

INTISARI

Pertambangan batu bara di Indonesia sangat bergantung pada ketersediaan dan keandalan alat berat, khususnya *dump truck* sebagai alat angkut utama. Tingginya intensitas penggunaan menyebabkan frekuensi kerusakan yang tinggi sehingga berdampak pada meningkatnya *downtime* dan menurunnya produktivitas operasional. Penelitian ini bertujuan mengidentifikasi komponen kritis penyumbang *downtime* terbesar, merekomendasikan strategi pemeliharaan yang tepat, dan menentukan tindakan pemeliharaan menggunakan pendekatan *Reliability Centered Maintenance* (RCM). Data historis *downtime* selama periode Januari–Desember dari tiga unit dump truck (DT4368, DT4367, DT4062) dianalisis menggunakan perhitungan MTBF, MTTR, *Availability*, *Root Cause Analysis* (RCA) dengan *Fishbone Diagram*, serta *Failure Mode and Effect Analysis* (FMEA). Hasil penelitian menunjukkan bahwa komponen kritis utama adalah *Fuel Tank* (DT4368, RPN 336), *Welding Chassis* (DT4367, RPN 315), dan *Welding Chassis* (DT4062, RPN 252). Strategi pemeliharaan yang direkomendasikan meliputi *Condition Directed Maintenance* untuk komponen dengan risiko tinggi dan sulit dideteksi, serta *Time Directed Maintenance* untuk komponen dengan pola degradasi yang dapat diprediksi. Implementasi RCM diharapkan mampu menekan *downtime*, meningkatkan nilai MTBF, serta mengoptimalkan *availability* unit *dump truck* secara berkelanjutan.

Kata kunci : *Reliability Centered Maintenance*, *downtime*, FMEA, MTBF, MTTR.

ABSTRACT

Coal mining operations in Indonesia are heavily on the availability and reliability of heavy equipment, particularly dump trucks as the primary hauling units. The high intensity of usage leads to a high frequency of failures, which in turn increases downtime and reduces operational productivity. This study aims to identify the critical components contributing most significantly to downtime, recommend appropriate maintenance strategies, and determine maintenance actions using the Reliability Centered Maintenance (RCM) approach. Historical downtime data from January to December for three dump truck units (DT4368, DT4367, and DT4062) were analyzed using Mean Time Between Failures (MTBF), Mean Time to Repair (MTTR), and Availability calculations, Root Cause Analysis (RCA) through Fishbone Diagrams, and Failure Mode and Effect Analysis (FMEA). The results show that the primary critical components are the Fuel Tank (DT4368, RPN 336), Welding Chassis (DT4367, RPN 315), and Welding Chassis (DT4062, RPN 252). The recommended maintenance strategies include Condition Directed Maintenance for components with high risk and low detectability, and Time Directed Maintenance for components with predictable degradation patterns. The implementation of RCM is expected to reduce downtime, improve MTBF values, and optimize the availability of dump truck units on a sustainable basis.

Keywords: Reliability Centered Maintenance, downtime, FMEA, MTBF, MTTR.