

**ANALISIS EFEKTIVITAS MESIN *OPEN TOP ROLLER* DAN
IDENTIFIKASI *SIX BIG LOSSES* DI PT PERKEBUNAN
NUSANTARA IV REGIONAL IV UNIT USAHA DANAU
KEMBAR**

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**DEPARTEMEN TEKNIK INDUSTRI
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*Sebagai Salah Satu Syarat untuk Menyelesaikan Program Sarjana pada
Departemen Teknik Industri Fakultas Teknik Universitas Andalas*



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ABSTRAK

Kegiatan produksi teh di PT Perkebunan Nusantara IV Regional IV Unit Usaha Danau Kembar sangat bergantung pada kinerja mesin, terutama sistem mesin Open Top Roller (OTR) pada tahap awal penggilingan. Berdasarkan data historis tahun 2025, enam unit OTR mengalami 43 kejadian kerusakan dengan total downtime 519 jam. Kondisi tersebut menunjukkan perlunya evaluasi efektivitas sistem mesin untuk mengetahui kerugian yang memengaruhi kinerja proses produksi.

Penelitian ini bertujuan mengukur efektivitas sistem mesin OTR, mengidentifikasi six big losses, serta menyusun usulan perbaikan berdasarkan penyebab prioritas. Pengukuran dilakukan menggunakan Overall Equipment Effectiveness (OEE) dengan basis machine-hour yang terdiri atas availability, performance efficiency, dan quality rate. Penyebab kerugian dominan diidentifikasi menggunakan fishbone diagram dan diprioritaskan melalui Failure Mode and Effects Analysis (FMEA) berdasarkan Risk Priority Number (RPN), critical value sebagai screening awal, serta validasi pihak perusahaan.

Hasil penelitian menunjukkan rata-rata bulanan OEE sebesar 66,75%, dengan rata-rata availability 96,52%, performance efficiency 69,18%, dan quality rate 100%. Secara agregat tahunan, nilai OEE diperoleh sebesar 66,07%. Kerugian utama berasal dari reduced speed losses dengan rata-rata bulanan 29,77% dan equipment failure losses sebesar 3,48%. Secara agregat tahunan, kedua kerugian tersebut masing-masing sebesar 30,68% dan 3,27%. Hasil FMEA menetapkan sembilan cause of failure sebagai prioritas akhir. Usulan perbaikan meliputi standar interval pemeriksaan dan perawatan komponen, checksheet kesiapan operasi, checksheet pembersihan mesin dan area kerja, SOP persiapan dan pembersihan bahan baku, serta checksheet pemantauan kecepatan dan kestabilan mesin. Usulan tersebut dirancang untuk mendukung peningkatan efektivitas dan pemeliharaan sistem OTR yang lebih terstruktur.

Kata Kunci: Overall Equipment Effectiveness (OEE), Six Big Losses, Fishbone Diagram, FMEA, Mesin OTR.

ABSTRACT

Tea production activities at PT Perkebunan Nusantara IV Regional IV, Danau Kembar Business Unit, depend heavily on machine performance, particularly the *Open Top Roller* (OTR) system used in the initial rolling stage. Based on historical data from 2025, the six OTR units experienced 43 failure events with a total *downtime* of 519 hours. This condition indicates the need to evaluate the effectiveness of the machine system to identify losses affecting production performance.

This study aims to measure the effectiveness of the OTR machine system, identify the *six big losses*, and develop improvement proposals based on priority causes. The measurement was conducted using *Overall Equipment Effectiveness* (OEE) on a *machine-hour* basis, consisting of *availability*, *performance efficiency*, and *quality rate*. The dominant losses were identified using a *fishbone diagram* and prioritized through *Failure Mode and Effects Analysis* (FMEA) based on the *Risk Priority Number* (RPN), *critical value* as an initial screening criterion, and company validation.

The results show an average monthly OEE of 66,75%, with an average *availability* of 96,52%, *performance efficiency* of 69,18%, and *quality rate* of 100%. The annual aggregate OEE was 66,07%. The main losses were *reduced speed losses* with a monthly average of 29,77% and *equipment failure losses* with a monthly average of 3,48%. On an annual aggregate basis, these losses were 30,68% and 3,27%, respectively. The FMEA identified nine *causes of failure* as final priorities. The proposed improvements include standard inspection and maintenance intervals, an operational readiness checksheet, a machine and work-area cleaning checksheet, a raw material preparation and cleaning SOP, and a machine speed and stability monitoring checksheet. These proposals are designed to support improved effectiveness and a more structured OTR maintenance system.

Keywords: Overall Equipment Effectiveness (OEE), Six Big Losses, Fishbone Diagram, FMEA, OTR Machine.