INTISARI

ANALISIS FENOMENA *HIGH OIL CONSUMPTION* PADA *ENGINE EXCAVATOR* CAT 352 DENGAN METODE *ROOT CAUSE ANALYSIS* (RCA) DAN *FAILURE MODE AND EFFECT ANALYSIS* (FMEA)

Disusun Oleh:

Tabina Fauziyyah Azalia Hartopo

21/483114/SV/20082

Fenomena *high oil consumption* pada unit *Excavator* CAT 352 di PT. Anugrah Bumi Lestari menunjukkan adanya indikasi kerusakan sistem pelumasan meskipun unit masih tergolong baru dan dilakukan perawatan rutin. Penelitian ini bertujuan untuk mengidentifikasi penyebab utama dan menentukan komponen kritis dari masalah konsumsi oli berlebih serta merumuskan tindakan perawatan yang tepat. Metode yang digunakan meliputi analisis data dari *Scheduled Oil Sampling* (SOS), pendekatan *Root Cause Analysis* (RCA) melalui metode 5 *Whys* dan diagram *Fishbone*, serta evaluasi risiko kegagalan menggunakan *Failure Mode and Effect Analysis* (FMEA). Hasil SOS menunjukkan degradasi pelumas secara konsisten yang ditandai dengan viskositas sangat rendah (2,79 cSt pada 100°C), fuel dilution mencapai 74,983%, peningkatan kandungan logam (Fe, Cu, Pb, dan Si), serta penurunan nilai TBN, yang semuanya berulang dalam empat siklus pengambilan sampel. Pemeriksaan *boroscope* menunjukkan goresan pada dinding *cylinder liner* nomor 1, 2, dan 5 sebagai penyebab utama. Hasil FMEA menetapkan komponen kritis dengan nilai RPN tertinggi yaitu *cylinder liner* (432), *piston ring* (280), dan *oil control ring* (280). Penelitian ini menyimpulkan bahwa kombinasi antara kualitas pelumasan yang menurun dan kerusakan pada komponen internal menjadi penyebab utama *high oil consumption*, dan dapat dicegah melalui perbaikan SOP pengisian oli, inspeksi *boroscope* berkala, serta peningkatan kompetensi teknisi dan operator.

Kata Kunci: High Oil Consumption, Excavator CAT 352, SOS, RCA, FMEA, Cylinder Liner, RPN

ABSTRACT

HIGH OIL CONSUMPTION PHENOMENON ANALYSIS ON CAT 352 EXCAVATOR ENGINE USING ROOT CAUSE ANALYSIS (RCA) AND FAILURE MODE AND EFFECT ANALYSIS (FMEA) METHODS

Disusun Oleh:

Tabina Fauziyyah Azalia Hartopo

21/483114/SV/20082

The phenomenon of high oil consumption in the CAT 352 Excavator unit at PT. Anugrah Bumi Lestari indicates potential damage to the lubrication system, despite the unit being relatively new and undergoing regular maintenance. This study aims to identify the root cause and determine the critical components contributing to excessive oil consumption, as well as to formulate appropriate maintenance actions. The methods used include analysis of data from Scheduled Oil Sampling (SOS), a Root Cause Analysis (RCA) approach using the 5 Whys method and Fishbone Diagram, and failure risk evaluation through Failure Mode and Effect Analysis (FMEA). The SOS results consistently showed lubricant degradation, indicated by very low viscosity (2.79 cSt at 100°C), fuel dilution reaching 74.983%, increased levels of metals (Fe, Cu, Pb, and Si), and a decline in TBN values, all observed across four sampling cycles. Boroscope inspection revealed scratches on the cylinder liner walls of cylinders 1, 2, and 5 as the primary cause. The FMEA results identified critical components with the highest RPN values, including the cylinder liner (432), piston ring (280), and oil control ring (280). This study concludes that the combination of deteriorating lubricant quality and internal component damage is the main cause of high oil consumption, which can be prevented through improved oil filling SOPs, regular boroscope inspections, and enhanced training for technicians and operators.

Keywords: High Oil Consumption, CAT 352 Excavator, SOS, RCA, FMEA, Cylinder Liner, RPN