ABSTRAK

Penelitian ini menganalisis perawatan mesin boiler pada PT. Karya Serasi Jaya Abadi menggunakan pendekatan predictive maintenance berbasis metode ARIMA untuk memprediksi waktu kegagalan komponen kritis. Data historis kerusakan selama tiga tahun (2022-2024) dari Superheater Tubes, Economizer Tubes, dan Feed Water Pump diolah dengan perhitungan MTBF (sekitar 339-340 jam operasi) dan model ARIMA(1,0,1) menggunakan Minitab 22, menghasilkan forecast waktu antar kegagalan stabil pada kisaran 340-341 jam dengan interval kepercayaan 297-384 jam. Pendekatan ini menggantikan sistem preventive dan corrective maintenance konvensional yang kurang efisien, sehingga mengurangi downtime tak terencana dan meningkatkan keandalan operasional pabrik pengolahan kelapa sawit berkapasitas 30 ton/jam. Hasil menunjukkan model ARIMA efektif untuk jadwal perawatan prediktif yang optimal bagi industri manufaktur.

Kata Kunci: predictive maintenance, ARIMA, mesin boiler, MTBF, time series, keandalan mesin

ABSTRACT

This research analyzes boiler machine maintenance at PT. Karya Serasi Jaya Abadi using a predictive maintenance approach based on the ARIMA method to forecast critical component failure times. Historical failure data over three years (2022-2024) from Superheater Tubes, Economizer Tubes, and Feed Water Pump were processed via MTBF calculations (around 339-340 operating hours) and ARIMA(1,0,1) modeling in Minitab 22, yielding stable forecasts of 340-341 hours between failures with 95% confidence intervals of 297-384 hours. This replaces conventional preventive and corrective maintenance, reducing unplanned downtime and enhancing reliability in the 30 ton/hour palm oil processing plant operations. The ARIMA model proves effective for optimized predictive maintenance scheduling in manufacturing industries.

Keywords: predictive maintenance, ARIMA, boiler machine, MTBF, time series, machine reliability