

ABSTRAK

ANALISIS PENGARUH VARIASI DIMENSI TABUNG *BALL MILL PORTABLE* TERHADAP HASIL PARTIKEL BATUBARA

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Penelitian ini dilakukan untuk mengkaji pengaruh variasi dimensi tabung ball mill portable terhadap hasil penggilingan batubara serta menentukan dimensi tabung yang paling efektif dalam menghasilkan partikel berukuran halus. Pengujian menggunakan tiga variasi dimensi tabung dimana yang berubah dimeternya, yaitu 15×30 cm, $12,5 \times 30$ cm, dan 10×30 cm. Massa batubara yang digunakan pada setiap perlakuan ditetapkan sebesar 10% dari volume tabung. Setelah proses penggilingan, sampel dianalisis menggunakan ayakan 70 mesh untuk mengetahui massa material yang lolos, massa material yang tertahan, dan persentase material yang lolos ayakan. Hasil penelitian menunjukkan bahwa perbedaan dimensi tabung memengaruhi distribusi ukuran partikel batubara hasil penggilingan. Persentase material yang lolos ayakan pada variasi T1 (15×30 cm), T2 ($12,5 \times 30$ cm), dan T3 (10×30 cm) masing-masing sebesar 50,81%, 60,58%, Dan 65,75%. Hasil tersebut menunjukkan bahwa semakin kecil dimensi tabung yang digunakan, semakin tinggi kemampuan ball mill dalam menghasilkan partikel halus. Variasi T3 menghasilkan persentase lolos ayakan tertinggi dengan rata-rata massa material lolos sebesar 217 g dan massa material tertahan sebesar 113 g. Berdasarkan hasil penelitian dapat disimpulkan bahwa variasi dimensi tabung berpengaruh terhadap efektivitas proses penggilingan batubara. Tabung berukuran 10×30 cm memberikan hasil terbaik dengan persentase material lolos ayakan 70 mesh tertinggi, yaitu sebesar 65,75%.

Kata Kunci: ball mill portable, batubara, dimensi tabung, penggilingan, ayakan 70 mesh, ukuran partikel.

ABSTRACT

ANALYSIS OF THE EFFECT OF PORTABLE BALL MILL CYLINDER DIMENSION VARIATIONS ON COAL PARTICLE SIZE

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This study was conducted to investigate the influence of different portable ball mill cylinder dimensions on the grinding performance of coal and to identify the most effective cylinder size for producing finer particles. Three cylinder dimension variations were evaluated: 15×30 cm, 12.5×30 cm, and 10×30 cm. For each experimental treatment, the coal mass was maintained at 10% of the respective cylinder volume. After the milling process, the ground samples were subjected to a 70-mesh sieve analysis to determine the mass of material passing through the sieve, the mass retained on the sieve, and the percentage of particles that successfully passed through the mesh. The findings revealed that cylinder dimensions significantly affected the particle size distribution of the milled coal. The percentages of material passing through the 70-mesh sieve for treatments T1 (15×30 cm), T2 (12.5×30 cm), and T3 (10×30 cm) were 50,81%, 60,58%, and 65,75%, respectively. These results indicate that reducing the cylinder dimensions enhances the ball mill's ability to generate finer coal particles. Among the tested configurations, the T3 cylinder (10×30 cm) demonstrated the highest grinding efficiency, producing an average passing mass of 217 g and an average retained mass of 113 g. Based on the experimental results, it can be concluded that cylinder dimensions play an important role in determining the effectiveness of the coal grinding process. The 10×30 cm cylinder exhibited the best performance, achieving the highest proportion of material passing through the 70-mesh sieve, with a value of 65,75%.

Keywords: portable ball mill, coal grinding, cylinder dimensions, particle size distribution, 70-mesh sieve, milling efficiency.