

## ABSTRAK

Kegiatan perawatan mesin merupakan aspek penting dalam menjamin kelancaran operasional fasilitas produksi. Proses produksi di PT Bintang Toedjoe mengalami hambatan akibat kerusakan pada mesin *filling* merek Ilapak yang beroperasi dalam 3 *shift* sehingga meningkatkan risiko kegagalan tak terencana yang akan mengakibatkan *downtime* mesin. Selama periode Januari 2024 hingga Januari 2025, tercatat 752 kejadian kegagalan tak terencana pada 12 unit mesin dengan total *downtime* (durasi kegagalan tak terencana) mencapai 1.958,61 jam. Mesin Ilapak 11 menjadi penyumbang tertinggi dengan 96 kejadian dan durasi 327,83 jam (16,74% dari total durasi *downtime* 12 mesin *filling* Ilapak). Meskipun perusahaan telah menerapkan pemeliharaan berbasis waktu, masih diperlukan strategi pemeliharaan yang lebih terukur dan berbasis data guna menekan *downtime* dan meningkatkan keandalan mesin.

Penelitian ini menerapkan pendekatan *Reliability Centered Maintenance II* (RCM II) dan *Age Replacement* untuk merancang strategi perawatan mesin *filling* Ilapak 11. Analisis dilakukan melalui FMEA dan *RCM decision worksheet* untuk menentukan jenis tindakan perawatan, sementara metode *Age Replacement* digunakan untuk menetapkan interval penggantian komponen secara optimal guna mengurangi *downtime* dan menjaga keandalan mesin.

Hasil pengolahan data mengidentifikasi lima komponen mesin *filling* Ilapak 11 dengan mode kegagalan berbeda yang direkomendasikan untuk tindakan *scheduled discard task*. Penerapan strategi pemeliharaan pencegahan berbasis RCM II dan *Age Replacement* pada lima komponen tersebut secara keseluruhan berhasil mengurangi *downtime* dan meningkatkan keandalan mesin dengan penurunan *downtime* sebesar dari 66,02 jam menjadi 37,87 jam (turun 42,64%). Penurunan ini menunjukkan bahwa strategi penggantian terjadwal mampu mengatasi kegagalan pada komponen kritis sehingga mencegah gangguan mendadak yang berdampak pada keberlangsungan proses produksi.

**Kata kunci:** Pemeliharaan pencegahan, *Reliability Centered Maintenance II*, *Age replacement*, FMEA, Penggantian komponen terencana.

## **Filling Machine Maintenance Strategy to Minimize Downtime with Reliability Centered Maintenance II (RCM II) And Age Replacement**

### ***ABSTRACT***

*Machine maintenance activities are an important aspect in ensuring the smooth operation of production facilities. The production process at PT Bintang Toedjoe experienced obstacles due to damage to the Ilapak filling machine, which operates in 3 shifts, thereby increasing the risk of unplanned failures that would result in machine downtime. During the period from January 2024 to January 2025, there were 752 instances of unplanned failures across 12 machines, resulting in a total downtime of 1,958.61 hours. The Ilapak 11 machine contributed the highest number of incidents with 96 occurrences and a duration of 327.83 hours (16.74% of the total downtime duration of the 12 Ilapak filling machines). Although the company has implemented time-based maintenance, a more measurable and data-driven maintenance strategy is still needed to reduce downtime and improve machine reliability.*

*This study applied the Reliability Centered Maintenance II (RCM II) and Age Replacement approaches to design a maintenance strategy for the Ilapak 11 filling machine. Analysis was conducted using FMEA and RCM decision worksheets to determine the type of maintenance actions, while the Age Replacement method was used to establish optimal component replacement intervals to reduce downtime and maintain machine reliability.*

*Data processing identified five components of the Ilapak 11 filling machine with different failure modes that were recommended for scheduled discard tasks. The implementation of RCM II and Age Replacement-based preventive maintenance strategies on these five components successfully reduced downtime and improved machine reliability, with a decrease in downtime from 66.02 hours to 37.87 hours (a 42.64% reduction). This reduction indicates that the scheduled replacement strategy is capable of addressing failures in critical components, thereby preventing sudden disruptions that impact the continuity of the production process.*

**Keywords:** *Preventive maintenance, Reliability Centered Maintenance II, Age replacement, FMEA, schedule discard task*