

RINGKASAN

Penelitian dilakukan pada *Extraction Level* (2830 mdpl) di area *Panel 18* dan *Panel 20* yang berlokasi di tambang bawah tanah *Grasberg Block Cave*, Pegunungan Jaya Wijaya, Kecamatan Mimika Timur, Kabupaten Timika, Provinsi Papua. *Panel* tersebut menjadi dasar awal penelitian yang akan digunakan sebagai perhitungan hingga berakhirnya masa umur tambang GBC.

Kegiatan penambangan bawah tanah selalu berkaitan dengan masalah deformasi dan kestabilan massa batuan di sekitar lubang bukaan. Karakteristik massa batuan dan struktur geologi akan berpengaruh dalam penerapan *ground support*. Maka, perlu dilakukan kajian terhadap penerapan rancangan *ground support* yang telah diterapkan pada lubang bukaan tersebut. Evaluasi yang digunakan berdasarkan *Rock Mass Rating* (RMR). Kemudian dilakukan pemodelan numerik dengan *Finite Element Method* dikarenakan lubang bukaan memiliki bentuk yang tidak beraturan dan adanya struktur geologi sifat-sifat massa batuan yang dikaji sangat beragam.

Penelitian dilakukan di lokasi *Panel 18* dan *Panel 20* Level Ekstraksi 2830. Batuan yang terdapat pada lokasi penelitian memiliki kelas massa batuan berdasarkan RMR kelas *poor rock* hingga *fair rock*, dengan kebutuhan *Rock Bolt* jenis *resin bar* berjumlah 11 buah, *cablebolt* 10 buah dan ketebalan shotcrete 75 mm. Kemudian berdasarkan *Finite Element Method* dan Kriteria Keruntuhan Mohr Coulomb dengan Faktor Keamanan pada atap dan dinding terendah untuk kondisi batuan *Poor Ground* adalah 1,59 dan untuk *Fair Ground* adalah 1,51 dalam penggunaan *ground support* berdasarkan RMR. *Ground Support* yang telah diterapkan oleh PT Freeport Indonesia dinilai sudah sesuai dengan kondisi massa batuan, sehingga diharapkan mengoptimalkan pemasangan *ground support* yang dilakukan oleh operator dilapangan baik dari proses *mark up* dan panjang lubang bor.

Kata Kunci : Massa Batuan, *Ground Support*, Faktor Keamanan

ABSTRACT

The study was conducted at the Extraction Level (2830 masl) in the Panel 18 and Panel 20 areas located in the underground mine Grasberg Block Cave, Jaya Wijaya Mountains, East Mimika District, Timika Regency, Papua Province. The panel is the initial basis for the research that will be used as a calculation until the end of the GBC mine life.

Underground mining activities are always related to the problem of deformation and stability of the rock mass around the opening. Characteristics of rock mass and geological structure will affect the application of ground support. Therefore, it is necessary to study the application of the ground support design that has been applied to the opening. The evaluation used is based on the Rock Mass Rating (RMR). Then numerical modeling was carried out with the Finite Element Method because the openings had irregular shapes and the geological structure of the rock mass properties studied was very diverse.

The research was conducted at Panel 18 and 20 Extraction Level 2830. The rocks found at the research site have rock mass classes based on RMR class poor rock to fair rock, with the need for Rock Bolt type resin bar totaling 11 pieces, cablebolt 10 pieces and shotcrete thickness 75 mm. Then based on the Finite Element Method and Mohr Coulomb Collapse Criteria with the lowest safety factor on the roof and walls for Poor Ground rock conditions is 1.59 and for Fair Ground is 1.51 in the use of ground support based on RMR. Ground Support that has been implemented by PT Freeport Indonesia is considered to be in accordance with the condition of the rock mass, so it is expected to optimize the installation of ground support carried out by operators in the field, both from the mark up process and the length of the drill hole.

Keywords : Rock Mass, Ground Support, Safety Factor