

## RINGKASAN

PT Kaltim Prima Coal merencanakan membuka pit baru yaitu Pit Inul Lignite Selatan. Pada Pit Inul Lignite Selatan terdapat 19 *full coring* dan 10 *spot coring*. Dari *coring* didapatkan 356 sampel. Nilai kuat tekan uniaksialnya beragam 0,5 Mpa sampai 6 MPa. Nilai Kuat tekan tersebut tergolong batuan lunak. Kegiatan penambangan akan menghasilkan lereng *lowwall* yang memiliki kemungkinan longsor. Potensi longsor lereng tunggal longsor *non-circular* dengan bidang gelincir di material *weaklayer*, sehingga diperlukan studi kemandapan lereng. Tinggi lereng tunggal 10 m sampai 76 m dan kemiringan lapisan 17° sampai 25°. Studi kemandapan lereng bertujuan untuk mencegah terjadinya longsor dan penentuan titik pemantauan. Lereng yang memiliki FK <1,2 perlu dilakukan rancangan ulang dan yang memiliki PL > 0,5% harus dilakukan pemantauan.

Studi kemandapan lereng menggunakan pendekatan probabilitas pada *lowwall* Pit Inul Lignite Selatan diperlukan untuk menghitung nilai FK dan PL pada tiap jenjang tunggal dan jenjang keseluruhan. Pengumpulan parameter yang diperlukan yaitu UCS, kohesi, sudut gesek dalam, bobot isi, RQD, D, mi dan *Jcondition*. Menggunakan metode kesetimbangan batas (metode spencer) dengan dua kriteria kekuatan yaitu Mohr Colomb untuk material batubara, *weaklayer*, *top soil* dan *generalized Hoek-Brown* untuk material *overburden*. Pengolahan data statistik dilakukan pada parameter kuat tekan uniaksial dan bobot isi basah. 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 5000 digunakan mencari nilai faktor keamanan, probabilitas longsor, dan batas sensitivitas geometri yang dirancangan oleh Departemen *Mineplan*.

Berdasarkan hasil penelitian terdapat 3 lereng yang tidak stabil yaitu sayatan 1 lereng 1 memiliki FK 1,107 PL 10,60 %, sayatan 4 lereng 1 memiliki FK 1,050 PL 35,57 % dan sayatan 4 lereng 3 FK 1,136 PL 0%. Hasil rancangan ulang pada sayatan 1 lereng 1 tinggi lereng maksimum 37 m, sayatan 4 lereng 1 tinggi lereng maksimum 61 m dan sayatan 4 lereng 3 tinggi lereng maksimum 29 m. Pemantauan lereng dilakukan pada sayatan 1 di lereng 1 dengan titik kordinat (106424E, 206487N) memiliki PL 10,6 % dan sayatan 4 di lereng 1 dengan titik kordinat (108600E, 204801N) memiliki PL 35,57 %. Pengukuran pergerakan lereng menggunakan instrumen *total station*. Nilai batas sensitifitas kuat tekan pada *section* 1 1277,0 kN/m<sup>2</sup> dan *section* 4 1103,0 kN/m<sup>2</sup>. Peringatan bahaya diberitahukan ketika kegiatan penambangan pada kedalaman 21 m, 39 m, 109 m, 153 m pada sayatan 1 dan 18 m, 59 m pada sayatan 4.

*Kata kunci: lowwall, longsor bidang, spencer, probabilitas longsor, pemanataan.*

## ABSTRACT

PT Kaltim Prima Coal plan to open a new pit that is Inul Lignite Selatan Pit. Pit Inul Lignite South has 19 *full coring* dan 10 *spot coring*. From coring get 356 samples. Compressive strength as a rock mass characteristic, has result of compressive strength from 0.5 MPa to 6 MPa, so the rock mass characteristic classified into soft rock mass. The bench height is 10 m to 76 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 non-circular 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 South Inul Lignite 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 and wet density. 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. Monte carlo method with 5000 number of sampling ues to search the value of safety factor, failure probability and sensitivity the design from Mineplan Department .

Based on the study results, there are 3 unstable slopes, section 1 slope 1 has FS of 1,107 and PoF of 10.60 %, section 4 slope 1 has FS of 1,050 and PoF of 35,57 % and section 4 slope 3 has FS of 1,136 and PoF of 0%. 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 21 m, 39 m, 109 m, 153 m on section 1 and 18 m, 59 m pada *section* 4.

Keywords: lowwall, plane failure, spencer, failure of probabality, sensitivity, monitoring