Certified in Planning and Inventory Management

Execution and Capacity performance

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Execution and Capacity Performance

1. Role of Execution in the MPC System

Execution is where production plans become actual results. It connects planning outputs (MPS, MRP, CRP) with real operations on the shop floor. Understanding execution ensures planners can translate theoretical schedules into human, machine, and material activities. This concept includes dispatching, tracking work orders, managing labor and machine assignments, and handling real-time issues. Mastery ensures production aligns with planned schedules and customer commitments.

2. Closed-Loop Manufacturing Planning and Control (MPC)

Closed-loop MPC means that execution feedback is continuously used to adjust MRP, CRP, and MPS. Capacity performance data—such as actual hours, throughput, and delays—feeds back to planning to correct assumptions and improve future planning accuracy. Understanding closed-loop systems ensures planners recognize how execution affects long-term reliability, data accuracy, and schedule stability.

3. Capacity Performance Measurement

Capacity performance evaluates how effectively a facility uses available labor and machines. Key measures include utilization, efficiency, output reliability, overall equipment effectiveness (OEE), and schedule adherence. Understanding these metrics helps identify bottlenecks, wasted capacity, and improvement opportunities. Mastery ensures planners accurately interpret real-world performance and adjust planning parameters accordingly.

4. Work Order Release and Execution
Work order execution begins with releasing orders according to dispatching rules, capacity availability, and material readiness. Understanding when and how to release orders is crucial because premature release increases WIP and congestion, while late release causes shortages and idle time. Effective release procedures support stable flow, realistic loads, and accurate capacity performance.

5. Dispatching Rules and Priority Systems
Dispatching determines the sequencing of jobs on the shop floor. Common rules include FIFO, LIFO, earliest due date, shortest processing time, critical ratio, and TOC-based prioritization. Mastering dispatching rules helps planners choose the right method based on product mix, variability, and customer service requirements. Effective dispatching maximizes throughput and minimizes waiting time.

6. Bottleneck and Non-Bottleneck Management
Execution performance heavily depends on controlling bottlenecks, as they determine system throughput. Non-bottlenecks should support the pace set by the bottleneck without overproduction. Understanding bottleneck behavior helps planners adjust workloads, prioritize jobs, and focus improvement initiatives where they deliver the highest impact. This concept is fundamental to capacity performance and flow stability.

7. Actual vs. Planned Capacity Tracking
Execution teams collect actual labor hours, machine hours, queue times, and setup times. These are compared with planned values to identify variances. Understanding how to

track and interpret these differences helps planners update standards, adjust schedules, and improve planning accuracy. This feedback loop is essential for continuous improvement.

8. Work Center Performance Monitoring
Monitoring work-center performance involves tracking key metrics such as work-in-process (WIP), throughput, idle time, downtime, scrap, and absenteeism. These measures reveal whether a work center meets schedule expectations. Understanding these metrics helps planners identify issues early, implement corrective actions, and refine capacity models.

9. Throughput, WIP, and Flow Control
Capacity performance depends on maintaining optimal WIP levels. Too much WIP leads to congestion and longer lead times; too little WIP slows throughput. Understanding Little's Law (WIP = Throughput × Lead Time) allows planners to maintain steady flow. This concept is core to execution, lean thinking, and bottleneck management.

10. Execution Feedback and Real-Time Adjustments
Execution performance requires constant adjustments to schedules, labor assignments, and machine loads based on real-time issues like machine failure, absenteeism, or material shortages. Understanding real-time feedback processes helps planners ensure the system remains stable and customer commitments are met, despite operational variability.

11. Overall Equipment Effectiveness (OEE)
OEE measures equipment performance using availability, performance speed, and quality rate. It helps determine how much of planned capacity is actually usable. Understanding OEE allows planners to identify equipment-related capacity losses such as downtime, slow cycles, and defects—critical for improving long-term capacity performance.

12. Root Cause Analysis of Capacity Problems
Understanding how to systematically analyze performance problems using tools like 5 Why, Ishikawa diagrams, Pareto analysis, and SPC charts is essential. Root cause analysis ensures that planners address underlying issues rather than symptoms. It improves equipment uptime, labor productivity, and schedule adherence.

13. Capacity Constraints and Execution Variability
Variability in labor, machines, material, and demand affects capacity performance. Understanding how variability creates queues, bottlenecks, and schedule disruptions helps planners create robust schedules and apply variability-reduction strategies such as standardization, preventive maintenance, and process control.

14. Execution Control Systems: MES and SFC
Manufacturing Execution Systems (MES) and Shop Floor Control Systems (SFC) manage production activities in real time. They provide data on order status, labor hours, machine usage, and quality results. Understanding these systems helps planners receive accurate and timely capacity data, improving scheduling and decision-making.

15. Preventive and Predictive Maintenance
Maintenance greatly affects capacity because equipment failures disrupt schedules and reduce throughput. Preventive maintenance ensures regular service, while predictive maintenance uses data to forecast failures. Understanding maintenance strategies helps planners accurately model available capacity and minimize unplanned downtime.

16. Lean Practices and Capacity Performance
Lean techniques—such as 5S, standard work, kaizen, line balancing, and takt time—enhance capacity performance by removing waste and improving flow. Understanding how lean supports execution ensures planners align scheduling with stable, predictable processes that increase throughput and reduce variability.

17. Managing Labor Performance in Execution
Labor performance during execution includes attendance, productivity, skill availability, morale, and fatigue. Planners must understand how labor-related issues impact capacity, such as unexpected absenteeism or skill shortages. Effective labor management ensures smooth execution and accurate capacity modeling.

18. Queue Management and Scheduling Efficiency
Queues reflect system congestion and directly influence lead time and throughput. Understanding queue behavior, causes of excessive WIP, and methods to reduce waiting—such as load leveling, sequencing rules, and WIP limits—helps planners maintain flow and improve schedule reliability.

19. Schedule Adherence and Production Reliability
Schedule adherence measures how closely actual production matches planned schedules. Poor adherence indicates issues in capacity, material flow, or execution control. Understanding schedule adherence helps planners identify systemic problems, adjust capacity assumptions, and improve future planning accuracy.

20. Continuous Improvement and Capacity Optimization
Continuous improvement programs—such as Lean, Six Sigma, and TOC—help enhance capacity performance through waste elimination, defect reduction, and flow optimization. Understanding these improvement approaches ensures planners can identify capacity improvement opportunities, refine planning parameters, and support strategic operational excellence.

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8. Supply Chain Performance Metrics (KPIs)
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15. Supply Chain Sustainability and Green Logistics
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17. Supply Chain Collaboration and Integration
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24. Supply Chain Cost Reduction Techniques
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32. Managing Third-Party Logistics (3PL) Providers
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34. Production Planning and Scheduling
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37. Vendor-Managed Inventory (VMI)
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41. Warehouse Automation and Robotics
42. SCOR DS Roadmap for Supply Chain Excellence
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Micro-Learning Programs in Procurement …

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50. Future Skills and Trends in Procurement

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