ABSTRAK

Irwan
Evaluasi Kinerja Sistem pendingin Mesin Diesel pada PTLD Tello 25MW untuk meningkatkan keandalan Operasi PLTD PT PLN IP UBP TELLO
Dibimbing oleh Bambang Setiadi, S.T., M.T.

Penelitian ini bertujuan untuk mengevaluasi kinerja sistem pendingin mesin diesel pada PLTD Tello 25 MW PT PLN Indonesia Power UBP Tello dalam mendukung keandalan operasi pembangkit. Latar belakang penelitian didasari oleh pentingnya sistem pendingin dalam menjaga kestabilan temperatur mesin diesel agar tetap berada pada rentang kerja optimal serta mencegah terjadinya overheating yang dapat menurunkan efisiensi dan keandalan pembangkit. Rumusan masalah penelitian meliputi kondisi aktual kinerja sistem pendingin, faktor-faktor penyebab penurunan kinerja, pengaruh sistem pendingin terhadap keandalan operasi, serta upaya peningkatan efektivitas pendinginan. Metode yang digunakan adalah deskriptif kuantitatif melalui pengukuran temperatur, tekanan, debit aliran pendingin, kualitas air, serta analisis neraca energi dan availability unit. Hasil analisis menunjukkan bahwa sistem pendingin masih bekerja secara efektif dengan selisih temperatur 8–23 °C dan panas terserap hingga 1.362,5 kJ/s, serta nilai availability mencapai 99,17%. Meskipun demikian, pada beban tinggi terjadi kecenderungan kenaikan suhu yang mendekati batas aman. Kesimpulan penelitian menyatakan bahwa kinerja sistem pendingin tergolong baik dan mendukung keandalan operasi PLTD, namun tetap memerlukan pemantauan dan pemeliharaan berkala. Disarankan peningkatan monitoring suhu real-time, pembersihan radiator terjadwal, serta optimalisasi pengaturan beban untuk mencegah risiko overheat.

Kata Kunci : sistem pendingin, mesin diesel, PLTD Tello, keandalan operasi, kinerja pendinginan.

ABSTRACT

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Performance Evaluation of the Diesel Engine Cooling System at PLTD Tello 25 MW to Enhance the Operational Reliability of PT PLN Indonesia Power UBP Tello
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This study aims to evaluate the performance of the diesel engine cooling system at PLTD Tello 25 MW, PT PLN Indonesia Power UBP Tello, in supporting the reliability of power plant operations. The background of this research is based on the critical role of the cooling system in maintaining stable diesel engine operating temperatures within the optimal range and preventing overheating, which can reduce efficiency and operational reliability. The research problems focus on the actual condition of the cooling system performance, factors causing performance degradation, the influence of the cooling system on operational reliability, and efforts to improve cooling effectiveness. A descriptive quantitative method was applied by measuring temperature, pressure, cooling water flow rate, water quality, and analyzing energy balance and unit availability. The analysis results show that the cooling system is still operating effectively with a temperature difference of 8–23 °C and heat absorption up to 1,362.5 kJ/s, while the availability value reaches 99.17%. However, under high load conditions, there is a tendency for temperature to approach the upper safe limit. The study concludes that the cooling system performance is generally good and supports the reliable operation of the PLTD, but continuous monitoring and periodic maintenance are required. It is recommended to enhance real-time temperature monitoring, schedule regular radiator cleaning, and optimize load management to prevent overheating risks.

Keywords: cooling system, diesel engine, PLTD Tello, operational reliability, cooling performance.