ABSTRAK

ANALISIS PENGARUH PENGHUBUNG *(GEARBOX)* PADA *FAN COOLING TOWER* TERHADAP EFISIENSI MOTOR INDUKSI 3 FASA DI PLN UBP KERAMASAN

(2026: xii + 53 Halaman + Daftar Gambar + Daftar Tabel + Lampiran)

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Motor induksi 3 fasa banyak digunakan pada sistem industri karena memiliki efisiensi dan keandalan yang baik. Pada sistem fan cooling tower, gearbox digunakan sebagai penghubung untuk menyesuaikan putaran dan torsi, namun dapat menimbulkan rugi-rugi daya yang mempengaruhi efisiensi sistem. Penelitian ini bertujuan untuk menganalisis pengaruh gearbox terhadap efisiensi motor induksi 3 fasa pada penggerak fan cooling tower di PT PLN Indonesia Power UBP Keramasan Palembang. Metode penelitian dilakukan melalui observasi, diskusi, dan studi literatur dengan menggunakan data hasil pengukuran berupa tegangan, arus, faktor daya, kecepatan putar, dan torsi. Analisis dilakukan melalui perhitungan daya masukan motor, daya keluaran, rugi-rugi total, serta efisiensi sistem. Hasil penelitian menunjukkan bahwa rugi-rugi total berada pada rentang 9.585,2Watt hingga 13.142,9 Watt. Efisiensi motor berada pada rentang 76,8%–79,8%, sedangkan efisiensi sistem berada pada rentang 72,7%–75,6%. Nilai efisiensi sistem yang lebih rendah menunjukkan bahwa gearbox memberikan kontribusi terhadap rugi-rugi transmisi sehingga menurunkan efisiensi keseluruhan sistem penggerak fan cooling tower.

Kata kunci: motor induksi tiga fasa, gearbox, efisiensi, rugi-rugi daya, *fan cooling tower*.

ABSTRACT

ANALYSIS OF THE EFFECT OF A GEARBOX AS A COUPLING SYSTEM ON THE EFFICIENCY OF A THREE-PHASE INDUCTION MOTOR IN A COOLING TOWER FAN AT PLN UBP KERAMASAN

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Three-phase induction motors are widely used in industrial applications due to their efficiency and reliability. In cooling tower fan systems, a gearbox is used to adjust speed and torque; however, it may introduce additional power losses that affect overall system efficiency. This study aims to analyze the effect of the gearbox on the efficiency of a three-phase induction motor used as a cooling tower fan drive at PT PLN Indonesia Power UBP Keramasan Palembang. The study was conducted through observation, discussion, and literature review using measured data including voltage, current, power factor, rotational speed, and torque. The analysis included calculations of motor input power, output power, total losses, and system efficiency. The results showed that total power losses ranged from 9,585.2 W to 13,142.9 W. Motor efficiency ranged from 76.8% to 79.8%, while system efficiency ranged from 72.7% to 75.6%. The lower system efficiency indicates that the gearbox contributes to transmission losses, reducing the overall efficiency of the cooling tower drive system.

Keywords: *three-phase induction motor, gearbox, efficiency, power losses, cooling tower fan.*