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**Analisis Penyebab Kerusakan Swing Drive Unit Excavator Caterpillar 395 Pada Kontraktor Pertambangan
Batu Bara**
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Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

INTISARI

Kerusakan pada *sistem swing drive excavator* Caterpillar 395 dapat menurunkan keandalan unit, meningkatkan *downtime*, dan menambah biaya perawatan. Penelitian ini bertujuan mengidentifikasi jenis kerusakan, menganalisis akar penyebab, serta menentukan prioritas risiko kegagalan pada sistem *swing drive* di pertambangan batu bara.

Penelitian menggunakan metode deskriptif analitis dengan pendekatan studi kasus melalui analisis kualitatif dan kuantitatif. Data meliputi riwayat kerusakan, *downtime*, inspeksi lapangan, wawancara, dan data *Scheduled Oil Sampling* (SOS) periode Desember 2024–November 2025. Analisis dilakukan menggunakan *Root Cause Analysis* (RCA) dengan diagram *fishbone* dan metode 5 *Why*, serta *Failure Mode and Effects Analysis* (FMEA) berdasarkan nilai *Risk Priority Number* (RPN).

Hasil penelitian menunjukkan 76 kejadian kerusakan pada sistem *swing* dengan total *downtime* 199,48 jam. Kerusakan meliputi *bearing, gear planetary, ring gear, lip seal*, sistem pelumasan, dan *shaft pinion*. Akar penyebab utama berkaitan dengan penurunan efektivitas pelumasan akibat kebocoran, kontaminasi, dan *oil starvation*. FMEA menunjukkan *lip seal* memiliki RPN tertinggi sebesar 448, diikuti *bearing pinion* sebesar 441. Rekomendasi perbaikan meliputi peningkatan pemantauan SOS, inspeksi komponen, dan evaluasi sistem pelumasan.

Kata kunci: *Swing drive*, Caterpillar 395, kerusakan, RCA, FMEA, SOS.

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ABSTRACT

Failures in the swing drive system of Caterpillar 395 excavators can reduce equipment reliability, increase downtime, and raise maintenance costs. This study aims to identify failure types, analyze root causes, and determine failure risk priorities in coal mining operations.

This study employed a descriptive-analytical method with a case study approach, combining qualitative and quantitative analyses. Data included failure records, downtime, field inspections, interviews, and Scheduled Oil Sampling (SOS) data from December 2024 to November 2025. Root Cause Analysis (RCA) was conducted using a fishbone diagram and the 5 Whys method, while Failure Mode and Effects Analysis (FMEA) was used to determine Risk Priority Numbers (RPN).

The results recorded 76 swing system failure events with a total downtime of 199.48 hours. Failures involved bearings, planetary gears, ring gears, lip seals, the lubrication system, and pinion shafts. The main causes were reduced lubrication effectiveness due to leakage, contamination, and oil starvation. FMEA identified the lip seal as the highest-priority component, with an RPN of 448, followed by the pinion bearing with an RPN of 441. Recommended improvements include enhanced SOS monitoring, component inspections, and lubrication system evaluation.

***Keywords**: Swing drive, Caterpillar 395, failure, RCA, FMEA, SOS.*