**Fuel Consumption Reduction in HD785-7 Dump Trucks at Open Pit Coal Mining Site: A Data-Driven Approach**

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# ABSTRACT

In the mining industry, operational efficiency is crucial for reducing both costs and environmental impact. Fuel consumption, particularly in hauling activities involving dump trucks, is one of the largest contributors to these costs and emissions. This research aims to analyze the factors influencing fuel consumption (L/h) in HD785-7 dump trucks using a data-driven approach. The analysis applies machine learning techniques to predict fuel consumption patterns based on variables such as road conditions, vehicle speed, and operator driving behavior related to fuel efficiency. The results show that optimizing engine speed, acceleration position, and eco mode usage in accordance with actual road conditions significantly improves fuel efficiency. This data-driven approach supports the development of a recommendation system that provides optimal engine speed and acceleration values for each road segment. The system utilizes historical fuel-efficient data to generate these recommendations, which are updated hourly using the last five hours of operational data.Additionally, an alert mechanism is incorporated to optimize eco mode usage under varying travel conditions. All optimization features are integrated into the Ewacspro Exc ellent system installed in each HD785-7 unit. The findings indicate that implementing appropriate operational strategies—such as optimizing driving techniques for each road segment and improving road conditions—can reduce fuel consumption by up to 6.31%. Furthermore, regular monitoring and maintenance of HD785-7 units contribute significantly to overall fuel efficiency.In conclusion, this data-driven approach not only enhances the fuel efficiency of HD785-7 dump trucks but also provides actionable insights for mine operations management. This research is expected to guide companies in improving both the efficiency and sustainability of equipment operations in the mining industry.