

ABSTRACT

PT. Duta Tambang Sumber Alam (PT. DTSA) is one of the coal mines located in the area Seimenggaris, Nunukan Regent, North Kalimantan Province. PT. DTSA plan to do a mining development on the block II and III, so need a geotechnical recommendation such as safely slopes geometry planning.

Data input for geotechnical modeling blocks II and III are represented by four drill hole locations, there are A2-GT02 and A2-GT03 for block II, also A3-GT01 and A3-GT02 for block III, then made cross sections there are cross section A-A' through Drill hole A2-GT03, cross section B-B' through drill hole A2-GT02, and the cross section C-C' through drill hole A3-GT01 and A3-GT02. From drill holes, there were conducted sampling and knowable rock layer lithology. Then, samples further tested by the physical test, Unconfined Compressive Strength Testing, and Direct Shear Strength Test. Data input materials used include dry density (γ_d) and saturated density (γ_s), cohesion (C), and the shear angle (ϕ). Groundwater conditions assumed in dry conditions, half saturated and saturated. Geotechnical modeling is done using the help of Slide 6.0 program with the limit equilibrium method. Modeling a single slope design is made with a slope height 6 m, 10 m, and 15 m, with a slope angle of 60°, 70°, and 80°. Overall simulated slopes with a slope 26 m high, 36 m, 46 m, and 56 m at an angle of 35°, 40°, 45° and 50° for all heights. Modeling slope Lowwall assuming slope formed from the maximum height to the deepest main seam.

The possibility of failure that occurred on slopes is circular failure. Single slope geometry recommendation for all types of material is 10 m high and the angle of 60°. Stability analysis on lowwall slope with reference safety factor is $SF > 1,50$, obtain value of $SF = 3,33$ (Block II) and $SF = 2,77$ (Block III), so it can safely be said. Recommendations highwall slope on each block, that is block II: Height 56 m, angle 40°, with a value of SF is 1,59, and block III: Height 56 m, angle 50°, with the value of SF 1,65. Assumptions saturated groundwater conditions. Slope geometry recommendations are based on minimum safely of SF value, that is $SF \geq 1,30$ for the single slope and $FK \geq 1,50$ for the overall slope. In highwall slope, the largest value of Safety Factor (SF) obtained at a height of 26 m with a slope angle 35°, and the smallest value of SF in height 56 m with a slope angle of 50°. Overall slopes in saturated conditions, the value of SF in block II ranged from 3,40 to 1,41, block III between 3,68 to 1,65, and lowwall both blocks between 2,77 to 3,33. In dry conditions, the value of SF in block II ranged from 4,42 to 2,09, block III between 5,51 to 2,62, and Lowwall both blocks between 7,00 to 9,07.