



Certified in Logistics, Transportation and Distribution

Storage



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Storage

1. Purpose and Objectives of Storage

Storage exists to hold materials until they are needed for production or customer orders. Its objectives include ensuring product protection, maintaining inventory accuracy, optimizing space, and supporting smooth warehouse flow. Effective storage reduces handling costs, minimizes damage, supports accurate order fulfillment, and aligns with inventory management strategies. For CLTD, understanding why storage is necessary, how it integrates with logistics functions, and how it affects service levels and operating costs is key. Candidates should also recognize the trade-offs between storage, handling, and transportation efficiency.

2. Storage System Design Principles

Storage system design ensures optimal use of space, labor, equipment, and material flow. Key principles include cube utilization, slotting strategy, accessibility, safety, and minimizing travel distance. Design choices must match product characteristics, order profiles, and throughput requirements. CLTD candidates must understand how layout, capacity planning, and flow principles drive operational efficiency. Proper design supports scalability, reduces congestion, and improves order cycle times.

3. Product Characteristics and Storage Requirements

Different products have unique storage needs based on size, weight, fragility, temperature sensitivity, hazard classification, and shelf life. Understanding product profiles ensures accurate selection of storage equipment,

environmental controls, and handling techniques. Knowledge of these characteristics also helps determine palletizing methods, racking choices, and replenishment strategies. Tailoring storage to product requirements prevents damage, ensures compliance, and improves efficiency.

4. Storage Equipment and Racking Systems

Racking systems such as selective pallet racks, drive-in/drive-through racks, push-back racks, pallet flow racks, cantilever racks, and shelving units are essential in warehouse storage. CLTD candidates must understand the advantages, limitations, and appropriate applications of each type. Equipment choices depend on SKU mix, turnover rates, inventory levels, and material handling options. Well-chosen storage equipment maximizes space and enhances picking efficiency.

5. Palletization and Unit Load Design

Palletization creates stable unit loads that improve handling efficiency and reduce product damage. Knowledge of pallet types, sizes, material composition, load stability, wrapping methods, and weight distribution is critical. Proper unit load design supports safe storage, optimizes space, improves stacking capability, and enhances compatibility with racking and handling systems. Pallet standards such as ISO, CHEP, and GMA may also appear in exam questions.

6. Slotting and Inventory Placement Strategies

Slotting determines where products are stored to minimize travel time, improve picking speed, and enhance ergonomics. Strategies consider factors such as ABC

classification, velocity, cube-per-order index (COI), order patterns, and replenishment frequency. Effective slotting supports lean operations, maintains space efficiency, and improves workforce productivity. CLTD candidates should understand slotting tools, periodic reviews, and optimization techniques.

7. FIFO, LIFO, and FEFO Storage Methods

FIFO (First-In, First-Out) ensures older inventory is used first, ideal for perishables or regulated products. LIFO (Last-In, First-Out) may apply to bulk storage or specific accounting strategies. FEFO (First-Expired, First-Out) prioritizes items with the earliest expiration dates. Understanding when and how to apply each method helps maintain product integrity, reduce waste, and comply with regulations. These strategies influence layout, replenishment, and inventory control.

8. Bulk Storage vs. Rack Storage

Bulk storage involves stacking goods directly on the floor without racking, suitable for homogenous and palletized products. Rack storage provides greater selectivity, organization, and product protection. Understanding the benefits, limitations, and cost implications of each helps align storage choices with inventory characteristics and operational needs. CLTD candidates must evaluate throughput, space availability, and handling equipment to select the right approach.

9. Special Storage Requirements (Temperature-Controlled, Hazardous, High-Value)

Some products require specialized environments such as

cold storage, humidity control, explosion-proof areas, or secure cages. Understanding regulatory compliance (e.g., for pharmaceuticals, chemicals, food), design considerations, and monitoring requirements is essential. Properly managing special storage protects product integrity, safety, and legal compliance.

10. Warehouse Layout and Flow Optimization

Effective layouts support efficient receiving, storage, picking, and shipping flows. Layout planning considers zoning, staging areas, travel paths, equipment turning radii, aisle spacing, and order profiles. A well-designed layout minimizes travel distance, reduces congestion, improves safety, and enhances throughput. CLTD candidates must understand U-shaped, L-shaped, and I-shaped layouts and their strategic advantages.

11. Cube Utilization and Space Optimization

Cube utilization refers to how effectively a warehouse uses its total available space, including vertical height. Space optimization techniques include high-bay storage, narrow aisle systems, slotting reviews, and dynamic storage allocation. Mastering cube utilization is crucial for controlling storage costs, improving handling efficiency, and maximizing capacity without expanding physical space.

12. Inventory Visibility and Traceability

Storage must maintain accurate, real-time visibility of inventory location, quantity, batch/lot ID, and condition. Technologies such as WMS, barcoding, RFID, and automated tracking systems support traceability. High visibility ensures

effective replenishment, improves picking accuracy, supports audits, and reduces shrinkage. This is a core competence for CLTD.

13. Material Handling Integration with Storage

Storage strategy must align with the capabilities and constraints of material handling equipment. Forklifts, AGVs, conveyors, and pallet jacks influence aisle widths, racking height, and storage density. Understanding the interplay between equipment and storage ensures safe, efficient warehouse movement and maximizes throughput.

14. Replenishment Methods and Control

Replenishment moves products from reserve storage to forward pick locations. Methods include demand-driven, min-max, scheduled, or automated replenishment. Mastering replenishment ensures forward pick areas maintain sufficient stock without overfilling. Effective replenishment reduces picking delays, enhances service levels, and stabilizes labor planning.

15. Storage Costs and Financial Considerations

Storage costs include facility overhead, equipment depreciation, utilities, labor, insurance, and inventory carrying costs. Understanding fixed vs. variable costs, cost-per-unit metrics, and space utilization economics supports better decision-making. CLTD candidates must link storage decisions to overall supply chain financial performance and cost optimization.

16. Safety in Storage Operations

Safe storage requires proper rack loading, clear aisles,

ergonomic placement, hazard identification, and compliance with regulations. Poorly designed or overloaded storage increases accident risk, product damage, and legal liability. Understanding safety standards, inspections, and preventive measures ensures secure and efficient storage operations.

17. Warehouse Management Systems (WMS) for Storage

A WMS controls inventory location management, replenishment, slotting, cycle counting, and visibility. Understanding system capabilities, configuration options, and data accuracy is key. WMS automation ensures efficient space utilization, reduces labor, and minimizes errors in storage-related transactions.

18. Automation and Robotics in Storage

Automated storage and retrieval systems (AS/RS), shuttle systems, vertical lift modules (VLMs), and robotic cube storage greatly enhance space utilization and picking speed. Understanding advantages, constraints, cost implications, and integration requirements is important. Automation impacts labor, accuracy, throughput, and storage density.

19. Lean Storage and Waste Reduction

Lean principles aim to eliminate waste (muda) in storage processes—such as excess movement, inventory, or space. Lean tools include 5S, visual management, takt-based space planning, and value stream mapping. Applying lean to storage reduces cost, improves flow, and enhances productivity.

20. Continuous Improvement and Performance Metrics

Key storage KPIs include space utilization, storage density, inventory accuracy, replenishment efficiency, picking accuracy, and damage rate. Understanding how to measure, analyze, and improve performance is essential. Root-cause analysis and continuous improvement tools help optimize storage processes and align operations with strategic goals.

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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 ...



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38. Transportation Optimization Techniques
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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
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49. Supply Chain in Crisis Management and Recovery
50. Future Trends and Technologies in Supply Chain

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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
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25. Supplier Risk Assessment Models

Micro-Learning Programs in Procurement ...



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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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