

ABSTRAK

Daerah penelitian terletak di daerah pertambangan batubara. Pada daerah penelitian berada di daerah cekungan Sumatera Selatan masuk ke dalam Formasi Muaraenim. Formasi Muaraenim memiliki variasi litologi batuan yang tersusun atas litologi batupasir, batulempung, batulanau, batulempung sisipan batupasir dan lapisan batubara. Lapisan litologi batuan lereng *High wall* daerah penelitian memiliki arah *dip* dominan *North-East* dan ditemukan juga struktur geologi sesar di lereng *High wall* tersebut. Analisis kestabilan lereng yang digunakan untuk menghitung dan mengkonfigurasi geometri lereng dan variasi litologi batuan adalah *Finite Element Method* (FEM) dan *Limited Equilibrium Method* (LEM). Kondisi lereng *High wall* dengan variasi litologi suatu lereng dan didapatkan struktur geologi sesar yang berkembang menjadi hal menarik untuk dilakukan analisis geometri lereng untuk mengetahui kestabilan lereng *High wall* menggunakan metode FEM dan LEM. Hasil analisis geometri lereng terhadap litologi batuan dan struktur geologi untuk mendapatkan analisis kestabilan lereng dibuat empat *Section* lereng *High wall*, dari empat *Section* terdapat dua *Section* yang stabil dan dua *Section* tidak stabil yaitu *Section B-B'* dan *C-C'*. *Section A-A'* dan *D-D'* didapatkan hasil perhitungan *Section A-A'* FK 1.98 (LEM) dan 1.98 (FEM) dan *Section D-D'* FK 1.27 (FEM) dan 1.71 (LEM). *Section B-B'* didapatkan hasil perhitungan FK 0.88 (FEM) dan 0.98 (LEM), *Section C-C'* FK 0.64 (FEM) dan 0.83 (LEM). Penulis melakukan analisis kestabilan lereng dengan geometri lereng yang sama dan parameter litologi dan struktur geologi *Section* yang tidak stabil (*B-B'* dan *C-C'*) dan didapatkan hasil nilai FK *Section B* litologi batupasir 0.75, batulempung 0.87, batulanau 0.98 dan batubara 1, sedangkan nilai FK *Section C* litologi batupasir 0.58, batulempung 0.85, batulanau 1.03 dan batubara 1.06. Perubahan nilai faktor keamanan dipengaruhi litologi dari karakteristik material *Properties* geoteknik dan struktur geologi. Kemudian nilai FK pada parameter struktur geologi dengan geometri yang sama mendapatkan hasil *Section C* adalah 0.64 menjadi hasil dari pengaruh penurunan atau perubahan nilai faktor keamanan. Perbandingan nilai Faktor keamanan dari dua metoda (*Finite Element* dan *Limited Equilibrium*) tidak terlalu jauh (0.7% - 1.2%) yang dipengaruhi karena perbedaan iterasi perhitungan dari dua metode dan perbedaan batasan masing-masing aplikasi serta perbedaan ketelitian dan pembulatan dalam perhitungan. Analisis geometri lereng parameter litologi dan struktur geologi dan metoda FEM dan LEM mempengaruhi perhitungan nilai faktor keamanan.

Kata Kunci : Analisis Kestabilan Lereng, Geometri lereng, Litologi Batuan dan Struktur Geologi, *Finite Element* dan *Limited Equilibrium Method*.

ABSTRACT

The research area is located in a Coal mining area. The research area is located in the South Sumatra basin and is included in the Muaraenim Formation. The Muaraenim Formation has a varied rock lithology consisting of sandstone, mudstone, siltstone, and mudstone with layers of sandstone and Coal. The rock lithological layers on the slopes of the High Wall in the research area have a dominant northeast direction and fault geological structures were also found on the slopes of the High Wall. The slope stability analysis used to calculate and configure slope geometry and variations in rock lithology is the Finite Element Method (FEM) and Limited Equilibrium Method (LEM). The condition of the High Wall slope with variations in the lithology of a slope and the resulting fault geological structure that has developed is an interesting thing to carry out slope geometry analysis to determine the stability of the High Wall slope using the FEM and LEM methods. The results of the slope geometry analysis of rock lithology and geological structure to obtain a slope stability analysis were made into four Sections of the High Wall slope, of these four Sections there were two stable Sections and two unstable Sections, namely Sections B-B' and C -C'. In Sections A-A' and D-D', the calculation results for Sections A-A' FK 1.98 (LEM) and 1.98 (FEM) and Section D-D' FK 1.27 (FEM) and 1.71 (LEM) are obtained. In Section B-B' the FK calculation results were 0.88 (FEM) and 0.98 (LEM), Section C-C' FK 0.64 (FEM) and 0.83 (LEM). The author carried out a slope stability analysis with the same slope geometry and lithological parameters and geological structure in the unstable Sections (B-B' and C-C') and obtained the FK values for Section B in the lithology of sandstone 0.75, mudstone 0.87, siltstone 0.98 and Coal is 1, while the FK value in Section C for sandstone lithology is 0.58, mudstone 0.85, siltstone 1.03 and Coal 1.06. Changes in the value of the safety factor affect the lithology of the characteristics of geotechnical material Properties and geological structures. Then the fk value for the geological structure parameters with the same geometry produces results in Section C of 0.64, which results from the influence of decreasing or changing the value of the safety factor. The comparison of the safety factor values of the two methods (Finite Element and Limited Equilibrium) is not too far apart (0.7% - 1.2%) which is influenced by differences in calculation iterations of the two methods and differences in the limits of each application as well as differences in accuracy and rounding in calculations. Analysis of slope geometry, lithological parameters, and geological structures, and FEM and LEM methods influence the value of the calculated safety factor.

Keywords: Slope Stability Analysis, Slope Geometry, Rock Lithology and Geological Structure, Finite Element and Limited Equilibrium Method.