



# **Certified in Logistics, Transportation and Distribution**

**Routing, Transportation Costs,  
and Freight Settlement**





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# **Routing, Transportation Costs, and Freight Settlement**

## **1. Principles of Route Optimization**

Route optimization ensures that freight moves through the most efficient path considering distance, road conditions, capacity, service requirements, and regulations.

Understanding algorithms such as shortest-path, TSP (Traveling Salesman Problem), and VRP (Vehicle Routing Problem) is critical. Effective routing reduces miles traveled, fuel use, transit times, and overall cost. CLTD candidates should know both manual routing techniques and advanced route-planning software capabilities, including constraints like time windows, driver legality, and equipment availability. Route optimization directly impacts customer service, reliability, and the financial performance of transportation operations.

## **2. Carrier Routing Strategies**

Carriers use different routing strategies such as hub-and-spoke, point-to-point, multi-stop routing, and dynamic routing. Understanding these helps shippers choose the best carrier and negotiate services. Hub-and-spoke systems consolidate freight to reduce long-haul costs, while point-to-point routes minimize handling and damage. Multi-stop routing increases asset utilization but adds complexity. Dynamic routing adapts to real-time conditions. Knowing the strengths and limitations of each strategy helps align transportation plans with service promises and cost goals.

## **3. Routing Constraints and Regulatory Compliance**

Routing decisions must comply with regulations involving driver hours-of-service (HOS), vehicle weight/size limits,

hazardous materials routing rules, and state toll requirements. These constraints shape routing options and influence cost. Non-compliance can trigger penalties, lost time, and service failures. CLTD candidates must understand how legal restrictions affect planning, especially in cross-border operations. Effective routing balances regulatory compliance with customer delivery commitments and cost reduction.

#### **4. Transportation Cost Structures**

Transportation costs include fixed, variable, semi-variable, and joint costs. Fixed costs (equipment, terminals) stay constant, while variable costs (fuel, labor, maintenance) fluctuate with mileage or usage. Understanding how carriers calculate costs, allocate overhead, and assess profitability helps shippers negotiate rates and optimize inbound/outbound strategies. Cost structure knowledge supports mode selection, volume commitments, and carrier scorecards. It also allows supply chain managers to evaluate the total landed cost and shipment profitability.

#### **5. Rate-Making and Tariff Structures**

Carriers use tariffs, rate bases, class rates, contract rates, and spot quotes. Knowledge of how rates are constructed—including weight breaks, freight classes, distance scales, and surcharges—is essential. Rate-making considers market conditions, competition, operating costs, and shipper requirements. Understanding accessorials like detention, layover, fuel surcharge, and reclassification fees helps prevent surprises. CLTD exam takers should be comfortable interpreting tariffs and applying rate tables to calculate transportation charges.

## **6. Mode Selection and Cost Trade-Offs**

Choosing between truck, rail, air, ocean, or intermodal relies on comparing cost, speed, reliability, frequency, capacity, and risk. Mode selection also depends on product characteristics—volume, weight, value, perishability, and special handling requirements. Shippers often face trade-offs between service and cost; for example, air freight is faster but expensive, while ocean transport is cheapest but slow. Analyzing these trade-offs supports better routing, network design, and resilience planning.

## **7. Consolidation and Pooling Strategies**

Freight consolidation (combining multiple LTL shipments into FTL loads) and pooling (using intermediate distribution points) help reduce costs and improve carrier utilization. Pooling points allow shippers to aggregate freight going to the same region, improving efficiency. Understanding consolidation metrics—density, cube utilization, freight compatibility—is essential. These strategies reduce per-unit transportation cost and lower carbon footprint. They also enhance negotiating leverage with carriers through improved volume and consistency.

## **8. Freight Classification and Density-Based Rating**

Freight class (in the U.S. NMFC system) influences rates based on density, stowability, handling, and liability. Increasingly, carriers use density-based pricing. CLTD candidates must understand how density calculations, packaging decisions, and load configuration affect cost. Knowing how reclassification issues arise helps avoid disputes and charges. Proper classification ensures fair

pricing, reduces audit problems, and supports accurate budgeting.

## **9. Accessorial Charges and Surcharges**

Accessorials are additional fees for services beyond line-haul transport—fuel surcharges, residential delivery, liftgate use, inside delivery, reconsignment, detention, and hazardous material handling. These can significantly raise total cost. Understanding them allows shippers to reduce avoidable charges through better planning and communication. Accessorial management is integral to accurate freight budgeting and carrier contract negotiations.

## **10. Fuel Cost Management**

Fuel is a major variable cost in transportation. Fuel surcharges, fuel hedging, and energy-efficient routing help manage volatility. CLTD candidates should understand how surcharge formulas work and how carriers pass through fuel costs to shippers. Strategic planning—including scheduling, route efficiency, consolidation, and idle-time reduction—helps control total freight costs.

## **11. Total Landed Cost Analysis**

Total landed cost (TLC) includes transportation, customs, duties, warehousing, insurance, handling, and risk costs. It helps determine optimum sourcing, routing, and pricing. Knowledge of TLC is essential for evaluating global shipping decisions and selecting cost-effective supply chain alternatives. TLC is also used for vendor scorecards and freight settlement.

## **12. Freight Audit and Payment Processes**

Freight audit ensures that invoice charges match contracted rates, shipment details, and service levels. Audits detect billing errors, reclassifications, duplicate invoices, or unauthorized surcharges. Payment processes often involve third-party audit firms or automated systems. Effective freight audit improves cost control, transparency, and compliance while supporting accurate financial reporting.

## **13. Freight Claims Management**

Claims arise for loss, damage, delay, or billing disputes. Understanding carrier liability limits, documentation requirements, timelines, and claim categories is critical. Efficient claim management reduces financial exposure and protects customer service. Incoterms also influence liability. CLTD candidates must understand how routing decisions, packaging, consolidation, and carrier selection impact claim frequency and severity.

## **14. Contract Negotiation and Carrier Scorecards**

Carrier contracts define rates, service levels, fuel surcharge formulas, accessorial terms, and performance expectations. Scorecards track on-time delivery, damage rate, communication, cost accuracy, and responsiveness. Understanding these tools helps companies maintain strategic transportation partnerships. Negotiation skills ensure shippers receive competitive rates and reliable service.

## **15. Transportation Management Systems (TMS)**

A TMS automates routing, rating, carrier selection, tendering, documentation, track-and-trace, and freight

audit. Understanding TMS capabilities helps optimize execution, reduce cost, and improve visibility. Advanced TMS uses AI for dynamic routing and load matching. Knowledge of TMS is vital for modern logistics environments and digital freight ecosystems.

## **16. Freight Settlement and Cost Allocation**

Freight settlement finalizes payments based on verified charges, contract terms, and shipment data. Cost allocation assigns transportation cost across products, customers, business units, or cost centers. Allocation helps determine product profitability and supports pricing decisions. Understanding settlement workflows reduces disputes and accelerates financial closing cycles.

## **17. Multimodal and Intermodal Routing**

Multimodal uses a single bill of lading for different transport modes; intermodal uses separate contracts for each mode. Understanding the difference is essential for routing, liability, documentation, and cost management. Intermodal often reduces cost and carbon footprint but may increase transit time. Knowledge of these models supports better network design.

## **18. Carrier Capacity Management**

Capacity availability varies by season, market conditions, and economic cycles. Understanding capacity dynamics—including spot market versus contract capacity—is vital for routing decisions and cost forecasting. Effective management includes using dedicated fleets, core carrier programs, load matching, and flexible routing.



## **19. Dynamic Routing and Real-Time Visibility**

GPS, telematics, IoT, and visibility platforms enable dynamic routing adjustments based on congestion, weather, equipment delays, and customer changes. Real-time visibility improves ETA accuracy, service reliability, and cost control. Knowledge of dynamic routing is essential for modern transportation planning and resilience.

## **20. Performance Measurement and Cost KPIs**

Key performance indicators include cost per mile, cost per pound, on-time delivery, damage rate, fuel efficiency, and network utilization. Understanding KPIs supports continuous improvement and better routing decisions. Benchmarking performance helps identify cost-saving opportunities and enhances overall supply chain efficiency.

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# Micro-Learning Programs in Supply Chain Management & Procurement



Enhance your professional edge with Fhyzics Business Consultants' Micro-Learning Programs in Supply Chain Management and Procurement. Designed as focused, two-hour Executive Development Programs, these sessions deliver practical insights and tools to solve real-world business challenges. Conducted in small batches for personalized learning, participants gain a deeper understanding of key supply chain and procurement strategies that drive efficiency and profitability. Each participant receives a certificate of completion, adding value to their professional profile and career growth. Whether you aim to advance in your current role or explore new opportunities, this program equips you with the knowledge and confidence to excel.



# Micro-Learning Programs in Supply Chain Management



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2. Supply Chain Planning and Optimization
3. Demand Forecasting Techniques
4. Inventory Control and Management
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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 ...



26. Capacity Planning and Resource Allocation
27. Managing Supply Chain Disruptions
28. End-to-End Supply Chain Visibility
29. Cold Chain Logistics Management
30. Supply Chain Compliance and Ethics
31. Import–Export Procedures and Documentation
32. Managing Third-Party Logistics (3PL) Providers
33. Supply Chain Collaboration Technologies
34. Production Planning and Scheduling
35. Strategic Supply Chain Design Using Case Studies
36. Circular Economy in Supply Chain
37. Vendor-Managed Inventory (VMI)
38. Transportation Optimization Techniques
39. E-Commerce Supply Chain Models
40. Omni-Channel Fulfillment Strategies
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
46. Strategic Sourcing in Supply Chain Context
47. Supply Chain Benchmarking and Best Practices
48. Integrated Business Planning (IBP)
49. Supply Chain in Crisis Management and Recovery
50. Future Trends and Technologies in Supply Chain



# Micro-Learning Programs in Procurement



1. Fundamentals of Procurement Management
2. Strategic Sourcing and Category Management
3. Supplier Selection and Evaluation
4. Contract Management Essentials
5. Cost and Price Analysis in Procurement
6. Negotiation Strategies for Procurement Professionals
7. E-Procurement and Digital Tools
8. Procurement Planning and Budgeting
9. Risk Management in Procurement
10. Supplier Relationship and Performance Management
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
21. Managing Global and Offshore Procurement
22. Negotiation Simulation Workshop
23. Contract Law for Procurement Managers
24. Cost Reduction Strategies in Procurement
25. Supplier Risk Assessment Models

# Micro-Learning Programs in Procurement ...



26. Procurement Process Mapping and Improvement
27. Procurement Automation and AI Applications
28. Managing Procurement Teams Effectively
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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