

ABSTRAK

KARAKTERISTIK BATUAN SEBAGAI PARAMETER ESTIMASI TARGET FRAGMENTASI *BLASTING* DI PIT “AD”, DESA SUNGAI PAYANG, PROVINSI KALIMANTAN TIMUR

Oleh
Adella Tara Dwita Kurniawan
NIM : 111220149
(Program Studi Sarjana Teknik Geologi)

Penelitian ini dilakukan di PIT AD, Desa Sungai Payang, Kalimantan Timur, yang termasuk dalam Formasi Balikpapan, salah satu formasi pembawa batubara utama di Cekungan Kutai. Aktivitas penambangan di daerah ini menggunakan metode tambang terbuka, sehingga proses peledakan (*blasting*) menjadi tahap penting untuk mengupas material keras (*overburden*) dan memudahkan penggalian. Tujuan penelitian adalah untuk mengetahui kondisi geologi daerah penelitian, mengidentifikasi karakteristik material batuan melalui uji *Uniaxial Compressive Strength* (UCS), *Rock Quality Designation* (RQD), *Rock Mass Rating* (RMR), serta uji sifat fisik (densitas), dan mengestimasi target fragmentasi *blasting* yang optimal. Metode penelitian meliputi pemetaan geologi permukaan skala 1 : 7500, pengambilan sampel batuan, serta pengujian laboratorium. Analisis dilakukan dengan menghubungkan sifat mekanik dan fisik batuan terhadap hasil fragmentasi, menggunakan pendekatan teori geometri peledakan Walter dan Konya (1990) dan Model Kuz-Ram oleh Kuznetsov (1973). Hasil penelitian menunjukkan urutan stratigrafi yang tersusun atas satuan batulempung Balikpapan, satuan batupasir Balikpapan dengan kehadiran struktur geologi kekar gerus berarah utara - selatan, serta endapan aluvial. Nilai densitas batuan berkisar antara 1.75 – 2.01 gr/cm³. Kuat tekan batuan di daerah penelitian berkisar dari 1.61 – 11.66 MPa. Data *scanline* menunjukkan kualitas batupasir kategori sedang (*fair*) dengan nilai RQD sebesar 65.27% dan 60.08 dengan rentang nilai RMR 75 – 79 yang termasuk dalam kelas RMR II yaitu batuan berkualitas baik. Perhitungan parameter *blasting* pada geometri burden spasi 7.5 × 8.5 meter menghasilkan ukuran fragmentasi 35.52 – 42.5 cm. Pada geometri burden spasi 9 × 10 meter menghasilkan ukuran fragmentasi 36.1 cm. Urutan litologi dengan hasil fragmentasi peledakan dari ukuran besar ke kecil adalah batulanau dan batupasir, kemudian batulempung. Variasi ukuran fragmentasi ini dikontrol oleh karakteristik material batuan seperti kuat tekan dan komposisi mineral, serta faktor eksternal berupa kerapatan bidang diskontinuitas.

Kata Kunci : Balikpapan, *Blasting*, Fragmentasi, Sifat Fisik, Sifat Mekanik

ABSTRACT

CHARACTERISTICS OF ROCK AS PARAMETERS IN ESTIMATING BLAST FRAGMENTATION TARGETS AT PIT “AD”, SUNGAI PAYANG VILLAGE, EAST KALIMANTAN PROVINCE

By

Adella Tara Dwita Kurniawan

NIM : 111220149

(Geological Engineering Undergraduate Program)

This research was conducted at PIT AD, Sungai Payang Village, East Kalimantan, which is part of the Balikpapan Formation, one of the main coal-bearing formations in the Kutai Basin. Mining activities in this area use an open-pit method, making the blasting process an important stage to remove hard overburden material and facilitate excavation. The purpose of the study is to determine the geological conditions of the research area, identify the characteristics of rock materials through Uniaxial Compressive Strength (UCS) tests, Rock Quality Designation (RQD), Rock Mass Rating (RMR), and physical properties test (density), and estimate the optimal blasting fragmentation target. The research methods include surface geological mapping at a 1:7500 scale, rock sampling, and laboratory testing. The analysis was conducted by linking the mechanical and physical properties of the rocks to the fragmentation results, using the blasting geometry theory approach by Walter and Konya (1990) and the Kuz-Ram Model by Kuznetsov (1973). The research results show a stratigraphic sequence consisting of Balikpapan claystone units, Balikpapan sandstone units with the presence of north-south trending shear joint geological structures, and alluvial deposits. The rock density ranges from 1.75 to 2.01 g/cm³. The compressive strength of rocks in the study area ranges from 1.61 to 11.66 MPa. Scanline data shows that the sandstone quality is in the fair category with an RQD value of 65.27% and 60.08 with an RMR range of 75 – 79, which falls into RMR class II, meaning good quality rock. The calculation of blasting parameters at a burden spacing geometry of 7.5 × 8.5 meters resulted fragmentation sizes of 35.52 – 42.5 cm. At a burden spacing geometry of 9 × 10 meters, it resulted fragmentation size of 36.1 cm. The lithological sequence of blast fragmentation results, from largest to smallest, is siltstone and sandstone, followed by mudstone. Variations in fragmentation size are controlled by rock material characteristics such as compressive strength and mineral composition, as well as external factors such as the density of discontinuity planes.

Keywords : Balikpapan, Blasting, Fragmentation, Physical Properties, Mechanical Properties