

Abstract

The research location is located in Karangdawa Village, Margasari District, Tegal Regency, Central Java. The research location is an exploration mining business permit area of PT. Indocement Tunggal Prakarsa Tbk., With limestone commodities. This study aims to determine the quality, resources and reserves of limestone and geotechnical models based on geological models. The geotechnical model is also determined based on the rockmass model which is used as a slope stability analysis model to determine pit design. The method used in this study includes field work in the form of observations of rock outcrops and sampling and laboratory analysis in the form of petrographic analysis and XRF analysis using surface samples analysis, physical and mechanical properties of rocks, and rock mass classification based on the Geological Strength Index (GSI) using secondary data in the form of core drilling data. Slope stability analysis in this study uses the limit equilibrium method. Interpretation and correlation of core drilling data indicate that the study location is stratigraphically composed of three rock units, namely: limestone, claystone, and sandstone. The results of XRF analysis and geological modeling show that the quality of limestone meets the standard as a raw material for cement with a limestone resource of 13.180 million tons. Slope geometry resulting from slope stability analysis are: single slope height of 10 meters, single slope angle of 80 degrees, overall slope of 48 degrees, 50 degrees, 54 degrees, 60 degrees, 8.31 meters of width. Estimated limestone reserves are determined only based on consideration of the pit and ultimate pit limit designs which are limited by the IUP Region. Limestone mineable reserves amounted to 7,477,000 tons.

Keywords: *Geotechnical, mine design, reserves, limestone, Tegal.*

Sari

Lokasi penelitian terletak di Desa Karangdawa, Kecamatan Margasari, Kabupaten Tegal, Jawa Tengah. Lokasi penelitian merupakan Wilayah Izin Usaha Pertambangan eksplorasi PT. Indocement Tunggul Prakarsa Tbk., dengan komoditas batugamping. Penelitian ini ditujukan untuk mengetahui kualitas, sumber daya dan cadangan batugamping serta model geoteknik berdasarkan model geologi. Model geoteknik juga ditentukan berdasarkan model *rockmass* yang digunakan sebagai model analisis kestabilan lereng untuk mendesain pit tambang. Metode yang digunakan dalam penelitian ini meliputi pekerjaan lapangan berupa pengamatan terhadap singkapan batuan dan pengambilan sampel, serta analisis laboratorium berupa analisis petrografi dan analisis XRF menggunakan sampel permukaan, analisis sifat fisik dan mekanik batuan, serta klasifikasi massa batuan berdasarkan *Geological Strength Index* (GSI) menggunakan data sekunder berupa data inti pemboran. Analisis kestabilan lereng pada penelitian ini menggunakan metode kesetimbangan batas (*limit equilibrium method*). Interpretasi dan korelasi data inti pemboran menunjukkan bahwa lokasi penelitian secara stratigrafi tersusun oleh tiga satuan batuan yaitu : batugamping, batulempung, serta batupasir. Hasil analisis XRF dan pemodelan geologi menunjukkan kualitas batugamping memenuhi standar sebagai bahan baku semen dengan jumlah sumberdaya batugamping 13.180.000 ton. Geometri lereng yang dihasilkan dari analisis kestabilan lereng yaitu : tinggi lereng tunggal 10 meter, sudut kemiringan lereng tunggal 80 derajat, lereng *overall* 48 derajat, 50 derajat, 54 derajat, 60 derajat, lebar jenjang 8,31 meter. Estimasi cadangan batugamping ditentukan hanya berdasarkan pertimbangan desain pit tambang dan *ultimate pit limit* yang dibatasi oleh Wilayah IUP. Cadangan tertambang (*mineable reserve*) batugamping berjumlah 7.477.000 ton.

Kata kunci : Geoteknik, desain tambang, cadangan, batugamping, Tegal.