

ABSTRAK

ANALISIS PENGARUH GRADE JALAN TERHADAP KONSUMSI BAHAN BAKAR ALAT ANGKUT DI PT ANTAM UBPB KALIMANTAN BARAT

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Penelitian ini dilakukan di PT ANTAM UBPB Kalimantan Barat untuk menganalisis pengaruh grade jalan terhadap konsumsi bahan bakar alat angkut UD Quester CWE 280 6x4 pada kegiatan supply bauksit dari stock EFO menuju *jetty*. Permasalahan penelitian dilatarbelakangi oleh konsumsi bahan bakar alat angkut yang melebihi standar perusahaan sebesar 15,50 liter/jam. Kondisi tersebut diduga dipengaruhi oleh *grade* jalan yang tinggi serta kondisi permukaan jalan yang kurang baik sehingga meningkatkan *rolling resistance* dan kebutuhan *rimpull* alat angkut.

Metode penelitian dilakukan melalui pengukuran *grade* jalan, pengamatan kondisi permukaan jalan dan kedalaman amblesan, serta pengumpulan data spesifikasi alat angkut dan konsumsi bahan bakar aktual. Pengolahan data meliputi perhitungan *grade resistance*, *rolling resistance*, *rimpull*, *load factor*, dan konsumsi bahan bakar teoritis berdasarkan kondisi aktual jalan angkut. Selanjutnya dilakukan simulasi perbaikan kemiringan jalan dan kondisi jalan untuk mengetahui perubahan konsumsi bahan bakar setelah perbaikan.

Hasil penelitian menunjukkan bahwa peningkatan *grade* jalan dan buruknya kondisi permukaan jalan menyebabkan meningkatnya nilai *grade resistance* dan *rolling resistance* sehingga kebutuhan *rimpull* alat angkut menjadi lebih besar. Kondisi tersebut berdampak pada meningkatnya *load factor* mesin dan konsumsi bahan bakar alat angkut. Upaya perbaikan berupa pengurangan *grade* jalan yang melebihi standar dan perbaikan kondisi permukaan jalan mampu menurunkan hambatan jalan angkut serta meningkatkan efisiensi penggunaan bahan bakar. Setelah dilakukan perbaikan, konsumsi bahan bakar alat angkut mengalami penurunan dibandingkan kondisi aktual sehingga penggunaan bahan bakar menjadi lebih optimal.

Kata Kunci: Efisiensi Bahan Bakar, *Grade Jalan*, *Rolling Resistance*, *Rimpull*

ABSTRACT

Analysis of The Impact of Road Grade on Fuel Consumption of Transport Vehicles at PT ANTAM UBPB Kalimantan Barat

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This research was conducted at PT ANTAM UBPB Kalimantan Barat to analyze the effect of road grade on the fuel consumption of UD Quester CWE 280 6x4 haul trucks used in bauxite supply activities from the EFO stockpile to the jetty. The study was motivated by the fuel consumption of the haul trucks exceeding the company standard of 15.50 liters/hour. This condition was suspected to be caused by steep road grades and poor road surface conditions, which increased rolling resistance and the rimpull requirement of the haul trucks.

The research method involved measuring road grade, observing road surface conditions and rut depth, and collecting haul truck specification data along with actual fuel consumption data. Data processing included calculations of grade resistance, rolling resistance, rimpull, load factor, and theoretical fuel consumption based on the actual road conditions. Furthermore, road geometry and surface condition improvement simulations were carried out to determine changes in fuel consumption after improvements.

The results showed that increasing road grade and poor road surface conditions caused higher grade resistance and rolling resistance values, resulting in greater rimpull requirements for the haul trucks. These conditions increased engine load factor and fuel consumption. Improvement efforts through reducing road grades that exceeded standards and repairing road surface conditions were proven to reduce haul road resistance and improve fuel efficiency. After the improvements were implemented, the haul truck fuel consumption decreased compared to the actual condition, resulting in more optimal fuel usage.

Keywords: Fuel Efficiency, Grade Resistance, Rolling Resistance, Rimpull