

**PERENCANAAN ULANG JADWAL *MAINTENANCE* UNTUK MINIMASI
BIAYA PERAWATAN *GANTRY JIB CRANE 2* MENGGUNAKAN METODE
RELIABILITY CENTERED MAINTENANCE (RCM)
(Studi Kasus PT Pelabuhan Tanjung Priok Cabang Panjang)**

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INTISARI

Latar Belakang: PT Pelabuhan Tanjung Priok Cabang Panjang (PTP Nonpetikemas) mengalami permasalahan *downtime* tinggi pada alat berat *Gantry Jib Crane 2* (GJC 2), dengan waktu *downtime* sebesar 2.882,53 atau setara dengan 32,88% dari total waktu operasi satu tahun. Hal ini menyebabkan keterlambatan aktivitas bongkar muat dan peningkatan biaya operasional.

Tujuan: Tujuan dari penelitian ini adalah untuk mengetahui hubungan antarfungsi komponen pada alat berat GJC 2 melalui pendekatan FBD, mengidentifikasi komponen kritis menggunakan FMEA, menetapkan interval waktu dan jenis tindakan perawatanyang tepat dengan pendekatan RCM, serta membandingkan biaya perawatan sebelum dan sesudah menggunakan metode RCM.

Metode Penelitian: Metode penelitian ini dilakukan dengan pendekatan RCM, diawali dengan identifikasi komponen GJC 2, analisis FMEA, pengukuran TTF dan TTR, Uji *Goodness of Fit*, perhitungan MTTF dan MTTR, pemilihan tindakan perawatan, dan dilakukan analisis biaya perawatan menggunakan perbandingan Cf dan CP.

Hasil: Hasil penelitian menunjukkan penerapan RCM berhasil mengidentifikasi empat komponen kritis, yaitu: *motor gantry*, *drive*, PLC, *wire rope*. Interval perawatan dihitung berdasarkan distribusi statistik masing-masing komponen. Tindakan perawatan TD diterapkan pada komponen *motor gantry* dan *wire rope*, sedangkan CD digunakan pada *drive* dan FF pada PLC. Biaya perawatan setelah penerapan RCM mengalami peningkatan pada perhitungan biaya perawatan. Namun biaya yang dikeluarkan hanya pada perawatan alat berat tidak mencakup ke biaya lain. Karena pada penerapan metode RCM, alat berat akan mengalami pengurangan *breakdown* yang akan menyebabkan terhentinya kegiatan bongkar muat barang.

Kesimpulan: Penerapan metode RCM pada alat berat GJC 2 efektif dalam meminimasi *downtime*. RCM mampu mengoptimalkan jadwal perawatan melalui identifikasi komponen kritis, pemilihan tindakan yang tepat, serta penentuan interval perawatan yang optimal. Oleh sebab itu, RCM dapat dijadikan strategi perawatan jangka panjang untuk alat berat lainnya di PTP Nonpetikemas.

Kata kunci: *Maintenance*, RCM, GJC 2, Biaya Perawatan, *Downtime*.

**REPLANNING OF MAINTENANCE SCHEDULES TO MINIMIZE GANTRY
JIB CRANE 2 MAINTENANCE COSTS USING THE RELIABILITY
CENTERED MAINTENANCE (RCM) METHOD**
(Case Study of PT Pelabuhan Tanjung Priok Panjang Branch)

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ABSTRACT

Background: PT Pelabuhan Tanjung Priok Cabang Panjang (PTP Nonpetikemas) experienced high downtime problems on the Gantry Jib Crane 2 (GJC 2) heavy equipment, with a downtime of 2,882.53 or equivalent to 32.88% of the total one-year operating time. This leads to delays in loading and unloading activities and increased operational costs.

Objective: The purpose of this study was to determine the relationship between component functions in GJC 2 heavy equipment through the FBD approach, identify critical components using FMEA, determine the time interval and type of appropriate maintenance actions with the RCM approach, and compare the maintenance costs before and after using the RCM method.

Research Method: This research method was carried out with an RCM approach, starting with the identification of GJC 2 components, FMEA analysis, TTF and TTR measurements, Goodness of Fit Test, MTTF and MTTR calculations, selection of treatment actions, and treatment cost analysis using Cf and CP comparisons.

Results: The results of the study showed that the application of RCM successfully identified four critical components, namely: gantry motor, drive, PLC, wire rope. The maintenance interval is calculated based on the statistical distribution of each component. TD maintenance measures are applied to Gantry Motor and wire rope components, while CD is used on drive and FF on PLC. Maintenance costs after RCM implementation have increased in maintenance cost calculations. However, the costs incurred only on the maintenance of heavy equipment do not include other costs. Because in the application of the RCM method, heavy equipment will experience a reduction in breakdown which will cause the cessation of loading and unloading activities.

Conclusion: The application of the RCM method on GJC 2 machines is effective in minimizing downtime. RCM is able to optimize maintenance schedules through the identification of critical components, the selection of appropriate actions, and the determination of optimal maintenance intervals. Therefore, RCM can be used as a long-term maintenance strategy for other heavy equipment at PTP Nonpetikemas.

Keywords: Maintenance, RCM, GJC 2, Maintenance Costs, Downtime.