Certified in Planning and Inventory Management

Production Activity Control

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Production Activity Control

1. Role and Objectives of PAC

Production Activity Control (PAC) ensures that the execution of the production plan aligns with schedules, capacity, and resource availability. It translates MPS and MRP outputs into actionable shop-floor activities. PAC monitors, controls, and adjusts production orders, ensuring work progresses on time and within capacity limits. It balances competing goals—high throughput, low inventory, and high customer service. Mastery of PAC requires understanding its role in coordinating workers, machines, materials, and information flows, while rapidly responding to disruptions and maintaining efficient operations. PAC serves as the bridge between planning and real-time shop-floor performance.

2. Release of Work Orders

Work order release involves authorizing production to begin based on material availability, capacity readiness, and schedule priority. This step ensures that only feasible orders enter the shop floor, controlling work-in-process (WIP) and preventing congestion. Proper release timing reduces bottlenecks, stabilizes flow, and supports accurate lead time performance. Techniques such as input/output control and dispatching rules help planners decide when to release orders. A strong understanding of work order release is vital because premature release causes excess WIP and delays, while late release leads to stockouts and missed due dates.

3. Shop Floor Control Systems

Shop floor control systems track, manage, and report the status of production operations. They capture real-time data on machine utilization, labor time, queue lengths, order progress, and material movement. Modern systems may integrate MES (Manufacturing Execution Systems), barcoding, RFID, or IoT sensors to improve accuracy and visibility. Shop floor control helps PAC manage deviations by enabling timely corrective actions. These systems provide essential feedback loops to planning functions, ensuring that schedules reflect actual capacity and constraints. Mastery involves understanding system capabilities, data flows, and performance indicators used in shop-floor execution.

4. Dispatching and Dispatch Lists

Dispatching is the process of authorizing work to proceed on the shop floor and determining the sequence in which operations are performed. The dispatch list is the primary tool, showing prioritized jobs at a work center based on scheduling rules. Dispatching ensures work centers operate efficiently, remain aligned with due dates, and respond to real-time shop-floor conditions. Effective dispatching minimizes idle time, balances workloads, and prevents bottlenecks. Key rules include FCFS, SPT, EDD, CR, and slack time. Understanding dispatching techniques ensures the execution schedule remains feasible and synchronized with overall manufacturing priorities.

5. Priority Control and Sequencing Rules

Priority control determines which jobs should be processed first when multiple orders compete for the same resources. Sequencing rules such as First Come First Served (FCFS), Shortest Processing Time (SPT), Earliest Due Date (EDD), and Critical Ratio (CR) influence throughput, WIP, and customer service. Choosing the correct rule depends on objectives—minimizing tardiness, reducing queue time, or maximizing on-time delivery. Priority control is essential for managing shop-floor variability and handling resource conflicts. A strong grasp of sequencing strategies helps ensure timely completion of orders and aligns work center activities with business goals.

6. Input/Output Control (I/O Control)
Input/Output Control is a technique for managing work centers by comparing planned inputs (released work) with actual outputs (completed work). It ensures that WIP stays within acceptable limits and that production flows smoothly. I/O Control helps identify overloaded or underloaded work centers and supports decisions related to order release, capacity adjustments, and workload balancing. Regular review of I/O reports allows PAC teams to intervene early, preventing schedule delays or idle resources. Understanding I/O Control is critical for maintaining stable lead times and consistent production performance.

7. Queue Management and Queue Time Reduction
Queue management involves overseeing the waiting time of jobs before they are processed at work centers. Excessive queue time increases lead time, WIP levels, and operating costs. PAC aims to minimize queue lengths by balancing workloads, optimizing sequences, and maintaining realistic schedules. Techniques include workload leveling, buffer sizing, drum-buffer-rope synchronization, and capacity adjustments. Understanding queue behavior is critical

because queues naturally arise from variability in processing times, demand patterns, and resource availability. Effective queue management improves responsiveness and throughput while lowering inventory levels and improving on-time performance.

8. Bottleneck Identification and Management

Bottlenecks are resources whose limited capacity constrains overall throughput. PAC must identify bottlenecks early and manage them through prioritization, load balancing, overtime, offloading, or scheduling interventions. The Theory of Constraints (TOC) provides valuable tools—including drum-buffer-rope scheduling—to optimize performance around the bottleneck. PAC's role is to ensure bottlenecks are continuously productive, protected from disruptions, and synchronized with upstream and downstream operations. Mastering bottleneck management is essential for improving productivity, stabilizing flow, and increasing output without raising inventory or adding excessive capacity.

9. Work Center Loading and Capacity Control

Work center loading ensures that scheduled work does not exceed available capacity. PAC uses methods such as infinite loading (planning without considering capacity constraints) and finite loading (ensuring workloads fit actual capacity). Planners must understand capacity components—rated capacity, demonstrated capacity, utilization, and efficiency. Effective loading prevents bottlenecks, reduces lead time variability, and supports reliable schedules. Capacity control ensures that actual production stays aligned with planned capacity, requiring continual monitoring, adjustments, and communication with planning teams. Understanding loading techniques is vital for feasible and executable schedules.

10. Lead Time Management

Lead time management ensures that planned lead times reflect actual shop-floor performance. PAC monitors processing, move, queue, and wait times to ensure schedules remain accurate. Lead times affect MRP calculations, order release timing, WIP levels, and customer service performance. PAC uses historical data and feedback loops to adjust planned lead times to reality. Consistently overstating lead times leads to excess inventory, while understating them leads to delays and missed due dates. Mastering lead time management ensures the alignment of planning and execution across all production activities.

11. Production Reporting and Data Accuracy

Accurate production reporting is essential for evaluating performance, updating inventory balances, closing work orders, and feeding back data to MRP. Reports typically include labor time, machine time, scrap quantities, order progress, and completion status. Data inaccuracies can cause shortages, incorrect schedules, and financial discrepancies. PAC must ensure real-time, accurate capture of shop-floor data through automated systems such as MES, barcodes, and RFID. Understanding production reporting processes is crucial for maintaining the reliability of planning data and ensuring responsive execution.

12. Work-in-Process (WIP) Management
WIP management ensures that work-in-process inventory stays within optimal levels. Excess WIP increases lead times, space usage, and handling costs, while low WIP may lead to idle resources and production delays. PAC uses tools such as order release control, bottleneck management, and scheduling discipline to balance WIP levels. Techniques such as CONWIP and Kanban help regulate WIP in pull systems. Understanding WIP behavior is critical for maintaining smooth flow, reducing variability, and improving overall production responsiveness and efficiency.

13. PAC in Push vs. Pull Systems
PAC plays different roles in push (MRP-driven) and pull (JIT/Kanban-driven) environments. In push systems, PAC manages order release, dispatching, and priorities based on planned schedules. In pull systems, PAC regulates production based on actual demand signals using visual controls such as Kanban. Understanding both environments is essential for the CPIM exam, as hybrid systems are common. PAC must adapt its tools and techniques—whether managing queue times, WIP, or sequencing rules—based on the planning philosophy. Mastery ensures smooth operations regardless of system type.

14. Backflushing and Order Completion
Backflushing automatically deducts component inventory from stock based on finished goods reporting rather than issuing materials at multiple points in production. It simplifies transactions, reduces administrative effort, and is common in repetitive and flow environments. PAC must ensure accurate BOMs, routing data, and reporting for

backflushing to work effectively. Order completion involves closing work orders, reconciling variances, and updating financial and inventory records. A solid understanding of backflushing is essential for environments emphasizing speed, low transaction volumes, and simplified production reporting.

15. Schedule Adherence and Performance Monitoring
Schedule adherence measures how closely actual production follows the planned schedule. PAC monitors adherence to improve reliability and ensure commitments to customers are met. Deviations may result from equipment failures, material delays, or inaccurate planning. Performance monitoring includes evaluating metrics such as throughput, WIP, machine utilization, and labor productivity. PAC uses this feedback to adjust priorities, revise schedules, or escalate issues. Understanding schedule adherence is vital for continuous improvement and building dependable production systems.

16. Real-Time Problem Solving on the Shop Floor
PAC personnel must respond quickly to disruptions such as machine breakdowns, material shortages, absenteeism, and quality issues. Real-time problem solving involves root-cause analysis, quick decision-making, escalation procedures, and prioritization. Tools such as visual management, andon systems, and daily management boards support rapid issue resolution. PAC must maintain flexibility in routing, sequencing, and order adjustments. Understanding this capability is crucial for ensuring that schedules remain executable and customer service levels stay high despite variability.

17. Production Execution in Different Manufacturing Environments

PAC practices differ in job shops, batch manufacturing, flow lines, and continuous production. Job shops require detailed sequencing rules, while flow lines use synchronized scheduling. Batch environments depend on setup optimization and capacity planning. Continuous systems emphasize monitoring and maintaining throughput. Mastering these differences helps CPIM candidates apply the right PAC tools and principles based on production type. Understanding environment-specific execution requirements ensures effective planning and seamless flow across diverse operations.

18. Move and Queue Time Management

Move time is the time required to transfer materials between operations, while queue time refers to waiting before processing. PAC must minimize both by optimizing layouts, sequencing rules, and routing decisions. High move and queue times increase lead time variability and reduce responsiveness. PAC uses techniques like cellular manufacturing, layout redesign, and workload balancing to reduce these delays. Understanding these components is essential for accurate lead-time planning and effective shop-floor execution.

19. Order Splitting and Overlapping Techniques

Order splitting divides large work orders into smaller batches to improve flow and reduce lead times. Overlapping allows subsequent operations to begin before prior operations are fully completed. Both techniques require careful coordination to avoid quality issues or resource conflicts. PAC uses these strategies to reduce throughput time and increase flexibility in high-mix environments. Understanding when and how to apply splitting and overlapping supports better schedule performance and throughput improvement.

20. Integration of PAC with MRP and Capacity Planning

PAC depends heavily on accurate MRP outputs and provides essential feedback on capacity, lead times, and production performance. Integration ensures that planned orders reflect shop-floor realities and that execution aligns with broader planning goals. PAC communicates resource constraints, delays, scrap rates, and actual run times to improve future planning cycles. Understanding this closed-loop process is critical for synchronizing planning and execution, enhancing reliability, and supporting continuous improvement.

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50. Future Skills and Trends in Procurement

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