

RINGKASAN

Pit Inul Lignit mempunyai tinggi lereng tunggal 10 m sampai 75 m dan kemiringan lapisan 17° sampai 25°. Kegiatan penambangan akan menghasilkan lereng *lowwall* yang memiliki kemungkinan longsor. Potensi longsor lereng tunggal longsor bidang dengan bidang gelincir di material *weaklayer*, sehingga diperlukan studi kemantapan lereng dan titik pemantauan. Lereng yang memiliki $FK < 1,2$ perlu dilakukan rancangan ulang dan yang memiliki $PL > 0,5\%$ harus dilakukan pemantauan.

Studi kemantapan lereng menggunakan pendekatan probabilitas pada *lowwall* Pit Inul Lignit diperlukan untuk menghitung nilai FK dan PL pada tiap jenjang tunggal dan jenjang keseluruhan. Pengumpulan parameter yang diperlukan yaitu UCS, kohesi, sudut gesek dalam, wet density, RQD, D, mi dan *Jcondition*. Menggunakan metode kesetimbangan batas (Spencer) dengan dua kriteria kekuatan yaitu Mohr Colomb untuk material batubara, *weaklayer* dan *top soil* dan generalized Hoek-Brown untuk material *overburden*. Pengolahan data statistik dilakukan pada parameter kuat tekan uniaksial. Berdasarkan karakterisasi OB, didapatkan 5 OB utama yaitu OB A8, A4, dan K21 berdistribusi lognormal, sementara OB A7 dan NG berdistribusi gamma, sedangkan bobot isi basah berdistribusi normal. Metode *sampling* Monte Carlo 1000 digunakan mencari nilai faktor keamanan, probabilitas longsor, dan batas sensitivitas yang telah dirancangan yang sudah dibuat Departemen *Mineplan*.

Berdasarkan hasil penelitian pada tiap section, pemantuan lereng dilakukan pada sayatan 1 lereng 1 memiliki FK 1,116 PL 12,40 % dengan titik koordinat (106424E, 206487N) dan pada sayatan 4 lereng 1 memiliki FK 1,134 PL 10,86 % dengan titik kordinat (108600E, 204801N). Pengukuran pergerakan lereng menggunakan instrumen *total station*. Nilai batas sensitifitas kuat tekan pada *section 1* 1240,0 kN/m² dan *section 4* 724,9 kN/m². Peringatan bahaya diberitahukan ketika kegiatan penambangan sudah pada kedalaman > 75 m pada sayatan 1 dan > 60 m pada sayatan 4.

Didapatkan volume *overburden* rancangan ulang sebesar 201.764.752 Bcm lebih besar dibanding dengan rancangan awal, tonase batubara rancangan ulang sebesar 25.038.938 ton lebih besar dibandingkan dengan rancangan awal, dan *stripping ratio* yang lebih besar sebesar 8.06 dibanding dengan rancangan awal.

Kata kunci: lowwall, longsor bidang, spencer, probabilitas longsor, pemanatauan, stripping ratio.

ABSTRACT

Inul Lignit Pit has a bench height is 10 m to 75 m and the bench angle is 17° to 25°. Mining activities will produce lowwall slopes which have probability of failure. The failure potential of single slope is plane failure with slip surface at weak layer material, so that slope stability study is needed to prevent slope failure and to monitoring slope behavior. Slope has FS < 1,2 must be redesign and has PoF > 0,5 % must be monitoring.

Slope stability study using probability approach in Inul Lignit Pit lowwall is required to calculate FS and PoF values at each single slope and overall slope. The analysis is using 19 full coring data and 10 c drill data (spot coring). The required parameters are UCS, cohesion, angle of internal friction, wet density, RQD, D, mi and Jcondition. The analysis is using the spencer method with two strenght criterion Mohr Colomb for coal, weaklayer and top soil, and generalized Hoek-Brown for overburden. Statistical data processing is done based on uniaxial compressive strength parameter. Based on OB characterization, the main 5 OB are A8, A4, and K21 which are classified into lognormal distribution, while OB A7 and NG are classified into gamma distribution, while the wet density is normal distribution. The design from Mineplan Department then calculated to obtain the value of safety factor, failure probability and sensitivity using 1000 Monte Carlo sampling method.

Based on the study results, there are 2 unstable slopes, section 1 slope 1 has FS of 1,116 and PoF of 12,40 % and section 4 slope 1 has FS of 1,134 and PoF of 10,86 %. Based on the redesign of slice 1 slope 1, the maximum slope height is 37 m, section 4 slope 1, the maximum slope height is 61 m and section 4 slope 3, the maximum slope height is 29 m. Slope monitoring on section 1 slope 1 koordinat (106424E, 206487N) has PoF 10,6 % and *section* 4 slope 1 koordinat (108600E, 204801N) has PoF 35,57 %. Slope moverment measuring ues total station instrument. Hazard alert give if the activity of mining until depth > 75 m on section 1 and > 60 m pada *section* 4.

The re-design overburden volume of 201.764.752 Bcm is greather than the original design, the coal tonnage of 25.038.938 ton is greater than the original design, and the stripping ratio of 8.06 is greater than the original design.

Keywords: lowwall, plane failure, spencer, failure of probability, sensitivity, monitoring, stripping ratio.