
Total Productive Maintenance (TPM) Pillar Structure Policy

1.0 Program Objective & Scope

The objective of this Total Productive Maintenance (TPM) Pillar Structure Policy is to establish a standardized framework for implementing and sustaining TPM across all production and material handling assets within the facility. TPM is a holistic approach to equipment management that aims to achieve zero breakdowns, zero defects, and zero accidents by engaging all employees—from operators to senior leadership—in proactive maintenance and continuous improvement. This policy applies to all manufacturing lines, packaging equipment, conveyors, robotics, and critical utilities (e.g., compressed air, HVAC, chillers) within the plant. The scope includes the deployment of the eight

TPM pillars: Autonomous Maintenance, Planned Maintenance, Focused Improvement, Quality Maintenance, Early Equipment Management, Training & Education, Safety, Health & Environment, and TPM in Administration. Each pillar is assigned a cross-functional team responsible for driving specific loss-reduction activities. The program aligns with the plant's overall reliability strategy and sustainability goals, targeting a 20% reduction in unplanned downtime and a 15% improvement in Overall Equipment Effectiveness (OEE) within the first 18 months of implementation.

2.0 Key Performance Indicators (KPIs) & Metrics

Success of the TPM pillar structure is tracked through the following

KPIs and metrics: - Overall Equipment Effectiveness (OEE): Calculated as $\text{Availability} \times \text{Performance} \times \text{Quality}$. Availability = $(\text{Operating Time} / \text{Planned Production Time}) \times 100\%$. Performance = $(\text{Ideal Cycle Time} \times \text{Total Parts Produced}) / \text{Operating Time} \times 100\%$. Quality = $(\text{Good Parts Produced} / \text{Total Parts Produced}) \times 100\%$.

- Mean Time Between Failures (MTBF): Total operating time / number of breakdowns.

Target: ≥ 500 hours per asset.

- Mean Time To Repair (MTTR): Total downtime due to repairs / number of repairs.

Target: ≤ 45 minutes.

- Planned

Maintenance Compliance: $(\text{Number of PM tasks completed on time} / \text{Total scheduled PM tasks}) \times 100\%$.

Target: $\geq 95\%$.

- Autonomous

Maintenance Step Completion: Percentage of operators trained and certified on each step of autonomous maintenance (e.g., initial cleaning, countermeasures, standards).

Target: 100% within 12 months.

- Number of

Kaizen Events per Quarter: Minimum 2 per pillar per quarter.

- Safety Incident Rate (Lost Time Injuries per 200,000 hours worked).

Target: Zero.

- Energy Consumption per Unit Produced (kWh/unit): Tracked to identify waste reduction from TPM activities.

- Defect Rate (PPM): Parts per million defective.

Target: ≤ 500 ppm.

- 5S Audit

Score: Average score across all work areas.

Target: ≥ 4.0 out of 5.0.

All metrics are reviewed monthly by the TPM Steering Committee and displayed on a central TPM dashboard.

3.0 Roles & Responsibilities

The following roles are critical to the

TPM pillar structure: - Plant

Manager: Provides executive sponsorship, approves resource allocation, and chairs the TPM Steering Committee. Ensures TPM goals are integrated into the plant's annual business plan.

- Maintenance

Manager: Oversees the Planned Maintenance and Autonomous Maintenance pillars. Coordinates with pillar leads to schedule PMs, manage spare parts inventory, and ensure data integrity in the CMMS (ServiceGrid). Reports MTBF, MTTR, and PM compliance monthly.

- TPM Coordinator (Reliability Engineer): Facilitates pillar meetings, tracks progress against KPIs, and leads training on TPM methodology. Acts as the primary point of contact for all pillar leads.

- Pillar Leads (one per pillar): Cross-functional team leaders responsible for driving pillar activities, conducting kaizen events, and reporting results to the Steering Committee. Each lead must have at least 40 hours of TPM training.

- Machine

Operators: Perform daily autonomous maintenance tasks (cleaning, inspection, lubrication), report abnormalities via the CMMS, and participate in kaizen events. Operators are expected to complete step-based training and certification.

- Quality

Assurance Manager: Leads the Quality Maintenance pillar, focusing on defect reduction and process capability. Works with operators to establish condition-based quality checks.

- Safety

Manager: Leads the Safety, Health & Environment pillar, ensuring all TPM activities comply with OH&S regulations and that risk assessments are completed for every new maintenance procedure.

- Training

Coordinator: Manages the Training & Education pillar, maintaining training matrices, scheduling certification sessions, and tracking operator skill progression.

- Engineering

Manager: Leads the Early Equipment Management pillar, ensuring new equipment is designed for maintainability and that lifecycle cost analysis is performed before capital purchases.

4.0 Program Execution & Data Collection

Execution of the TPM pillar structure follows a phased approach:

Phase 1 – Foundation (Months 1-3): Conduct a baseline OEE assessment for all critical assets. Form eight pillar teams with designated leads. Deliver 40-hour TPM awareness training to all production and maintenance staff. Implement 5S in all work areas. Begin step 1 of Autonomous Maintenance (initial cleaning and inspection) on pilot equipment.

Phase 2 – Pillar Deployment (Months 4-12): Each pillar executes its specific roadmap:

- Autonomous

Maintenance: Operators progress through 7 steps (initial cleaning, countermeasure sources of contamination, cleaning/lubrication standards, general inspection, autonomous inspection, standardization, autonomous management).

- Planned

Maintenance: Maintenance team establishes time-based and condition-based PM schedules in ServiceGrid. PM tasks include vibration analysis, thermography, oil analysis, and visual inspections.

- Focused

Improvement: Conduct kaizen events targeting the six big losses (breakdowns, setup/adjustments, idling/minor stops, reduced speed, defects/rework, startup losses). Use root cause analysis (5-Why, Fishbone) to eliminate chronic losses.

- Quality

Maintenance: Set up condition-based quality checks (e.g., torque verification, dimensional gauging) and implement poka-yoke devices.

- Early

Equipment Management: Develop maintenance prevention checklists for new equipment procurement. Review lifecycle cost data.

- Training & Education: Create skill matrices for operators and maintenance technicians. Deliver on-the-job training and certification exams.

- Safety, Health & Environment: Conduct risk assessments for all TPM tasks. Integrate lockout/tagout procedures into PM work orders.

- TPM in

Administration: Apply TPM principles to administrative processes (e.g., procurement, scheduling) to reduce lead times and errors.

Data Collection: All PM completion data, breakdown records, OEE calculations, and defect logs are entered into ServiceGrid (CMMS) daily. Operators record autonomous maintenance findings on digital checklists via tablets. Pillar leads submit monthly progress reports to the TPM Coordinator. Energy data is pulled from utility meters and correlated with production output.

Phase 3 – Sustain & Improve (Months 13+): Conduct quarterly TPM audits using the JIPM (Japan Institute of Plant Maintenance) criteria. Pillar teams rotate focus areas based on loss analysis. Annual TPM awards recognize top-performing teams.

5.0 Review, Reporting & Continuous Improvement

Data collected through the TPM program is reviewed at multiple levels:

- Daily: Shift supervisors review OEE and downtime data from the previous shift during morning huddles. Operators discuss abnormalities and countermeasures.
- Weekly: Pillar teams meet for 30 minutes to review progress on kaizen events, PM compliance, and training completion. Action items are tracked in ServiceGrid.
- Monthly: The TPM Steering Committee (Plant Manager, Maintenance Manager, TPM Coordinator, Pillar Leads) reviews the TPM dashboard, including OEE trends, MTBF/MTTR, defect rates, and safety incidents. Decisions on resource reallocation or capital expenditure (CapEx) are made based on loss analysis. For example, if a specific asset shows chronic breakdowns, a focused improvement kaizen event is initiated, and if root cause indicates design flaw, a CapEx request for equipment modification is submitted.
- Quarterly: Formal TPM audit using JIPM criteria. Results are shared with corporate leadership. Gaps are documented in an improvement register.
- Annually: Comprehensive review of TPM program effectiveness. Update the TPM master plan for the next year. Benchmark OEE against industry standards (e.g., World Class OEE > 85%).

Continuous Improvement Loop: All pillar teams use the PDCA (Plan-Do-Check-Act) cycle. Kaizen events are documented with before/after metrics. Successful countermeasures are standardized and rolled out to similar assets. The TPM Coordinator maintains a lessons-learned database accessible via ServiceGrid. Any significant improvement (e.g., >10% OEE gain) triggers a review for potential replication across the plant. CapEx proposals must include a TPM impact assessment showing how the investment reduces the six big losses. The ultimate goal is to embed TPM into the plant's culture, achieving autonomous maintenance by operators and zero-breakdown reliability.

Regulatory Disclaimer: This program document is a generic strategic template. The end-user assumes all liability for aligning these metrics, KPIs, and reliability frameworks with specific corporate goals and OEM engineering standards.