

ABSTRAK

ANALISIS PERBANDINGAN KERJA ALAT SEMI OTOMASTIS DAN MANUAL DALAM PROSES PEMBERSIHAN *FILTER* STRAINER

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(2025: xvi + 39 Halaman, 21 Gambar, 9 Tabel, 10 Lampiran)

Filter strainer merupakan komponen penting dalam sistem penyaringan fluida industri, namun sering mengalami penurunan performa akibat penumpukan kotoran. Pembersihan manual memerlukan waktu, tenaga, serta berisiko merusak filter jika dilakukan tidak tepat. Sebagai solusi, penulis merancang alat semi otomatis yang terdiri dari tabung utama, sistem sikat tembaga, motor pemutar (bor), dan semprotan air bertekanan. Rancangan diuji secara simulatif melalui analisis pembebanan statik menggunakan software FEA untuk memastikan kekuatan struktur. Pengujian dilakukan dengan variasi kecepatan putaran dan tekanan air (1–5 bar) untuk mengevaluasi efisiensi waktu dan kinerja alat. Hasil pengujian menunjukkan bahwa waktu pengerjaan menyeluruh secara manual mencapai 4.845 detik, sedangkan dengan alat semi otomatis hanya membutuhkan 3.023 detik. Pembersihan unit filter secara manual memerlukan waktu rata-rata 167–220 detik, sedangkan menggunakan alat berkisar antara 61–105 detik tergantung kombinasi parameter. Selain meningkatkan efisiensi waktu, alat juga terbukti aman digunakan berdasarkan hasil safety factor $\geq 1,967$. Kesimpulannya, penggunaan alat semi otomatis memberikan peningkatan signifikan dalam hal efisiensi waktu, keamanan, serta kenyamanan operator. Rekomendasi dari penelitian ini adalah implementasi alat di lingkungan industri guna mendukung produktivitas dan efektivitas proses perawatan filter.

Kata Kunci: *Filter* Strainer, alat semi otomatis, efisiensi kerja, pembersihan *filter*, perbandingan manual.

ABSTRACT

COMPARATIVE ANALYSIS OF SEMI-AUTOMATIC AND MANUAL EQUIPMENT WORK IN THE FILTER STRAINER CLEANING PROCESS

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Filter strainers are essential components in industrial fluid filtration systems but often suffer performance degradation due to dirt accumulation. Manual cleaning methods require considerable time and labor and pose a risk of damaging the filter if not performed properly. As a solution, the researcher designed a semi-automatic cleaning tool consisting of a main cylindrical body, copper brush system, rotating motor (drill), and pressurized water spray. The design was tested through static load analysis using Finite Element Analysis (FEA) software to ensure structural strength. Experimental testing was carried out with variations in rotational speed and water pressure (1–5 bar) to evaluate the tool's time efficiency and performance. The test results showed that the total manual cleaning process took 4,845 seconds, while the semi-automatic tool reduced it to just 3,023 seconds. Individual filter cleaning using the manual method required an average of 167–220 seconds, whereas the tool shortened this to 61–105 seconds depending on the parameter combinations. In addition to improving time efficiency, the tool also proved safe to use, as indicated by a safety factor ≥ 1.967 . In conclusion, the use of a semi-automatic tool significantly improves time efficiency, safety, and operator convenience. This research recommends implementing the tool in industrial environments to support productivity and enhance the effectiveness of filter maintenance processes.

Keywords: filter strainer, semi-automatic tool, work efficiency, filter cleaning, manual comparison