Certified in Planning and Inventory Management

Lean

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Lean

1. Lean Philosophy and Principles

Lean is a continuous improvement philosophy that aims to deliver maximum customer value with minimum waste. It is built on five core principles: identify value, map the value stream, create flow, establish pull, and pursue perfection. Lean shifts organizations from traditional push-based systems to customer-driven processes. CPIM candidates must understand how Lean supports shorter lead times, improved quality, reduced inventory, and more agile supply chains. The philosophy encourages respect for people, problem-solving at the source, and continuous pursuit of better ways to work.

2. Types of Waste (Muda, Mura, Muri)

Waste is central to Lean thinking. **Muda** includes the seven traditional wastes—overproduction, waiting, transport, overprocessing, inventory, motion, and defects. **Mura** refers to unevenness or variation, while **Muri** refers to overburdening equipment or people. Mastering these helps CPIM learners identify inefficiencies and design processes that prevent unnecessary work, delays, or strain. Recognizing waste allows organizations to target improvement actions where they matter most. Lean systems strive to eliminate all three forms to achieve smooth flow, stable processes, and high-quality outcomes.

3. Value Stream Mapping (VSM)

VSM visually maps every step in the material and information flow from order to delivery. It distinguishes value-added from non-value-added activities and reveals

bottlenecks, delays, and inconsistencies. CPIM professionals use VSM to understand the entire supply chain, not just isolated processes. Creating current-state and future-state maps helps teams redesign processes to reduce waste, shorten lead times, and improve flow. VSM also supports cross-functional coordination, making it a powerful tool for strategic Lean planning.

4. 5S Workplace Organization

5S—Sort, Set in Order, Shine, Standardize, and Sustain—is a foundational Lean tool for creating organized, efficient, and safe workplaces. It minimizes search time, prevents errors, improves equipment reliability, and enhances morale. CPIM learners must understand how 5S supports visual management and forms the basis for more advanced Lean initiatives. Implementing and sustaining 5S requires discipline and employee involvement. A well-maintained 5S environment reduces waste, supports quality, and creates the foundation for continuous improvement.

5. Kaizen and Kaizen Events

Kaizen focuses on small, continuous improvements involving all employees. It encourages frequent problem-solving, idea generation, and experimentation. Kaizen events (or blitzes) are short, intense workshops that target specific issues such as lead time reduction, setup improvement, or layout redesign. CPIM candidates must understand how Kaizen supports cultural transformation by empowering teams to take ownership of improvements. It enhances engagement, reduces waste, and drives incremental gains that collectively deliver major performance improvements over time.

6. Pull Systems and Kanban

Pull systems ensure production is triggered by actual customer demand rather than forecasts. Kanban cards, bins, or digital signals control material replenishment and limit WIP. CPIM practitioners must know how Kanban supports inventory control, reduces overproduction, and stabilizes flow. It also makes production more responsive to demand changes and prevents bottlenecks. Kanban enables organizations to maintain optimal inventory levels while reducing lead times and improving throughput.

7. Continuous Flow and One-Piece Flow

Continuous flow aims to minimize interruptions, delays, and batching by ensuring materials move smoothly from step to step. One-piece flow reduces cycle time, improves quality, and increases flexibility by producing items one at a time rather than in batches. CPIM learners must understand how continuous flow improves visibility and responsiveness. Achieving flow may require layout changes, process redesign, cross-training, and equipment balancing. It is a core Lean goal and often the hardest to implement.

8. Takt Time

Takt time represents the pace at which products must be produced to meet customer demand. It is calculated as available production time divided by customer demand. CPIM candidates must understand how takt time guides line balancing, workforce planning, equipment loading, and scheduling. When processes align with takt, production flows smoothly and consistently. Deviations from takt reveal bottlenecks or underutilization, making it a powerful tool for analyzing performance and designing lean workflows.

9. Standard Work

Standard work documents the best known, safest, and most efficient method for performing a task. It ensures consistency, reduces variability, and provides a baseline for continuous improvement. CPIM candidates must understand components of standard work, including takt time alignment, work sequence, and in-process inventory limits. Standard work stabilizes processes so abnormalities are quickly visible and improvements become easier to implement. It is both a Lean tool and a cultural expectation.

10. SMED (Single-Minute Exchange of Die)

SMED reduces setup and changeover times to less than 10 minutes. It separates internal (machine stopped) and external (machine running) setup tasks and redesigns processes to streamline changeover. CPIM professionals must understand how SMED increases flexibility, reduces batch sizes, enables flow, and decreases downtime. SMED supports quick response manufacturing and improves capacity utilization. It is critical in environments with frequent product variations or short production runs.

11. Poka-Yoke (Error-Proofing)

Poka-yoke prevents mistakes or makes them immediately detectable. Devices, fixtures, sensors, or process designs ensure correct execution of steps. CPIM candidates must understand how poka-yoke prevents defects, reduces rework, and enhances reliability. Error-proofing supports “quality at the source,” reduces inspection needs, and builds confidence in processes. Implementing poka-yoke often requires creativity and teamwork but yields long-term quality benefits.

12. Heijunka (Production Leveling)
Heijunka smooths production by leveling volume and mix to match demand patterns. Instead of fluctuating production schedules, level loading creates stability, reduces variability, and enables balanced workloads. CPIM learners must know how heijunka reduces the need for excess inventory, prevents overburden, and improves flow. It requires flexible processes, small batch sizes, and fast changeovers. Heijunka is especially important in environments with variable demand.

13. Jidoka (Autonomation)
Jidoka enables machines or operators to stop production when abnormalities occur. It supports immediate problem-solving and prevents defective items from continuing down the line. CPIM candidates must understand how Jidoka enhances quality, empowers employees, and improves process reliability. It often includes automated detection such as sensors, andon lights, or shutdown mechanisms. Jidoka combines quality assurance with productivity and forms one of the two pillars of the Toyota Production System.

14. Andon Systems
Andon is a visual control system that signals the status of operations—normal, needs assistance, or stopped. It supports immediate response when issues occur, allowing supervisors or support teams to intervene quickly. CPIM professionals must understand how Andon improves communication, reduces downtime, and encourages operator responsibility. Andon boards or lights are essential in Lean environments to maintain flow, detect issues early, and reinforce a culture of transparency.

15. Visual Management

Visual management uses displays, color coding, floor markings, labels, dashboards, and real-time boards to make process status visible at a glance. CPIM candidates must understand how visual cues support standard work, reduce misunderstandings, promote safety, and enable faster decision-making. Visual controls bring abnormalities to the surface and reinforce discipline. They are essential for sustaining Lean improvements and maintaining operational stability.

16. Total Productive Maintenance (TPM)

TPM aims to maximize equipment availability through preventive and autonomous maintenance. Operators participate in routine cleaning, inspection, and minor maintenance tasks. CPIM learners must understand TPM pillars, including planned maintenance, focused improvement, and training. TPM reduces breakdowns, defects, and speed losses, improving OEE (Overall Equipment Effectiveness). Reliable equipment is essential for achieving flow and maintaining balanced lines.

17. Cellular Manufacturing

Cellular manufacturing arranges machines and workstations in sequence to support flow and minimize movement. Cells produce families of similar products using multi-skilled workers. CPIM candidates must understand how cellular layouts reduce transport waste, improve flexibility, and support one-piece flow. Cells enable higher productivity, faster changeovers, and stronger teamwork. They also enhance ownership and accountability in the workforce.

18. Lean Supply Chain Management

Lean extends beyond the factory to suppliers, logistics providers, and customers. CPIM candidates must understand how Lean enhances visibility, reduces inventory in the entire chain, synchronizes demand, and improves responsiveness. Techniques include supplier collaboration, JIT deliveries, milk runs, and standardized packaging. Lean supply chains minimize waste such as excess stock, long lead times, and redundant handling.

19. A3 Problem-Solving

A3 problem-solving uses a structured, one-page format to analyze issues and document improvement plans. It includes problem definition, root cause analysis, countermeasures, implementation plans, and follow-up. CPIM learners must understand how A3 supports communication, alignment, and clear thinking. It encourages concise documentation and disciplined problem-solving. A3 reports also serve as training tools and promote organizational learning.

20. Continuous Improvement Culture

A Lean culture supports teamwork, respect for people, empowerment, and shared responsibility for improvement. CPIM candidates must understand how leadership behaviors, communication, training, recognition, and problem-solving mindsets sustain Lean initiatives. Culture ensures Lean tools do not become short-term projects but long-term ways of thinking and working. A strong Lean culture drives innovation, reduces waste, and enhances competitiveness.

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49. Managing Procurement with Power BI Dashboards
50. Future Skills and Trends in Procurement

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