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**Abstract Index**

**DOI: 10.20556/imj.Vol25.No2.2022.1346**
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**Analysis of Explosive Energy Distribution at Pit 7 West PT. Makmur Mandiri Utama Binungan Suaran – Berau, East Kalimantan Province**
***Analisis Distribusi Energi Bahan Peledak di Pit 7 West PT. Bukit Makmur Mandiri Utama Binungan Suaran – Berau, Provinsi Kalimantan Timur***
**IMJ, Vol. 25, No. 2, October 2022,**
**P. 59-75**

Blasting geometry and blasting material filling are closely related to the rock mass characteristics and the geological conditions to obtain ideal fragmentation. Blastability Index analysis, including Description of Rock Mass, Combined Plane Spacing, Combined Plane Orientation, Specific Gravity Influencey, and Hardness, are the alternative geometry experiment conducted to overcome the problem of rock fragmentation so that the speed of excavation equipment can increase according to the productivity of Komatsu PC2000 plan at PT. BUMA Jobsite BINSUA. Furthermore, the actual rock values obtained from blasting location and alternative geometry recommendations using R.L.Ash theory combined with Vertical Energy Distribution theory. In the C2 layer with a rock factor value of 5.95, the recommended load is 7.2 m, space is 8.3 m, and the VED explosive power is 48%. In layer D2 the rock factor value is 6.89 with a load of 7.5 m, space of 8.3 m, and 55% VED explosive charge. While in the DU layer, the rock factor value is 6.39 with a load of 7.3 m, 8.4 m space, and 51% VED filling of explosives. Prediction of blasting fragmentation analysis using Kuz-ram theory obtained fragmentation > 100 cm, namely 14.99% for the C2 layer, 14.84% for the D2 layer, and 14.82% for the DU layer.

Keywords: blastability index, fragmentation, blasting geometry, R.L.Ash, VED

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**GIS Application for Monitoring the Mine Areas**
***Aplikasi GIS untuk Memantau Wilayah Tambang***
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Technology development is growing fast, such as satellite imagery and GIS for various applications, one of them is mining technology. Several regulations for the mining sector regarding the mandatory use of satellite imagery have been stated in some regulations to be implemented in mining sectors. Some mine environmental studies showed that the remote sensing and the GIS analysis could detect the small changes in its environment area with effective cost as the coverage of the sensory images is quite broad. The purpose is to monitor land alteration by observing the changes at the taking place, in either the number of voids or their area, using the 2019 and 2020 SPOT 6/7 image data. The algorithm change detection analyzes the number and void changing, mainly to provide a visual description of the void image trend and other applications. The trend of void numbers and its area can be predictable and correlated with the coal mine activities yearly. The results of 2019 SPOT 6/7 image showed that the total area of coal mine openings increased from 2% of the total area of the IUP to 2.53% in 2020. But, its allegation of environmental changes due to the mining activities will be strengthened by a ground check survey that cannot be conducted now.

Keywords: geographical information system, satellite imagery, environmental monitoring, coal mine

**DOI: 10.30556/imj.Vol25.No2.2022.1261**
**Bahfie, Fathan; Manaf, Azwar; Astuti, Widi; Nurjaman, Fajar; Prastyo, Erik and Herlina, Ulin (Research Unit for Mineral Technology – BRIN; Physic Department – Universitas Indonesia)**
**Development of Laterite Ore Processing and Its Applications**
***Perkembanngan Pengolahan Bijih Laterit dan Aplikasinya***
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Nickel ore is found in two types sulfide and laterite. The sulfide is a nickel ore that has high nickel content and low reserves of natural resources than of the zinc laterite. In contrast, the laterite is a rock mineral that contains the iron-nickel oxide compounds. There are two methods of processing nickel laterite, namely hydrometallurgy and pyrometallurgy. The former is a method that uses leaching by a chemical solution or solid such as acid, as a reducing agent. The alkaline leaching (ammonia) is the most optimal method to obtain a nickel grade with the highest recovery but it needs more modification. Pyrometallurgical method uses high heat up to 1800°C, so it requires a lot of energy and needs improvement to decrease the carbon usage. The rotary kiln-electric furnace method is the optimal method for developing the nickel laterite. These methods generate products that can be applied to various fields. For example, the pyrometallurgy method produces nickel pig iron and ferronickel as raw materials for stainless steel and steel alloys. The hydrometallurgy method produces nickel sulfate and nickel oxide with a purity of 99% by weight as raw materials for magnets, sensors, and batteries. Hence, the hydrometallurgy method still needs improvements for the environmentally friendly reagent. Therefore, bioleaching will be a nickel laterite leaching process in the future by using bacteria as the reducing agent.

Keywords: illegal mining, social-economy impact, environmental impact

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**Effect of $CaCO_3$ and Lime Glass Using to Pore Structure Forming on a Ceramic Glass Based on Scoria Basalt Rocks**

***Pengaruh Penggunaan $CaCO_3$ dan* Lime Glass *dalam Pembentukan Struktu Berpori pada* Glass Ceramic *Berbasis Batuan* Basalt *Skoria***

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**P. 105-113**

Technological developments occur at this time cause the technology for making lightweight materials is also growing. The technology for making lightweight materials aims to reduce the total weight of the material without reducing its mechanical strength. Parameters that influence the manufacture of lightweight materials are the number of pores, material density, and physical resistance. One of the commonly used methods is mixing the ceramic glass with a foaming agent. In this study, the basalt rock from East Lampung, Indonesia and the lime glass were used as a ceramic glass material. Variations in its composition were carried out by mass comparison between the basalt and the lime glass, namely Sample A (100:0), Sample B (70:30), Sample C (50:50), and Sample D (30:70) with 50%wt. $CaCO_3$ added to each sample and heated up to 1200 °C. Cooling variations (annealed and normalized) are also applied to see the occurred phenomena. Based on the characterization results, the best sample is Sample B with normalized cooling and has a porosity value of 53.2% and a density value of 1.08 gr/cm$^3$. Based on the SEM test results, the pores with a size of $\leq$ 0.5µm are 95%, and $\geq$ 0.5µm are 5% in which the crystals formed are pyroxene and calcite with the compositions of CaO and $SiO_2$ 39.46% and 41.90% respectively.

Keywords: basalt, $CaCO_3$, lime glass, foam agent, light material

DOI: 10.30556/imj.Vol25.No2.2022.1343
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**Characterization, Beneficiation, and REEs Extraction of Coal Bottom Ash**

***Karakterisasi, Benefisiasi, dan Ekstraksi Logam Tanah Jarang dari Abu Batubara Dasar***

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**P. 115-126**

Rare earth elements are strategic materials. The elements have critical roles in meeting the needs of raw material for producing the modern industrial products. Most of the REE minerals is available in the form of associated minerals. One of them is coal. In terms of obtaining an overview regarding the possibility of coal to be a source of REEs, a research was carried out by beneficiating the bottom ash of the coal using a shaking table and a magnetic separator, and was followed by extracting the REEs using the alkaline fusion and leaching them using the nitric acid. The results showed that the bottom ash of gasified coal from the Palimanan pilot plant contained cerium, lanthanum, samarium, neodymium, praseodymium, europium, gadolinium, dysprosium, and yttrium, with a total content of 77.85 ppm. Concentrating the REEs using the shaking table and the magnetic separator result in a recovery of 32.96% and 50.5%, respectively. Extracting the REEs by alkaline fusion using NaOH as flux was not promising while leaching with nitric acid was able to extract the REEs with various percentage extraction values, and the highest extraction for Neodymium was 73.46% under conditions of 2M nitric acid leaching and heated at 80°C.

Keywords: beneficiation, coal bottom ash, nitric acid leaching, rare earth elements