

ABSTRACT

The Komatsu WA350-3 wheel loader is a heavy-duty machine widely used in construction and material handling operations; therefore, it requires a high level of reliability. One of the main factors contributing to decreased equipment productivity is increased downtime caused by failures in the hydraulic system, particularly the hydraulic pump. This study aims to identify the types of hydraulic pump failures, determine their root causes, evaluate the repair process, and analyze the impact of these failures on unit downtime. This research employed a qualitative method through field observations, interviews with mechanics, maintenance documentation, hydraulic pressure measurements using a pressure gauge, and analysis using Root Cause Analysis (RCA) and a Fishbone Diagram. The results showed that the decrease in hydraulic pump performance was caused by drive gear wear, damage to the center bearing seal, damaged O-rings, and hydraulic oil contamination resulting from an ineffective flushing process. These failures caused a reduction in hydraulic system pressure, resulting in slower lifting, dumping, and steering movements and increased unit downtime. The implementation of replacing damaged components and improving preventive maintenance procedures was able to restore hydraulic pressure close to the standard operating level and improve the operational performance of the wheel loader. The application of Root Cause Analysis proved effective in identifying the root causes of failures and can serve as a basis for developing maintenance strategies to reduce the occurrence of recurring failures.

Keyword : Wheel loader, Hydraulic Pump, Downtime, Root Cause Analysis, Fishbone Diagram.

INTISARI

Wheel loader Komatsu WA350-3 merupakan alat berat yang banyak digunakan pada pekerjaan konstruksi dan pemindahan material sehingga memerlukan tingkat keandalan yang tinggi. Salah satu penyebab utama menurunnya produktivitas alat adalah meningkatnya *downtime* akibat kerusakan pada sistem hidrolik, khususnya pompa hidrolik. Penelitian ini bertujuan mengidentifikasi jenis kerusakan pompa hidrolik, menentukan akar penyebab kerusakan, mengevaluasi proses perbaikan, serta menganalisis pengaruh kerusakan terhadap *downtime* unit. Penelitian menggunakan metode kualitatif melalui observasi lapangan, wawancara mekanik, dokumentasi perawatan, pengukuran tekanan hidrolik menggunakan *Pressure gauge*, serta analisis *Root Cause Analysis* (RCA) dan *Fishbone Diagram*. Hasil penelitian menunjukkan bahwa penurunan performa pompa hidrolik disebabkan oleh keausan *drive gear*, kerusakan *seal center bearing*, kerusakan *O-ring*, serta kontaminasi oli hidrolik akibat proses flushing yang kurang optimal. Kerusakan tersebut menyebabkan tekanan sistem hidrolik menurun sehingga gerakan *lifting*, *dumping*, dan *steering* menjadi lambat serta meningkatkan *downtime* unit. Implementasi penggantian komponen yang rusak dan peningkatan prosedur *preventive maintenance* mampu mengembalikan tekanan hidrolik mendekati standar kerja dan meningkatkan performa operasional *Wheel loader*. Penerapan *Root Cause Analysis* terbukti membantu mengidentifikasi akar penyebab kerusakan sehingga dapat digunakan sebagai dasar penyusunan strategi perawatan untuk menekan terjadinya kerusakan berulang.

Kata Kunci : Wheel loader, Pompa Hidrolik, Downtime, Root Cause Analysis, Fishbone Diagram.