

ANALISIS KERUSAKAN MESIN GAS DOOSAN GV180 TI PADA UNIT PEMBANGKIT LISTRIK DI PLTMG PT. BIMA GOLDEN POWERINDO SITE MELIBUR MENGGUNAKAN METODE DIAGRAM *PARETO* DAN *FISHBONE*

Nama : M. SURYADI
Nim : 22042221435
Dosen Pembimbing : IMRAN, S. Pd., M.T.

ABSTRAK

Mesin Gas Doosan GV180 TI di PLTMG dituntut beroperasi dengan tingkat keandalan tinggi. Namun, tingginya frekuensi penyusutan celah katup buang kerap memicu penurunan efisiensi termal hingga risiko kegagalan berantai. Penelitian ini bertujuan mengidentifikasi silinder kritis, menganalisis akar penyebab, serta merumuskan strategi pemeliharaan yang adaptif. Menggunakan data riwayat pemeliharaan Unit 5 periode Juli 2025–Juni 2026, penelitian ini memadukan analisis kuantitatif Diagram Pareto dan kualitatif Diagram Fishbone (pendekatan 4M: *Machine, Material, Method, Man*). Hasil Diagram Pareto menunjukkan bahwa kegagalan terpusat pada kelompok *vital few* (Silinder 5, 9, 10, 6, 8, dan 4) yang menyumbang 75,4% dari total kasus. Sementara itu, analisis Fishbone menemukan empat akar penyebab dominan: *overheat* lokal akibat kerak *water jacket* (*Machine*), beban termal 560°C dan gesekan kering gas alam (*Material*), interval pemeliharaan 500 jam yang kurang responsif melacak tren (*Method*), serta keterbatasan ergonomi ruang mesin (*Man*). Solusi yang direkomendasikan guna menjaga keandalan operasional meliputi penerapan inspeksi sela setiap 250 *Running Hours*, pembuatan *trend monitoring chart*, serta rutinitas *chemical cleaning* pada jalur pendingin.

Kata Kunci: Doosan GV180 TI, Celah Katup Buang, Diagram Pareto, Diagram Fishbone, Strategi Pemeliharaan.

***Failure Analysis of the DOOSAN GV180 TI Gas Engine in the
Power Generation Unit at PLTMG PT. Bima Golden Powerindo
Melibur Site Using Pareto and Fishbone Diagram Methods***

Nama : M. SURYADI

Nim : 22042221435

Dosen Pembimbing : IMRAN, S. Pd., M.T.

ABSTRACT

The Doosan GV180 TI Gas Engine at the Gas Engine Power Plant is required to operate with high reliability. However, the high frequency of exhaust valve clearance reduction often leads to decreased thermal efficiency and risks a failure cascade. This research aims to identify critical cylinders, analyze the root causes, and formulate an adaptive maintenance strategy. Utilizing the maintenance history data of Unit 5 from July 2025 to June 2026, this study integrates quantitative analysis using a Pareto Chart and qualitative analysis using a Fishbone Diagram (4M approach: Machine, Material, Method, Man). The Pareto Chart results indicate that the failures are concentrated in the vital few group (Cylinders 5, 9, 10, 6, 8, and 4), which accounts for 75.4% of the total cases. Meanwhile, the Fishbone analysis identifies four dominant root causes: local overheat due to water jacket scaling (Machine), a 560°C thermal load combined with the dry friction of natural gas (Material), a 500-hour maintenance interval that is insufficiently responsive in tracking degradation trends (Method), and ergonomic limitations within the engine room (Man). The recommended solutions to maintain operational reliability include implementing interim inspections every 250 Running Hours, creating a trend monitoring chart, and conducting routine chemical cleaning on the cooling system.

Keywords: *Doosan GV180 TI, Exhaust Valve Clearance, Pareto Chart, Fishbone Diagram, Maintenance Strategy.*