

## INTISARI

Kuari (*quarry*) tanah liat Mliwang salah satu *pit* yang masih beroperasi dalam pemenuhan batulempung sebagai bahan baku semen PT. Semen Indonesia (persero) Tbk. Karakteristik batulempung bersifat *shrinking* dan *swelling* menjadikan tantangan dalam operasional penambangan. Longsor pada area kuari sering terjadi karena pengaruh curah hujan yang tinggi. Tercatat Mei tahun 2020 saat kondisi curah hujan tinggi, salah satu lereng pada kuari tanah liat Mliwang mengalami longsor. Maka, diperlukan penelitian mengenai evaluasi kondisi geologi teknik dan analisis kestabilan lereng pada kuari tanah liat Mliwang. Adapun data yang diperlukan dalam mengetahui kondisi geologi teknik meliputi geomorfologi, batuan dan tanah, struktur geologi, serta hidrogeologi. Metode penelitian dilakukan dengan melakukan pemetaan geologi kaveling lokasi penelitian skala 1:12.500 dan pemetaan geologi teknik area kuari tanah liat Mliwang skala 1:10.000 serta melakukan pengujian sifat keteknikan pada sampel batuan dan tanah.

Aspek geomorfologi lokasi penelitian meliputi dataran aluvial berlereng sangat landai, dataran denudasional struktur patahan berlereng landai, dan perbukitan karst berlereng sedang. Aspek litologi dibagi menjadi satuan batulempung sisipan batupasir dan satuan batugamping. Aspek struktur geologi yang berkembang antara lain kekar gerus, kekar rilis, dan sesar diperkirakan. Kondisi hidrogeologi area kuari tanah liat Mliwang berada pada ketinggian 4–7 mdpl. Karakteristik geologi teknik area kuari tanah liat Mliwang berdasarkan tingkat pelapukan terdiri dari batulempung sisipan batupasir lapuk sedang dan lapuk ringan. Berdasarkan kualitas massa batuan *Geological Strength Index* (GSI) permukaan dibagi menjadi batuan GSI 30–40 dan GSI 40–50.

Analisis kestabilan lereng dilakukan menggunakan metode *Bishop's Simplified* untuk mengetahui faktor keamanan lereng aktual. Diperlukan *back analysis* pada lereng tersebut untuk mengestimasi parameter *material properties* yang sesuai dengan kondisi lapangan. Hasil analisis kestabilan lereng pada segmen lereng C (STA 139) dalam kondisi tidak stabil sedangkan segmen lereng B (STA 138) dan segmen lereng A (STA 137) dalam kondisi kritis.

**Kata kunci:** analisis kestabilan lereng, *back analysis*, kuari tanah liat Mliwang, karakteristik geologi teknik, longsor

## ABSTRACT

*Mliwang claystone quarry is one of the pits that is still operating in the provider of claystone as cement's raw material for PT. Semen Indonesia (persero) Tbk. The characteristics of claystone are shrinking and swelling, that make challenge in mining operation. Failure in the quarry often occur due to the influence of high rainfall. It was recorded that in April 2020, during high rainfall conditions, one of the benches in the Mliwang claystone quarry failure. Therefore, research is needed on evaluating engineering geology condition and slope stability analysis in the Mliwang claystone quarry. The data needed to analysis the condition of engineering geology include geomorphology, rock and soil, geological structures and hydrogeology. The research method was carried out by geological mapping of the research location at a scale of 1:12.500 and engineering geological mapping of the Mliwang claystone quarry at a scale of 1:10.000 also laboratorium testing of the engineering properties of rock and soil samples.*

*The geomorphological aspect of the area includes alluvial plains with very gentle slope, denudational plains in fault structures with gently slope and karst hills with moderate slope. The lithology aspect is divided into claystone with sandstone insert units and reef limestone units. Aspect of the geological structure that developed include shear joints, release joints, estimated fault and estimated anticline. The hydrogeological conditions of the Mliwang claystone quarry are at a 4–7 masl. The engineering geological characteristics of the Mliwang claystone quarry area based on the weathering degree consisted of moderately weathered in claystone with sandstone insert and slightly weathered. Based on rock mass quality from Geological Strength Index of the surface is divided into GSI 30–40 and GSI 40–50.*

*Slope stability analysis was carried out using Bishop's Simplified method to determine actual safety factor. Back analysis is needed on the slope to estimate the parameter material according to the field condition. The results of slope stability analysis on slope segment C (STA 139) are in an unstable condition, while slope segment B (STA 138) and slope segment A (STA 137) are in critical condition.*

**Keywords:** *slope stability analysis, back analysis, Mliwang claystone quarry, the engineering geological characteristics, failure*