

ABSTRAK

PENERAPAN METODE *Q-SLOPE* DALAM ANALISIS KESTABILAN LERENG PADA PENAMBANGAN DOLOMIT PT POLOWIJO GOSARI

Oleh
Satria Rama Kinasty Adilah
NIM: 112200161
(Program Studi Sarjana Teknik Pertambangan)

Penilaian kestabilan lereng pada tambang terbuka batuan dolomit memerlukan pendekatan terintegrasi yang menggabungkan metode empiris dan analitik. Penelitian ini dilaksanakan di PT Polowijo Gosari, Desa Sekapuk, Kecamatan Ujung Pangkah, Kabupaten Gresik, Jawa Timur. Klasifikasi massa batuan dilakukan menggunakan metode empiris *Q-Slope* (Bar & Barton, 2015) pada tiga sektor lereng penambangan aktif, dengan pengambilan data diskontinuitas menggunakan metode *scanline* sepanjang 15 m per lereng tunggal. Hasil analisis kinematika berbasis proyeksi stereografis mengidentifikasi potensi longsoran bidang (*planar failure*) sebagai mekanisme dominan pada ketiga sektor. Nilai *Q-Slope* yang diperoleh berturut-turut adalah 0,904 (Sektor A), 1,473 (Sektor B), dan 2,300 (Sektor C), menghasilkan sudut lereng aman 64° , 68° , dan 72° . Sektor A dan B diklasifikasikan *unstable* karena sudut aktual melampaui batas *Q-Slope*. Validasi analitik menggunakan Metode Keseimbangan Batas (LEM) dengan simulasi *Latin Hypercube Sampling* (3.000 iterasi) menunjukkan seluruh sektor memenuhi kriteria $FK \geq 1,1$ pada kondisi kering. Namun, analisis longsoran busur menggunakan metode *Bishop Simplified* mengidentifikasi Sektor A sebagai kondisi kritis pada kejenuhan penuh ($FK = 0,953$; $PL = 100\%$), mengindikasikan risiko yang lebih tinggi dibandingkan analisis longsoran bidang semata. Tekanan air pori terbukti sebagai parameter paling sensitif melalui analisis sensitivitas, diikuti sudut lereng dan kohesi. Hasil penelitian merekomendasikan implementasi sistem drainase prioritas dan koreksi geometri lereng Sektor A dan B sesuai peraturan KEPMEN ESDM No. 1827 K/30/MEM/2018.

Kata kunci: *q-slope*, longsoran bidang, kestabilan lereng, keseimbangan batas, probabilitas longsor

ABSTRACT

APPLICATION OF THE Q-SLOPE METHOD IN SLOPE STABILITY ANALYSIS FOR DOLOMITE MINING AT PT POLOWIJO GOSARI

By

Satria Rama Kinasty Adilah

NIM: 11200161

(Mining Engineering Undergraduated Program)

*Slope stability assessment in open-pit dolomite mining necessitates an integrated approach combining empirical and analytical methods. This study was conducted at PT Polowijo Gosari, Sekapuk Village, Ujung Pangkah District, Gresik Regency, East Java. Rock mass classification was performed using the empirical **Q-Slope** method (Bar & Barton, 2015) on three active mining slope sectors, with discontinuity data collected via the scanline mapping method along 15 m per single slope. Kinematic analysis based on stereographic projection identified planar failure as the dominant failure mechanism across all three sectors. The computed **Q-Slope** values were 0.904 (Sector A), 1.473 (Sector B), and 2.300 (Sector C), yielding maximum safe slope angles of 64°, 68°, and 72°, respectively. Sectors A and B were classified as unstable, as actual slope angles exceeded the Q-Slope limit. Analytical validation using the Limit Equilibrium Method (LEM) with Latin Hypercube Sampling simulation (3,000 iterations) indicated all sectors satisfied $FoS \geq 1.1$ under dry conditions. However, circular failure analysis using the Bishop Simplified method identified Sector A as critical under fully saturated conditions ($FoS = 0.953$; $PoF = 100\%$), demonstrating higher risk than planar failure analysis alone. Sensitivity analysis confirmed pore water pressure as the most influential parameter, followed by slope angle and cohesion. Findings recommend prioritizing drainage system implementation and geometry correction for Sectors A and B in accordance with KEPMEN ESDM No. 1827 K/30/MEM/2018.*

Keywords: q-slope, planar failure, slope stability, limit equilibrium, probability of failure