggunakan *Rock Mass Rating* (RMR) dan *Geological Strength Index* (GSI), serta analisis kestabilan lereng dengan klasifikasi *Slope Mass Rating* (SMR) dan metode kesetimbangan batas. Daerah penelitian terdiri dari 5 satuan batuan yang tersusun oleh batulempung (*mudrock*), batulanau (*mudrock*), batupasir sangat halus (*quartz wacke*), batupasir halus (*lithic wacke*), batupasir sedang, dan batubara yang termasuk dalam Formasi Warukin. Hasil penelitian menunjukkan kualitas massa batuan berada pada kategori *poor rock* hingga *good rock* dengan nilai GSI berkisar antara 39 – 66. Analisis SMR menunjukkan kondisi lereng bervariasi dari *stable* hingga *completely unstable* dengan potensi longsoran dominan pada skala *bench slope* berupa *wedge failure*. Analisis kesetimbangan batas yang menunjukkan bidang gelincir *non-circular* dengan skala *overall slope* atau *inter-ramp slope* pada sayatan A – A' dan B – B' berada dalam kondisi aman, sedangkan sayatan C – C' dan D – D' belum memenuhi faktor keamanan minimum pada kondisi aktual. Optimasi geometri sayatan C – C’ dilakukan melalui pelebaran jenjang RL 89 dari 1,72 m menjadi 6,82 m yang dinilai lebih efektif dibandingkan melandaikan *single slope* RL 81 – Rl 89, dan sayatan D – D’ dilakukan pelandaian *single slope* dari 46^{o} menjadi 34^{o}, serta dilakukan penyesuaian posisi jalan angkut berhasil meningkatkan faktor keamanan hingga memenuhi kriteria Kepmen ESDM Nomor 1827 K/30/MEM/2018. Hasil penelitian menunjukkan bahwa kualitas massa batuan dan geometri lereng merupakan faktor utama yang mengontrol kestabilan lereng pada daerah penelitian.

Kata Kunci: kestabilan lereng, faktor keamanan, GSI, SMR, optimasi lereng.

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ABSTRACT

This Research was conducted on the sidewall slope of pit E at PT Lautan Hutan Lestari, North Barito Regency, Central Kalimantan. The study aimed to identify the engineering geological conditions and rock mass characteristics, evaluate slope stability based on rock mass classification and limit equilibrium analysis, and determine slope geometry optimization that satisfies the minimum factor of safety requirements. The research methods included engineering geological mapping, petrographic analysis, discontinuity measurements using the scanline method, rock mass classification based on Rock Mass Rating (RMR) and Geological Strength Index (GSI), and slope stability analysis using Slope Mass Rating (SMR) classification and limit equilibrium method. Slope geometry optimization was performed on slopes that did not meet the minimum factor of safety criteria. The study area consists of five rock units composed of claystone (mudrock), siltstone (mudrock), very fine sandstone (quartz wacke), fine sandstone (lithic wacke), medium sandstone, and coal belonging to the Warukin Formation. The results indicate that the rock mass quality ranges from poor rock to good rock, with GSI values ranging from 39 to 66. SMR analysis shows that slope conditions vary from stable to completely unstable, with wedge failure identified as the dominant potential failure mechanism at bench slope scale. Limit equilibrium analysis shows that the non-circular slip plane with the overall slope or inter-ramp slope scale at sections A – A' and B – B' are stable, whereas sections C – C' and D – D' do not satisfy the minimum factor of safety under existing conditions. Slope geometry optimization for sections C – C' was carried out by widening the bench at RL 89 from 1,72 m to 6,82 m, which proved to be more effective than flattening the single slope between RL 81 and RL 89. For sections D – D', the optimization involved reducing the single slope angle from 46 º to 34 º and adjusting the haul road alignment, these modifications successfully increased the factor of safety to comply with the criteria specified in the KEPMEN ESDM No. 1827 K/30/MEM/2018. The results demonstrate that rock mass characteristics and slope geometry are the primary factors controlling slope stability in the study area.

***Keywords**: slope stability, factor of safety, GSI, SMR, slope optimization.*