

ABSTRAK

Argy Dwihanggara, 2026. Analisis *Maintenance* pada Mesin *Mixing* Menggunakan Metode *Reliability Centered Maintenance* (RCM) dan *Life Cycle Cost* (LCC) di PT. Citra Indobeton Abadi. Program Studi Teknik Industri, Fakultas Teknik, Universitas PGRI Madiun (2026). Pembimbing (I) Aan Zainal Muttaqin, S.T., M.T., IPP., Pembimbing (II) Doni Susanto, S.Pd., M.Pd.

Keandalan mesin merupakan faktor penting dalam menjaga kelancaran proses produksi beton siap pakai (*ready mix*). Pada PT. Citra Indobeton Abadi, mesin *mixing* memiliki kontribusi biaya perbaikan tertinggi dibandingkan unit lainnya sehingga diperlukan strategi pemeliharaan yang mampu meningkatkan keandalan mesin sekaligus mengoptimalkan biaya pemeliharaan. Penelitian ini bertujuan mengidentifikasi komponen kritis dan pola kegagalan, menganalisis tingkat keandalan mesin berdasarkan nilai Mean Time to Failure (MTTF), Mean Time to Repair (MTTR), dan Mean Time Between Failure (MTBF), serta menentukan strategi *maintenance* yang optimal menggunakan metode *Reliability Centered Maintenance* (RCM) dan *Life Cycle Cost* (LCC). Penelitian menggunakan pendekatan kuantitatif dengan data primer melalui observasi dan wawancara serta data sekunder berupa riwayat kerusakan, *downtime*, waktu perbaikan, dan biaya *maintenance* periode Januari–Desember 2025. Hasil penelitian menunjukkan bahwa komponen *bearing* merupakan komponen paling kritis dengan nilai Risk Priority Number (RPN) sebesar 180. Analisis keandalan menghasilkan nilai MTTF sebesar 278,06 jam, MTTR sebesar 3,15 jam, dan MTBF sebesar 281,21 jam. Analisis LCC menunjukkan alternatif terbaik diperoleh pada umur mesin 18 tahun dengan satu mekanik dan total *Life Cycle Cost* sebesar Rp593.949.395. Integrasi metode RCM dan LCC menghasilkan rekomendasi strategi *preventive maintenance* yang mampu meningkatkan keandalan mesin dan mengoptimalkan biaya pemeliharaan.

Kata Kunci: *Reliability Centered Maintenance* (RCM), *Life Cycle Cost* (LCC), FMEA, keandalan mesin, *preventive maintenance*.

ABSTRACT

Argy Dwihanggara, 2026. *Maintenance Analysis of the Mixing Machine Using the Reliability Centered Maintenance (RCM) and Life Cycle Cost (LCC) Methods at PT. Citra Indobeton Abadi. Industrial Engineering Study Program, Faculty of Engineering, Universitas PGRI Madiun (2026). Supervisor I: Aan Zainal Muttaqin, S.T., M.T., IPP. Supervisor II: Doni Susanto, S.Pd., M.Pd.*

Machine reliability is a crucial factor in maintaining the continuity of ready-mix concrete production. At PT. Citra Indobeton Abadi, the mixing machine contributes the highest maintenance costs among all production units, requiring an effective maintenance strategy to improve machine reliability while optimizing maintenance costs. This study aims to identify critical components and failure modes, analyze machine reliability based on the Mean Time to Failure (MTTF), Mean Time to Repair (MTTR), and Mean Time Between Failures (MTBF), and determine the optimal maintenance strategy using the Reliability Centered Maintenance (RCM) and Life Cycle Cost (LCC) methods. This research employed a quantitative approach using primary data obtained through observations and interviews, as well as secondary data consisting of machine failure records, downtime, repair time, and maintenance costs from January to December 2025. The results indicate that the bearing is the most critical component, with a Risk Priority Number (RPN) of 180. Reliability analysis yielded an MTTF of 278.06 hours, an MTTR of 3.15 hours, and an MTBF of 281.21 hours. The LCC analysis identified the optimal alternative at the 18th year of machine operation with one mechanic, resulting in a minimum life cycle cost of IDR 593,949,395. The integration of the RCM and LCC methods provides an effective preventive maintenance strategy to improve machine reliability while optimizing maintenance costs.

Keywords: *Reliability Centered Maintenance (RCM), Life Cycle Cost (LCC), Failure Mode and Effect Analysis (FMEA), machine reliability, preventive maintenance.*