

Executive Summary – Production Performance Analysis & Continuous Improvement

Business Context

This project analyzes production performance in a manufacturing environment using minute-level operational data to evaluate equipment effectiveness, identify performance loss drivers, and support continuous improvement decisions.

Analytical Approach

The analysis followed an end-to-end framework covering data validation, OEE decomposition, downtime root cause analysis, statistical process control (SPC), and executive dashboard development.

Key Findings

- Availability is the primary contributor to OEE loss, while performance and quality remain consistently high.
- Machine M1 contributes approximately two-thirds of total downtime and is the main improvement priority.
- Downtime patterns are machine-specific, driven by starvation, electrical, changeover, and quality-related issues.
- SPC analysis confirms the process is statistically stable with no special-cause variation detected.
- Performance losses are operational rather than inherent to process instability.

Business Implications

Improvement initiatives should prioritize targeted downtime reduction and availability optimization instead of process parameter adjustments. SPC serves as a monitoring and early warning tool, while RCA guides corrective actions.

Recommended Actions

1. Improve upstream material flow to reduce starvation.
2. Strengthen preventive maintenance and electrical reliability.
3. Standardize and optimize changeover procedures.
4. Maintain SPC-based monitoring for early detection.

Value Delivered

This project demonstrates a complete analytics-to-action workflow, converting raw production data into executive-ready insights and decision support tools applicable to manufacturing operations and continuous improvement programs.