OPTIMISATION OF FUEL FILTRATION COSTS IN MAINTANK UNITS THROUGH THE DEVELOPMENT PROCESS OF NON-OEM ALTERNATIVE FILTERS WITHIN THE OPERATIONAL SCOPE OF PT. KPP PROJECTS

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STATEMENT BY THE AUTHOR

I hereby declare that this submission is my own work and to the best of my knowledge, it contains no material previously published or written by another person, nor material which to a substantial extent has been accepted for the award of any other degree or diploma at any educational institution, except where due acknowledgement is made in the thesis.



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ABSTRAK

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Penelitian ini bertujuan untuk mengevaluasi kelayakan teknis dan ekonomi penggunaan filter Non-OEM sebagai alternatif filter OEM pada sistem filtrasi bahan bakar unit maintank di lingkungan operasional PT. KPP. Latar belakang penelitian ini adalah tingginya biaya penggunaan filter OEM yang meningkat seiring dengan pertumbuhan volume konsumsi bahan bakar, sehingga berdampak signifikan terhadap biaya pemeliharaan sistem filtrasi. Oleh karena itu, diperlukan alternatif yang lebih efisien tanpa mengorbankan kualitas filtrasi dan keandalan sistem.

Penelitian ini menggunakan pendekatan kuantitatif dengan desain eksperimental dan komparatif, serta mengintegrasikan metodologi DMAIC (Define–Measure–Analyze–Improve–Control) untuk memastikan proses evaluasi dan pengendalian yang berkelanjutan. Evaluasi teknis dilakukan melalui pengujian laboratorium dan verifikasi lapangan terhadap beberapa parameter utama, yaitu ISO 4406 cleanliness code, differential pressure, water content, flowrate, dirt holding capacity, dan usia pakai filter. Analisis ekonomi dilakukan menggunakan pendekatan Life Cycle Cost (LCC) dan Net Present Value (NPV) untuk menilai efisiensi biaya jangka pendek dan jangka menengah. Selain itu, metode Analytical Hierarchy Process (AHP) digunakan untuk mendukung pengambilan keputusan.

Hasil penelitian menunjukkan bahwa beberapa filter Non-OEM mampu menyamai performa filter OEM pada parameter teknis kritikal. Dari sisi ekonomi, filter Non-OEM tertentu memberikan potensi penghematan biaya hingga sekitar 38% per tahun serta menghasilkan nilai NPV yang lebih optimal. Temuan ini menunjukkan bahwa filter Non-OEM layak dipertimbangkan sebagai alternatif yang efisien, ekonomis, dan berkelanjutan dalam sistem filtrasi bahan bakar industri pertambangan.

Keywords: Filter OEM and non OEM, ISO 4406, DMAIC Methodology, MCDM, LCC, NPV

ABSTRACT

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This study aims to evaluate the technical and economic feasibility of using non-OEM filters as an alternative to OEM filters in the fuel filtration system of the maintank unit in the operational environment of PT. KPP. The background to this study is the high cost of using OEM filters, which increases in line with the growth in fuel consumption volume, thereby having a significant impact on the maintenance costs of the filtration system. Therefore, a more efficient alternative is needed without compromising filtration quality and system reliability.

This study uses a quantitative approach with an experimental and comparative design, and integrates the DMAIC (Define–Measure–Analyse–Improve–Control) methodology to ensure a continuous evaluation and control process. Technical evaluation was conducted through laboratory testing and field verification of several key parameters, namely ISO 4406 cleanliness code, differential pressure, water content, flow rate, dirt holding capacity, and filter service life. Economic analysis was conducted using the Life Cycle Cost (LCC) and Net Present Value (NPV) approaches to assess short-term and medium-term cost efficiency. In addition, the Analytical Hierarchy Process (AHP) method is used to support multi-criteria decision making.

The results of the study indicate that some non-OEM filters are capable of matching the performance of OEM filters in critical technical parameters. From an economic perspective, certain non-OEM filters offer potential cost savings of up to approximately 38% per annum and generate a more optimal NPV value. These findings indicate that non-OEM filters are worth considering as an efficient, economical, and sustainable alternative in industrial mining fuel filtration systems.

Keywords: Filter OEM and non OEM, ISO 4406, DMAIC Methodology, MCDM, LCC, NPV

DEDICATION

Karya ini saya dedikasikan untuk kemajuan dan efesiensi maintenance cost pada pengelolaan filtrasi bahan bakar di PT. Kalimantan Prima Persada

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