Certified in Logistics, Transportation and Distribution

Picking Systems

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Picking Systems

1. Order Picking Fundamentals

Order picking is the process of retrieving items from storage to fulfill customer orders. It is often the most labor-intensive and costly warehouse activity, making optimization critical. Mastery of picking fundamentals—including accuracy, productivity, travel time, and ergonomics—forms the basis for selecting appropriate systems. Understanding characteristics such as order profiles, SKU velocity, cube utilization, and worker workflows will help design efficient picking operations that reduce cycle time and enhance service levels.

2. Types of Picking Strategies

Picking strategies include discrete, batch, zone, and wave picking. Each strategy offers trade-offs in travel time, labor balancing, equipment needs, and order consolidation complexity. Discrete picking is simple but travel-heavy; batch picking reduces travel by combining orders; zone picking improves specialization; and wave picking organizes work by time windows or carrier schedules. Understanding when and how each strategy is applied is critical for optimizing throughput and maintaining service promises.

3. Discrete (Single Order) Picking

Discrete picking is the most straightforward method, where one picker completes one order at a time. It offers simplicity, flexibility, and high accuracy because items are picked directly into final order containers. However, it often results in high travel time and low labor efficiency. This method works best in small warehouses, low-SKU

environments, or operations where order accuracy is more important than speed. Understanding its strengths and limitations helps identify when more advanced systems are needed.

4. Batch Picking

Batch picking combines multiple orders into one picking tour, reducing travel time and improving picker utilization. Items are later sorted into individual orders. Batch picking suits high-order-volume environments with significant SKU overlap. However, it requires efficient sorting mechanisms and may introduce complexity in handling mixed items. Understanding slotting, batching logic, tote management, and consolidation processes is essential to maximize efficiency while preventing sorting errors.

5. Zone Picking

Zone picking divides the warehouse into dedicated zones, with each picker responsible for specific SKUs. Orders pass through zones sequentially (sequential zone picking) or are collected simultaneously (simultaneous zone picking). This approach minimizes picker travel and increases specialization. However, it requires effective coordination, order consolidation, and workload balancing. Mastery involves understanding zone layout design, throughput balancing, bottleneck avoidance, and communication workflows.

6. Wave and Waveless Picking

Wave picking organizes order releases into batches or “waves” based on shipping schedules, carrier cutoffs, or workload balancing. It increases control over the picking

process and supports predictable throughput. Waveless (continuous) picking dynamically releases tasks in real time, offering flexibility for e-commerce and same-day fulfillment. Understanding the benefits and constraints of both approaches, along with WMS configuration requirements, is critical for modern distribution centers.

7. Slotting and ABC Analysis

Slotting is the placement of products in optimal picking locations to reduce travel time and increase efficiency. Techniques such as ABC velocity analysis, cube movement, and family grouping ensure fast-moving items are placed ergonomically and close to picking paths. Proper slotting supports all picking strategies by minimizing bending, reaching, and walking. Understanding the relationship between SKU velocity, storage type, and pick face sizing is essential for optimized material flow.

8. Pick Paths and Travel Minimization

Travel time often represents 50–70% of total picking activity. Designing efficient pick paths—such as serpentine, return, or optimized routing—is critical for maximizing productivity. Concepts include aisle layout, one-way flow, congestion avoidance, and batch route optimization. Systems like WMS routing algorithms help reduce unnecessary travel. Understanding how to measure and minimize travel ensures significant labor savings and faster order cycle times.

9. Paper-Based vs. Paperless Picking

Paper-based picking uses printed pick lists, which are simple but error-prone and inefficient. Paperless systems (RF

scanning, pick-to-light, voice picking, mobile devices) provide real-time instructions, validation, and error reduction. Understanding the transition from paper to paperless systems—including training needs, technology costs, and accuracy benefits—is critical for scaling operations and integrating with WMS workflows.

10. RF (Radio Frequency) Picking

RF picking involves handheld scanners that provide real-time instructions, item verification, and location tracking. It improves accuracy and traceability. Mastery includes understanding barcodes, scanning workflows, data capture accuracy, device ergonomics, and network reliability. RF systems support discrete, batch, and zone picking, making them versatile tools in modern warehouses.

11. Pick-to-Light Systems

Pick-to-light uses LED displays installed on shelving locations to guide pickers to the correct SKU and quantity. It significantly improves speed and accuracy in high-volume, small-item picking environments. Key considerations include installation cost, wiring or wireless infrastructure, zone layout, and maintenance needs. Understanding how PTL integrates with WMS and how it supports zone picking is crucial for optimizing labor output.

12. Put-to-Light Systems

Put-to-light is used to sort batch-picked items into individual orders. Lights illuminate on order locations to indicate where items should be placed. This system increases sorting accuracy and is ideal for batch picking, returns processing, and omnichannel distribution.

Understanding carton flow rack design, light modules, system scalability, and error reduction techniques is essential for effective deployment.

13. Voice Picking Systems

Voice-directed picking uses headsets and wearable devices to provide spoken instructions. It keeps workers hands-free and eyes-free, improving safety, accuracy, and productivity. Key concepts include speech recognition, multi-language support, noise mitigation, battery life, and device ergonomics. Voice systems excel in grocery, cold storage, and high-SKU environments. Understanding integration challenges and productivity impacts is important for evaluating adoption.

14. Pick Modules and Multi-Level Systems

Pick modules combine conveyors, carton flow racks, and multi-level structures to support high-volume picking. They allow batch, zone, or wave picking with minimal travel. Key considerations include vertical throughput, ergonomics, replenishment paths, carton flow design, and safety regulations. Understanding how to balance picking and replenishment traffic is crucial to maximizing flow in multi-level systems.

15. Carousels and Vertical Lift Modules (VLMs) in Picking

Carousels (horizontal or vertical) and VLMs bring items to the picker rather than sending the picker to the items. These goods-to-person systems minimize travel, increase accuracy, and optimize cubic storage. Understanding throughput capabilities, integration with WMS, order sequencing, and ergonomic benefits is essential for environments requiring high accuracy and space efficiency.

16. Autonomous Mobile Robots (AMRs) for Picking
AMRs support goods-to-person or person-to-goods picking by transporting totes, guiding pickers, or delivering items for consolidation. They improve productivity and reduce travel time. Key concepts include mapping, fleet management, charge scheduling, navigation safety, payload limits, and WMS integration. Understanding when AMRs outperform traditional carts or conveyors is critical for future-ready operations.

17. Goods-to-Person (GTP) Systems
GTP systems automatically deliver items to pickers using shuttles, robotics, or AS/RS technology. They minimize travel, balance workloads, and increase pick rates dramatically. Concepts include workstation design, buffer sequencing, order batching, and throughput matching. Understanding capacity planning and ROI analysis helps determine when GTP is justified for high-volume fulfillment.

18. Order Consolidation and Sorting
Efficient picking often requires consolidating items from multiple zones, batches, or waves. Sorting methods include manual sorting, conveyor sorters, put walls, and automated systems. Key considerations include bin design, workflow sequencing, real-time visibility, and error reduction. Understanding consolidation is critical for multi-zone and batch picking operations.

19. Labor Management and Productivity Metrics
KPIs such as picks per hour, lines per hour, accuracy rate, travel time ratio, utilization, and order cycle time measure picking performance. Labor standards (engineered or

historical) help benchmark productivity. Understanding how to analyze performance, identify bottlenecks, and apply incentive programs ensures continuous improvement in picking operations.

20. Safety and Ergonomics in Picking

Picking involves repetitive motions, bending, reaching, lifting, and long walking distances. Safety considerations include ergonomic workstation design, appropriate pick heights, weight limits, slip/trip prevention, and equipment training. Ensuring safe picking practices reduces injuries, improves morale, and enhances productivity. Understanding OSHA guidelines and ergonomic risk assessments is essential for maintaining a safe work environment.

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

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