

# **ANALISIS PERAWATAN MESIN MENGGUNAKAN METODE *RELIABILITY CENTERED MAINTENANCE* GUNA MENGURANGI KOMPONEN KRITIS PADA MESIN HLP BOLD 1**

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## **ABSTRAK**

Mesin HLP Bold 1 merupakan mesin *packer* atau mesin pengemas rokok. Pada proses produksinya, komponen mesin ini sering mengalami kerusakan. Hal ini dapat dilihat dari data yang telah diperoleh dari bulan Januari 2022-Februari 2023 diketahui bahwa komponen konveyor mengalami kerusakan sebanyak 8 kali, komponen dudukan pocket sebanyak 9 kali, komponen *strength* sebanyak 4 kali, komponen drum sebanyak 1 kali, komponen *heather* sebanyak 2 kali dan komponen pertekan sebanyak 4 kali. Kerusakan pada komponen tersebut akan menambah waktu *downtime* dan tentu saja hal ini akan mengakibatkan proses produksi tidak dapat berjalan dengan maksimal. Metode yang digunakan yaitu metode *Reliability Centered Maintenance* (RCM) dan *Failure Mode Effect and Analysis* (FMEA). Berdasarkan hasil olah data didapatkan nilai MTTF komponen dudukan pocket sebesar 938,21 jam dan MTTR sebesar 0,49 jam. Sedangkan komponen konveyor mendapatkan nilai MTTF sebesar 890,23 jam dan MTTR sebesar 0,35 jam. Usulan perawatan yang disarankan untuk komponen dudukan pocket yaitu 250,60 jam atau 10 hari dan konveyor yaitu 292,96 jam atau 12 hari. Setelah dilakukannya perawatan, nilai kehandalan komponen dudukan pocket naik hingga 82% yang sebelumnya hanya 39% dan komponen konveyor naik hingga 72% yang sebelumnya hanya 37%.

**Kata Kunci** : Mesin HLP Bold 1, *Reliability Centered Maintenance*, FMEA, *Maintenance*

# **ANALYSIS OF MACHINE MAINTENANCE USING RELIABILITY-CENTERED MAINTENANCE METHOD TO REDUCE CRITICAL COMPONENTS ON HLP BOLD 1 MACHINE**

## **ABSTRACT**

The HLP Bold 1 machine is a cigarette-packing machine. This machine component is frequently damaged throughout the production process. The statistics gathered from January 2022 to February 2023 show that the conveyor component was damaged 8 times, the pocket holder component 9 times, the strength component 4 times, the drum component 1 time, the heather component 2 times, and the press component 4 times. Damage to these components will result in increased downtime, and the production process will not be able to run correctly. The Reliability Centered Maintenance (RCM) and Failure Mode Effect and Analysis (FMEA) methods were employed. Based on data processing results, the MTTF of the pocket holder component is 938.21 hours, and the MTTR is 0.49 hours. Conversely, the conveyor component has an MTTF of 890.23 hours and an MTTR of 0.35 hours. The suggested maintenance period for pocket-holding components is 250.60 hours, or 10 days; for the conveyor, it is 292.96, or 12 days. Following maintenance, the reliability value of the pocket holder component increased to 82%, up from 39% previously, and the reliability value of the conveyor component increased to 72%, up from 37% previously.

**Keywords:** HLP Bold 1 Machine, Reliability Centered Maintenance, FMEA, Maintenance

## DAFTAR PUSTAKA

- Alfath, A., Komariah, A., & Suprpto (2022). Analisis Sistem Perawatan Unit Multiflo Mf420Ex Menggunakan Metode *Reliability Centered Maintenance* (RCM) di PP Klm. *Prosiding*, 978–979. <http://journal.uniba.ac.id/index.php/PSD/article/view/380%0Ahttps://journal.uniba.ac.id/index.php/PSD/article/view/380/256>
- Cahyono, A. H. (2022). Perawatan *Preventif Van-Belt* Pada Mesin *Ultra High Frequency* (UHF). *Vocational Education National Seminar (VENS)*121–125.
- Darno. (2020). Perencanaan Pemeliharaan Motor Diesel Dengan Metode RCM (*Reliability Centered Maintenance*) Pada PLTG Teluk Lembu Pekanbaru. 7(1), 77–85.
- Dias, J., Nunes, E., & Sousa, S. (2020). *Productivity Improvement Of Transmission Electron Microscopes - A Case Study*. *Procedia Manufacturing*, 51(2019), 1559–1566. <https://doi.org/10.1016/j.promfg.2020.10.217>
- Dwi, R. D. (2022). Analisis Perawatan Mesin Yilmak Laundry Dengan Metode *Reliability Centered Maintenance* (RCM) dan *Risk Based Maintenance* (RBM) (Studi Kasus : Departement Laundry PT Eratex Djaja). *Jurnal Energy : Jurnal Ilmiah Ilmu-Ilmu Teknik*, 12(1), 16–21.
- Dzulyadain, H., Budiasih, E., & Atmaji, F. T. D. (2021). *Proposed Maintenance Policy Using Reliability Centered Maintenance (RCM) Method With FMECA Analysis: A Case Study Of Automotive Industry*. *IOP Conference Series: Materials Science and Engineering*, 1034(1), 012111. <https://doi.org/10.1088/1757-899x/1034/1/012111>
- Fang, F., Zhao, Z. J., Huang, C., Zhang, X. Y., Wang, H. T., & Yang, Y. J. Y. (2019). *Application Of Reliability Centered Maintenance In Metro Door System*. *IEEE Access*, 7, 186167–186174. <https://doi.org/10.1109/ACCESS.2019.2960521>
- Haris, S. T. P., As'Adi, M., & Montreano, D. (2021). *Machine Maintenance Planning in Manufacturing Company Using RCM II Methods*. *Journal of Physics: Conference Series*, 1899(1). <https://doi.org/10.1088/1742-6596/1899/1/012085>
- Hurisandi, V., & Ulkhaq, M. M. (2017). Analisis Efektivitas Mesin Delphi di PT Djarum Kudus Dengan Metode *Overall Equipment Effectiveness* Dan *Cause Effect Diagram*. *Industrial Engineering Online Journal*, 1–7.
- Isfi, M. Z. F., Kamal, D. M., & Apriana, A. (2022). Perencanaan *Preventive Maintenance* Pada Mesin *Speedmaster CDL 102* Di PT X Dengan Metode *Reliability Centered Maintenance* (RCM). 296–305.
- Kurniawan, D., Trismawati., & Prihatiningsih, T. (2021). Perbaikan Perawatan Mesin Rotary Lathe dengan Metode *Reliability Centered Maintenance* (RCM) Menggunakan Pendekatan *Overall Equipment Effectiveness* (OEE). *Jurnal SENOPATI: Sustainability, Ergonomics, Optimization, and Application of Industrial Engineering*, 2(2), 82–91. <https://doi.org/10.31284/j.senopati.2021.v2i2.1488>
- Marbun, N, J., Juni, S., & Tahir, T. (2022). *Preventive Maintenance* Mesin Press

- Hydraulic Limbah Spent Bleaching Earth Menggunakan Metode Reliability Centered Maintenance di PT Mega Green Technology Dumai.* 145–155.
- Martins, L., Silva, F. J. G., Pimentel, C., Casais, R. B., & Campilho, R. D. S. G. (2020). *Improving Preventive Maintenance Management In An Energy Solutions Company. Procedia Manufacturing*, 51(2019), 1551–1558. <https://doi.org/10.1016/j.promfg.2020.10.216>
- Nugroho, R. D., Rarindo, H., Setiawan, A., & Yudianto, E. (2022) *Metode Reliability Centered Maintenance Untuk Keandalan Perawatan Ketel Uap Pada PT “X”.* *Jurnal Teknologi*, 16(1), 2022.
- Panjaitan, I. G., Junaidi, & Kurniawan, F. A. (2022). *Analisis Pemeliharaan CGR (Compact Gas Ramp) Menggunakan Metode Reliability Centered Maintenance (RCM) di PLTMG Balai Pungut-Duri.* 17(3), 1–5.
- Patil, S. S., & Bewoor, A. K. (2022). *Optimization Of Maintenance Strategies For Steam Boiler System Using Reliability Centered Maintenance (RCM) Model – A Case Study From Indian Textile Industries. International Journal of Quality and Reliability Management*, 39(7), 1745–1765. <https://doi.org/10.1108/IJQRM-07-2021-0216>
- Patil, S. S., Bewoor, A. K., Kumar, R., Ahmadi, M. H., Sharifpur, M., & PraveenKumar, S. (2022). *Development Of Optimized Maintenance Program For A Steam Boiler System Using Reliability Centered Maintenance Approach. Sustainability (Switzerland)*, 14(16). <https://doi.org/10.3390/su141610073>
- Ramere, M. D., & Laseinde, O. T. (2021). *Optimization Of Condition Based Maintenance Strategy Prediction For Aging Automotive Industrial Equipment Using FMEA. Procedia Computer Science*, 180, 229–238. <https://doi.org/10.1016/j.procs.2021.01.160>
- Raharja, I. P., Suardika, I. B., & Galuh, H. W. (2021). *Analisis Sistem Perawatan Mesin Bubut Menggunakan Metode RCM (Reliability Centered Maintenance) di CV Jaya Perkasa Teknik.* 39–48.
- Sembiring, N., Buchari, & Hermansah. (2021). *Application Of Reliability Engineering Method in Machine Maintenance. IOP Conference Series: Materials Science and Engineering*, 1122(1), 012053. <https://doi.org/10.1088/1757-899x/1122/1/012053>
- Setiawan, D., Jusolihun, N., & Cahyo, W. N. (2019). *Maintenance System Design On Air Jet Loom (AJL) Machine Using Reliability Centered Maintenance (RCM) Method. IOP Conference Series: Materials Science and Engineering*, 673(1). <https://doi.org/10.1088/1757-899X/673/1/012102>
- Sinar, A., Subekti, A., & Setiawan, P. A. (2018). *Perencanaan Kegiatan Perawatan dengan Metode RCM II (Reliability Centered Maintenance) dan Penentuan Persediaan Suku Cadang Pada Boiler Perusahaan Rokok. Conference on Safety Engineering and Its Application*, 1(1), 341–347.
- Situngkir, D. I., Matondang, R., & Nazaruddin. (2017). *Maintenance Strategy Improvement Design in Cigarette Paper Machine Station.* 6(07), 405–409.
- Sodikin, J., & Jati, U. S. (2022). *Analisa Kerusakan Transmisi Otomatis dengan Metode Failures Mode and Effects Analysis (FMEA) dan Logic Tree Anaysis (LTA). Accurate: Journal of Mechanical Engineering and Science*, 3(1), 13–

21. <https://doi.org/10.35970/accurate.v3i1.1510>
- Sunaryo., Japri., Yuhelson., & Hakim, L. (2021). Implementasi RCM Pada Mesin Diesel Deutz 20 kVA. *IO(1)*, 42–52.
- Suwandy, R. (2019). Analisa Perawatan Mesin Digester dengan Metode *Reliability Cenytered Maintenance* (RCM) pada PTPN II Pagara Merbau.
- Syafei, M, I., & Suhendar, E. (2022). Perencanaan Perawatan Mesin dengan Pendekatan Metode *Reliability Centered Maintenance* (RCM) dan *Maintenance Value Stream Map* (MVSM). 7.
- Utama, D. W. (2022). Perancangan *Preventive Maintenace* Mesin *Screw Press* dengan Metode *Reliability Centered Maintenance*. *Industrial Engineering System and Management Journal*, 3(1), 92–101. <https://www.doi.org/10.22303/iesm.3.1.2022.92-101>
- Wiratama, N, A., Apriana, A., & Rahayu, M. (2022). Perencanaan *Preventive Maintenance* Unit Dump Truk Dengan Metode *Reliability Centered Maintenance* (RCM) di PT X. *Oleh* : 66–72.
- Wulandari, S. A. (2018). Analisis Proses Perawatan Mesin Giling Tebu Dengan Metode *Failure Mode and Effect Analysis* (FMEA) Dan *Logic Tree Analysis* (LTA).
- Yang, Y. J., Zhang, X. Y., Zhao, Z. J., Wang, G. H., He, Y. J., Wu, Y. L., & Li, J. (2020). *Applying Reliability Centered Maintenance (RCM) to Sampling Subsystem in Continuous Emission Monitoring System*. *IEEE Access*, 8, 55054–55062. <https://doi.org/10.1109/ACCESS.2020.2980630>
- Yanti, M, A., & Sugianto, W. (2020). Usulan Peningkatan Kinerja Mesin Pengemas Rokok Pada PT XYZ. *Comasie*, 3(3), 21–30.
- Zaelani, A, A, B., & Sudarmawan, G. (2019). Jadwal Pemeliharaan *Preventive Intermac Slitting ISL-130SFA8* di PT X. 826–830.