

INTISARI

Final drive merupakan komponen penggerak pada *excavator* Caterpillar 330 di PT Cipta Kridatama yang *life time*-nya belum mencapai target, yaitu hanya 29%-89% pada sisi kiri dan 32%-85% pada sisi kanan, sehingga berisiko menimbulkan *breakdown* dan *downtime* pada operasional unit. Penelitian ini bertujuan untuk mengidentifikasi penyebab kerusakan *final drive*, menentukan akar penyebabnya, serta menyusun strategi perawatan yang tepat guna meningkatkan *life time* komponen tersebut.

Penyelesaian masalah dilakukan melalui beberapa metode, yaitu pengujian *Scheduled Oil Sampling* (SOS) untuk menganalisis kandungan *wear metal*, *contaminant*, dan *viscosity* oli, pembongkaran komponen (*overhaul*) untuk mengamati kondisi fisik *final drive* secara langsung, serta analisis akar masalah (*Root Cause Analysis*) menggunakan diagram *fishbone*, *5 Whys*, dan *Fault Tree Analysis* (FTA) untuk menelusuri penyebab kegagalan hingga ke akar permasalahannya.

Hasil penelitian menunjukkan bahwa kandungan *water contamination* pada oli *final drive* mencapai 13,77% (melebihi batas maksimum 0,5%) dan nilai Particle Quantifier Index (PQI) mencapai 7.662 ppm (melebihi batas maksimum 1.000 ppm), yang dikonfirmasi melalui temuan *sludge* dan deformasi *floating seal* pada saat *overhaul*. Deformasi *floating seal* teridentifikasi sebagai *basic event* utama, dipicu oleh faktor pengoperasian *travel* yang tidak sesuai prosedur dan pengendalian temperatur yang kurang optimal. Sebagai kesimpulan, strategi perawatan disusun berbasis histori SOS (*Monitor*, *Action Required*, *Urgent Action Required*) yang meliputi penggantian *floating seal* dan oli terkontaminasi, pembersihan komponen internal, serta pemantauan berkelanjutan untuk memperpanjang umur pakai *final drive*.

Kata Kunci: *Final drive*, *Excavator* CAT 330, *Scheduled Oil Sampling*, *Root Cause Analysis*.

ABSTRACT

The final drive is a drive component on the Caterpillar 330 excavator at PT Cipta Kridatama whose life time has not reached the target, which is only 29%-89% on the left side and 32%-85% on the right side, so it is at risk of causing breakdown and downtime in unit operations. This study aims to identify the causes of final drive damage, determine the root cause, and develop an appropriate maintenance strategy to increase the life time of the component.

The problem was addressed through several methods: Scheduled Oil Sampling (SOS) testing to analyze the oil's wear metal, contaminant, and viscosity content; component overhaul to directly observe the physical condition of the final drive; and Root Cause Analysis using fishbone diagrams, 5 Whys, and Fault Tree Analysis (FTA) to trace the failure cause down to its root.

The results show that the water contamination content in the final drive oil reached 13,77% (exceeding the 0,5% maximum threshold) and the Particle Quantifier Index (PQI) reached 7.662 ppm (exceeding the 1.000 ppm maximum threshold), confirmed by the sludge deposits and floating seal deformation found during the overhaul. Floating seal deformation was identified as the main basic event, triggered by improper travel operation procedures and suboptimal temperature control. In conclusion, a maintenance strategy was developed based on SOS history (Monitor, Action Required, Urgent Action Required), covering the replacement of floating seals and contaminated oil, internal component cleaning, and continuous monitoring to extend the final drive's service life

Keywords: *Final drive, CAT 330 Excavator, Scheduled Oil Sampling, Root Cause Analysis.*