

ABSTRAK

Mesin *Rubber Tyred Gantry* (RTG) merupakan peralatan utama dalam proses bongkar muat peti kemas di PT XYZ, Terminal Nilam Surabaya. Tingginya frekuensi *downtime* pada RTG 07 menyebabkan terganggunya kelancaran operasional sehingga diperlukan sistem perawatan yang lebih efektif. Penelitian ini bertujuan untuk mengidentifikasi komponen kritis, menentukan interval perawatan yang optimal, serta menyusun jadwal *preventive maintenance* menggunakan metode *Reliability Centered Maintenance* (RCM). Metode yang digunakan meliputi *Failure Mode and Effect Analysis* (FMEA) untuk menentukan prioritas risiko kegagalan, *Logic Tree Analysis* (LTA) untuk menentukan tindakan perawatan, serta analisis distribusi menggunakan perangkat lunak Minitab guna memperoleh nilai *Mean Time To Failure* (MTTF) dan *Mean Time To Repair* (MTTR). Data penelitian berupa data *downtime* RTG 07 periode Januari–Desember 2025 yang diperoleh dari perusahaan serta data hasil wawancara dengan PIC. Hasil penelitian menunjukkan bahwa komponen kritis pada RTG 07 adalah *Engine*, Sistem *Trolley*, dan Sistem *Spreader*. Berdasarkan hasil optimasi interval perawatan diperoleh interval *preventive maintenance* optimal yaitu *Engine* sebesar 1097 jam, Sistem *Trolley* sebesar 697 jam, dan Sistem *Spreader* sebesar 300 jam. Interval tersebut kemudian digunakan sebagai dasar penyusunan jadwal perawatan selama satu tahun. Penerapan jadwal perawatan berbasis keandalan mampu meningkatkan nilai *reliability* komponen dibandingkan sebelum dilakukan penjadwalan, sehingga diharapkan dapat menurunkan frekuensi *downtime*, meningkatkan keandalan mesin, serta mendukung kelancaran operasional bongkar muat di PT XYZ.

Kata Kunci: *Reliability Centered Maintenance, Failure Mode and Effect Analysis, Logic Tree Analysis, preventive maintenance, Rubber Tyred Gantry, downtime.*

ABSTRACT

The Rubber Tyred Gantry (RTG) is one of the primary pieces of equipment used in container loading and unloading operations at PT XYZ, Terminal Nilam, Surabaya. The high frequency of downtime experienced by RTG 07 has disrupted operational activities, highlighting the need for a more effective maintenance system. This study aims to identify critical components, determine the optimal maintenance intervals, and develop a preventive maintenance schedule using the Reliability Centered Maintenance (RCM) method. The research methods include Failure Mode and Effect Analysis (FMEA) to determine the priority of failure risks, Logic Tree Analysis (LTA) to determine appropriate maintenance actions, and statistical distribution analysis using Minitab software to calculate the Mean Time To Failure (MTTF) and Mean Time To Repair (MTTR). The research data consisted of RTG 07 downtime records from January to December 2025 obtained from the company, along with interview data collected from the Person in Charge (PIC). The results indicate that the critical components of RTG 07 are the Engine, Trolley System, and Spreader System. Based on the maintenance interval optimization, the optimal preventive maintenance intervals were determined to be 1097 hours for the Engine, 697 hours for the Trolley System, and 300 hours for the Spreader System. These intervals were subsequently used as the basis for developing a one-year maintenance schedule. The implementation of the reliability-based maintenance schedule improved the reliability of the critical components compared to the condition before scheduling. Therefore, the proposed maintenance schedule is expected to reduce downtime frequency, improve machine reliability, and support the efficiency of container loading and unloading operations at PT XYZ.

Keywords: *Reliability Centered Maintenance, Failure Mode and Effect Analysis, Logic Tree Analysis, preventive maintenance, Rubber Tyred Gantry, downtime.*