Certified in Planning and Inventory Management

Total Productive Maintenance and Health, Safety, and Environment

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Total Productive Maintenance and Health, Safety, and Environment

1. Foundations of Total Productive Maintenance (TPM)

TPM is a comprehensive approach that aims to maximize equipment effectiveness by involving all employees, from operators to leadership. It focuses on preventing breakdowns, reducing variability, and eliminating losses across the production system. TPM's philosophy is built around proactive and preventive maintenance rather than reactive repairs. For CPIM, understanding TPM's core principle of engaging operators in basic care of equipment is crucial. TPM aligns maintenance with production goals, supports continuous improvement, and enhances productivity, quality, and safety.

2. The Eight Pillars of TPM

The eight pillars form the framework for TPM: Autonomous Maintenance, Planned Maintenance, Quality Maintenance, Focused Improvement, Early Equipment Management, Training and Education, Safety/Health/Environment, and Administrative TPM. Together, these pillars drive holistic improvement in equipment reliability and workplace culture. CPIM candidates should understand what each pillar addresses and how they work together to reduce downtime, improve quality, and empower workers. These pillars reinforce continuous improvement and ensure maintenance practices support overall business objectives.

3. Overall Equipment Effectiveness (OEE)

OEE is a key performance metric in TPM that measures how effectively a manufacturing operation uses its equipment. It combines availability, performance, and quality into one

comprehensive score. A high OEE indicates optimized equipment use and minimal waste. CPIM professionals must understand how to calculate OEE, interpret its components, and identify losses such as breakdowns, speed reductions, and defects. OEE provides insight into improvement opportunities and helps track the impact of TPM initiatives on equipment performance.

4. Autonomous Maintenance

Autonomous Maintenance trains operators to perform routine tasks such as cleaning, lubricating, inspecting, and minor repairs. This builds ownership and ensures equipment remains in optimal condition. It frees maintenance teams to focus on complex tasks and root cause investigations. CPIM candidates must understand the benefits of Autonomous Maintenance, which include reduced downtime, early detection of abnormalities, and improved operator skills. It is a cornerstone of TPM and essential for sustaining high-performing manufacturing systems.

5. Planned Maintenance

Planned Maintenance focuses on conducting maintenance tasks at optimal intervals based on equipment condition and historical data. It includes preventive, predictive, and corrective activities. CPIM professionals should understand how planned maintenance reduces unplanned downtime, extends equipment life, and improves system reliability. Techniques such as predictive analytics, vibration analysis, and thermal imaging can be used. Planned maintenance ensures maintenance work is scheduled with minimal disruption to production and supports long-term cost efficiency.

6. Predictive Maintenance Technologies

Predictive maintenance (PdM) uses real-time data and condition monitoring technologies to identify early signs of equipment failure. Techniques include vibration monitoring, thermography, oil analysis, and sensor-based diagnostics. CPIM candidates should understand how predictive maintenance supports reliability, reduces unplanned downtime, and optimizes maintenance scheduling. It allows organizations to repair equipment only when needed, improving maintenance efficiency and lowering costs. As Industry 4.0 technologies grow, predictive maintenance is increasingly critical to operations.

7. Root Cause Analysis (RCA) in TPM

RCA identifies the underlying causes of equipment failures and chronic issues. Tools include 5 Whys, fishbone diagrams, and fault-tree analysis. CPIM professionals must understand how RCA supports Focused Improvement by eliminating recurring problems rather than addressing symptoms. RCA leads to more reliable equipment, lower maintenance costs, and improved productivity. It is a core component of TPM and ensures continuous learning from failures.

8. Early Equipment Management

Early Equipment Management applies TPM principles to the design and installation of new equipment. It ensures maintainability, reliability, accessibility, and operator friendliness are built into the design. CPIM candidates should understand how involving operators and maintenance teams early in the design process reduces long-term costs and prevents future operational problems.

This concept supports smoother start-ups, shorter learning curves, and improved overall lifecycle performance.

9. Focused Improvement (Kaizen)

Focused Improvement targets the elimination of the "Six Big Losses" that reduce equipment productivity: breakdowns, setup/changeover losses, minor stoppages, speed losses, quality defects, and startup losses. CPIM candidates should understand how Kaizen teams analyze data, identify inefficiencies, and implement cost-effective improvements. Focused Improvement enhances production flow, boost OEE, and strengthens cross-functional collaboration. It is a continuous effort to achieve incremental performance gains.

10. Health, Safety, and Environment (HSE) Management Systems

HSE systems ensure compliance with laws, protect worker wellbeing, and minimize environmental impacts. Frameworks like ISO 45001 (Safety) and ISO 14001 (Environment) guide organizations toward structured and proactive approaches. CPIM candidates should understand how integrating HSE into operations supports risk control, sustainability, and regulatory compliance. HSE systems also reduce workplace accidents, improve culture, and contribute to long-term operational stability.

11. Hazard Identification and Risk Assessment (HIRA)

HIRA is the systematic process of identifying hazards, assessing risks, and determining mitigation measures. Hazards include physical, chemical, biological, ergonomic, and environmental factors. CPIM professionals must

understand how to evaluate risk likelihood and severity, prioritize controls, and implement preventive strategies. Effective risk assessment supports safer operations, reduces unexpected disruptions, and strengthens organizational resilience.

12. Safety Culture and Employee Engagement

A strong safety culture emphasizes shared responsibility, open communication, and proactive hazard reporting. CPIM candidates should understand how leadership commitment, training, and consistent enforcement contribute to a safer work environment. Employee engagement in safety initiatives reduces accidents, improves morale, and supports TPM goals. A strong safety culture ensures sustained compliance and operational excellence.

13. Environmental Sustainability Practices

Sustainability initiatives reduce waste, energy consumption, emissions, and water usage. CPIM professionals must understand the operational and regulatory drivers for environmental performance. Practices such as recycling, lean waste reduction, green procurement, and energy-efficient technology support long-term sustainability goals. Environmental stewardship also enhances brand reputation and reduces operational costs.

14. Regulatory Compliance and Standards

Organizations must comply with local, national, and international regulations related to HSE, such as OSHA standards, environmental protection laws, and hazardous material rules. CPIM candidates must understand the importance of compliance to avoid fines, legal liability, and

operational shutdowns. Compliance also enhances worker safety and environmental protection. Staying updated on regulations is crucial for effective HSE management.

15. Emergency Preparedness and Response
Emergency response plans outline procedures for fires, chemical spills, equipment failures, natural disasters, and workplace injuries. CPIM professionals must understand the components of an effective emergency plan, including communication protocols, roles, training, and drills. Preparedness reduces response time, limits damage, and protects workers and assets. It is a core part of comprehensive HSE management.

16. Ergonomics and Human Factors Engineering
Ergonomics focuses on designing work environments that match human capabilities and limitations. CPIM candidates must understand how improper ergonomics leads to injuries, fatigue, and reduced productivity. Ergonomic improvements—such as workspace redesign, lifting aids, and workstation adjustments—enhance comfort and reduce musculoskeletal disorders. This contributes to safer operations and higher performance.

17. Waste and Pollution Control
Effective waste management includes controlling solid waste, wastewater, emissions, and hazardous materials. CPIM professionals should understand how lean principles, process optimization, and recycling programs reduce environmental impact and operational costs. Pollution control ensures compliance with environmental regulations while supporting sustainability goals.

18. Safety Performance Metrics

Metrics such as Total Recordable Incident Rate (TRIR), near-miss reporting, lost-time injuries, and audit scores help measure safety performance. CPIM candidates must understand how these metrics support continuous improvement and guide decision-making. Monitoring safety metrics helps identify risks early, prioritize interventions, and reinforce preventive practices.

19. Training and Competency Development

Training ensures that employees understand safety procedures, equipment operation, emergency response, and maintenance responsibilities. CPIM professionals must recognize the importance of continuous competency development to support TPM and HSE goals. Effective training improves engagement, reduces accidents, and enhances operational performance. It also ensures consistency and reduces human errors.

20. Integrated TPM and HSE Strategy

Integrating TPM and HSE ensures that maintenance, reliability, safety, and environmental performance support one another. CPIM candidates should understand how combining these strategies promotes a safer, more efficient workplace. For example, well-maintained equipment reduces accidents, and strong safety systems support reliable operations. Integration enhances productivity, reduces risk, and strengthens organizational resilience.

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Micro-Learning Programs in Supply Chain Management

1. Fundamentals of Supply Chain Management
2. Supply Chain Planning and Optimization
3. Demand Forecasting Techniques
4. Inventory Control and Management
5. Distribution and Logistics Strategy
6. Warehouse Layout and Operations Efficiency
7. Supply Chain Risk Management
8. Supply Chain Performance Metrics (KPIs)
9. Lean Supply Chain Practices
10. Agile and Responsive Supply Chains
11. Sales and Operations Planning (S&OP)
12. Supply Chain Network Design
13. Supply Chain Digital Transformation
14. AI and Data Analytics in Supply Chain
15. Supply Chain Sustainability and Green Logistics
16. Reverse Logistics and Returns Management
17. Supply Chain Collaboration and Integration
18. Supplier Relationship Management in SCM
19. Global Supply Chain Strategy
20. Transportation Management Systems (TMS)
21. Inventory Optimization Models
22. Demand-Driven MRP (DDMRP) Concepts
23. Blockchain Applications in Supply Chain
24. Supply Chain Cost Reduction Techniques
25. SCOR Model and Process Improvement

Micro-Learning Programs in Supply Chain Management …

26. Capacity Planning and Resource Allocation
27. Managing Supply Chain Disruptions
28. End-to-End Supply Chain Visibility
29. Cold Chain Logistics Management
30. Supply Chain Compliance and Ethics
31. Import–Export Procedures and Documentation
32. Managing Third-Party Logistics (3PL) Providers
33. Supply Chain Collaboration Technologies
34. Production Planning and Scheduling
35. Strategic Supply Chain Design Using Case Studies
36. Circular Economy in Supply Chain
37. Vendor-Managed Inventory (VMI)
38. Transportation Optimization Techniques
39. E-Commerce Supply Chain Models
40. Omni-Channel Fulfillment Strategies
41. Warehouse Automation and Robotics
42. SCOR DS Roadmap for Supply Chain Excellence
43. Customer-Centric Supply Chain Strategies
44. Supply Chain Finance and Working Capital Management
45. Supply Chain Data Visualization Using Power BI
46. Strategic Sourcing in Supply Chain Context
47. Supply Chain Benchmarking and Best Practices
48. Integrated Business Planning (IBP)
49. Supply Chain in Crisis Management and Recovery
50. Future Trends and Technologies in Supply Chain

Micro-Learning Programs in Procurement

1. Fundamentals of Procurement Management
2. Strategic Sourcing and Category Management
3. Supplier Selection and Evaluation
4. Contract Management Essentials
5. Cost and Price Analysis in Procurement
6. Negotiation Strategies for Procurement Professionals
7. E-Procurement and Digital Tools
8. Procurement Planning and Budgeting
9. Risk Management in Procurement
10. Supplier Relationship and Performance Management
11. Sustainable and Ethical Procurement
12. Total Cost of Ownership (TCO) Analysis
13. Make-or-Buy Decision Frameworks
14. Procurement Policies and Governance
15. Procurement in Public vs. Private Sectors
16. Procurement Audit and Compliance
17. Procurement Data Analytics and Reporting
18. Procurement Scorecards and KPIs
19. Strategic Supplier Partnerships
20. Category Strategy Development
21. Managing Global and Offshore Procurement
22. Negotiation Simulation Workshop
23. Contract Law for Procurement Managers
24. Cost Reduction Strategies in Procurement
25. Supplier Risk Assessment Models

Micro-Learning Programs in Procurement …

26. Procurement Process Mapping and Improvement
27. Procurement Automation and AI Applications
28. Managing Procurement Teams Effectively
29. Procurement Ethics and Transparency
30. Procurement in the Digital Supply Chain
31. Vendor Consolidation Strategies
32. Spend Analysis and Optimization
33. Demand Forecasting for Procurement
34. E-Auction and Reverse Bidding Techniques
35. Inventory and Procurement Alignment
36. Procurement in Project-Based Organizations
37. Supplier Onboarding and Development
38. Procurement Market Intelligence
39. Measuring Supplier Innovation
40. Procurement in Times of Supply Disruption
41. Cross-Functional Collaboration in Procurement
42. Writing Effective RFPs, RFQs, and RFIs
43. Contract Negotiation Best Practices
44. Green Procurement and Circular Economy
45. Legal Aspects of Procurement Contracts
46. Performance-Based Contracting
47. Procurement Leadership and Strategic Influence
48. Cost Avoidance and Value Creation in Procurement
49. Managing Procurement with Power BI Dashboards
50. Future Skills and Trends in Procurement

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