

## ABSTRAK

ALAN HALMAR

Pengaruh Pemeliharaan *Major Overhaul* Terhadap *Specific Fuel Consumption (SFC)* Pada Mesin Diesel Unit 4 PLTD Lemukutan

Dibimbing Oleh HALIM RUSJDI, S.T, M.T.

Pembangkit Listrik Tenaga Diesel (PLTD) merupakan sistem pembangkit yang banyak digunakan di wilayah terpencil, termasuk PLTD Lemukutan. Kinerja mesin diesel sebagai penggerak utama generator sangat menentukan efisiensi operasional pembangkit, yang dapat diukur melalui parameter *Specific Fuel Consumption (SFC)*. Nilai *SFC* yang tinggi menunjukkan penurunan efisiensi akibat keausan komponen, penurunan tekanan kompresi, serta ketidaksempurnaan sistem pembakaran. Oleh karena itu, diperlukan pemeliharaan *Major Overhaul* untuk mengembalikan kondisi mesin mendekati spesifikasi pabrikan. Penelitian ini bertujuan untuk menganalisis perubahan nilai *Specific Fuel Consumption (SFC)* sebelum dan sesudah pelaksanaan *Major Overhaul* serta menghitung besarnya pengaruh kegiatan tersebut terhadap efisiensi penggunaan bahan bakar. Metode yang digunakan adalah kuantitatif komparatif dengan membandingkan data konsumsi bahan bakar dan produksi energi listrik selama tiga bulan sebelum dan tiga bulan sesudah *Major Overhaul*. Hasil penelitian menunjukkan bahwa nilai rata-rata *SFC* sebelum *Major Overhaul* sebesar 0,34 Liter/kWh dan menurun menjadi 0,30 Liter/kWh setelah *Major Overhaul*. Terjadi penurunan sebesar 11,76%, yang menunjukkan adanya peningkatan efisiensi penggunaan bahan bakar. Penurunan tersebut dipengaruhi oleh meningkatnya tekanan kompresi, optimalnya sistem injeksi bahan bakar, serta berkurangnya *losses* mekanis setelah penggantian komponen aus. Dengan demikian, pelaksanaan *Major Overhaul* terbukti memberikan pengaruh signifikan terhadap peningkatan efisiensi dan kinerja Mesin Diesel Unit 4 di PLTD Lemukutan.

Kata kunci: *Major Overhaul*, Mesin Diesel, *Specific Fuel Consumption (SFC)*, Efisiensi, PLTD Lemukutan.

## ***ABSTRACT***

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*The Effect of Major Overhaul Maintenance on Specific Fuel Consumption (SFC) of Diesel Engine Unit 4 at Lemukutan Diesel Power Plant*

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*Diesel Power Plants (PLTD) are widely utilized in remote and island areas, including the Lemukutan Diesel Power Plant. The performance of the diesel engine as the prime mover significantly affects operational efficiency, which can be evaluated through the Specific Fuel Consumption (SFC) parameter. A high SFC value indicates decreased efficiency due to component wear, reduced compression pressure, and incomplete combustion. Therefore, Major Overhaul maintenance is required to restore engine performance close to manufacturer specifications. This study aims to analyze the change in Specific Fuel Consumption (SFC) before and after the implementation of Major Overhaul and to determine the magnitude of its effect on fuel efficiency. A quantitative comparative method was employed by comparing fuel consumption and electricity production data for three months before and three months after the Major Overhaul. The results show that the average SFC before Major Overhaul was 0.34 Liter/kWh and decreased to 0.30 Liter/kWh after Major Overhaul. This represents a reduction of 11.76%, indicating an improvement in fuel efficiency. The decrease was influenced by restored compression pressure, optimized fuel injection performance, and reduced mechanical losses due to component replacement. Therefore, the implementation of Major Overhaul has been proven to significantly improve the efficiency and performance of Diesel Engine Unit 4 at the Lemukutan Diesel Power Plant.*

*Keywords: Major Overhaul, Diesel Engine, Specific Fuel Consumption (SFC), Efficiency, Lemukutan Diesel Power Plant.*