

INTISARI

Penelitian dilakukan pada pit barat tambang terbuka batubara PT. Tawabu Mineral Resource (TMR) yang terletak di Kecamatan Bengalon, Kabupaten Kutai Timur, Provinsi Kalimantan Timur. Penelitian dilatarbelakangi beberapa longsor yang terjadi di lokasi penelitian, namun belum dievaluasi mengenai kondisi geologi teknik dan kestabilan lerengnya. Penelitian ini dilakukan untuk mengetahui kondisi geologi teknik, menentukan kondisi kestabilan lereng yang mengacu pada kriteria Kepmen ESDM Nomor 1827 K/30/MEM/2018, dan mengetahui rekomendasi optimasi lereng yang tepat. Data sekunder yang digunakan adalah peta topografi pra-penambangan, peta topografi terbaru, foto udara terbaru, data uji sondir/CPT, data pengeboran, hasil uji sifat fisik dan mekanik, beban gempa, beban statis alat berat, dan penyelidikan geologi terdahulu. Data primer yang digunakan adalah hasil pengamatan geologi di lapangan dan foto udara terbaru. Daerah penelitian dibagi menjadi 2 satuan geomorfologi, yaitu satuan Dataran Aluvial dan Perbukitan Struktural. Batuan di lokasi penelitian terdiri dari batulempung (*claystone*), batupasir (*sandstone*), dan batubara (*coal*) dengan arah perlapisan umum strike N59°E – N63°E dengan dip 19°-26°. Batuan ini terbagi menjadi 2 satuan, yaitu Satuan perselingan batulempung dan batupasir, kemudian secara selaras diendapkan Satuan perselingan batupasir dan batulempung. Struktur geologi teridentifikasi pada *highwall*, dari barat ke timur yaitu sesar geser sinistral *oblique* berarah relatif NNE-SSW, 2 sesar geser sinistral berarah relatif NE-SW, dan sesar geser dekstral berarah relatif NW-SE. Struktur geologi di lokasi penelitian diinterpretasi terbentuk karena proses perlipatan. Elevasi muka air tanah berada pada level -45 m hingga 20 m. Analisis balik dilakukan pada segmen lereng *lowwall* utara menunjukkan lereng berada pada kondisi kritis dengan mereduksi parameter kuat geser puncak *claystone* sebesar 20%. Parameter hasil analisis balik digunakan pada analisis kestabilan 10 profil lereng *lowwall* dan *highwall* yang menunjukkan bahwa semua profil lereng memenuhi kriteria kestabilan kecuali profil East HW-4 yang berada pada *highwall* timur. Pada profil ini, direkomendasikan optimasi lereng dengan 2 alternatif, yaitu menurunkan elevasi MAT sedalam 4 meter dari kondisi aktual atau dengan melandaikan kemiringan lereng keseluruhan menjadi 31°.

Kata kunci : geologi teknik, analisis kestabilan lereng, analisis balik, tambang batubara, optimasi lereng

ABSTRACT

The research area was located in the west pit of the open pit coal mine of PT. Tawabu Mineral Resource (TMR) which is located in Bengalon District, East Kutai Regency, East Kalimantan Province. The research was driven by several landslides that occurred at the research location, but no engineering geological and slope stability condition have been evaluated. This study was aimed to understand engineering geological conditions of research area, slope stability conditions which refer to the criteria of the Minister of Energy and Mineral Resources No. 1827 K/30/MEM/2018, and recommend slope optimization. The secondary data used are pre-mining topographic maps, the latest topographic maps, the latest aerial photographs, CPT results data, drilling data, test results of index and mechanical properties, earthquake loads, heavy equipment static loads, and previous geological investigations. The primary data used are the results of geological observations in the field and the latest aerial photographs. The research area is divided into 2 geomorphological units, namely the Alluvial Plain and Structural Hills. Rocks in the study area consist of claystone, sandstone, and coal with a general layer strike direction of N59°E – N63°E with a dip of 19°-26°. These rocks are divided into 2 units, namely the alternating of claystone and sandstone, then the alternating of sandstone and claystone. The geological structures are identified on the highwall, from west to east namely oblique sinistral shear fault with a relative direction of NNE-SSW, 2 sinistral shear faults with a relative direction of NE-SW, and a dextral shear fault with a relative direction of NW-SE. These geological structures were interpreted as being formed by the folding process. The groundwater level is at a level of -45 m to 20 m. Back analysis performed on the northern lowwall slope segment showed that the slope was in a critical condition by reducing the claystone peak shear strength parameter by 20%. The parameters of the back analysis were used in the stability analysis of 10 lowwall and highwall slope profiles which showed that all slope profiles met the stability criteria except the East HW-4 profile which was located on the east highwall. In this profile, it is recommended to optimize the slope with 2 alternatives, namely lowering the groundwater elevation by 4 meters from the actual level or by reducing the angle the overall slope to 31°.

Keywords: engineering geology, slope stability analysis, back analysis, coal mine, slope optimization