A COMPREHENSIVE PRACTICAL TEXTBOOK

FREIGHT FORWARDING & LOGISTICS

From Global Trade Fundamentals to Professional Practice

Air Freight • Ocean Freight • Road Freight
Contract Logistics • Project Logistics



QUAZI ASIF NEWAZ

Industry experience. Practical knowledge. Modern thinking.

Freight Forwarding and Logistics

From Global Trade Fundamentals to Professional Practice

A comprehensive practical textbook

Air freight • Ocean freight • Road freight
Contract logistics • Project logistics

Quazi Asif Newaz

Edition 1.0 • July 2026 edition

Forty chapters across ten parts, with worked examples, applied exercises, extended workshops and integrated cases.

© 2026 Quazi Asif Newaz. All rights reserved.

No part of this publication may be reproduced, distributed or transmitted without prior written permission, except as permitted by applicable law or by a licence expressly identified in this book.

Worksheets may be completed for personal study; retain the copyright notice. Third-party photographs remain subject to their stated licences and credits in Sources and photograph credits.

For permissions and enquiries: https://quaziasifnewaz.com.

Preface and how to use this book

A shipment often begins with a short message: “The goods are ready. Please arrange delivery.” Behind that message sit questions about the cargo, the customer’s deadline, the documents, the route and the people expected to pay. Learning to recognise those questions is the first step towards becoming useful in a forwarding office.

This book takes you from that first enquiry to the work of planning, pricing, operating and improving logistics services. It is written for students, people entering the trade and professionals who want to understand the activities beyond their own desk. You do not need industry experience. You do need the patience to read an instruction carefully, check a number that looks wrong and ask what a customer actually needs.

The ten parts follow a practical progression. Foundations come first, followed by cargo and documents. Dedicated sections then explain air, ocean, road and multimodal services, contract logistics and project logistics. Commercial practice, risk, digital systems and sustainability lead into career development and two integrated cases.

Read a chapter with a pencil or a calculation sheet beside you. Try the review questions and exercises before consulting the answers. The extended workshops ask you to make decisions with incomplete information, as a forwarding team often must. State the gap and assign a next action instead of filling it with an invented fact.

The complete contents appears at the front with page numbers and links. Answers and marking guidance, the glossary, reusable worksheets, calculation guide, references, illustration register and alphabetical subject index are collected at the end. The short reference labels inside the chapters link to that consolidated source register. P1 and P2 identify the foundation source groups; N identifies sources supporting the later parts.

Companies, prices, schedules, emissions factors and incident records in the cases are fictional teaching inputs. They are not live quotations or operating instructions. Regulatory examples identify their context, and source details include the edition or date where material. Customs, dangerous-goods, insurance and engineering decisions still require the applicable professional authority and current requirements.

The aim is professional judgement: a clear understanding of what is known, what remains to be confirmed, who can decide and what must happen next. A well-explained estimate is more useful than a precise-looking number whose basis nobody can find.

About the author

Quazi Asif Newaz began his logistics career in 2004, joined GEODIS Bangladesh in 2013 and became Managing Director in 2020. His experience covers air and ocean freight, customs brokerage, road transport, pharmaceutical logistics, contract logistics, project logistics and control tower operations. His leadership work includes country business management, trade lane development, business excellence and people development.

He also develops practical digital tools, including Logistics Toolbox, ShipBrief and Freight Quote Studio, exploring how industry knowledge and AI can support everyday logistics work. His portfolio is available at https://quaziasifnewaz.com.

Publication notes

Edition 1.0 · July 2026 edition. © 2026 Quazi Asif Newaz. All rights reserved. Source checks and regulatory edition references retain their actual dates in the consolidated reference section.

Incoterms® is a registered trademark of the International Chamber of Commerce. This textbook is independent of ICC and does not claim its endorsement. Teaching explanations do not replace the full authoritative rule text.

Original teaching diagrams, examples, case companies, sample records and worksheets have been prepared for this book. The cover uses illustrative generated imagery. Reproduced photographs retain their stated licences and are credited in their captions and the consolidated reference section. Their inclusion does not imply endorsement by the photographers or organisations shown.

Use the blank worksheets for your own fictional or authorised cases. Do not include confidential customer records, personal data or employer information in a student portfolio without the necessary permission.

Complete contents

Page numbers refer to this edition. Click a title to move to the chapter or shared resource.

Preface and how to use this book....3
About the author....4

Part 1 Foundations of trade and forwarding....9

Chapter 1 The world of trade and logistics....10
Chapter 2 The forwarder and the logistics ecosystem....16
Chapter 3 The shipment lifecycle....22
Chapter 4 Trade terms and commercial documents....29

Part 2 Cargo and operational foundations....37

Chapter 5 Cargo characteristics and packaging....38
Chapter 6 Transport documents and data quality....45
Chapter 7 Customs and border processes....54
Chapter 8 Safety security and cargo care....62

Part 3 Air freight....71

Chapter 9 Air cargo services and capacity....72
Chapter 10 Air export and import operations....77
Chapter 11 Air pricing and chargeable weight....81
Chapter 12 Special air cargo and service recovery....85

Complete contents — continued

Part 4 Ocean freight 90

Chapter 13 Ocean services and equipment 91

Chapter 14 Ocean export and import operations 96

Chapter 15 Ocean pricing and total shipment cost 100

Chapter 16 Ocean disruption and customer decisions 104

Part 5 Road rail and multimodal services 109

Chapter 17 Road freight services and equipment 110

Chapter 18 Road dispatch and cross border movements 115

Chapter 19 Road pricing and route planning 119

Chapter 20 Rail inland waterways and multimodal design 123

Part 6 Contract logistics 128

Chapter 21 Warehousing and contract logistics models 129

Chapter 22 Warehouse processes and inventory accuracy 133

Chapter 23 Warehouse capacity productivity and pricing 137

Chapter 24 Implementation systems and performance 141

Complete contents — continued

Part 7 Project logistics 146

Chapter 25 Project cargo and feasibility 147

Chapter 26 Route surveys engineering and permits 152

Chapter 27 Project execution and procurement 156

Chapter 28 Project budgets risk and change control 160

Part 8 Commercial management and customer service 165

Chapter 29 Procurement rates and quotation building 166

Chapter 30 Sales tenders and customer solutions 170

Chapter 31 Margins credit cash flow and shipment closure 175

Chapter 32 Customer communication and performance 179

Part 9 Risk responsibility and digital practice 183

Chapter 33 Liability insurance and claims 184

Chapter 34 Ethics compliance and responsible operations 188

Chapter 35 Visibility control towers and AI 192

Chapter 36 Sustainability and logistics improvement 197

Complete contents — continued

Part 10 Careers and integrated applications 201

Chapter 37 Roles skills and professional development 202

Chapter 38 Integrated retail supply chain case 206

Chapter 39 Integrated industrial project case 211

Chapter 40 Assessment and professional portfolio 216

Shared resources

Answers and marking guidance 220

Working glossary 251

Practice worksheets and templates 257

Calculation and measurement guide 282

Sources and photograph credits 284

List of figures and photographs 290

Alphabetical subject index 292

Part 1 Foundations of trade and forwarding

Begin with the customer’s purpose. These chapters introduce the language of trade, the parties in a shipment, the sequence of decisions and the distinction between sale, carriage and insurance arrangements. The Riverbend order provides a common case to follow.

Chapters 1–4

Chapter 1 The world of trade and logistics

Chapter 2 The forwarder and the logistics ecosystem

Chapter 3 The shipment lifecycle

Chapter 4 Trade terms and commercial documents

Chapter 1 The world of trade and logistics

An order is placed

Nordhaven Retail orders 12,000 cotton shirts from Riverbend Apparel. The retailer intends to have the shirts in its German distribution centre before a seasonal promotion. The manufacturer has agreed a price, a specification and a production deadline. Both sides have reasons to feel pleased. The order is commercially attractive, and the factory has the capacity to make it.

Now imagine the shirts arriving two weeks after the promotion begins. They may be perfectly stitched, accurately packed and competitively priced. The retailer still has a problem. Empty shelves during the promotion cannot be repaired simply by delivering the same goods later.

For the forwarding team, the order therefore starts with a business requirement: usable stock must reach a particular place by a particular date. The transport plan has to serve that requirement. Before asking which vessel has space, the forwarder needs to understand what the customer is trying to achieve.

What you should be able to do

By the end of this chapter, you should be able to distinguish trade, transport, logistics and supply chain management; trace cargo, information and money through a simple transaction; explain the five principal service areas in this book; and compare transport choices using the customer’s total requirement.

1.1 Four ideas that belong together

Trade is the exchange of goods or services between parties. In this book, we concentrate on the movement of physical goods associated with domestic and international trade. The commercial agreement determines what is being bought, in what quantity and on what terms. Transport gives those goods a physical journey.

Logistics includes the planning and execution needed to make goods available where they are required. A truck movement is transport. Deciding when the truck should collect, whether the cartons will fit, where they should wait, which documents must accompany them and how the receiver will unload them is logistics.

Supply chain management considers a wider set of relationships, including sourcing, production, inventory, logistics and customer demand. A sourcing decision made months before dispatch can determine the routes available to the forwarding team. A factory’s late production decision can consume the time originally allowed for ocean transport. Understanding these connections helps a forwarder ask better questions, even when the forwarding contract covers only part of the chain.

Consider the shirt order. Choosing the fabric supplier belongs to sourcing. Sewing the shirts belongs to production. Storing finished cartons, arranging collection and organising the journey to Germany belong to logistics. Selling the shirts to consumers completes a commercial purpose that began well before the cargo reached a port.

The borders between these activities are not rigid. A logistics provider may manage supplier bookings or operate a warehouse inside a manufacturer’s premises. What matters is the agreed scope of work and the handover between one activity and the next.

1.2 Why companies trade across borders

A buyer may source overseas because a supplier offers the right manufacturing capability, material, product quality, capacity or price. An overseas factory may also bring a longer replenishment cycle, additional transport stages and more demanding documentation. The sourcing price is therefore only one part of the decision.

Suppose two factories offer the same product. One can supply in small weekly quantities; the other requires a large minimum order and six weeks of replenishment time. Even before freight is priced, the second arrangement may require more stock and more working capital. A forwarder who understands this can discuss consolidation frequency or smaller release quantities rather than treating every enquiry as an isolated request for a cheaper rate.

Trade also depends on permission to move the goods and the ability to complete border formalities. A sales agreement does not remove product restrictions or documentation requirements. In a real transaction, the exporter, importer and their appointed specialists must establish the requirements of the countries and goods involved. Part 2 examines these matters in greater depth.

1.3 Follow three flows

The easiest way to understand a transaction is to draw three separate flows: cargo, information and money. They are related, but they do not travel together or move at the same speed.

The cargo flow follows the physical goods. In our case, cartons leave the factory, move to an origin consolidation facility, travel through a port and an ocean service, and continue through destination handling to the retailer’s distribution centre. Each transfer creates a need to identify the goods and record their condition.

The information flow often begins first. The buyer sends an order. The supplier confirms readiness. The forwarder requests space. Instructions and shipment data move between the parties before the vehicle arrives. During transport, actual events feed back into the plan. Information is also corrected, approved and sometimes disputed; it rarely moves in one tidy direction.

The money flow follows the commercial agreements. The buyer pays the supplier under the agreed payment arrangement. Separately, someone pays the forwarder, carrier, warehouse and other service providers. The party receiving an invoice is not necessarily the party holding the cargo at that moment.

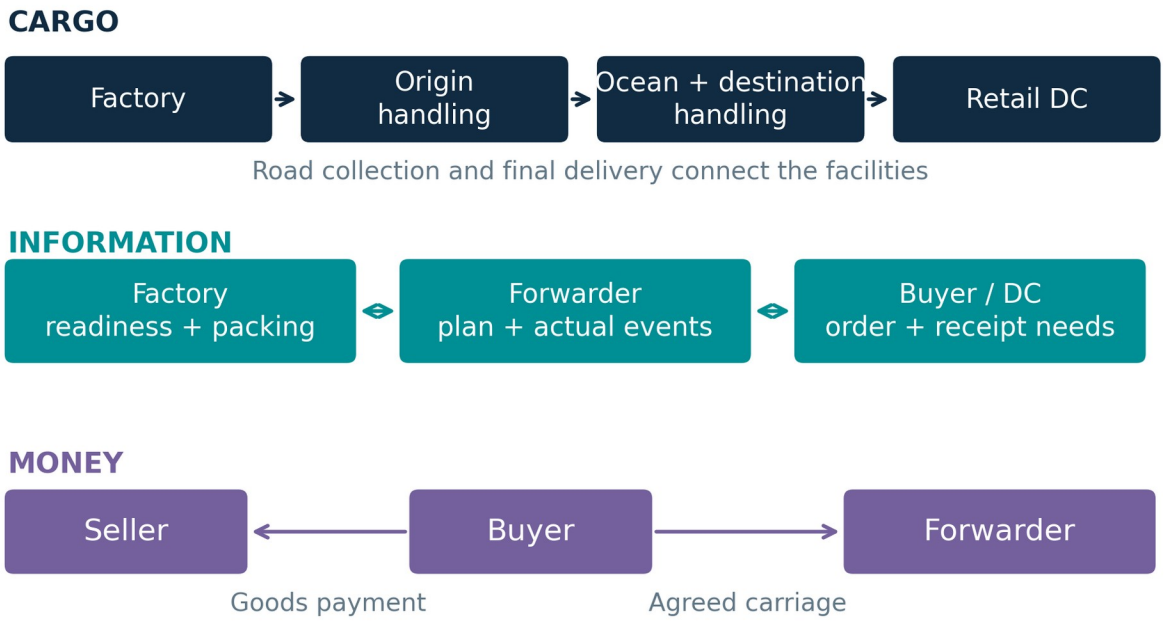


Figure 1.1 Cargo information and money in the teaching case. Arrows show the main relationships, not every document or payment.

A useful habit is to ask which flow has stopped. If a container is waiting because a document has not been released, adding another truck may accomplish nothing. If the warehouse has the right goods but the system shows an unapproved product code, the problem may be information rather than capacity. Diagnosis saves effort.

1.4 The recurring shipment

Riverbend's order gives us a common set of figures to use throughout Part 1. The buyer is fictional, and the route is a teaching route rather than a carrier schedule. The sale uses FCA at the named factory loading point under Incoterms® 2020; Chapter 4 explains that expression.

Item	Teaching assumption
Seller and origin	Riverbend Apparel, Gazipur, Bangladesh
Buyer and destination	Nordhaven Retail, German distribution centre
Goods	12,000 cotton shirts
Packing	300 cartons, each containing 40 shirts
Carton dimensions	50 × 40 × 20 cm external dimensions
Gross weight	10 kg per carton; 3,000 kg in total
Net weight	9 kg per carton; 2,700 kg in total
Invoice value	USD 5 per shirt; USD 60,000 in total
Planned service	Consolidated ocean shipment with road collection and delivery
Required receipt	By the end of teaching Day 42

Worked example 1.1 Checking the order. Divide 12,000 shirts by 40 shirts per carton: 300 cartons. Multiply 300 cartons by 10 kg: 3,000 kg gross. Convert the carton dimensions to metres before multiplying: 0.50 × 0.40 × 0.20 = 0.04 cubic metres per carton. Total volume is 300 × 0.04 = 12 cubic metres, usually written 12 m³ or 12 CBM.

These calculations establish a starting point. They do not establish whether the cargo can be stacked, whether pallets will be used or how a particular service will charge it. Palletisation can change external dimensions and weight. A quotation based on loose cartons must be checked again if the factory later adds pallets.

The 300 kg difference between net and gross weight represents packaging in this simplified example: 3,000 − 2,700 = 300 kg. Net weight refers to the goods themselves; gross weight includes their packaging. Using the net weight when a carrier needs the gross weight understates what must actually be handled.

1.5 Five service areas and different working problems

Air freight involves aircraft capacity and airport handling, with road legs commonly needed at either end. It is useful to think about the whole journey rather than the flight alone. A fast flight does little for a spare part that cannot be collected until after the required cutoff. Airport acceptance, security requirements, cargo characteristics and destination release all matter.

Ocean freight can carry large shipment volumes, but its service plan depends on port operations, equipment, sailing patterns and sometimes connections between vessels. A small shipment may share container space with other customers' cargo. A full-container service uses a container booked for the shipment arrangement concerned. Detailed service selection comes later; the first lesson is to ask what happens before loading and after discharge.

Road freight connects factories, terminals, warehouses and customers. It may also carry the entire shipment domestically or across borders. Vehicle access, loading facilities, delivery windows and route constraints can determine success. A promised arrival at a city is not the same as an accepted delivery appointment at a warehouse.

Contract logistics usually concerns an ongoing outsourced operation with an agreed scope, rather than one isolated transport movement. A provider might receive stock, maintain inventory records, replenish picking locations, prepare customer orders and manage returns. Performance is measured over repeated activity. Accuracy on the thousandth order matters as much as speed on the first.

Project logistics organises the movement of equipment and materials for a defined project. Cargo may be unusually heavy or large, and delivery sequence may be dictated by construction or installation. Planning must account for engineering, handling and site readiness. A specialised trailer arriving before the site can receive its load creates a problem even if the road journey was flawless.

Service	First customer question	Example of a decisive constraint
Air freight	When must the part be usable?	Acceptance cutoff and final delivery hours
Ocean freight	What arrival window can the business accept?	Sailing connection and destination handling
Road freight	Where and how will loading and unloading happen?	Vehicle access and booked delivery slot
Contract logistics	What daily operation is being outsourced?	Stock accuracy and peak order capacity

Service	First customer question	Example of a decisive constraint
Project logistics	In what sequence must equipment reach the site?	Route feasibility and installation readiness

These services frequently meet in one assignment. A factory installation may use ocean freight for machinery, air freight for missing components, specialist road transport for the inland move and temporary warehousing for material arriving early. The coordination between services deserves as much attention as each service on its own.

1.6 Compare the cost of a decision

Worked example 1.2 A cheaper rate with a dearer outcome. Two fictional service proposals for a retail shipment are summarised below. The buyer has estimated storage and handling consequences for each option. Taxes, purchase price and other costs are identical and excluded from this comparison.

Cost or service feature	Option A	Option B
Freight and ordinary handling	USD 2,400	USD 2,750
Extra storage expected under the plan	USD 480	USD 120
Additional receiving labour	USD 250	USD 100
Comparable total	USD 3,130	USD 2,970

Option B costs USD 350 more in freight and ordinary handling but saves USD 510 elsewhere. Its comparable total is USD 160 lower. The conclusion depends on the storage and labour assumptions being credible. If they are guesses, the next task is to test them rather than present the total as a certainty.

A quote should be compared on a common boundary: the same origin, destination, cargo, service scope and timing requirement. An airport-to-airport rate and a door-delivered quotation are different products. Place both on the same basis before deciding which is cheaper.

Worked example 1.3 How much disruption can the order absorb? Assume Nordhaven has 2,400 shirts available and demand is 300 shirts per day. Stock cover is 2,400 ÷ 300 = eight days. If the replenishment is now expected in ten days, the simple gap is two days. An early delivery of 600 shirts would cover that gap if demand stays constant and the stock is available before the existing stock runs out.

This is an initial business calculation, not an automatic instruction to send 600 shirts by air. The planner must check carton quantities, minimum shipment costs, demand uncertainty and whether the early stock can actually reach the warehouse in time. Here, 600 shirts equal 15 cartons. The forwarder can now price a defined recovery quantity instead of an undefined “urgent shipment”.

1.7 What good performance looks like

“On time” needs a defined event. A shipment may depart on schedule and arrive after the customer’s receiving deadline. It may arrive at the port on time and remain unavailable because release is incomplete. For Nordhaven, the useful event is accepted receipt at the distribution centre, subject to the order’s agreed quantity and condition.

The same care applies to “delivered”. Did the driver reach the gate, begin unloading or obtain a signed receipt? A service report becomes meaningful only when everyone uses the same definition. Later chapters develop performance measures, but the discipline begins here: give the event a name and record what happened.

You should also separate causes from symptoms. “Late delivery” describes an outcome. Late production, an unconfirmed pickup, a missed sailing and an unavailable receiving slot describe different causes. They require different corrective action.

Chapter 1 recap

A forwarding decision starts with the customer’s commercial need. Follow cargo, information and money separately, then examine where they depend on one another. Compare service proposals on the same basis, and define the event the customer actually needs. A sound plan can explain its assumptions as clearly as its price.

Review questions

Answers and marking guidance • **page 221**

1. How does logistics extend beyond the physical act of transport?
2. Give one sourcing decision that could change a transport requirement.
3. Why might a shipment stop even though the goods and a vehicle are available?
4. Who pays for the goods, and why might that payment differ from payment for freight?
5. Calculate the volume of one carton in the recurring case.
6. Why should a quotation be reviewed if loose cartons are placed on pallets?
7. What makes contract logistics different from an isolated warehouse receipt?
8. Why can early arrival create a problem in project logistics?
9. What must be aligned before two freight quotations can be compared fairly?
10. Which event would you use to judge service performance for Nordhaven, and why?

Applied exercises

Exercise 1A Draw the three flows. Map the Riverbend shipment from factory release to Nordhaven’s distribution centre. Include an origin forwarder, an ocean carrier, a destination representative and a warehouse. Use separate arrows for cargo, instructions and payments. Assume the buyer pays the seller for the shirts and appoints the forwarder for carriage. Mark two places where an information failure could interrupt the cargo flow. Explain your choices in 150 words.

Exercise 1B Compare a replenishment decision. A warehouse holds 1,800 units and uses 225 units a day. The new ocean shipment is expected in 12 days. A smaller air shipment can arrive in six days. Calculate the current stock cover and the minimum bridging quantity, assuming constant demand and arrival before consumption on the stated day. If the air shipment’s total incremental cost is USD 1,620 and each unmet unit would lose USD 4 contribution, calculate the potential contribution protected by the minimum shipment. Recommend a decision, including one assumption you would verify with the customer.

Chapter 2 The forwarder and the logistics ecosystem

The truck that nobody confirmed

At 08:30, Riverbend's shipping supervisor asks when the truck will arrive. The forwarder's customer service colleague believes transport has been arranged. The road operator has received a rate enquiry but no firm order. The factory has prepared cartons for collection, yet the loading team has been assigned to another job because no appointment was confirmed.

By 10:00, several people are looking at the same email chain. It contains a price, a preferred collection date and the sentence "Please proceed." It does not identify the vehicle booking reference, the agreed collection time or the person who accepted the instruction.

The recovery begins with finding a vehicle and a loading slot. The investigation begins with identifying what each party was expected to do and what evidence shows that it happened. Those are different tasks. A customer waiting for cargo needs progress on the first while the team works carefully through the second.

What you should be able to do

By the end of this chapter, you should be able to identify the main parties in a shipment, explain the difference between organising carriage and undertaking carriage, assign operational tasks to named owners, recognise what a handover record should contain and investigate a failure without confusing operational responsibility with legal liability.

2.1 What a freight forwarder does

A freight forwarder helps arrange the movement of goods and the associated services. The work can include consolidation, handling, storage, documentation and coordination with transport providers. FIATA's description also recognises advisory and information services. The precise service depends on the contract and the provider's capabilities. [P1-01]

In practice, the forwarder converts a customer's requirement into instructions that other parties can execute. That may involve asking the factory to revise its packing information, finding a suitable service, securing bookings, checking documents, following actual events and resolving problems. A small error in one instruction can travel through several organisations before somebody notices it.

A forwarder's value is particularly visible when the customer's request is incomplete. "Send our cargo to Germany" is a destination statement. It is not yet a shipment instruction. A good operator draws out the missing details without turning the enquiry into an endless questionnaire. The immediate questions are those that could change feasibility, cost, compliance or the customer's decision.

Some forwarding businesses own vehicles or warehouses. Others rely heavily on contracted providers. Many use a mixture. Ownership alone does not tell you whether a particular service is suitable. You need to know who will perform each activity, what has been promised and how the provider will deal with an exception.

2.2 Seller, buyer, shipper and consignee

The seller supplies the goods under the sales agreement. The buyer purchases them. In a straightforward transaction, the seller also appears as shipper and the buyer as consignee on transport documents. More complex transactions can separate those roles.

The shipper is the party identified in the relevant transport arrangement or document as tendering or contracting for the goods' shipment. The consignee is the named receiving party in that document. Exact legal consequences depend on the document and applicable arrangements. Do not change either name simply because another company is paying an invoice.

A trading company may buy from a factory and resell to an overseas retailer. A bank may feature in an order bill of lading arrangement. A distribution centre may receive goods on behalf of a buyer located elsewhere. The forwarder needs verified instructions for each role, including the final delivery address. Similar-looking names are not a reason to merge them in a system.

For the recurring case, Riverbend is the seller and shipper, while Nordhaven is the buyer and consignee. Nordhaven's distribution centre is the physical delivery location. We keep those roles aligned initially so that the operational sequence is easy to follow. Real files should still check each field separately.

2.3 Carriers, terminals and warehouses

A carrier undertakes carriage. The organisation physically operating a vessel, aircraft or truck may differ from the organisation contracting to provide carriage to the customer. This is one reason that "Who has the cargo?" and "Who is our contractual counterparty?" can have different answers.

A terminal handles cargo or transport equipment within a defined facility. An origin consolidation warehouse receives smaller consignments and prepares them for a combined movement. A destination deconsolidation operation separates those consignments for onward delivery. A distribution centre receives stock and fulfils a different operational purpose: making inventory available for customer orders.

The records created by these facilities are useful because they describe events at particular places. A warehouse receiving record can confirm a package count. It may also record visible damage. It does not automatically establish the contents of every sealed carton or prove that the merchandise meets the buyer's specification.

The distinction matters in our case. If 300 sealed cartons are received, the warehouse can report the carton count and the observations it was instructed and equipped to make. It cannot responsibly claim that all 12,000 shirts are the correct size and colour unless the service included an appropriate inspection and that inspection was performed.

2.4 Customs brokers and public authorities

A customs broker or other authorised representative assists with declarations and clearance within the applicable local framework. The authority, rather than the broker, decides whether the goods may be released under the relevant procedure. The importer and exporter must provide the information and authorisations needed for their roles.

A forwarding company may offer customs brokerage itself where permitted, or coordinate an independent broker. For the customer, the arrangement should be clear: who prepares the declaration, who verifies product information and who responds when an authority asks a question? Legal responsibilities cannot be inferred from an informal email heading.

In the classroom, it is tempting to draw customs as a single box marked "cleared". In practice, the useful question is whether the particular shipment has the release needed for the next movement. A cleared import

declaration does not necessarily mean a carrier has released the cargo or a terminal has completed its delivery requirements.

2.5 Banks, insurers and inspection providers

Banks support payment arrangements and trade finance. Insurers provide cover according to their policies. Surveyors and inspection providers may examine goods, packing or damage within a defined scope. Each contributes something different to the transaction.

The operations team should know when its decisions could affect these arrangements. Releasing documents in a way that conflicts with a payment instruction can expose the seller to a commercial problem. Moving damaged cargo without recording its condition can weaken the available evidence. These concerns should be raised with the responsible specialists rather than handled through guesswork.

A forwarder can coordinate an insurance request without becoming the insurer. It can supply documents to support a claim without deciding whether the policy pays. Keeping those boundaries clear improves customer communication, particularly when the customer is under pressure.

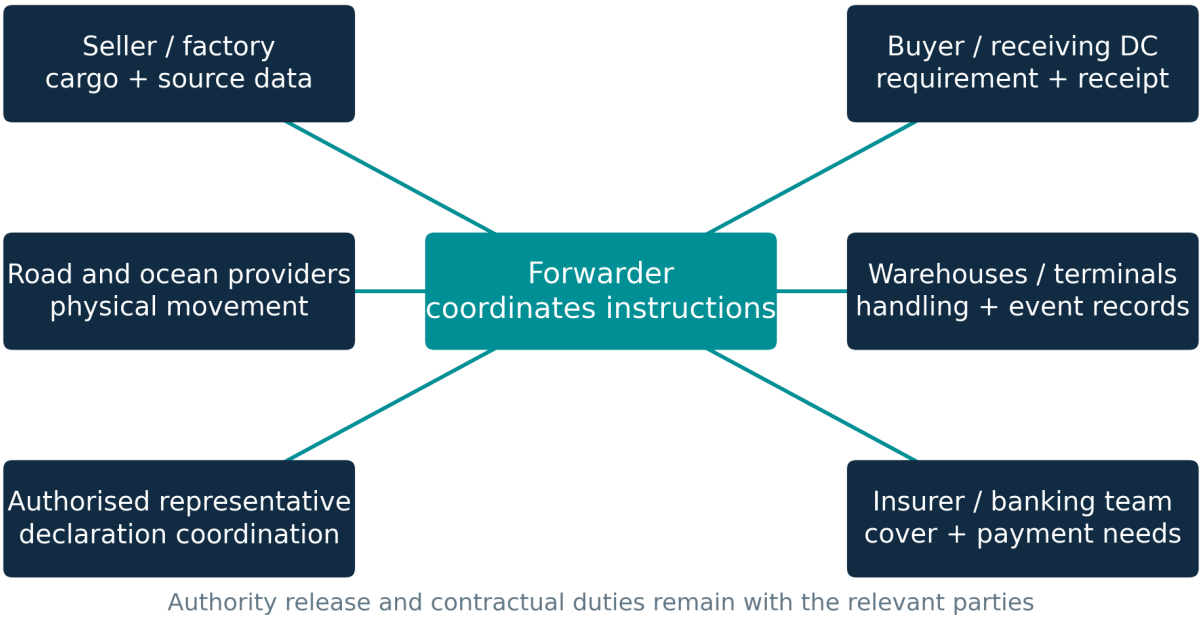


Figure 2.1 Working relationships around the shipment. Coordination lines do not imply that every party has a contract with the forwarder.

2.6 Acting as agent or as contractual carrier

FIATA's Model Rules recognise that a forwarder may act as an agent or as a contractual carrier. They are a framework for trading conditions, not a law that automatically governs every shipment. Actual obligations depend on the agreed terms and applicable law. [P1-02]

In an agency arrangement, the forwarder arranges services on the customer's behalf within its authority. In a contractual-carrier arrangement, it undertakes carriage in its own name, even where another carrier performs the physical movement. The wording of the agreement and the documents matters more than the job title of the person answering the telephone.

Worked example 2.1 Two offers with a similar appearance. Provider A says it will arrange a booking with a named ocean carrier as the customer's disclosed agent and charge a booking fee. Provider B offers

carriage under its own transport document, using a subcontracted ocean carrier. Both offers describe the same port pair. They may still create different contractual relationships.

The customer should examine the contracting party, document issuer, service scope, applicable terms and claim process. A comparison based solely on the freight total would miss these questions. At this stage, you do not need to decide the legal outcome of a future claim. You do need to recognise that it cannot be settled by saying “both companies are forwarders”.

An operational coordinator should preserve the relevant quotation, accepted conditions and transport documents. If a dispute develops, legal or claims colleagues will need to reconstruct the agreement. A complete file is more useful than somebody’s recollection of a hurried telephone call.

2.7 Draw a responsibility map

A responsibility map identifies the person or organisation expected to act at each stage. It is an operating tool. It should not be treated as a legal allocation of all cargo risk or liability.

In the following example, Nordhaven appoints a forwarder to coordinate carriage after the agreed factory handover. Riverbend remains responsible for preparing its cargo and for its seller obligations. Names and assignments are teaching assumptions.

Activity	Operational lead	Evidence needed before proceeding
Confirm order and receipt deadline	Buyer and seller	Accepted order and named delivery requirement
Confirm cargo readiness and packing	Factory shipping supervisor	Approved packing data and release time
Issue collection instruction	Forwarder operations coordinator	Instruction accepted by road operator
Prepare loading team	Factory shipping supervisor	Confirmed appointment and loading resources
Supply vehicle	Road operator dispatcher	Vehicle reference and driver contact
Receive cargo at consolidation facility	Warehouse receiving team	Receiving record with count and exceptions
Submit export declaration	Appointed authorised representative	Accepted instruction and required source documents
Arrange destination delivery	Destination coordinator	Required releases and receiving appointment

A named lead should have the authority and information to perform the task. “Operations” is often too broad. If two departments each assume the other will act, the map has failed even if both departments appear somewhere on it.

The last column is equally important. “Truck arranged” is an assertion. An accepted order with a vehicle reference and a pickup window is evidence that can be checked. An acknowledgement is not a guarantee of performance, but it gives the coordinator something concrete to follow up.

2.8 Make the handover visible

At a cargo handover, the parties should establish what was transferred, in what apparent condition, when and to whom. Useful records commonly include a shipment reference, package count, weight or seal information where relevant, observed exceptions and the identities of the releasing and receiving parties.

Worked example 2.2 Three wet cartons. Riverbend presents 300 cartons for collection. The driver sees wet patches on three cartons before loading. Signing an unqualified receipt for 300 cartons in apparent good order would leave a poor record. The driver should record the observed condition through the agreed process, notify the dispatcher and obtain instructions. The factory and forwarder can then assess replacement packing, inspection or another suitable action before the goods continue.

The observation should remain factual: “Visible wet patches on cartons 118, 119 and 120; photographs recorded at loading point” is stronger than “The factory damaged the goods.” The second statement jumps from evidence to an attribution of cause. A receiving record should describe what the person can actually observe.

Where a sealed container is handed over, the visible container and seal details may be more immediately accessible than the goods inside. A seal discrepancy calls for escalation and the applicable control process; it is not something to correct silently on the paperwork.

2.9 Investigate the missed collection

Return to the chapter’s opening problem. The following teaching record is more useful than a general accusation that somebody failed.

Time	Event	What the event establishes
Previous day 15:00	Road operator sends a rate	A price was offered; no vehicle commitment is shown
Previous day 15:25	Sales writes “Please proceed” to internal operations	An internal request exists
Previous day 17:10	Operations asks the factory if cargo is ready	Readiness is being checked; pickup remains unconfirmed
Collection day 08:30	Factory asks for arrival time	The factory expects a vehicle
Collection day 09:00	Road operator confirms no order received	No accepted transport instruction has been found

Worked example 2.3 Recovery and correction. The coordinator first establishes the latest viable collection time, checks the factory’s loading availability and secures a vehicle that can meet the next facility’s receiving hours. The buyer receives an update with the revised plan and any cost requiring approval. The shipment record captures what was agreed.

The process correction addresses the missing acceptance step. In this case, a rate enquiry was allowed to become a presumed booking. A practical improvement is to require an accepted transport order before the customer is told that collection is confirmed. An unaccepted order needs an owner and an escalation time.

The evidence points to an operational control failure. It does not, by itself, resolve a legal claim for delay or determine who must absorb every cost. Those questions require the contracts, instructions and wider facts. Keeping that distinction avoids both defensive blame and premature promises.

2.10 Working across offices

Origin and destination teams see different parts of the same movement. The origin team may know that the cargo was loaded; the destination team may know that the consignee has no delivery appointment. A useful handover gives both teams the references, current status, unresolved questions and decisions still needed.

Time zones make vague instructions especially expensive. “Please confirm today” leaves the receiver guessing whose day is intended. Use an explicit deadline and time zone where timing matters. If a decision cannot wait for the next office to open, the escalation arrangement should already identify an authorised person.

The professional skill is to keep responsibility visible without making every message confrontational. “Please confirm vehicle acceptance by 14:00 Bangladesh time so that the factory can reserve its loading team” explains the action and its purpose. It is easier to act on than a string of increasingly urgent reminders.

Chapter 2 recap

Know which role each party is performing on the actual shipment. Record accepted instructions and make handovers observable. When something goes wrong, organise the recovery, preserve the facts and investigate the cause. Operational ownership, contractual obligation and legal liability are related questions that require different evidence.

Review questions

Answers and marking guidance • page 222

1. What does a forwarder contribute before a transport booking is made?
2. Why should seller, shipper, buyer and consignee be checked separately?
3. How can a contractual carrier differ from the physical carrier?
4. What can a warehouse receipt for sealed cartons reasonably establish?
5. Who grants customs release: the broker or the authority?
6. Why does arranging insurance not make the forwarder the insurer?
7. Which records help identify whether a forwarder acted as agent or contractual carrier?
8. Why is a responsibility map useful without being a complete liability agreement?
9. What is missing when a rate enquiry is treated as a confirmed collection?
10. How would you record visible wet packaging without making an unsupported accusation?

Applied exercises

Exercise 2A Allocate the work. Use the missed-collection timeline to prepare a recovery plan. Assign an owner to vehicle confirmation, factory loading, receiving-facility coordination, customer communication and cost approval. Then write a 100-word internal explanation of the control failure. Distinguish the evidence from any assumption about who is legally liable.

Exercise 2B Investigate a shortage. The factory packing list states 300 cartons. The collection receipt also records 300. The consolidation warehouse’s receiving record states 298, with no explanation. The vehicle has left. List the records and people you would check, draft a factual customer update of no more than 90 words and identify two reasons why you should not immediately issue a corrected packing list for 298 cartons.

Chapter 3 The shipment lifecycle

The enquiry that needs another conversation

“Please quote our garments to Germany. Around 300 cartons. Ready next week. Need delivery urgently. Send your best rate.”

An experienced operator can recognise the outline of a job in this message. There is cargo, an approximate quantity, an origin implied by the customer relationship and a destination country. There is also enough missing information to make a firm quotation unreliable.

The task is to turn the message into a shipment brief without losing the customer’s interest. Ask the questions that affect the service, explain why they matter and distinguish a preliminary estimate from a confirmed offer. This chapter follows that process through to delivery and financial closure.

What you should be able to do

By the end of this chapter, you should be able to turn an enquiry into an executable shipment brief, distinguish a quotation from a booking, plan milestones backwards from a receipt deadline, identify dependencies before releasing the next instruction, communicate an exception and close a shipment file with the evidence needed for operational and financial review.

3.1 Establish what is being requested

Start with the cargo and the service boundary. What are the goods, where will they be collected and where must they be delivered? Does the customer want port-to-port movement, door-to-door coordination or only a quotation for one leg? A destination country is too broad to establish an inland delivery cost.

Next, establish quantity and handling needs. A carton count without dimensions or gross weight cannot describe the capacity requirement. A cargo description such as “equipment” may conceal batteries, liquids, unusual handling needs or oversized pieces. The person pricing the shipment needs enough detail to refer the cargo to the appropriate operational or specialist team.

Then clarify time. “Urgent” describes the customer’s concern, not a measurable deadline. Ask when the goods will actually be released for collection and when they must be available to the receiver. If those dates are incompatible with the proposed service, the problem should be visible before a booking is accepted.

Finally, establish who is giving the instruction and who will pay. The seller’s employee asking for a rate may not be authorised to approve a change in the buyer’s transport arrangement. The sales term, appointment and billing instruction need to fit together. Chapter 4 develops the contractual side of these questions.

3.2 A shipment brief that somebody else can use

A shipment brief should let a competent colleague understand the work without reconstructing several weeks of messages. It is a controlled record of what the team currently knows. Estimates should remain labelled as estimates until they are confirmed.

Field	Completed teaching instruction	Why the field matters
Job reference	RB–NH–001; purchase order NH–104	Links the order to the shipment file
Cargo description	Cotton shirts; new retail garments	Supports service and document review

Field	Completed teaching instruction	Why the field matters
Packing	300 cartons; 50 × 40 × 20 cm each	Establishes external volume
Weight	3,000 kg gross; 2,700 kg net	Separates handling weight from goods weight
Collection	Riverbend factory, loading bay 2, Gazipur	Identifies the physical handover point
Readiness	Teaching Day 0, 16:00 Bangladesh time	Distinguishes production completion from release
Delivery	Nordhaven DC, receiving bay 4, Germany	Identifies the receiving operation
Receipt deadline	End of teaching Day 42	Defines the customer's required outcome
Sales term	FCA Riverbend factory loading bay 2, Gazipur, Bangladesh, Incoterms® 2020	Records the agreed sale-delivery basis
Instruction and billing	Nordhaven appoints forwarder; bill approved carriage to Nordhaven	Identifies appointment and payer
Contacts	Named factory supervisor and DC receiving coordinator held in job file	Gives the operator actionable contacts
Documents	Invoice and packing list to be checked before dispatch	Establishes a readiness dependency

This is an instructional extract, not a complete customs or carrier form. A live file also needs full verified addresses, contact details, any required identifiers, authorisations and service-specific information. The table uses fictional facility names to demonstrate the logic without creating plausible personal data.

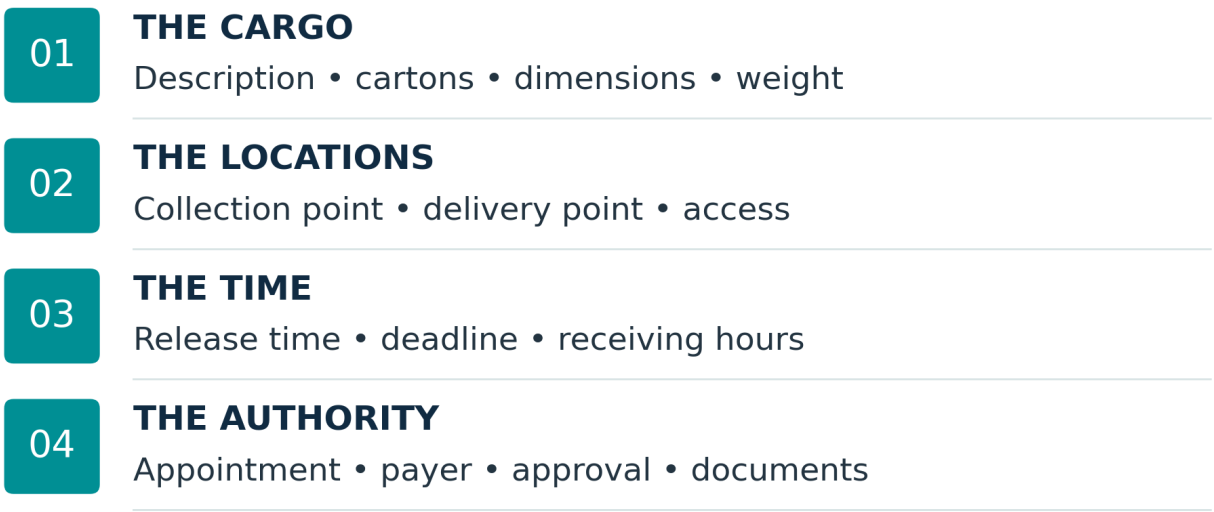


Figure 3.1 Reading a shipment instruction. Each group of fields answers a different operational question.

3.3 Build a quotation with a visible boundary

The quotation records the commercial offer. It should identify the shipment assumptions, service scope, price basis, inclusions, exclusions, validity and relevant conditions. An estimated journey should be described as an estimate unless a specific commitment has been agreed and can be supported.

Worked example 3.1 Three versions of the same request. At first, the customer provides only “300 cartons to Germany”. The forwarder can acknowledge the enquiry and request the missing data. Once weight, dimensions, locations and dates are available, a provisional service proposal can be costed. After the customer accepts the defined proposal and the provider confirms the necessary arrangements, the job can move into execution.

The important point is the change in evidence. A price does not prove that space has been secured. A customer’s acceptance does not prove that a vehicle is available. A carrier booking does not prove that the cargo has passed acceptance checks. Each event answers a different question.

In a revised quotation, say what changed. If the original quote assumed 12 CBM of stackable cartons and the final packing creates 16 CBM of non-stackable units, reprice the relevant service and obtain the appropriate approval. Quietly absorbing the discrepancy in a job note leaves the commercial conversation unfinished.

3.4 Plan backwards from the customer’s date

For the Riverbend case, use the following teaching milestones. “Day” means an elapsed calendar-day index, not a published sailing schedule. The intervals are invented for learning; actual lead times require current route and service checks.

Milestone	Planned teaching day	Evidence to seek
Cargo released by factory	0	Factory release confirmation
Collection completed	1	Collection record
Origin warehouse receipt	2	Receiving record and discrepancies
Export readiness complete	3	Required release and accepted documents
Cargo cutoff	4	Facility or carrier acceptance status
Vessel departure	6	Actual departure confirmation
Destination port arrival	35	Actual arrival status
Release and delivery preparation	36–38	Required releases and receiving slot
DC delivery	39	Delivery receipt and exception record
Latest customer receipt	42	Contractual or agreed customer deadline

Worked example 3.2 Calculate the available time. Planned factory release to DC delivery takes 39 elapsed days: 39 − 0. The vessel stage takes 29 days: 35 − 6. The difference, ten days, is allocated to activities before departure and after arrival. The plan has three days between expected DC delivery and the latest receipt date: 42 − 39.

That three-day allowance is available schedule margin, not a promise that every three-day disruption can be absorbed. If the next sailing departs a week later, missing a cutoff can produce a seven-day shift rather than

a one-day shift. The relationship between events matters more than adding a blanket percentage to the transit time.

A backward check begins at Day 42. If destination preparation and delivery require four elapsed days after port arrival, arrival must occur by Day 38. If the assumed vessel stage is 29 days, departure must occur by Day 9. A departure on Day 13 would already threaten the deadline under these assumptions. This check helps the team decide when a recovery discussion is necessary.



Figure 3.2 The Riverbend teaching schedule. The three-day margin follows the planned DC delivery, rather than being hidden inside the vessel transit estimate.

3.5 Confirm bookings and dependencies

A booking is a specific arrangement with a service provider, subject to its terms and acceptance requirements. Record the provider reference, service details, dates, cutoffs and outstanding conditions. Where space or equipment remains pending, the customer-facing status should say so.

Before issuing collection instructions, verify that the factory can release the goods and the receiving facility can accept them. Before planning dispatch from a warehouse, verify the required instructions and release status. These checks are dependencies: one activity requires something else to be true first.

A simple decision test helps. Ask what would make the next instruction impossible, unsafe, non-compliant or commercially unauthorised. For a collection, that might be an inaccessible loading point, unready cargo or an unapproved extra charge. For final delivery, it might be an unresolved release requirement or a receiver that does not accept unscheduled vehicles.

A dependency should have an owner and a deadline. “Awaiting documents” is incomplete. “Factory to provide the corrected packing list by 12:00 Bangladesh time on Day 1; operations to check before collection release” can be followed and escalated.

3.6 Accept the cargo and reconcile the record

At collection and origin receipt, compare the physical records with the booking data. If cartons, weights or dimensions differ, establish the reason. A discrepancy might be an ordinary packing change, a counting error or something requiring investigation. It should not disappear because the system makes editing a field easy.

For Riverbend, suppose the warehouse records 300 cartons and 3,060 kg rather than 3,000 kg. The team should check the measurement basis, the accuracy of the original weight and any packaging added. A 60 kg difference may be understandable, but the explanation should be recorded and the relevant documents or bookings corrected through the appropriate process.

The origin team also checks whether the required documents are consistent and whether any further action is needed for the goods and route. This chapter introduces the control point. It does not attempt to supply a universal customs checklist; those requirements differ by jurisdiction and cargo.

3.7 Monitor actual events

A planned event is an intention. An actual event is something supported by evidence. Estimated time of departure and estimated time of arrival are commonly shortened to ETD and ETA. Their actual counterparts are ATD and ATA. The location and event must accompany the abbreviation: ATA at a port is not arrival at the customer's warehouse.

A useful milestone record captures the planned time, revised estimate, actual time if known, source and next action. The source matters. A carrier's movement message, a terminal record and an informal telephone estimate have different evidential weight. If information conflicts, resolve it or describe the uncertainty.

Tracking should lead to action. A colourful dashboard that displays a late connection without identifying who will contact the buyer is incomplete. In the recurring case, a revised arrival on Day 40 would consume the margin and move the assumed DC receipt to Day 44. The customer needs to know the consequence for its promotion, not only the revised port ETA.

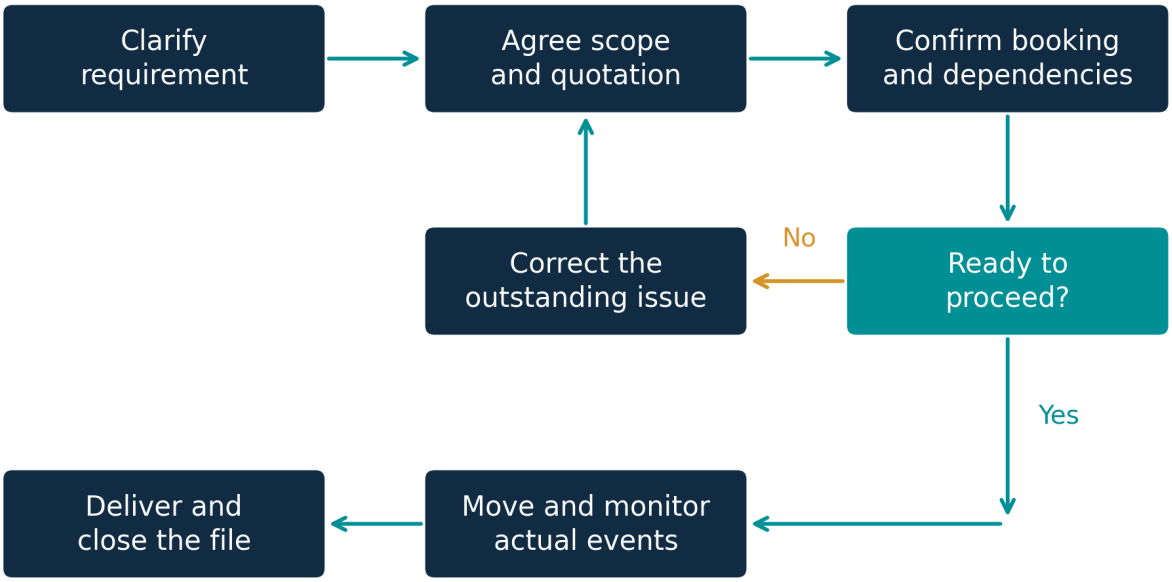


Figure 3.3 Shipment decisions and feedback. A failed readiness check returns the job to correction before the next instruction is issued.

3.8 Handle a missed departure

Worked example 3.3 A seven-day shift. Suppose the planned Day 6 departure is missed and the next available service departs on Day 13. Keep the 29-day vessel stage and four-day destination interval unchanged for this exercise. Port arrival becomes Day 42 and DC delivery becomes Day 46, four days after the customer's Day 42 deadline.

The forwarder should examine alternatives with the customer. Possibilities might include a different service, a partial urgent movement, a revised receiving plan or acceptance of the later delivery. Each needs

its own feasibility and cost check. An alternative is not a recovery plan until the relevant space, handling and delivery arrangements are credible.

Assume Nordhaven authorises a separate urgent shipment of 600 shirts. At 40 shirts per carton, 15 cartons move separately and 285 remain for the ocean movement. The split represents 150 kg gross and 0.6 CBM in the urgent portion, leaving 2,850 kg and 11.4 CBM in the ocean portion. Total quantities must still reconcile to the original 300 cartons and 12,000 shirts.

A split also requires document review, instructions to each provider and a receiving plan that identifies both shipments. The operator should not simply book the urgent portion and leave the original ocean paperwork unchanged. Chapter 4 shows how to reconcile the commercial figures.

3.9 Tell the customer what the change means

A useful update says what has happened, how it affects the agreed requirement, what action is under way and when the next decision or update is due. The tone should be calm enough to be useful and direct enough to be trusted.

Sample message for the fictional case: “The shipment did not depart on teaching Day 6. The next available service currently offered departs on Day 13. On the present planning assumptions, DC delivery would move from Day 39 to Day 46, four days after your required date. We are checking an earlier ocean option and a separate movement of 15 cartons. Please confirm whether 600 shirts would cover the immediate requirement. We will report the confirmed options and additional costs by 16:00 Bangladesh time on Day 7.”

The message does not claim that an alternative is confirmed. It gives the customer a decision that relates to its business. If the cause is still being investigated, say that separately. Do not present a convenient explanation as a verified fact.

3.10 Prepare destination delivery before arrival

The destination team should have the shipment references, documents, estimated arrival and receiving instructions early enough to prepare. It should establish what releases and local actions are needed, who will undertake them and when the receiver can accept the goods.

An arrival notice is an instruction to prepare, not proof that cargo is already available for collection. A receiver’s purchase order reference may be essential to obtaining a delivery slot. Opening hours, unloading equipment and appointment rules can matter as much as the line-haul arrival.

For Nordhaven, the coordinator checks the DC’s receiving reference and agrees a slot. Once the necessary releases are complete, a road operator receives the final delivery instruction. If the cargo cannot be released in time for the slot, the team must rebook it rather than dispatch a vehicle on the hope that the issue will resolve itself.

3.11 Close the shipment properly

Proof of delivery, often called POD, records the delivery event in the form used for the service. Check the date, receiver, quantity information and any recorded exceptions. A receipt with a shortage note is a different outcome from an unqualified receipt. If the service includes return of empty equipment, that obligation also needs completion.

Operational closure includes resolving outstanding discrepancies or assigning them to a continuing claim or corrective-action process. Financial closure reconciles expected costs with supplier invoices, confirms

approved customer charges and records the job's result. Marking a job "delivered" should not make unresolved costs disappear from view.

Worked example 3.4 Closing the file. A fictional forwarding job has customer revenue of USD 2,800, expected supplier costs of USD 2,250 and an additional approved supplier charge of USD 90. If the customer revenue remains USD 2,800, total cost is USD 2,340 and gross profit is USD 460. The original expected profit was USD 550. The USD 90 difference needs an explanation; it is not corrected by leaving the late supplier invoice out of the file.

A short review should identify what the next shipment can learn. If every delivery requires a last-minute call to obtain the same warehouse reference, the recurring instruction needs correction. Repeated emergencies often expose a missing piece of routine information.

Chapter 3 recap

The shipment file should show how an enquiry became an agreed service, how that service was executed and what happened when the plan changed. Check dependencies before issuing instructions. Maintain separate planned and actual events. Delivery closes the physical journey, while a complete job record also addresses documents, exceptions and costs.

Review questions

Answers and marking guidance • **page 223**

1. What is the difference between an urgent request and a measurable deadline?
2. Name four cargo facts needed before a firm service proposal can be prepared.
3. Why does a customer's acceptance not prove that carrier space is confirmed?
4. How many elapsed days are planned between factory release and DC delivery in the recurring case?
5. What does the three-day schedule margin mean, and what does it not guarantee?
6. Explain a dependency that must be satisfied before collection.
7. How does an ETA differ from an actual arrival event?
8. Why must the team investigate a weight discrepancy before silently editing the system?
9. What should a customer update explain beyond a revised arrival date?
10. Why is a delivery receipt insufficient, by itself, for full financial closure?

Applied exercises

Exercise 3A Repair the enquiry. Use the opening message about "around 300 cartons" to identify eight missing information groups. Draft a concise reply asking for them. Then explain which two answers could most directly change the transport mode. You may assume that the customer is established, but not that its shipment details are already known.

Exercise 3B Replan the timeline. A different teaching shipment has cargo release on Day 0, departure on Day 5, port arrival on Day 24 and DC delivery on Day 28. The customer needs receipt by Day 30. Departure changes to Day 9 and the vessel stage remains 19 days. Calculate the revised port arrival, DC delivery and delay against the deadline. If destination preparation can legitimately be reduced from four days to two through pre-arranged actions, calculate the revised result. Identify two actions to investigate and one assumption that must be confirmed.

Chapter 4 Trade terms and commercial documents

Who carries the risk on the water

A buyer sees an offer that includes freight to the destination port and assumes the seller remains responsible for the goods until arrival. The seller believes risk passes earlier. Both parties can read the price correctly and still disagree about what happens if the goods are damaged during the voyage.

The disagreement may remain invisible while shipments run smoothly. It becomes urgent when there is a loss. A forwarder should be able to recognise the issue before that happens and ask the parties to align their instructions. This chapter introduces the rules and documents that make those conversations more precise.

What you should be able to do

By the end of this chapter, you should be able to separate delivery, cost, risk and ownership; identify the two mode groups in Incoterms® 2020; explain the practical significance of a named place; compare offers on a common cost basis; distinguish commercial and transport documents; and reconcile the quantities and values in a simple shipment file.

4.1 Four questions to keep separate

The first question is where the seller fulfils the agreed delivery obligation. The second is which costs each party pays. The third is when the risk of loss or damage passes between seller and buyer. The fourth is when ownership changes. They need not have the same answer.

Incoterms® rules, published by the International Chamber of Commerce, address specified obligations, costs and risk in a sale of goods. They do not settle ownership, payment terms or every consequence of delay. Those matters need the wider contract and applicable law. Write the chosen rule, precise place or port and edition into the agreement. [P1-04]

For example, “FCA Riverbend Apparel, loading bay 2, Gazipur, Bangladesh, Incoterms® 2020” tells the operator far more than “FCA Bangladesh”. A real contract would include the verified address. The exact loading point matters if a large site has several gates with different access or handling arrangements.

Do not use the phrase “ownership passes at the port” when the evidence establishes only a delivery or risk point. If a customer asks an ownership question, consult the sale agreement and the appropriate specialist. Freight payment is not proof of ownership either.

4.2 The eleven rules at a glance

Incoterms® 2020 contains seven rules for any mode or combination of modes and four for sea or inland waterway transport. [P1-05] The following map is an introductory guide, not the full ICC rules. Its purpose is to help you recognise the choice being made and locate the provision that requires closer reading.

Any mode or combination	Delivery and risk point in outline
EXW — Ex Works	Goods made available at the named place, before loading
FCA — Free Carrier	Agreed handover to the buyer’s nominated carrier or person

Any mode or combination	Delivery and risk point in outline
CPT — Carriage Paid To	Handover to the seller's carrier; seller pays agreed carriage onward
CIP — Carriage and Insurance Paid To	As CPT, with seller-arranged cargo insurance
DAP — Delivered at Place	Named destination, on arriving transport, ready for unloading
DPU — Delivered at Place Unloaded	Named destination, after unloading
DDP — Delivered Duty Paid	Named destination, import-cleared, ready for unloading

Sea or inland waterway	Delivery and risk point in outline
FAS — Free Alongside Ship	Alongside the nominated vessel at the shipment port
FOB — Free On Board	On board the nominated vessel at the shipment port
CFR — Cost and Freight	On board at shipment; seller pays freight to the destination port
CIF — Cost Insurance and Freight	As CFR, with seller-arranged cargo insurance

Sources for the map: ICC's mode groups [P1-05], its rules for any mode [P1-06] and sea or inland waterway rules [P1-07], and ICC Academy's explanation of the C and D groups [P1-08]. Obligations such as export or import clearance, notices and documents require the fuller rule; the map deliberately does not reproduce every obligation.

The abbreviations become easier to remember when used in a real instruction. Begin with FCA, CPT or CIP, and DAP or DPU for the multimodal examples in this book. Then compare the sea rules with their different delivery points. Memorising eleven names without understanding the handover is of limited practical value.

4.3 Apply FCA to the factory collection

Under FCA at the seller's premises, delivery occurs when the goods are loaded on the buyer-arranged collecting transport. At another named place, the handover mechanics differ: the goods arrive on the seller's transport, ready for unloading, at the disposal of the buyer's nominated carrier or person. The seller handles export clearance where applicable. [P1-06]

Worked example 4.1 The factory loading point. Riverbend and Nordhaven use FCA at Riverbend's loading bay. Nordhaven appoints the forwarder, which arranges collection. The factory must prepare and load the goods in accordance with the agreed arrangement. The collection record becomes useful evidence of the handover. A later port gate-in is a separate event.

Suppose the buyer changes the named place from the factory to an inland consolidation facility. The operator must revisit the plan, because the seller's delivery obligation is now tied to a different location. The factory-to-facility movement cannot be treated as commercially unchanged merely because the final ocean destination remains Germany.

EXW should not be used as shorthand for any factory collection. Its allocation differs from FCA, including the seller's loading and export-clearance obligations. A seller that intends to load the collection vehicle and arrange export clearance should have the proposed rule checked against that intention. ICC's selection guidance discusses these practical differences. [P1-09]

4.4 Cost and risk can separate

Under the C rules, the seller pays for specified onward carriage even though risk passes at an earlier delivery point. Under the D rules, delivery and risk transfer are at the named destination. [P1-08] This distinction explains the opening scenario.

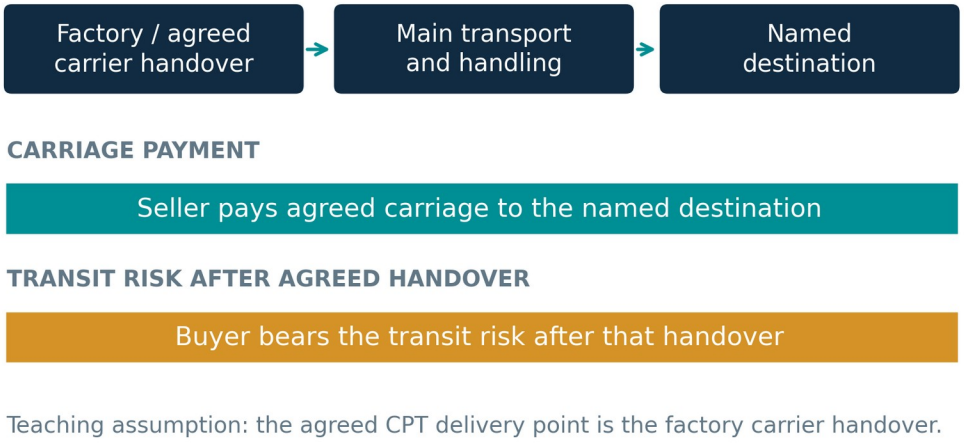


Figure 4.1 CPT in the fictional case. Seller-paid carriage extends beyond the agreed carrier handover where risk passes. The diagram concerns the sale arrangement, not ownership or carrier liability.

Worked example 4.2 A CPT offer. Imagine Riverbend quotes CPT Nordhaven's German distribution centre and the parties agree that delivery to the first carrier occurs at the factory. Riverbend arranges and pays the contracted carriage to that destination. If cargo is damaged after the agreed handover, the buyer cannot establish that the seller still bore transit risk merely by pointing to the freight-inclusive price.

The file must still be investigated. Was the loss after the handover? Was packing adequate? Did either party breach another obligation? Is there a claim against a carrier or under an insurance policy? Incoterms risk allocation answers one question in that investigation; it does not erase every possible responsibility for another party's conduct.

For a forwarding operator, the immediate lesson is to record both points: the place where the seller delivers under the sale and the destination to which carriage is paid. If the system offers only one location field, use a clear supplementary note rather than forcing two different facts into the same label.

4.5 Sea rules and container handovers

FOB, CFR and CIF use an on-board delivery point; FAS uses a point alongside the vessel. When containerised goods are handed to a carrier before vessel loading, ICC guidance directs attention to rules that match that earlier handover, such as FCA, CPT or CIP. [P1-07, P1-09]

In our teaching case, the 300 cartons enter a consolidation process before the container reaches the ship. A description such as "FOB factory" would leave the instruction confused. The parties should identify the intended handover and choose a rule that fits it.

An operator should not silently replace the sales term in an invoice or booking because a different rule seems more suitable. Explain the mismatch, ask the authorised buyer and seller to clarify their agreement, and update the related instructions consistently. A correction needs acceptance, not just a well-informed typist.

4.6 Insurance and arrival obligations

CIP and CIF require the seller to arrange insurance, but the default cover differs. Incoterms® 2020 generally calls for Institute Cargo Clauses (A) or similar cover under CIP and Clauses (C) or similar under CIF, unless the parties agree otherwise. Neither label means that every loss will be paid. Policy terms, exclusions and evidence still matter. [P1-10]

A buyer considering a high-value or vulnerable product should ask an insurance specialist to check the required protection. The operator's role is to obtain clear instructions and keep the insurance arrangement consistent with the shipment. Avoid describing a shipment as "fully insured" unless the intended meaning has been carefully established.

DAP and DPU differ at unloading: DAP delivery occurs with goods ready for unloading; DPU delivery follows unloading. In both, the buyer normally handles import clearance. [P1-11] DDP gives the seller import-clearance and duty obligations as well as destination delivery responsibilities, which may be difficult to perform in a foreign jurisdiction. [P1-06]

Consider a project shipment whose receiver has no crane. A DPU offer needs a workable unloading plan. A DAP arrangement still needs the buyer's unloading preparation to be coordinated with vehicle arrival. The rule does not make a crane appear at the site. It tells the parties which obligation they must turn into an executable plan.

4.7 Match the connected contracts

A transaction may involve separate agreements for sale, carriage, insurance and payment. They need compatible instructions, although the parties and obligations differ. Incoterms rules incorporated in the sales contract do not automatically become the terms of the carriage or banking arrangement. [P1-04]

For Riverbend, the sales file specifies the garments and price. The forwarding instruction defines the logistics work. A transport document records the relevant carriage arrangement. If insurance is arranged, its policy provides the applicable cover. Payment follows the agreed mechanism.

Worked example 4.3 A document condition that does not fit the service. A buyer proposes an air shipment while a draft payment condition requests an ocean on-board bill of lading. The goods may be perfectly suitable for air transport, but the document requirement needs amendment through the responsible parties before shipment. The forwarder cannot solve the mismatch by inventing a sea document.

This is why document review belongs before dispatch. A requirement that looks like administration can determine whether the seller can present the documents needed to obtain payment.

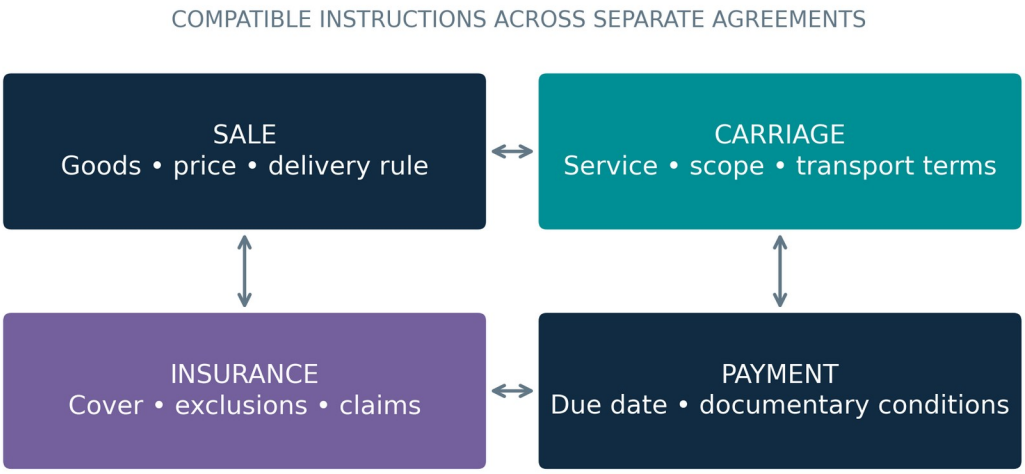


Figure 4.2 Four agreements around one transaction. The documents and instructions must be compatible even though the agreements serve different purposes.

4.8 Compare two supplier offers fairly

Worked example 4.4 FCA versus DAP. Nordhaven receives two fictional offers for the same 12,000 shirts, quality and receipt requirement. Offer A is USD 60,000 FCA at Riverbend's factory. Offer B is USD 63,500 DAP at the named German DC. For this exercise, all listed delivery costs in B are included, all amounts use USD and both offers are feasible on the stated schedule.

Comparable cost to the same DC	Offer A	Offer B
Supplier's price	60,000	63,500
Collection after FCA handover	250	Included
Origin handling after handover	450	Included
Ocean freight	1,350	Included
Destination handling	600	Included
Final road delivery	350	Included
Subtotal before common exclusions	63,000	63,500

The buyer-controlled charges under A total USD 3,000: 250 + 450 + 1,350 + 600 + 350. On the stated cost boundary, A is USD 500 lower than B. Per shirt, A is USD 5.25 and B is approximately USD 5.29. These are comparison subtotals, not complete landed costs.

For both offers, the exercise excludes import duty, import taxes, import-clearance service charges, buyer unloading and any separately arranged insurance. Those items must be evaluated for a live decision. Recoverable tax may affect cash flow differently from economic cost. Its treatment needs the buyer's finance and customs specialists.

The cheaper subtotal is only the first finding. Under FCA, the buyer carries risk after the agreed factory handover; DAP keeps the seller's transit risk through the destination delivery point before unloading. Nordhaven should compare service control, insurance needs, exclusions and contractual protection before making its final decision. Two offers can have similar transport costs and different commercial allocations.

Sensitivity check. If Offer A's ocean freight rises by USD 700 before an acceptable rate is secured, its subtotal becomes USD 63,700. It is then USD 200 above B, assuming B's price remains valid and its inclusions unchanged. The buyer should therefore examine quote validity and exposure to changes as well as the initial numbers.

4.9 Read documents by their purpose

A commercial invoice records the sale value and goods being invoiced. A packing list describes how the shipment is packed. They answer different questions, so one does not replace the other. Transport documents identify the carriage and shipment details. Their legal effects depend on document type and governing arrangements. [P1-12]

Document or record	Question it helps answer
Purchase order or sales agreement	What did buyer and seller agree?
Pro forma invoice	What commercial offer is being proposed?
Commercial invoice	What goods and value are being invoiced?
Packing list	How are the goods distributed among packages?
Shipment instruction	What has the logistics team been asked to arrange?
Booking confirmation	What service arrangement has the provider confirmed?
Transport document	What carriage and shipment details are recorded?
Delivery receipt	What receipt event and exceptions were recorded?

For air freight, an air waybill is non-negotiable. [P1-13] In ocean transport, an order bill of lading and a non-negotiable document create different release considerations. Do not assume that a scan of any document, or the appearance of a consignee name, is sufficient authority to release cargo. The actual document, carrier procedure and applicable law need checking. [P1-12]

The goal in Part 1 is to recognise the document family and its purpose. Part 2 examines individual fields and document controls in greater detail.

4.10 Reconcile the commercial record

In Riverbend's original shipment, the invoice quantity is 12,000 shirts at USD 5 each. The packing list explains that 300 cartons contain 40 shirts each. The arithmetic agrees: 300 × 40 = 12,000, and 12,000 × 5 = USD 60,000.

Original teaching document extract	Quantity or value
Purchase order NH–104	12,000 shirts
Invoice RB–001	12,000 × USD 5 = USD 60,000

Original teaching document extract	Quantity or value
Packing list PL–001	300 cartons × 40 shirts
Gross weight	3,000 kg
Net weight	2,700 kg
External volume	12 CBM

Now apply Chapter 3's authorised split. Fifteen cartons contain 600 shirts valued at USD 3,000. The remaining 285 cartons contain 11,400 shirts valued at USD 57,000. Together they still represent the original order. The exporter and relevant specialists must establish the proper document and declaration treatment for the separate movements.

Worked example 4.5 Avoid double invoicing. If the original USD 60,000 invoice remains assigned to the ocean shipment and a new USD 3,000 invoice is issued for the urgent portion without a corresponding adjustment, the records can appear to total USD 63,000. A document register should show which versions were superseded or allocated to each movement. The correct commercial total in this exercise remains USD 60,000.

Consistency does not mean blindly forcing every field to match. Different documents may describe different scopes. A master transport document can cover consolidated cargo belonging to several customers, while a shipment-level record covers only Riverbend. Reconcile like with like and explain the relationship. The same principle applies to gross weight after additional transport packaging is introduced.

4.11 Understand the payment arrangement

Under payment in advance, the buyer pays before the agreed supply stage. Under open account terms, payment is due later under the sales arrangement. These choices affect commercial exposure, but neither phrase specifies the cargo's route or handover point. [P1-14]

A letter of credit involves a bank undertaking tied to a complying documentary presentation. The required documents and conditions need review before shipment; the bank is not performing a physical quality inspection of the goods. [P1-14, P1-15] A documentary collection uses banks to handle documents under collection instructions, but it does not provide the same bank payment undertaking. [P1-16]

For a forwarding team, the practical questions are which transport document is required, who must receive it, when it must be available and whether a change in routing or shipment structure creates a mismatch. The exporter's banking specialists should resolve payment conditions. The operator should make relevant shipment changes visible to them.

A customer's request to alter a document date to make it fit a payment condition is not an administrative shortcut. Record actual events accurately and seek a legitimate amendment or other authorised resolution. Trust in the file depends on its records describing what happened.

4.12 A disciplined document check

Read the file in a fixed order. Start with the commercial agreement, then the shipment instructions, packing information and transport records. Check party identities, references, quantities, values, currency, locations and dates. Where documents differ, determine whether the difference is explained by their scope or represents an error. [P1-03]

Then test the practical consequences. Does the named delivery point fit the collection plan? Does the selected service produce the required document? Can the party assigned import responsibilities perform them? Is unloading covered by an actual arrangement? These questions connect the paperwork to the physical movement.

The best time to resolve a mismatch is while there is still a choice. Once the vessel has departed or a presentation deadline has passed, a simple correction may no longer be available.

Chapter 4 recap

Read the sale-delivery rule with its named place and edition. Identify cost and risk separately, and check the wider agreement for ownership and payment. Compare quotations at the same service boundary. Reconcile documents to the goods and to one another, preserving the record of authorised changes.

Review questions

Answers and marking guidance • page 223

1. Which four questions should be separated when discussing delivery terms?
2. What does an Incoterms rule leave to the wider contract or applicable law?
3. Which seven rules can be used for any mode or combination of modes?
4. What is the delivery point under FCA at the seller’s premises?
5. Why can a seller pay freight beyond the point where risk passes?
6. Why should a container handover before vessel loading prompt a review of an FOB instruction?
7. What is the principal unloading distinction between DAP and DPU?
8. Why is a packing list not a substitute for a commercial invoice?
9. How could a partial shipment accidentally lead to double invoicing?
10. Why should payment-document requirements be reviewed before booking the service?

Applied exercises

Exercise 4A Compare supplier offers. Offer X is USD 48,000 FCA at the named factory for 8,000 units. Buyer-arranged costs after handover are collection USD 300, origin handling USD 400, main carriage USD 1,500, destination handling USD 550 and final delivery USD 350. Offer Y is USD 51,300 DAP at the same final location, including those delivery services. Both exclude the same import charges, unloading and separately arranged insurance. Calculate comparable subtotals, the difference and cost per unit. Explain one risk-allocation difference. Recalculate if X’s main carriage rises by USD 500 while Y remains fixed and valid.

Exercise 4B Audit a small file. The order is for 12,000 shirts at USD 5 each, FCA Riverbend’s factory loading bay under Incoterms® 2020. The invoice says 12,000 shirts and USD 60,000 but lists DAP Hamburg. The packing list says 295 cartons at 40 shirts per carton. A draft transport record says 300 cartons and 3,000 kg. Identify the inconsistencies, calculate the quantity difference and state what you would verify before allowing documents to be finalised. Explain why changing 295 to 300 without checking the physical shipment would be unacceptable.

Part 2 Cargo and operational foundations

A forwarding plan depends on a reliable description of the goods. These chapters examine measurement, packaging, documents, customs readiness and cargo care. Each topic asks what evidence is needed before the next instruction can be issued.

Chapters 5–8

Chapter 5 Cargo characteristics and packaging

Chapter 6 Transport documents and data quality

Chapter 7 Customs and border processes

Chapter 8 Safety security and cargo care

Chapter 5 Cargo characteristics and packaging

The quotation that changed at the warehouse

The customer has described a shipment as “about two cubic metres”. The quotation is accepted, and the cartons arrive at the warehouse. Some are larger than the packing list suggests. Two contain projecting handles. The customer then asks for everything to travel on pallets because the receiving site will not accept loose cartons.

Nobody has changed the goods being sold. Nevertheless, the transport requirement has changed. There is more external volume, additional packaging weight and a different handling unit. The forwarder must now check the booking, the price and the receiver’s instructions. The avoidable part of this problem happened before collection: the team accepted an approximate description without establishing what would actually be handed over.

What you should be able to do

By the end of this chapter, you should be able to prepare a useful cargo description, distinguish net weight from gross weight and packaging tare, calculate mixed-carton volume, assess the numerical effect of palletisation, and identify packing questions that require a supplier or handling specialist’s answer. You should also be able to explain why geometric fit does not establish that a load is safe.

5.1 Begin with the goods themselves

A useful cargo description starts with what the article is and what it does. “Spare parts” might mean steel brackets, a battery assembly, a pressurised component or a fragile optical instrument. These are different transport jobs. A product name familiar to the seller may tell a warehouse operator very little.

Ask about the material, function, condition and form in which the goods will move. Are they new or used? Are they loose, assembled, filled, drained, folded, rolled or mounted on a frame? Is the item sold as a set? Does the package contain accessories that have not appeared in the main description? The answers can affect handling, documentation and the specialist reviews discussed in Chapters 7 and 8.

For Riverbend, “new cotton shirts, packed in export cartons” is a useful beginning. The shipment brief still needs the number of cartons, shirts per carton, outer dimensions, weights and packing condition. For machinery, “textile machine” is only a starting point. The planner needs the actual function, model, packed dimensions, gross weight, access arrangements and any relevant information about batteries, liquids or other contents.

Do not confuse a commercial product description with a transport acceptance decision. A forwarder can improve an incomplete description without claiming to have certified the goods. If a technical question changes whether the service can be used, obtain an answer from the manufacturer or the appropriate specialist before confirming the arrangement.

5.2 Identify the counting unit

Cargo can be counted at several levels. A purchase order may refer to individual shirts; a packing list may group them into cartons; a warehouse may receive pallets; a carrier may move a container. All these counts can be correct at the same time.

The problem arises when the counting unit disappears. An instruction stating “quantity 10” is incomplete unless the reader knows whether it means pieces, cartons, pallets or containers. Systems often display the number prominently and the unit in a small field nearby. Check both.

For the original Riverbend order, the commercial quantity is 12,000 shirts and the packing quantity is 300 cartons. If an approved packing proposal places those cartons on ten pallets, the outer handling-unit count becomes ten pallets containing 300 cartons. It does not become ten shirts, nor do the underlying cartons cease to exist for stock reconciliation.

When a transport document requires a package description, the issuer must establish how the outer units and their contents should be recorded for that service. Do not select whichever count makes the document look consistent with another form. Preserve the relationship between levels, then use the required field definition.

5.3 Separate net weight gross weight and tare

Net weight is the weight of the goods under the stated measurement convention. Gross weight includes the relevant packaging. Tare is the weight of the packaging or equipment being considered. The phrase “relevant packaging” matters: the gross weight of a loose carton and the gross weight of a loaded pallet describe different boundaries.

For the original Riverbend cartons, each contains 9 kg of shirts and weighs 10 kg including its packaging. Across 300 cartons, the net weight is 2,700 kg and the carton-level gross weight is 3,000 kg. The difference, 300 kg, represents packaging within that boundary. A pallet added later is additional weight.

Worked example 5.1 The extra weight of palletisation. Assume a proposal uses ten pallets, each weighing 20 kg, with no other additional material for this calculation. Added tare is 10 × 20 = 200 kg. The palletised shipment’s gross weight is therefore 3,000 + 200 = 3,200 kg. The shirts still weigh 2,700 kg. Total packaging within the expanded boundary is 3,200 − 2,700 = 500 kg.

The calculation is simple; the operational consequence is less trivial. A vehicle plan based on 3,000 kg is now using an outdated figure. A packing list must explain whether its gross weight includes pallets. If straps, wrapping or protective boards are added, their actual contribution also belongs in the final measurement.

A container’s tare is another boundary again. Do not add the empty container weight to an individual carton’s gross weight field. Ocean container weight declarations and their methods are examined in Part 4. For now, attach a clear description to every weight: what was weighed, when, by whom and whether the value is measured or estimated.

5.4 Measure the outside of the transport package

Transport capacity is occupied by the package presented for carriage. Measure the external length, width and height in the shipping orientation. Include projections that occupy space, such as handles, protective frames or a bulging carton wall. Internal box dimensions and product dimensions are different facts.

Record units beside the numbers. “60 × 40 × 30” is not a complete dimension record. A centimetre entered as a millimetre produces a large error once three dimensions are multiplied. The familiar centimetre-to-metre conversion is not enough: volume involves three conversions.

For a rectangular package, volume in cubic metres equals length in metres × width in metres × height in metres. When all dimensions are in centimetres, divide their product by 1,000,000. One metre contains 100 centimetres, so one cubic metre contains 100 × 100 × 100 cubic centimetres.

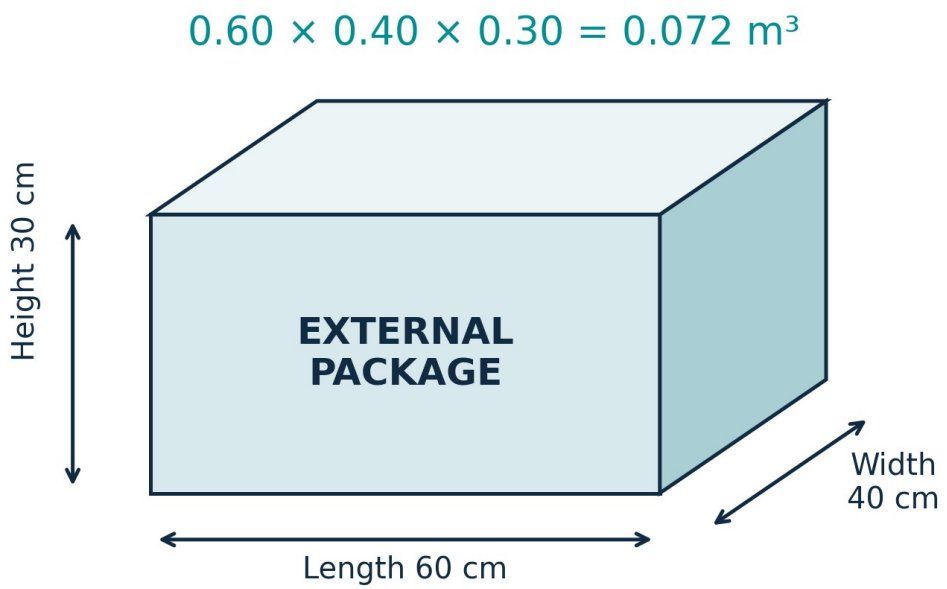


Figure 5.1 Measuring a transport package. The example uses external dimensions of 60 × 40 × 30 cm. The three arrows show independent measurements; the drawing is a teaching schematic, not a packaging specification.

A round drum or irregular machine may occupy a rectangular space larger than its material volume. Establish the carrier's measurement convention instead of substituting a cylinder formula because it gives a smaller number. Likewise, a vehicle's published internal dimensions do not by themselves establish that a package can pass through the door or be manoeuvred into position.

Worked example 5.2 Mixed cartons. A fictional spare-parts order contains 20 cartons of type A, each 60 × 40 × 30 cm and 12 kg gross, and ten cartons of type B, each 50 × 40 × 40 cm and 18 kg gross. Calculate each group separately before adding them.

Carton group	Volume calculation	Gross weight calculation
A — 20 cartons	20 × 0.60 × 0.40 × 0.30 = 1.44 m³	20 × 12 = 240 kg
B — 10 cartons	10 × 0.50 × 0.40 × 0.40 = 0.80 m³	10 × 18 = 180 kg
Shipment total	1.44 + 0.80 = 2.24 m³	240 + 180 = 420 kg

The shipment has 30 cartons, not 30 identical cartons. A single average dimension can conceal how those cartons must actually be handled and arranged. Keep the group-level measurements available even when a quotation shows only total weight and total volume.

5.5 Understand density and dimensional weight

Physical density describes the relationship between mass and volume. In forwarding calculations, a useful descriptive measure is gross kilograms divided by external cubic metres. It helps explain why a shipment can fill available space before it reaches an equipment weight limit, or reach a weight limit while leaving space unused.

For the mixed cartons, gross density is 420 ÷ 2.24 = 187.5 kg/m³. This describes the measured shipment. It is not a tariff, a safety limit or a universal instruction about which mode to choose.

Dimensional weight is a commercial conversion of space into a weight equivalent under a specified rating rule. Its formula may look familiar across quotations, but the divisor, rounding, minimums and treatment of individual pieces can differ. Always read the service's terms before calculating the chargeable quantity.

Worked example 5.3 The same cartons under two stated quote rules. For this exercise, both offers compare the shipment's total gross weight with its total dimensional weight, with no rounding or minimum charge. Offer A uses 6,000 cm³ per kg; offer B uses 5,000 cm³ per kg. These are exercise assumptions, not declarations of universal air or express rules.

The total external volume is 2.24 × 1,000,000 = 2,240,000 cm³. Under A, dimensional weight is 2,240,000 ÷ 6,000 = 373.33 kg, so the comparison selects 420 kg gross. Under B, dimensional weight is 2,240,000 ÷ 5,000 = 448 kg, so the comparison selects 448 kg.

The cargo has not become heavier on the second service. The commercial conversion changed. You still cannot decide which offer is cheaper until the rates, fixed charges, inclusions and service commitments are known. Part 3 develops chargeable-weight calculations and rate breaks in detail.

5.6 Test a palletisation proposal

Palletisation can improve handling and reduce the number of separate units a warehouse must move. It can also add weight, increase the outside envelope and introduce constraints at a receiving site. The decision should connect origin handling, transport and destination requirements.

The following proposal returns to the original, unsplit Riverbend order of 300 cartons. It is a comparison exercise; the later urgent split remains a separate scenario. Each carton is 50 × 40 × 20 cm and 10 kg gross. The proposed pallet footprint is 120 × 100 cm, with a pallet height of 15 cm and tare of 20 kg.

Place the 40 cm carton side along the pallet's 120 cm side: three cartons fit. Place the 50 cm carton side along the 100 cm side: two fit. This arrangement gives six cartons per layer without geometric overhang. Five layers give 30 cartons on each pallet. Ten pallets accommodate 300 cartons.

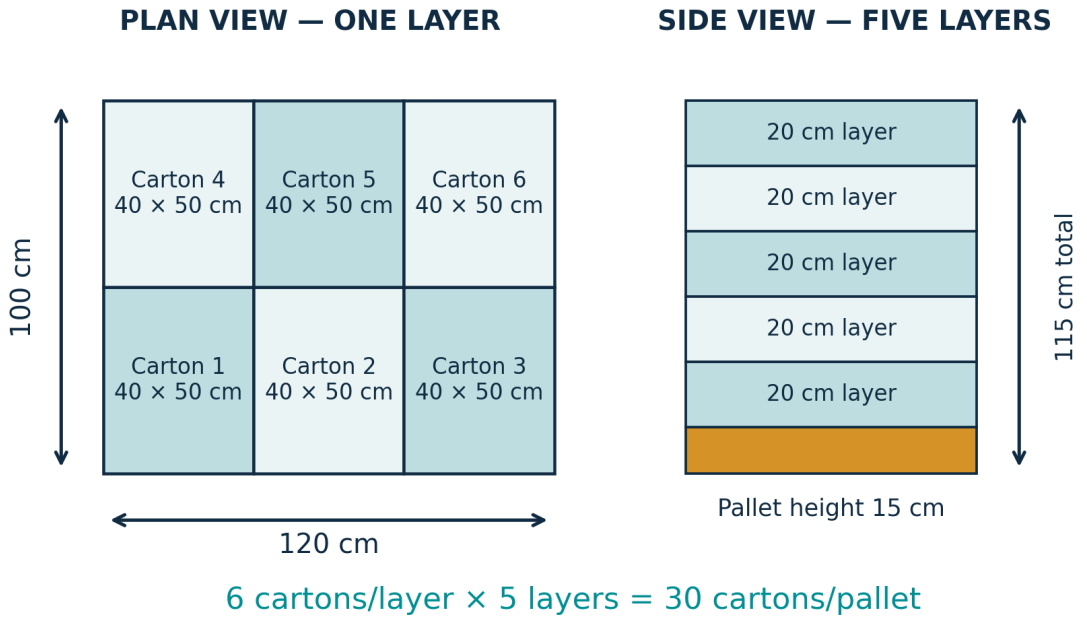


Figure 5.2 Riverbend pallet proposal. The plan view shows six 50 × 40 cm cartons in one layer. The side view shows five 20 cm layers above a 15 cm pallet. Geometry alone does not approve stack strength, load restraint or handling suitability.

Worked example 5.4 Compare loose and palletised dimensions. The total height is 5 × 20 + 15 = 115 cm. Each loaded pallet has an external volume of 1.20 × 1.00 × 1.15 = 1.38 m³. Ten pallets occupy 13.8 m³ under this rectangular-envelope calculation. The original loose-carton total was 12 m³. The increase is 1.8 m³, or 1.8 ÷ 12 × 100 = 15%.

Each loaded pallet weighs 30 × 10 + 20 = 320 kg under the stated assumptions. Ten pallets weigh 3,200 kg, agreeing with worked example 5.1. The commercial quantity remains 12,000 shirts.

Before accepting the proposal, the shipper and handling provider must confirm that the cartons can support the intended stack, the pallet and handling equipment are suitable, the load can be restrained, and the receiver accepts that footprint and height. A carton arrangement that fits neatly on a drawing can still fail when lifted or transported. The CTU Code provides a broader framework for packing and securing cargo transport units; this exercise is not a load-securing design. [P2-02]



Photograph 5.1 Palletised cartons at the UNICEF world warehouse in Copenhagen, photographed in 2011. Notice the distinct pallets, carton labels and unitising straps. The photograph cannot establish weight ratings or approve a packing arrangement. Credit: Wikimedia Commons user Heb, CC BY-SA 3.0; reproduced unchanged apart from display scaling. Full source and licence appear in the image credits.

5.7 Ask what the packaging must survive

Packaging has to protect the product through the actual route. A strong retail box may still be unsuitable for repeated warehouse transfers. A crate designed for one controlled lift may need further assessment if the cargo will pass through several facilities. Start with the route and handling events, then ask the packer what the packaging was designed to withstand.

Useful questions concern compression, impact, vibration, moisture, orientation and access for handling. What supports the product inside the package? Which surfaces can take a load? Can another package be placed above it? Are lifting or fork-entry points identified by the responsible designer? Does opening the package compromise protection, cleanliness or warranty arrangements?

“Stackable” deserves a precise answer. The packer might mean that identical cartons can be stacked five high in a dry warehouse. A carrier might be asking whether unrelated freight can be loaded on top during

transit. Those are different conditions. Record the actual limitation and communicate it to the provider that must act on it.

Wood packaging can introduce a separate plant-health question. ISPM 15 addresses regulated raw-wood packaging and dunnage used in international trade; processed materials such as plywood are treated differently under the standard. A crate described as plywood may still include raw-wood skids. Check the complete construction, the destination requirements and the evidence from the authorised packaging supplier. Do not create, copy or improvise an official treatment mark. [P2-01]

5.8 Recognise concentrated loads and awkward shapes

Arcwell Textiles plans to import a crated textile-processing machine. The crate measures 2.00 × 1.20 × 1.50 m, weighs 900 kg gross and contains a machine weighing 780 kg net. Its rectangular envelope is 3.6 m³, and the packaging contributes 120 kg. These figures establish a starting description, not a handling method.

A planner must also ask where the weight bears on the supporting surface, where the centre of gravity lies and which handling points are approved. Dividing 900 kg by the crate's full floor area would give an average distributed figure, but the real load may bear through narrow runners or feet. That average cannot approve a floor, a tail lift or a forklift operation.

For project cargo, request a manufacturer's drawing and a specialist handling assessment early. For ordinary palletised goods, the same habit is useful at a smaller scale: avoid treating the outside dimensions as the whole story. A light package can be awkward; a compact package can be unusually heavy.

5.9 Control measurements when packing changes

Measurements should have a status. An estimate from a sales enquiry, a packer's planned dimension and a warehouse's measured dimension are not interchangeable. Record the source and date, and identify which value currently controls the booking.

Worked example 5.5 Small dimension changes accumulate. The 15 urgent Riverbend cartons were expected to measure 50 × 40 × 20 cm, giving 0.60 m³ in total. Suppose protective packing changes the measured dimensions to 52 × 42 × 22 cm. One carton now occupies 0.52 × 0.42 × 0.22 = 0.048048 m³. Fifteen occupy 0.72072 m³, an increase of 0.12072 m³, or 20.12%.

Do not quietly retain 0.60 m³ because the increase seems small per side. Confirm whether the new measurements describe every carton and whether weight also changed. Then update the relevant booking and document records, obtain any required price approval and notify the destination if handling requirements are affected.

A useful cargo record therefore ends with an unresolved-questions field. "Palletisation awaiting receiving-site approval" tells the next operator something important. A polished table with an empty exception field can be less reliable if the person completing it has simply ignored the uncertainty.

Chapter 5 recap

Measure the package that will actually travel and name the unit being counted or weighed. Calculate mixed groups separately. When packing changes, revisit weight, volume, handling and receiving requirements together. A successful calculation shows that the numbers are internally consistent; a suitable packing arrangement also needs evidence about the product, packaging and route.

Review questions

Answers and marking guidance • page 225

1. Why is “spare parts” often an inadequate transport description?
2. How can ten pallets and 300 cartons both correctly describe one shipment?
3. What changes when pallets are included in the gross-weight boundary?
4. Why are external dimensions used for the calculations in this chapter?
5. How many cubic centimetres are in one cubic metre?
6. Why should mixed carton groups be calculated separately?
7. How does physical density differ from dimensional weight?
8. Why does a pallet plan that fits geometrically still require further review?
9. Why might a plywood crate require questions about its skids?
10. Which records should be reviewed after the warehouse measures a larger package?

Applied exercises

Exercise 5A Mixed cargo and a quote rule. A shipment contains 16 cartons measuring 60 × 40 × 35 cm and weighing 14 kg gross each, plus eight cartons measuring 50 × 50 × 40 cm and weighing 20 kg gross each. Calculate total external volume, total gross weight and gross density. For this exercise, the quotation compares total gross weight with total dimensional weight using 6,000 cm^3/kg, rounds the dimensional result up to the next whole kilogram, and has no other minimum. Determine the resulting chargeable weight and name two assumptions that must be checked on a live quote.

Exercise 5B Assess a packing proposal. A shipment has 144 cartons of 40 × 30 × 25 cm, each 8 kg gross. A proposed 120 × 80 cm pallet holds eight cartons per layer and three layers, with a 15 cm pallet height and 18 kg tare. Draw a possible layer arrangement, calculate pallet count, loaded height, total palletised volume and total gross weight, and compare volume with the loose-carton total. Give four questions that must be resolved before approving the proposal for actual handling.

Chapter 6 Transport documents and data quality

Three documents and three different stories

Riverbend's urgent shipment has been separated from the original order. Fifteen cartons will move by air and 285 by ocean. The packing team has updated the ocean packing list. The commercial team has changed the invoice quantity but left the old total at the bottom. The forwarding system still contains the original 300-carton booking.

Each department believes it has finished its part of the work. Taken together, the records describe incompatible shipments. If the team waits until cargo acceptance to compare them, it will have less time to correct the problem and more people depending on the wrong information.

Document control is often described as administrative work. In forwarding, it is part of operational control. The records help determine what is booked, what is declared, what can be released, what is charged and what evidence remains after a dispute.

What you should be able to do

By the end of this chapter, you should be able to explain the purpose of the principal commercial and transport records, distinguish a draft from an issued document, reconcile a shipment across several documents, recognise a valid house-to-master difference and manage corrections without concealing the original record. You should also be able to identify which issuer or authorised party must approve a change.

6.1 Start with the question each document answers

A document is easier to review when you know its purpose. The commercial invoice records the goods and value being invoiced. The packing list describes the packing structure. A transport document records a carriage arrangement and shipment particulars. A delivery receipt records a delivery event in the form used for that service. A customs declaration serves a different legal process again.

The US International Trade Administration's document guidance identifies commercial invoices, packing lists and transport documents as distinct records. Its country-specific filing guidance should not be treated as a worldwide rule; the useful principle here is to establish the function of each document and the requirements of the actual transaction. [P2-03]

An invoice may correctly describe two machines while a packing list describes three crates because one crate contains shared accessories. Conversely, a document that says "two packages" may conceal a missing accessory crate if that relationship has not been explained. Consistency means that the records tell a coherent story, not that every field contains the same number.

When reviewing a new file, begin with the sale or shipment instruction and ask what should be moving. Then use the other records to test that expectation. Starting with the last email attachment and adjusting everything else to match it can turn an unverified document into the accidental authority for the whole file.

6.2 Distinguish preparation from issue

A quotation is not a booking confirmation. A draft transport document is not necessarily an issued transport document. A submitted electronic message is not necessarily an accepted message. These distinctions were introduced in Part 1; they become especially important when documents move between systems.

Use explicit statuses such as draft, awaiting confirmation, approved for issue, issued, amended and superseded. Define what each status means in the operation. “Approved” is otherwise ambiguous: approved by the customer for content, approved by a carrier for issue, or approved internally for billing?

Maintain the issuer’s identity and the party authorised to request changes. A forwarding employee may prepare invoice data for a customer’s review, but that does not make the forwarder the seller or authorise it to change the seller’s commercial terms. A document’s professional appearance cannot supply missing authority.

Worked example 6.1 A screenshot that looks final. A customer forwards a screenshot of a draft bill of lading and asks the destination office to release cargo. The screenshot shows a consignee and a vessel name, but the issuer’s record still says “draft”. The destination team should verify the actual issued document and the applicable release process with the issuer. The screenshot can help identify the file; it does not establish that release conditions have been met.

The same discipline applies to electronic systems. A green tick may mean that a message passed a format check. It may not mean that its commercial content was approved or that an authority released the cargo. Find out which event the status represents.

6.3 Read the transport document family

An air waybill records the air-carriage relationship and shipment details. IATA describes the AWB as a central carriage document and its e-freight programme as a move towards paperless processes supported by high-quality data. Electronic operation does not remove the need for a valid agreement or accurate shipment information. [P2-04]

Air waybills are non-negotiable. Ocean documents need a more careful distinction. A bill of lading can serve as a receipt and evidence of carriage terms and, depending on its form and applicable law, have document-of-title functions. A sea waybill is non-negotiable and does not perform those title functions. Carrier guidance illustrates the different release arrangements, but the operator must follow the particular issuer’s requirements and governing terms. [P2-03, P2-06]

Avoid two shortcuts: that every bill of lading works in the same way, and that a named consignee can always collect goods merely by showing identification. Original-document requirements, surrender arrangements, electronic systems, payment holds and local procedures can affect release. A non-negotiable straight bill of lading should not automatically be treated as equivalent to a sea waybill.

For road carriage, the applicable consignment note depends on the route and legal framework. UNECE’s explanation of the CMR describes its role in qualifying international road-carriage contracts and the development of electronic consignment notes. A domestic delivery note in another jurisdiction should not simply be called “a CMR” because a truck is involved. [P2-05]

Record	Main operational use	What it does not establish by itself
Air waybill or electronic air-carriage record	Identifies the carriage arrangement and air shipment particulars	Product quality, customs release or satisfaction of every payment condition

Record	Main operational use	What it does not establish by itself
Ocean bill of lading	Records receipt and carriage particulars; legal functions depend on the form and law	That a photocopy is sufficient for release in every case
Sea waybill	Records non-negotiable carriage to an identified consignee	That all other release conditions have been satisfied
Road consignment note	Records the road-carriage shipment and relevant particulars	That one convention applies to every road movement
Warehouse receiving record	Records receipt, count and observations within its inspection scope	The contents or quality of every unopened package

The table is a working map, not a substitute for the actual documents. Later service-specific chapters examine fields, issue processes and exceptions in greater detail.

6.4 Keep house and master levels separate

A forwarder may issue a house transport document to its customer while contracting with an airline or ocean carrier under a master document. The parties named at the two levels can differ because the contracts differ. A consolidated master shipment may also include several house shipments.

The task is to preserve the link between levels. Record the relevant house reference, master reference and consolidation record, and establish which quantities belong to each. Do not replace the customer’s consignee with a destination handling agent merely to make two documents look alike.

Worked example 6.2 A legitimate weight difference. In a fictional ocean consolidation, Riverbend contributes 285 cartons weighing 2,850 kg gross. A second customer contributes 45 cartons weighing 450 kg gross. Assume no additional packing weight and the same counting boundary for this example. The master-level total is 330 cartons and 3,300 kg. Riverbend’s house-level record remains 285 cartons and 2,850 kg.

The difference is explained by the consolidation. A reviewer should check the other house record and the consolidation total, rather than “correcting” Riverbend’s house weight to 3,300 kg. If the master weight includes additional transport packing, that difference needs its own explanation.



Figure 6.1 House and master reconciliation in the teaching consolidation. Two customer records support one master total. The diagram shows a data relationship; it does not reproduce a carrier's transport document.

For a warehouse receiving consolidated goods, the useful next question is whether deconsolidation can identify each customer's packages. Accurate totals are not enough if the marks and references no longer connect the physical goods to the right file.

6.5 Build a controlled shipment record

A reliable shipment record holds the current accepted information and points back to its source. It need not be a complicated system. A small operation can maintain a disciplined register, provided people know who can change it and how corrections reach affected parties.

Group the information into identities, commercial references, cargo details, transport instructions and status. For each critical field, retain its source, confirmation date and owner. "Gross weight 2,850 kg; warehouse measured; receipt WH-017; confirmed on teaching Day 2" is more useful than a bare number copied from an unknown attachment.

Critical identifiers deserve exact comparison. Check company legal names, locations, purchase-order references and document numbers carefully. A typographical variation in a contact person's display name may have a different consequence from a different legal consignee. Neither should be changed casually, but they do not necessarily demand the same response.

Treat units, currency and date format as part of the value. USD 57,000 and EUR 57,000 are different instructions. The date 04/05 can be read in more than one way. A timestamp without a time zone can make an acceptance deadline appear later than it is. Where ambiguity matters, use an explicit month or a defined system format and time zone.

6.6 Audit the Riverbend document set

The following extracts deliberately contain errors. They are original classroom records, not valid commercial or customs documents. Do not use them for a real shipment. The authorised case facts are 285 ocean cartons containing 11,400 shirts at USD 5 each, plus a separately documented urgent movement of 15 cartons containing 600 shirts.

Teaching document A Commercial invoice extract

Field	Draft entry
Status	FICTIONAL TRAINING DOCUMENT — draft v1, not valid for trade
Issuer and buyer	Riverbend Apparel / Nordhaven Retail
Invoice and order references	RB-001-O / NH-104
Description	New cotton shirts — ocean portion of split order
Quantity and unit price	11,400 shirts × USD 5.00
Invoice total shown	USD 60,000.00
Delivery term	FCA Riverbend factory loading bay 2, Gazipur, Bangladesh, Incoterms® 2020

Review annotation A. Recalculate the invoice from its line quantity and unit price. The commercial issuer must correct an erroneous total. The forwarder should not silently overwrite the invoice PDF or change the unit price to make the old total work.

Teaching document B Packing list extract

Field	Draft entry
Status	FICTIONAL TRAINING DOCUMENT — draft v1, not valid for trade
Packing list and invoice	PL-001-O / RB-001-O
Purchase order	NH-140
Carton marks	RB-O-001 through RB-O-285
Packing structure	285 cartons × 40 shirts = 11,400 shirts
Dimensions	Every carton 50 × 40 × 20 cm
Net and gross weights	2,565 kg net / 2,850 kg gross
External carton volume	11.40 m³

Review annotation B. Reconcile the order reference to the commercial instruction. The weight and volume are consistent with 285 cartons under the original packing assumptions. Correcting a reference is different from deciding that the physical quantity has changed.

Teaching document C Booking extract

Field	Draft entry
Status	FICTIONAL TRAINING DOCUMENT — original unsplit booking data
Job and order	RB-NH-001 / NH-104
Cargo entered	300 cartons / 12,000 shirts
Gross weight and volume	3,000 kg / 12.00 m³
Collection point	Riverbend factory loading bay 2

Field	Draft entry
Consignee and delivery	Nordhaven Retail / German distribution centre
Service instruction	Ocean movement; no reference to the urgent split

Review annotation C. The booking still describes the whole order. The coordinator must confirm the authorised split, revise the ocean instructions and ensure the urgent portion has its own linked records. A change to booking data may require the provider's acceptance; an internal system edit alone does not confirm that acceptance.

Worked example 6.3 Reconcile the three records. The ocean invoice should total 11,400 × USD 5 = USD 57,000. The packing-list order reference should be checked against NH-104 and corrected by its issuer if NH-140 is an error. The ocean booking should be brought into line with the confirmed 285 cartons, 2,850 kg and 11.40 m³. The 15-carton urgent portion represents 600 shirts, USD 3,000, 150 kg gross and 0.60 m³ under the original dimensions.

The two portions must reconcile to 300 cartons, 12,000 shirts and USD 60,000. This arithmetic supports the review; it does not authorise the customs or commercial treatment of split documents. The relevant issuers and specialists must confirm that treatment before issue or filing.

Notice the different corrective actions. One is a commercial total, one a reference discrepancy, and one an operational scope change. Sending an email saying "please make all documents match" would conceal the judgment needed for each.

6.7 Correct the record without erasing its history

A useful correction process records the discrepancy, checks the source, obtains an authorised correction, distributes the replacement and confirms that affected users have adopted it. Preserve the superseded version with a clear status. Do not let two files both called "final" remain equally plausible instructions.

For Riverbend, the coordinator might record the invoice total discrepancy at 10:10, obtain the issuer's corrected v2 at 11:05, forward it to the appointed declaration team at 11:12 and record their acknowledgement at 11:25. Those events describe a controlled correction. Merely saving v2 in a folder does not establish that the person preparing a declaration has stopped using v1.

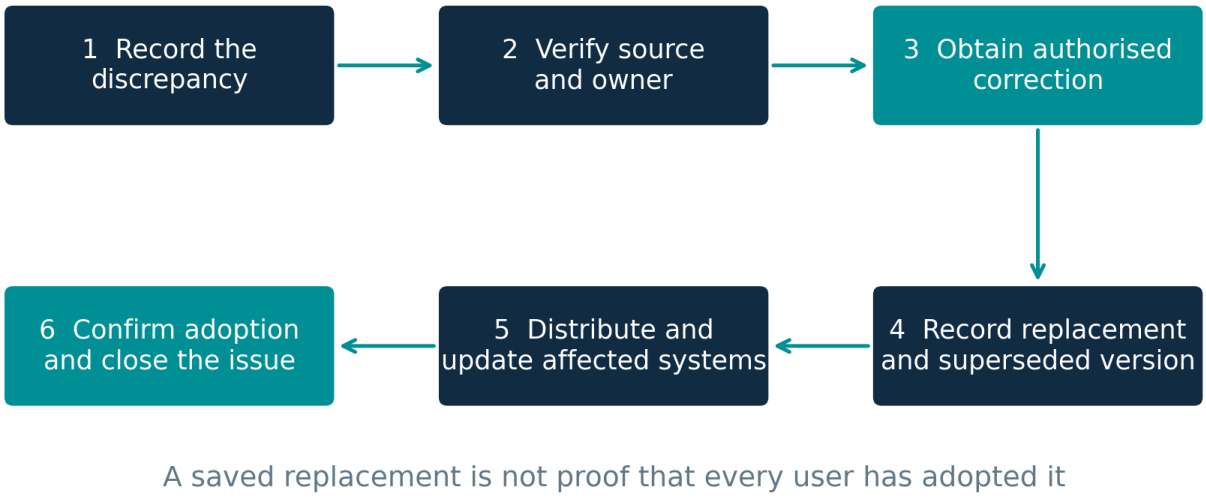


Figure 6.2 A controlled correction. The person who discovers an error does not automatically have authority to amend every affected record. Close the loop by confirming that the corrected version reached the people relying on it.

If an error is discovered after a transport document has been issued or a declaration lodged, follow the applicable amendment process. Do not manufacture a replacement that makes the original event disappear. Preserve what was submitted, what was wrong, who was informed and what correction was accepted.

There is also a practical reason to retain history: it helps explain charges and delays. Without the sequence, a customer may see only a revised invoice and a missed cutoff. With it, the team can reconstruct which information was available when the booking decision was made.

6.8 Use digital tools without losing the evidence

Optical character recognition can extract a weight from a scan. A spreadsheet can calculate totals. An AI tool can suggest that an order reference differs between two files. Each can help the reviewer, but none makes the source correct merely by processing it.

Define checks that correspond to meaningful failures. Compare invoice line arithmetic with totals; compare the packing structure with quantities; compare the booked service with the latest approved instruction. A rule that flags every difference between a house and master document would produce false alarms. A rule that ignores all differences would miss real errors.

Keep an audit trail when data is transformed. If a system converts pounds to kilograms or splits a line across two shipments, record the original value, conversion basis and resulting value. Do not round at every intermediate step unless the applicable rule requires it. Otherwise, several small rounding decisions can create an unexplained difference in the total.

Commercial and personal information should only be entered into tools approved for that use. A useful classroom exercise can use fictional data. A live invoice may contain information the customer has not authorised the forwarding team to upload to an external service.

Worked example 6.4 Measure document quality honestly. A team reviews 48 jobs. Six contain at least one material discrepancy at first review. The initial affected-job rate is $6 \div 48 \times 100 = 12.5\%$. Four of those jobs are corrected before the agreed release point; two remain unresolved. The unresolved-job rate at that point is $2 \div 48 \times 100 = 4.17\%$, rounded to two decimal places.

These are two different measures. Reporting only 4.17% hides the work required to repair the original data. Reporting only 12.5% ignores the control that caught and corrected four jobs. Neither figure is the number of individual errors: a job may contain several discrepancies. Name the denominator and the measurement stage whenever you present a percentage.

6.9 Decide what must stop the next action

Not every spelling variation requires an entire operation to stop. Some discrepancies, however, change who owns the instruction, which goods are moving, what is being declared or whether the selected service is suitable. The reviewer needs a way to distinguish them.

Ask what would happen if the field remained wrong. A missing delivery contact may prevent a receiving appointment. An incorrect gross weight may affect handling and acceptance. A different currency changes the commercial value. An unexplained consignee change raises an authority question. A battery omitted from a description may affect transport eligibility.

For each material discrepancy, assign an owner, a next action and a decision deadline linked to the shipment. “Awaiting corrected invoice from seller by 14:00; declaration preparation held; escalation to customer service at 13:00” gives the team a workable instruction. “Documents pending” gives almost none.

The final review should leave a short, intelligible record of what was checked and what remains open. Another colleague should be able to take over the file without guessing whether silence means acceptance or unfinished work.

Chapter 6 recap

Read each document according to its purpose and status. Reconcile related information at the correct level, preserve legitimate differences and investigate unexplained ones. A correction is complete when the authorised change has reached the people and systems relying on it. Good document control protects both the shipment and the evidence behind its decisions.

Review questions

Answers and marking guidance • page 226

1. Why is a packing list not a substitute for a commercial invoice?
2. What can a draft transport document establish, and what can it fail to establish?
3. What is the difference between submission and acceptance of an electronic message?
4. Why should a sea waybill not be treated as an order bill of lading?
5. Why is “CMR” not a universal name for every road delivery note?
6. How can a house weight differ legitimately from its linked master weight?
7. Which information makes a measured weight traceable?
8. Why should an issuer correct its own commercial invoice?
9. What must happen after a corrected document is saved?
10. Why must a document-quality percentage identify both its denominator and review stage?

Applied exercises

Exercise 6A Audit an urgent shipment. An approved instruction specifies 24 cartons of 50 units each, USD 4 per unit, 15 kg gross per carton and dimensions of 60 × 40 × 30 cm. The invoice shows 1,200 units, a unit price of USD 4 and a total of USD 4,800. The packing list shows 24 cartons, 1,200 units, 336 kg net, 360 kg gross and 1.728 m³. The booking shows 20 cartons, 300 kg and 1.44 m³. Its delivery location also differs from the approved instruction. Identify what agrees, what requires correction or clarification, the correct booking quantities if the instruction is reconfirmed, and which parties must acknowledge the changes.

Exercise 6B Manage a late correction. At 09:00, a seller advises that invoice v1 has the wrong currency. The document has already been sent to the appointed declaration team, but you do not know whether a declaration has been lodged. The operational cutoff is 12:00. Write a six-step response plan and a customer update of no more than 100 words. Explain why simply renaming v2 “final” is insufficient.

Chapter 7 Customs and border processes

The machine is ready but the import is not

Arcwell Textiles has purchased two textile-processing machines for a factory expansion. The supplier confirms that both crates are ready. The installation team books travel. A forwarding coordinator then asks for the machine specifications and the importer's clearance instructions.

The response is a one-line invoice description: "industrial equipment". Nobody has confirmed the intended customs procedure. The supplier's proposed tariff code has not been reviewed for the destination, and the buyer expects a duty concession because a colleague remembers using one on a different project.

The shipment is physically ready but commercially exposed. Sending the crates immediately would transfer unanswered questions to a more expensive location. Customs preparation belongs in the shipment plan before departure, especially where an installation date depends on release.

What you should be able to do

By the end of this chapter, you should be able to distinguish tariff classification, customs value and origin; explain the purpose of a customs procedure; assemble a clearance-readiness file; calculate an illustrative duty-and-tax estimate from explicit assumptions; and separate customs release from other conditions for delivery. You should recognise which questions require the importer, exporter, authorised representative or relevant authority to decide.

7.1 Understand what a border process is trying to establish

A border crossing raises several questions. What are the goods? What procedure is requested? Are the parties entitled and authorised to use that procedure? Which duties, taxes, restrictions or other controls apply? What evidence supports the declaration?

Customs authorities administer customs requirements, while other agencies may control matters such as plant health, food safety, medicines or technical product requirements. The exact division differs by jurisdiction and commodity. A forwarding team must identify the relevant requirements rather than assume that one customs release settles every regulatory question.

A customs representative helps prepare and manage the process within the authority granted to it. The importer and exporter still need to supply reliable facts and fulfil their own obligations. Appointment is not the same as transferring every responsibility to the broker. The legal effect of the representation arrangement must be checked locally.

The forwarder's practical contribution is coordination: obtain the right information early, bring discrepancies to the responsible parties, align the declaration plan with the movement and record the actual release status. It should neither promise an authority's decision nor turn an unresolved question into a confident entry merely to keep a booking moving.

7.2 Keep classification value and origin separate

These three concepts often appear together, but they answer different questions. Classification places the goods within the applicable tariff nomenclature. Customs valuation establishes the value used under the relevant rules. Origin determines the goods' economic nationality under the applicable origin rules.

The European Commission identifies tariff, value and origin as central factors in customs-duty calculations. This is a useful organising framework, not a claim that every country applies identical rates or administrative procedures. [P2-09]

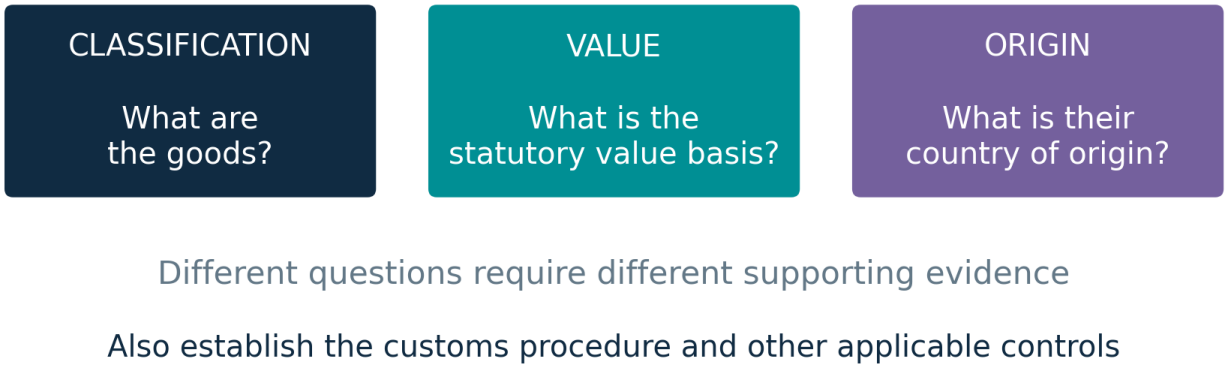


Figure 7.1 Three distinct customs questions. A product description supports all three investigations, but a tariff code does not establish value or origin. The selected customs procedure and other applicable controls must also be considered.

For Arcwell, the machinery's function and technical characteristics support classification. The sale and relevant cost information support valuation. Manufacturing and origin evidence support the origin analysis. A shipping route through another country answers a transport question and cannot replace any of those investigations.

Do not let an apparently complete invoice obscure a missing decision. A form can contain a tariff code, a value and a country name while leaving the basis of all three unexplained. A good readiness review asks who confirmed each field and which evidence they used.

7.3 Tariff classification begins with product knowledge

The Harmonized System provides an international structure with six-digit commodity classifications. National or regional tariff systems may add further subdivisions. The WCO's overview and frequently asked questions explain the structure and direct classification enquiries to the relevant customs administration. At the date of this review, the WCO identifies HS 2022 as the current international edition. [P2-07]

Finding a familiar word in a search result is not a complete classification method. The actual goods, legal descriptions, section and chapter notes and applicable interpretative rules matter. A machine's trade name may not describe its principal function. A part may require different analysis from a complete machine. The condition and form of presentation can also matter.

For the machinery case, request the manufacturer's specification, model, principal function, operating description, materials where relevant, photographs or drawings and a clear list of included components. Ask whether the goods arrive assembled, disassembled, as a complete system or as separate articles. These are facts for the classification specialist, not reasons to guess a code in this chapter.

Worked example 7.1 A code copied from another shipment. The supplier suggests the code used on its export declaration. Arcwell's purchasing colleague finds a different code on a previous import of another machine. The coordinator should record both proposals and their sources, then refer the actual product

information to the authorised classification reviewer. It should not choose the code with the lower rate or the one that allows an invoice to be issued fastest.

An established classification record can make future work more efficient, but only while the product, jurisdiction and relevant rules remain applicable. If the model changes, ask whether the earlier analysis still fits. A database entry is evidence of a past decision; it is not proof that the present goods are identical.

Where available and appropriate, an advance classification ruling can provide greater certainty. In the EU, Binding Tariff Information is a formal decision issued by customs authorities. Informal advice and another trader's public ruling should not be treated as though they were automatically a binding decision for your own transaction. [P2-24]

7.4 Customs value is not simply a convenient invoice number

The WTO valuation framework primarily uses transaction value: the price actually paid or payable for goods sold for export to the importing country, subject to the required conditions and adjustments. Where that basis cannot be used, other prescribed methods apply. The framework does not authorise a trader to select an arbitrary value that produces a preferred duty bill. [P2-08]

In practical preparation, collect the commercial agreement and the cost information needed by the valuation reviewer. Ask whether transport, insurance, packing, commissions, buyer-supplied items, royalties or other payments require consideration under the applicable rules. Do not add every cost automatically; equally, do not assume that anything absent from the invoice is irrelevant.

Delivery terms help explain which costs may be included in the seller's price, but an Incoterms rule is not a complete customs valuation calculation. A freight-inclusive invoice and a factory-price invoice may need different adjustments to reach the correct statutory basis. Double counting freight is a common analytical error when the reviewer does not establish what the invoice already includes.

For the EU, the Commission describes transaction value as the main method, subject to specified additions and deductions. This jurisdictional example illustrates why the valuation basis must be checked rather than inferred from the invoice heading. The numerical exercise below is deliberately a fictional regime and does not reproduce EU or Bangladesh tax treatment. [P2-09]

Worked example 7.2 Build an illustrative duty-and-tax estimate. Arcwell's teaching order contains two machines priced at USD 24,000 each. Assume a fictional customs regime in which the accepted valuation method adds USD 1,600 freight and USD 200 insurance to the goods price. Assume an ad valorem duty of 5%. For this exercise only, import tax is 20% of customs value plus duty plus USD 300 of specified post-border delivery cost. There are no other charges, exemptions, exchange-rate effects or reliefs in the exercise.

Calculation stage	Substitution	Result
Goods value	2 × USD 24,000	USD 48,000
Assumed customs value	48,000 + 1,600 + 200	USD 49,800
Illustrative duty	49,800 × 5%	USD 2,490
Assumed import-tax base	49,800 + 2,490 + 300	USD 52,590
Illustrative import tax	52,590 × 20%	USD 10,518
Duty plus import tax	2,490 + 10,518	USD 13,008

The estimate is useful because every assumption is visible. It is not a quotation for clearing these machines in a real country. A live calculation requires the confirmed tariff, valuation treatment, procedure, origin, tax rules, exchange rate where applicable and any other relevant measures.

Separate cash requirements from final economic cost. A tax may be recoverable, deferred or irrecoverable depending on the importer and regime. Those possibilities require finance and customs advice. A forwarder should not tell the customer that a tax “does not cost anything” merely because recovery might later be possible.

7.5 Origin is different from the country of dispatch

Origin concerns where goods are regarded as produced under the applicable rules. The country of dispatch identifies where a movement began. A transshipment location identifies a transport event. These facts may coincide, but they need not.

Preferential origin concerns eligibility for treatment under a particular trade arrangement. Non-preferential origin serves other tariff and trade-policy purposes. The European Commission distinguishes the two and notes that origin is not determined simply by the country from which goods are shipped. [P2-10]

Suppose a machine is manufactured in one country, sold by a trading company in another and routed through a third country’s port. The forwarding record should distinguish manufacturer, seller, dispatch location and transshipment port. It should not copy the last port into the origin field because that is the location most visible in the sailing schedule.

Worked example 7.3 An unsupported preference claim. Arcwell’s buyer asks the forwarder to claim a reduced rate because the supplier is based in a country covered by a trade arrangement. That fact is insufficient. The responsible specialist must establish whether the goods meet the relevant origin rule and whether the required proof and other conditions are satisfied. If the evidence is missing, record the unresolved claim and seek an authorised decision on how to proceed.

The proof required can differ between arrangements. Certificates, declarations or statements may have specific eligibility and issue requirements. A supplier’s general statement that a product is “locally made” is not automatically the proof needed for a preference claim. The Commission’s proof-of-origin guidance is an example of the need to check the actual arrangement. [P2-11]

7.6 Select the procedure before building the schedule

Goods can enter a territory for different reasons. They may be imported permanently, admitted temporarily for a demonstration, moved under transit, stored under a customs procedure or sent for processing or repair. The names, availability and conditions of procedures vary. Establish the intended use and legal requirements early.

For Arcwell, the first question is whether the two machines are bought for permanent installation or are entering temporarily for a trial. That commercial fact can change the preparation. Serial numbers, guarantees, authorisations, re-export commitments and recordkeeping may become important under the relevant procedure.

Transit deserves particular care. In the EU example, it allows eligible goods to move under customs control while specified charges and formalities are suspended until the appropriate destination process. It does not mean that the goods can be freely sold or that the movement no longer needs customs control. The procedure must be properly completed. [P2-13]

Do not use “bonded” as an all-purpose explanation. Ask which authorised procedure or facility is involved, who is responsible, what movement is permitted and how completion will be evidenced. A warehouse’s marketing description is not the legal status of every shipment inside it.

7.7 Assemble the clearance-readiness file

A readiness file should make the proposed transaction understandable to the responsible specialist. For Arcwell, the equipment description must connect the sales documents to the physical crates and the intended use. The following checklist is a coordination aid, not a country-specific declaration form.

Readiness area	Evidence to assemble	Owner to confirm
Parties and authority	Correct legal entities, required registrations and representation appointment	Importer, exporter and appointed representative
Product identity	Model, function, specification, serial numbers and component list	Manufacturer and importer
Packing and measurement	Two crates, each 900 kg gross; net and external dimensions supported by records	Packer and receiving or measuring team
Commercial basis	Invoice, agreement, currency, payment terms and price breakdown	Buyer and seller
Classification	Confirmed code at the required local level with supporting rationale	Authorised classification reviewer
Valuation	Relevant cost evidence and treatment of additions or deductions	Importer and valuation specialist
Origin	Manufacturing facts and required supporting proof	Supplier and origin reviewer
Procedure and controls	Intended use, applicable licences, authorisations and other agency requirements	Importer and local specialists
Funding and timing	Duty or guarantee arrangements, document deadlines and receiving plan	Importer, finance and operations

As a jurisdictional example, EU customs operations use EORI identifiers for economic operators and other persons where required. The operator’s identity and relevant registration should be checked early. An identifier does not, by itself, authorise every procedure or settle every obligation. [P2-12]

Use the checklist to make gaps visible. “Technical brochure requested from supplier; classification review cannot finish until received” is a useful status. A tick beside “HS code” is less useful if somebody copied an unverified number from an old file.

7.8 Understand the sequence without promising the outcome

The exact order and electronic systems vary, but a general coordination sequence is preparation, submission through the authorised channel, any review or control, the applicable release decision and the next permitted movement. Some information may be required before arrival. Other events depend on goods being presented or a particular procedure being completed.

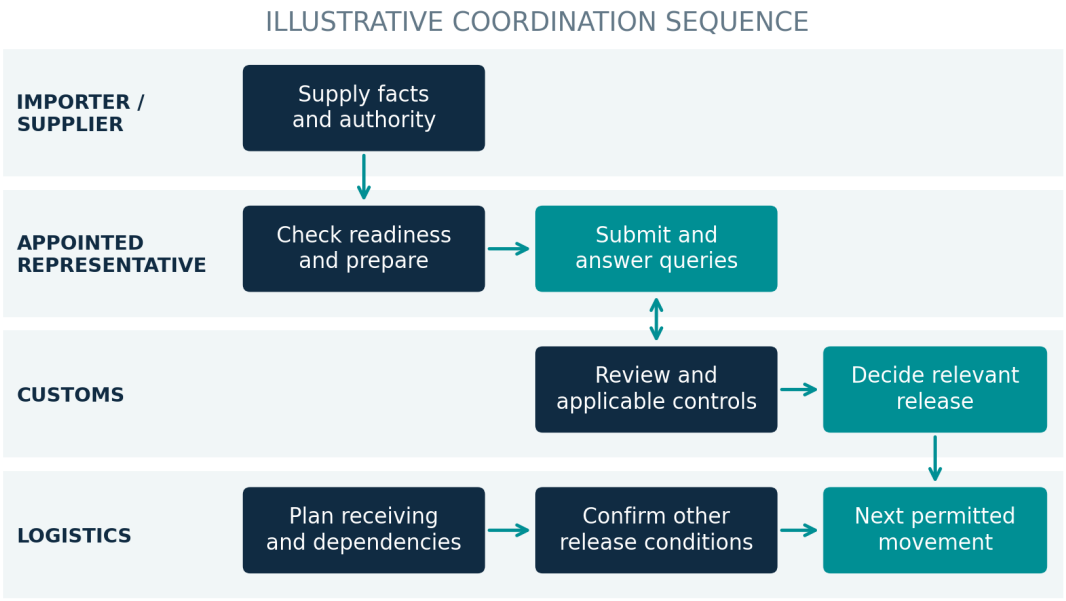


Figure 7.2 A simplified border-process swimlane. The importer and supplier provide evidence, the representative manages the declaration process within its authority, customs decides the relevant release, and logistics coordinates the next permitted movement. Timing and formal requirements vary by jurisdiction.

Build the schedule around dependencies rather than a single optimistic “clearance time”. If a permit must exist before shipment, arrival does not cure its absence. If an examination is required, a carrier’s delivery appointment does not override it. If additional information is requested, the file needs an owner who can obtain a reliable answer.

Worked example 7.4 A classification question at the wrong time. The machines are due to arrive on teaching Day 10. On Day 7, the reviewer still lacks a component specification. The installation team expects delivery on Day 11. The coordinator should explain that release readiness remains unresolved, obtain a firm response deadline from the supplier and review delivery and installation commitments with the customer. It should not enter a convenient description to preserve the Day 11 promise.

There may be more than one responsible agency or release record. Keep a concise log of submissions, queries, responses and decisions. Record the actual reference and scope of a release rather than a colleague’s summary that “customs is okay”.

7.9 Separate regulatory commercial and physical release

Customs release, a carrier’s release, a terminal’s delivery readiness and the receiver’s ability to accept goods are related but separate conditions. A shipment may satisfy one and fail another.

Suppose customs has released Arcwell’s machines, but the carrier still has an unresolved document hold. Dispatching a truck would not remove that hold. Alternatively, all release conditions may be satisfied while the factory has no suitable unloading arrangement. The coordinator must connect the records to a workable physical delivery.

Status in the fictional machine file	Meaning for dispatch
Customs release confirmed; carrier document hold remains	Resolve the carrier condition before treating cargo as available

Status in the fictional machine file	Meaning for dispatch
Carrier release confirmed; required authority decision pending	Wait for the relevant permitted-movement status
Required releases confirmed; warehouse appointment absent	Arrange the receiving slot and handling resources
Releases and appointment confirmed; unsafe crate reported	Apply the safety hold and obtain a competent handling decision

This is why a good status update names the remaining condition. “Cleared but awaiting carrier release” is more useful than “almost delivered”. The customer can then understand what action or decision is still needed.

7.10 Record changes and close the procedure

The job is not complete merely because the goods left the terminal. Depending on the procedure, records may need to evidence arrival, discharge of transit, re-export, authorised use or subsequent corrections. Assign those obligations before delivery so that they do not disappear between departments.

If an error is discovered after submission, notify the authorised representative and follow the applicable correction route. Retain the original record, the basis for the change and the accepted outcome. Do not assume that an amended commercial invoice automatically amends an already-lodged declaration.

For an estimate, identify what was provisional and reconcile it to the final assessed or invoiced amounts. Explain differences by cause: a revised value basis, a confirmed classification, a changed charge or an exchange-rate effect. Avoid presenting a single unexplained variance called “customs cost”.

Professional judgment is especially important when a customer presses for a shortcut. A request to understate value or misdescribe the goods is not a routine document correction. Record the concern and escalate through the organisation’s compliance process. The practical objective is a lawful, supportable movement whose records can withstand later review.

Chapter 7 recap

Prepare customs work around facts and evidence. Classification, value and origin require separate reasoning, and the intended procedure affects both documents and timing. A forwarding coordinator helps the responsible parties resolve gaps before the cargo reaches an expensive decision point. Delivery planning must account for all relevant releases and the receiver’s actual readiness.

Review questions

Answers and marking guidance • page 227

1. How can customs and another border agency have different responsibilities for the same shipment?
2. What distinct questions do classification, valuation and origin answer?
3. Why is a supplier’s export tariff code not automatically sufficient for the importing country?
4. Which product facts would you request for an industrial machine?

5. Why can an invoice amount differ from the applicable customs value?

6. Why does a freight-inclusive sales term not settle the entire valuation calculation?

7. How does origin differ from a transshipment port?

8. Why is a trade agreement alone insufficient to support a preference claim?

9. How can the intended customs procedure change preparation and timing?

10. Why can customs-released goods still be unavailable for delivery?

Applied exercises

Exercise 7A Calculate an estimate under stated assumptions. Use the fictional regime in worked example 7.2 with goods value USD 30,000, freight USD 1,200, insurance USD 150, duty at 4%, post-border delivery USD 250 and import tax at 18% of customs value plus duty plus the stated post-border delivery. Calculate customs value, duty, tax base, tax and combined duty plus tax. Then recalculate the combined amount if the confirmed duty rate is 6%, with all other assumptions unchanged. Explain why this comparison does not permit the operator to choose the lower classification.

Exercise 7B Prepare an equipment import. A buyer says, “Two used machines, about 2 tonnes, arriving next week. Supplier says duty-free. Please clear and deliver directly to our new factory.” Build a readiness list of at least ten questions, with an owner for each. Identify three unresolved matters that could affect shipment or delivery timing. Draft a customer update that distinguishes confirmed facts from the supplier’s unverified claim.

Chapter 8 Safety security and cargo care

The carton that should interrupt the routine

A warehouse receives a small consignment described as “inspection accessories”. The paperwork looks ordinary. One carton has a crushed corner. A label visible through an opening refers to a rechargeable battery pack, although the booking says nothing about batteries. The driver wants a signature and the customer wants the cargo on the evening departure.

The receiving employee now has two separate concerns: damaged packaging and a possible omission in the cargo description. Neither is resolved by the urgency of the booking. The useful response begins with the observed facts, the site’s safety procedures and the people authorised to assess the cargo.

This chapter is about recognising those moments. A newcomer does not need to improvise a technical solution to be useful. They need to notice the problem, avoid making it worse and bring the right evidence to the right person before the next movement is released.

What you should be able to do

By the end of this chapter, you should be able to distinguish safety, security and cargo care; identify concerns at a handover; recognise possible undeclared dangerous goods; record an incident without making unsupported conclusions; interpret a simple temperature record; and prepare a clear escalation and customer update. You should understand why awareness training does not authorise specialist handling, classification or product-release decisions.

8.1 Three responsibilities that meet at the cargo

Safety concerns harm to people and the environment arising from the work and the goods. Security concerns deliberate interference, unauthorised access, theft and other threats to the integrity of the movement. Cargo care concerns preserving the goods’ condition and suitability throughout the service. An incident can involve all three.

A damaged package might expose a person to sharp edges, create a risk of contents falling out and leave goods vulnerable to loss. A diverted delivery instruction might be a clerical mistake or an unauthorised attempt to redirect cargo. A temperature excursion might affect product quality even when the truck arrived on time and the seals remained intact.

The categories help organise a response; they should not divide responsibility so narrowly that nobody acts. The person who notices a problem should know how to raise it and which activity must pause under the site’s procedure. A customer-service employee who is not physically at the warehouse can still prevent an unsafe instruction from being issued.

Professional care also includes recognising uncertainty. “No problem reported” is different from “condition checked and accepted”. A dashboard cannot prove a cargo-care requirement was met if the event was never measured or the record is missing.

8.2 Make the handover an observation point

At receipt, compare the shipment identity and count with the expected record, then make the observations within the receiving team’s authorised scope. Look for obvious packaging damage, leakage, unusual

conditions and discrepancies in marks or seals. Do not turn a routine receiving check into an unauthorised inspection of unknown hazardous contents.

Describe what is visible. “Upper right corner crushed; outer board torn; contents not examined” is more useful than “goods destroyed”. The first statement can be supported by a photograph and a receiving record. The second claims knowledge the receiver may not have.



Photograph 8.1 Damaged external packaging. Describe the deformation and visible openings before drawing conclusions about the contents. This is a parcel photograph, not evidence from the fictional warehouse incident. Credit: Meanwell Packaging, CC BY 2.0; reproduced unchanged apart from display scaling. Full source and licence appear in the image credits.

Worked example 8.1 Write an evidence-based receipt note. A fictional warehouse receives 24 cartons. Carton AC-017 has a torn outer panel and one crushed corner; no leakage or heat is observed from a safe position. A suitable note is: “24 cartons received. AC-017: outer panel torn and upper corner crushed. Internal contents not inspected. Photographs recorded; supervisor notified; carton status placed on hold pending authorised assessment.”

The note separates count, condition, inspection scope and action. It does not determine when damage occurred, who caused it or whether the product is usable. Those questions require further evidence and, where appropriate, qualified inspection.

Take photographs only where it is safe and permitted. Preserve the package identification, relevant wide view and visible detail without exposing unnecessary personal or confidential information. Retain the original image files and link them to the event record. A photograph without a shipment reference or time context can be difficult to use later.

8.3 Recognise when routine handling must stop

There is an important difference between holding a document decision and moving a suspect package into a different location. Physical movement may itself be unsafe. Follow the site’s emergency and isolation procedures, and let trained personnel determine any handling response.

If there are signs of immediate danger, such as smoke, abnormal heat or a suspicious leak, move away, alert the site's emergency response and keep others clear according to the established procedure. Do not open, touch or move the package to investigate it. A learner's role is to recognise the escalation point, not to diagnose the substance or improvise a remedy.

Where there is no apparent immediate emergency but acceptance is uncertain, pause the next affected action and refer the issue to the responsible supervisor or specialist. The cargo's system status, physical status and movement instruction should agree. A "hold" note in an email is ineffective if the warehouse release instruction still says to load it.

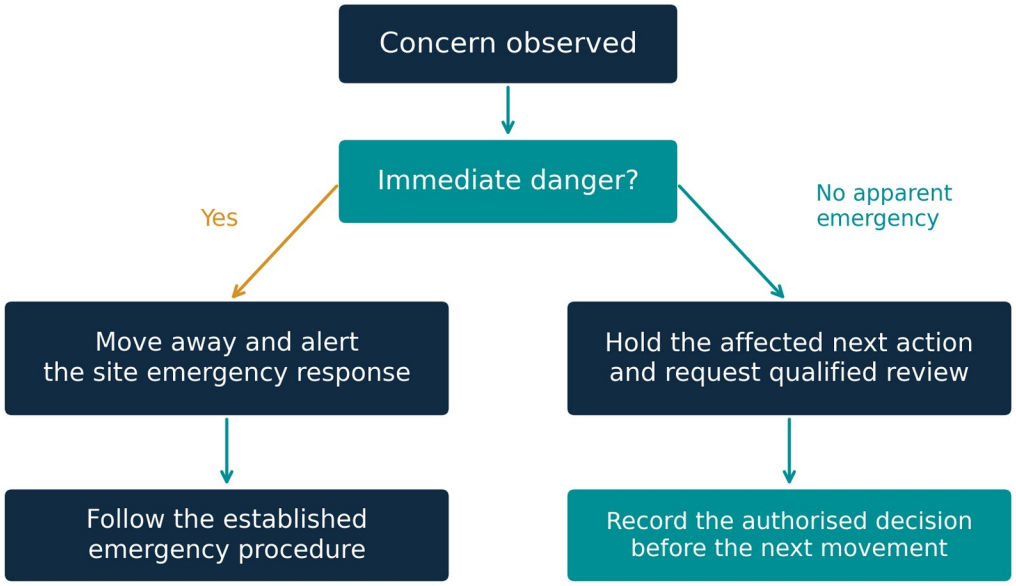


Figure 8.1 Recognition and escalation. This is an awareness pathway for deciding whom to involve. It does not provide emergency-treatment, dangerous-goods handling or release instructions.

The person who places an operational hold should identify who can release it and what evidence is required. Otherwise, the hold can become an indefinite problem with no owner, or a later employee may remove it without understanding why it exists.

8.4 Dangerous goods can hide behind ordinary descriptions

Dangerous goods are classified because of their transport hazards, not because the customer considers the product unusual. Everyday articles can raise questions: aerosols, certain chemicals, battery-powered devices, paints, perfumes, dry ice and pressurised equipment are examples that may require specialist assessment.

The nine hazard classes provide a useful orientation. They are not a shortcut for assigning a shipment's classification. Divisions, subsidiary risks, packing groups where applicable, technical criteria and modal requirements need competent review under the relevant rules. [P2-16, P2-18]

Class	Broad hazard family
1	Explosives
2	Gases
3	Flammable liquids

Class	Broad hazard family
4	Flammable solids, substances liable to spontaneous combustion, and substances dangerous when wet
5	Oxidising substances and organic peroxides
6	Toxic and infectious substances
7	Radioactive material
8	Corrosive substances
9	Miscellaneous dangerous substances and articles

An incomplete description should prompt a better question. “Does it contain a battery, liquid, gas, chemical or other regulated component?” is more useful than simply asking the shipper to confirm “non-hazardous”. The shipper’s answer should be supported by appropriate product information where necessary.

A safety data sheet can help identify hazards, but it is not a universal transport permission. Some articles do not have an SDS, and available information may not reflect the item’s current condition or transport configuration. FAA guidance specifically calls for consideration of changed or damaged products and notes that carrier restrictions may be additional to regulatory requirements. [P2-16]

Do not copy a dangerous-goods label from another shipment or select a UN number because it resembles a product name. Nor should a forwarder erase a battery reference from the description to avoid a question at acceptance. The appropriate response is to establish the facts and obtain the required specialist review.

8.5 Ask the battery questions before promising carriage

For a battery-related shipment, the reviewer may need to establish the chemistry, battery type, rating, quantity, condition and configuration: batteries by themselves, packed with equipment or contained in equipment. Manufacturer documentation and test-summary information may be relevant. A damaged, defective or recalled article raises additional questions that cannot be answered merely by quoting its capacity.

IATA’s 2026 battery guidance covers lithium and sodium-ion batteries and reflects changes in the air-transport requirements. Its current guidance is a reference for trained assessment; it does not replace the applicable regulations, packing instructions or carrier acceptance. The exact shipment configuration and the edition in force matter. [P2-15]

Worked example 8.2 The undeclared battery. Return to the opening case. The visible label suggests a rechargeable battery pack, but the paperwork says only “inspection accessories”. The coordinator should hold the affected onward acceptance process, notify the warehouse supervisor and dangerous-goods specialist, obtain the exact product and battery information from the shipper, and seek a documented decision on the permitted next action. If the package shows signs of immediate danger, the emergency response takes priority over document collection.

A suitable customer message is: “During receipt, the team observed damaged outer packaging and a battery reference not included in the shipment description. Onward acceptance is on hold pending assessment. Please provide the manufacturer’s product and battery information and confirm the item’s condition. We will advise the next permitted service option after the qualified review.”

This message does not label the customer dishonest, declare the shipment compliant or promise that repacking will solve it. It explains why movement has paused and identifies the information needed next.

8.6 Check the rules for every transport leg

Air, sea and road dangerous-goods requirements are not interchangeable. A shipment accepted for one leg may need different assessment, documentation or arrangements for another. The route may also involve carrier restrictions, local law and temporary operating conditions.

At the date of this review, IMO identifies the IMDG Code 2024 Edition, including Amendment 42-24, as mandatory from 1 January 2026. UNECE publishes ADR 2025 for the road framework within its applicable scope. These references identify the relevant families of rules; neither is a universal permission for every route or consignment. [P2-17, P2-18]

Avoid describing a service as “all by road” without checking its execution. An express network may use air transport. A road movement may include a sea crossing. The specialist must know the actual mode sequence and available service before completing the assessment.

For learners, the operational lesson is to capture enough information to route the question correctly. The authority to classify, pack, sign declarations, accept cargo or perform particular handling tasks depends on training, role, regulations and the organisation’s procedures. Reading this chapter is not certification for those functions.

8.7 Plan safe loading and unloading as shared work

Loading connects the driver, the site, the equipment operator and the cargo. A delivery appointment should establish more than an arrival time. It should establish access, suitable equipment, the responsible people and the arrangements for a safe handover.

UK HSE guidance emphasises separation of people from vehicles, suitable loading areas, stable loads and agreement between companies on how work will be done. Its practical guidance is useful for identifying questions, while the applicable workplace law and site procedures must be checked locally. [P2-14, P2-21]

For Arcwell’s machines, a driver arriving at a factory gate cannot create an unloading solution. The receiver must have an agreed arrangement suited to the actual crates. The forwarder should obtain confirmation before dispatch and refer unresolved capacity, lifting or access issues to competent personnel.

Do not assume a tail lift is suitable merely because its headline capacity exceeds the crate’s gross weight. Configuration, load position, platform size and the manufacturer’s limits can matter. Similarly, “a forklift is available” does not confirm that the particular operation is suitable. These are equipment and handling decisions for competent operators and planners.

Worked example 8.3 A delivery that is not ready. The truck is available at 10:00, but Arcwell confirms that its planned unloading equipment has failed. The coordinator should withhold dispatch to that unloading operation until a safe alternative is approved, assess storage and rescheduling options and explain the effect on delivery. A signed instruction from an impatient buyer does not make an unsuitable handling arrangement safe.

8.8 Match cargo care to the product

Cargo-care requirements should be specific enough to execute. “Keep safe”, “protect from heat” and “handle carefully” express intentions but leave important questions unanswered. Establish the required conditions, the limits of the service, monitoring needs and the person authorised to decide what happens after a deviation.

Garments may need protection from moisture, dirt and odour. Machinery may need suitable protection against corrosion, impact and vibration. Food and pharmaceutical products may have specified storage conditions, segregation requirements, shelf-life considerations and quality-release controls. One generic checklist cannot replace the product owner’s instructions.

For moisture-sensitive cargo, ask about packing condition, exposure before loading, the suitability of the transport unit and compatibility with other goods. The CTU Code’s packing guidance includes consideration of moisture and incompatible cargo. A sealed container is not proof that its interior will remain dry throughout every journey. [P2-02]

For medical products, WHO guidance addresses controlled conditions, monitoring, records, segregation and authorised release. The transport team must follow the approved product requirements and quality process; it should not decide that goods are usable merely because their external packaging looks normal. [P2-19]

Written instructions should also cover handovers. If a temperature requirement applies throughout the service, a short transfer between facilities is still part of the operation. Identify where the goods may wait, who monitors them and how the next party receives the relevant records.

8.9 Read a temperature record without claiming too much

Worked example 8.4 What seven readings can tell you. A fictional product instruction specifies 2–8°C. A logger is associated with the consignment and records the following values at ten-minute intervals. Assume the clock and shipment association have been checked; calibration and placement evidence are still part of the quality review.

Time on the same teaching day	Recorded temperature
08:00	5.2°C
08:10	5.6°C
08:20	7.9°C
08:30	9.3°C
08:40	9.1°C
08:50	7.4°C
09:00	6.0°C

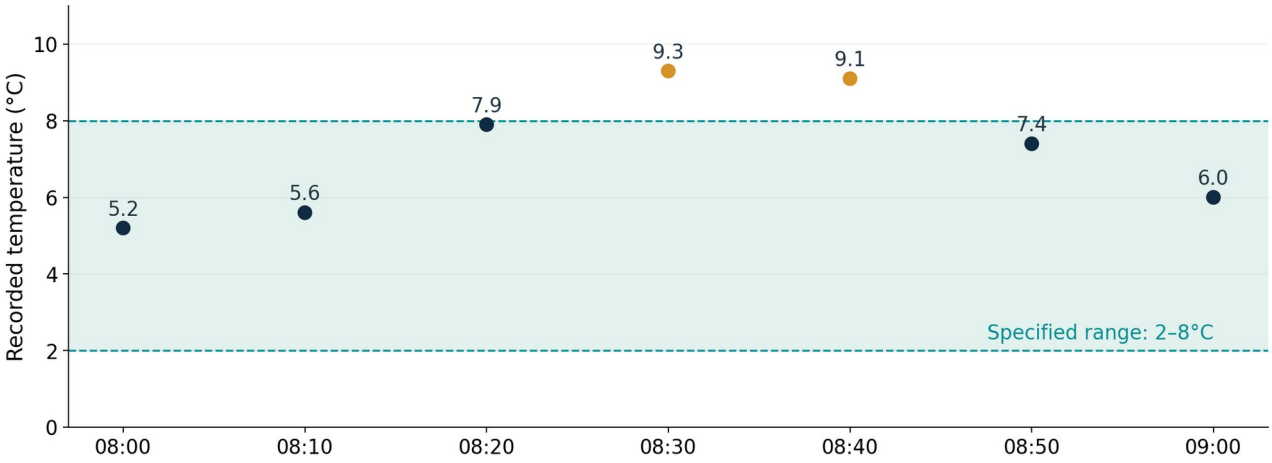


Figure 8.2 Recorded observations against a fictional 2–8°C instruction. Points show measurements at the stated times; no line is drawn to imply measured temperatures between samples. The shaded band represents the exercise's specified range, not a universal product requirement.

Two recorded values exceed the upper limit. Their timestamps are ten minutes apart. The data does not establish the exact start and end of the excursion between samples, nor does a later reading inside the range prove that the product remains acceptable. Do not report "exactly twenty minutes out of range" without evidence that supports that duration.

Place the affected goods under the applicable quality hold, preserve the raw record and refer the deviation to the authorised product-quality decision maker. The review may need the full logger record, placement, calibration status, custody events and product-specific stability information. The forwarder's immediate job is to preserve conditions and evidence while obtaining the decision.

The distinction between air temperature at a logger and the temperature of the product itself can also matter. Do not rename one as the other without supporting evidence. Describe the measurement that was actually made.

8.10 Protect the integrity of the movement

Security relies on controlled access, reliable identities, traceable instructions and observation at handovers. The WCO SAFE Framework links trade facilitation with supply-chain security and cooperation between customs, businesses and other agencies. It provides a wider context for these controls; it does not replace an operator's approved security programme. [P2-20]

For a forwarding office, security can begin with an instruction change. If an email unexpectedly redirects a valuable shipment to a different warehouse, verify the authority through a trusted, established channel before changing the delivery. Do not use contact details contained only in the suspicious instruction as the sole verification source.

At physical handover, follow the applicable identity, access and seal-control procedures. A seal number can support traceability, but a matching number does not prove every aspect of the cargo's history. An unexplained mismatch should be investigated through the authorised process.

Worked example 8.5 A seal discrepancy. The dispatch record lists seal S-104, while the receiving team observes S-140. Record the observed identifier, time and condition, preserve the dispatch evidence and notify the responsible supervisor or security team. Establish whether an authorised intervention explains the difference. Do not silently alter S-104 in the original record or break the observed seal merely to "check everything". Any inspection or onward release must follow the relevant authorised process.

The customer update should remain factual. “Seal discrepancy under investigation” describes the known issue. “Cargo stolen” or “just a typing error” would jump ahead of the evidence.

8.11 Build an incident record that another person can use

A useful incident record identifies the shipment, package or equipment, observation time and location, the person recording the event, observed facts, immediate controls, notifications and the pending decision. Preserve supporting records such as photographs, temperature data, receipts and relevant instructions.

Separate four things in the narrative: what was observed, what action was taken, what is suspected and what remains unknown. For example, “outer carton wet” is an observation; “receipt placed on hold” is an action; “possible exposure at the loading bay” is a hypothesis; and “condition of inner garments not examined” is a limitation.

This structure helps an investigator without forcing the receiver to decide the cause. It also helps customer service. A customer can act on a clear account of the shipment’s status and options. Repeated assurances that the team is “looking into it” become less useful when no owner or next update time is given.

Before reopening the movement, record who authorised the next action and on what basis. Where packaging is replaced, preserve the link between the old and new identifiers and update the relevant weights and dimensions. Where goods are rejected, follow the approved disposition rather than treating them as ordinary available stock.

8.12 Learn from the event without losing the immediate priority

The immediate priority is to protect people, control the goods and establish a permitted next step. The later review asks why the problem arose and how recurrence can be reduced. Those are connected tasks with different timing.

If battery information was omitted, examine how the cargo description was collected, whether the question was asked clearly and whether the booking process could recognise the omission. If damaged cartons repeatedly arrive from one source, review packing and handover evidence with that source. If temperature records are missing, examine responsibility for activating, transferring and retrieving the monitoring data.

Avoid treating a stronger reminder as the only corrective action. A revised instruction, a better handover field, a training need or a changed supplier process may be more useful. The review should identify the control that will change and the evidence that will show whether it works.

Chapter 8 recap

Good cargo care begins with accurate information and continues through observable handovers. Recognise concerns early, apply the appropriate hold or emergency escalation, and preserve facts without making unsupported conclusions. The next movement should follow a documented decision by the person authorised to make it. Urgency changes the importance of communication; it does not remove a safety or quality requirement.

Review questions

Answers and marking guidance • page 228

1. How do safety, security and cargo care differ, and how can one incident involve all three?

2. What should a receiving note say when packaging is damaged but the contents have not been inspected?

3. Why might moving a suspect package be an unsafe response?

4. Why is “non-hazardous accessories” an insufficient answer to a specific battery question?

5. Why is an SDS not a universal permission to transport an article?

6. Which battery facts may be needed by the specialist reviewing a shipment?

7. Why should the actual mode sequence be checked for an express movement?

8. Why does a forklift’s presence not establish that an unloading operation is suitable?

9. What do the two out-of-range readings in worked example 8.4 establish, and what do they leave unknown?

10. Why should a seal mismatch remain visible in the incident record even if an authorised explanation is later found?

Applied exercises

Exercise 8A Respond at receipt. A shipment booked as “electronic test equipment” arrives with 18 cartons. One has a torn side and a visible battery reference. The booking contains no battery information. There is no observed heat, smoke or leakage from the receiving team’s safe position. The driver is waiting for a receipt and the customer is pressing for same-day dispatch. Write an initial observation note, identify the immediate operational controls and the people to involve, list the product information to request, and draft a customer message of no more than 100 words. State what would change if signs of immediate danger appeared.

Exercise 8B Review a cargo-care exception. A fictional product requires 15–25°C. Recorded readings at 14:00, 14:15, 14:30, 14:45 and 15:00 are 22.0, 24.5, 27.0, 26.2 and 24.0°C. The delivery receipt has no external-damage note. Identify the observed exception and explain why the receipt does not settle product acceptability. List the evidence and authorised decision needed before the goods enter available stock. Do not infer an exact excursion duration from the sample points.

Part 3 Air freight

Air freight compresses the transport time but does not remove the work around it. Learn to compare service boundaries, plan acceptance, calculate rating quantities and respond when a special-cargo movement is disrupted.

Chapters 9–12

Chapter 9 Air cargo services and capacity

Chapter 10 Air export and import operations

Chapter 11 Air pricing and chargeable weight

Chapter 12 Special air cargo and service recovery

Chapter 9 Air cargo services and capacity

The fastest flight is not always the fastest delivery

Arcwell Textiles needs a replacement drive unit for a stopped production line. The supplier can release it at 10:00 on Monday. One quotation advertises a direct flight departing that evening. Another offers a connection and a higher price. The maintenance manager naturally prefers the direct flight, until the forwarding coordinator discovers that its cargo acceptance cutoff is 09:00. The goods cannot reach that departure.

Air freight decisions begin with the time at which usable cargo can enter the service, not with a flight displayed on a passenger timetable. The relevant finish is also specific: customs-released equipment delivered to the receiving team, rather than an aircraft landing somewhere in the destination country. This chapter explains how to compare services against those two boundaries.

What you should be able to do

Explain the different service scopes sold as air freight; distinguish capacity from acceptance; compare passenger-aircraft, freighter, consolidation and express options; and recommend a service using a complete delivery timeline.

9.1 Start with the service boundary

Airport-to-airport normally describes a main transport scope between airports, but the precise origin and destination handling inclusions still need checking. A door service adds inland stages under an agreed arrangement. Neither expression alone establishes who completes customs formalities, pays duties, arranges insurance or unloads at delivery.

Ask the provider to identify the first event it accepts responsibility for and the final event included in its price. Is collection from the supplier included? Must the shipment already be screened and ready for carriage? Does destination delivery mean a normal business-hours attempt or an agreed appointment? A quotation becomes useful when the answers are visible.

The same shipment may be sold through several parties. A forwarder can purchase airline space, organise collection and appoint a destination agent. An integrated express provider can offer a coordinated network with its own acceptance rules. A specialist emergency provider may arrange an accompanied service where lawful and suitable. Each model needs the actual commodity, dimensions, route and customs requirements checked.

Service model	Practical strength	Question before selection
Airport-to-airport	Main transport can be compared separately	Who owns collection and destination completion?
Forwarder door service	Several stages coordinated under an agreed scope	Which parties and exclusions sit behind the offer?
Consolidated air freight	Several shipments share a planned movement	What consolidation and release times apply?
Express network	Integrated handling and delivery processes	Does the piece meet network limits and acceptance rules?

Service model	Practical strength	Question before selection
Dedicated emergency arrangement	Can address an unusually urgent requirement	Is the entire route feasible and explicitly confirmed?



Photograph 9.1 A Cathay Pacific Boeing 747 freighter at Dhaka, 2022. Aircraft identity alone does not establish a shipment's loadability. Credit: Md Shaifuzzaman Ayon, CC BY-SA 4.0; unchanged apart from display scaling.

9.2 Understand where the space comes from

Passenger aircraft can carry cargo in lower-deck holds alongside baggage and mail. Freighters dedicate their main commercial purpose to cargo and may offer main-deck positions and different loading access. A freighter is not automatically available, and a passenger service is not automatically unsuitable. The actual aircraft configuration, piece dimensions, weight, cargo type and operating conditions control the answer.

A quoted weight allowance is only one capacity measure. A shipment may be light but too tall for the accepted contour, or compact but concentrated on an unsuitable bearing area. An airline's acceptance decision also depends on handling capability and restrictions throughout the route. Do not infer acceptability from a generic photograph or an aircraft model name.

Aircraft unit load devices, or ULDs, group and restrain cargo, mail or baggage. An aircraft container and a pallet used with its associated net are different ULD forms. They interface with the aircraft loading system and are regulated equipment, rather than ordinary warehouse pallets. A forwarder should obtain the right cargo information for qualified load planning; the ability to draw cartons inside a rectangle does not qualify someone to build or approve a ULD. [N-01]

Worked example 9.1 A piece that changes the service. Arcwell's supplier first describes a 180 kg spare as “one box”. The packed crate is later confirmed as 160 × 120 × 170 cm. A previously quoted service has not approved those dimensions. The coordinator sends the final packing information to the provider and requests written confirmation of aircraft and transfer acceptance. The original rate remains a commercial indication until suitability is established. The correct response is a revised service assessment, not a promise based on 180 kg alone.

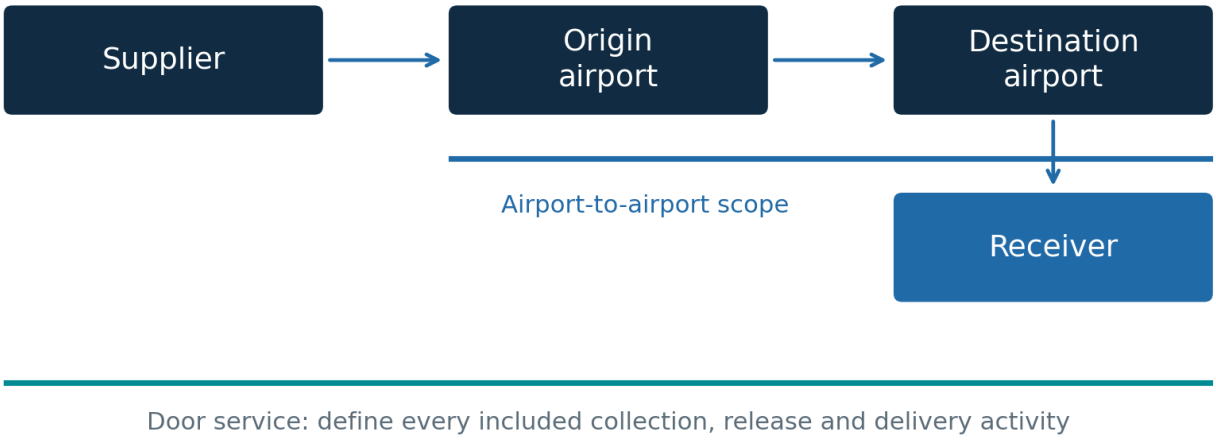


Figure 9.1 Service boundaries around an air movement. The lesson is to compare the complete promised scope, including collection, acceptance, destination release and delivery.

9.3 Consolidation and express describe operating choices

In an air consolidation, a forwarder groups compatible consignments under a master arrangement while retaining customer-level records. Consolidation can improve purchasing and regularity. It can also introduce a planned closing time, warehouse handling and a destination breakdown process. Those events must be included when comparing a consolidated service with a shipment moving under another arrangement.

“Express” is a service proposition, not a universal promise that every consignment moves on the next aircraft. Network limits, cutoffs, security acceptance, customs data and delivery coverage still apply. A remote destination, an oversized piece or a restricted commodity may require a different service or extra review.

A road feeder service can be part of an air cargo network. Consequently, an airport code in a routing does not prove that every segment is flown. Ask which segments use road transport when that matters to the customer's deadline, product requirements or contractual instructions.

9.4 Compare times on the same clock

Use one time basis in a planning worksheet and state it. Local departure and arrival times are useful for operations but confusing when added without time-zone conversion. Record the time zone beside each event, or convert a calculation copy to UTC while retaining the original local data.

Separate scheduled events, confirmed bookings and observed events. A scheduled departure describes a plan. A booking confirmation establishes a particular reservation under its terms. An actual uplift message is evidence of a later event. Customer updates should preserve those distinctions.

Worked example 9.2 The door timeline. All times in this fictional example use the same planning clock. Option A collects Monday 12:00, completes origin acceptance at 18:00, arrives Wednesday 06:00 and can deliver after release on Thursday 10:00. Option B collects Monday 12:00, arrives Tuesday 14:00 and can deliver Wednesday 09:00. From collection, A takes 70 hours and B takes 45 hours. If the operational deadline is Wednesday 12:00, only B meets the stated plan. Its 25-hour advantage comes from the complete arrangement, not merely the duration of flight.

Both remain conditional on the stated readiness and release assumptions. If B's destination representative cannot process the commodity, its faster air movement is irrelevant. Compare feasibility before price.

9.5 Put a value on time without inventing a guarantee

An urgent shipment often protects something more valuable than the goods themselves: production time, a launch, a repair visit or a contractual milestone. Ask the customer to quantify the relevant consequence. Do not invent a daily loss figure or treat all late hours as equally costly.

Worked example 9.3 An urgency premium. A fictional standard option costs USD 1,100 and delivers Friday. A feasible priority option costs USD 1,850 and delivers Thursday. The customer estimates an avoidable production contribution loss of USD 2,400 for that extra day, and confirms that the spare is the only remaining constraint. Additional freight is 1,850 − 1,100 = USD 750. On those assumptions, the priority option protects a net USD 1,650. If an engineer cannot install the spare until Friday, the claimed benefit disappears.

The forwarder provides the comparison; the customer owns the business-value assumption and approval. Record the chosen option, spending authority, latest booking decision and consequence if acceptance changes.

9.6 Ask what happens when the plan fails

A useful quotation discussion includes recovery. If a connection is missed, when is the next suitable departure? Can the shipment remain under the required care? Who supplies status evidence outside office hours? Is splitting the consignment operationally useful, or would one missing component make the whole delivery unusable?

Availability of an alternative is different from a commitment to use it. A recovery option may need new approval, extra handling, different documentation or a fresh acceptance decision. Ask for enough detail to judge the risk without claiming that every possible disruption can be removed.

Air service selection therefore combines four questions: can the cargo be accepted; can the complete sequence meet the business need; what does it cost; and what decisions remain conditional? Keep the answers in one service comparison record.

Chapter 9 recap

Choose an air service against the customer's usable-delivery requirement. Check physical and regulatory acceptance, include ground and release stages, compare time zones consistently and record the assumptions behind any urgency premium.

Review questions

Answers and marking guidance • page 229

1. Why can a direct flight fail to provide the earliest delivery?
2. What does airport-to-airport leave to be clarified?
3. How do passenger-aircraft and freighter capacity differ?
4. Why does a weight allowance not establish piece acceptance?
5. What is the purpose of an aircraft ULD?

6. What additional events can a consolidation introduce?

7. Why should a road feeder segment be identified?

8. How do scheduled, booked and actual events differ?

9. Who should confirm the business value of an earlier delivery?

10. What makes a recovery option credible?

Applied exercises

Exercise 9A Compare complete services. A shipment is collected at 08:00 on teaching Day 1. Offer A delivers at 16:00 on Day 3 for USD 1,250. Offer B delivers at 10:00 on Day 2 for USD 1,900. All times share one clock and both are assumed feasible. The deadline is 12:00 on Day 2. Calculate each duration and the premium. Identify three assumptions to confirm before recommending B.

Exercise 9B Challenge a capacity statement. A supplier says “two pallets, 300 kg, normal cargo”. Draft eight questions needed before confirming an air service. Include physical measurements, commodity characteristics, timing and destination completion. Explain why copying an old rate cannot answer them.

Chapter 10 Air export and import operations

The shipment at the wrong stage

At 15:00 the customer asks whether the spare is “on the flight”. The truck has reached the cargo terminal, but the acceptance team has found a mismatch between the number of packages delivered and the booking. A vehicle arrival record is available. An uplift record is not.

The coordinator needs to explain the actual stage without making the update sound evasive: “The terminal has received the vehicle. Cargo acceptance is pending reconciliation of the package count. We are checking the discrepancy now; the booked departure remains at risk.” Good operations depend on that precision.

What you should be able to do

Build an air export and import sequence; identify the evidence required at each handover; plan backwards from acceptance cutoffs; and manage a missed cutoff without concealing the original record.

10.1 Convert the booking into a controlled job

The booking should connect an approved customer instruction to a provider's accepted scope. Retain shipment references, commercial parties, collection and delivery locations, commodity facts, pieces, measurements, declared special requirements, route, service, timing and charge responsibility.

The provider may require booking amendments when the shipment changes. A coordinator updating an internal spreadsheet has not necessarily changed the airline reservation. Record the amendment request, the party authorised to accept it and the response.

IATA's public cargo-handling overview describes a chain of forwarder, carrier and handling activities, including readiness checks before carriage. Its value for a beginner is the distinction between stages: receiving goods, accepting them as ready for carriage and actually transporting them are separate events. Detailed operating instructions belong to the applicable manuals and operator procedures. [N-02]

10.2 Work backwards from the relevant cutoffs

There may be separate deadlines for booking data, documents, cargo acceptance, special cargo approval and security processes. Do not substitute the aircraft departure time for the latest acceptance time. Obtain the provider's actual deadline for this shipment.

Worked example 10.1 A backwards export plan. The fictional cargo acceptance deadline is Tuesday 16:00. Allow 90 minutes for the stated terminal process and 30 minutes of planning margin. The truck should arrive by 14:00. Collection requires a two-hour drive, so departure from the supplier is 12:00. Loading takes 45 minutes, giving an 11:15 loading start. The supplier must have cargo and records ready before that start. These are teaching durations, not published airport standards.

If the supplier can only begin loading at 12:00, the plan has a 45-minute deficit. The coordinator should raise that conflict while options remain. Writing the original times in a milestone sheet does not make them achievable.

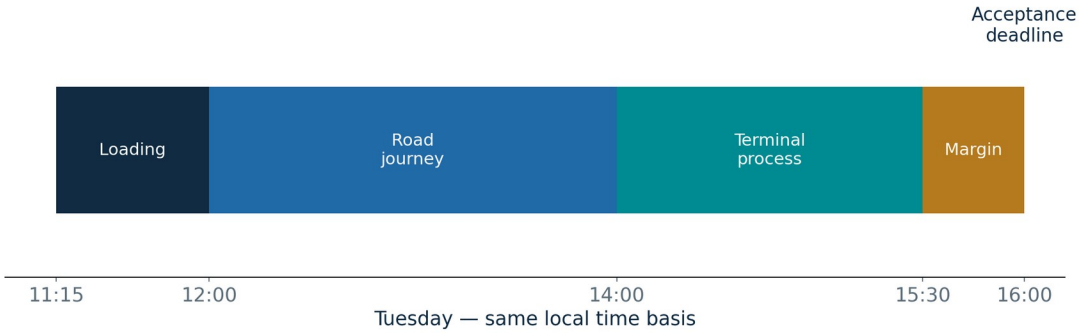


Figure 10.1 Backwards planning from a fictional air cargo acceptance deadline. The available margin is explicit; it is not hidden inside the driving time.

10.3 Make collection a verification point

At collection, compare the goods presented with the approved instruction within the collecting team's authorised scope. Check package count, marks, visible condition and required transport preparation. Where measurements are obtained at a later facility, record that dependency and its effect on acceptance and cost.

The driver should know where to report, whom to contact and how to record an exception. A collection instruction that simply says “collect today” transfers all the uncertainty to the person at the gate.

If the goods differ, preserve both the instructed and observed information. A useful exception is “booking 12 cartons; supplier presents 13; supplier approval and revised packing list requested”. “Cargo mismatch” alone does not tell the next operator what to solve.

10.4 Keep security and acceptance evidence intact

Air cargo is subject to security requirements administered through the applicable jurisdictions and authorised supply-chain arrangements. Staff must follow approved procedures and use the appropriate qualified parties. Do not treat a commercial invoice, a previous screening event or the customer's assurance as universal evidence that current security requirements are satisfied.

An acceptance check can examine whether the cargo and data match the booking, whether required approvals exist and whether the consignment meets the operator's conditions. The forwarder should understand the required outcome and preserve its evidence without improvising restricted procedures.

Worked example 10.2 A changed count. A booking lists 12 cartons, but the terminal receives 11. The supplier confirms that carton 12 remained at the factory. The customer wants the 11 available cartons to move. The coordinator obtains an authorised partial-shipment instruction, requests the necessary booking and document amendments, checks whether the available pieces are commercially useful, and confirms acceptance with the provider. Sending “11 received” does not by itself authorise a split or change an existing filing.

10.5 Understand the document handovers

The house and master air-carriage records may name different contractual parties. Keep their relationships clear, together with the commercial invoice, packing list and customs information. Chapter 6 explains why equal-looking documents are not the same as accurate documents.

A destination pre-alert is a package of relevant information sent ahead of arrival. Its contents depend on the service and applicable requirements. In a teaching job it could include transport references, flight plan, cargo particulars, commercial documents, special instructions, release dependencies and contact details.

Send the current approved version and identify changes. A pre-alert sent early but left uncorrected after a split shipment can create a larger destination problem than a later, accurate package.

10.6 Monitor the connection rather than the headline departure

An origin departure is a meaningful event, but a shipment using a transfer point still needs a connection. Monitor arrival, transfer readiness, any care requirement and the onward movement. Identify the next decision time: when would a missed event require recovery action?

Worked example 10.3 The uncertain connection. A fictional inbound flight arrives at 08:00. The onward flight departs at 13:00, but the operator requires transfer readiness by 10:00. The shipment is not confirmed available until 10:30. The relevant connection margin is already negative by 30 minutes; there are not “two and a half hours left”. The coordinator asks the operator to confirm actual acceptance or rebooking and informs destination planning of the risk.

Never manufacture an uplift confirmation from a public flight-tracking page. An aircraft can depart while a particular consignment remains behind. Shipment-level evidence is needed.

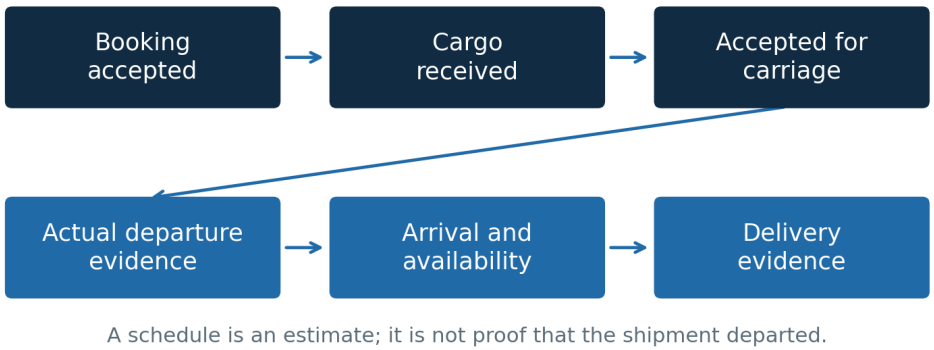


Figure 10.2 Air shipment events and evidence. Each event answers a different question; an earlier event cannot prove a later one.

10.7 Prepare import completion before arrival

The destination team needs sufficient information to prepare the applicable formalities, arrange any product review and plan delivery. Establish the importer, appointed representative, release conditions, funding arrangements where relevant, receiving hours and unloading responsibilities.

Arrival, cargo availability, customs release, carrier release and delivery readiness are distinct. Some may be processed in parallel, but the final movement must satisfy all applicable conditions. A customer who sees “arrived” in a tracking system may reasonably assume delivery is imminent unless the coordinator explains what remains.

Where a delivery appointment is required, agree how it will be updated if release changes. Reserving a slot without reliable availability can create waiting charges or a failed attempt. Waiting until every process is complete before contacting the receiver can create an avoidable further delay.

10.8 Recover from a missed acceptance cutoff

First establish the facts: what is incomplete, who controls it and which service options remain. Ask whether the operator has an authorised alternative acceptance arrangement; never assume an exception. If the shipment must move later, confirm care, custody, revised charges and the next feasible delivery.

A recovery record should connect the cause, approved decision, new plan and customer communication. Retain the original cutoff and actual events. Otherwise a later service review may incorrectly show that the shipment met a deadline that was quietly rewritten.

For the recurring spare-parts case, a one-day delay may affect an engineer's visit and factory restart. Inform the customer of those dependencies early enough to change them. The purpose of tracking is to support decisions, not to accumulate timestamps.

Chapter 10 recap

Build the job around explicit events and evidence. Plan backwards from shipment-specific cutoffs, reconcile changes before acceptance, monitor transfer dependencies and prepare destination completion before arrival.

Review questions

Answers and marking guidance • page 230

1. Why is terminal arrival different from cargo acceptance?
2. Which booking fields should be linked to the approved instruction?
3. Why may several cutoffs apply to one shipment?
4. What should happen when supplier readiness conflicts with the plan?
5. What makes a collection exception useful?
6. Who determines the applicable security procedure?
7. What is the purpose of a destination pre-alert?
8. Why does aircraft departure not prove shipment uplift?
9. Which conditions may remain after destination arrival?
10. Why should the original plan remain visible after recovery?

Applied exercises

Exercise 10A Plan collection. Acceptance closes at 18:00. Allow 75 minutes for terminal processing, 45 minutes of planning margin, three hours of driving and 60 minutes for loading. All use one clock. Calculate the latest planned truck arrival, supplier departure and loading start. What must change if loading cannot start before 13:30?

Exercise 10B Recover the file. The terminal receives nine of ten pieces. A factory manager asks you to alter the packing list to ten so the booking can proceed. Write the immediate response, the information needed for an authorised nine-piece movement and a customer update of no more than 100 words.

Chapter 11 Air pricing and chargeable weight

The cheaper kilogram rate

Two air offers arrive in the sales inbox. One shows USD 3.10 per kilogram; the other shows USD 2.85. The second appears cheaper until its dimensional rule and minimum charge are applied. Comparing the headline rate alone has answered the wrong question.

The commercial task is to calculate each offer using its own stated rules, then compare the same service boundary. This chapter uses fictional tariffs so that the arithmetic is fully visible. None of the rates, divisors or rounding conventions should be treated as a live quotation.

What you should be able to do

Calculate volume and dimensional weight; apply stated rounding, minimums and rate breaks; distinguish freight from total cost; and build a selling price from an explicit margin requirement.

11.1 Establish the measurement boundary

Begin with the final external dimensions and gross weights of the packages presented for carriage. Keep package groups separate when sizes differ. Confirm whether the offer uses shipment-level or piece-level comparisons, how measurements are rounded, whether non-stackability changes charging and which additional handling items apply.

Dimensional weight converts occupied space into a commercial weight equivalent. With dimensions in centimetres and a divisor stated in cm³/kg, divide total cubic centimetres by that divisor. The divisor is a quotation term. Do not assume that a value used in one exercise applies to every carrier, product or express network. UPS's public waybill guidance illustrates the comparison between actual and dimensional weight; the detailed service rules still need checking. [N-03]

Worked example 11.1 The blueprint shipment. Twelve cartons each measure 50 × 40 × 40 cm and together weigh 180 kg gross. The assumed divisor is 6,000 cm³/kg, with shipment-level comparison and no additional rounding. Volume = 12 × 50 × 40 × 40 = 960,000 cm³ = 0.96 m³. Dimensional weight = 960,000 ÷ 6,000 = 160 kg. Chargeable weight is max(180, 160) = 180 kg.

At USD 3.20/kg, freight is 180 × 3.20 = USD 576. Add fixed charges of USD 95: total supplier cost is USD 671. The fixed charges are not multiplied by chargeable weight. If a fuel charge or destination fee is excluded, the USD 671 is not a complete comparable cost.

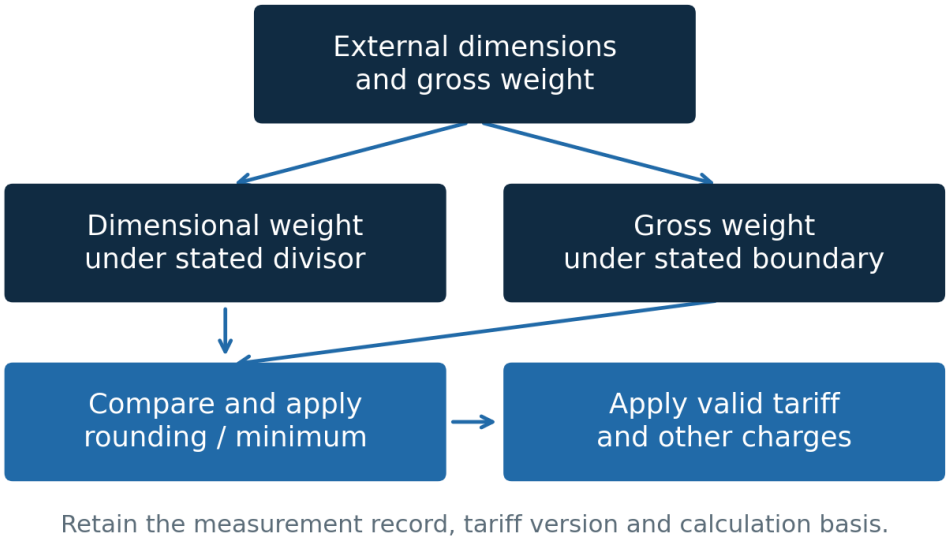


Figure 11.1 A transparent air-rating sequence. Measurements determine the rating quantity; the quoted rules determine which quantity and rate apply.

11.2 Apply minimums before comparing offers

A minimum charge protects a supplier against a very small shipment generating insufficient revenue. It may apply to freight alone or to a particular fee. Read the scope before adding it.

Worked example 11.2 A minimum that matters. Chargeable weight is 28 kg. The teaching tariff is USD 4.00/kg, subject to a USD 140 minimum freight charge, plus USD 55 fixed handling. Calculated weight freight is 28 × 4 = USD 112. Apply max(112, 140) = USD 140, then add handling: total USD 195. Adding both USD 112 and the full minimum would double-count freight.

The same care applies to charges expressed “per shipment”, “per air waybill”, “per piece” and “per kilogram”. Preserve the basis beside the rate in the comparison sheet. A blank unit is an unresolved commercial term.

11.3 Understand the higher-weight comparison

Some tariffs permit a shipment to be charged at a higher weight break when that produces a lower freight amount. This is a rating convention, not a change to the physical gross weight. It must be permitted by the actual offer.

Worked example 11.3 A break at 100 kg. A shipment has 92 kg chargeable weight. The fictional tariff charges USD 4.00/kg below 100 kg and USD 3.50/kg at 100 kg or above, and explicitly permits charging as 100 kg. At the lower break: 92 × 4.00 = USD 368. At the higher break: 100 × 3.50 = USD 350. The permitted higher-break calculation saves USD 18. Record 92 kg as the actual calculated chargeable weight and 100 kg as the rating weight used under this rule.

The threshold at which USD 4.00/kg equals the 100 kg minimum at USD 3.50/kg is 350 ÷ 4 = 87.5 kg. Between that threshold and 100 kg, the higher-break option can be cheaper under these assumptions. Other charges may use actual or chargeable weight differently, so check them separately.

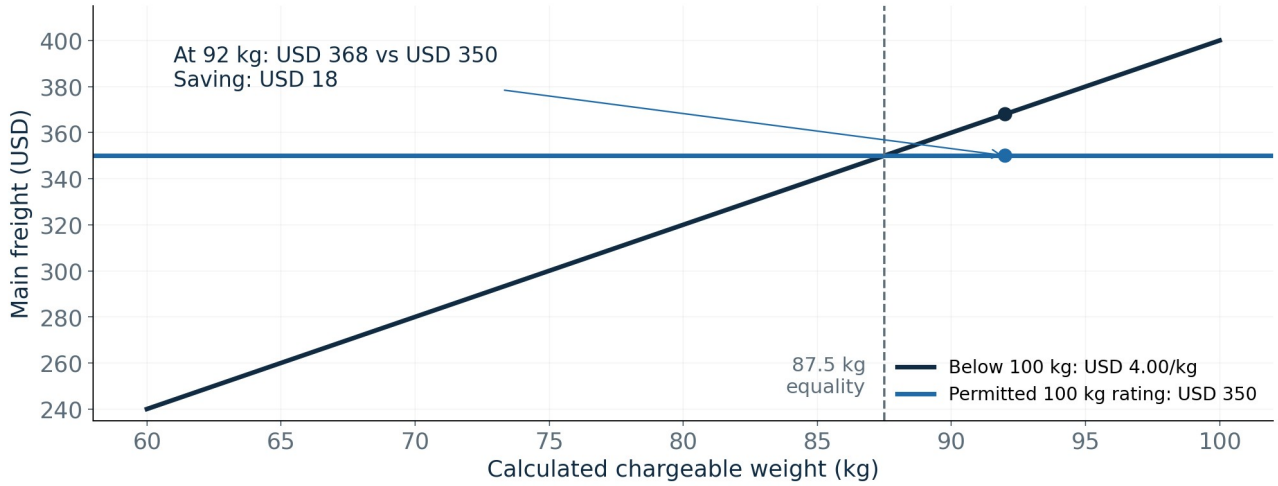


Figure 11.2 The fictional 100 kg rate-break comparison. The lower freight amount depends on the stated permission to rate at the next break.

11.4 Compare three offers line by line

Return to the 180 kg, 0.96 m³ shipment. Offer A uses divisor 6,000, rate USD 3.20/kg and fixed charges USD 95. Offer B uses divisor 5,000, rate USD 2.95/kg and fixed charges USD 130. Offer C uses divisor 6,000, rate USD 3.05/kg and fixed charges USD 120, but excludes a confirmed USD 70 destination fee.

Offer	Rating calculation	Comparable total in USD
A	180 kg × 3.20 + 95	671.00
B	192 kg × 2.95 + 130	696.40
C	180 kg × 3.05 + 120 + 70	739.00

Offer B's dimensional weight is 960,000 ÷ 5,000 = 192 kg, which exceeds gross weight. Offer C's low rate does not offset its additional fees. This comparison assumes all three have an equivalent, acceptable service scope. If their delivery dates or care arrangements differ, present that difference alongside the cost.

11.5 Build a selling price deliberately

Gross profit is selling revenue less the defined direct supplier cost. Gross margin divides that profit by selling revenue; markup divides it by cost. These percentages answer different questions.

Worked example 11.4 Margin and markup. To earn a 20% gross margin on the USD 671 supplier cost, selling price = 671 ÷ (1 − 0.20) = USD 838.75. Gross profit is USD 167.75. Applying a 20% markup instead gives 671 × 1.20 = USD 805.20. That produces USD 134.20 profit and a margin of 134.20 ÷ 805.20 = 16.67%.

A margin calculation cannot repair incomplete costs. Include the relevant origin, main-carriage and destination services before pricing. Establish how taxes, duties, disbursements and pass-through charges are treated in the commercial model rather than silently mixing them into one margin base.

11.6 Explain amendments without surprising the customer

A quotation should state its measurement assumptions and the process for reconciling final cargo. If volume grows after packing, show the original and revised figures, the applicable rating rule and the cost effect. Avoid describing a mathematical consequence as a discretionary penalty.

Suppose Offer A's shipment becomes 1.20 m^3 while gross remains 180 kg. Under its divisor, dimensional weight becomes 1,200,000 ÷ 6,000 = 200 kg. Freight becomes USD 640 and total supplier cost USD 735, an increase of USD 64. The next step is to confirm the final measurements and obtain any required commercial approval before proceeding.

Rounding can affect small shipments materially. Retain unrounded intermediate values unless the quoted rule requires rounding at that stage. A spreadsheet should show the rule, not merely a rounded answer.

Chapter 11 recap

Price the final cargo under each offer's rules. Keep freight, minimums and other charges separate; test permitted weight breaks; compare equivalent scope; and distinguish margin from markup.

Review questions

Answers and marking guidance • **page 231**

1. Why are external package dimensions used?
2. What unit does the divisor need in the chapter's formula?
3. Why is 6,000 not a universal instruction?
4. How is a minimum freight charge applied?
5. What is the difference between physical weight and a higher rating break?
6. When is rating at the next break permissible?
7. Why can a lower kilogram rate produce a higher total?
8. How do markup and margin differ?
9. Why should intermediate rounding be controlled?
10. What should accompany a price amendment after remeasurement?

Applied exercises

Exercise 11A Rate a shipment. Ten cartons measure 60 × 50 × 40 cm and weigh 18 kg gross each. Use a divisor of 6,000, shipment-level comparison, USD 3.10/kg, minimum freight USD 500 and fixed charges USD 80. Calculate volume, gross weight, dimensional weight, freight, total cost and a selling price yielding 20% gross margin.

Exercise 11B Test a break. Chargeable weight is 88 kg. The tariff is USD 4.20/kg below 100 kg and USD 3.60/kg from 100 kg, explicitly allowing charging as 100 kg. Fixed charges are USD 65 under either option. Calculate both totals, choose the permitted lower amount and explain which weight belongs in the physical cargo record.

Chapter 12 Special air cargo and service recovery

A delay with a product clock

A temperature-sensitive consignment reaches a transfer airport after its onward flight has closed. The customer's first question is when it can depart. The more immediate operational question is whether the goods remain under the required conditions while that decision is made.

Some cargo has a condition deadline as well as a delivery deadline. A recovery plan that moves the shipment earlier but breaks its care requirements can make the service worse. This chapter develops the information and decisions needed for special cargo without replacing product-specific instructions or regulated training.

What you should be able to do

Identify the additional information needed for special air cargo; distinguish transport acceptance from product release; manage a transfer delay through authorised parties; and write an exception update that separates facts from unverified assumptions.

12.1 Define what makes the cargo special

The term covers different requirements. Temperature-sensitive products need defined conditions and monitoring. Dangerous goods need classification, packing, documentation and acceptance under applicable rules. Live animals need species-specific welfare and carriage arrangements. Perishables may have limited useful life. Valuable goods may require specific security, custody and insurance arrangements.

Do not combine these categories into one generic “special handling” instruction. A shipment can belong to more than one category, and its requirements may interact. Refrigerant, batteries, monitoring devices or preservation materials can introduce additional questions.

The shipper should provide accurate product information. Qualified parties determine regulated classifications and acceptance. The forwarder coordinates the approved arrangement, checks that every stage can support it and records unresolved conditions. IATA's specialised cargo resources identify separate manuals and processes; a general forwarding chapter is awareness education. [N-04]

12.2 Translate product requirements into a route

Ask for the required temperature range or other condition, the permitted exposure information where applicable, packaging qualification, monitoring instructions, handling limits, emergency contacts and the authorised person who decides product disposition.

Then test the entire route. Where will the goods wait before acceptance, during transfer and after arrival? Is the required facility available at the planned times? Who controls access and monitoring? What happens if arrival is outside normal hours? The existence of a cold room somewhere at an airport does not establish that this shipment has access to it.

Worked example 12.1 The missing transfer arrangement. A fictional product requires 2–8°C under its approved instruction. Origin and destination facilities have confirmed the required service, but the transfer

booking says only “general cargo”. The coordinator holds confirmation of the proposed route until the transfer provider verifies the required care and acceptance. The temperature requirement is not removed to fit the booking. A feasible alternative route or later dispatch may be preferable.

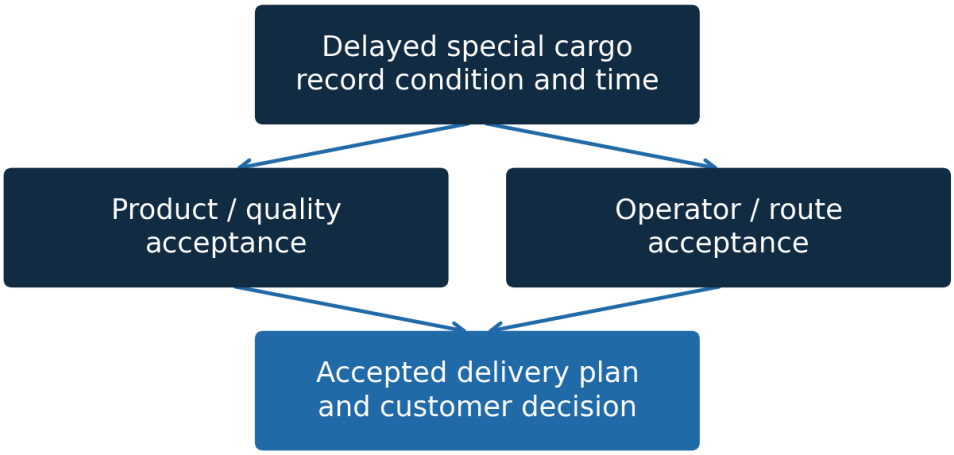
12.3 Work with packaging qualification

Passive packaging uses a qualified packing arrangement to maintain conditions for a defined scenario; active equipment uses a powered or otherwise actively controlled system. The suitability of either depends on the product, route, duration and handling conditions established by qualified parties.

A claimed duration should be read with its test conditions and limitations. “Valid for 72 hours” is not meaningful without knowing when that period starts, how the package is prepared, which environmental profile applies and what would invalidate the arrangement.

Worked example 12.2 Remaining qualified duration. In a fictional approved plan, the packaging's relevant duration is 72 hours from pack-out at Monday 06:00. At Tuesday 18:00, 36 hours have elapsed, leaving 36 hours to that planning limit. The revised route would deliver Thursday 08:00, 74 hours after pack-out. It exceeds the stated limit by two hours. The coordinator refers the plan to the authorised product and packaging team; no general arithmetic exercise can extend qualification.

The calculation identifies a conflict. It does not prove the product is damaged or approve reconditioning. Those decisions require the relevant technical authority and evidence.



A faster flight alone does not establish a suitable recovery plan.

Figure 12.1 Recovery decisions for a special-cargo delay. The route must remain acceptable for the product before its timing and price can be approved.

12.4 Preserve evidence during a delay

Obtain the actual location, custody holder, current status, relevant condition records, event times and the provider's confirmed options. Keep the original monitoring files where available. A screenshot may support an immediate discussion but should not replace the underlying record.

Temperature readings require context: sensor association, time basis, placement and calibration evidence. As Chapter 8 explained, a reading within range after an excursion does not establish product acceptability.

WHO guidance on storage and distribution provides a primary reference for controlled conditions and authorised quality decisions for medical products. [P2-19]

Worked example 12.3 Two recovery offers. Option A departs in six hours but has no confirmed controlled transfer arrangement. Option B departs in 14 hours and has confirmed suitable facilities, while the authorised product team confirms that the remaining qualified duration accommodates it. Under those stated facts, B is the supportable operational option. A's earlier departure is not enough to make it acceptable. If B's qualification assumption changes, the decision must be reopened.

12.5 Recognise dangerous-goods questions early

Ask about the actual contents and configuration rather than relying on the sales description. A diagnostic instrument may contain a battery. A sample may use a regulated preservative. A cooling arrangement may introduce a refrigerant with its own requirements.

The applicable air rules and operator variations must be assessed by appropriately trained personnel. The current edition matters. IATA's 2026 battery guidance supports the need to establish chemistry, configuration and condition; it is not permission for an untrained coordinator to select a packing instruction. [P2-15]

If a new fact appears after booking, stop the affected acceptance process and refer it through the established procedure. Preserve the original description and correction trail. Operational urgency does not authorise the forwarder to conceal the new information.

12.6 Give security and welfare their own questions

High-value cargo may require approved facilities, restricted access, specific handover records and agreed insurance conditions. Discuss the arrangement through the authorised channels, limiting sensitive information to those who need it. A service label alone does not establish coverage or custody controls.

For live animals, species, condition, route, documentation, container suitability, welfare requirements and receiving arrangements need specialist attention. Do not make a booking from a generic animal weight and box size. Airline and competent-authority requirements govern the actual movement.

For perishables, obtain the customer's commercial-use deadline and product-care instructions. A consignment can arrive physically intact but too late for its intended market. The service recommendation should make that distinction visible.

12.7 Communicate the decision in useful order

Start with the verified event and the customer's consequence. State the protective action already taken, the options being checked, the decision needed and the next update time. Avoid unsupported assurances such as “product is safe” when only transport storage has been confirmed.

A suitable teaching update is: “The onward connection was missed. The transfer handler confirms the shipment is in the agreed controlled facility. We are checking the next accepted service against the packaging duration and destination receiving hours. Product release remains with your authorised quality team. We will provide the confirmed options and cost difference by 16:00.”

Close the exception only when the approved next action and its evidence are recorded. Later, review whether the original route allowed enough margin and whether the information reached every provider. Recovery experience should improve the next plan.

Workshop A transfer delay and two clocks

This is an independent fictional case for group discussion. It does not change the numerical examples earlier in the chapter. Meridian Diagnostics ships a temperature-sensitive instrument kit for a planned installation. The approved product instruction requires controlled conditions, and the authorised packaging team has accepted a 96-hour planning period beginning at pack-out.

Pack-out occurs Monday at 06:00. The shipment reaches the transfer facility Tuesday at 18:00, but the onward connection is missed. The handler confirms the goods are in the agreed controlled facility. The raw logger record has been retained; the quality team has not yet reviewed it. The customer needs the kit at the installation site Thursday at 12:00.

Option	Confirmed information	Outstanding condition
A	Departure Wednesday 08:00; potential site delivery Thursday 08:00; extra USD 450	Alternative operator has not accepted the exact configuration
B	Accepted departure Wednesday 20:00; planned site delivery Friday 10:00; extra USD 120	Customer's quality team must assess the revised duration
C	Hold for an approved packaging intervention at the transfer point	Technical method, resources, cost and schedule unconfirmed

The service coordinator receives three messages. Sales says the customer will accept any reasonable extra cost. The handler says Option A space is currently available but cannot be held indefinitely. The quality contact says it needs the original product instruction, packaging qualification and logger data before giving an answer.

Prepare for a 20-minute recovery meeting. Begin by listing the facts that are confirmed and those that are merely possible. Calculate elapsed time at the transfer facility, the total pack-out-to-delivery duration for A and B, and each option's relationship to the customer's installation deadline. Use one stated clock throughout.

The calculation should expose two separate constraints: the product's approved planning period and the customer's usable-delivery requirement. Meeting one does not prove that the other is satisfied. A route can be technically acceptable but commercially late, or commercially attractive but not yet accepted for the product.

Assign an owner to each outstanding decision. The alternative operator owns its acceptance decision; the authorised product and packaging team owns the relevant technical assessment; the customer owns the installation consequence and spending approval. The forwarding coordinator connects the evidence and ensures that decisions arrive before options expire.

Draft a decision sheet with the option, acceptance status, complete delivery estimate, incremental cost, product-care condition and latest approval time. Do not mark Option A green simply because sales has approved spending. Do not mark Option B unsafe solely from an arithmetic conflict; refer the conflict to the authorised technical team.

Finally, write a customer update of no more than 120 words. It should explain why the team cannot yet promise the earliest apparent delivery, what is already protecting the goods and when the next decision will be available. Retain the original booking and update history.

For an extension, the instructor may announce that A is accepted at 16:00 but the destination receiver cannot unload until Thursday 14:00. Reassess the complete plan and the business consequence. A flight improvement is not automatically a usable-delivery improvement.

Chapter 12 recap

Special cargo requires a complete care arrangement, not just a priority label. Preserve condition evidence, calculate timing conflicts transparently and leave acceptance, handling and product-release decisions with the authorised parties.

Review questions

Answers and marking guidance • page 232

1. Why can a faster recovery route be unsuitable?
2. Which different needs can “special cargo” conceal?
3. Who supplies product facts and who approves regulated acceptance?
4. Why must transfer facilities be confirmed?
5. What information belongs beside a packaging-duration claim?
6. What does a remaining-duration calculation establish?
7. Why should original monitoring records be retained?
8. What should happen when a battery is discovered after booking?
9. Why do security and animal welfare require distinct reviews?
10. What should a useful exception update contain?

Applied exercises

Exercise 12A Test a revised plan. A fictional approved packaging period is 96 hours from Day 1 at 08:00. At Day 3 at 20:00, calculate elapsed and remaining time. Revised delivery is Day 5 at 10:00. Identify the conflict and the approvals or alternatives required; do not decide product disposition.

Exercise 12B Write the recovery record. A valuable diagnostic instrument misses its connection. Its battery configuration is confirmed in the approved booking, but the alternative operator has not accepted it. The customer requests immediate rerouting. Draft a decision record identifying verified facts, unresolved acceptance, custody and care checks, spending authority and the next update.

Part 4 Ocean freight

Ocean forwarding connects equipment, cargo readiness, schedules, documents and destination release. The lowest ocean rate is only one part of the decision. Build a complete view of shipment cost and the consequences of delay.

Chapters 13–16

Chapter 13 Ocean services and equipment

Chapter 14 Ocean export and import operations

Chapter 15 Ocean pricing and total shipment cost

Chapter 16 Ocean disruption and customer decisions

Chapter 13 Ocean services and equipment

The container is only part of the answer

Riverbend's ocean order contains 285 cartons after the urgent air split. The sales team asks whether it should use a full container or join a consolidation. Someone suggests comparing 11.4 m³ with the advertised capacity of a container. That is a useful starting measurement, but it does not settle the service decision.

The buyer needs a particular delivery date, the cartons need an acceptable handling arrangement, and each offer has origin and destination activities. A container option can be commercially attractive even when the container is not full. A consolidation can be attractive even when the cargo occupies substantial space. This chapter develops the questions behind that choice.

What you should be able to do

Distinguish FCL, LCL and non-containerised services; identify common container types; evaluate equipment questions without treating catalogue dimensions as approval; and compare service options against the cargo and receiving requirements.

13.1 FCL and LCL describe different service arrangements

Full-container-load, or FCL, generally means the customer books a container movement for its shipment under the agreed arrangement. It does not mean that every cubic metre must be occupied. Less-than-container-load, or LCL, places consignments within a consolidation and normally includes cargo-level receiving and breakdown activities.

The important comparison is operational. Who receives the loose cargo? Where is it consolidated? When must it be available? How are marks and package counts preserved? At destination, when can the individual consignment be collected or delivered?

Do not promise that an FCL container will never be opened. Customs examination, inspection or other authorised intervention can occur. Nor does LCL necessarily imply an inferior service. The actual route, handling plan, providers and terms determine suitability. Carrier explanations of FCL and LCL are useful introductions, but volume thresholds in marketing articles are not universal decision rules. [N-05]

Worked example 13.1 A service choice for Riverbend. The teaching FCL offer provides a dedicated container arrangement with delivery on Day 39. The LCL offer includes origin consolidation and destination breakdown and plans delivery on Day 41. Both can meet the Day 42 requirement, subject to confirmed readiness. The buyer should compare total cost, the one-day versus three-day delivery margin, handling suitability and recovery options. The 11.4 m³ volume alone cannot choose the answer.



Photograph 13.1 Container ship off San Francisco, 2012. Vessel capacity and port schedules must be checked for the actual service. Credit: Basil D Soufi (BDS2006), CC BY-SA 4.0; unchanged apart from display scaling.

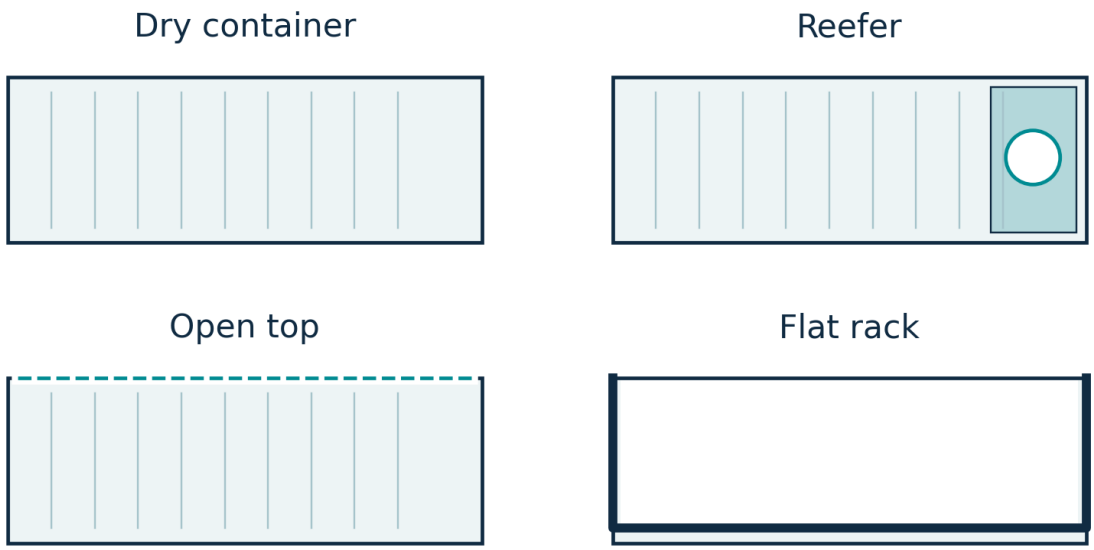
13.2 Learn the equipment families

Dry containers serve many general-cargo movements. High-cube equipment provides a different height envelope from a standard-height unit, but the actual dimensions, door opening, payload and road limits need checking. Reefer containers provide a temperature-controlled transport environment under specified operating conditions.

Open-top and hardtop equipment can offer different loading access. Flat racks and platforms support suitable heavy or out-of-gauge cargo under approved arrangements. A name such as “40-foot flat rack” does not identify every relevant structural, dimensional or securing limit.

Equipment or service	Typical reason to investigate it	Information still required
Dry container	General packaged goods	Actual dimensions, payload, access and cargo compatibility
High cube	Additional height or volume	Door opening, route limits and loading arrangement
Reefer	Specified temperature-controlled transport	Product instructions, settings, airflow and power plan
Open top or hardtop	Top-loading or height requirement	Lift, securing, cover and overheight acceptance
Flat rack or platform	Suitable heavy or oversized cargo	Engineering, support points, securing and route approval
Breakbulk or ro-ro	Cargo suited to other vessel handling	Vessel capability, terminal method and transport interfaces

Hapag-Lloyd's equipment guide explicitly warns that fleet specifications vary by manufacturer. Use a catalogue for preliminary comparison, then obtain the actual equipment and service confirmation. [N-06]



Functional sketches only — check actual dimensions, payload and loading acceptance.

Figure 13.1 Common ocean equipment families. The drawings identify functional differences and are not dimensioned loading or securing designs.

13.3 Separate internal space from usable loading space

The cargo must pass through the loading opening, fit the accepted arrangement and remain suitable for handling and securing. Internal cubic capacity is therefore not a simple promise of how many cartons can be loaded.

Packing geometry also interacts with access. A crate may fit inside a container but be impossible to manoeuvre through its door in the proposed orientation. Weight distribution, floor loading, securing arrangements and unloading capability can be decisive even when total weight is below a nominal payload.

Worked example 13.2 A preliminary cube comparison. A fictional equipment offer states 32 m³ of internal volume. Riverbend's loose cartons total 11.4 m³, so the simple volume ratio is 11.4 ÷ 32 × 100 = 35.625%. This is a volume comparison, not a certified utilisation or loading plan. Pallets, voids, access and securing space may change the actual arrangement. Calling it “36% full” without that qualification can mislead a planner.

13.4 Treat reefer requirements as a system

Obtain the product's required conditions and the shipper's approved instructions. Confirm the equipment, set point, ventilation or other relevant settings through qualified parties, together with pre-trip requirements, loading condition, airflow, monitoring and power continuity.

A reefer should not be assumed capable of correcting any product temperature presented at loading. Product preparation and the accepted operating arrangement matter. Ask who checks the cargo condition before stuffing and who has authority to accept a deviation.

The inland stages need attention too. A suitable ocean reefer arrangement can fail if a road leg lacks the required power provision or a terminal handover is not coordinated. The forwarding job joins these interfaces; it does not end at booking the container type.

Worked example 13.3 A chilled-food enquiry. The shipper requests a reefer but provides no product instructions or loading temperature. The coordinator records the missing information and requests the product specification, preparation requirements, proposed route, receiving arrangements and qualified acceptance contacts. A generic temperature setting from a previous shipment is not reused as authority for this product.

13.5 Know when to examine breakbulk or ro-ro

Breakbulk involves individually handled cargo units rather than ordinary containerised carriage. Roll-on/roll-off, or ro-ro, uses wheeled or otherwise suitably mobilised units under the vessel and terminal arrangement. Project cargo can involve either, as well as specialised container equipment.

The choice depends on the complete execution method. How will the cargo reach the vessel? How will it be handled, supported and secured? Which terminal facilities are required? How will destination delivery work? Part 7 develops these questions with a project case.

Do not assume that every port on a map supports the selected handling method. A route can be geographically short and operationally infeasible. Written provider acceptance should identify the cargo configuration and relevant conditions.

13.6 Examine the route behind the sailing

A direct service, a feeder connection and a transshipment service create different interfaces. Ask for the proposed ports, connections, service frequency and the milestones used to monitor them. “Transit time” needs a boundary: port-to-port, cargo receipt to availability, or door-to-door.

Consolidation and deconsolidation may add time outside the published vessel transit. A cheaper ocean linehaul can therefore produce a later usable delivery. Compare the timetable the customer experiences.

If a shipment has several items, ask whether all need the same service. The Riverbend case already separated an urgent 15-carton portion. A split can protect a launch while the balance moves economically, but it adds document, customs, receiving and cost-control work. It must be approved and reconciled.

Chapter 13 recap

Select ocean equipment and service as part of an end-to-end arrangement. FCL and LCL are not decided by a universal cube threshold. Equipment names and catalogue capacity require confirmation against actual cargo, handling and route conditions.

Review questions

Answers and marking guidance • page 232

1. Why can an FCL container be partly filled?
2. Which handling stages distinguish an LCL arrangement?
3. Why is a catalogue volume not a loading approval?
4. What additional space does high-cube equipment provide?
5. What should be confirmed for reefer cargo beyond the set point?
6. Why can a crate fit internally but still be unsuitable?

7. How do open-top and flat-rack enquiries differ from ordinary dry cargo?

8. What distinguishes breakbulk and ro-ro handling?

9. Why should feeder and transshipment interfaces be identified?

10. Which records must change after an approved air/ocean split?

Applied exercises

Exercise 13A Compare service fit. Cargo occupies 18 m³ and weighs 4,000 kg. A fictional FCL offer costs USD 2,900 and plans delivery on Day 30. An LCL offer costs USD 2,550 and plans delivery on Day 33. The deadline is Day 34. Compare cost and time margin, then list five non-price questions needed for a recommendation.

Exercise 13B Investigate equipment. A machine crate measures 2.4 × 2.3 × 2.5 m and weighs 5,500 kg. The supplier says a high-cube container “should work”. Prepare an information request covering loading access, final dimensions, bearing points, securing, lifting and destination unloading. Do not approve an equipment type from the dimensions alone.

Chapter 14 Ocean export and import operations

The vessel sailed without the box

The factory completed stuffing on time and the truck reached the port. The customer therefore assumes the container sailed. In fact, the container missed a required terminal acceptance condition and remained behind. The vessel's departure did not prove that this container was on board.

Ocean operations are a sequence of cargo, data, equipment and release decisions. Each has an owner and evidence. A good coordinator brings those streams together before the point at which a missing item becomes expensive.

What you should be able to do

Plan export and import milestones; distinguish shipping instructions, verified gross mass and terminal handover; reconcile container and seal records; and identify the separate conditions needed for delivery.

14.1 Turn the booking into a milestone plan

Record the accepted route, equipment, release location, empty collection arrangements, cargo and document cutoffs, vessel plan and destination instructions. Confirm which deadlines apply to this booking and how changes are notified.

Shipping instructions supply data used for the transport document and associated processes. They are not the same as a customs declaration or verified gross mass submission. A single customer email can contain information for all three, but their owners, checks and acceptance processes remain distinct.

Worked example 14.1 Four deadlines. A fictional booking requires shipping instructions by Day 4 at 12:00, an approved special-cargo submission by Day 4 at 16:00, VGM by Day 5 at 10:00 and terminal gate-in by Day 5 at 18:00. The vessel plans to depart Day 6. A team that tracks only gate-in can still fail the booking. Put each requirement in the plan with an owner and confirmation field.

14.2 Plan equipment collection and stuffing

The team needs an appropriate released unit, a suitable loading location, ready cargo, an approved packing and securing arrangement, and a transport plan that respects applicable limits. Equipment inspection and acceptance belong within the provider's authorised procedures.

Record the actual container identifier and reconcile it with the booking and related documents. Check that the cargo presented matches the approved scope. Where a seal is applied, record the identifier and the event through the established process.

The CTU Code provides guidance on packing cargo transport units, including load distribution and securing. It is a primary reference for competent packing practice; this textbook's calculations do not replace a packing or securing design. [P2-02]

Worked example 14.2 A changed container. A released container is rejected before loading and replaced. The replacement has a different identifier and tare mass. The coordinator ensures that affected booking,

VGM, transport-document and customs processes receive the authorised correction. Copying the rejected unit's details into the new file would create an internally consistent but physically false record.

14.3 Understand verified gross mass

For packed containers within the applicable SOLAS scope, verified gross mass is a condition for loading. IMO describes two methods: weighing the packed container, or using the approved method of summing cargo, packaging, pallets, dunnage and securing material with container tare. The responsible shipper and authorised submission process must be established. An invoice weight alone is not VGM. Availability of VGM does not guarantee loading; the master retains the relevant acceptance discretion. [N-07]

Worked example 14.3 A VGM arithmetic boundary. Assume an approved method and verified component measurements for this teaching calculation. Cargo including its packaging weighs 8,400 kg; added pallets weigh 240 kg; dunnage and securing material weigh 110 kg; container tare is 2,250 kg. Total = 8,400 + 240 + 110 + 2,250 = 11,000 kg. The arithmetic shows what is included. It does not establish that the measurement method or submission is compliant in a real jurisdiction.

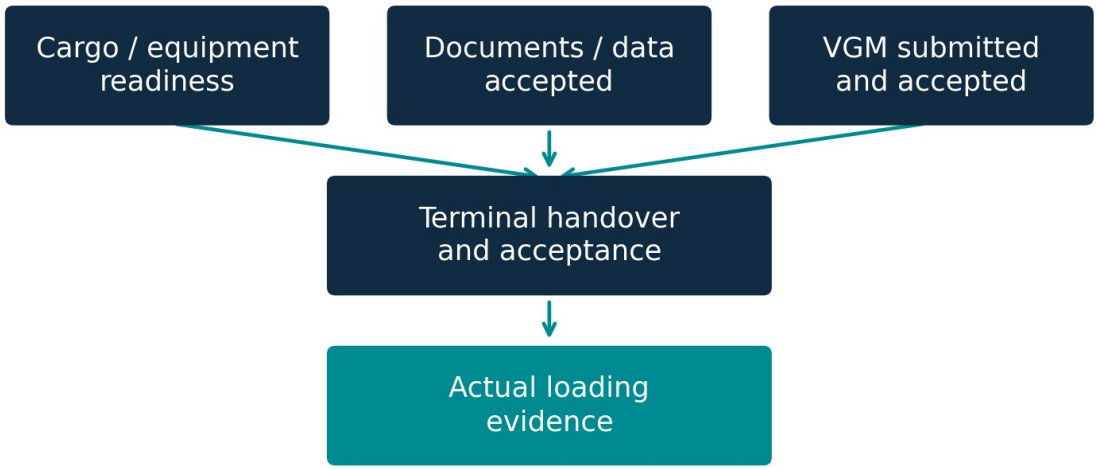


Figure 14.1 Separate export readiness streams. Equipment, cargo, documents and VGM must reach the required accepted state before the next movement.

14.4 Treat terminal handover as an event

Gate-in confirms a particular terminal event under its recorded conditions. It is not proof of customs release, loading or departure. Preserve the terminal record and investigate discrepancies while the relevant parties can still act.

If a container misses a cutoff, obtain the provider's actual options. A late-gate arrangement may require specific approval and may not be available. Do not instruct a driver to proceed on an assumed exception. Check custody, storage, equipment charges and the revised voyage.

Monitor shipment-level loading and departure evidence. A public vessel movement is useful context but cannot establish the status of a specific container.

14.5 Review the transport document before issue

Compare the draft with the approved instructions and actual movement. Verify parties, references, package description, weights, marks, container and seal details where applicable, routing and required clauses through the issuer's process.

A draft review is a chance to catch errors before they affect release or payment. It is not authority to insert an unsupported statement. If a customer requests a date or description inconsistent with the facts, preserve the request and use the proper escalation route.

The choice and release process for a bill of lading or sea waybill must match the commercial and legal arrangement. Chapter 6 explains their different functions. Do not assume that a scanned copy satisfies every release requirement.

14.6 Prepare the import while the goods are moving

The destination team should identify the importer and representative, establish document readiness, review applicable permits and controls, plan funds where required and arrange receiving capability.

Container availability, customs release, carrier release, terminal conditions and a delivery slot are separate dependencies. A truck should be dispatched against a workable combination of those conditions, not merely a vessel's estimated arrival.

Worked example 14.4 A release conflict. The container is discharged on Day 20. Customs release is confirmed on Day 21, but the carrier's document hold remains until Day 23. The warehouse can receive on Day 24. A Day 21 truck reservation would not have produced lawful delivery under these assumptions. The coordinator aligns the carrier release, terminal availability and receiving appointment while monitoring any charging clock.

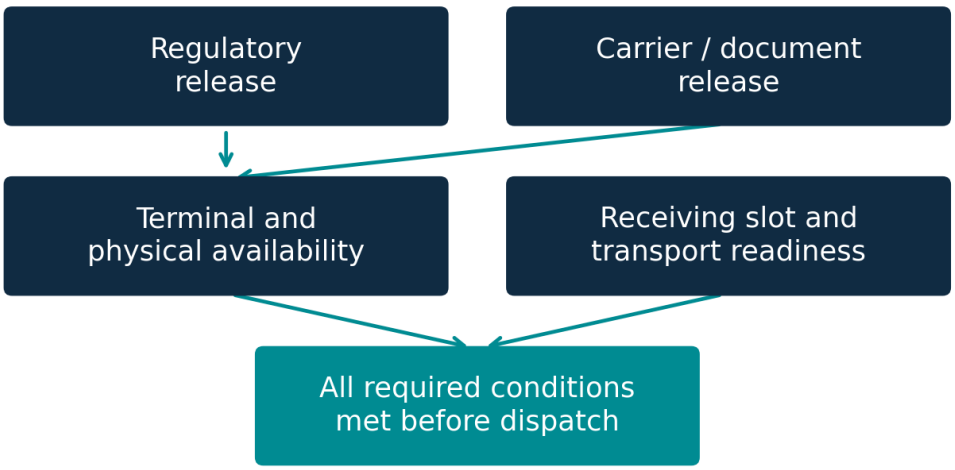


Figure 14.2 Delivery readiness combines regulatory, commercial, terminal and receiving conditions. The last unresolved condition can control dispatch.

14.7 Close the equipment cycle

For a carrier-owned container movement, empty return can be a separate operational and commercial completion event. Confirm the required return location, acceptance hours, booking arrangements and evidence. Delivery of the goods does not necessarily stop every equipment-related charge.

Keep proof of delivery and empty-return evidence connected to the same job. If the nominated depot changes or rejects the return, record the instruction and event, seek the next authorised arrangement and preserve the cost evidence.

The file closes when operational, documentary and financial obligations have been reconciled, not when the customer first receives a delivery message.

Chapter 14 recap

Ocean execution requires several readiness streams to converge. Track each cutoff and its acceptance, preserve physical identifiers, distinguish VGM from cargo weight and plan delivery together with the equipment-return obligation.

Review questions

Answers and marking guidance • **page 233**

1. Why does gate-in not prove loading?
2. How do shipping instructions and VGM differ?
3. What should change when a container is replaced?
4. Which items belong in a VGM component calculation?
5. Why is VGM not an entitlement to loading?
6. What makes a late-gate arrangement valid?
7. Which draft-document fields need reconciliation?
8. Why should import preparation begin before arrival?
9. Which conditions can prevent dispatch after customs release?
10. Why is empty return a separate completion event?

Applied exercises

Exercise 14A Calculate the boundary. Verified cargo and packaging weigh 12,600 kg, added pallets 300 kg, dunnage 90 kg and container tare 3,750 kg. Calculate the component total under an assumed approved method. Identify who must confirm the method, authority and submission in a real movement.

Exercise 14B Prepare a dependency plan. Gate-in closes Friday 18:00, VGM Friday 12:00 and shipping instructions Thursday 15:00. Stuffing is planned Friday 10:00–13:00 and the terminal drive takes three hours. Identify the VGM conflict, the gate-in margin and the questions needed before accepting the plan.

Chapter 15 Ocean pricing and total shipment cost

A low freight rate and an expensive arrival

Nordhaven compares two ocean offers and selects the lower main-carriage rate. At destination, additional handling and delayed equipment return produce a total above the competing offer. The original comparison was not wrong arithmetic; it was incomplete scope.

Ocean pricing combines different units, parties and charging clocks. This chapter uses explicit fictional terms to show how to build a complete comparison without pretending that one carrier's tariff applies everywhere.

What you should be able to do

Normalise FCL and LCL offers; calculate stated weight-or-measurement charges; distinguish storage and equipment charges; and model destination-cost scenarios with clear day-counting assumptions.

15.1 Establish the cost boundary

List origin collection, export handling, customs-service fees where included, main carriage, destination handling, delivery and any specifically required services. Record exclusions, taxes and duties separately. Include the number of containers or consignments and the basis of every fee.

A local charge described as “at cost” still belongs in the commercial risk discussion. Obtain an estimate or make the uncertainty explicit. Do not quietly treat a missing destination charge as zero.

Worked example 15.1 Compare complete FCL costs. Offer A has origin charges USD 480, ocean freight USD 1,250, destination charges USD 620 and delivery USD 350: total USD 2,700. Offer B has USD 390, USD 1,380, USD 440 and USD 340: total USD 2,550. B is USD 150 cheaper despite its higher ocean line. Both comparisons exclude duties and taxes and assume equivalent acceptable service.

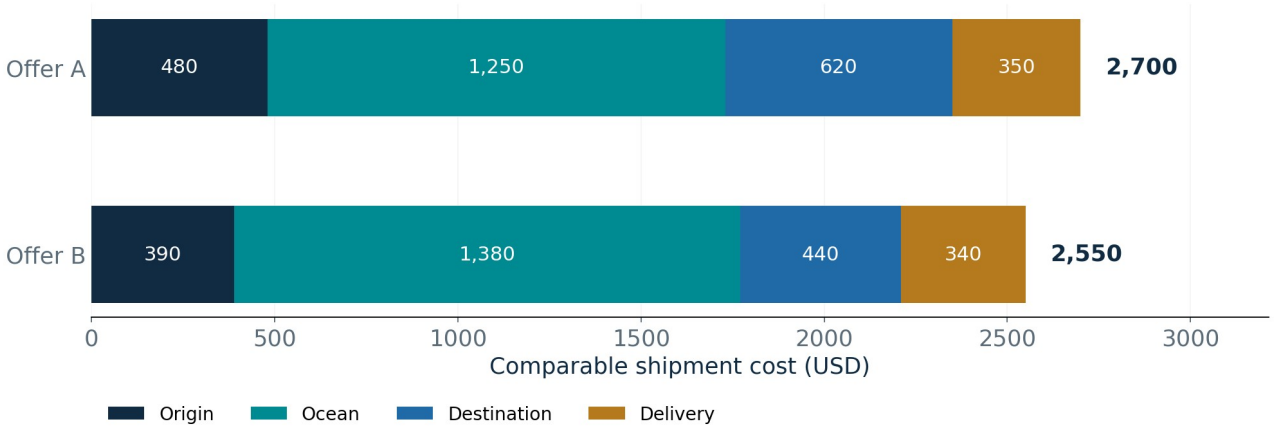


Figure 15.1 The fictional FCL comparison by cost stage. Comparing the ocean line alone reverses the total-cost conclusion.

15.2 Read LCL weight-or-measurement rules

LCL tariffs may use a revenue-tonne or weight-or-measurement convention. The precise relationship, rounding, minimums and charge basis must come from the quotation. In this chapter's examples only, one revenue unit is the greater of one cubic metre or one metric tonne, assessed for the whole shipment.

Worked example 15.2 Riverbend under an assumed LCL rule. The 285 cartons occupy 11.4 m³ and weigh 2.85 tonnes gross. Chargeable revenue units are max(11.4, 2.85) = 11.4. At USD 85 per unit, main freight is USD 969. Add origin USD 240, destination USD 380 and delivery USD 310: total USD 1,899. A one-unit minimum would not affect this shipment.

If the destination charge were instead USD 40 per revenue unit, it would be USD 456, not USD 380. Record the unit and scope, not merely the currency amount copied from another job.

15.3 Compare LCL and FCL using a threshold carefully

Suppose a fictional LCL offer costs USD 520 fixed plus USD 95 per chargeable cubic metre, while an acceptable FCL offer costs USD 2,800. For light cargo under this stated volume rule, equality occurs when 520 + 95V = 2,800. Therefore V = 2,280 ÷ 95 = 24 m³.

Below 24 m³ the stated LCL cost is lower; above it the stated FCL cost is lower, assuming the cargo still fits the accepted FCL arrangement. This is a threshold for these two offers, not a market rule. Different weight density, local fees, equipment or delivery timing changes the result.

Worked example 15.3 A 20 m³ decision. LCL costs 520 + 95 × 20 = USD 2,420, which is USD 380 below the FCL offer. If FCL protects a delivery date worth more than that difference to the customer, it may still be the preferred option. The cost calculation informs the decision; it does not replace the service assessment.

15.4 Separate the charging clocks

Demurrage, detention and storage terminology varies with the contract, country and service. A carrier may distinguish equipment held inside the terminal from equipment outside it, or apply a combined period. Terminal storage may be separately charged. Maersk's published terms illustrate these distinctions and explicitly identify country-specific application. [N-08]

For every clock, record the start event, end event, free period, calendar or working-day basis, whether the first and last days count, rate tiers and the responsible payer. Avoid applying a familiar rule from another port.

The following example is wholly fictional. It does not describe Maersk or any other provider's actual tariff.

Teaching charge	Explicit rule	Rate after free time
Terminal storage	Discharge day is Day 1; three calendar days free; gate-out day included	Days 4–6 USD 45/day, then USD 70/day
Equipment outside terminal	Day after gate-out is Day 1; two calendar days free; return day included	USD 60/day

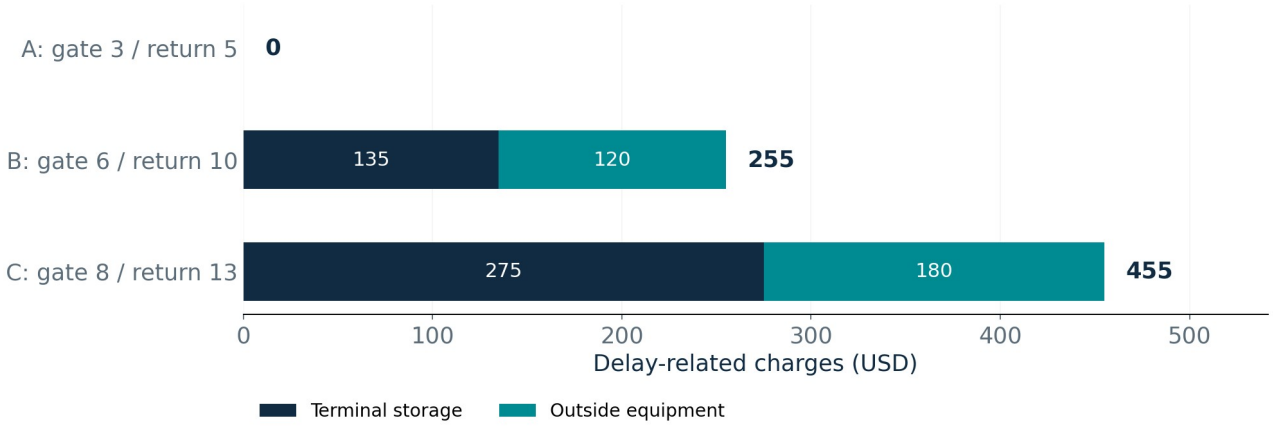
15.5 Calculate scenarios before the delay grows

Worked example 15.4 Three delivery outcomes. Scenario A gates out on Day 3 and returns the empty on Day 5. Storage is zero. Outside days are Days 4 and 5, both free, so equipment charges are zero.

Scenario B gates out on Day 6 and returns on Day 10. Storage is three charged days, Days 4–6: 3 × 45 = USD 135. Outside days are Days 7–10: four days, of which two are free and two charged. Equipment charge = 2 × 60 = USD 120. Total delay-related charges are USD 255.

Scenario C gates out on Day 8 and returns on Day 13. Storage = 3 × 45 + 2 × 70 = USD 275. Outside days are Days 9–13: five days, three charged after the two free days. Equipment charge = 3 × 60 = USD 180. Total is USD 455.

The calculation depends on the stated day counting. If a real tariff uses different events or a combined clock, rebuild the model. Do not merely change the daily rate.



Fictional separate clocks; use the precise counting rules in Chapter 15.

Figure 15.2 Delay-related costs under the chapter's fictional tariff. Separate clocks explain why the final amount changes with both gate-out and empty return.

15.6 Evaluate an intervention against the cost it changes

Suppose an additional receiving shift costs USD 180 and would move Scenario C to Scenario B. The modelled charge saving is 455 − 255 = USD 200, leaving USD 20 net direct saving. There may be other benefits or costs, but they need separate evidence.

An intervention that moves gate-out earlier can increase outside equipment time if empty return does not change. Evaluate the whole cycle. A manager who optimises only terminal storage may unintentionally move the cost elsewhere.

Confirm that the intervention is feasible before seeking spending approval. Warehouse staff, unloading resources, transport availability and return arrangements must support the revised plan.

15.7 Reconcile the actual bill

At closure, compare each supplier charge with the accepted quotation, actual events and applicable tariff. A genuine difference may arise from changed scope or verified delay. An error may arise from the wrong count, dates, equipment type or duplicate billing.

Dispute a charge with evidence and within the applicable process. Keep the original invoice, calculation, supporting events and correspondence. Do not reduce the supplier accrual merely because a dispute has been raised; the accounting treatment requires the appropriate finance decision.

Chapter 15 recap

Ocean cost comparison requires common scope, explicit units and separate charging clocks. Calculate scenarios using stated events and day-counting rules, then test whether a proposed intervention changes the complete cost.

Review questions

Answers and marking guidance • **page 234**

1. Why can lower ocean freight produce higher total cost?
2. How should an unknown destination charge be shown?
3. What does the chapter's weight-or-measurement rule compare?
4. Why is a calculated LCL/FCL threshold quotation-specific?
5. How can terminal storage differ from equipment charges?
6. Which day-counting assumptions are essential?
7. Why can earlier gate-out fail to reduce total cost?
8. What should be confirmed before buying an extra receiving shift?
9. Which evidence supports an invoice dispute?
10. Why does raising a dispute not automatically remove a cost?

Applied exercises

Exercise 15A Rate LCL. Cargo is 7.2 m^3 and 9.5 metric tonnes. Under the chapter's assumed whole-shipment rule, use the greater number as revenue units. Freight is USD 78 per unit, origin USD 190, destination USD 260 and delivery USD 210. Calculate the total and identify the controlling measure.

Exercise 15B Count the days. Use the fictional storage and outside-equipment rules in section 15.4. Gate-out occurs on Day 7 and empty return on Day 11. Calculate each charge and the total. Show the charged days explicitly.

Chapter 16 Ocean disruption and customer decisions

The seasonal collection misses its connection

Riverbend's ocean consignment reaches the transshipment port, but the onward connection is missed. Nordhaven has already planned store replenishment. The customer asks for an immediate answer: wait, reroute or fly some stock?

There is no useful answer until the team identifies what stock is needed, when it becomes usable under each option, which options are actually available and who can approve the cost. Recovery is a decision problem with evidence, not a contest to sound confident.

What you should be able to do

Distinguish common ocean disruptions; calculate the effect on delivery margin; compare recovery options using customer consequences; and maintain an accurate decision and communication record.

16.1 Name the event precisely

A rollover means a booked shipment does not move on the intended sailing under the relevant circumstances. A blank sailing removes or changes a planned service departure. Congestion can delay terminal or vessel processes. A missed connection occurs when the onward movement is not achieved. These labels help only when tied to the actual shipment event.

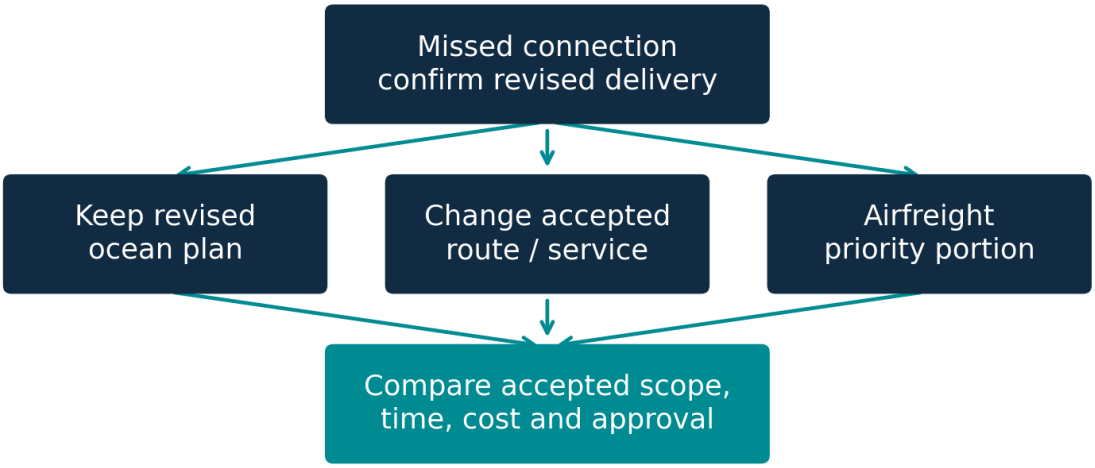
Ask what is confirmed. Where is the cargo? Has it been discharged? Is it available for another arrangement? Which booking remains active? What is the provider's next accepted plan? A general report that a port is congested cannot answer those shipment-level questions.

Do not infer the cause from the outcome. A container remaining at origin may reflect readiness, documentation, capacity, terminal restrictions or another issue. Preserve the evidence before assigning responsibility.

16.2 Recalculate the usable-delivery date

Worked example 16.1 Consuming the margin. Riverbend originally plans delivery on Day 39 against a Day 42 deadline, leaving three days. A missed connection adds five days to the accepted plan, making delivery Day 44. The movement is now two days beyond the deadline. Reporting only “five-day delay” misses the customer's operational consequence; reporting “two days late to the required DC date” makes it clear.

Check the destination stages again. A revised vessel arrival on a weekend may change receiving availability by more than the voyage delay. A later customs query or warehouse slot can further change the complete plan.



Reconcile split quantities and documents before instructing a recovery.

Figure 16.1 Recovery options for a delayed retail shipment. Each branch requires an accepted cargo, document and delivery arrangement before it becomes an actionable alternative.

16.3 Identify which stock protects the business

The buyer may not need every carton on the launch date. Ask for the minimum useful quantity by product, size or location, together with the consequence of shortage. A random air split can deliver the wrong assortment.

Worked example 16.2 A useful emergency split. Nordhaven identifies 600 shirts needed for launch displays and early demand. At 40 shirts per carton, that is 15 cartons. The buyer confirms the selected carton marks and the remainder can arrive later. The coordinator evaluates whether those specific cartons can lawfully and practically be separated at the current location, and what documentation and handling changes follow. The earlier original air split is a separate teaching scenario; this example does not silently add another 600 shirts to the same live order.

A split requires reconciliation of quantities, values, package marks, documents and receiving records. The customer's approval should identify exactly what moves under each arrangement.

16.4 Compare options on one decision sheet

Include usable-delivery date, incremental cost, acceptance status, handling implications, document changes and unresolved assumptions. Distinguish the baseline cost already committed from the extra cost of recovery. Otherwise the comparison may double-count costs that cannot be avoided.

Fictional option	Usable delivery	Extra cost	Decision condition
Wait for accepted onward sailing	Day 44	USD 0	Buyer can tolerate the two-day shortfall
Approved alternative ocean routing	Day 42	USD 900	Cargo transfer and destination completion confirmed

Fictional option	Usable delivery	Extra cost	Decision condition
Approved urgent air portion	Day 40 for selected stock	USD 1,800	Exact assortment, split and air acceptance confirmed

Worked example 16.3 Compare the business consequence. The buyer estimates an avoidable contribution loss of USD 1,200 per day for two days if the minimum launch assortment is absent. Waiting exposes USD 2,400 under that assumption. The air split costs USD 1,800 and protects the full stated requirement, giving a USD 600 net advantage before other effects. The alternative ocean routing costs USD 900 and meets the deadline exactly, but has no time margin. The customer must weigh its accepted feasibility and residual uncertainty; a lower price is not a guarantee of success.

16.5 Use scenarios without disguising them as predictions

If a provider gives a range rather than a confirmed date, show the range. Test what happens at its early and late ends. A single average can hide a missed launch.

Worked example 16.4 A sensitivity check. Suppose the alternative ocean route may deliver between Days 41 and 44, and no probability is established. The forwarder should not assign an invented 90% chance of Day 42. Present the best stated outcome, the late outcome and the decision deadline. Ask whether the buyer would fund the air portion to protect the minimum requirement while accepting the later arrival of the balance.

Expected-value calculations are useful only when their probability assumptions have a defensible basis. Even then, a low-frequency event can be unacceptable if its consequence is severe or a mandatory requirement is breached.

16.6 Obtain approval before changing the movement

Recovery can change contracts, documents, customs procedures, handling, insurance arrangements and responsibility. Identify the customer decision maker and the providers authorised to accept the change.

Record the approved option, scope, cost ceiling, assumptions and expiry of availability. A verbal “do whatever is necessary” can be too vague when several expensive alternatives exist. Confirm the concrete instruction in the approved communication channel.

Do not cancel a viable booking merely because an unconfirmed alternative looks attractive. Sequence the decisions so that the customer understands any period in which space or routing is uncertain.

16.7 Communicate and then learn

A useful message starts with the shipment fact and effect: “The onward connection was missed; the accepted revised plan delivers on Day 44, two days after your required date.” Then present options, recommendation, decision needed and next update.

Avoid repeated statements that the team is “closely monitoring” without a decision or next event. Monitoring has value when it triggers an action before an option expires.

After delivery, review the cause and the performance of the response. Was supplier readiness late? Was the connection plan too tight? Did the team receive the event promptly? Were approvals available outside office hours? Separate preventable process failures from external disruptions while retaining accountability for the response.

Workshop A seasonal order at a transshipment port

This independent case concerns Harbourlight Home, a fictional retailer importing 900 cartons for a promotion. Each carton contains ten units. The promotion requires 1,800 identified units at the DC by Day 20; the remaining stock can arrive by Day 28. The original plan delivers everything on Day 18.

At Day 10, the forwarder learns that the onward connection is missed. The accepted revised ocean plan delivers on Day 25. The cargo remains in the controlled custody of the current provider. It has not been confirmed available for separation or another routing.

Recovery enquiry	Teaching commercial indication	Status
Keep revised ocean plan	No extra freight; delivery Day 25	Accepted plan
Alternative ocean connection	USD 1,400 extra; potential delivery Day 21	Transfer and space unconfirmed
Air the priority assortment	USD 3,100 extra; potential delivery Day 18	Cargo access, split and air acceptance unconfirmed

The buyer estimates an avoidable contribution loss of USD 800 for each of five days if the priority assortment is absent after Day 20. It has not quantified any loss for the balance arriving on Day 25. The commercial issuer has prepared one invoice for the full order, and destination has already received it.

The first task is to calculate the minimum priority carton count and distinguish the early and balance deadlines. The second is to identify what must be true before either unconfirmed recovery enquiry becomes an executable option. The third is to compare the accepted baseline with the potential alternatives without treating all their dates as equally certain.

Create a document-change map for an approved air split. Include the parent order, carton marks, quantities and values, transport records, relevant customs processes and DC receiving instruction. Do not assume that issuing a second invoice automatically resolves every affected record.

Now examine the business case. Under the buyer's stated loss model, estimate the avoidable consequence of waiting and compare it with the air indication. Explain what would change if the selected cartons were not the right assortment or if air delivered on Day 22 instead of Day 18.

Prepare a recommendation with two stages: actions to verify immediately and the decision to request once acceptance is known. Include the latest useful decision time and who has authority to approve the extra cost.

For the meeting role-play, one person represents the buyer, one the provider, one destination operations and one the forwarder. The buyer should challenge the value assumption, the provider should identify acceptance conditions and destination should test the document and receiving plan. The forwarder should finish with one agreed decision record rather than four separate email interpretations.

The final service review should preserve the original Day 18 commitment, the Day 25 accepted revision and the outcome of recovery. Do not rewrite the baseline to make the shipment appear originally on time.

Chapter 16 recap

Translate disruption into the customer's usable-stock requirement. Verify available options, calculate incremental costs and consequences, obtain a precise approval and preserve both the original and revised plans.

Review questions

Answers and marking guidance • page 234

1. How do rollover, blank sailing and missed connection differ?
2. Why should the cause remain separate from the observed event?
3. What does delivery margin reveal?
4. Why is the minimum useful assortment important?
5. Which records change after a split?
6. How does incremental recovery cost differ from total shipment cost?
7. Why should an unverified probability not be used?
8. What belongs in a recovery approval?
9. Why should cancellation and rebooking be sequenced carefully?
10. Which response failures can be improved after an external disruption?

Applied exercises

Exercise 16A Recommend an option. Original delivery is Day 28 against a Day 31 deadline. The revised accepted plan is Day 34. A feasible air split costs an extra USD 2,100 and delivers the minimum useful stock on Day 30. The buyer estimates avoidable contribution loss of USD 900 per day for Days 32–34, three days in total. Calculate the deadline shortfall and the direct net benefit of the split under those assumptions. State two reasons to revisit the recommendation.

Exercise 16B Write the decision note. A customer requests rerouting through another port, but container transfer, customs treatment and the new receiving slot remain unconfirmed. Draft a note separating the requested option from an accepted plan, naming the owners of the three open decisions and setting a next update.

Part 5 Road rail and multimodal services

The inland journey depends on access, vehicle suitability, appointments and the cost of the complete operating cycle. Extend the analysis to rail and waterways, where terminal interfaces and departure calendars shape the whole chain.

Chapters 17–20

Chapter 17 Road freight services and equipment

Chapter 18 Road dispatch and cross border movements

Chapter 19 Road pricing and route planning

Chapter 20 Rail inland waterways and multimodal design

Chapter 17 Road freight services and equipment

A truck at a door it cannot use

The delivery vehicle reaches a city-centre shop on time. The shop has no loading dock, the access street cannot accommodate the booked vehicle, and the goods are too heavy for the receiving staff to move manually. The transport planner had confirmed the address and delivery date but never established how delivery would actually happen.

Road freight feels familiar because everyone sees trucks. Professional planning begins where that familiarity stops: equipment, access, loading, securing, delivery windows and the people responsible for each handover.

What you should be able to do

Compare full-load, part-load, groupage and dedicated services; identify vehicle and access questions; distinguish weight capacity from space capacity; and write an equipment brief that supports a feasible delivery.

17.1 Match the service to the requirement

A full-truckload arrangement reserves the agreed vehicle or load capacity for a shipment. It need not mean that the vehicle is physically full. Groupage combines consignments, usually through planned collection, terminal and delivery processes. Less-than-truckload and part-load descriptions vary between markets, so confirm the actual handling and service model.

A dedicated vehicle can reduce intermediate handling and support a specific timing requirement, but it still depends on legal operation, suitable equipment and receiving access. A groupage service can be efficient for smaller, compatible consignments whose delivery requirements fit the network.

The distinction matters commercially. A quote for standard network delivery cannot automatically be used for a fixed appointment, restricted site or waiting requirement. Define the promised service before comparing prices.

Requirement	Option to investigate	Important limitation
Small regular pallet consignments	Groupage network	Terminal handling and delivery-window rules
Large compatible shipment	Full-load or part-load service	Actual weight, space and route constraints
Urgent direct movement	Dedicated vehicle	Feasible timing and confirmed equipment
Temperature-controlled delivery	Suitable controlled vehicle service	Product instructions and full-route care
Oversized or unusually heavy cargo	Specialist transport	Engineering, permits and route approval



Photograph 17.1 Flatbed semi-trailer truck, Russia, 2024. Equipment selection also depends on the actual load, support and securing arrangement. Credit: Georg Pik, CC0 1.0; unchanged apart from display scaling.

17.2 Describe the vehicle by function

The planner needs more than “a truck”. Relevant features can include body type, internal dimensions, door opening, loading access, payload, floor and axle constraints, temperature control, lifting equipment and the ability to approach the site.

Curtainside, box, flatbed, refrigerated and specialist vehicles provide different access and protection. A tail lift may support a particular delivery method, but its headline capacity alone does not establish suitability for the actual load, position and operation. Competent operators and site procedures govern the handling decision.

Worked example 17.1 Five delivery sites. A fictional route serves a dock-equipped distribution centre, a shop without a dock, a narrow industrial yard, a temperature-controlled receiver and a project site with an appointment-only crane. One generic vehicle instruction cannot cover all five. The planner records each site's access, unloading method, hours, contact and cargo requirement, then groups only compatible work into a feasible service.

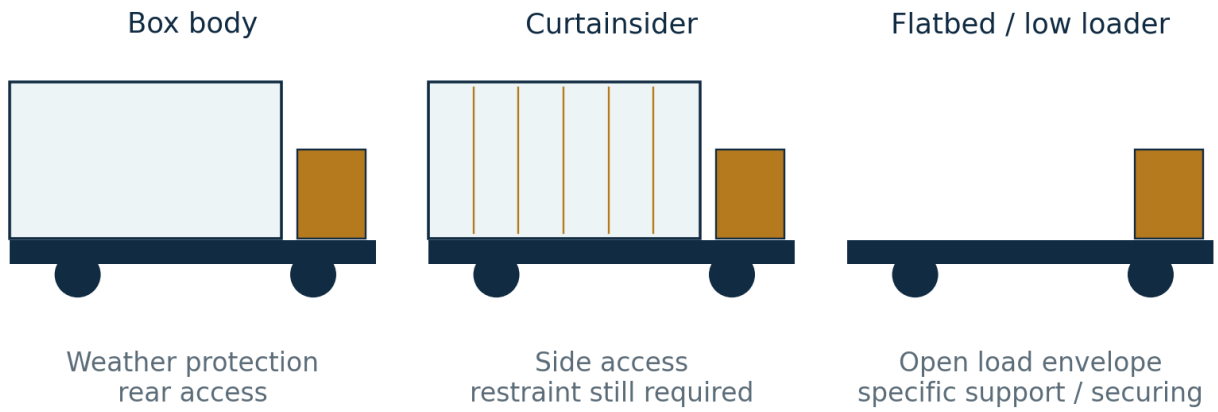


Figure 17.1 Vehicle features answer different delivery questions. Body protection, access and unloading capability must be checked together.

17.3 Calculate both weight and space

For a teaching vehicle, suppose the accepted arrangement has a maximum cargo mass of 24,000 kg and 33 stated pallet positions. A shipment of 20 pallets at 600 kg each weighs 12,000 kg. Weight utilisation is 12,000 ÷ 24,000 = 50%; position utilisation is 20 ÷ 33 = 60.61%.

These measures are different. The shipment uses more of the stated position capacity than the mass capacity. Neither calculation approves axle distribution, securing or loading. The actual arrangement must still be accepted.

Worked example 17.2 A dense shipment. Thirty pallets at 900 kg each would weigh 27,000 kg. They fit within the stated count of 33 positions but exceed the teaching mass allowance by 3,000 kg. A planner must change the arrangement or shipment allocation; unused floor positions do not compensate for excess mass.

Some quotations use loading metres. A common area-based teaching calculation divides occupied floor area by a stated usable vehicle width. Its commercial application depends on the tariff and accepted arrangement, especially where goods cannot stack or share adjacent space.

Worked example 17.3 An assumed loading-metre calculation. Four pallets each occupy 1.20 × 0.80 m. Total footprint is 3.84 m². With an assumed 2.40 m usable width and a compatible arrangement, the area-based quantity is 3.84 ÷ 2.40 = 1.60 loading metres. The calculation does not establish that the four pallets can be positioned as intended or that the provider uses this charging method.

17.4 Ask about stacking rather than assuming it

“Stackable” should identify the permitted arrangement, not merely the absence of a warning label. Product packaging, compression strength, load stability and handling method can limit what may be placed above a pallet.

For non-stackable cargo, the unused space above the load may still affect the rate. Obtain the provider's charging convention and explain it in the quotation. Do not change the cargo description to obtain a lower rate.

Packaging also affects delivery equipment. Long projecting pieces, loose accessories or an unstable pallet can make an otherwise ordinary collection unsuitable. Bring the packer and transport provider into the discussion before the vehicle arrives.

17.5 Confirm site access and responsibility

Ask for the exact entrance, approach restrictions, booking process, operating hours, vehicle limits and unloading resources. A postal address is not a site-access plan.

Establish who provides equipment and who controls loading or unloading. UK HSE guidance illustrates the importance of cooperation between visiting drivers and site operators; the applicable law and site procedure must be checked in the actual location. [P2-14]

If the site cannot receive as planned, preserve the cargo and obtain an approved alternative. A waiting driver should not be pressured into an unsafe manual workaround. Delivery urgency does not change equipment suitability.

17.6 Build the road service brief

The brief should connect cargo facts, collection and delivery requirements, equipment, timing, handling responsibilities, documents and exception contacts. Include the requested proof of delivery and how shortages or damage should be recorded.

For a network service, confirm whether a delivery is an appointment, a window or a standard service estimate. For a dedicated movement, establish whether waiting, additional stops, return goods and failed delivery are included.

The most useful road planner is often the person who asks one practical question early: “How will the receiver take this off the vehicle?” That question prevents a surprising number of expensive failures.

Chapter 17 recap

Choose road services through the cargo and the sites they connect. Check mass, space, access and handling independently, then bring them together in an accepted equipment and delivery arrangement.

Review questions

Answers and marking guidance • **page 235**

1. Why does a full-load booking not necessarily mean a full vehicle?
2. How can groupage add handling stages?
3. What should “dedicated” still leave to be checked?
4. Which vehicle features matter beyond payload?
5. Why do weight and position utilisation differ?
6. What limitation applies to an area-based loading-metre calculation?
7. Why must stacking permission be specific?
8. What information is missing from a postal address?
9. Who should agree loading and unloading responsibilities?

10. Which extra services can change a road quotation?

Applied exercises

Exercise 17A Test two capacities. A fictional accepted vehicle arrangement permits 18,000 kg and 26 pallet positions. A consignment has 22 pallets weighing 700 kg each. Calculate mass and position utilisation. State four additional checks before confirming the load.

Exercise 17B Write the delivery brief. Six non-stackable pallets must reach a shop without a dock between 09:00 and 11:00. The street has vehicle restrictions and the receiver has no forklift. Draft the questions needed to obtain an appropriate service, without assuming a tail lift alone solves the problem.

Chapter 18 Road dispatch and cross border movements

The border delay that became a missed appointment

A truck is booked to deliver at 15:00. A border process takes two hours longer than planned, and the dispatcher tells the receiver the truck will arrive at 17:00. The driver then explains that the revised movement also changes the required driving and rest plan. The arithmetic added the border delay but ignored the operating constraints.

Road dispatch is the management of a feasible sequence, not simply distance divided by speed. The plan must include loading, travel, breaks, border processes, waiting, unloading and evidence of completion.

What you should be able to do

Create a dispatch timeline; identify border and document dependencies; distinguish driving time from elapsed job time; and manage delivery exceptions and proof of delivery accurately.

18.1 Establish readiness before dispatch

Confirm that the cargo, documents, equipment, driver instructions and receiving arrangements are ready. Identify any unresolved condition that could prevent loading, border passage or delivery.

The dispatch instruction should include the job reference, cargo identity, site contacts, agreed timing, vehicle and handling requirements, approved route or routing constraints, document responsibilities and escalation contacts.

A dispatcher should know who can authorise a route change, extra waiting or return movement. Without those decisions, a driver can be left making commercial choices at a gate with incomplete information.

18.2 Build the timeline with separate activities

Worked example 18.1 A teaching dispatch day. Loading begins at 07:00 and takes 45 minutes. The first driving segment takes two hours, followed by a 30-minute planned processing stop. The second segment takes 90 minutes, and unloading takes 45 minutes. Completion is 12:30: 07:00 + 0:45 + 2:00 + 0:30 + 1:30 + 0:45. This simplified arithmetic is not a complete legal driving-and-rest assessment.

Record each activity separately because delays affect different dependencies. A longer loading process may consume an appointment margin. A border hold may change driver availability. An unloading delay may affect a later collection.

European Commission guidance describes EU driving-time and rest rules, with scope, exceptions and related requirements. A real dispatch plan needs the applicable current rules and the driver's relevant activity history, not merely a calculation for one isolated trip. [N-09]

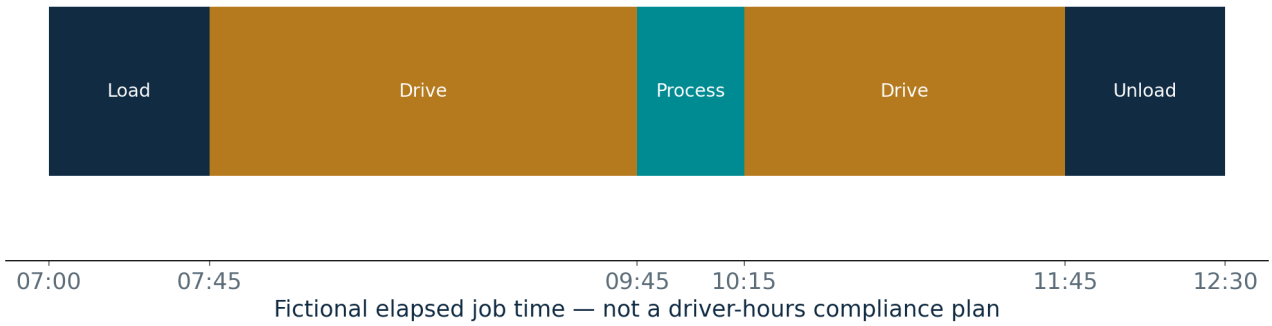


Figure 18.1 Elapsed job time includes more than driving. The fictional timeline supports planning arithmetic without substituting for a lawful driver schedule.

18.3 Prepare the border movement

Identify the countries, route, goods, customs procedure, transport authorisations and appointed parties. Establish where the vehicle must report and which documents or electronic references are required.

Do not assume that “customs cleared” describes every border stage. Export, transit, import and other product controls can have distinct requirements. A transit process may need formal completion at a specified destination.

The CMR Convention concerns qualifying international road-carriage contracts. Its scope is not every domestic truck movement, and the consignment note does not replace customs or product-control requirements. The UNECE guide and convention text explain the contractual and documentary framework. [N-10]

Worked example 18.2 A missing transit completion. A fictional movement reaches the receiving country, but the required transit procedure has not been completed. The customer asks for direct delivery because the warehouse is nearby. The dispatcher refers the movement to the appointed customs representative and follows the authorised next step. Physical proximity does not remove the procedure.

18.4 Keep documents and physical facts aligned

Before departure, compare the instructed cargo with the loaded count and identifiers within the authorised inspection scope. Record shortages, substitutions and visible damage rather than altering the paperwork to match a desired outcome.

For a cross-border movement, changes may affect filings and transport documents. Obtain the relevant issuer or representative's correction. An internal dispatch note does not necessarily amend an accepted declaration.

A useful handover identifies both the document version and its status. “Final paperwork sent” is weaker than “approved invoice v3 and packing list v2 sent to the appointed representative at 10:15; receipt acknowledged”.

18.5 Manage border delay as a new plan

Worked example 18.3 A missed receiving window. The teaching plan reaches the border at 10:00, allows one hour for processing and then two hours to the receiver, giving arrival at 13:00 within a 12:00–14:00 window. Actual processing ends at 13:30. The earliest simple travel estimate becomes 15:30, outside the

window. The dispatcher must also have the operator reassess lawful driving and rest, then confirm a new receiving arrangement. The original appointment is not silently changed in the performance record.

The update should distinguish the observed border event from the estimated onward journey. If processing completion is still unknown, an exact new delivery promise may be unjustified.

18.6 Record delivery accurately

Proof of delivery records a delivery event in the form used by the service. It may include time, location, receiving identity, count and recorded exceptions. Its evidential meaning depends on the process and applicable terms.

A signature does not automatically establish the condition of every item inside sealed packaging. Conversely, an unrecorded visible shortage can make later investigation harder. Train the team to record observations clearly and within its authority.

If the receiver refuses delivery, obtain the reason, identify immediate cargo-care needs and seek an authorised next instruction. Do not leave goods at an unapproved location merely to generate a completion event.

18.7 Control empty returns and additional work

Returnable packaging, pallets, empty equipment or customer returns can create further obligations. Define the count, condition, exchange arrangement, destination and evidence. Avoid mixing an informal pallet promise into a transport job without ownership.

Additional stops and waiting should follow the agreed approval process. Record actual times and the event causing them. A driver reporting “waited all afternoon” may be honest but still leave the billing team without an auditable calculation.

Good dispatch closes the operational loop: what was instructed, what actually happened, what changed, who approved it and what evidence confirms completion.

Chapter 18 recap

Plan road movements as a sequence of activities and legal dependencies. Keep border procedures, driver availability and receiving windows visible, and preserve accurate delivery and exception evidence.

Review questions

Answers and marking guidance • **page 235**

1. Why is distance divided by speed insufficient for dispatch?
2. Which conditions should be checked before releasing a vehicle?
3. Why does a driver's prior activity matter?
4. What does a border procedure add beyond transport documents?
5. Why is CMR not a universal name for a delivery note?
6. What should happen when loaded cargo differs from the instruction?
7. How should an uncertain border completion be communicated?
8. What can a proof of delivery establish?

9. What should happen after a receiver refuses delivery?

10. Why should returnable equipment be explicitly included?

Applied exercises

Exercise 18A Replan a window. Loading starts at 06:30 and takes 60 minutes. Travel to a border takes 2.5 hours, processing is planned for 90 minutes, onward travel takes two hours and unloading takes 30 minutes. Calculate planned arrival and completion on one clock. Processing actually lasts four hours. Recalculate the simple times and identify the further checks needed before promising the revised arrival.

Exercise 18B Document an exception. A receiver accepts eight pallets but reports that one outer carton is crushed and declines to confirm internal condition. Draft an accurate delivery note and a follow-up record. Explain why “goods received in perfect condition” would be unsupported.

Chapter 19 Road pricing and route planning

The empty journey home

A dedicated truck quote covers 240 km from depot to customer. The vehicle must then return 240 km without a confirmed paying load. A sales trainee prices only the outward distance and wonders why the job loses money.

Road pricing needs a clear operating cycle. The customer may buy one delivery, but the provider incurs the vehicle's time, distance and resources needed to perform it. This chapter separates those cost drivers and shows how route choices change them.

What you should be able to do

Calculate a road quote from stated distance, time and stop assumptions; assess empty running and utilisation; compare route options against windows; and distinguish total vehicle cost from cost allocated to one consignment.

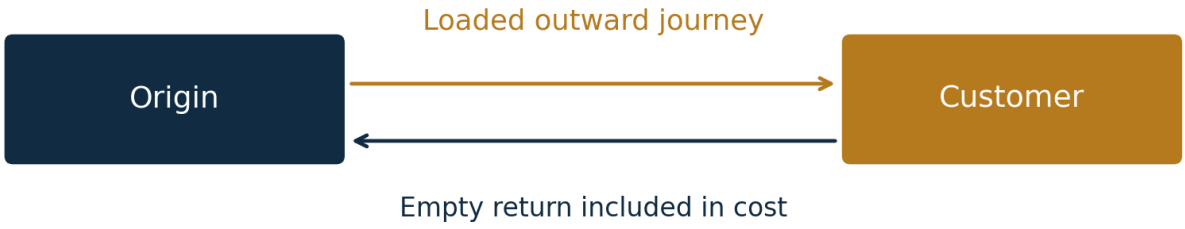
19.1 Identify the cost drivers

A teaching vehicle-cost model can include fixed daily or hourly availability, variable distance cost, tolls, stop activity, waiting and special equipment. Decide what each component includes so that fuel, driver time or depreciation is not counted twice.

Real pricing can also use tariff zones, weight breaks, pallet positions, loading metres or negotiated lane rates. A cost model helps explain economics, but the accepted market offer and service conditions still govern the commercial transaction.

Worked example 19.1 The full cycle. The fictional vehicle costs USD 180 for the day's availability plus USD 0.90 per kilometre, including fuel and other distance-related costs. The outward and empty-return distance total 480 km. Add tolls USD 40 and two chargeable stops at USD 15 each. Cost = 180 + 480 × 0.90 + 40 + 30 = USD 682. At 15% gross margin, price = 682 ÷ 0.85 = USD 802.35 rounded to cents.

Pricing only 240 km would omit USD 216 of distance cost. A possible backhaul is not a confirmed saving. Identify its probability and commercial responsibility before using it to justify the quote.



USD 180 + 480 km × USD 0.90 + USD 40 + USD 30 = USD 682

At 15% gross margin: USD 682 ÷ 0.85 = USD 802.35

Figure 19.1 The costed vehicle cycle includes the stated empty return. A customer-facing one-way service can create costs in both directions.

19.2 Separate waiting from productive movement

Waiting consumes availability even when distance does not increase. A tariff may include a free period and charge thereafter. Record the trigger, time unit, rounding rule and evidence.

Worked example 19.2 Waiting at a receiver. The offer includes 60 minutes from the agreed arrival event, then charges USD 30 for each started 30-minute period. Actual waiting is 145 minutes. Chargeable waiting is 145 − 60 = 85 minutes, which uses three started periods. Charge = 3 × 30 = USD 90. If the tariff instead charged exact minutes, the result would differ.

Distinguish waiting from unloading where the contract does. The event record should support the particular charging rule. Do not retrofit timestamps after the invoice arrives.

19.3 Compare routes with service constraints

The shortest route is not always the least-cost feasible route. Restrictions, tolls, appointment windows, congestion exposure and vehicle suitability can alter the result. Use the operator's accepted route and legal requirements.

Worked example 19.3 Distance versus time. Route A is 300 km and takes five hours, with no toll. Route B is 260 km and takes six hours, with a USD 25 toll. For this separate teaching comparison, cost is USD 0.70/km plus USD 25/hour of vehicle time; neither component overlaps the other. A costs 300 × 0.70 + 5 × 25 = USD 335. B costs 260 × 0.70 + 6 × 25 + 25 = USD 357. The shorter route is USD 22 more expensive under these assumptions.

If only B can meet an access requirement, A is not a valid alternative regardless of cost. Feasibility is a condition of the comparison.

19.4 Plan multiple stops around windows

A multi-stop route needs travel times between specific locations, service durations and receiving windows. The order of stops changes whether the route is feasible. A geographical sequence that looks tidy may reach one customer after closing.

Consider three fictional customers. A accepts 08:00–10:00, B accepts 10:00–12:00 and C accepts 09:00–16:00. The planner must test travel and unloading times, not simply sort the addresses alphabetically. Include the effect of a late first stop on the rest of the route.

A dispatch sheet should identify which appointment is binding, which window has flexibility and who must be contacted if the plan moves. Keep the driver informed through the approved channel without creating distraction while driving.

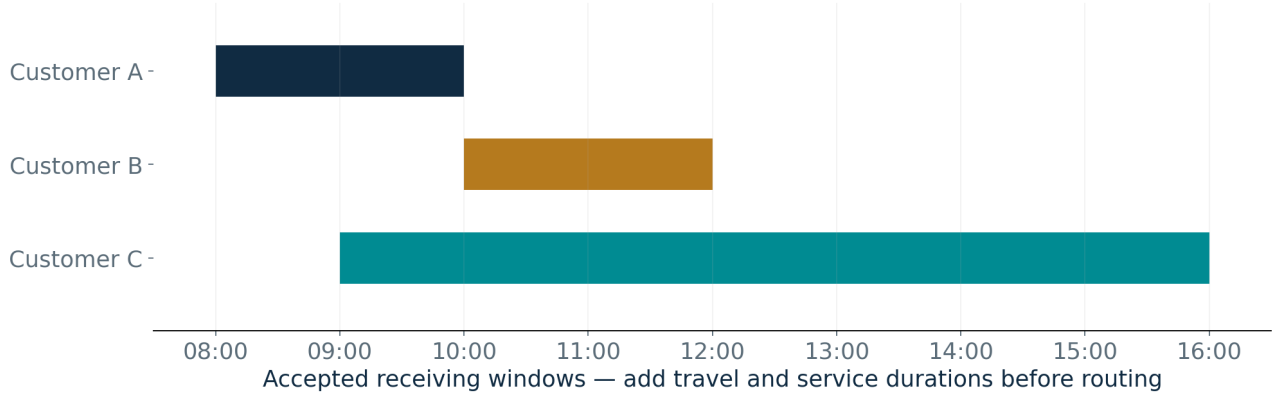


Figure 19.2 Delivery windows create scheduling constraints. A route must fit both travel and service time within the accepted appointments.

19.5 Allocate shared cost transparently

When several consignments share a vehicle, cost allocation can use weight, occupied space, stops, handling effort or a combination. No single basis is automatically fair for every purpose.

Worked example 19.4 Two allocations. A shared movement costs USD 900. Customer A has six of ten pallet positions and Customer B has four. A position-only allocation gives A USD 540 and B USD 360. If USD 200 is instead identified as two equal customer-specific stop costs and the remaining USD 700 is allocated by positions, A receives 100 + 420 = USD 520 and B receives 100 + 280 = USD 380. Both sum to USD 900 but explain the costs differently.

The accounting allocation is not necessarily the selling price. The quotation must reflect agreed service, market conditions and commercial policy. Use the allocation to understand economics rather than conceal cross-subsidy.

19.6 Measure utilisation with a purpose

Distance utilisation, weight utilisation, space utilisation and time utilisation answer different questions. A truck can be fully occupied by light goods while using little payload capacity. A heavily loaded outward trip can still have substantial empty running.

For 240 loaded kilometres and 240 empty kilometres, loaded-distance utilisation is 240 ÷ 480 = 50%. If a confirmed backhaul adds 180 loaded kilometres and 20 extra kilometres to the cycle, the new loaded distance is 420 km and total distance 500 km, giving 84%. The backhaul still needs its revenue, handling time and compatibility assessed.

Do not improve a utilisation number by accepting an unsafe or incompatible load. Capacity is useful only within the approved operating arrangement.

19.7 Quote the exceptions before they happen

State included stops, waiting allowance, access assumptions, loading and unloading responsibility, additional-distance treatment and return arrangements. Identify how the customer approves a changed scope.

At closure, reconcile the planned route with actual authorised work. Investigate a variance before assuming it is waste: a diversion may have been necessary, an extra stop may have been approved, or a receiving failure may have caused a return journey.

Chapter 19 recap

Cost the complete vehicle cycle, keep cost components distinct and test routes against real constraints. Use utilisation and allocation measures to explain decisions, while preserving the agreed service boundary.

Review questions

Answers and marking guidance • page 236

1. Why does an empty return belong in a vehicle-cost model?
2. How can fuel be accidentally counted twice?
3. Why should an unconfirmed backhaul not be treated as certain?
4. Which rules determine a waiting charge?
5. Why can the shorter route cost more?
6. How do delivery windows change stop order?
7. Why can two reasonable allocation methods differ?
8. How does allocation differ from selling price?
9. Which utilisation measures should be kept separate?
10. What evidence explains an actual route-cost variance?

Applied exercises

Exercise 19A Build a quote. A complete vehicle cycle is 360 km. Daily availability costs USD 160, variable distance cost USD 0.85/km, tolls USD 28 and three stops USD 12 each. Calculate cost and a price yielding 20% gross margin. Fuel is included in the distance cost.

Exercise 19B Evaluate a backhaul. The original cycle has 200 loaded and 200 empty kilometres and costs USD 520. A confirmed compatible backhaul adds USD 260 revenue and USD 90 incremental cost, with 20 extra kilometres. It converts 160 previously empty kilometres to loaded kilometres. Calculate incremental contribution and the new loaded-distance utilisation.

Chapter 20 Rail inland waterways and multimodal design

The inland customer

Nordhaven considers a new distribution centre far from the seaport. One proposal uses direct road delivery. Another moves the container inland by rail before a short road leg. A third uses an inland waterway service and a nearby terminal.

The question is not which mode is “best” in general. It is which complete service meets the customer's volume, timing, reliability, handling and cost requirements. Transfer points can create efficiency and also create dependencies.

What you should be able to do

Distinguish multimodal and intermodal concepts; identify rail and inland-waterway interfaces; compare complete transport chains; and explain why a through-service arrangement still needs clear operational ownership.

20.1 Use the terms carefully

Multimodal transport uses more than one mode. Intermodal transport generally keeps the goods within the same loading unit or road vehicle while changing modes, avoiding handling of the goods themselves at each transfer. UNECE terminology provides these conceptual distinctions and cautions that legal and statistical definitions may use their own reference documents. [N-11]

“Combined transport” has particular policy and geographical uses, especially in Europe. Do not assume that a marketing label establishes eligibility for a legal incentive or a specific liability regime.

A physical multimodal chain and a contractual through-service arrangement are related but different. Several modes can be purchased through separate contracts. A through offer may coordinate them under one commercial arrangement, but the applicable terms and responsibilities must still be read.

20.2 Understand the rail interface

Rail can support substantial inland flows where suitable services and terminals exist. The complete chain may include port handling, rail-terminal acceptance, train departure, inland unloading and final road delivery.

Check the service frequency, cutoff, equipment acceptance, terminal capability and final-delivery arrangement. A low linehaul price can be offset by terminal charges or a poorly timed connection. The cargo's current container or loading unit must be suitable for the proposed service.

Worked example 20.1 A missed departure. A fictional train leaves every second day at 18:00 and requires terminal readiness by 12:00. A container becomes ready at 13:00. The next planned departure is two days later, not six hours later. The schedule effect arises from service frequency and cutoff, even though rail transit itself is unchanged.

20.3 Understand the inland-waterway interface

Inland-waterway services depend on navigable routes, vessel capability, terminals and the operating conditions of the waterway. Water levels, locks, schedules and terminal availability can affect capacity or timing. Assess the actual service rather than assuming constant conditions.

The receiving plan may need buffer stock or earlier release to accommodate a longer replenishment cycle. That does not make the service unsuitable; it means the inventory and transport decisions should be made together.

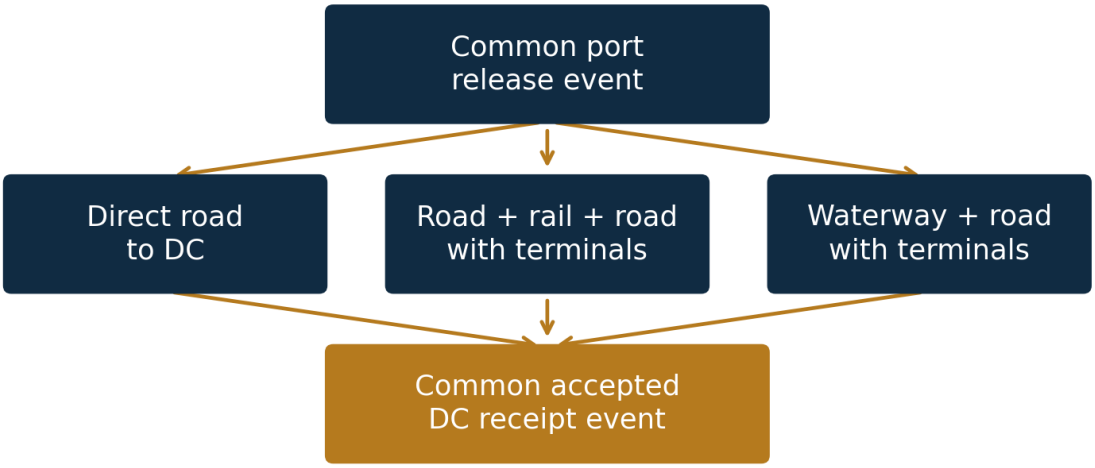
For temperature-sensitive or regulated cargo, the care and acceptance arrangement must continue through terminal waiting and transfer. A change of mode does not reset the product's requirements.

20.4 Compare complete chains

Worked example 20.2 Three inland options. All figures are fictional and assume suitable equipment and accepted services. Direct road costs USD 1,100 and takes one day from port availability. Rail costs USD 250 origin handling + USD 520 rail + USD 140 inland handling + USD 180 final road = USD 1,090 and takes three days. Waterway costs USD 210 origin + USD 390 main leg + USD 150 inland handling + USD 220 final road = USD 970 and takes four days.

Option	Complete cost	Planned duration	Main planning question
Direct road	USD 1,100	1 day	Vehicle and receiving availability
Rail and road	USD 1,090	3 days	Train cutoff and inland terminal connection
Waterway and road	USD 970	4 days	Service timing and waterway conditions

If the customer requires delivery in two days, only the stated road plan meets the requirement. If five days are available, all three remain candidates and the USD 130 waterway saving can be evaluated with reliability, inventory and other consequences.



Include departure calendars, handovers and all connecting costs.

Figure 20.1 Three complete inland chains for the same port-to-DC requirement. Terminal interfaces are part of each option's cost and time.

20.5 Include inventory consequences

Worked example 20.3 The extra inventory period. Suppose the goods have a teaching value of USD 80,000 and the customer's stated annual carrying-cost assumption is 18%, using a 365-day year. Waterway takes three more days than direct road. Incremental carrying cost = 80,000 × 0.18 × 3 ÷ 365 = USD 118.36. Against a USD 130 transport saving, the net modelled saving is USD 11.64 before other effects.

This is a decision model, not an accounting rule or a claim that every company incurs exactly that daily cash cost. The customer must confirm the value, rate and relevance of the inventory assumption. Stockout risk and service reliability may matter more than the simple carrying calculation.

20.6 Assign the handovers

For each transfer, identify the delivering party, receiving party, accepted unit, required record, cutoff and exception contact. A through-service coordinator should still know which underlying operator controls the next action.

Track the unit across changing references. A port container number, rail booking and inland delivery reference should remain linked. Otherwise a shipment can appear as several unrelated jobs and lose visibility at the point where attention is most needed.

If the plan changes from rail to road, review cancellation conditions, equipment availability, customs status, release location and commercial approval. A route change is not merely a different line on a map.

20.7 Compare emissions with a consistent boundary

Different modes can have different emissions characteristics, but a valid shipment comparison needs a stated method, data and boundary. Include the terminal and road stages where required by the chosen method. Do not present an unsupported universal percentage saving.

Chapter 36 develops a transparent calculation using fictional factors. At this stage, the lesson is to request comparable evidence and show the tradeoff between service, cost and emissions rather than using a “green” label as proof.

Workshop A regional distribution network

Fieldstone Components operates a fictional inland DC serving three customer groups. Group A needs small daily replenishments, Group B accepts twice-weekly deliveries and Group C needs a monthly industrial shipment with an appointment. The company currently uses separate road bookings for every order.

Management asks whether rail or an inland-waterway connection could reduce cost. The proposal begins at a port and ends at the DC; the customer-delivery network remains a separate downstream service. Keeping that boundary clear prevents double-counting or omitting the last stage.

Port-to-DC option	Complete teaching cost per unit	Stated duration and frequency
Road	USD 1,200	One day; daily availability subject to booking
Rail plus road	USD 1,040	Three days; departures Monday and Thursday
Waterway plus road	USD 930	Four days; one weekly departure

Each transport unit carries goods valued at USD 100,000. Use an annual carrying-cost assumption of 15% and a 365-day year only for this exercise. All options are assumed technically suitable once booked, but their cutoffs and release dependencies must still be planned.

A unit becomes available at the port on Friday morning, after the weekly waterway cutoff. The next rail departure is Monday. The business requires stock at the DC by the following Wednesday afternoon. The service durations begin at departure, not at port availability.

Build a timeline that includes waiting for the departure as well as transit. State the day-counting convention used. Identify which option can meet the requirement under the supplied schedule and which needs additional clarification about exact departure and delivery times.

Then compare a regular planned flow that can be released before each service cutoff. Calculate the extra carrying cost of the three-day and four-day options relative to one-day road. Compare those amounts with the transport savings. Explain why the result may differ for lower-value goods.

The DC also receives a proposal to consolidate Group B's downstream deliveries. The proposed change reduces vehicle movements but requires one extra day of stock at the customers. Identify who must approve that service change and what evidence is needed before claiming an overall saving or emissions reduction.

Prepare a network recommendation that distinguishes urgent replenishment from planned regular flows. Avoid forcing every shipment into one mode simply to simplify the tariff. Identify the data that should be collected during a pilot: actual waiting, cutoff performance, terminal events, delivery reliability, cost, stock effects and exceptions.

For an extension, assume the rail service loses one weekly departure during the pilot. Reassess the inventory and delivery consequence. The main-leg transit duration has not changed, but the complete service has.

Chapter 20 recap

Multimodal design joins complete services. Frequency, cutoffs, terminal capability, inventory consequences and handover ownership can determine whether a theoretically attractive mode works for the customer.

Review questions

Answers and marking guidance • page 236

1. How do multimodal and intermodal concepts differ?
2. Why can a legal definition differ from a general glossary?
3. What is the difference between a physical chain and a through contract?
4. How does service frequency affect a missed rail cutoff?
5. Which conditions can affect inland-waterway service?
6. Why should terminal charges be included?
7. How can inventory cost change a transport comparison?
8. What information belongs at each handover?
9. Which records change when rail is replaced by road?
10. Why does an emissions comparison need a common boundary?

Applied exercises

Exercise 20A Compare inland chains. Road costs USD 1,250 and takes one day. Rail includes USD 220 origin handling, USD 610 main leg, USD 150 inland handling and USD 190 final road, taking three days. The deadline is four days after port availability. Calculate the cost difference and time margins, then state the remaining feasibility checks.

Exercise 20B Include inventory. Goods worth USD 120,000 travel four extra days under an alternative that saves USD 300 in transport. Use a fictional 15% annual carrying-cost assumption and a 365-day year. Calculate the incremental carrying cost and net saving. Explain two limitations of that conclusion.

Part 6 Contract logistics

Contract logistics manages a continuing flow of receipts, stock and customer orders. The service succeeds when physical processes, data, labour, capacity and decision rights work together. These chapters turn the scope into a measurable operation.

Chapters 21–24

Chapter 21 Warehousing and contract logistics models

Chapter 22 Warehouse processes and inventory accuracy

Chapter 23 Warehouse capacity productivity and pricing

Chapter 24 Implementation systems and performance

Chapter 21 Warehousing and contract logistics models

More than a place to put stock

Nordhaven wants to outsource a distribution centre. Its first request is simple: “Please quote storage for 600 pallets.” During discovery, the provider learns that the operation also receives mixed cartons, separates retail orders, relabels selected products, manages returns and sends inventory updates to the retailer's system.

The original request describes one resource, not the service. Contract logistics begins by defining the work, the interfaces and the performance expected over time. Storage is only one possible element.

What you should be able to do

Distinguish warehousing from an integrated outsourced operation; define a scope of work; identify customer and provider responsibilities; and translate demand into operational requirements.

21.1 Define the service model

A shared-user warehouse serves several customers within an agreed operating arrangement. A dedicated operation reserves facilities or resources for a particular customer. An in-house operation remains under the customer's own management, while an outsourced provider may operate at its own site or at a customer facility.

These choices affect flexibility, investment, control, implementation and commercial risk. Shared resources can accommodate variable demand, but service compatibility and allocation need attention. Dedicated resources can support a specialised process, but the parties must decide who pays for unused capacity and changes in demand.

The word “contract” does not imply that every operational risk has already been allocated. The scope, assumptions, service levels, pricing and change process need to work together.

21.2 Map the flow before pricing it

Trace receiving, checks, putaway, storage, replenishment, picking, packing, dispatch and returns. Add value-added activities such as labelling or kitting only where required. Identify who releases stock into each next process.

For each activity, define the input, output, unit, expected volume, system event and exception owner. “Receive goods” could mean unloading full pallets, counting cartons, checking item-level quantities or inspecting against a particular quality standard. These have very different labour requirements.

Worked example 21.1 Two receiving scopes. In Scope A, the provider receives 100 sealed, identified pallets and records pallet count and visible condition. In Scope B, it opens and checks 4,000 cartons at item level. Both may be called “100 pallets received”, but they are not equivalent work. The quotation must identify the inspection level and the customer's responsibility for source data.

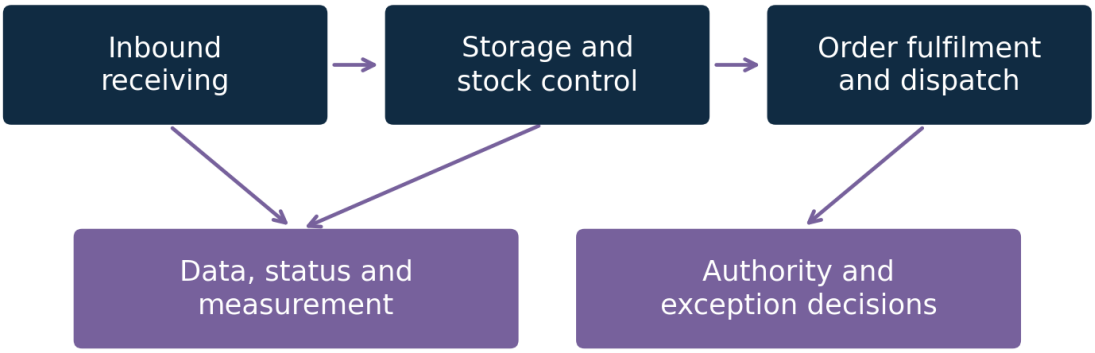


Figure 21.1 A contract-logistics scope connects physical activities, information and decision rights. Each interface needs an agreed owner.

21.3 Build a usable scope of work

A scope of work should state the products, operating calendar, volume profile, storage conditions, process boundaries, inspection standards, system interfaces, service measures and exclusions. Include handling of damaged, unidentified, returned or held stock.

Scope area	Nordhaven teaching requirement	Clarification needed
Inbound	Pallet and carton receipts	Count level and booking discipline
Storage	Ambient apparel	Product-care and segregation instructions
Outbound	Retail orders by store	Order cutoff, line profile and packing rules
Returns	Store returns and selected customer returns	Inspection and disposition authority
Data	Inventory and order-status exchange	Message ownership, timing and reconciliation
Peak	Seasonal volume increase	Forecast notice and agreed capacity process

Do not let an exclusion disappear during sales discussions. If product-quality inspection is outside scope, explain what observations the provider will make and how suspect stock is held for the customer's decision.

21.4 Describe the demand profile

Average pallets alone cannot size an operation. Obtain receipts and dispatches by day or shift, order lines per order, units per line, SKU count, stock dimensions, returns, seasonality and the concentration of work around cutoffs.

Worked example 21.2 Same volume, different labour. Customer A ships 1,000 units in ten orders of 100 units, all from one SKU per order. Customer B ships 1,000 units in 500 orders of two units, drawn from many locations. The unit total is equal, but B may require far more travel, order handling, packing and label production. A per-unit rate copied from A can underprice B.

Ask for a representative transaction file, not only a summary. Check whether the period includes peaks and unusual campaigns. Identify missing or unreliable data before treating the model as a commitment.

21.5 Allocate responsibilities at the boundary

The customer commonly controls product master data, commercial order release, demand forecasts and certain quality decisions. The provider controls the agreed operational execution. The actual contract may differ, so make the division explicit.

A responsibility matrix should name one accountable owner for each decision, while allowing several contributors. “Both parties” is not enough for a time-sensitive release. Identify who resolves a stock discrepancy, approves disposal, changes a packing rule or authorises overtime.

Worked example 21.3 A forecast change. Nordhaven forecasts 3,000 daily order lines, then requests 5,000 with two days' notice. The provider compares the request with the agreed capacity and notice assumptions, identifies feasible additional resources and presents the service and cost effect. It should not silently accept an impossible cutoff or reject the request without exploring options.

21.6 Define service levels that can be measured

A service-level agreement needs a precise event, denominator, time boundary, data source and exception rule. “Orders on time” could mean picked, dispatched or delivered. The provider should not be measured on an event outside its scope without an agreed attribution method.

For example, a warehouse dispatch measure might assess eligible orders released before the agreed cutoff and handed to the nominated carrier by the agreed time. Orders held by the customer's quality team need a transparent treatment, not an informal deletion from the report.

Set both service and control measures. High dispatch speed with poor inventory accuracy creates future failures. A balanced review considers accuracy, timeliness, stock control, damage, safety, capacity and corrective actions.

21.7 Prepare for change and exit

Products, systems and demand will change. Define how a change is assessed, approved, priced and implemented. A new carton label can affect master data, printer setup, packing time and customer compliance.

Also define how the operation would transfer or end: inventory reconciliation, data export, open orders, equipment ownership and records. Exit planning is ordinary operational discipline, not a prediction that the relationship will fail.

The best contract-logistics proposal makes the service understandable to the people who must operate it. A polished commercial document cannot compensate for an undefined receiving process.

Chapter 21 recap

Contract logistics is an agreed operating system, not just storage space. Define activities, demand, interfaces, decision rights and service measures before committing resources and prices.

Review questions

Answers and marking guidance • page 237

1. How does an integrated outsourced operation differ from storage alone?
2. What tradeoffs arise between shared-user and dedicated models?
3. Why should receiving inspection levels be explicit?
4. Which demand measures matter beyond average pallets?
5. Why can equal unit volumes create different workloads?
6. Which decisions require a named owner?
7. How should a forecast increase be assessed?
8. What makes a service level measurable?
9. Why should quality holds remain visible in reporting?
10. What should an exit plan address?

Applied exercises

Exercise 21A Write a scope. A retailer needs storage for 500 pallets, 1,200 daily order lines, weekly store returns and occasional relabelling. Draft a scope with ten defined items and five questions that must be answered before pricing.

Exercise 21B Resolve ownership. Stock is physically present, but its product code is missing from the customer master data. Orders are due today. Allocate the data correction, operational hold, customer communication and release decision. Explain why creating an unapproved substitute code is unsuitable.

Chapter 22 Warehouse processes and inventory accuracy

The stock that exists in two places

The warehouse system shows 40 cartons in location A-03. A picker finds 28. Another 12 are later discovered in B-07 without a recorded transfer. Total physical stock is correct, but the operation still failed: the order could not be picked reliably from the system.

Inventory accuracy is more than a total quantity. The correct item, location, status, batch and unit of measure must remain connected to physical stock. This chapter follows that connection through the warehouse.

What you should be able to do

Explain the main warehouse processes; distinguish stock identity, quantity, location and status; investigate discrepancies; and calculate inventory-accuracy measures with explicit definitions.

22.1 Receive against an expected record

An advance shipping notice, purchase order or other expected receipt helps the warehouse prepare. The receiving team compares the actual goods within its inspection scope and records differences.

Identify the handling unit and the items it contains. GS1's logistic-label guidance uses the Serial Shipping Container Code, or SSCC, to identify a logistics unit and connect it with associated information. Scanning an identifier supports traceability, but it does not independently prove that the physical contents match the electronic record. [N-12]

Worked example 22.1 A unit-of-measure error. The supplier sends 20 cases, each containing 12 units. The receiving interface interprets “20” as individual units. Physical quantity is 240 units, while the system records 20. The correction must establish the source unit, conversion and affected transactions. Simply adding 220 units without fixing the conversion leaves the next receipt exposed to the same error.

22.2 Put away with a confirmed location

Putaway assigns stock to an appropriate accepted location and records the movement. Product compatibility, dimensions, weight, status, rotation and access can affect the choice. A system suggestion does not override an unsafe or unsuitable physical condition.

Confirm the actual destination through the approved process. If the suggested location is unavailable, use the authorised exception route rather than placing stock elsewhere and intending to update it later.

The opening example shows why. The unrecorded 12-carton movement did not lose goods, but it created a picking failure and an investigation. Location accuracy has operational value independent of total stock accuracy.

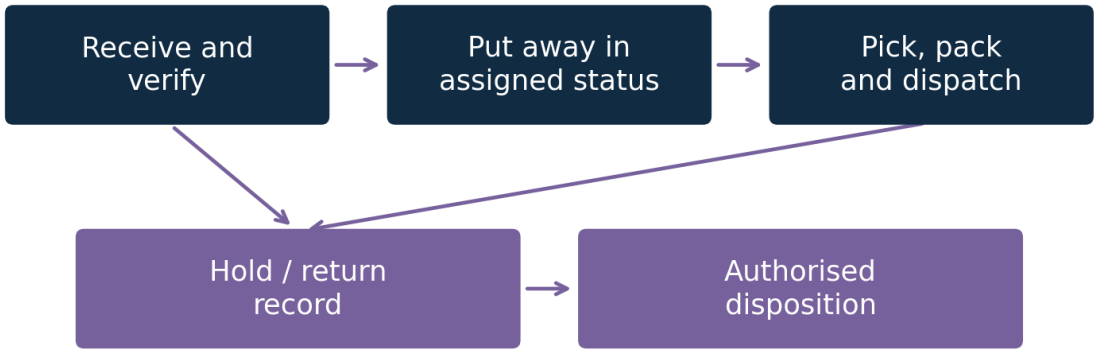


Figure 22.1 Warehouse stock changes location and status through controlled events. Returns and holds require a disposition decision before stock re-enters available inventory.

22.3 Replenish before the pick face runs out

A pick location may hold only part of the stock, with reserve stock stored elsewhere. Replenishment moves goods into the picking area under a recorded instruction.

Plan replenishment around demand, stock rotation and the operating schedule. If it occurs too late, pickers wait or make informal substitutions. If it creates congestion during a dispatch peak, the operation may lose productivity.

A replenishment shortage should trigger a stock check, not an automatic inventory adjustment. Establish whether stock is absent, held, misplaced, already committed or incorrectly recorded.

22.4 Pick and pack against the released order

Picking selects the required item and quantity under the applicable rotation and status rules. Packing confirms the shipment configuration, protection, labels and documents.

Batch or expiry control may require a specific method, such as first-expiry-first-out where appropriate. Do not substitute a general first-in-first-out habit for a product-specific instruction. Held or expired stock must not be treated as available merely because it is physically close.

Worked example 22.2 A correct quantity with the wrong status. An order requires 30 units. The system shows 20 available and 10 on quality hold. Total physical stock is 30, but only 20 are released. The picker must not use the held units to complete the order. The customer or authorised quality owner decides the next action, which may be partial shipment or another source.

22.5 Confirm dispatch and manage returns

At dispatch, reconcile the order, packages, carrier handover and system event. A packed order still inside the warehouse is not necessarily dispatched. Record the event used by the service measure.

Returns need their own identity and status. The returned product may be saleable, damaged, incomplete, recalled or unidentified. Receipt of a return does not automatically make it available for resale.

Establish who inspects, grades, authorises repair or disposal, and releases any saleable stock. Preserve the link to the original order where relevant, together with the reason and observed condition.

22.6 Count to find causes

A cycle-count programme checks selected stock throughout the year. Selection can reflect value, movement, risk, past errors or other agreed priorities. A count should follow a controlled procedure that avoids confusing in-progress movements with discrepancies.

Worked example 22.3 Record accuracy. A count checks 200 defined stock records, each identified by SKU, location and status. Twelve records differ from the accepted physical result. Exact-record accuracy is (200 − 12) ÷ 200 × 100 = 94%. This measure does not reveal the value or size of the discrepancies; a second measure may be needed.

If one SKU is short by 50 units and another is over by 50, the net difference is zero but the records are not accurate. Avoid a metric that allows unrelated errors to cancel.

22.7 Investigate before adjusting

Trace the expected stock equation: opening quantity + receipts + authorised transfers in − dispatches − transfers out ± authorised adjustments = expected closing quantity. Then inspect the underlying events.

Worked example 22.4 A reconciliation. Opening stock is 500 units, receipts 240, dispatches 610 and an authorised damage write-off 10. Expected closing stock is 500 + 240 − 610 − 10 = 120. The physical count is 108, leaving an unexplained shortage of 12. Search for missed dispatch confirmation, unit conversion, location movement, receipt error or other evidence before assigning a cause.

An adjustment requires the appropriate approval and reason. It changes the record; it does not by itself correct the process that caused the discrepancy.

22.8 Use a corrective action that can be tested

“Staff reminded” may be necessary but is rarely enough when the system allows an unrecorded movement. Consider clearer scanning steps, location validation, unit controls, workflow design or training tied to the observed cause.

Define how improvement will be measured. If the problem involved case-to-unit conversion, test the next relevant receipts and monitor that error type. A general improvement in overall accuracy may hide recurrence of the same defect.

Chapter 22 recap

Inventory accuracy joins identity, quantity, location, status and timing. Record movements at the point they occur, keep held stock distinct and investigate discrepancies before approving adjustments.

Review questions

Answers and marking guidance • page 238

1. Why can correct total quantity still conceal an inventory failure?
2. What can an SSCC support, and what does scanning not prove?
3. Why must units of measure be controlled?

4. What should happen when a suggested putaway location is unavailable?

5. How can late replenishment affect picking?

6. Why is physical stock not always available stock?

7. What distinguishes packing from dispatch?

8. Why should returns enter a controlled status?

9. How is exact-record accuracy calculated?

10. Why is an adjustment not a corrective action?

Applied exercises

Exercise 22A Reconcile stock. Opening stock is 320 units, receipts 180, dispatches 275 and authorised write-offs 5. Physical stock is 212. Calculate expected stock and the discrepancy. Give four evidence checks before adjustment.

Exercise 22B Measure and investigate. A count checks 150 defined records; nine differ. Calculate exact-record accuracy. One SKU is 20 units over and another 20 short. Explain why netting them to zero would not establish accuracy, and propose a controlled investigation.

Chapter 23 Warehouse capacity productivity and pricing

The average that hid the peak

Nordhaven's warehouse model uses average stock of 500 pallets and average demand of 3,000 order lines per day. During the seasonal launch, stock reaches 680 pallets and orders arrive in a concentrated afternoon wave. The operation runs out of suitable locations and labour hours even though the annual averages remain correct.

Capacity planning turns demand into resources at the time the work occurs. It must distinguish physical capacity, practical working capacity, labour productivity and the bottleneck that limits completion.

What you should be able to do

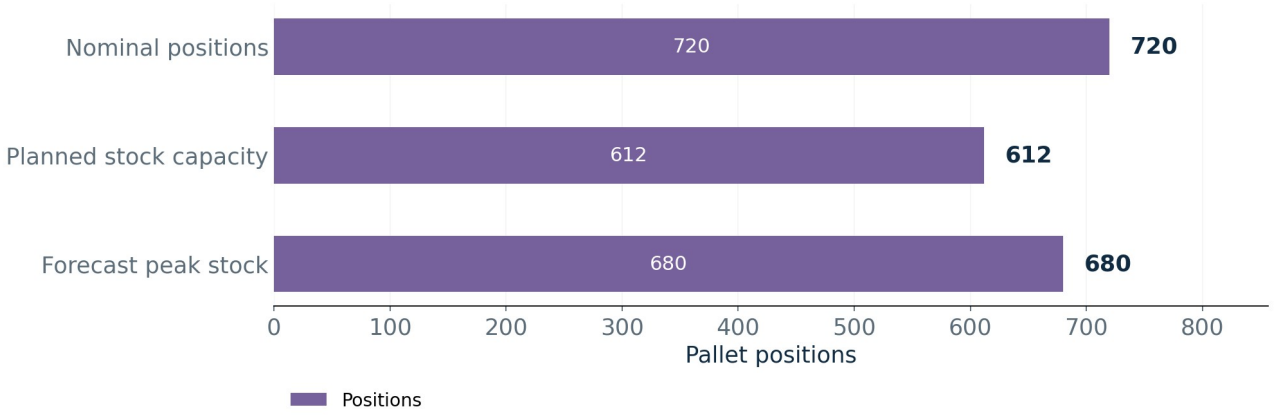
Calculate storage and labour requirements from stated assumptions; distinguish productive hours from paid hours; identify bottlenecks; and build a warehouse price with visible activity units.

23.1 Count usable positions carefully

Storage capacity depends on the accepted layout, equipment, product dimensions and operating rules. Do not derive a safe rack loading or building design from a simple arithmetic model.

Worked example 23.1 Position capacity. A fictional approved layout has 120 bays, three storage levels per bay and two positions per level. Nominal positions = 120 × 3 × 2 = 720. If the planning policy limits operating occupancy to 85% to preserve flexibility, planned stock capacity is 720 × 0.85 = 612 pallets. The 85% is an explicit teaching assumption, not an industry-wide limit.

If expected peak stock is 680 pallets under the same assumption, required nominal positions are 680 ÷ 0.85 = 800. The current 720-position layout is short by 80 nominal positions. The team must examine alternative capacity or stock timing rather than assume every nominal location can be continuously occupied.



Planning policy: 85% occupancy. Peak requirement exceeds planned capacity by 68.

Figure 23.1 Nominal and planned working capacity under the stated occupancy assumption. Capacity available to planning can be lower than the physical position count.

23.2 Convert workload to productive hours

Productivity needs a defined unit and work boundary. Lines per productive hour, units per hour and orders per paid hour are different measures. State whether travel, setup, checking and normal interruptions are included.

Worked example 23.2 Picking labour. Daily demand is 3,600 order lines. The validated teaching rate is 75 lines per productive hour, so required productive hours are 3,600 ÷ 75 = 48. Each scheduled person contributes six productive hours within the paid shift under the stated allowance. Required people = 48 ÷ 6 = 8. Do not divide by an eight-hour paid shift and then assume breaks and other work require no time.

At a peak of 5,400 lines, the same assumptions require 72 productive hours and 12 people. Training, attendance and the availability of suitable equipment still affect whether the plan can be delivered.

23.3 Test the bottleneck

Increasing picking labour does not help if packing or dispatch cannot handle the output. Model each stage at the relevant time interval.

Worked example 23.3 The packing constraint. Picking can release 900 order lines per hour. Packing can complete 700 equivalent lines per hour under the defined order mix. Over four hours, picking could produce 3,600 lines but packing can complete only 2,800. Work in progress grows by 800 lines if both continue at those rates. The plan needs a balanced release, extra packing capability or a changed cutoff; simply adding pickers makes the queue larger.

Check whether the measures are genuinely comparable. If packing productivity is recorded in orders rather than lines, convert using the actual order profile instead of equating unlike units.

23.4 Include variability and learning

New employees may not immediately achieve a validated experienced-worker rate. Product mix, location distribution, order complexity and replenishment quality can change productivity.

Use a clear scenario range rather than an unexplained contingency. For 3,600 lines, a rate of 60 lines per productive hour requires 60 hours, or ten people at six productive hours each. At 75 lines it requires eight. The staffing decision should identify which rate is supported and what would trigger additional resources.

An average can also hide a concentrated release. If most orders arrive two hours before cutoff, an eight-person daily calculation may not provide enough capacity in the available window. Model the arrival profile.

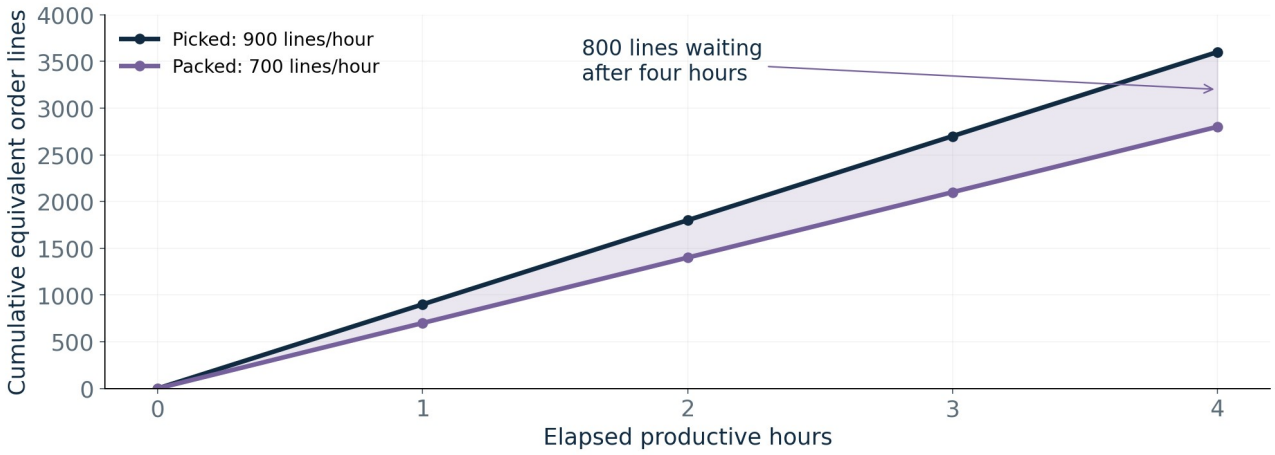


Figure 23.2 An unbalanced picking and packing process creates work in progress. The slower accepted stage controls completed output.

23.5 Price activities with defined units

A warehouse price can include storage, inbound handling, outbound handling, order lines, packaging materials, value-added work, systems and management. The appropriate model depends on scope and risk allocation.

Worked example 23.4 A monthly teaching invoice. Average billable storage is 600 pallets at USD 0.45 per pallet-day for a 30-day month: USD 8,100. Inbound handling is 1,800 pallets at USD 0.85: USD 1,530. Outbound handling is 1,650 pallets at USD 0.95: USD 1,567.50. A fixed management and system fee is USD 2,400. Total = USD 13,597.50, excluding any activities outside this example.

The phrase “average billable storage” must have a calculation rule. Daily closing stock, daily maximum stock and a monthly snapshot can produce different invoices. Agree the data source and treatment of held or returned goods.

23.6 Understand fixed and variable exposure

A dedicated operation may incur rent, core management and equipment costs even when volume falls. A fully variable customer rate can therefore create risk if the volume assumption is not achieved.

Suppose fixed monthly cost is USD 20,000 and contribution after variable cost is USD 2.50 per order. Break-even volume is 20,000 ÷ 2.50 = 8,000 orders. At 6,000 orders, contribution is USD 15,000, leaving a USD 5,000 shortfall before other effects.

This simple model supports negotiation of minimum commitments, capacity reservations or different pricing structures. It is not a substitute for a full business case. Include implementation, peak resources and working-capital effects where relevant.

23.7 Review performance without encouraging shortcuts

Productivity should be paired with accuracy, safety and service. A team can increase lines per hour by skipping checks or choosing easy orders first, while leaving difficult orders late.

Compare like-for-like work and investigate changes in mix. Use the metric to understand the process, not to punish someone for a system outage or an unplanned complexity that the model ignored.

Chapter 23 recap

Translate demand into positions, productive hours and stage capacity. Keep assumptions visible, test peaks and bottlenecks, and price the actual activities and risk allocation.

Review questions

Answers and marking guidance • page 238

1. Why can working capacity be lower than nominal positions?
2. Why is the 85% occupancy assumption not universal?
3. How do productive and paid hours differ?
4. Which unit should a productivity rate specify?
5. Why can extra pickers increase a queue?
6. How does order-release timing affect staffing?
7. What should define billable storage?
8. How do fixed and variable costs affect volume risk?
9. What does break-even volume show?
10. Which measures should accompany productivity?

Applied exercises

Exercise 23A Size storage and labour. Peak stock is 900 pallets and the fictional planning occupancy is 90%. Calculate required nominal positions. Picking demand is 4,800 lines at 80 lines per productive hour, with six productive hours per person. Calculate required people.

Exercise 23B Calculate a monthly charge. Billable storage is 420 pallets for 30 days at USD 0.50 per pallet-day. Inbound is 900 pallets at USD 1.20, outbound 850 at USD 1.40 and the fixed fee USD 1,800. Calculate the total and list three scope or measurement assumptions to verify.

Chapter 24 Implementation systems and performance

The system is live but the operation is not ready

The warehouse management system passes a demonstration. Orders can be entered and labels printed. On launch day, however, the item master contains duplicate codes, the customer interface sends cases where the warehouse expects units, and the returns process has never been tested.

Implementation succeeds when people, processes, data, systems and facilities work together under real conditions. A software demonstration is one piece of evidence, not the whole acceptance decision.

What you should be able to do

Build an implementation plan; identify master-data and interface controls; define meaningful acceptance tests; and investigate performance using stable definitions and evidence.

24.1 Establish the design before configuration

Translate the agreed scope into process maps, decision rules, roles and data requirements. Identify standard work and exception work. A system configured around an unclear process can automate the confusion.

For each transaction, define the trigger, required fields, validation, resulting stock status and acknowledgement. Examples include expected receipt, receipt confirmation, order release, pick completion, dispatch, inventory adjustment and return disposition.

The design should also state what happens when a message fails. Who sees the error? Can the same message be replayed safely? How are duplicate transactions prevented? How does the operation continue under an approved fallback?

24.2 Make master data an operational responsibility

Product codes, units of measure, dimensions, weights, barcodes, storage conditions, batch rules and packing instructions affect physical work. Assign ownership and approval to changes.

Worked example 24.1 The case conversion. A product has 24 units per case. The customer interface sends an order for ten cases, but the warehouse interprets ten units. The expected quantity is 240 units, not ten. The test should have included unit conversion, and the correction must address both the master data and affected orders. A manual fix to one shipment does not resolve the interface defect.

Maintain a migration reconciliation. Compare source totals, imported totals, rejected records and approved transformations. An import that finishes without a software error can still contain incomplete or wrong business data.

24.3 Test realistic end-to-end scenarios

User acceptance testing should follow the real work from input to physical and system outcome. Include normal receipts and orders, but also shortages, duplicate messages, damaged goods, quality holds, returns, cancellations and interface outages.

Worked example 24.2 A duplicate dispatch message. The warehouse sends a dispatch confirmation, receives no acknowledgement and resends it. The customer system should not deduct stock twice. The test checks the agreed unique transaction identifier and duplicate-handling behaviour. “Message delivered” is not enough; the business effect must be correct.

Record the expected result before testing, the actual result, evidence, defect severity, owner and retest outcome. Closing a defect means its correction was verified, not merely that someone changed a setting.

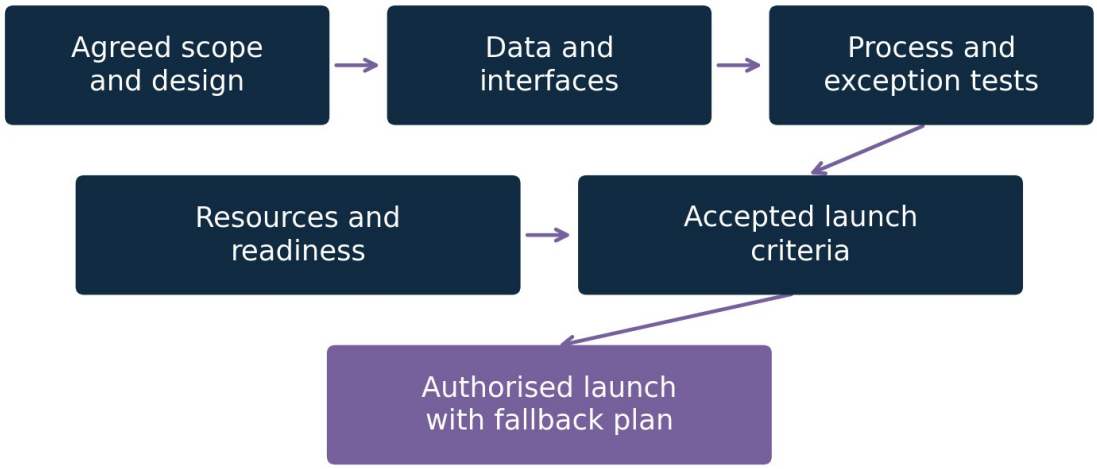


Figure 24.1 Implementation gates connect design, data, testing and operational readiness. A failed acceptance condition returns to correction before launch.

24.4 Plan cutover as a controlled change

Cutover can include inventory counting, system freeze, data transfer, validation, open-order reconciliation, staff briefing and the first operational transactions. Define the sequence, owners and go/no-go authority.

Establish a fallback that is technically and operationally possible. A rollback plan is not credible if stock has moved extensively and the old system cannot reconstruct those movements.

Worked example 24.3 A launch gate. The agreed launch conditions include reconciled opening inventory, passed critical order and receipt tests, trained shift leaders and a working exception contact rota. Three conditions pass, but opening inventory has an unexplained 2% value difference. The steering group should resolve or explicitly assess that defect through its authorised decision process; it should not mark the gate green because the calendar says launch day.

24.5 Stabilise before optimising

The initial period should monitor actual transactions closely, provide rapid support and reconcile interfaces. Separate defects from ordinary learning and from changes in customer demand.

A daily issue log needs severity, affected work, owner, action and evidence of resolution. Avoid allowing the same issue to appear in several disconnected spreadsheets with different statuses.

Once the operation is stable, improvement can target travel, slotting, replenishment, batching, packing and information flow. Changing several variables at once makes it harder to know which change helped.

24.6 Define the KPI before drawing the dashboard

An order-accuracy measure should specify whether it is assessed at line, order or shipment level, when errors are detected and which population is included. A dispatch measure should define its cutoff and event. Inventory accuracy needs a defined record and tolerance.

Worked example 24.4 Different denominators. During a month, 2,000 orders contain 10,000 lines. Forty lines have confirmed errors, spread across 30 orders. Line accuracy = (10,000 − 40) ÷ 10,000 = 99.6%. Order accuracy = (2,000 − 30) ÷ 2,000 = 98.5%. Both are correct and describe different customer experiences.

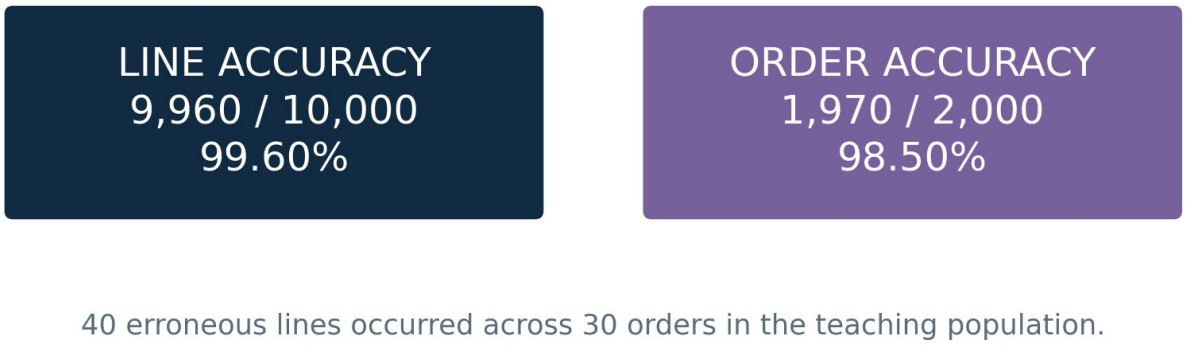


Figure 24.2 The same error population produces different line and order accuracy. The denominator belongs beside every reported percentage.

24.7 Investigate a falling result

Segment the data by shift, process, product family, order type and error category where useful. Look for changes in volume, mix, system releases, training and replenishment.

Suppose order accuracy falls after a new label format is introduced. The first question is whether the errors actually involve labels. If they are predominantly wrong-item picks, the timing may be coincidental. Use event evidence rather than choosing the most recent change as the cause.

A service review should agree corrective action, owner, due date and verification method. “Accuracy to improve next month” is an aspiration. “Validate the new barcode mapping, retest affected SKUs and review the next 500 lines” is an action.

24.8 Keep governance alive after launch

Maintain change control for new products, systems, services and volume commitments. Revisit assumptions when the operation materially changes. A contract built around full-case retail orders may need redesign if it becomes a single-item ecommerce operation.

The implementation file should become a useful operational reference: approved scope, process versions, data definitions, test evidence, system ownership and escalation arrangements. Otherwise the next change starts by rediscovering decisions that were already made.

Workshop A warehouse peak and a data defect

Northgate Fulfilment is preparing a seasonal peak for a fictional retail customer. The approved layout has 1,000 nominal pallet positions. The planning occupancy assumption is 85%. Expected peak stock is 920 pallets, while normal stock is 700.

The forecast is 6,000 order lines per day. The validated picking rate is 75 lines per productive hour, and each scheduled picker contributes five productive hours within the shift. Packing capacity is 900 equivalent lines per hour for a six-hour operating window. The case assumes compatible units between the two stages.

The WMS receives orders from the customer. One new product has 12 units per case, but the interface currently interprets a case as one unit. Testing has also found that a resent dispatch message can create a duplicate deduction. The project team has a launch date in five days.

Workstream	Current evidence	Decision needed
Storage	Peak exceeds planned working capacity	Accepted overflow or stock-timing arrangement
Picking	Productivity rate validated for current mix	Staff and equipment plan for the peak
Packing	Six-hour capacity known	Balance with required daily output
Master data	Case conversion defect reproduced	Corrected and retested mapping
Interface	Duplicate dispatch defect reproduced	Safe replay and reconciliation before launch

Calculate planned storage capacity, the stock shortfall and the nominal positions needed at the stated occupancy. Calculate productive picking hours and whole-person staffing. Compare packing output with the 6,000-line requirement and quantify the gap.

Do not solve every problem by adding labour. Extra pickers cannot create storage positions or repair the interface. Identify the specific resource or control needed for each constraint and the evidence that would close it.

Prepare a five-day readiness plan with owners and gates. Include customer forecast confirmation, accepted overflow arrangements, staffing and training, corrected unit conversion, duplicate-message retest, opening-stock reconciliation and a launch decision. A deadline should be assigned to each action, but a critical failed test must remain visible.

Draft a short customer communication explaining the service implications and the decisions needed. Avoid presenting a technical defect in unexplained system jargon; explain that the current interface can record the wrong quantity or deduct dispatch twice.

For the improvement review, assume the launch is postponed and the defects are corrected. The first week's order accuracy is still below target. Identify the additional data needed before blaming the earlier interface problem. Segment errors by type, product, shift and process and compare the actual evidence.

The workshop tests whether capacity planning and system implementation are managed together. A warehouse can have enough people and still fail because the data or storage plan is wrong.

Chapter 24 recap

Implementation brings together design, data, systems and people. Test complete business outcomes, use explicit launch gates and measure performance with stable definitions before deciding what to improve.

Review questions

Answers and marking guidance • page 239

1. Why is a software demonstration insufficient for launch?
2. What should be defined for each interface transaction?
3. Why is master data an operational control?
4. What makes a duplicate-message test meaningful?
5. Which evidence closes a defect?
6. What makes a fallback credible?
7. Why should stabilisation precede broad optimisation?
8. How do line accuracy and order accuracy differ?
9. Why does correlation with a recent change not prove cause?
10. What should remain in the implementation reference file?

Applied exercises

Exercise 24A Calculate accuracy. A period contains 1,500 orders and 9,000 lines. Sixty erroneous lines affect 45 orders. Calculate line and order accuracy. Explain which measure better shows the proportion of customers receiving an error-free order in this dataset.

Exercise 24B Make a launch decision. Training and normal-order tests are complete, but duplicate-message handling and quality-hold release have failed. Write a go/no-go recommendation, the evidence required to change it and a short stakeholder update. Do not assume a calendar deadline overrides unresolved critical defects.

Part 7 Project logistics

Project cargo must arrive in a sequence that the site can use. These chapters connect reliable cargo data with engineering review, route constraints, procurement, execution and change control. Coordination and technical approval remain distinct responsibilities.

Chapters 25–28

Chapter 25 Project cargo and feasibility

Chapter 26 Route surveys engineering and permits

Chapter 27 Project execution and procurement

Chapter 28 Project budgets risk and change control

Chapter 25 Project cargo and feasibility

The machine arrives before the factory is ready

Arcwell's separate factory-expansion project includes a large press module, a utilities skid and a control assembly. The procurement team celebrates an early shipping date. The site team then reports that the foundation has not been released for installation and the access road is still under construction.

Early arrival is not automatically good performance. Project logistics serves an installation sequence with physical, engineering and commercial dependencies. The forwarding team must understand the project well enough to identify those dependencies and obtain decisions from the right specialists.

What you should be able to do

Define a project-cargo feasibility brief; distinguish transport dimensions from equipment descriptions; identify handling and sequencing constraints; and separate preliminary planning from approved engineering.

25.1 Identify what makes the movement a project

Project logistics often involves unusual size or mass, specialised handling, multiple suppliers, strict installation sequences or a one-off site requirement. A shipment does not need to be exceptionally heavy to become critical to a project.

An inexpensive control component can delay commissioning if it arrives after the installation team. A large module can block the laydown area if it arrives before its foundation is ready. The logistics objective is the right equipment in the right usable sequence, with a controlled execution method.

The recurring expansion case is separate from Arcwell's earlier two-crate import exercise. Its fictional cargo consists of M1, a 48-tonne press module; M2, a 12-tonne utilities skid; and M3, a 6-tonne control assembly. Exact engineering and routing are deliberately left to authorised specialists.



Photograph 25.1 Low-loader trailers at an industry exhibition in Hanover, 2014. The display illustrates specialist equipment; it is not an approved transport configuration for the teaching case. Credit: Spielvogel / Wikimedia Commons, CC0 1.0; unchanged apart from display scaling.

25.2 Obtain a reliable cargo register

The register should identify each item, supplier, readiness date, final transport configuration, dimensions, gross mass, centre-of-gravity information where relevant, support and lifting information, packing, preservation requirements and document status.

Distinguish equipment operating dimensions from the packed transport envelope. Transport frames, protective covers, skids and projections can materially change the movement.

Worked example 25.1 A changing envelope. M1's equipment drawing shows 5.8 × 2.8 × 3.2 m. The final transport arrangement is 6.2 × 3.1 × 3.6 m. Rectangular envelope volume rises from 51.968 m³ to 69.192 m³, an increase of about 33.14%. This does not directly determine a freight rate, but it can change vessel, terminal, road and permit feasibility. The final configuration must control the plan.

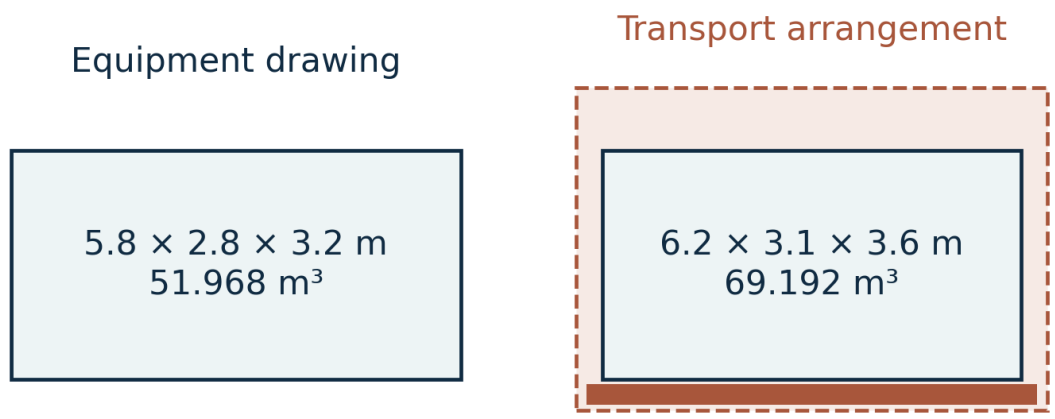


Figure 25.1 Equipment dimensions and the transport envelope are different planning records. Projections, frame and preservation arrangements must be included.

25.3 Define the physical interfaces

Identify where the cargo changes custody or support: factory loading, road movement, export terminal, vessel loading, discharge, inland transport, temporary storage and final placement. Each interface needs a suitable method and a responsible competent party.

A forwarder can coordinate engineering inputs without claiming engineering approval. Request the relevant drawings, method statements, calculations, permits and acceptance evidence. Record their status and the conditions under which they remain valid.

Do not use a total weight and a crane's headline capacity to approve a lift. Radius, configuration, ground conditions, load geometry, accessories and other factors can control suitability. UK HSE guidance illustrates the need for competent planning and appropriate supervision; the actual jurisdiction and operation determine the applicable requirements. [N-13]

25.4 Understand the installation sequence

The site may need utilities before the press and controls after mechanical installation. Translate those dependencies into required delivery windows.

Worked example 25.2 A sequence conflict. Arcwell requires M2 before M1 and M1 before M3. The supplier proposes shipping M3 first because it is ready. If the site has limited laydown space, early M3 may occupy the area needed for M2. Options include holding at origin, approved off-site storage or changing the shipping sequence. The project team should compare the consequences before accepting the early shipment.

The cargo register should include the required-on-site date and the earliest acceptable arrival, not just the latest deadline. Both can matter.

25.5 Build a preliminary route and method study

A feasibility study considers origin access, possible ports and vessels, handling capability, inland route constraints, permits, site access and the installation interface. It identifies what is known, what is assumed and what needs a specialist decision.

The study should not quietly turn a desktop route into an approved transport route. Map information can be incomplete or outdated. Physical surveys and relevant authority or asset-owner approvals may be required.

Worked example 25.3 Two port options. Port A is 100 km from site but has an unresolved discharge-method question. Port B is 180 km away and its terminal confirms preliminary capability subject to engineering review. The shorter distance does not make A preferable. The recommendation should compare the complete accepted method, route, cost and schedule rather than rank ports by kilometres alone.

25.6 Use a feasibility gate

Before firm execution commitments, establish the cargo configuration, route and handling acceptance, permit path, site readiness, commercial scope and required approvals. Some items can remain provisional during tendering, but their consequences should be visible.

Feasibility item	Evidence needed	Status language
Cargo configuration	Current approved transport drawings and mass	Confirmed or awaiting revision
Handling	Competent method and provider acceptance	Preliminary or approved for stated conditions
Route	Survey and relevant approvals	Desktop option or accepted route
Site	Access, ground, foundation and receiving readiness	Open condition with owner and date
Commercial scope	Inclusions, exclusions and change assumptions	Budgetary or firm under stated terms

The purpose of the gate is to prevent incompatible commitments. A vessel booking, road permit and site crane plan must refer to the same cargo and execution sequence.

25.7 Write a feasibility conclusion

A strong conclusion states whether the proposed movement appears feasible, under which confirmed conditions, and what prevents a firm commitment. It names the next evidence and decision, with an owner and date.

For Arcwell: “The preliminary port and inland options remain available for assessment. Final transport-frame dimensions, route survey approval and foundation release are outstanding. A firm delivery commitment should follow confirmation of those conditions.”

This is more useful than either an unsupported “no problem” or a vague refusal to plan until everything is known. Project work advances by resolving the dependencies in a deliberate order.

Chapter 25 recap

Project feasibility begins with final cargo facts and the installation requirement. Separate preliminary options from approved methods, and keep the transport, handling, route and site decisions aligned.

Review questions

Answers and marking guidance • page 239

1. Why can early arrival harm a project?
2. What can make a small component project-critical?
3. Which fields belong in a cargo register?
4. How does a transport envelope differ from operating dimensions?
5. Why must support and custody interfaces be identified?
6. What is the forwarder's role in engineering coordination?
7. Why should the earliest acceptable arrival be recorded?
8. Why is the shortest port-to-site route not always preferable?
9. What should a feasibility gate establish?
10. What makes a preliminary conclusion useful?

Applied exercises

Exercise 25A Compare envelopes. A machine's operating dimensions are 4.0 × 2.0 × 2.5 m. Its packed transport dimensions are 4.5 × 2.4 × 2.8 m. Calculate both rectangular volumes and the percentage increase. List five decisions that may need review; do not treat the volume calculation as approval.

Exercise 25B Prepare a brief. A customer requests movement of a “50-tonne transformer” to an inland site. Draft a feasibility information request covering cargo, handling, route, permits, preservation, site and installation sequence. Assign likely evidence owners.

Chapter 26 Route surveys engineering and permits

The route on the screen

A map shows a continuous road from port to site. The project team assumes the route is available. A specialist survey later identifies a restricted structure, an unsuitable turning area and an overhead interface requiring coordination.

A road drawn on a map is not a route approval for a particular load. Project feasibility depends on the transported configuration, vehicle arrangement, infrastructure and the conditions imposed by relevant authorities and asset owners.

What you should be able to do

Explain the purpose and limits of route surveys; identify engineering and permit dependencies; maintain a constraint register; and recognise when a changed cargo or route invalidates earlier assumptions.

26.1 Define the survey scope

The survey should relate to a specific cargo and transport arrangement. Relevant information can include overall transported dimensions, mass and distribution, vehicle configuration, clearances, turning requirements, structures, gradients, surfaces, utilities, traffic controls and access to temporary areas.

The competent survey and engineering teams determine the methods and required assessments. The forwarding coordinator ensures they receive current inputs and that their findings reach the execution plan.

A survey report should identify its date, route, assumptions, observed conditions, limitations, unresolved items and required actions. Conditions may change after the survey, so establish how the route will be revalidated before execution.

26.2 Keep the transported configuration explicit

The cargo's own height is not the total transported height. Support frames, trailer deck and other components can change the envelope. Similarly, total load mass and its distribution affect the vehicle and infrastructure assessment.

Worked example 26.1 A configuration change. The approved preliminary study assumed a 3.6 m cargo height and a particular transport arrangement. A preservation frame adds 0.25 m to the cargo envelope. The coordinator flags the change to the transport and engineering teams and holds reliance on the old clearance assessment. Subtracting the addition from an estimated clearance is not enough to approve the route.

The same principle applies to a changed centre of gravity or support point. A small dimensional change can have a large consequence at a constrained interface.

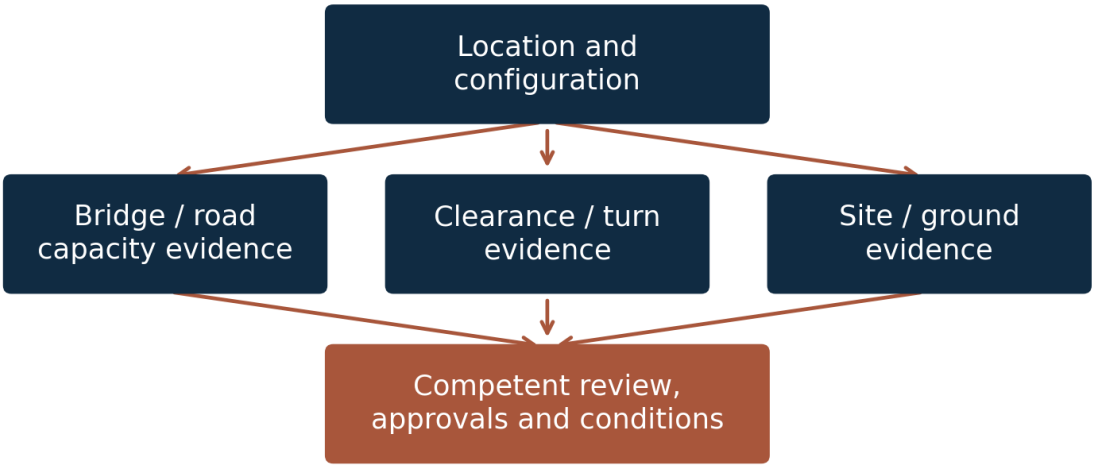


Figure 26.1 A route constraint register connects each location with evidence, an owner and an approval condition. This is a planning schematic, not a surveyed route.

26.3 Distinguish different approvals

A road movement permit, a structural assessment, a utility arrangement and a lifting approval can address different risks. One does not automatically replace the others.

The applicable authorities and processes vary by jurisdiction. Establish who applies, what information is required, the validity period, operating conditions and how changes are handled. Do not infer a universal permit threshold from another country's practice.

Worked example 26.2 A permit with conditions. A fictional permit is issued for the stated route and vehicle configuration during an agreed time window. The haulier proposes another vehicle after a breakdown. The project team must have the responsible parties assess the change and obtain any required amended acceptance. The original permit is not treated as a transferable approval for any vehicle carrying the same cargo.

26.4 Coordinate lifting and ground information

The lift planner needs reliable load information and site conditions. The ground or supporting structure needs assessment by appropriate competent parties. The equipment provider's selected configuration and operating conditions must align with that assessment.

UK HSE guidance describes lifting operations as needing competent planning, suitable supervision and safe execution. Its detailed guidance distinguishes simple routine work from complex operations requiring more extensive planning. These are UK references used to illustrate the principle of competence and proportional planning, not a universal engineering checklist. [N-13]

The forwarding team should not calculate a safe lift from a textbook example. Its practical contribution is to obtain the approved method, verify that the current plan matches its stated assumptions and ensure that changes reach the competent decision maker.

26.5 Manage constraints as actions

Worked example 26.3 A route register. The survey identifies three unresolved interfaces: bridge assessment pending with the infrastructure reviewer; a temporary turning-area arrangement pending with the landowner; and site access completion pending with the construction team. The coordinator records the evidence needed, owner, due date and consequence for the movement date. “Route issues” is too vague to manage.

Constraint	Required decision	Evidence of closure
Structure on route	Relevant assessment and acceptance	Approved record for the stated configuration
Turning or staging area	Permission and suitable arrangement	Written acceptance and confirmed availability
Site access	Construction and receiving readiness	Authorised site release for the planned movement
Utility interface	Relevant asset-owner arrangement	Confirmed conditions and responsible team

A closed action needs evidence. A phone call saying “should be fine” is not equivalent to the required approval.

26.6 Protect the validity of the plan

Create a change trigger list: cargo dimensions or mass, transport configuration, route, handling equipment, ground conditions, weather limits, access arrangements and execution date. A change can require reassessment even when the commercial scope appears unchanged.

Do not assume a previous successful movement proves the next one is acceptable. The load, equipment and conditions may differ. Previous experience is useful evidence, but the current competent review must establish its relevance.

26.7 Hold a coordinated readiness review

Before mobilisation, confirm that required approvals exist, conditions are understood, resources are available and responsibilities are assigned. The review should include the parties who control the actual constraints.

An unresolved technical condition should be visible to the commercial team. Otherwise a delivery promise may be made after the engineering team has already identified a reason to stop.

If a condition changes during execution, follow the agreed stop and escalation process. A logistics coordinator should not improvise a route or handling method to recover the schedule. Preserve the facts, protect people and cargo, and obtain the authorised revised plan.

Chapter 26 recap

Surveys and approvals are specific to the cargo, equipment, route and conditions assessed. Maintain their validity through change control, clear ownership and evidence-based readiness decisions.

Review questions

Answers and marking guidance • page 240

1. Why does a map not establish route suitability?
2. Which configuration should a survey assess?
3. Why can cargo height differ from transported height?
4. How can different approvals address different risks?
5. Why should permit conditions remain visible?
6. Who should approve lifting and ground suitability?
7. What makes a constraint register actionable?
8. Which changes can trigger reassessment?
9. Why is past success insufficient by itself?
10. What should happen when an execution condition changes?

Applied exercises

Exercise 26A Audit the file. A route study uses an old drawing, a road permit names a different vehicle, the site ground report is missing and the customer has announced a delivery date. Prepare a readiness note with four open decisions, owners and consequences.

Exercise 26B Assess a change request. Protective packing increases the transport width by 0.20 m after preliminary route acceptance. Write the coordination steps needed before proceeding. Do not calculate or declare a safe clearance.

Chapter 27 Project execution and procurement

Three suppliers and one installation window

Arcwell buys M1, M2 and M3 from different suppliers. Each supplier offers its own ready date. The site can receive only two major units into the laydown area, and the utilities skid must be available before the press installation.

The logistics plan must join supplier readiness, shipping capacity, specialist transport, site resources and the installation sequence. Buying each leg independently at the lowest price can produce an execution plan that does not fit together.

What you should be able to do

Build a project milestone plan; procure comparable service scopes; identify critical dependencies and resource interfaces; and control execution through documented readiness and handovers.

27.1 Build the work breakdown

Separate the project into manageable work packages: origin preparation, inland transport, export handling, ocean movement, destination handling, inland delivery, temporary storage and site handover. Add engineering, permits, surveys, preservation and management where required.

For each package, state the output and the interfaces with other packages. A contract for “delivery to site” should identify whether unloading, placement, preservation and installation support are included.

The work breakdown helps identify omissions. Insurance arrangements, mobilisation, escorts where required, temporary works, standby and demobilisation can be material even when they are not the main freight line.

27.2 Procure against a common basis

Give bidders the same current cargo register, route assumptions, scope boundaries, schedule and required evidence. Ask them to state exclusions and dependencies.

Worked example 27.1 Two offers that are not yet comparable. Bid A is USD 92,000 and includes port handling, inland movement and site unloading. Bid B is USD 84,000 but excludes unloading estimated at USD 11,000 and a confirmed permit-service fee of USD 2,000. B's comparable total is USD 97,000. A is USD 5,000 lower under those assumptions, subject to equivalent technical acceptance and terms.

A low price with an unresolved technical method is not a firm execution alternative. Evaluate capability, proposed method, resources, evidence, interfaces, financial terms and price together.

27.3 Schedule the dependencies

Worked example 27.2 A simple project network. Final drawings take three teaching days. Route review then takes five days; permit preparation and approval take four further days. Separately, packing takes six days after drawings. Transport can start only after both paths finish. The route-and-permit path takes 3 + 5 + 4 = 12 days; the drawings-and-packing path takes 3 + 6 = 9 days. The earliest start is Day 12 on this simplified elapsed-time basis, with three days of float on the packing path.

This arithmetic assumes the tasks are sequential as stated and the durations are accepted planning estimates. Real calendars, authority response times and resource availability require a more detailed schedule.

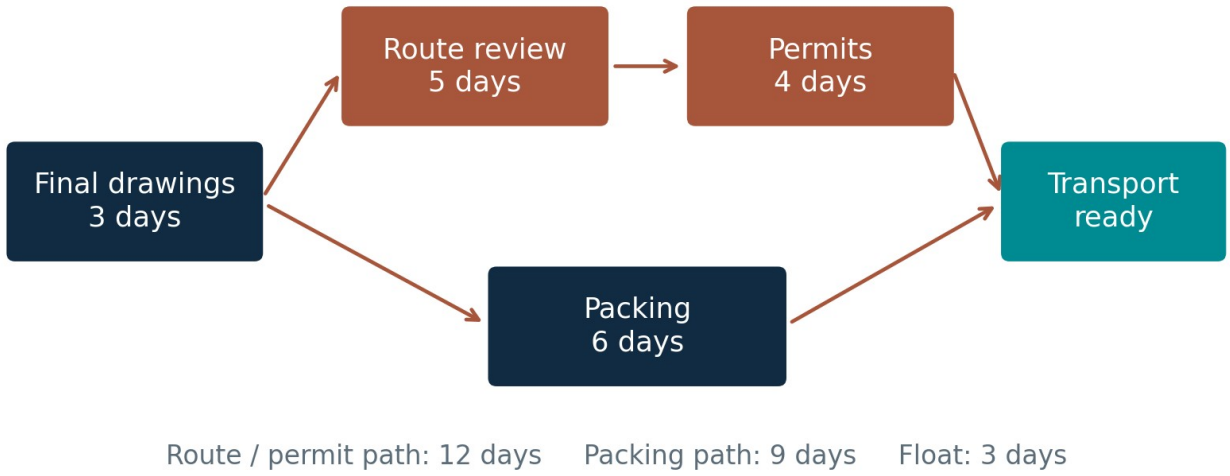


Figure 27.1 Two prerequisite paths converge before transport. The longer stated path controls the earliest start in the teaching network.

27.4 Coordinate vessel and terminal capability

The selected vessel arrangement and terminals must accept the cargo and handling method. Establish loading and discharge responsibilities, equipment, working conditions, sequence and the evidence required before mobilisation.

For specialised or charter arrangements, commercial terms can allocate time and cost differently from ordinary liner services. Obtain qualified chartering and legal advice where needed. Do not apply a container tariff concept automatically to a charter-party time calculation.

The forwarder should understand which event triggers readiness, waiting or additional cost under the agreed contract, and ensure the site and supplier plans support it.

27.5 Deliver in the installation sequence

Worked example 27.3 Limited laydown. The site accepts at most two major units. M2 must be installed before M1, and M3 follows M1. If M1 and M3 arrive first, both positions are occupied and M2 cannot enter without an additional move or storage arrangement. A feasible sequence is M2 first, then M1 after or alongside the agreed M2 activity, with M3 timed to released capacity. The exact plan depends on the site's accepted space and installation schedule.

The additional handling created by a poor sequence can add cost, damage exposure and delay. Ask the installation team to confirm the sequence and the conditions that release each space.

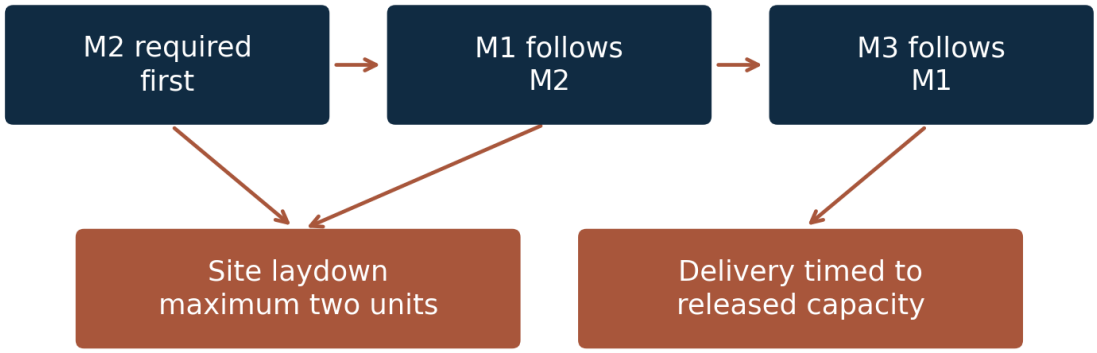


Figure 27.2 Arrival order must support installation and laydown capacity. Early delivery of the wrong unit can block the next required activity.

27.6 Use readiness gates before mobilisation

Confirm cargo readiness, current documents, approvals, transport resources, terminal arrangements, site access, handling capability and emergency coordination. Record who authorises the next stage.

Mobilisation can be expensive. A crane or specialist vehicle should not be sent merely because a date appears in a schedule if the critical prerequisites remain unconfirmed.

Worked example 27.4 A missing foundation release. All transport resources are available, but the site has not released M1's foundation. The project team compares holding at origin, approved temporary storage and revised mobilisation. It obtains the site owner's expected decision date and the cost of each option. The transport coordinator does not certify the foundation or unload into an unapproved area to preserve an arrival KPI.

27.7 Control execution communication

Use one current milestone plan and one change register. Define the regular update rhythm and the events requiring immediate escalation. The team needs to know what changed, what it affects and which decision is required.

At each handover, record cargo identity, count, observed condition, custody and the relevant completion evidence. Preserve technical and commercial records together so that a later dispute can be understood.

Close work packages against their agreed deliverables. A supplier invoice may arrive before the project has confirmed completion; finance and operations should reconcile the status rather than assume one proves the other.

Chapter 27 recap

Project execution joins work packages and dependencies. Procure against a common scope, align arrival with installation, and mobilise resources only when the required conditions are confirmed.

Review questions

Answers and marking guidance • page 240

1. Why should project work be divided into packages?
2. What belongs in a common bidder information pack?
3. Why can the lowest headline bid be more expensive?
4. What controls the earliest start in a dependency network?
5. What does float mean in the teaching example?
6. Why should charter arrangements receive specialist review?
7. How can arrival sequence block a laydown area?
8. Which conditions should precede mobilisation?
9. What should a project update explain?
10. How should work-package completion be evidenced?

Applied exercises

Exercise 27A Compare offers. Offer A is USD 75,000 including unloading. Offer B is USD 69,000 excluding unloading USD 8,500 and survey USD 2,000, both required. Calculate comparable totals and the difference. List four non-price evaluation items.

Exercise 27B Find the controlling path. Drawings take four days. Route review then takes six days and permits three more. Packing takes seven days after drawings. Transport waits for both paths. Calculate the earliest start and packing-path float under the stated sequential assumptions.

Chapter 28 Project budgets risk and change control

The delivery sequence changes

Two weeks before arrival, Arcwell changes the installation sequence. The transport contract still reflects the original order, a storage reservation must be extended and the specialist handling team may need to remobilise.

The customer has changed one sentence in the project plan. Several cost and time consequences follow. Change control makes those consequences visible before they become an argument after execution.

What you should be able to do

Build a project budget with explicit assumptions; distinguish contingency from an undisclosed allowance; calculate delay and change scenarios; and maintain an auditable approval record.

28.1 Separate the budget components

Identify confirmed commitments, estimates, allowances and unresolved scope. A budget should show which items are firm under stated conditions and which require further evidence.

Worked example 28.1 Arcwell's teaching budget. Ocean movement is USD 80,000; port services USD 25,000; inland transport USD 45,000; engineering and surveys USD 12,000; handling USD 20,000; storage USD 8,000; insurance arrangement USD 5,000; and project management USD 10,000. Base total is USD 205,000.

For this classroom model, the customer approves a 10% contingency on the entire base: USD 20,500. Total authorised planning budget is USD 225,500. The contingency basis is explicit. It does not mean every supplier receives an automatic 10% price increase or that every risk is covered.

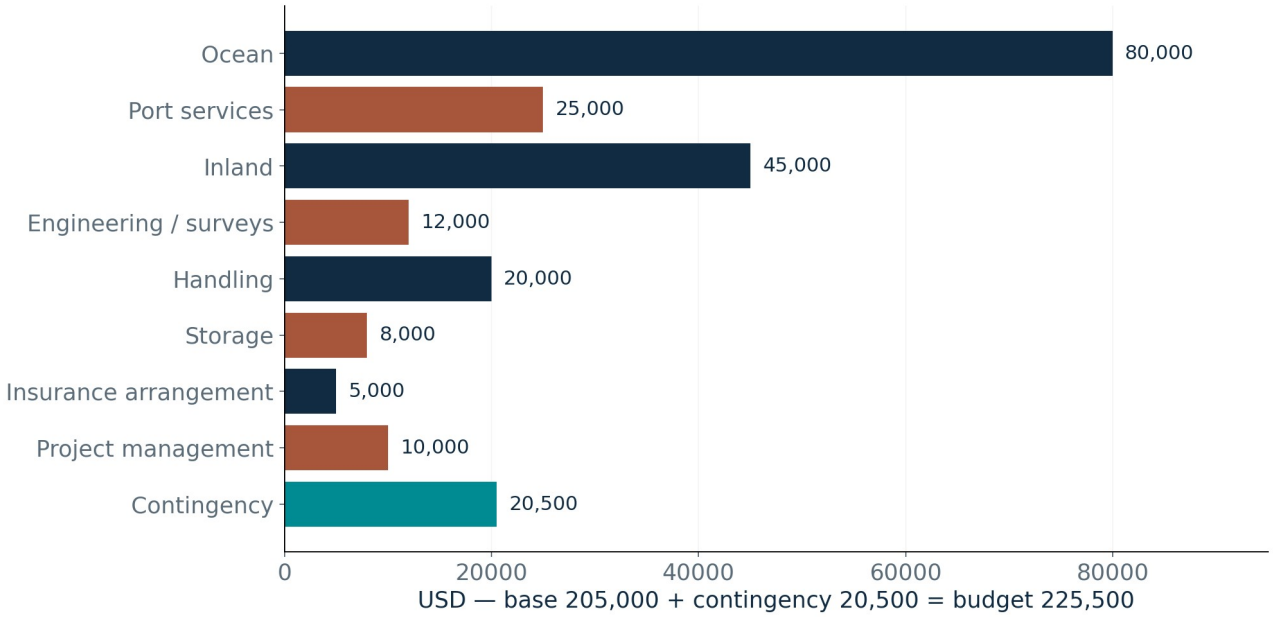


Figure 28.1 The teaching project budget separates base categories and contingency. A visible allowance supports control; it does not replace scope definition.

28.2 Use a risk register to support decisions

Record the event, cause or condition, consequence, owner, response, trigger and residual uncertainty. A risk description such as “delay” is too broad. “Foundation release may miss the vessel arrival, requiring storage and handling changes” is actionable.

Likelihood and impact scores can help prioritise discussion, but they should not imply scientific precision when the evidence is weak. Keep mandatory safety and legal requirements outside a simplistic cost-benefit tradeoff.

Worked example 28.2 Expected cost and exposure. A fictional commercial risk has a defensible estimated 30% probability of causing USD 12,000 additional cost. Expected cost is 0.30 × 12,000 = USD 3,600. The possible event cost remains USD 12,000. Reserving USD 3,600 does not guarantee enough cash if the event occurs. The customer must decide how to manage the exposure and budget.

28.3 Calculate delay scenarios by resource

Different resources may charge differently: storage, specialist vehicle standby, handling equipment, labour, remobilisation or cancelled reservations. Read the applicable terms and avoid applying one daily rate to the whole project.

Worked example 28.3 Three days of site delay. Under fictional agreed rates, storage costs USD 1,500 per day and a handling team on standby costs USD 2,400 per day. Three days cost 3 × (1,500 + 2,400) = USD 11,700. An alternative demobilises the handling team and later remobilises it for USD 6,800, while the same storage cost remains USD 4,500. Total alternative cost is USD 11,300, a USD 400 saving, provided remobilisation is feasible and does not create another delay.

The cheaper arithmetic is not enough if the team will be unavailable when the site is ready. Record resource availability and schedule consequences beside the cost.

28.4 Write the change request before execution

A change request should identify the original scope, requested change, reason, affected cargo or work package, cost and time effect, technical implications, alternatives, approval authority and decision deadline.

Change field	Teaching entry
Original plan	M2 then M1 then M3 within the agreed site sequence
Requested change	Hold M1 for three additional days
Reason	Foundation release delayed
Cost effect	Storage and handling options calculated separately
Technical review	Preservation and handling arrangements reconfirmed
Decision needed	Approved option and revised mobilisation instruction
Record	Date, approver, revised plan and affected providers

A change can be necessary and still require approval. Conversely, approval of a budget increase does not approve a technical method. Keep those decision rights separate.

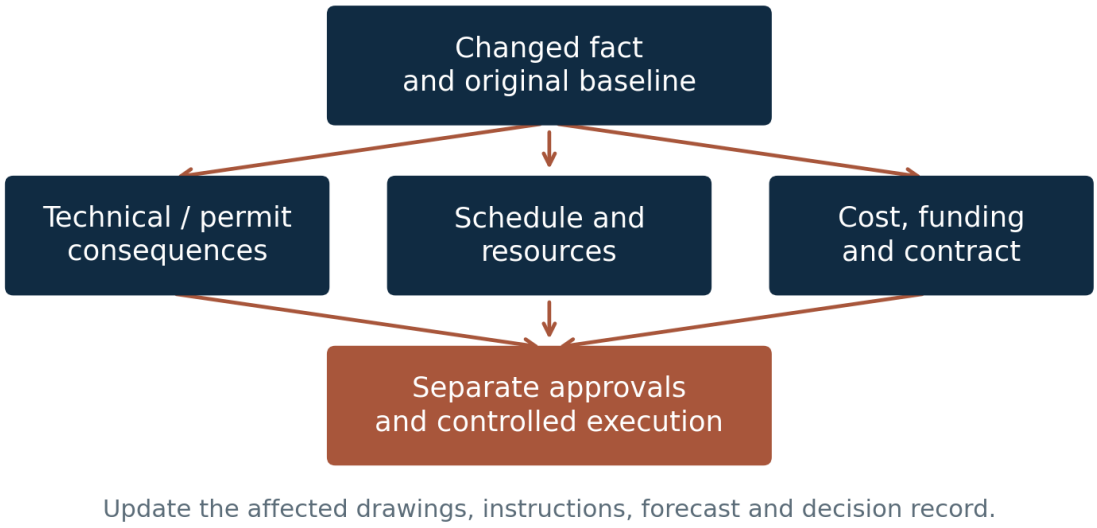


Figure 28.2 A change is assessed across scope, technical conditions, schedule and cost before authorised execution.

28.5 Control versions and commitments

Maintain a current approved plan and preserve superseded versions. Identify which suppliers have accepted the revision. A customer-approved change may still require a provider's confirmation of resources or terms.

Do not overwrite the baseline budget. Record approved changes separately so that the final variance can be explained. Otherwise the project appears to have met a budget that was repeatedly rewritten.

Worked example 28.4 Forecast at completion. Base budget is USD 205,000. Approved changes add USD 9,000. Current forecast for the remaining original work is USD 3,000 above its base estimate.

Forecast at completion is 205,000 + 9,000 + 3,000 = USD 217,000. Against the USD 225,500 authorised budget including contingency, remaining headroom is USD 8,500. This does not mean unapproved changes may automatically consume the headroom.

28.6 Reconcile costs as the project progresses

Track commitments, accrued work, invoiced amounts, paid amounts and remaining forecast. These are different states. A low invoice total early in execution can conceal substantial committed cost.

For each variance, identify whether it reflects price, quantity, scope, timing, exchange rate or an error. Preserve the supporting instruction and evidence. Finance needs a credible forecast, not just the invoices received to date.

28.7 Close with lessons that can change practice

At completion, reconcile cargo handover, supplier deliverables, claims or exceptions, cost and change approvals. Review which assumptions proved wrong and which controls worked.

If site readiness caused most extra cost, the next project may need an earlier release gate or a different arrival strategy. If drawings changed repeatedly, improve configuration control. The aim is a specific change to future work, not a generic statement that communication should improve.

Workshop A project change meeting

The fictional Westbank Utilities project imports two modules to a site with a limited installation window. The baseline transport and handling budget is USD 180,000, with a separately approved 10% contingency. The current forecast is on budget.

Ten days before arrival, the site requests a four-day delay. Accepted temporary storage costs USD 1,100 per day. Keeping the specialist transport team on standby costs USD 2,200 per day. Demobilising and returning the team costs USD 6,000 in total, but the provider has not confirmed return availability.

At the same time, a revised preservation cover increases one module's transported height. The route and handling approvals refer to the old drawing. The customer offers immediate approval for USD 15,000 extra spending and asks the forwarder to keep the original inland movement date.

The meeting has three independent issues: site timing, resource cost and technical validity. Treating the spending approval as an answer to all three would be a serious error.

Calculate the two four-day delay options and the difference. Compare each with the approved contingency, then explain why available budget does not establish permission to proceed. Identify any further cost that remains unconfirmed, such as revised engineering or permit work.

Decision	Appropriate evidence	Owner to involve
Site readiness	Revised authorised release date and receiving arrangement	Site/project owner
Team strategy	Confirmed standby or return availability and terms	Specialist provider
Revised configuration	Current drawing and reassessment of affected approvals	Competent technical parties
Commercial change	Approved scope, amount and conditions	Authorised customer decision maker

Prepare a change request that preserves the baseline and records both the requested delay and the drawing revision. Do not combine them into a single unexplained “extra logistics” line. Show the forecast at completion under each cost option, with unresolved items separately identified.

Write the opening statement for the meeting. It should acknowledge the customer's urgency, explain the two unclosed conditions and present the next decisions. A useful statement remains constructive without implying that technical review can be purchased away.

For an extension, the specialist provider confirms return availability but only one day after the site becomes ready. Assess the additional storage day and the installation consequence before selecting the apparently cheaper option.

Close the workshop with a lessons log. Identify one earlier control that might have detected site readiness risk, one control for drawing changes and one improvement to the approval record. Each lesson should propose a concrete future action and a way to verify it.

Chapter 28 recap

Project budgets need visible assumptions, separate change records and current forecasts. Calculate resource-specific consequences, preserve the baseline and ensure commercial approval never substitutes for technical acceptance.

Review questions

Answers and marking guidance • **page 241**

1. How do commitments, estimates and allowances differ?
2. What should define the contingency basis?
3. Why does expected cost differ from possible event cost?
4. Which resources can create delay charges?
5. Why may demobilisation be cheaper but unsuitable?
6. What belongs in a change request?
7. Why should technical and commercial approvals remain separate?
8. Why preserve the baseline budget?
9. How does forecast at completion differ from invoices received?
10. What makes a project lesson actionable?

Applied exercises

Exercise 28A Build the budget. Base categories total USD 160,000. The customer approves 12% contingency on that entire base. Approved changes later add USD 8,000 and the remaining original scope is forecast USD 4,500 above base. Calculate authorised planning budget, forecast at completion and remaining headroom.

Exercise 28B Compare delay options. Four days of storage cost USD 900/day. Keeping a specialist team costs USD 1,800/day; demobilisation and remobilisation together cost USD 5,500. Calculate both totals and the saving. Identify three feasibility checks before choosing.

Part 8 Commercial management and customer service

Commercial work is part of operational quality. Comparable quotations, credible tenders, controlled credit, complete cost records and useful customer updates protect both the service and the business supporting it.

Chapters 29–32

Chapter 29 Procurement rates and quotation building

Chapter 30 Sales tenders and customer solutions

Chapter 31 Margins credit cash flow and shipment closure

Chapter 32 Customer communication and performance

Chapter 29 Procurement rates and quotation building

Three offers and three different promises

A customer sends the same shipment to three providers and receives three prices. One is in dollars, one combines dollars and euros, and one excludes destination handling. The cheapest headline figure is easy to identify. The cheapest acceptable service is not.

Quotation work joins operational understanding with commercial discipline. The forwarder must know what is being bought before deciding what to sell, and must make uncertainty visible rather than bury it in an apparently precise total.

What you should be able to do

Prepare a useful rate request; normalise scope, currencies and charge bases; identify exclusions and validity conditions; and produce a transparent customer quotation with a controlled revision process.

29.1 Send a rate request that supports an answer

Include cargo description, final or clearly provisional measurements, quantity, route, collection and delivery requirements, readiness, deadline, handling and care needs, service scope and relevant trade terms. State whether the request is a budget estimate or a live booking enquiry.

Ask providers to identify included and excluded services, charging units, minimums, validity, acceptance conditions and cancellation or amendment terms. A vague rate request invites offers built on different assumptions.

Worked example 29.1 A missing delivery condition. The buyer asks for “door delivery”, but the site requires a fixed appointment and specialised unloading. The procurement team adds those facts before comparing rates. Otherwise a standard delivery offer and a specialist service would appear to be alternatives when they are different products.

29.2 Use a common comparison boundary

Create a row for each required cost stage and a column for each offer. Mark confirmed, estimated and excluded items distinctly. An exclusion is not zero.

Cost stage	Offer A in USD	Offer B converted to USD	Offer C in USD
Origin	120	185	170
Main carriage	1,200	1,045	990
Destination	85	231	250 estimated
Delivery	300	260	300
Total	1,705	1,721	1,710 provisional

Worked example 29.2 Normalise currencies. Offer B's main carriage is EUR 950 and destination charge EUR 210. The classroom comparison uses an explicitly assumed USD 1.10 per EUR. Converted amounts are USD 1,045 and USD 231. With the two dollar charges, B totals USD 1,721. This is not a live exchange rate or a promise that the same conversion will apply when invoiced.

Offer C's total cannot be presented as equally firm because USD 250 is an estimate. If the confirmed destination charge becomes USD 330, its total becomes USD 1,790. A small apparent price advantage can disappear when a missing item is resolved.

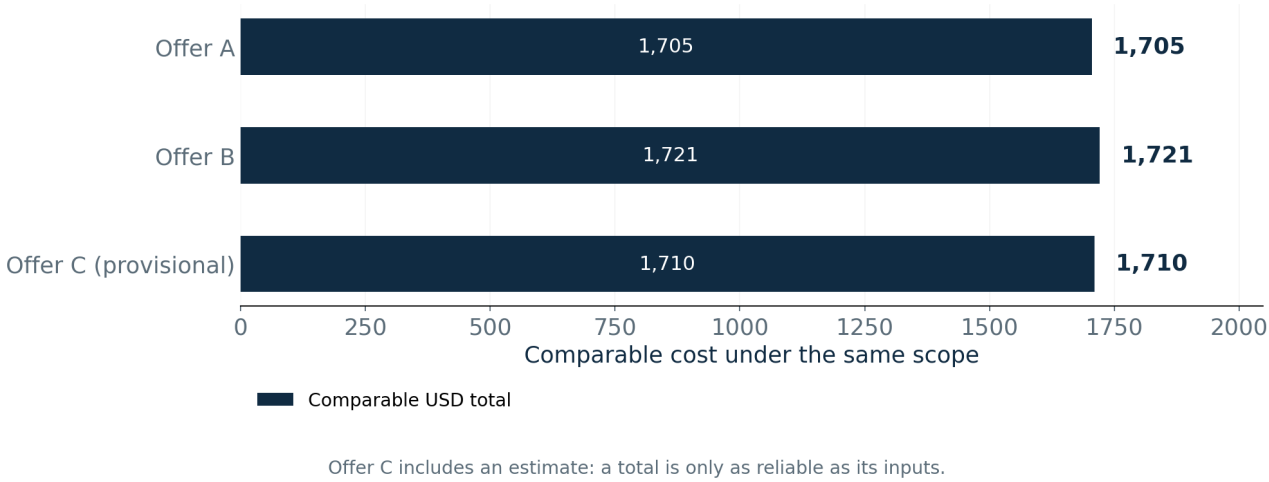


Figure 29.1 A quotation comparison preserves both the cost boundary and the confidence of each input. An estimated charge remains visible in the total.

29.3 Keep the charge basis beside the amount

Record whether a charge is per kilogram, revenue unit, container, shipment, document, stop, day or activity. Check minimums, rounding and the quantity to which it applies.

A fuel or other percentage surcharge needs a defined base. Ten percent of main freight is different from ten percent of the whole quotation.

Worked example 29.3 A percentage base. Main freight is USD 1,200, origin USD 120, destination USD 85 and delivery USD 300. A fictional 10% surcharge applies only to main freight. It adds USD 120, making the total USD 1,825. Applying 10% to the original USD 1,705 total would add USD 170.50 and overstate the stated charge by USD 50.50.

29.4 Compare service and terms beside cost

Check delivery plan, capacity and equipment acceptance, cutoffs, care requirements, release arrangements and provider capability. Also review payment terms, validity and the treatment of changes.

A quotation valid until Friday may refer to booking date, departure date or another defined event. Ask which. A rate subject to space does not establish a confirmed reservation.

Record the currency exposure and any agreed conversion rule. A seller quoting a fixed local-currency price while buying a foreign-currency service accepts a different risk from one quoting subject to a transparent exchange-rate adjustment. The appropriate policy belongs to the business and customer agreement.

29.5 Build the customer quotation

State the parties, shipment reference, scope, cargo assumptions, service description, price and units, inclusions, exclusions, validity, acceptance conditions, payment terms and approval process. Make the operational promise consistent with the supplier arrangement.

Do not claim a guaranteed delivery merely because a schedule exists. If a guarantee is actually offered, its scope and remedies require the relevant terms.

The quotation should identify how remeasurement, waiting, storage or changed requirements will be handled. A clear explanation protects both parties from treating a conditional estimate as a fixed price for unlimited scope.

29.6 Use margin as a deliberate decision

If total accepted supplier cost is USD 1,705 and the target gross margin is 18%, selling price is 1,705 ÷ 0.82 = USD 2,079.27, rounded to cents. The model assumes that all relevant direct cost is included and that the margin base is defined.

Commercial judgement may lead to another price, but the decision should be visible. A discount should show its profit effect rather than be described only as a percentage concession.

For example, reducing USD 2,079.27 by USD 100 leaves revenue USD 1,979.27 and gross profit USD 274.27. Margin is about 13.86%, not 18%. Chapter 31 develops this relationship further.

29.7 Control revisions and acceptance

Give each quotation a reference and version. Record what changed and whether the previous offer is superseded. Obtain customer acceptance through the agreed process and reconcile it with the provider booking.

A customer accepting an expired quote may require a fresh availability and rate check. An internal salesperson cannot create supplier capacity by marking an old quotation accepted.

Keep the final quotation in the job file with the relevant instruction, supplier confirmation and approved amendments. This makes later invoice reconciliation possible.

Chapter 29 recap

A defensible quotation compares the same service using explicit units, currencies and conditions. Preserve estimates as estimates, calculate margin from complete cost and control revisions through acceptance.

Review questions

Answers and marking guidance • page 241

1. What distinguishes a useful rate request from a vague enquiry?
2. Why is an excluded charge not zero?
3. What should be recorded beside a currency conversion?
4. Why must a percentage surcharge have a defined base?
5. What can quotation validity refer to?

6. Why does a rate subject to space not confirm capacity?

7. Which scope assumptions belong in the customer quote?

8. How can a discount change margin disproportionately?

9. Why should quotation versions be retained?

10. What should happen when an expired quote is accepted?

Applied exercises

Exercise 29A Normalise offers. A costs USD 980 main carriage, USD 160 origin, USD 220 destination and USD 140 delivery. B costs EUR 850 main carriage, USD 140 origin, EUR 180 destination and USD 150 delivery. Use a fictional USD 1.08/EUR. Calculate both totals and the difference, assuming equivalent accepted scope.

Exercise 29B Prepare the quote. Supplier cost is USD 1,500. Target gross margin is 20%. Calculate the selling price, then draft six essential quotation conditions for cargo whose final dimensions are not yet confirmed. Explain how the provisional measurements should be treated.

Chapter 30 Sales tenders and customer solutions

The tender that rewards the wrong answer

Nordhaven sends a tender asking for the lowest freight rate on several lanes. During discussion, the forwarder learns that the real problem is repeated late supplier readiness, fragmented booking information and poor visibility of stock needed for store launches.

A rate-only response can win the wrong business: a promise the provider cannot execute profitably and a service that does not solve the customer's problem. Professional sales starts by understanding the operating requirement and deciding whether the business is a good fit.

What you should be able to do

Conduct discovery; qualify an opportunity; turn requirements into a service design; compare proposals through a transparent evaluation; and make commitments that operations can deliver.

30.1 Discover the problem behind the request

Ask about products, suppliers, lanes, volumes, seasonality, order frequency, deadlines, current failures and the consequences of those failures. Identify the decision makers, users and people who will approve operational changes.

Listen for conflicts. Procurement may prioritise price, retail operations may prioritise launch availability and finance may require predictable cash exposure. A useful solution makes those tradeoffs explicit.

Worked example 30.1 A better discovery question. Instead of asking only “How many containers do you ship?”, ask “Which shipments create the most disruption when they arrive late, and what happens next?” The answer may reveal a small urgent subset that needs a different service while the rest can move economically.

Do not promise to solve a problem before confirming its cause. A visibility dashboard cannot correct a supplier's production delay, although it can make the delay visible earlier and support a response.

30.2 Qualify the opportunity honestly

Assess service capability, geographical fit, commodity requirements, credit, capacity, implementation resources, expected margin and the customer's willingness to share the information needed.

An attractive revenue figure can conceal unsuitable payment terms or a service commitment beyond the provider's control. Qualification protects the customer as well as the provider by identifying those gaps before launch.

Record a decision to bid, clarify, partner or decline. A bid/no-bid process should use evidence and accountable judgement rather than automatically pursue every enquiry.

30.3 Translate needs into a solution

For Nordhaven, a solution might combine supplier booking discipline, milestone ownership, a planned ocean service, an approved urgent-air process, destination coordination and a warehouse receiving interface.

Describe how each component addresses a specific requirement. Avoid a catalogue of capabilities with no connection to the customer's work.

Worked example 30.2 A service design. The customer needs 600 launch-critical shirts on time and can accept the balance later. The proposal includes an early readiness check, a decision deadline for an authorised air split and a linked document-reconciliation process. The value is the decision made before options disappear, not the mere availability of air freight.

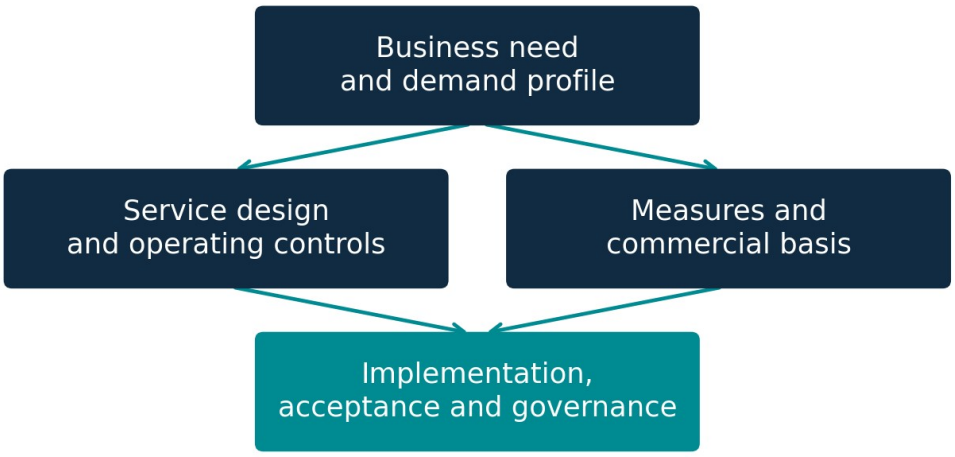


Figure 30.1 Discovery links business needs to service controls, measurable outcomes and implementation requirements.

30.4 Build a transparent tender response

Use the customer's required format where practical. State assumptions, scope, service design, operating model, implementation, performance measures, pricing and exceptions. Answer mandatory requirements directly.

A deviation should be visible. If the provider cannot offer a requested delivery guarantee, explain the alternative commitment and its measurement rather than hiding the gap in general language.

For volume pricing, state the assumed profile and what happens when it changes materially. A rate based on regular full loads should not silently cover irregular small consignments with additional handling.

30.5 Evaluate proposals with both gates and scores

Mandatory capability or compliance requirements should be treated as gates. A bidder that fails a critical requirement should not compensate merely by receiving a high price score.

Worked example 30.3 A weighted comparison. After mandatory gates pass, the customer weights service 40%, cost 30%, implementation 20% and reporting 10%. On a common 1–5 scale, Bid A scores 4, 3, 5 and

4: weighted result = 4×0.40 + 3×0.30 + 5×0.20 + 4×0.10 = 3.90. Bid B scores 3, 5, 3 and 4: result = 1.20 + 1.50 + 0.60 + 0.40 = 3.70.

The scores support discussion; they do not remove judgement. Define the scoring evidence before evaluating bids, and test whether a modest change in weights reverses the conclusion.

30.6 Explain value without inventing savings

Use the customer's baseline and a clear method. Separate avoided cost, lower purchase cost, reduced working capital, improved service and hypothetical risk reduction.

Worked example 30.4 A substantiated process benefit. The customer confirms that ten avoidable document errors each month cost an average USD 120 in rework and extra handling. A pilot reduces the observed count to four under comparable conditions. The measured monthly reduction is six errors, with an estimated cost effect of 6 × 120 = USD 720. Do not extrapolate to a full year as a guaranteed saving without checking persistence and comparability.

A proposal should identify which benefits are demonstrated, estimated or dependent on customer action. This makes the business case more credible.

30.7 Make implementation part of the sale

Agree the mobilisation plan, data requirements, operating procedures, contacts, training, tests and launch criteria. Sales should hand over the actual promises and assumptions to operations.

A customer should not discover after award that the proposed reporting requires data nobody agreed to provide. Similarly, operations should not inherit an unrecorded promise of free storage or unlimited urgent support.

Use a structured handover containing the signed scope, pricing, exceptions, customer priorities, unresolved items and approval history. Confirm that the receiving team understands it.

30.8 Develop the relationship through evidence

Regular reviews should connect performance, exceptions, improvement and future demand. Ask what has changed in the customer's business. New suppliers, products or sales channels can alter the logistics requirement.

Good selling continues after award by helping the customer make better decisions. It does not depend on overstating capability or concealing the limits of a service.

Workshop A retail tender with hidden scope

Elmbridge Retail invites bids for 1,200 annual ocean consignments and asks bidders to complete a rate sheet. Its data pack shows average volume but no seasonal profile. A discovery call reveals that 35% of annual shipments move in a ten-week peak and that 15% require fixed DC appointments.

The customer also wants supplier booking support, document checking, weekly performance reporting and an urgent-air process for selected orders. None of those activities appears as a separate line in the original rate template.

Three fictional bidders pass the stated mandatory capability gates. Their annual comparable estimates are USD 1.80 million, USD 1.72 million and USD 1.68 million, but the third excludes appointment

management and system integration. Those exclusions are estimated at USD 70,000 and USD 40,000 respectively and remain subject to confirmation.

The customer weights service design 40%, cost 30%, implementation 20% and reporting 10%. The exercise does not provide scores; the group must define what evidence would justify each score before evaluating the narrative proposals.

First, calculate average weekly shipments across a 52-week teaching year and average weekly shipments within the ten-week peak. Explain why the annual average cannot by itself size operational support. Normalise the third bidder's indicated annual cost and preserve its provisional status.

Prepare a clarification request covering scope, shipment profile, appointment requirements, data ownership, implementation, credit and measurement. Identify which information is essential for a firm offer and which can remain a stated assumption during a budgetary response.

Then design a service proposal around three customer problems: late supplier bookings, document errors and lack of early warning for launch-critical stock. For each problem, state the process, owner, customer input, measure and escalation trigger.

The proposal should include a mobilisation plan. Specify what must be tested before launch, who approves the operating procedure and how the first month will be reviewed. Do not promise a dashboard that depends on data the customer has not agreed to provide.

For a role-play, procurement asks for a 5% discount on the selected offer without changing scope. Operations says the peak support is already at its minimum feasible staffing. Finance raises concern about payment terms. Prepare a response that explains the tradeoff and explores genuine scope or process alternatives rather than making an unsupported concession.

The final submission is a two-page executive proposal plus a detailed assumptions sheet. Its quality depends on whether operations could execute the promises and finance could understand the exposure, not on the number of capabilities listed.

Chapter 30 recap

Start with the customer's operating problem, qualify the fit and design a service that can be implemented. Use transparent assumptions, measurable value and a complete sales-to-operations handover.

Review questions

Answers and marking guidance • page 242

1. Why can a rate-only tender miss the customer's problem?
2. Which stakeholders can have different priorities?
3. What should opportunity qualification assess?
4. How does a service component connect to a business need?
5. Why should mandatory gates precede weighted scoring?
6. What makes tender scoring defensible?
7. How should estimated savings be described?
8. Why is implementation part of the sale?
9. What should the operations handover contain?

10. How can an account review reveal a changed requirement?

Applied exercises

Exercise 30A Score two proposals. Weights are service 50%, cost 25%, implementation 15% and reporting 10%. A scores 4, 3, 4, 5; B scores 3, 5, 4, 3. Calculate both results. State why a failed mandatory cargo-care requirement would override the score.

Exercise 30B Draft a solution. A retailer reports late supplier bookings, repeated invoice corrections and poor visibility of launch-critical stock. Propose three connected controls, one measure for each and the customer inputs required. Avoid unsupported savings or delivery guarantees.

Chapter 31 Margins credit cash flow and shipment closure

Profit on paper and no cash in the bank

A forwarding office wins a large account at an acceptable gross margin. Suppliers require payment after 14 days, while the customer pays after 45. Volume grows quickly and the office becomes short of cash despite reporting profitable shipments.

Revenue, profit and cash describe different things. A manager needs all three, together with reliable job costing and credit control. This chapter uses simple business examples; accounting policy, tax treatment and credit decisions require the company's authorised finance process.

What you should be able to do

Calculate gross profit, margin and markup; explain timing-related cash exposure; reconcile job accruals and supplier invoices; and close shipments with a traceable commercial record.

31.1 Define the measures

Revenue is the recognised selling amount under the relevant accounting policy. Direct cost is the defined supplier and other job cost. Gross profit is revenue minus that cost. Gross margin divides gross profit by revenue. Markup divides it by cost.

Worked example 31.1 Three percentages. A job sells for USD 900 and has direct cost USD 720. Gross profit is USD 180. Margin is 180 ÷ 900 = 20%. Markup is 180 ÷ 720 = 25%. A statement that the job earns “20%” is incomplete until the denominator is named.

Taxes, duties, disbursements and agency arrangements may require different accounting treatment. Do not assume every amount passing through a forwarding invoice is revenue or margin-bearing. Use the business's applicable policy.

31.2 Understand the effect of a discount

With the same USD 720 cost, a USD 50 discount reduces revenue to USD 850 and profit to USD 130. Margin becomes 130 ÷ 850 = 15.29%. Revenue falls by 5.56%, but gross profit falls by 27.78%.

The difference explains why a seemingly small concession can materially change job economics. A manager may still approve it for a sound commercial reason, but the effect should be calculated.

If a customer asks for a lower price, explore scope or operating changes that reduce cost without undermining the required service. Do not promise a margin improvement merely by asking operations to “be more efficient” after the price is agreed.



Figure 31.1 Revenue, gross profit and cash timing answer different management questions. A profitable job can still require funding before collection.

31.3 Model the cash timing

Worked example 31.2 A funding gap. Ten jobs each require USD 800 supplier payment on Day 14 and produce USD 1,000 customer collection on Day 45. Assume all jobs share those dates and no other cash flows. Supplier cash outflow is USD 8,000, funded for 31 days before customer receipts. At a fictional annual funding rate of 12% on a 365-day basis, the simple funding cost is 8,000 × 0.12 × 31 ÷ 365 = USD 81.53.

The eventual gross profit is USD 2,000 before other costs, but the business must first fund USD 8,000. More jobs or later payment increase the exposure. A profit report alone does not show this timing.

In a continuing operation, overlapping jobs create a larger rolling balance. Finance should model the pattern rather than multiply a single-job gap blindly.

31.4 Set credit conditions before exposure grows

Establish the approved customer entity, credit limit, payment terms, invoicing requirements, dispute process and escalation. A well-known brand name does not establish which legal entity will pay.

Check whether purchase-order references, portal submission or supporting documents are required for valid invoicing. An invoice sent to the wrong channel can delay collection even when the shipment was executed correctly.

Worked example 31.3 A limit decision. A customer has USD 36,000 outstanding against an approved USD 40,000 limit. A new job would add USD 7,000 exposure under the company's stated policy, bringing the total to USD 43,000. The team must seek the authorised credit decision or an approved payment arrangement before accepting the additional exposure. Sales enthusiasm does not change the limit.

31.5 Accrue the cost when the work creates it

An accrual records an expected cost for work already incurred under the relevant accounting process before the supplier invoice is final or received. It prevents a job from appearing artificially profitable because invoices arrive late.

Worked example 31.4 A late cost. A job sells for USD 2,400. Initially recorded direct cost is USD 1,800, giving USD 600 profit. A required destination service of USD 250 was omitted. Corrected cost is USD 2,050 and profit USD 350, a 14.58% margin. The late invoice did not create the operational service; it revealed the incomplete cost record.

Retain the source of estimates and update them when better evidence arrives. An accrual should be reasonable and controlled, not a convenient number chosen to meet a target.

31.6 Reconcile supplier and customer billing

Compare supplier invoices with the accepted rate, quantity, service, dates and approved changes. Separate genuine additional work from errors or duplicates.

For customer billing, confirm the agreed price, applicable amendments, references and supporting evidence. A justified supplier cost is not automatically recoverable from the customer if the selling agreement did not provide for it.

When a dispute arises, preserve the original invoice and correspondence. Record the amount disputed, reason, evidence, owner and expected resolution. Finance decides the accounting treatment under the applicable policy.

31.7 Close the job with a complete record

Operational closure includes delivery and outstanding equipment or document obligations. Financial closure includes complete revenue and cost, approved adjustments, reconciled invoices and known disputes. A job can be operationally complete while financially open.

The closure checklist should identify missing supplier invoices, unbilled approved work, credit notes, claims, currency differences and retained evidence. Do not close unresolved obligations merely to clear a dashboard.

Analyse the variance against the quotation. Was it caused by rate, quantity, scope, waiting, currency or a mistake? This feedback improves future pricing and execution.

Chapter 31 recap

Keep revenue, gross profit and cash timing separate. Price from complete cost, assess credit before exposure grows and close the job through evidence-based financial reconciliation.

Review questions

Answers and marking guidance • page 242

1. How do gross margin and markup differ?

2. Why can a small discount sharply reduce profit?

3. Why is an invoice total not always equivalent to revenue?

4. How can profitable growth create a cash problem?

5. Which invoicing requirements can delay collection?

6. What should happen when a job exceeds a credit limit?

7. What is the purpose of a cost accrual?

8. Why is supplier cost not automatically recoverable from a customer?

9. How do operational and financial closure differ?

10. Which categories help explain a job variance?

Applied exercises

Exercise 31A Calculate profitability. Revenue is USD 1,600 and direct cost USD 1,240. Calculate gross profit, margin and markup. Then apply a USD 100 discount with unchanged cost and recalculate profit and margin.

Exercise 31B Model cash. Supplier payments total USD 15,000 on Day 10; customer receipts arrive on Day 40. Use a fictional 10% annual funding rate and a 365-day year. Calculate the gap and simple funding cost. Explain why the calculation does not measure bad-debt risk.

Chapter 32 Customer communication and performance

An update that creates more work

The customer receives: “Shipment delayed due to operational reasons. We are monitoring closely.” The message contains no current location, revised consequence, available option or next update. The customer now has to ask four more questions before deciding what to tell its own team.

Good communication reduces uncertainty enough for someone to act. It does not require a long email, but it does require a clear distinction between known facts, estimates, decisions and unanswered questions.

What you should be able to do

Write useful status and exception updates; define performance measures; calculate on-time results with transparent denominators; and conduct a service review that produces specific improvement actions.

32.1 Start with the customer's decision

Ask what the reader needs to know or do. A factory manager may need a revised delivery window to schedule technicians. A buyer may need to approve an air split. A finance team may need evidence for an additional charge.

The same event can therefore require different emphasis for different audiences. Preserve one factual record, then explain its consequence in language relevant to each reader.

Worked example 32.1 A useful delay update. “The container missed the planned onward sailing. The provider's accepted revised plan delivers to your DC on Day 44, two days after the required date. We are checking an alternative routing and a 15-carton air option for the launch assortment. Please confirm the priority carton marks by 14:00. We will send the comparable options and costs by 16:00.” The message names the event, consequence, action, decision and next update.

32.2 Label the confidence of information

Use scheduled, estimated, confirmed and actual deliberately. Identify the source and time of a material update. If a provider's estimate is unconfirmed, do not convert it into a promise by removing the qualifier.

An honest unknown is useful when paired with an owner and next step. “Release time remains unconfirmed; the appointed representative is obtaining the authority's status, with an update due at 11:00” tells the customer more than a guessed delivery time.

Avoid blame before evidence. The first communication should support the next decision; responsibility can be investigated without delaying necessary operational information.

32.3 Structure an exception record

Record the shipment, observed event, time, source, customer effect, protective action, options, decision owner, deadline and closure evidence. Keep related messages linked to the record.

Worked example 32.2 A revised estimate. At 09:00, a carrier estimates cargo availability at 14:00. At 13:00, it revises availability to 18:00. The coordinator preserves both updates and their sources, then checks whether the receiving appointment remains feasible. Replacing the original estimate with the later one would conceal the change the customer experienced.

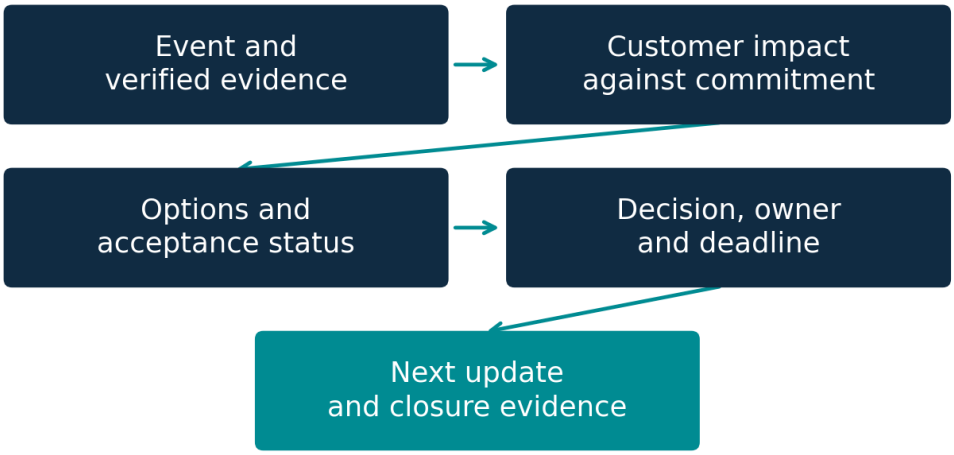


Figure 32.1 A useful update connects evidence to consequence and action. The next update has an owner and time even when the final answer is still unknown.

32.4 Define on-time performance

Specify the promised event, planned time, tolerance, eligible population, actual-event source and treatment of changes. Decide whether performance is measured against the original accepted commitment or an authorised revised commitment, and report the distinction.

Worked example 32.3 Two denominators. A month has 100 deliveries. Eighty-eight meet the original accepted deadline. Five are late following a customer-approved change requested before dispatch, and seven are late for other reasons. Original-commitment on-time performance is 88%. If the agreed service measure excludes those five changed jobs, the comparable eligible result is 88 ÷ 95 = 92.63%. Report the exclusion count and reason; do not present 92.63% as though all 100 original commitments were met.

A revised-date measure can be useful, but it should not allow poor original planning to disappear. Keep both views when they serve different decisions.

32.5 Combine time with completeness and accuracy

An on-time delivery of half the required order may not satisfy the customer. Measures such as on-time-in-full require definitions for both timing and quantity, and may also need quality or documentation criteria.

Worked example 32.4 On-time-in-full. Of 200 orders, 180 are on time and 190 are complete. The overlap meeting both conditions is 174. OTIF is 174 ÷ 200 = 87%. Multiplying 90% by 95% assumes a relationship not established by these counts and gives 85.5%, which is not the observed result.

Use order-level evidence to identify the intersection. A dashboard should not infer a combined measure from unrelated summary percentages.

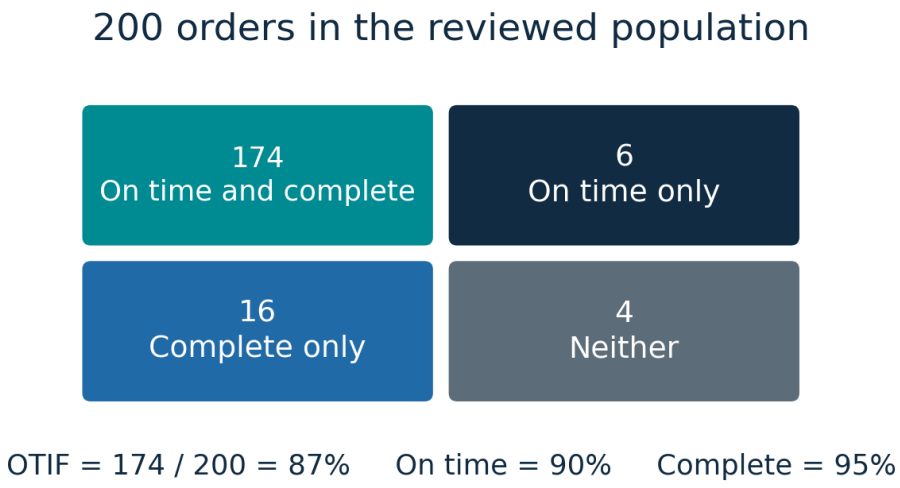


Figure 32.2 On-time and complete populations overlap. The combined result must use the orders meeting both conditions.

32.6 Review causes without manipulating the score

Classify exceptions consistently and retain evidence. Categories might include supplier readiness, documentation, transport execution, authority process, receiving constraints and data issues. The categories should support action, not merely transfer blame.

A provider may not control an external event but can still control how early it identifies and communicates it. Separate execution outcome from response performance.

Check for missing data. If actual delivery timestamps are absent for ten jobs, do not automatically count them as on time. Report data completeness and resolve the records through the agreed process.

32.7 Turn the review into improvement

Select a small number of material issues, identify causes, agree actions and define how results will be verified. A review is not complete when a slide deck has been presented.

For repeated late supplier bookings, an action could introduce a readiness check three days before cutoff, a named supplier contact and escalation when data is missing. Verify whether earlier notice increases the available recovery options.

For repeated incorrect documents, examine source ownership and version control rather than instructing staff to “be careful”. The best action changes the conditions that allowed the error.

32.8 Close the communication loop

After the decision or delivery, confirm what happened and any remaining obligation. If an estimate changed, explain the final outcome. If an action was promised, record whether it was completed.

Customers remember whether the forwarding team helped them manage their business. A short, accurate message at the right time can be more valuable than a large volume of automated notifications.

Chapter 32 recap

Communicate verified events, customer consequences and required decisions. Define metrics before reporting them, preserve exclusions and missing data, and use service reviews to agree testable improvements.

Review questions

Answers and marking guidance • page 243

1. What makes a status update useful?
2. Why should different audiences receive different emphasis?
3. How should confirmed and estimated information be distinguished?
4. What should accompany an unresolved question?
5. Why retain earlier estimates?
6. Which elements define an on-time measure?
7. Why should exclusions remain visible?
8. How is OTIF calculated from order-level evidence?
9. Why should missing timestamps not be assumed successful?
10. What makes a review action testable?

Applied exercises

Exercise 32A Calculate performance. There are 120 orders. Ninety-six meet the original deadline. Eight other orders have agreed customer changes and are excluded under the stated eligible-job metric. Calculate original-commitment performance and eligible-job performance. State the denominator and exclusion in your report.

Exercise 32B Write the update. An accepted delivery plan is now one day late. The provider has confirmed the cargo location but not the recovery departure. The customer must decide whether to reserve an additional receiving shift by 15:00. Draft a factual update of no more than 120 words with a decision deadline and next update.

Part 9 Risk responsibility and digital practice

Professional logistics requires truthful records, evidence-based decisions and clear authority. Explore claims, ethical choices, control towers, AI assistance and emissions comparisons without losing sight of the shipment and customer requirement.

Chapters 33–36

Chapter 33 Liability insurance and claims

Chapter 34 Ethics compliance and responsible operations

Chapter 35 Visibility control towers and AI

Chapter 36 Sustainability and logistics improvement

Chapter 33 Liability insurance and claims

The value on the invoice

A machine worth USD 80,000 arrives damaged. The customer assumes that the carrier will reimburse the invoice value because it accepted the shipment. The forwarder knows that the answer depends on the facts, applicable liability regime, contracts, insurance and claim procedures.

This is a difficult conversation to begin after a loss. A professional discusses the distinction between liability and cargo insurance before dispatch, then preserves evidence and follows the relevant claim process if something goes wrong.

What you should be able to do

Distinguish liability from cargo insurance; identify the information needed to assess a claim; preserve evidence without making unsupported admissions; and recognise why limits, notice requirements and deadlines require case-specific review.

33.1 Separate responsibility from insurance

Liability concerns whether a party is legally responsible under the applicable law and contract, and for what amount. Cargo insurance concerns cover under a policy for the insured interest and risks. Liability insurance protects a provider against specified liabilities under its own cover.

FIATA's guidance distinguishes cargo insurance from a forwarder's liability insurance. Having a forwarder or carrier involved does not mean the customer's goods are insured for their full value. [N-14]

Ask who arranges cargo insurance, what interest is insured, the agreed value basis, transit scope, covered risks, exclusions, deductibles and claim process. Do not describe “all risks” as covering every possible loss; the actual policy terms govern.

33.2 Identify the applicable legal and contractual framework

The mode, route, contracting parties, role of the forwarder and applicable law can affect liability. A forwarder may act as agent for some services or as contractual carrier under another arrangement. Mandatory law may affect contractual terms.

For air carriage where the Montreal Convention 1999 applies, ICAO's published revision increased the Article 22(3) cargo limit to 26 SDR per kilogram effective 28 December 2024. This is a dated example of why old tables can become wrong; applicability, weight basis, special declarations and other legal questions still need qualified review. [N-15]

Do not apply an air limit to road or ocean cargo, or assume that one ocean regime governs every movement. The learner's first task is to identify the relevant documents and seek the proper assessment.

Worked example 33.1 The wrong shortcut. A customer sends a commercial invoice and asks for immediate full reimbursement. The coordinator records the claim, preserves the transport and condition evidence, notifies the authorised claims team and insurer where required, and explains that the assessment depends on the applicable terms and facts. The coordinator neither promises automatic full payment nor rejects the claim solely because a limitation might exist.

33.3 Arrange cover against the actual transit

Confirm the goods, route, handling, temporary storage, transshipment, project activities and any special conditions with the authorised insurance party. An arrangement suitable for ordinary packaged goods may not match a heavy-lift or temperature-sensitive movement.

Worked example 33.2 A fictional premium calculation. Assume an insurer has accepted a value basis of 110% of a USD 25,000 declared commercial value for this exercise, with a premium rate of 0.35% and no other charges. Insured value is USD 27,500. Premium is 27,500 × 0.0035 = USD 96.25. The calculation does not establish that 110% is required or that the assumed cover applies to a real shipment.

Retain confirmation of cover and its effective conditions. A request for insurance is not the same as accepted cover. If cargo or routing changes, notify the authorised insurance contact as required.

33.4 Respond to an incident with evidence

Protect people first and follow the applicable cargo-care and emergency procedures. Record observed condition, package identifiers, time, location and custody. Preserve photographs, transport documents, receipts, monitoring records and relevant communications.

Do not destroy packaging, dispose of goods or carry out repairs without considering the required survey, mitigation and insurer instructions. The immediate response should prevent further loss where safely and lawfully possible while preserving the evidence needed.

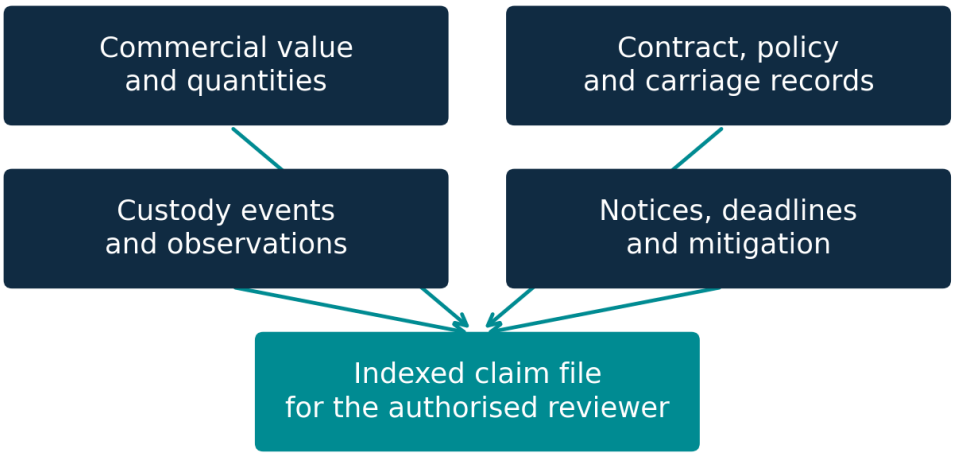


Figure 33.1 A claim file joins commercial value, carriage records, custody and condition evidence. No single document answers every question.

33.5 Distinguish observation from cause

“Outer crate wet at delivery” is an observation. “Carrier left the crate in rain” is a causal allegation requiring evidence. “Internal components damaged” needs inspection evidence within the appropriate authority.

Worked example 33.3 A useful initial record. The receiver observes two crushed cartons out of 40, photographs the package marks and visible damage, records the delivery time and notes that internal

contents have not been examined. This record preserves facts. A statement that all goods are destroyed would go beyond the observation.

Trace the custody chain and compare condition records at earlier handovers. Missing evidence should be identified as missing, not filled with a plausible narrative.

33.6 Track notices and deadlines immediately

Claims can involve prompt notification requirements, time bars and specific submission processes. These vary with the applicable law, contract and policy. Refer the matter promptly to the authorised claims or legal team and establish the actual deadlines.

Keep a deadline register with the source, responsible person and evidence of submission. A customer email to an operational contact may not satisfy every required notice. Do not assume an ongoing discussion automatically extends a deadline.

The textbook does not provide a universal notice period because applying the wrong one can cause harm. The operational skill is to identify and control the relevant requirement in the actual file.

33.7 Calculate an assumed insurance settlement carefully

Worked example 33.4 Deductible and salvage. In a wholly fictional accepted claim, covered loss is USD 30,000 before salvage. Agreed salvage recovery is USD 2,000, and the policy applies a USD 500 deductible to the remaining covered amount, with an adequate limit and no other adjustment. Calculation: 30,000 − 2,000 − 500 = USD 27,500. Real policies may apply terms differently; the authorised assessor determines the settlement.

A premium calculation, insured value and claim settlement are different calculations. Do not use one as proof of another.

33.8 Close the claim and improve the operation

Retain the final decision, settlement or rejection basis, receipts, recoveries and any continuing obligations. Reconcile financial treatment through the authorised process.

Review the operational cause where established. Better packaging, clearer handovers, improved measurement or a different route may reduce recurrence. A claim paid by insurance does not mean the underlying service was satisfactory.

Chapter 33 recap

Liability and insurance answer different questions. Discuss cover before movement, preserve facts after an incident and control the applicable notice and assessment process without promising an unsupported outcome.

Review questions

Answers and marking guidance • page 243

1. How do liability and cargo insurance differ?

2. What does a forwarder's liability insurance cover conceptually?

3. Why must the applicable regime be identified?

4. Why should liability tables be checked for current dates?

5. What should be confirmed before insurance is treated as arranged?

6. Why preserve packaging and monitoring records?

7. How does an observation differ from a causal allegation?

8. Why is there no universal claim-notice period in this chapter?

9. How do insured value and settlement differ?

10. Why should an insured loss still lead to operational review?

Applied exercises

Exercise 33A Apply stated policy arithmetic. In a fictional accepted claim, covered loss is USD 18,000, agreed salvage USD 1,200 and the deductible USD 300, applied after salvage. The limit is adequate and no other adjustment applies. Calculate the assumed settlement and list three matters the arithmetic does not establish.

Exercise 33B Build the file. A sealed crate arrives visibly damaged and the customer alleges total loss. List ten records or facts to preserve or obtain, identify the required specialist contacts and draft a neutral initial acknowledgement.

Chapter 34 Ethics compliance and responsible operations

The shortcut presented as customer service

A customer asks the forwarding team to reduce an invoice value “just for customs” and restore the correct value later. The request is framed as a small favour needed to keep the shipment moving.

Professional judgement is tested when a commercial objective conflicts with truthful records or required controls. A useful response protects the transaction without treating urgency as authority to misdescribe it.

What you should be able to do

Recognise improper requests and conflicts of interest; distinguish genuine corrections from concealment; use appropriate escalation; and protect commercial and personal information in daily operations.

34.1 Keep records truthful

Commercial, transport and customs records should reflect their actual purpose and authorised facts. A genuine error can be corrected through the proper issuer and amendment process. A request to create a false value, description, date or origin is different.

Worked example 34.1 An invoice request. The coordinator responds: “We can help obtain a corrected invoice if the commercial record contains an error. We cannot use a value that misrepresents the transaction. Please provide the accurate commercial basis; our appointed specialist can review the lawful treatment.” The request and response are retained and escalated under the organisation's procedure.

The tone can be calm and practical. Firmness does not require accusation, and politeness does not require agreement.

34.2 Understand compliance as a process

Identify the parties, goods, route, end-use information where relevant and applicable requirements. Screening and review should occur through the organisation's authorised tools and specialists.

Sanctions and export-control requirements can involve more than a country name. Parties, ownership, goods, services, end use and jurisdictional connections may matter. OFAC's framework is a US primary source illustrating a risk-based compliance programme with management commitment, controls, testing and training. It is not a substitute for assessing all applicable jurisdictions. [N-16]

Worked example 34.2 A possible screening match. A system flags a consignee name similar to a restricted party. The operator records the alert and refers it to the authorised compliance reviewer with the relevant identity information. The operator does not declare the customer prohibited from the name alone or alter the spelling to make the alert disappear.

34.3 Respond to improper payment requests

An unofficial payment request, unexplained cash fee or personal benefit linked to a business decision should trigger the organisation's anti-bribery process. Ask for the legitimate service basis and official documentation through authorised channels, and escalate concerns.

UK Ministry of Justice guidance describes principles including proportionate procedures, leadership commitment, risk assessment, due diligence, communication and review. These are a jurisdiction-specific primary reference for building controls, not permission to treat a customary payment as lawful. [N-17]

Worked example 34.3 A payment at a gate. A person requests cash personally to “speed up” release and will not provide an official basis. The team does not disguise it as a handling charge. It records the request, contacts the responsible supervisor or compliance channel and seeks the legitimate release process. If personal safety is threatened, the organisation's emergency guidance takes priority.

34.4 Declare conflicts of interest

A supplier relationship, gift or personal connection can affect impartial decisions or create that appearance. Follow the company's disclosure and approval requirements.

A conflict is not automatically proof of wrongdoing. Concealing it prevents the business from managing it. Procurement decisions should use documented capability, service and commercial criteria.

If a relative owns a proposed transport provider, disclose the relationship before participating in selection. The business can then determine an appropriate independent review.

34.5 Protect information deliberately

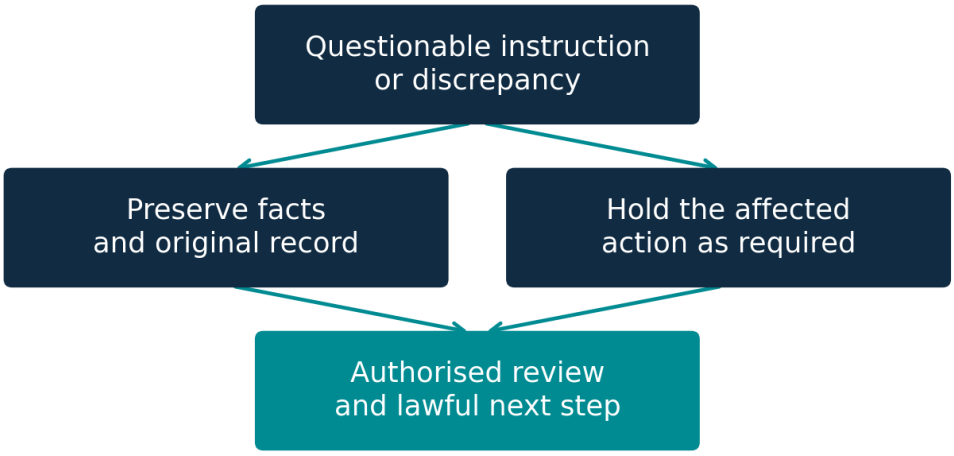
Shipment files can contain commercial prices, customer contacts, employee information and identity documents. Share only what is required with authorised parties through approved systems.

European Commission guidance on GDPR principles provides an example of purpose limitation, data minimisation, storage limitation and protection of personal data. The applicable legal basis and obligations require the relevant assessment; operational convenience alone is not enough. [N-18]

Do not paste customer documents into an unapproved public tool. A file containing no passport number can still be commercially confidential. Use fictional or properly anonymised data for training and demonstrations.

34.6 Make escalation usable

Employees need to know whom to contact, what facts to record and what action should pause. A policy that simply says “comply with all laws” does not help someone facing a specific request at 18:00.



A legitimate correction remains traceable; it does not conceal the original facts.

Figure 34.1 A responsible response preserves facts, pauses the affected action and seeks an authorised decision. A lawful correction remains distinct from concealment.

Worked example 34.4 A pressure test. A manager asks an operator to mark an unconfirmed shipment "departed" to avoid a poor KPI. The operator explains that the actual event is pending, preserves the evidence and uses the appropriate escalation channel. The performance report should reflect the real status, including missing data if necessary.

Protecting accurate records can prevent a small reporting pressure from becoming a customer, financial or legal problem.

34.7 Build a culture that supports the right action

Leaders should align targets and incentives with lawful, accurate execution. If staff are rewarded only for speed or revenue, they may perceive pressure to bypass controls.

Review near misses and concerns without automatically blaming the person who raised them. Identify whether procedures, training, staffing or system design made the problem harder to manage.

Responsible operations also include safe work, respectful treatment and appropriate labour practices. A low supplier price should not end the assessment of how the service is performed.

Chapter 34 recap

Keep records accurate, recognise conflicts and improper requests, and use authorised review rather than concealment. Practical escalation and leadership behaviour make compliance part of everyday work.

Review questions

Answers and marking guidance • page 244

1. How does a genuine correction differ from a false record?

2. Why is urgency not authority to bypass a control?

3. Why can sanctions assessment involve more than a country?

4. What should happen after a possible screening match?
5. Why is an unofficial payment not made legitimate by custom?
6. Why should conflicts of interest be disclosed?
7. What information belongs only in approved systems?
8. What makes an escalation procedure usable?
9. Why should an unconfirmed event remain unconfirmed in a KPI?
10. How can incentives undermine responsible operations?

Applied exercises

Exercise 34A Respond professionally. A customer asks you to describe battery-powered equipment as “plastic accessories” to avoid acceptance questions. Draft a response, identify the affected action to pause and list the facts needed for the authorised review.

Exercise 34B Manage a conflict. A procurement employee recommends a family-owned haulier and has received a personal gift. The provider may be capable. Explain the disclosure, independent evaluation and recordkeeping steps needed without assuming either guilt or automatic suitability.

Chapter 35 Visibility control towers and AI

A dashboard full of green shipments

The control tower reports that every shipment is on track. Operations then discovers that several rows have not received an event update for two days. The dashboard treated missing information as success.

Visibility means knowing enough about a shipment to support a decision. A control tower adds ownership, exception management and coordination to the information. AI can help organise and explain that work, but it cannot turn missing evidence into a confirmed event.

What you should be able to do

Design a useful milestone record; distinguish visibility from control; prioritise exceptions; evaluate AI-generated output; and define safe human review and audit requirements.

35.1 Start with decisions and milestones

Identify the customer decisions the system should support: supplier escalation, recovery booking, receiving capacity, stock allocation or cost approval. Then select the milestones and data needed.

A milestone record should include shipment identity, event definition, planned or estimated time, actual time where available, source, source timestamp, location, status and confidence or verification state.

DCSA's track-and-trace work illustrates the value of shared event definitions across organisations. A common data structure helps interpretation, but data quality still depends on the event producer and the actual implementation. [N-19]

35.2 Distinguish visibility from control

Visibility shows what is known. Control requires someone to interpret a condition, decide what to do and confirm the action. A red icon without an owner is an observation, not an intervention.

Worked example 35.1 A useful alert. The cargo-ready milestone is missing 24 hours before the booking cutoff. The alert names the supplier coordinator, identifies the required readiness evidence and sets an escalation time before the recovery option expires. It closes only after the evidence or approved revised plan is recorded.

The alert should not disappear merely because somebody opened it. Acknowledgement and resolution are different states.

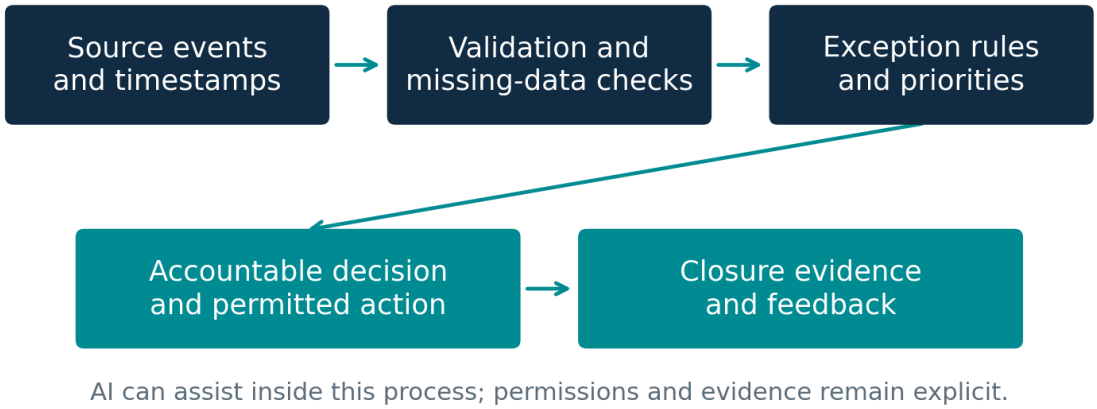


Figure 35.1 A control tower connects source events, validation, exception rules, accountable decisions and feedback. AI assistance sits within that controlled process.

35.3 Treat missing data as its own condition

An event may be late, not yet due, missing, contradictory or actually completed. Those states require different responses.

Worked example 35.2 A five-shipment queue. Shipment A has a confirmed two-day delay against a tomorrow deadline. B has no update but is not due for five days. C has a conflicting delivery timestamp. D has a temperature alert awaiting qualified review. E has a completed delivery and an open invoice query. D requires the relevant immediate cargo-care escalation; A needs urgent service recovery; C needs evidence reconciliation; B needs a data follow-up; E belongs in financial closure. A single “days late” sort cannot prioritise all five.

The exact priority depends on severity, urgency and applicable procedures. Do not allow a commercial scoring formula to override safety or mandatory controls.

35.4 Use automation for defined work

Automation can validate required fields, compare deadlines, detect duplicate references, calculate charges under explicit rules and route exceptions. It works best when the inputs and expected outcomes are defined.

A rules engine can flag that an arrival estimate exceeds the required date. It cannot infer that the customer will accept a later delivery without an instruction. Likewise, a calculated dimensional weight does not establish cargo acceptance.

Maintain logs of the input, rule version, output and action. If the logic changes, test known cases before relying on it operationally.

35.5 Use AI as an assistant with evidence

AI can help draft updates, summarise an incident timeline, compare document fields or suggest questions for an incomplete booking. Its output needs checking against the authoritative records.

NIST's AI risk-management framework and generative-AI profile support attention to governance, measurement and risks such as unreliable output. Their role here is a general framework; the operational controls below are designed for the fictional forwarding workflows in this book. [N-20]

Worked example 35.3 Critique an AI update. The source record says “flight scheduled Tuesday; shipment acceptance pending”. An AI draft says “Your shipment departed Tuesday and will arrive on time.” The draft has converted a schedule into an actual event and invented a service assurance. The reviewer rejects those claims and writes: “The flight is scheduled for Tuesday. Shipment acceptance remains pending; we are obtaining confirmation and will update you by 15:00.”

35.6 Define permission and human review

Decide which tasks can be automated, which need review and which are outside the system's authority. Drafting a message is different from sending it. Identifying a possible invoice discrepancy is different from amending a commercial record or declaration.

Use approved data environments and access controls. Customer documents should not be exposed to an external tool merely because it is convenient. Retain the minimum information needed for the task.

For consequential actions, the reviewer needs the underlying evidence, not just a polished explanation. A human who cannot inspect the source is poorly placed to provide meaningful approval.

35.7 Measure whether the tool helps

Assess accuracy, false alerts, missed exceptions, time saved and downstream errors. A high volume of generated messages is not necessarily value.

Worked example 35.4 Alert quality. A pilot raises 80 alerts. Review confirms 60 as useful exceptions; 20 are false alerts. It also finds ten real exceptions that the system missed. Precision is 60 ÷ 80 = 75%. Recall is 60 ÷ (60 + 10) = 85.71%. These measures reveal different weaknesses. Reducing all alerts might improve precision while missing more real problems.

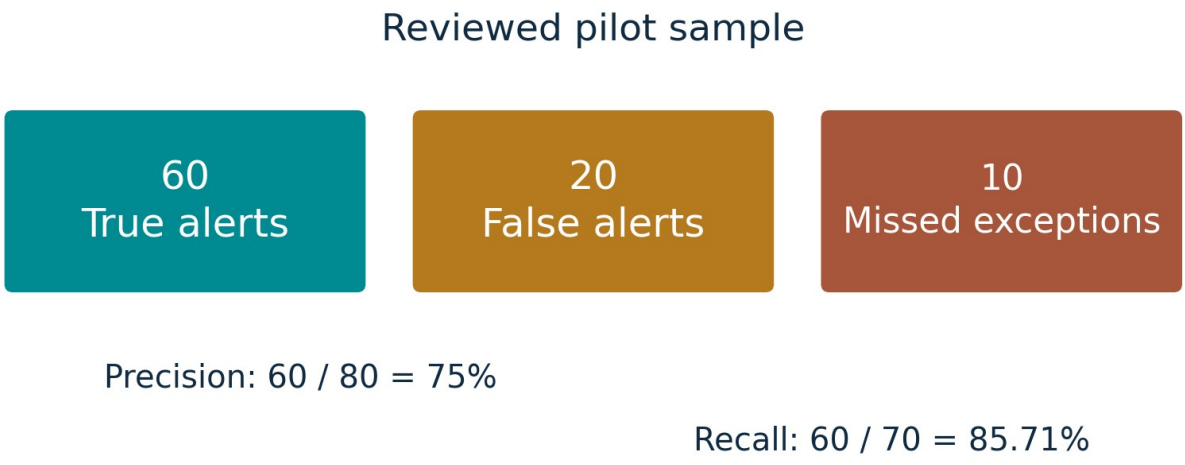


Figure 35.2 Precision concerns the alerts raised; recall concerns the real exceptions that should have been found. Both depend on a reliable reviewed sample.

35.8 Keep people and process in the design

Operators need clear ownership, training and a manageable queue. Too many low-value alerts can hide the urgent ones. Review thresholds and routing using actual cases.

The author's practical interest in AI is grounded in this relationship: industry knowledge defines the question, reliable data supports the answer and accountable people make the consequential decision. Technology is useful when it improves that chain.

Workshop A control tower prioritisation board

The fictional Atlas Retail control tower monitors 40 shipments. Its dashboard currently uses one colour based only on estimated delivery date. The customer reports that urgent exceptions are still being missed.

The following five records are a sample. All dates and conditions are classroom inputs.

Shipment	Current evidence	Business requirement
AR-01	Confirmed two-day delay	Launch stock required tomorrow
AR-02	Last event three days old; no confirmed delay	Replenishment needed in ten days
AR-03	Temperature alert; qualified review pending	Product must remain on the applicable hold
AR-04	Two conflicting delivery timestamps	Customer disputes whether receipt occurred
AR-05	Delivered; supplier invoice differs from quote	Financial closure required this week

The first task is to design a queue with separate exception types and owners. Do not rank AR-03 solely by delivery lateness, and do not turn AR-02 green because its estimated date still looks acceptable.

For each record, state the verified fact, uncertainty, next action, decision authority, response time and closure evidence. Identify which action belongs to operations, quality, data reconciliation or finance. A control tower coordinates those functions; it does not inherit every specialist authority.

The team proposes using AI to draft customer messages. A pilot draft for AR-02 says: “Your shipment is progressing normally and remains on schedule.” The source contains no evidence supporting normal progress. Write a corrected draft and define what source information the reviewer needs.

A separate alert pilot raises 100 alerts. Review confirms 70 real exceptions among them and finds 20 additional real exceptions that were missed. Calculate precision and recall. Discuss how changing thresholds might improve one result while worsening the other.

Now design three permission levels: automatic internal validation, human-reviewed customer communication and actions requiring an authorised operational or specialist decision. Place example tasks into each level, including arithmetic checks, sending an update, changing a booking, amending an invoice and releasing held goods.

The customer asks to include commercially sensitive invoices in a public demonstration of the system. Explain how the team can demonstrate the workflow using fictional or properly authorised material without exposing the customer's documents.

For the final presentation, show a revised dashboard specification with definitions, data age, source status, exception owner and next action. Avoid using colour as the only way to communicate state. Include a weekly review of false alerts, missed events and unresolved cases so that the design can improve.

Chapter 35 recap

Build visibility around decisions, event definitions and evidence. Give exceptions owners, treat missing data honestly and use AI within explicit permissions, review and performance measurement.

Review questions

Answers and marking guidance • page 244

1. How does control differ from visibility?
2. Which fields make a milestone traceable?
3. Why is missing data not success?
4. How do acknowledgement and resolution differ?
5. Why can a simple lateness score misprioritise exceptions?
6. What work suits deterministic automation?
7. What error did the AI draft in example 35.3 make?
8. Why must reviewers see underlying evidence?
9. How do precision and recall differ?
10. What should determine whether an AI tool is useful?

Applied exercises

Exercise 35A Evaluate alerts. A system raises 50 alerts; 40 are confirmed real exceptions. Review identifies another eight real exceptions that were missed. Calculate precision and recall. Suggest one investigation for false alerts and one for misses.

Exercise 35B Correct an AI draft. Source facts: container discharged Monday; customs review pending; no delivery appointment confirmed. Draft: “Your shipment has cleared customs and will be delivered tomorrow.” Identify unsupported claims and write a corrected update with an owner and next update time.

Chapter 36 Sustainability and logistics improvement

A green claim without a boundary

A proposal says that switching to rail will reduce emissions by 60%. It does not identify the road legs, terminal activity, distance, load, emission factors or calculation method. The percentage may look persuasive, but the customer cannot reproduce or assess it.

Sustainability analysis should be as transparent as a freight quotation. State what is measured, where the data comes from and what the comparison leaves uncertain. Then connect the result to a feasible service decision.

What you should be able to do

Define an emissions comparison boundary; calculate a teaching tonne-kilometre model; distinguish measured and estimated data; and evaluate operational improvements without unsupported environmental claims.

36.1 Define the transport chain

Identify the shipment mass, route legs, distances, modes, terminal activity and relevant energy or fuel boundary. Use the selected methodology consistently.

The GLEC Framework provides logistics emissions guidance aligned with ISO 14083. Smart Freight Centre's current resource describes the framework and its role in comparable transport-chain accounting. Use the applicable edition and qualified method for a real report. The factors in this chapter are fictional teaching inputs, not GLEC defaults or verified modal averages. [N-21]

Do not compare one option's full transport-chain emissions with another option's main-leg emissions alone. The result would reward an incomplete boundary.

36.2 Understand tonne-kilometres

Tonne-kilometres multiply transported mass in metric tonnes by distance in kilometres. A factor expressed in kg CO2e per tonne-kilometre can then be applied under the stated model.

Worked example 36.1 Direct road. A fictional 10-tonne shipment travels 800 km. Activity is 10 × 800 = 8,000 tonne-kilometres. With an assumed factor of 0.08 kg CO2e/tkm, emissions are 8,000 × 0.08 = 640 kg CO2e. This factor is used only to demonstrate the arithmetic.

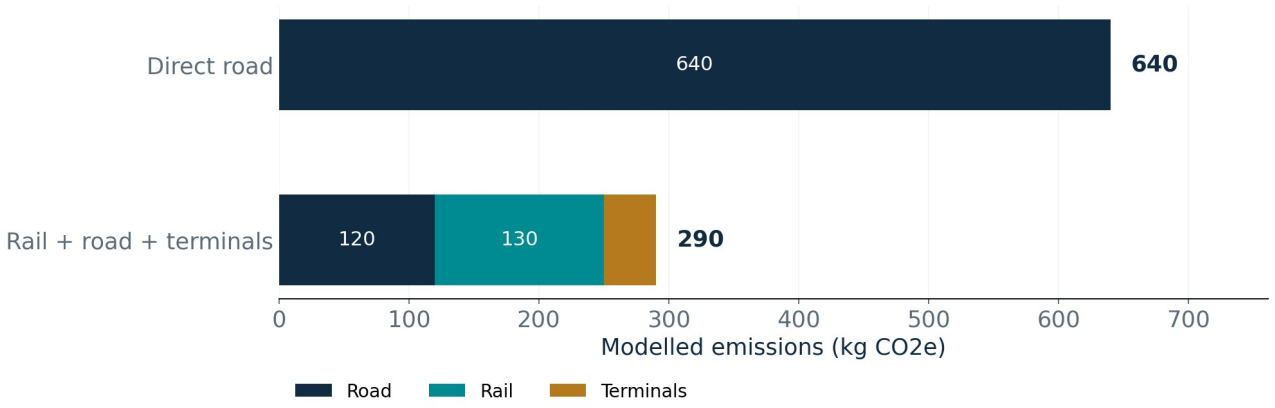
CO2e expresses greenhouse gases on a common equivalent basis under the selected method. It is not interchangeable with litres of fuel or a tailpipe-only CO2 measure.

36.3 Compare complete options

Worked example 36.2 Rail and road. The alternative moves the same 10 tonnes for 650 km by rail and 150 km by road. Use fictional compatible factors of 0.02 kg CO2e/tkm for rail and 0.08 for road, plus 40 kg

CO2e for the included terminal activities. Rail contributes 10 × 650 × 0.02 = 130 kg. Road contributes 10 × 150 × 0.08 = 120 kg. Total = 130 + 120 + 40 = 290 kg CO2e.

Compared with 640 kg, the modelled reduction is 350 kg, or 350 ÷ 640 × 100 = 54.69%. The conclusion is valid only within the stated fictional model and common boundary.



Fictional compatible factors; the alternative reduces this model by 350 kg (54.69%).

Figure 36.1 The teaching comparison includes the alternative's road and terminal stages. The numerical factors are fictional and do not establish real-world modal performance.

36.4 Describe data quality

Primary operational data can improve a calculation, but it still needs validation and an appropriate allocation method. Estimated distances, generic factors and assumed load utilisation should be identified.

Record the source, period, coverage, units and method version. Explain whether the result represents one shipment, a lane average or a company inventory. Avoid presenting a broad average as a precise measurement of a particular consignment.

If the underlying data is incomplete, report the uncertainty and the improvement needed. More decimal places do not create accuracy.

36.5 Include the service tradeoff

An option with lower modelled emissions must still meet product, timing and safety requirements. If it increases lead time, examine inventory and replenishment consequences. If it adds handling, assess product suitability.

Worked example 36.3 Cost per modelled tonne avoided. Suppose the accepted rail-and-road option costs USD 100 more than direct road and reduces the modelled result by 350 kg CO2e, or 0.35 tonnes. Additional cost per modelled tonne avoided is 100 ÷ 0.35 = USD 285.71/t CO2e. This is a comparison of the two stated logistics options, not a carbon-credit price or a verified abatement claim.

The customer can use the figure alongside service, cost and reporting objectives. The forwarder should not make the customer's tradeoff decision silently.

36.6 Improve the operation before adding a slogan

Potential improvements include reducing empty running, improving load utilisation, consolidating compatible shipments, preventing avoidable urgent freight, improving warehouse energy use and reducing damage or rework.

The benefit depends on execution. Consolidation that delays launch-critical stock and triggers a later emergency air shipment may fail the intended objective. A packaging reduction that increases damage can also create waste elsewhere.

Worked example 36.4 A consolidation pilot. Four weekly compatible shipments are combined into two under an accepted service plan. The team measures transport activity, actual vehicle utilisation, delivery performance and exceptions before and after. It does not assume emissions halved merely because the shipment count halved. The vehicle movements and allocation determine the calculation.

36.7 Keep environmental claims proportionate

State the scope and method beside a claim. Distinguish measured reductions, modelled scenarios, purchased instruments and future targets. Do not describe a service as “zero emission” simply because one stage uses a particular technology while other stages remain outside the claim.

Where a provider offers lower-emission fuel or book-and-claim arrangements, obtain the relevant evidence, accounting treatment and claim conditions. Their details require a current specialist assessment beyond this introductory calculation.

36.8 Use improvement cycles with evidence

Define the baseline, proposed change, expected mechanism, measures, trial period and review. Include service and cost measures so that an apparent environmental improvement does not conceal operational harm.

After the trial, compare like-for-like activity and explain changes in volume or mix. Retain unsuccessful trials as learning. A credible improvement programme can explain both what worked and what remains uncertain.

Workshop A consolidation and the whole-chain result

Greenfield Appliances wants to reduce transport emissions for a fictional 12-tonne weekly flow. It compares the current road service with a consolidated rail-and-road option. Both meet the product requirements, but the consolidated option needs earlier order release and a different receiving schedule.

The current road distance is 700 km. For this exercise only, use 0.09 kg CO2e per tonne-kilometre. The alternative uses 550 km by rail at a fictional 0.025 kg CO2e/tkm, 150 km by road at 0.09 and 45 kg CO2e for the included terminal activities. Assume compatible accounting boundaries for all stated factors.

Current complete transport cost is USD 1,400. The alternative costs USD 1,520 and takes two extra days. The goods value is USD 90,000, and the customer supplies a 16% annual carrying-cost assumption on a 365-day year.

Calculate the current and alternative modelled emissions, absolute and percentage reduction, extra transport cost, extra carrying cost and total modelled cost difference. Then calculate additional total cost per modelled tonne CO2e avoided. Label every result as a teaching scenario.

The operational team warns that late order release has previously caused emergency air shipments. The proposal contains no data about how often that would happen under consolidation. Explain why the expected whole-chain outcome cannot be declared from the regular service calculation alone.

Design a six-week pilot. Record release timing, service acceptance, actual modes and distances, terminal activity, shipment mass, utilisation assumptions, delivery performance, exceptions and emergency movements. Agree how the baseline will be made comparable if weekly volume changes.

Prepare a customer-facing claim that is accurate before the pilot and another that could be used after verified results, leaving placeholders for the actual measured evidence. The pre-pilot statement should describe a modelled opportunity, not a guaranteed reduction.

For an extension, the customer asks whether buying an environmental instrument makes the original service “zero emission”. Identify the specialist accounting and claim evidence needed and explain why a label cannot replace the transport-chain calculation.

The final recommendation should state whether to pilot, what conditions must change and what result would justify wider adoption. A useful sustainability proposal joins operational feasibility, transparent measurement and a customer decision.

Chapter 36 recap

Sustainability analysis needs a consistent boundary, transparent data and a reproducible method. Compare complete feasible services, label fictional or estimated inputs and test operational improvements against actual results.

Review questions

Answers and marking guidance • **page 245**

1. Why does an emissions claim need a boundary?
2. What is a tonne-kilometre?
3. Why are the chapter's factors not live modal averages?
4. Why include road and terminal stages in an intermodal option?
5. How should estimated data be identified?
6. Why do extra decimal places not prove accuracy?
7. What does cost per modelled tonne avoided show?
8. How can consolidation create an unintended consequence?
9. Why should shipment count not be treated as emissions?
10. What should an improvement trial measure?

Applied exercises

Exercise 36A Compare fictional options. Eight tonnes move 500 km by road at an assumed 0.10 kg CO2e/tkm. An alternative uses 400 km rail at 0.025, 100 km road at 0.10 and 30 kg for terminals. Calculate both totals, the absolute reduction and percentage reduction. State the comparison's limitations.

Exercise 36B Audit a claim. A supplier says “70% greener” without stating shipment weight, distances, factors, terminal coverage or service differences. Draft the information request needed to evaluate the claim and propose one operational trial that could produce useful evidence.

Part 10 Careers and integrated applications

Bring the earlier lessons together. Build a practical learning plan, work through the retail and industrial cases, and prepare a portfolio that shows your calculations, decisions, changes and reflection.

Chapters 37–40

Chapter 37 Roles skills and professional development

Chapter 38 Integrated retail supply chain case

Chapter 39 Integrated industrial project case

Chapter 40 Assessment and professional portfolio

Chapter 37 Roles skills and professional development

The first useful contribution

A new forwarding employee is asked to check a booking. They do not yet know every trade term or carrier process, but they notice that the customer has supplied no delivery contact and that two documents show different package counts. They record both gaps and ask the responsible colleague before the shipment is released.

That is a useful professional contribution. Early competence is not pretending to know everything. It is understanding the work well enough to recognise a missing fact, complete a defined task accurately and seek the right decision.

What you should be able to do

Map common logistics roles; identify transferable and specialist skills; build a realistic first-90-days learning plan; and demonstrate competence through evidence without overstating experience.

37.1 Understand the role families

Operations staff coordinate bookings, documents, milestones, handovers and exceptions. Customer-service and key-account teams connect execution with customer needs. Pricing and procurement teams obtain and compare services. Sales and solution-design teams translate requirements into commercial proposals.

Warehouse roles cover receiving, stock control, fulfilment, systems and supervision. Project-logistics roles coordinate specialised planning and execution. Analysts and control-tower staff work with data, exceptions and performance. Finance and credit teams protect job economics and cash.

These boundaries vary by company. In a small office one person may perform several roles; a larger organisation may specialise. Ask what the particular position owns and which decisions require another function.

37.2 Build a foundation of reliable habits

Useful habits include reading the complete instruction, recording units, checking arithmetic, controlling document versions, distinguishing estimates from facts and closing communication loops.

Worked example 37.1 Evidence of learning. A student creates a fictional shipment brief, identifies eight missing fields and explains how each could affect execution. This is stronger evidence than listing “excellent attention to detail” without an example. The work shows what the student can actually do.

Numeracy matters, but so does interpretation. A correct chargeable-weight calculation is incomplete if the learner cannot explain the divisor assumption or identify an excluded destination fee.

37.3 Develop communication and judgement

Practice short updates that state the event, consequence, action, decision and next time. Learn to ask a specific question rather than forward an unexplained email chain.

Judgement develops through supervised cases. Ask why an experienced colleague selected a service, stopped a movement or rejected a document. Compare the reasoning with the evidence, then record the lesson in a learning log.

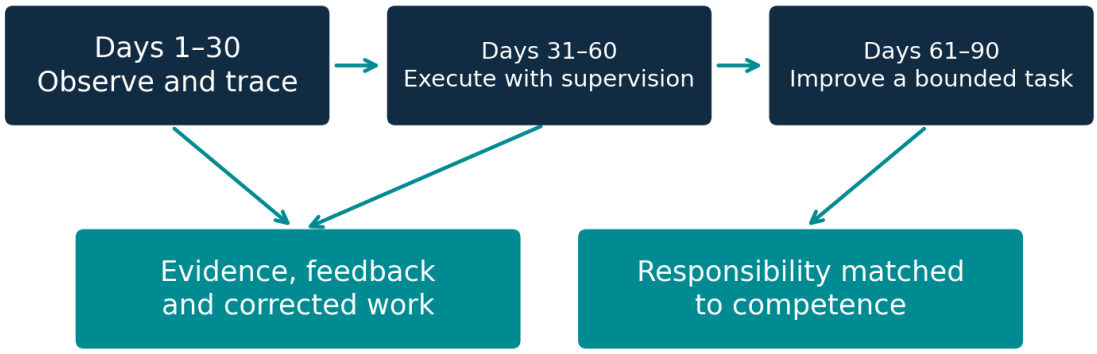
Worked example 37.2 A better escalation. “Please advise urgently” becomes: “The booking shows 12 cartons; the supplier has presented 13. The terminal cutoff is 16:00. Please confirm the authorised quantity and revised packing list by 13:00 so we can request provider acceptance.” The second message makes the decision and deadline clear.

37.4 Use a first-90-days plan

In the first 30 days, learn the company's scope, systems, terminology, contacts and escalation procedures. Observe a complete shipment file and practise calculations using approved training data.

During days 31–60, perform defined tasks under review: prepare a booking draft, reconcile documents, update milestones and explain a quotation. Seek feedback on both accuracy and reasoning.

During days 61–90, manage a limited workflow with supervision, investigate one recurring issue and present a small improvement supported by evidence. The scope should match the person's training and authority.



Illustrative development plan; progression depends on the role and demonstrated ability.

Figure 37.1 Early development moves from observation to supervised execution and then a bounded improvement task. Authority grows through demonstrated competence.

Worked example 37.3 A measurable goal. “Learn air freight” is too broad for a month. “Accurately calculate ten fictional air quotes with stated divisors, minimums and rate breaks, explain every assumption and correct errors after review” is measurable. A second goal can address real supervised booking work under the employer's procedures.

37.5 Choose further learning against the role

Identify which knowledge is needed for the work: customs, dangerous goods, warehouse systems, project coordination, commercial finance or data analysis. Some tasks require formal training, certification or authorisation under applicable rules.

Check current course content, recognition, prerequisites and assessment with the relevant official provider or professional body. A general certificate should not be described as permission to perform a regulated function it does not cover.

Combine structured learning with supervised practice. A person who passes a calculation test still needs to learn the organisation's actual systems, handovers and exception procedures.

37.6 Build a professional portfolio ethically

Use fictional or properly authorised material. Suitable items include an original quotation comparison, shipment plan, document audit, warehouse calculation, exception update and improvement analysis.

Explain your role and the assumptions. If an example is a classroom exercise, label it as such. Do not present a simulated project as a customer assignment or claim responsibility for a team result you did not own.

Protect employer and customer information. Remove identifying details only when anonymisation is sufficient and permitted; some confidential data should not be reused at all.

37.7 Learn to work across functions

An operator benefits from understanding finance, sales and customer priorities. A salesperson benefits from understanding acceptance and execution. An analyst benefits from watching how the physical operation creates data.

Ask for a structured handover or observation opportunity. The aim is to understand dependencies, not to bypass another person's authority. Respect the specialist who says a technical decision needs more evidence.

Leadership later adds resource allocation, coaching, performance management and ethical responsibility. These skills build on reliable operational understanding rather than replacing it.

37.8 Keep a learning record

Record the task, evidence, feedback, correction and next practice. Review recurring errors honestly. A useful learning record shows improvement over time, not just completed courses.

The industry changes in technology, regulation and customer expectations. The durable habit is to verify what has changed while retaining the discipline of accurate records, sound calculations and accountable decisions.

Chapter 37 recap

Build competence through reliable habits, supervised work and evidence. Use formal learning where required, communicate precisely and represent experience honestly.

Review questions

Answers and marking guidance • page 245

1. Which role families appear in forwarding and logistics?

2. Why should a job's decision authority be clarified?

3. What makes a learning goal measurable?

4. Why is interpretation needed alongside arithmetic?

5. How can an escalation be made more specific?

6. What should the first 30 days emphasise?

7. Why does a general certificate not confer every authorisation?

8. What makes a student portfolio credible?

9. Why should commercial information be protected?

10. What should a learning record contain?

Applied exercises

Exercise 37A Build your plan. Select an entry-level operations, warehouse or pricing role. Write three goals for each of the first 30, 60 and 90 days. Give an evidence item and reviewer for every goal.

Exercise 37B Present your work honestly. Draft a 120-word portfolio introduction for a student who has completed the book's fictional cases but has no industry employment yet. Describe demonstrated skills without inventing professional experience.

Chapter 38 Integrated retail supply chain case

One order and several decisions

This case restarts the original Riverbend order with a fixed classroom dataset. Earlier chapters explored alternative scenarios; do not add their shipments or costs to this case. The task is to design one coherent plan from the facts below, then revise it when new events occur.

Nordhaven needs a seasonal collection from Riverbend in Bangladesh for its European retail operation. A small launch assortment is required early; the balance can follow. The forwarding team must coordinate supplier readiness, air and ocean services, documents, customs preparation and warehouse receipt.

What you should be able to do

Build an end-to-end plan across modes; reconcile a split order; compare complete cost and timing; respond to disruptions; and present a recommendation with traceable assumptions and approvals.

38.1 Read the case file

The order is 12,000 shirts at USD 5 each, total USD 60,000. There are 300 cartons of 40 shirts. Each carton measures 50 × 40 × 20 cm and weighs 10 kg gross, including 9 kg of shirts. The cargo is ordinary new apparel for this classroom case, with no special product-control assumption supplied beyond the requirement for lawful review.

The sale uses FCA at the named Riverbend factory loading point under Incoterms 2020, as established in Chapter 4. The actual rights and obligations must be read with the sales agreement; the case does not reproduce the full rule text.

The supplier is ready on teaching Day 0. Nordhaven needs 600 identified launch shirts at the DC by Day 12 and the remaining 11,400 by Day 42. It confirms that those quantities are commercially useful separately. All day numbers in this case are relative planning days, not a live carrier schedule.

Case record	Confirmed teaching input
Total goods	12,000 shirts in 300 cartons
Unit value	USD 5 per shirt
Carton	50 × 40 × 20 cm; 10 kg gross; 9 kg net
Early requirement	600 identified shirts by Day 12
Balance requirement	11,400 shirts by Day 42
Air plan	Selected cartons delivered Day 6 if accepted by stated cutoff
LCL plan	Balance delivered Day 39 under the stated complete service
FCL plan	Balance delivered Day 37 under the stated complete service

The importer and appointed customs representative must confirm classification, value, origin, procedure and applicable requirements. The case does not provide a tariff code, duty rate or automatic preference.

38.2 Freeze the service assumptions

The air offer uses divisor 6,000 cm³/kg, shipment-level comparison, USD 4.20/kg and fixed charges USD 180 for the selected urgent portion. The complete accepted teaching scope includes the stated collection, handling and delivery activities. No other charges are included in the exercise.

The LCL offer uses the greater of cubic metres and metric tonnes for the whole shipment, at USD 95 per revenue unit plus USD 520 fixed. The FCL alternative costs USD 2,800 for the accepted scope and cargo arrangement. These are fictional rates.

All service plans remain subject to the supplied cargo, document readiness and required acceptance. A later change should be assessed rather than silently absorbed into these assumptions.

38.3 Reconcile the split

Worked example 38.1 Quantity and value. The early requirement is 600 ÷ 40 = 15 cartons. The balance is 285 cartons. Early goods value is 600 × 5 = USD 3,000; balance value is 11,400 × 5 = USD 57,000. Together they reconcile to 300 cartons, 12,000 shirts and USD 60,000.

Early volume is 15 × 0.50 × 0.40 × 0.20 = 0.60 m³. Gross weight is 150 kg and net weight 135 kg. Balance volume is 11.40 m³, gross 2,850 kg and net 2,565 kg. The combined values reconcile to 12 m³, 3,000 kg gross and 2,700 kg net.

Record	Air portion	Ocean portion
Cartons	15	285
Shirts	600	11,400
Commercial value	USD 3,000	USD 57,000
Gross weight	150 kg	2,850 kg
Net weight	135 kg	2,565 kg
External volume	0.60 m³	11.40 m³

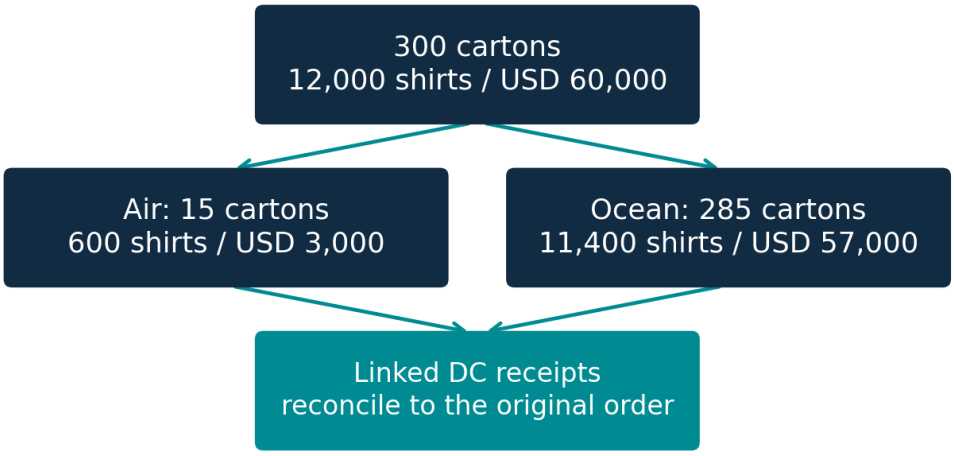
The actual commercial and customs treatment of split documents requires the relevant issuer and specialist approval. The arithmetic supports that work; it does not authorise it.

38.4 Calculate the transport options

Worked example 38.2 Air portion. Dimensional weight is 600,000 ÷ 6,000 = 100 kg. Gross weight controls at 150 kg. Air cost is 150 × 4.20 + 180 = USD 810. Planned delivery Day 6 leaves six days before the Day 12 requirement.

Worked example 38.3 Ocean balance. LCL revenue units are max(11.4 m³, 2.85 tonnes) = 11.4. Cost is 11.4 × 95 + 520 = USD 1,603. Air plus LCL total is USD 2,413. Air plus FCL total is USD 3,610. FCL costs USD 1,197 more and brings the balance two days earlier under the stated plans.

The LCL balance has three days of delivery margin; FCL has five. The customer must decide whether the additional two days and other accepted service differences justify USD 1,197. The required early assortment is protected by the air portion in either plan.



Keep carton marks, quantities, values and instructions aligned across both records.

Figure 38.1 The fixed retail case splits one order into linked air and ocean records. Quantities, value and receiving instructions must reconcile across the two paths.

38.5 Build the milestone and ownership plan

The supplier owns accurate readiness and packing information. The customer approves the priority assortment and commercial choice. The forwarder coordinates accepted services and current records. Appointed specialists complete the relevant border and product decisions. The DC confirms receiving arrangements and records the two receipts against the order.

Use milestone rows for cargo readiness, data approval, booking acceptance, collection, origin acceptance, departure, transfer where relevant, arrival, release, delivery and closure. Each row needs planned date, owner, evidence and exception trigger.

Do not rely on one person remembering that the order was split. Link the air and ocean job references to the parent purchase order and preserve the exact carton marks allocated to each.

38.6 Prepare the warehouse interface

The DC must know that 600 shirts arrive first and the balance later. It should avoid treating the early receipt as an unexplained shortage or closing the purchase order prematurely.

For a simple teaching warehouse calculation, assume carton receipt costs USD 0.60 per carton and the balance is palletised into ten accepted storage positions for 14 days at USD 0.45 per pallet-day. Receipt cost for all 300 cartons is USD 180. Storage cost is 10 × 14 × 0.45 = USD 63. Total for these two defined activities is USD 243. Picking, packing and other activities are outside this particular calculation.

The storage arrangement is an assumption, not a new certified pallet plan. The warehouse must confirm the actual configuration and product-care requirements.

38.7 Disruption one changes the air measurements

At final packing, the urgent cartons measure 52 × 42 × 22 cm. There are still 15 cartons at 10 kg each. New volume is 0.72072 m³ and dimensional weight is 720,720 ÷ 6,000 = 120.12 kg. Gross remains 150 kg, so the stated chargeable weight and USD 810 cost do not change.

This is an important lesson: a changed measurement does not always change the price, but it still changes the cargo record and may affect acceptance. Update the approved documents and provider information through the proper process.

The decision record should show the old and new measurements, who verified them, the recalculation and the acceptance response. Do not leave the original dimensions merely because the price is unchanged.

38.8 Disruption two delays the ocean balance

The accepted LCL plan changes from Day 39 to Day 44. The balance now misses its Day 42 requirement by two days. The launch assortment has already arrived by air, so the business consequence differs from a total stockout.

Ask Nordhaven which additional stock is critical and what the two-day delay affects. Do not automatically repeat the original air split. The available recovery options depend on the cargo's current location and whether an authorised separation is feasible.

For a classroom decision, assume an accepted alternative ocean arrangement delivers Day 42 for USD 900 extra. The buyer estimates that a two-day balance delay would cause USD 700 per day of avoidable contribution loss. Under those assumptions, the extra arrangement avoids USD 1,400 for USD 900, a net USD 500 benefit. The customer must confirm the business assumption and approve the change before execution.

38.9 Disruption three reveals a document conflict

The balance invoice still shows the original USD 60,000 total despite listing 11,400 shirts at USD 5. The packing list has the correct quantity, and the booking is correct.

The commercial issuer must correct the invoice to USD 57,000 through the authorised process. The coordinator should establish whether the incorrect version reached a declaration, bank, customer system or other user, then ensure the correction reaches each affected process. Saving a new PDF in the job folder is not enough.

The case illustrates three different changes: a physical measurement change, a transport-plan change and a commercial-document correction. They require different evidence and approvals.

38.10 Present the recommendation

The initial recommendation can support air for the identified 15 cartons and LCL for the balance, given the stated accepted service and cost assumptions. It should show the FCL alternative and its additional margin rather than conceal it.

After the disruptions, the recommendation changes only where the new facts justify it: update measurements without inventing a price increase, seek approval for the accepted USD 900 recovery option if the buyer confirms its value, and correct the invoice through its issuer.

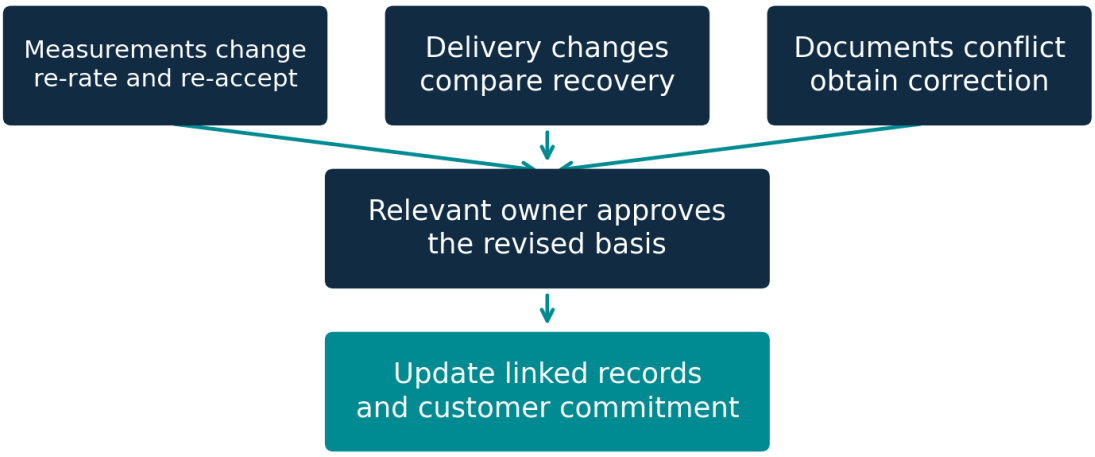


Figure 38.2 The retail case separates measurement, service and document decisions. Each change returns to the appropriate owner and affected records.

Chapter 38 recap

A coherent retail plan reconciles goods, value, transport, documents and warehouse receipt. Revisit the affected assumptions when events change; do not restart every decision or hide the original plan.

Review questions

Answers and marking guidance • page 246

1. Why does this case restart a fixed dataset?
2. How many cartons belong to the early requirement?
3. Which split totals must reconcile?
4. What controls the air chargeable weight?
5. What is the air-plus-LCL cost?
6. What additional time margin does FCL provide?
7. Why must the DC know about the split?
8. Why do changed dimensions matter when price is unchanged?
9. Why does a delayed balance differ from a total stockout?
10. Which users may need the corrected invoice?

Applied exercises

Exercise 38A Change the early requirement. Nordhaven now needs 800 shirts early, with the original carton dimensions and weights. Recalculate air and ocean carton counts, values, weights, volumes and total air-plus-LCL cost using the stated rules. Show reconciliation to the original order.

Exercise 38B Submit the case plan. Prepare a two-page recommendation containing the initial service choice, milestone owners, document controls, warehouse interface and responses to the three disruptions. Distinguish customer approvals from provider and specialist acceptance.

Chapter 39 Integrated industrial project case

One site and three transport problems

Arcwell's expansion needs three major units and an urgent spare. The press module requires specialist ocean and inland planning; the utilities skid must arrive first; the control assembly must avoid blocking the laydown area; and the spare must reach a technician before commissioning.

This case combines project logistics, air freight, road delivery and temporary storage. It uses a fixed fictional dataset. It is a coordination and commercial exercise, not an engineering design or permission to execute a lift or abnormal-load movement.

What you should be able to do

Build an integrated project execution proposal; identify critical technical and site dependencies; calculate service and change costs; and maintain separate commercial, engineering and quality approvals.

39.1 Freeze the cargo and site information

M1 is a 48-tonne press module with a final transport envelope of 6.2 × 3.1 × 3.6 m. M2 is a 12-tonne utilities skid. M3 is a 6-tonne control assembly. Their detailed drawings, support points, lifting information and preservation requirements must be supplied and assessed by competent parties.

The installation sequence is M2, then M1, then M3. The site can hold at most two major units in its approved laydown arrangement. The urgent spare is a separate 180 kg shipment packed in 12 cartons of 50 × 40 × 40 cm, with acceptance assumed only after the actual product and route review.

Item	Teaching mass	Required role in the sequence
M1 press module	48 tonnes	After utilities readiness
M2 utilities skid	12 tonnes	First major installation dependency
M3 control assembly	6 tonnes	After the press installation stage
Urgent spare	180 kg gross	Available for the commissioning technician

The major-unit total is 66 tonnes. The spare is separately tracked; do not add its cartons to a major-unit count or lose it inside a generic “project cargo” description.

39.2 Identify the readiness gates

Final drawings, route and handling acceptance, permits, preservation arrangements, site access and foundation release are required before the relevant execution steps. The exact legal and engineering requirements belong to the authorised specialists.

The teaching schedule assumes final drawings take three days, route review five further days and permits four further days. Packing takes six days after drawings. Transport waits for both paths, giving the Day 12 earliest start established in Chapter 27.

The project manager should not turn Day 12 into a guaranteed departure until the required approvals and resources are confirmed. A schedule model shows dependencies; it does not compel an authority to meet an estimate.

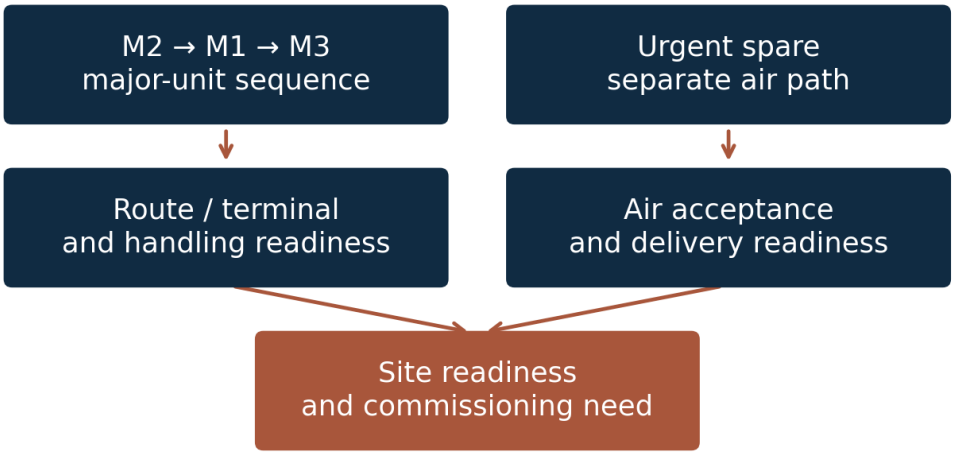


Figure 39.1 The industrial case combines the major-unit sequence with a separate urgent-air path. Site readiness connects the paths at commissioning.

39.3 Compare two execution proposals

Proposal A uses the accepted preliminary port and inland arrangement with a complete base cost of USD 205,000, as itemised in Chapter 28. Proposal B offers a USD 12,000 lower main transport package but requires USD 7,500 additional terminal handling and USD 6,500 additional inland preparation. Other base categories remain unchanged.

Worked example 39.1 Normalise the alternative. B's net change is −12,000 + 7,500 + 6,500 = +USD 2,000. Its comparable base is USD 207,000, not USD 193,000. Both proposals still require equivalent technical acceptance and site compatibility.

The comparison should also show schedule, handling interfaces, preservation and contingency conditions. An extra handling event may matter even if its price is modest.

39.4 Protect the installation sequence

The supplier proposes sending M1 and M3 first. The site can hold two units, so this would occupy both positions before M2 arrives. The plan creates a blocked dependency.

A coordinated sequence could hold M3 at an approved origin or intermediate location until the site releases capacity, while prioritising M2 and the accepted M1 timing. The decision needs preservation, custody, handling and cost review.

Worked example 39.2 A storage comparison. Approved origin storage for M3 costs USD 350 per day for six days, plus USD 600 additional handling: USD 2,700. An accepted destination storage option costs USD 500 per day for six days plus USD 900 handling: USD 3,900. Origin storage is USD 1,200 cheaper under the stated assumptions. It is suitable only if the revised shipment and installation sequence remain feasible.

The commercial result cannot override a preservation or technical constraint. Ask the relevant specialists to confirm the actual arrangement.

39.5 Price the urgent spare

Worked example 39.3 Air cost. Twelve cartons occupy 0.96 m³. With divisor 6,000, dimensional weight is 160 kg; gross controls at 180 kg. The teaching rate is USD 3.20/kg plus USD 95 fixed: cost USD 671. At 20% gross margin, selling price is USD 838.75.

The spare's delivery deadline is linked to the technician's availability, not merely the vessel arrival. Confirm whether it is needed for installation, testing or a later maintenance stage. If the technician is unavailable until a later date, paying for an earlier delivery may not protect the claimed benefit.

Keep the spare's invoice, packing, acceptance and receiving records separate but linked to the project. The major-unit cargo description should not conceal a battery, liquid or other relevant characteristic of the spare.

39.6 Build the budget and funding view

Proposal A's base is USD 205,000. The customer approves a 10% planning contingency, giving USD 225,500. Add the urgent-spare selling price separately if it is outside the original base scope; do not quietly count it twice.

For the case's provider-cost analysis, distinguish supplier cost USD 671 from customer selling price USD 838.75. A project budget prepared for the customer uses the agreed selling amount for that service; an internal job-cost model uses the provider's cost and revenue separately.

This distinction matters when multiple work packages are managed by different teams. The total must use a consistent perspective.

39.7 Respond to the foundation delay

The site delays M1's foundation release by three days. Under the accepted teaching rates, storage costs USD 1,500 per day. Keeping the handling team on standby costs USD 2,400 per day; demobilisation and remobilisation cost USD 6,800 in total.

Worked example 39.4 The change calculation. Standby option = 3 × 1,500 + 3 × 2,400 = USD 11,700. Remobilisation option = 3 × 1,500 + 6,800 = USD 11,300. The latter saves USD 400 if the team can return when needed and the alternative creates no further cost or risk.

The change request should identify the site cause, revised dates, preservation requirements, technical acceptance, commercial options and approval deadline. The customer must choose with the resource-availability evidence visible.

39.8 Respond to a drawing revision

Before inland movement, a new transport frame increases M1's width. The old route and handling assessments refer to the previous drawing.

The coordinator identifies the affected approvals, sends the revised configuration to the competent reviewers and holds reliance on the old plan. The project schedule and budget are updated only after the new consequences are assessed.

Do not describe this as a minor administrative change simply because the mass remains 48 tonnes. The relevant constraint may be width, support geometry, clearance or handling configuration.

39.9 Respond to an urgent commercial request

The customer asks the team to proceed while the revised route review is pending, offering to accept any additional cost. That approval addresses spending, not technical suitability or legal permission.

The response should explain the unresolved condition and the authorised path to a decision. Explore lawful alternatives with the specialists, such as a different accepted arrangement or revised timing. Do not improvise a route to preserve the delivery date.

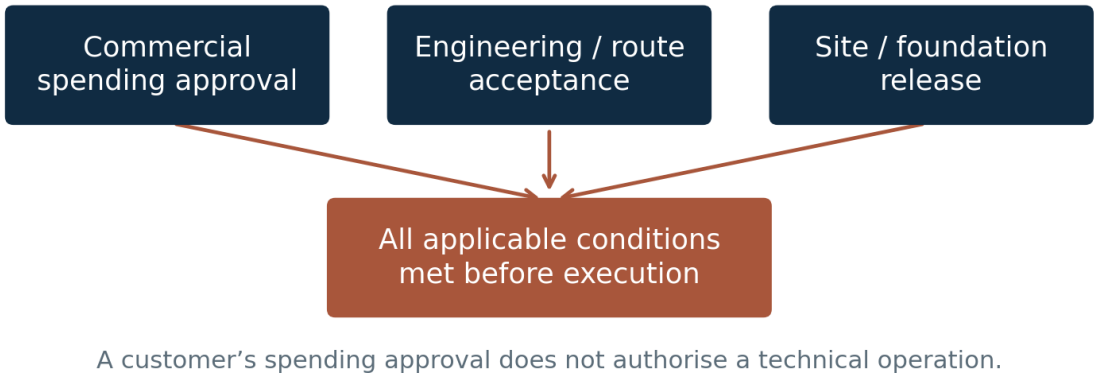


Figure 39.2 Commercial approval, engineering acceptance and site release are separate decisions. All relevant conditions must align before execution.

39.10 Prepare the execution control pack

The pack should contain the current cargo register, accepted scope, milestone plan, responsibility matrix, approved technical references, permit status, site readiness, preservation instructions, contacts, change register and cost forecast.

At each handover, record identity, count, observed condition, custody and the relevant acceptance evidence. Keep actual events distinct from the plan.

The customer report should focus on decisions: which prerequisites are complete, what remains open, what it affects and when approval is needed. Avoid filling the report with activity that does not change the project's readiness.

39.11 Close the project

Confirm major-unit and spare delivery, outstanding preservation or equipment obligations, work-package acceptance, supplier and customer billing, approved changes and any claims. Reconcile the final budget against the baseline and changes.

The final review should distinguish external events from controllable response. The foundation delay may originate with site construction, but the logistics team's quality is visible in how early it identified the conflict and how clearly it presented feasible alternatives.

Chapter 39 recap

Integrated project logistics coordinates different cargo, modes and decision authorities around one installation plan. Keep scope and cost perspectives consistent, preserve technical validity and control changes before execution.

Review questions

Answers and marking guidance • **page 247**

1. What is the major-unit mass total?
2. Why is the spare tracked separately?
3. Which path controls the earliest teaching start?
4. Why is Proposal B not USD 12,000 cheaper overall?
5. How can arrival order block the site?
6. What conditions qualify the storage-cost comparison?
7. Why distinguish supplier cost from selling price?
8. What is the calculated remobilisation saving?
9. Why does a width revision require reassessment?
10. Why does spending approval not authorise technical execution?

Applied exercises

Exercise 39A Extend the delay. The foundation delay becomes five days. Storage remains USD 1,500/day, standby USD 2,400/day and demobilisation/remobilisation USD 6,800 total. Calculate both options and the difference. Identify the resource and preservation conditions needed before recommending one.

Exercise 39B Submit the proposal. Prepare an execution proposal covering the cargo register, sequence, readiness gates, procurement comparison, urgent spare, budget, two change scenarios and customer communication. Mark every technical or legal approval that the logistics coordinator cannot grant.

Chapter 40 Assessment and professional portfolio

Show the work behind the answer

At the end of a textbook, it is tempting to test whether the reader remembers definitions. In forwarding, competence is also visible in the work produced: a usable instruction, a defensible calculation, a reconciled document set and a clear decision under uncertainty.

This chapter brings those outputs together in a professional portfolio. It is suitable for a student, a new employee or a practitioner reviewing their skills. Completing it demonstrates learning; it does not confer a regulated licence or replace supervised workplace assessment.

What you should be able to do

Assemble a coherent set of logistics work products; show assumptions and evidence; evaluate decisions across service, cost and risk; and identify the next development priorities.

40.1 Build one connected submission

Choose the retail case, the industrial case or an instructor-approved fictional variation. Keep the dataset consistent across all documents. A quotation, shipment plan and invoice audit should describe the same cargo and service.

The portfolio contains a shipment brief, service comparison, quotation, milestone plan, document audit, warehouse or project calculation, risk and change register, customer update and short management recommendation.

Include a source and assumption register. Distinguish supplied facts, verified external requirements, teaching assumptions and unresolved questions. A reader should be able to reproduce the numerical work and identify who would authorise the real decision.

40.2 Demonstrate operational completeness

The plan should identify cargo, parties, locations, service scope, timing, documents, handovers, receiving conditions and closure. It should also identify the event that triggers escalation.

Worked example 40.1 A complete-looking but weak plan. A student's timeline lists collection, departure, arrival and delivery, but no acceptance cutoff, release condition or receiving appointment. The plan is visually tidy but omits the dependencies that could stop it. The correction adds those events, their owners and evidence.

Completeness does not mean listing every conceivable risk. Select the requirements relevant to the case and explain why they matter.

40.3 Make calculations reproducible

Show the formula, units, substitution, result and interpretation. Keep intermediate values available and state rounding rules. Reconcile totals across the submission.

Worked example 40.2 A numerical explanation. “Air cost USD 810” becomes “15 cartons occupy 0.60 m³; dimensional weight at 6,000 cm³/kg is 100 kg; gross 150 kg controls; 150 × USD 4.20 + USD 180 = USD 810.” The second version can be checked and revised if a measurement changes.

A correct final number without its basis earns less confidence because the reviewer cannot distinguish understanding from coincidence.

40.4 Justify the recommendation

Compare feasible alternatives and identify the tradeoff. Explain why the chosen service meets the customer's requirement under the stated assumptions and what would change the decision.

Do not use a generic conclusion such as “air is faster” when the case needs a complete door-delivery comparison. Do not select a project option from price while its technical method remains unresolved.

Worked example 40.3 A conditional recommendation. “Use air for the identified launch assortment and LCL for the balance, subject to confirmed acceptance and the three-day balance margin. Reassess if the ocean plan moves beyond Day 42.” This statement identifies both the choice and its trigger for review.

40.5 Use the assessment rubric

The proposed rubric totals 100 marks. It rewards the work and reasoning rather than the appearance of certainty.

Assessment area	Marks	Evidence expected
Operational completeness	25	Connected scope, milestones, owners and handovers
Calculations	25	Correct units, formulas, assumptions and reconciliation
Justification	20	Feasible alternatives and a reasoned recommendation
Risk and compliance	15	Relevant controls, escalation and authority boundaries
Communication	15	Clear records, concise updates and usable presentation

Within each area, distinguish accurate completion, partial completion and material error. An unsupported claim of release, classification, safe handling or customer approval should reduce the relevant marks even if the rest of the presentation is polished.

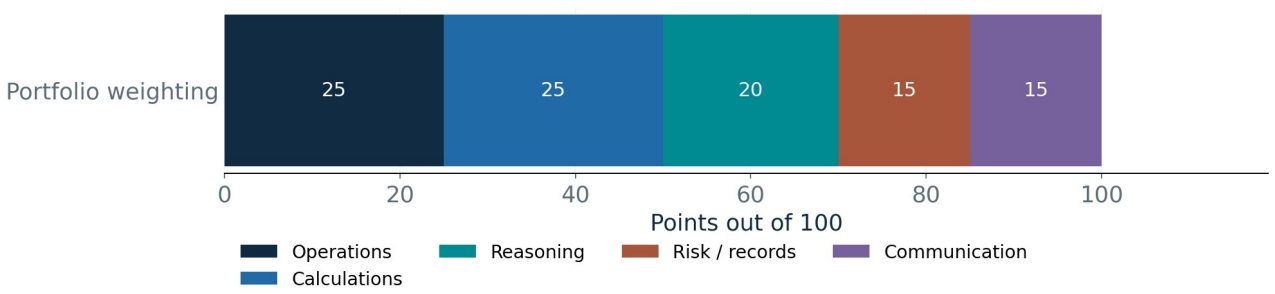


Figure 40.1 The portfolio rubric balances execution, numeracy, reasoning, responsible practice and communication.

40.6 Include a change event

After completing the baseline, introduce one meaningful change: revised dimensions, a missed connection, a stock discrepancy, a credit issue or site delay. Update only the affected records and explain the consequences.

The change tests whether the submission is connected. If dimensions change but the quote and booking remain untouched, the learner has treated the documents as separate assignments rather than one operation.

Preserve the baseline and identify the revision. The reviewer should be able to see what changed, why, who would approve it and which evidence closes the issue.

40.7 Present the work professionally

Use clear titles, readable tables, consistent units and labelled fictional documents. Keep the management recommendation short enough to support a decision, with detailed calculations available behind it.

If AI or another tool assisted, explain its role where required by the course or organisation. Verify the output yourself and retain the source data. Do not present generated text as evidence that an event occurred.

Use the workbook templates at the back of the book as starting structures, adapting them to the case. Blank fields should represent an explicit unresolved question or a deliberate exercise space, not a hidden omission.

40.8 Review your own limitations

Identify the tasks you can perform independently, those needing supervision and those requiring specialist qualification or authority. This is a professional skill, not a weakness.

Write a development plan with a specific next task, practice method, reviewer and evidence. Someone strong in calculations may need more practice with customer communication; someone confident in operations may need better financial reconciliation.

The book's cases have deliberately used fictional data so that readers can practise safely and openly. Real work adds local requirements, provider terms, system constraints and customer commitments. Carry the method into that work: establish facts, make assumptions visible, obtain the right decisions and close the record.

Chapter 40 recap

Demonstrate competence through a connected portfolio. Show how the work was calculated, why the decision was made and what changes when the facts change.

Review questions

Answers and marking guidance • page 247

1. Why should portfolio documents use one consistent dataset?
2. What belongs in an assumption register?
3. Why can a tidy timeline still be incomplete?
4. Which elements make a calculation reproducible?
5. What makes a recommendation conditional in a useful way?

6. Why does the rubric include risk and communication?

7. What does a change event test?

8. Why should the baseline be preserved?

9. How should AI assistance be treated?

10. Why should a learner identify their authority limits?

Applied exercises

Exercise 40A Complete the portfolio. Use the retail or industrial case and submit the nine connected work products described in section 40.1. Apply one change event and include the revised records. Use the 100-mark rubric for self-assessment before review.

Exercise 40B Review a peer submission. Check five material claims and three calculations against the supplied facts. Write feedback identifying two strengths, two corrections and one next learning task. Give evidence rather than a general impression of quality.

Answers and marking guidance

Use this section after attempting the chapter questions and applied exercises. For calculations, assess method, units, assumptions and the final result. For operational questions, credit a defensible recommendation with clear evidence and decision rights. A different answer can be sound when its assumptions are explicit and consistent with the case.

Chapter 1.....221
Chapter 2.....222
Chapter 3.....223
Chapter 4.....223
Chapter 5.....225
Chapter 6.....226
Chapter 7.....227
Chapter 8.....228
Chapter 9.....229
Chapter 10.....230
Chapter 11.....231
Chapter 12.....232
Chapter 13.....232
Chapter 14.....233
Chapter 15.....234
Chapter 16.....234
Chapter 17.....235
Chapter 18.....235
Chapter 19.....236
Chapter 20.....236
Chapter 21.....237
Chapter 22.....238
Chapter 23.....238
Chapter 24.....239
Chapter 25.....239
Chapter 26.....240
Chapter 27.....240
Chapter 28.....241
Chapter 29.....241
Chapter 30.....242
Chapter 31.....242
Chapter 32.....243
Chapter 33.....243
Chapter 34.....244
Chapter 35.....244

Chapter 36.....245
Chapter 37.....245
Chapter 38.....246
Chapter 39.....247
Chapter 40.....247

How to use these answers

For numerical questions, the answer is only part of the work. Show the calculation, units and assumptions. For operational questions, several responses may be sound. A strong answer identifies the missing evidence, assigns a practical next action and avoids promising an outcome that has not been confirmed.

Chapter 1 review answers

1. Logistics includes planning, storage, handling, information and coordination around transport. For example, booking a warehouse receiving slot supports a truck movement but is not itself transport.

2. A larger minimum order can increase shipment size and inventory needs; a distant supplier can extend replenishment time. Either may change service selection.

3. Required instructions, release information or a receiving appointment may be missing. Physical availability does not establish readiness to proceed.

4. The buyer pays the seller under the sales agreement. Freight is paid under the transport or forwarding arrangement, which may assign that cost differently.

5. $0.50 \times 0.40 \times 0.20 = 0.04$ m³ per carton.

6. Pallets can add weight, volume and handling constraints. The quoted assumptions may no longer describe the shipment.

7. Contract logistics manages a defined continuing operation, often with inventory and performance obligations across many receipts and orders.

8. The site may lack unloading resources or space, or need equipment in another sequence. Waiting can incur cost and block other activity.

9. Align cargo, locations, scope, timing, inclusions, exclusions, currency and validity.

10. Accepted DC receipt by the required deadline, with quantity and condition measured as agreed. Port arrival alone does not make stock available to the retailer.

Chapter 1 applied answers

Exercise 1A. A suitable cargo path is factory → origin consolidation facility → ocean movement → destination handling → DC. Information should include the buyer's order and transport appointment, factory readiness, booking instructions, milestone updates and receiving confirmation. Money should show the buyer paying the seller for goods and the appointed forwarder for agreed carriage. Provider payments can be shown separately. Two sound interruption points are missing release information at destination and a missing receiving appointment at the DC. Award credit for a consistent map rather than one preferred drawing style.

Exercise 1B. Stock cover is 1,800 ÷ 225 = eight days. The ocean arrival leaves a four-day gap: 12 − 8. Minimum bridging quantity is 4 × 225 = 900 units. The air shipment arrives on Day 6, before the existing stock is exhausted under the assumptions. Potential contribution protected is 900 × USD 4 = USD 3,600. After the USD 1,620 incremental transport cost, the illustrative net benefit is USD 1,980. A recommendation to use air is reasonable if the contribution would otherwise be lost, the service is feasible and no lower-cost recovery exists. Verify demand, arrival timing and whether customers would wait rather than cancel. These facts could change the financial conclusion.

Chapter 2 review answers

1. The forwarder clarifies the requirement, identifies missing data and builds a workable service plan before booking.

2. The seller or buyer may differ from the transport-document parties. Billing identity also may differ from delivery identity.

3. One party can undertake carriage contractually while another performs the physical movement.

4. It can establish the recorded package count and observable condition within the receiving scope, rather than the quality or contents of every sealed package.

5. The relevant authority grants customs release. A representative prepares and manages submissions within its authority.

6. Arranging a policy does not transfer the insurer’s coverage or claim-decision role to the forwarder.

7. Review the accepted offer, appointment, trading conditions and issued transport documents, with specialist advice if needed.

8. It makes tasks and evidence visible. Legal allocation still depends on contracts, facts and law.

9. An accepted transport order, with confirmed service details and an accountable owner, is missing.

10. Record the observed wet patches, affected carton identifiers, time and place; retain photographs and report the exception without asserting an unverified cause.

Chapter 2 applied answers

Exercise 2A. Forwarder operations obtains an accepted vehicle arrangement; the factory supervisor confirms a loading slot; the origin coordinator checks the receiving facility’s hours and booking; customer service explains the impact; the authorised customer or internal approver decides any additional expenditure. The investigation should note that no firm order was found with the road operator. A rate and an internal “proceed” message did not establish acceptance by that operator. The process needs a confirmation check and an escalation deadline. An answer that automatically assigns all liability to the road operator goes beyond the evidence.

Exercise 2B. Check the loading tally, signed collection receipt, warehouse count, any staged or rejected cartons, vehicle records and available handover photographs. Speak to the factory supervisor, driver, dispatcher and receiving supervisor. Verify that every record refers to the same shipment. A suitable customer update is: “The origin warehouse has recorded 298 cartons against the factory and collection records of 300. We are reconciling the receiving tally with the loading records and have asked the warehouse to check its staging areas. The discrepancy is not yet resolved. We will provide a verified count and next steps by the agreed update time.” Do not amend the packing list before establishing the facts: it could conceal a counting error or a genuine shortage and distort other commercial or regulatory records.

Chapter 3 review answers

1. A measurable deadline specifies the required event, place and time. “Urgent” does not.

2. A sound answer includes commodity, package count, external dimensions and gross weight, with handling characteristics where relevant.

3. Customer acceptance concerns the offer; service-provider acceptance establishes the booking. They are separate events.

4. 39 elapsed days, from Day 0 to Day 39.

5. Planned delivery precedes the deadline by three days. This does not guarantee that a missed connection or changed sailing can be recovered within that period.

6. The factory must be able to release the goods and the collection/receiving arrangements must be accepted. Identify a specific owner and confirmation.

7. ETA is a forecast for a named arrival event. Actual arrival requires evidence that the event occurred.

8. The difference may affect charges or documents and may indicate changed packing or measurement. Editing without explanation removes the investigation trail.

9. Explain the effect on the customer’s deadline, available options, required decision and next update.

10. Supplier costs, billing approvals and unresolved exceptions can remain after delivery. They need reconciliation.

Chapter 3 applied answers

Exercise 3A. Eight useful information groups are: precise cargo description and special characteristics; confirmed package count and packing method; external dimensions and stackability; gross and net weight; full collection and delivery locations with access requirements; release date and required receipt date; agreed sales term and service boundary; and authorised instructing/billing parties with document requirements. Related details can be grouped differently if nothing important is lost.

A suitable reply is: “Thank you. To propose the right service, please send the garment description and any special handling requirements; confirmed packing details, carton dimensions and stackability; gross and net weights; and the full collection and delivery addresses. Please also confirm when the factory can release the cargo, the latest acceptable delivery date, the sales term and scope required, and who will authorise and pay for the movement. Let us know any payment-related document requirements. We can then compare suitable services on the same basis.” Cargo characteristics and the readiness-to-receipt interval are particularly important to mode choice, although size, locations and cost limits can also be decisive.

Exercise 3B. Revised port arrival is Day 9 + 19 = Day 28. With four days for destination preparation and delivery, DC receipt is Day 32, two days after the Day 30 requirement. Reducing the destination interval to two days brings delivery to Day 30. Possible actions include preparing an accurate declaration package before arrival and reserving a viable receiving/delivery slot. Neither removes an authority’s right to inspect nor guarantees release. Confirm that the two-day interval is operationally achievable and that the receiver accepts the proposed slot. There is no remaining schedule margin.

Chapter 4 review answers

1. Delivery obligation, cost allocation, risk of loss or damage and ownership.

2. Examples include payment, ownership, remedies for breach and applicable law. The rule is not the entire sale contract.

3. EXW, FCA, CPT, CIP, DAP, DPU and DDP.

4. Loading the goods on the buyer-arranged collecting transport at the agreed seller-premises point.

5. The C rules separate the earlier delivery/risk point from the destination to which the seller pays carriage.

6. The actual handover occurs before FOB's on-board point. The parties should check a rule that matches their intended handover.

7. DAP delivery is before unloading; DPU delivery is after unloading at the named destination.

8. The invoice concerns sale quantities and value; the packing list describes packages and their contents. Both are needed for different checks.

9. Adding an invoice for the urgent portion while leaving the full original invoice allocated to the other shipment can duplicate value.

10. The chosen service may not produce the required document or meet the required timing. Clarification before shipment preserves the ability to amend the arrangement.

Chapter 4 applied answers

Exercise 4A. Buyer-arranged costs under X total USD 3,100: 300 + 400 + 1,500 + 550 + 350. X's subtotal is USD 51,100; Y is USD 51,300. X is USD 200 lower. Per-unit comparison is USD 6.3875 for X and USD 6.4125 for Y, or approximately USD 6.39 and USD 6.41. FCA transfers transit risk at the agreed origin handover, whereas DAP transfers it at destination before unloading. A USD 500 increase takes X to USD 51,600, or USD 6.45 per unit. Y then becomes USD 300 lower, on the stated assumptions. A good answer also notes the common exclusions and the need to compare service reliability and contract conditions.

Exercise 4B. The invoice's DAP Hamburg term conflicts with the agreed FCA factory term. The packing list implies 295 × 40 = 11,800 shirts, a difference of 200 shirts or five cartons from the order and the draft transport record. Verify the physical count, any partial-shipment approval, the correct commercial instruction and the source of the gross weight. Ask the authorised issuer to correct documents once the facts are established and preserve the version trail. Changing 295 to 300 without evidence could hide a shortage or create a false record.

Suggested assessment for Part 1

For an integrated review, ask the student to submit a three-flow map, a responsibility plan, a shipment brief, a milestone schedule and the completed supplier comparison. A practical marking allocation is 25% for operational completeness, 25% for numerical accuracy, 20% for the quality of reasoning, 15% for risk and document awareness and 15% for clear communication. Give credit for well-supported alternatives and deduct credit for unsupported certainty, even when the final number happens to be correct.

How to assess the work

For calculations, award credit for the method, units and assumptions as well as the result. For operational questions, look for a clear distinction between an observed fact, an unresolved question and an authorised decision. A response that recognises a missing dependency is often stronger than one that produces a quick but unsupported instruction.

Chapter 5 review answers

1. “Spare parts” does not identify the article’s function, materials, condition or potentially important contents. Different parts can require different handling and acceptance reviews.

2. The ten pallets are outer handling units containing 300 cartons. The packing hierarchy must remain visible.

3. The gross weight increases by pallet tare and any other added packaging. The goods’ net weight need not change.

4. The transport package occupies space at its outside dimensions, including relevant projections. Product and internal-box dimensions describe a different boundary.

5. There are 1,000,000 cm^3 in 1 m^3: 100 × 100 × 100.

6. Different carton groups have different dimensions and weights. Group-level data supports both accurate arithmetic and a usable handling description.

7. Physical density is mass divided by volume. Dimensional weight converts space to a commercial weight equivalent under a specified rating rule.

8. Geometry does not establish carton strength, pallet suitability, stability, restraint, equipment suitability or receiving-site acceptance.

9. Raw-wood skids or other components can raise questions even where the crate panels are processed wood. Check the whole construction and applicable requirements.

10. Review the cargo record, booking, quotation, packing list and any affected handling or receiving instructions. Establish whether weight also changed and obtain the necessary approvals.

Chapter 5 applied answers

Exercise 5A. The first group occupies 16 × 0.60 × 0.40 × 0.35 = 1.344 m^3 and weighs 16 × 14 = 224 kg gross. The second occupies 8 × 0.50 × 0.50 × 0.40 = 0.800 m^3 and weighs 8 × 20 = 160 kg gross. Total volume is 2.144 m^3 and total gross weight is 384 kg. Gross density is 384 ÷ 2.144 = approximately 179.10 kg/m^3.

Dimensional weight is 2,144,000 ÷ 6,000 = 357.333… kg, rounded up to 358 kg under the exercise rule. Comparing 358 kg with 384 kg gross gives 384 kg chargeable weight. Live checks include the divisor, piece-level versus shipment-level calculation, measurement rules, rounding, minimums, stackability and added packing. Any two relevant checks earn credit if their effect is explained.

Exercise 5B. Place four 30 cm carton sides along the 120 cm pallet side and two 40 cm sides along the 80 cm side. This gives eight cartons per layer. Three layers give 24 cartons per pallet, so 144 ÷ 24 = six pallets. Loaded height is 3 × 25 + 15 = 90 cm.

Each pallet occupies 1.20 × 0.80 × 0.90 = 0.864 m^3. Six occupy 5.184 m^3. Loose-carton volume is 144 × 0.40 × 0.30 × 0.25 = 4.320 m^3. The difference is 0.864 m^3, a 20% increase. Gross weight is 144 × 8 + 6 × 18 = 1,260 kg, or 210 kg per loaded pallet under the stated assumptions.

The proposal still needs confirmation of carton stacking strength, pallet and handling-equipment suitability, restraint and stability, receiving-site footprint and height limits, and any relevant wood-packaging requirements. Four well-explained questions are sufficient. Do not award full credit to an answer that describes the geometry as a certified loading plan.

Chapter 6 review answers

1. The invoice records the commercial goods and value; the packing list explains the packing structure. Both are needed for different checks.

2. A draft can show proposed particulars and help identify a file. It does not necessarily establish issue, acceptance or authority to release cargo.

3. Submission records that a message was sent. Acceptance records a defined response from the receiving process. The meaning of that acceptance must still be understood.

4. A sea waybill is non-negotiable and does not have the same title functions as an order bill of lading. Follow the actual issuer's release process.

5. The applicable road document and legal framework depend on the movement. CMR has a defined international scope, not universal application to every truck delivery.

6. The master may include several house shipments or a different packing boundary. The consolidation and measurement records should explain the difference.

7. Include what was weighed, the unit, measurement source, time, relevant receipt or record and whether the figure is measured or estimated.

8. The issuer is responsible for the commercial record and must authorise its correction. The forwarder should flag and coordinate the change within its own authority.

9. Distribute the replacement, mark the old version superseded, identify affected systems and users, and obtain the acknowledgements needed to prevent continued use of the old information.

10. Affected jobs, individual errors and unresolved jobs are different measures. A rate also changes meaning depending on whether it is measured at initial review or at a later control point.

Chapter 6 applied answers

Exercise 6A. The invoice arithmetic agrees: 24 × 50 = 1,200 units and 1,200 × USD 4 = USD 4,800. The packing-list gross weight agrees with 24 × 15 = 360 kg. Its volume agrees with 24 × 0.60 × 0.40 × 0.30 = 1.728 m³. Net weight of 336 kg is not contradicted by the brief, but its underlying source should be verified; the brief alone does not independently prove it.

The booking appears to retain a 20-carton scope. If the approved 24-carton instruction is reconfirmed, revise it to 24 cartons, 360 kg and 1.728 m³. Establish the correct delivery location from the authorised instruction and confirm access or appointment consequences. The customer or instructing party confirms the scope; the responsible provider must accept the booking amendment; origin, destination and any affected declaration teams need the current information. Do not treat a system edit as acknowledgement by all parties.

Exercise 6B. A strong six-step plan is: record the reported currency discrepancy and preserve v1; obtain the seller's authorised corrected invoice and confirm the commercial basis; urgently establish whether the declaration team has lodged anything using v1; request the applicable hold or amendment through the authorised process; circulate the corrected version and confirm affected systems and users have adopted it; then reassess cutoff feasibility and record the actual outcome.

Suitable customer update: "The seller has reported a currency error in invoice v1. We are obtaining the authorised correction and checking whether the declaration has already been lodged. The declaration team has been asked to prevent further reliance on v1 and advise the required correction process. The 12:00

cutoff remains at risk until that status is confirmed. We will update you by 10:30 with the corrected-document status and the available movement plan.”

Renaming v2 does not recall v1 from other users, amend an existing declaration or demonstrate approval. Credit plans that identify those dependencies and use a sensible earlier escalation time.

Chapter 7 review answers

1. Customs may administer the customs procedure while another agency controls a separate product or border requirement. Establish which decisions the actual shipment needs.

2. Classification identifies the tariff category; valuation establishes the relevant customs value; origin determines economic nationality under the applicable rules.

3. National subdivisions, product interpretation and destination requirements may differ. The proposed code needs review for the actual goods and importing jurisdiction.

4. Request function, model, specifications, condition, composition where relevant, drawings, serial numbers and the form of presentation, including components and accessories.

5. Applicable valuation rules may require adjustments and conditions beyond the invoice amount. The invoice is evidence, not necessarily the entire valuation calculation.

6. The sales term helps identify included costs but does not settle all statutory additions, deductions or valuation conditions.

7. Origin concerns production under the relevant rules. Transshipment is a routing event and does not, by itself, establish a new origin.

8. The goods must meet the arrangement’s origin and other conditions, with the required proof. The seller’s location alone does not establish eligibility.

9. Permanent import, temporary use, processing or transit can require different authorisations, evidence, guarantees and completion records.

10. Carrier holds, other agency requirements, terminal conditions, a missing receiving appointment or an unsafe unloading arrangement may remain.

Chapter 7 applied answers

Exercise 7A. Customs value is 30,000 + 1,200 + 150 = USD 31,350. Duty at 4% is USD 1,254. The assumed tax base is 31,350 + 1,254 + 250 = USD 32,854. Import tax is 32,854 × 18% = USD 5,913.72. Combined duty and tax are USD 7,167.72.

At 6%, duty becomes USD 1,881. The tax base becomes 31,350 + 1,881 + 250 = USD 33,481. Import tax is USD 6,026.58, giving combined duty and tax of USD 7,907.58. The increase is USD 739.86. The calculation compares consequences of stated assumptions; it does not authorise selection of a code for its price. Classification must follow the goods and applicable rules, and the live tax treatment must be confirmed separately.

Exercise 7B. A suitable readiness list asks the manufacturer for exact function and specifications; the seller for models, serial numbers and condition; the packer for final dimensions and weights; the buyer for intended use and procedure; the importer for legal identity and required registrations; the appointed reviewer for classification; the supplier and importer for origin evidence; the commercial parties for invoice and payment details; the valuation reviewer for relevant costs and adjustments; the local specialist for used-equipment restrictions or permits; finance for duty or guarantee arrangements; and the receiver for access and approved unloading resources.

Timing risks include unresolved product identification, unverified relief eligibility, missing permits or procedure authorisation, and an unprepared receiving site. A good response assigns an owner and deadline to the most material gaps rather than presenting every question as equally urgent.

Suitable update: “We understand that two used machines are expected next week, but final cargo measurements and clearance readiness are not yet confirmed. The supplier’s duty-free statement requires review against the actual goods, procedure and supporting evidence. Please provide the specifications, invoice and packing details, and confirm the intended use and importer appointment. We also need the factory’s unloading plan before arranging direct delivery. We will advise the unresolved requirements and schedule implications once these are reviewed.”

Chapter 8 review answers

1. Safety addresses harm arising from work or goods; security addresses deliberate interference and unauthorised access; cargo care preserves product condition. A damaged, tampered-with package can involve all three.

2. Record the count, exact visible damage, package identifier, inspection limitation, time and location, evidence and action taken. Do not assert unseen internal damage or responsibility without evidence.

3. Moving it may expose people or worsen a hazardous condition. Physical response belongs under the site procedure and the direction of trained personnel.

4. The statement omits the battery’s actual characteristics, configuration and condition. A specific concern needs supporting product information and qualified review.

5. An SDS may be absent, incomplete or inconsistent with the item’s current condition and transport configuration. Classification and acceptance still require the applicable review.

6. Chemistry, type, rating, quantity, condition, configuration and relevant manufacturer or test-summary documentation may be needed. The specialist establishes the exact requirements.

7. Express services may use aircraft or other modes not apparent from the customer’s label for the service. Requirements follow the actual movement.

8. Equipment suitability depends on the particular load and operation, including configuration and limits. A competent person must assess it.

9. They establish two recorded readings above 8°C, ten minutes apart. They do not establish exact excursion duration between samples or product acceptability.

10. The record must explain the discrepancy and its resolution. Editing away the original observation would destroy part of the custody evidence.

Chapter 8 applied answers

Exercise 8A. A suitable note is: “18 cartons received. One carton has a torn side with a battery reference visible through the opening. Battery details are absent from the booking. No heat, smoke or leakage observed from the receiving team’s safe position. Contents not examined. Supervisor notified; onward acceptance held pending assessment.” Identify the affected carton precisely in a live record.

Coordinate the system and movement hold through the site process. Involve the warehouse supervisor, the shipper, customer service and the qualified dangerous-goods reviewer; involve safety or security personnel as the facts require. Request the exact device and battery identification, chemistry, rating, quantity, configuration, condition and relevant manufacturer documentation. Do not open or manipulate unknown contents to obtain that information.

Suitable message: “Receipt has identified damaged outer packaging and a battery reference not included in the booking. Onward acceptance is on hold pending qualified assessment. Please send the manufacturer’s device and battery details and confirm the contents and condition. We are coordinating the review with the warehouse and will advise the permitted next step and schedule impact when confirmed.”

If immediate danger appears, the emergency response takes priority: move away, alert the site response and keep others clear under the established procedure. Do not move or open the package to investigate. Credit answers that distinguish an operational hold from a physical handling decision.

Exercise 8B. The readings at 14:30 and 14:45 exceed the fictional 25°C upper limit. The observations are fifteen minutes apart, but they do not establish the exact excursion start or end. The absence of external damage does not demonstrate compliance with temperature requirements or product suitability.

Apply the relevant quality hold and preserve the raw logger data, shipment association, time basis, placement and calibration evidence, custody events and product instructions. The authorised quality decision maker needs the appropriate product-specific assessment before release into available stock. A later 24°C reading is evidence of a later measurement within range, not automatic recovery of product quality.

Suggested practical assessment after Part 2

Ask the learner to prepare a cargo measurement record, a document-discrepancy log and a clearance-readiness note for Arcwell’s two-machine import. Add one operational exception: a changed crate dimension, an incomplete product description or an unresolved unloading arrangement. Require a customer update that explains the consequence and names the next decision.

Assess operational completeness at 25%, numerical accuracy at 25%, quality of reasoning at 20%, risk and document awareness at 15%, and communication at 15%. Give credit for an explicit, relevant uncertainty. Deduct credit for silently inventing a classification, a release, a safe handling method or a customer approval.

Chapter 9 answers

1. A direct flight can have an inaccessible cutoff or slower destination completion. Compare the entire accepted delivery sequence.

2. Clarify collection, origin and destination handling, formalities, duties, delivery and unloading rather than assuming the label includes them.

3. Passenger aircraft share relevant capacity with baggage and mail; freighters have cargo-oriented configurations and potentially different access. Actual acceptance remains aircraft- and service-specific.

4. Dimensions, contour, bearing characteristics, handling and commodity restrictions can control acceptance independently of total weight.

5. A ULD groups and restrains cargo, mail or baggage and interfaces with the aircraft loading system. It is not an ordinary warehouse pallet.

6. Consolidation can introduce receiving, closing, build-up and destination breakdown events. Include their timing and document relationships.

7. A road feeder segment changes the physical mode and may matter to timing, care requirements and the customer's instructions.

8. Scheduled describes a plan, booked describes a reservation under its conditions and actual describes an evidenced completed event.

9. The customer should confirm the avoidable business consequence and the authorised spending decision. The forwarder should not invent the loss.

10. A credible option has confirmed cargo and route suitability, resource availability, complete timing, cost and a decision deadline.

Exercise 9A. A takes 56 hours from Day 1 08:00 to Day 3 16:00. B takes 26 hours to Day 2 10:00. B's premium is USD 650 and its margin before the deadline is two hours. Confirm cargo and document readiness, provider acceptance and destination release and receiving arrangements. The recommendation should remain conditional on these facts rather than treating the exercise dates as a guarantee.

Exercise 9B. Strong questions cover the exact commodity and contents, package count, external dimensions, gross weight and measurement basis, stacking and handling limits, readiness and cutoff, required usable-delivery date, importer and release arrangements, receiving access and care requirements. Any eight well-explained questions are sufficient. An old rate lacks the current cargo, capacity, scope and validity evidence.

Chapter 10 answers

1. Terminal arrival records a vehicle or cargo arrival event. Acceptance requires the relevant readiness checks and does not itself prove uplift.

2. Link parties, cargo, locations, service scope, timing, care requirements, charges and references to the approved instruction.

3. Data, documents, special approvals, security processes and physical cargo can have different deadlines and owners.

4. Expose the deficit, seek a feasible revised sequence or service and obtain required approvals before promising the original plan.

5. It identifies the expected and observed facts, source, time, consequence, owner and next decision.

6. The applicable authorities, authorised security arrangements and operator procedures determine the process. The coordinator follows the approved route.

7. A pre-alert prepares destination work using current shipment, document, care and release information before arrival.

8. An aircraft may depart without the consignment. Shipment-level uplift evidence is required.

9. Availability, regulatory and carrier release, payment or document conditions and receiving readiness can remain open.

10. The original plan is necessary to explain the exception, assess performance and understand the approved change.

Exercise 10A. Planned terminal arrival is 18:00 minus 75 and 45 minutes = 16:00. Supplier departure is 13:00 after allowing three hours' driving. Loading starts at 12:00 after allowing one hour. A 13:30 loading start is 90 minutes later than planned and would yield 17:30 terminal arrival, leaving only 30 minutes until cutoff. The stated processing alone requires 75 minutes, so the plan is infeasible as given. Obtain an accepted alternative rather than remove the missing time.

Exercise 10B. Do not alter the packing list to a false count. Preserve the ten-piece instruction and nine-piece receipt, establish the missing piece and seek an authorised partial-shipment decision. Confirm commercial usefulness, corrected issuer documents, relevant filing amendments and provider acceptance. A suitable update states that nine pieces were received, acceptance is pending authorised reconciliation, the cutoff is at risk and the next confirmed update time.

Chapter 11 answers

1. External dimensions describe the package occupying transport space; product dimensions can omit packaging and projections.

2. The divisor is stated in cubic centimetres per kilogram when the numerator is cubic centimetres.

3. Divisors and other rating rules differ by offer, provider and service. The actual quotation controls.

4. Compare calculated freight with the minimum and select the applicable greater amount, then add separately defined charges.

5. Physical and calculated chargeable weights describe cargo and rating inputs. A permitted higher-break weight is a commercial charging convention.

6. It is permissible only when the actual tariff or offer allows it and its other conditions are met.

7. A different divisor, minimum, fee, exclusion or scope can outweigh the lower rate.

8. Margin divides profit by revenue; markup divides profit by cost.

9. Premature or repeated rounding can distort the result. Apply rounding at the stages required by the quoted rule.

10. Provide verified old and new measurements, the rating rule, recalculation, cost effect and required approval or acceptance.

Exercise 11A. Volume = 10 × 0.60 × 0.50 × 0.40 = 1.20 m³. Gross = 180 kg. Dimensional weight = 1,200,000 ÷ 6,000 = 200 kg, so 200 kg controls. Weight freight = 200 × 3.10 = USD 620, above the USD 500 minimum. Total cost = 620 + 80 = USD 700. Selling price for 20% margin = 700 ÷ 0.80 = USD 875, producing USD 175 gross profit.

Exercise 11B. At 88 kg, freight is 88 × 4.20 = USD 369.60; with fixed charges, USD 434.60. Charging as 100 kg gives USD 360 freight and USD 425 total, saving USD 9.60. Retain the actual measured gross weight and the calculated 88 kg chargeable weight as applicable; identify 100 kg separately as the permitted rating weight. Do not amend the physical cargo weight to 100 kg.

Chapter 12 answers

1. Earlier transport can violate care, acceptance or packaging conditions. Feasibility for the product comes before speed.

2. It can conceal temperature, dangerous-goods, welfare, perishability, security or other specific requirements.

3. The shipper supplies accurate facts; appropriately qualified and authorised parties determine regulated acceptance and technical decisions.

4. Care must continue through transfer waiting and handling. A facility's existence does not prove access for this shipment.

5. Record start event, preparation, tested conditions, duration, limitations and the authority approving its use.

6. It identifies a timing conflict against the stated qualification. It does not extend qualification or decide product condition.

7. Original records preserve timing, sensor and custody evidence that summaries or screenshots may omit.

8. Pause the affected acceptance process, preserve the new fact and refer it to the authorised dangerous-goods review.

9. They involve different risks, evidence, qualified decisions and operating arrangements.

10. State the verified event, consequence, protective action, options, decision owner and next update.

Exercise 12A. From Day 1 08:00 to Day 3 20:00, 60 hours have elapsed and 36 remain. Delivery at Day 5 10:00 is 98 hours after pack-out, two hours beyond the stated 96-hour period. Refer to the authorised product and packaging team, examine an accepted earlier delivery or other qualified alternative and preserve the conditions and records. Do not declare the product failed or extend the period yourself.

Exercise 12B. The record should state the missed connection, verified location and custody, approved original battery configuration and lack of alternative-operator acceptance. Obtain the new operator's qualified review, confirm care and secure custody while waiting, compare complete delivery and cost, and identify customer spending authority. Close only after the accepted revised plan is recorded. A customer request alone cannot create operator acceptance.

Chapter 13 answers

1. FCL describes the agreed container service, not a requirement to occupy every cubic metre.

2. LCL normally includes cargo receiving, consolidation and destination breakdown in addition to the main movement.

3. Openings, geometry, load distribution, securing, access and actual equipment limits still require assessment.

4. High-cube equipment offers a different height envelope; confirm the actual unit and route.

5. Product instructions, loading condition, airflow and other relevant settings, monitoring, power continuity and qualified acceptance.

6. The opening, handling method or required manoeuvre may prevent the intended loading even when internal dimensions appear sufficient.

7. They require cargo-specific handling, securing and potentially out-of-gauge acceptance rather than a generic dry-container assumption.

8. Breakbulk units are individually handled; ro-ro uses suitable wheeled or mobilised units under the accepted vessel arrangement.

9. Connections create additional cutoffs, custody and monitoring dependencies.

10. Quantities, values, carton marks, transport records, commercial documents, relevant filings and receiving instructions must remain reconciled.

Exercise 13A. FCL costs USD 350 more and has four days' margin; LCL has one day. Confirm packaging and handling suitability, actual route and connections, complete charge scope, cargo and document cutoffs, receiving arrangements and recovery options. Either recommendation can earn credit if it explains the customer's priorities and accepted service evidence.

Exercise 13B. Request the final packed drawing, external projections, gross mass and measurement source, loading orientation, door and internal access, support points, centre-of-gravity and lifting information, approved securing method and destination unloading capability. Refer equipment and handling suitability to the appropriate provider and competent specialists. Dimensions alone cannot certify the solution.

Chapter 14 answers

1. Gate-in is an earlier terminal event; release, acceptance, stowage and loading conditions may remain.

2. Shipping instructions provide transport-document data; VGM addresses verified packed-container mass under the applicable process.

3. Update identifiers, tare-dependent calculations and all affected booking, transport-document and filing records through authorised corrections.

4. Cargo and its packaging, added pallets, dunnage, securing material and actual container tare within the approved method.

5. Other acceptance conditions and the master's discretion remain.

6. It requires the relevant provider's actual approval under its conditions, not a dispatcher assumption.

7. Parties, references, packages, weights, marks, equipment and seal details where relevant, routing and required statements.

8. Documents, appointments, funding and controls can be prepared before the goods arrive, reducing avoidable delay.

9. Carrier or terminal holds, missing required authority decisions, receiving constraints or unsafe handling conditions.

10. Equipment obligations and charges can continue after goods delivery until the agreed return event.

Exercise 14A. Component total = 12,600 + 300 + 90 + 3,750 = 16,740 kg. The responsible shipper and authorised parties must establish the applicable approved method, measurement evidence, signatory and timely submission. The calculation alone does not prove VGM compliance.

Exercise 14B. Stuffing finishes at 13:00, after the 12:00 VGM cutoff. If the proposed method depends on completion, the plan conflicts with that deadline and needs an authorised feasible revision. The three-hour drive gives 16:00 gate-in, two hours before the 18:00 cutoff under the stated simple plan. Confirm the actual measurement method, submission acceptance, loading completion, driving and terminal conditions, plus Thursday's shipping-instruction readiness.

Chapter 15 answers

1. Origin, destination, delivery and delay-related charges can exceed the main-carriage saving.

2. Mark it unresolved or estimated with a source and range where available; do not assign zero.

3. It compares whole-shipment cubic metres with metric tonnes under the explicit fictional one-to-one convention.

4. Different fees, weight density, equipment and service assumptions change the equality point.

5. Storage can charge facility use, while equipment charges concern the carrier's unit under its terms.

6. Start and end events, included days, calendar basis, free time, tiers and rounding.

7. It can extend outside-equipment time or fail to change empty return.

8. Receiving labour, unloading resources, transport, release and empty-return arrangements must make the revised plan feasible.

9. The agreed rate, tariff, event records, quantities, identifiers and authorised changes.

10. A dispute is a claim for correction; the liability and accounting treatment remain subject to the proper decision.

Exercise 15A. Weight controls at 9.5 revenue units because 9.5 exceeds 7.2. Freight = 9.5 × 78 = USD 741. Total = 741 + 190 + 260 + 210 = USD 1,401. State that this is the exercise's whole-shipment rule.

Exercise 15B. Storage charges Days 4–6 at USD 45 and Day 7 at USD 70: USD 205. Outside days are Days 8–11; Days 8–9 are free and Days 10–11 charged at USD 60: USD 120. Total is USD 325. Gate-out day is included only in the storage clock under the stated convention.

Chapter 16 answers

1. Rollover concerns a shipment missing its intended sailing, blank sailing changes a planned departure and missed connection concerns the onward leg.

2. The same outcome can have different causes. Evidence is needed before assigning responsibility.

3. It shows how much delay the plan can absorb before the customer's requirement is missed.

4. An urgent movement must contain the assortment the customer can use, not arbitrary cartons.

5. Quantities, values, package identity, transport and commercial records, filings where affected and receiving instructions.

6. Incremental cost is the additional avoidable or required cost of changing the plan, rather than all costs already committed.

7. An invented probability creates false confidence and can distort the decision.

8. Exact option, scope, cost ceiling, assumptions, authority, timing and required provider acceptance.

9. An unconfirmed alternative may fail after the original booking is cancelled.

10. Detection, escalation, approval availability, evidence quality and communication can be improved even when the external event was uncontrollable.

Exercise 16A. Original margin is three days; revised Day 34 delivery is three days after the Day 31 deadline. Stated avoidable loss is 3 × 900 = USD 2,700. The USD 2,100 air split protects a net USD 600 under the assumptions. Revisit if the minimum assortment is not useful, air acceptance changes, another constraint prevents use or the buyer's loss estimate is unsupported.

Exercise 16B. The note should label the new port as a requested option, not an accepted route. Assign cargo transfer to the relevant carrier/terminal parties, customs treatment to the appointed representative and receiving capacity to the customer/site. Include current custody, the decision deadline, cost implications and a specific next update.

Chapter 17 answers

1. The customer may reserve the agreed vehicle arrangement without using every space or kilogram.

2. Collection, terminal sorting, consolidation and delivery processes can add handovers.

3. Legal operation, vehicle suitability, access, care and receiving conditions still apply.

4. Body type, internal and door dimensions, loading access, floor and axle constraints, temperature capability and unloading equipment.

5. They compare different limiting resources; light goods may occupy space before exhausting payload.

6. It assumes a compatible arrangement and the stated width and tariff. It is not loading or securing approval.

7. Packaging strength, stability and handling conditions determine what can be placed above the goods.

8. Entrance, approach, restrictions, booking, hours, unloading resources and responsible contacts.

9. The relevant transport and site parties must agree the division under the actual arrangement.

10. Waiting, appointments, extra stops, restricted access, special equipment, returns and failed delivery.

Exercise 17A. Mass = 22 × 700 = 15,400 kg. Mass utilisation = 15,400 ÷ 18,000 = 85.56%. Position utilisation = 22 ÷ 26 = 84.62%. Check actual dimensions, loading distribution and securing, stacking or compatibility, site access and unloading, plus applicable route and vehicle conditions.

Exercise 17B. Ask for pallet dimensions and weights, load stability, accepted unloading method, site approach and vehicle restrictions, lift and handling suitability, receiving staff and equipment, appointment confirmation, waiting terms and contingency. A tail lift requires a suitable actual load and operation; its presence is not proof of safe delivery.

Chapter 18 answers

1. Loading, processing, breaks, waiting, unloading and legal constraints add time and dependencies.

2. Cargo, documents, equipment, driver instructions, route and receiving arrangements.

3. Legal driving and rest depends on relevant prior activity and the applicable rules, not only the current trip.

4. Export, transit, import and product controls can require separate reporting and completion.

5. CMR concerns qualifying international carriage, not every domestic delivery.

6. Preserve expected and actual facts, obtain the authorised correction and update affected transport and filing processes.

7. State the known event, uncertainty, owner and next update instead of inventing a precise delivery time.

8. It records the delivery event within its process and inspection scope, not necessarily internal product quality.

9. Record the reason, protect cargo and seek an authorised next instruction.

10. Count, condition, exchange and return obligations create separate operational and commercial work.

Exercise 18A. Loading ends 07:30; border arrival 10:00; planned processing ends 11:30; receiver arrival 13:30; completion 14:00. Four-hour actual processing ends 14:00, giving simple arrival 16:00 and completion 16:30. Before promising these times, reassess lawful driving/rest, receiving hours, unloading and any changed route or border conditions.

Exercise 18B. Suitable note: “Eight pallets received at the recorded time and location. One identified outer carton visibly crushed; internal contents not examined. Receiver's exception recorded.” Preserve photographs, package identifiers, custody and notifications, and refer product assessment through the authorised process. “Perfect condition” contradicts the visible observation and exceeds the inspection scope.

Chapter 19 answers

1. The provider incurs resources for the complete operating cycle, including necessary repositioning.

2. It can be included in both a kilometre rate and an additional fuel line without an explicit separate basis.

3. Its revenue, compatibility and availability are uncertain until accepted.

4. Free period, start event, actual duration, rate unit and rounding convention.

5. Additional time and tolls can outweigh distance savings.

6. Travel and service durations must fit each customer's accepted window.

7. Different bases assign shared resources differently while preserving the total.

8. Allocation explains internal economics; selling price also reflects the agreed service and commercial decision.

9. Weight, space, loaded distance and time utilisation.

10. Actual route, authorised changes, stops, waiting, restrictions and provider records.

Exercise 19A. Distance cost = 360 × 0.85 = USD 306. Stops = USD 36. Total cost = 160 + 306 + 28 + 36 = USD 530. Price at 20% margin = 530 ÷ 0.80 = USD 662.50. Do not add fuel again.

Exercise 19B. Incremental contribution = 260 − 90 = USD 170. New loaded distance is 200 + 160 = 360 km; total distance is 400 + 20 = 420 km. Loaded-distance utilisation is 360 ÷ 420 = 85.71%, assuming the additional 20 km are not loaded. The exercise states compatibility and confirmation; a live decision would also check time and service effects.

Chapter 20 answers

1. Multimodal uses multiple modes; intermodal generally retains the same loading unit while changing modes without handling the goods themselves.

2. Legal or statistical instruments can define scope for a particular purpose.

3. The physical chain describes movement; the through contract describes a commercial and legal arrangement.

4. Missing a cutoff can mean waiting until the next service cycle, beyond the main transit duration.

5. Navigability, water levels, locks, vessel and terminal capability, schedules and operating conditions.

6. They are necessary parts of the complete service and can offset linehaul savings.

7. A slower service can tie up goods longer or change stockout exposure.

8. Parties, unit identity, acceptance record, cutoff, status and exception owner.

9. Bookings, cancellation, release, equipment, customs status, cost and customer approval where affected.

10. Otherwise one option can appear better by omitting parts of its transport chain.

Exercise 20A. Rail total = 220 + 610 + 150 + 190 = USD 1,170, USD 80 below road. Road has three days' margin and rail one. Confirm rail cutoff and frequency, unit acceptance, terminal and final-road capability, release and receiving arrangements, and comparable charge scope.

Exercise 20B. Extra carrying cost = 120,000 × 0.15 × 4 ÷ 365 = USD 197.26. Net modelled saving = 300 − 197.26 = USD 102.74. The assumed annual rate and goods value need customer confirmation; reliability, stockout consequences, accounting treatment and other costs may change the decision.

Chapter 21 answers

1. An integrated operation combines activities, data, decisions and performance over time; storage alone is one resource.

2. Shared-user models can offer flexibility; dedicated models can support specialisation but create reserved-capacity and investment exposure.

3. Pallet-level receipt and item-level inspection require different work and establish different evidence.

4. Daily and peak receipts, orders, lines, units, SKUs, dimensions, returns and cutoff concentration.

5. Order count, line mix, travel, packing and handling effort can differ.

6. Data correction, stock disposition, quality release, capacity changes, overtime and scope changes need clear authority.

7. Compare with agreed assumptions, test feasible resources and present service and cost consequences.

8. A defined event, population, time boundary, source and exception rule.

9. They explain why stock or orders were unavailable and prevent manipulation of the denominator.

10. Inventory, data, open work, equipment ownership, records and transfer responsibilities.

Exercise 21A. A strong scope defines products and care, receiving inspection, operating calendar, storage, order profile, cutoff, picking and packing, returns disposition, relabelling, systems and measures. Questions should address peak profile, units per line, product dimensions, data quality, quality authority, packing materials and forecast notice. Award credit for clear boundaries and owners rather than length.

Exercise 21B. Customer/master-data owner corrects and approves the product code; warehouse operations maintains the affected hold and protects stock; the account or service owner communicates the deadline consequence; the authorised business/quality process releases the corrected record. An improvised substitute can break traceability, valuation and future transactions.

Chapter 22 answers

1. Wrong location, identity, status or timing can prevent reliable fulfilment despite a correct total.

2. It links a logistics unit with associated data; scanning alone does not independently verify contents.

3. Cases, cartons and individual units can differ by large conversion factors.

4. Use the authorised exception and record the actual accepted location.

5. It creates waiting, congestion or informal substitutions.

6. Quality holds, allocations and other statuses can prevent use.

7. Packing prepares the shipment; dispatch records the defined carrier handover or departure event.

8. Returned goods need inspection and authorised disposition before becoming available.

9. Matching defined records divided by all checked records, using the stated tolerance.

10. Adjustment changes the record; corrective action addresses the cause.

Exercise 22A. Expected stock = 320 + 180 − 275 − 5 = 220 units. Physical 212 gives an unexplained shortage of eight. Check receipt evidence, dispatch confirmation, unit conversion, transfers, in-progress movements and authorised adjustments before deciding the cause.

Exercise 22B. Accuracy = (150 − 9) ÷ 150 = 94%. Equal overage and shortage on different SKUs do not make either record correct. Preserve counts, control relevant movements, trace source transactions and investigate possible misidentification or conversion without assuming that cause. Approve any adjustment through the proper process.

Chapter 23 answers

1. Practical flexibility, compatibility and operating constraints can require unoccupied or unavailable positions.

2. It is a stated classroom planning policy, not a universal safe or commercial limit.

3. Paid hours include time that may not produce the measured activity; the model must account for that boundary.

4. The activity unit and included work, such as lines per productive hour.

5. If packing is slower, extra picking increases work in progress rather than completed output.

6. A late concentrated wave may exceed capacity within the remaining window despite adequate daily hours.

7. Time basis, stock measure, source and treatment of holds, returns and peaks.

8. Fixed costs remain when volume falls; contribution must cover them.

9. The volume at which contribution equals the stated fixed cost under the model.

10. Accuracy, safety, service, damage, mix and data completeness.

Exercise 23A. Required nominal positions = 900 ÷ 0.90 = 1,000. Picking requires 4,800 ÷ 80 = 60 productive hours. At six per person, ten people are required. Confirm the rate, order profile, shift timing, training and other stage capacity.

Exercise 23B. Storage = 420 × 30 × 0.50 = USD 6,300. Inbound = USD 1,080. Outbound = USD 1,190. Add fixed USD 1,800: total USD 10,370. Verify billable storage method, activity count boundaries, included inspection and handling, and treatment of other services or taxes.

Chapter 24 answers

1. Data, people, exceptions, interfaces and physical processes may remain untested.

2. Trigger, fields, validation, resulting business state, acknowledgement and failure handling.

3. It determines identity, quantity, storage and handling in the physical operation.

4. It verifies that replay does not duplicate the business effect, not merely that a message arrives.

5. A successful retest against a predefined expected result with retained evidence.

6. It can actually restore or continue controlled operations while preserving stock and transaction integrity.

7. Stable operation allows causes and effects to be understood before several changes interact.

8. They use different populations and reflect different customer experiences.

9. Another factor may have caused the errors; event evidence and segmentation are needed.

10. Approved scope, process versions, data definitions, tests, ownership, contacts and change records.

Exercise 24A. Line accuracy = (9,000 − 60) ÷ 9,000 = 99.33%. Order accuracy = (1,500 − 45) ÷ 1,500 = 97%. The order measure directly describes the proportion of orders without a recorded error in this dataset. Neither alone proves all aspects of service quality.

Exercise 24B. Recommend no-go for the affected launch while critical duplicate handling and quality-hold release remain unresolved, unless an authorised, tested and genuinely adequate alternative controls those risks. Require corrected logic, passed end-to-end retests, reconciled stock effects and named launch authority. The update should state the two blockers, business consequences, owners and next review time.

Chapter 25 answers

1. It can consume laydown space, preservation resources or funds before installation is possible.

2. Its absence can block commissioning or a critical installation dependency.

3. Identity, supplier, readiness, final configuration, dimensions, mass, support/lifting information, preservation and document status.

4. Frames, packaging and projections can enlarge or otherwise change the transported unit.

5. Each transfer requires suitable support, handling, custody and evidence.

6. Coordinate current inputs, competent reviews and accepted conditions; do not claim the engineering decision.

7. Too-early arrival can be as disruptive as lateness.

8. Handling, infrastructure, approvals and site access may make the shorter option infeasible.

9. Alignment of cargo, route, handling, permits, site readiness and commercial conditions.

10. It states confirmed feasibility conditions, unresolved evidence, owners and consequences.

Exercise 25A. Operating envelope = 4 × 2 × 2.5 = 20 m³. Packed envelope = 4.5 × 2.4 × 2.8 = 30.24 m³. Increase = 10.24 ÷ 20 × 100 = 51.2%. Review vessel and terminal acceptance, inland configuration, route and permits, handling and support, preservation and site access. Volume is only one planning input.

Exercise 25B. Credit a structured request for final drawings and measured mass, centre-of-gravity and support/lifting data, transport configuration, origin/site access, route survey, required approvals, preservation and custody, readiness and installation sequence. Assign technical evidence to manufacturer and competent engineers, route and permit evidence to responsible specialists and authorities, and site readiness to the site owner.

Chapter 26 answers

1. It does not establish current clearances, structural capability, access or approval for the actual configuration.

2. The final cargo together with the intended transport equipment and support arrangement.

3. Deck, supports, frames and projections add to or change the envelope.

4. Permits, structures, utilities, lifting and site acceptance address different conditions.

5. Route, vehicle, timing and other conditions can limit the permit's validity.

6. Appropriately competent and authorised technical parties under the applicable requirements.

7. A specific location or issue, evidence required, owner, deadline and closure condition.

8. Cargo, mass, dimensions, support, vehicle, route, ground, weather, access or date changes as relevant.

9. The load or conditions may no longer match the earlier assessment.

10. Pause the affected action, preserve facts and obtain an authorised reassessment or revised plan.

Exercise 26A. Open decisions are current drawing validation, permit/vehicle alignment, ground suitability and a revised delivery commitment based on those prerequisites. Assign manufacturer/technical owner, haulier/permit authority, competent site reviewer and project/customer decision maker respectively. State that the announced date does not close any technical condition.

Exercise 26B. Record the revision, identify every assessment using the old width, issue current drawings to competent route/transport/handling reviewers, obtain required amended approvals and assess schedule and cost. Preserve superseded records and confirm provider adoption before execution. No learner clearance estimate should be treated as approval.

Chapter 27 answers

1. Packages make outputs, interfaces, owners and omissions visible.

2. Current cargo, scope, schedule, assumptions, required evidence and explicit exclusions.

3. Excluded required work can reverse the headline comparison.

4. The longest required dependency path under the stated logic.

5. The time the shorter path can slip before changing the shared start, assuming other conditions remain.

6. Their time and risk allocation can differ materially from ordinary liner services.

7. Early non-required units can occupy the space needed by the next prerequisite.

8. Cargo, documents, approvals, resources, terminal and site readiness, handling and coordination.

9. Changed facts, affected dependencies, consequence, decision and next time.

10. Against the agreed output with handover and acceptance records.

Exercise 27A. A = USD 75,000. B = 69,000 + 8,500 + 2,000 = USD 79,500. A is USD 4,500 lower. Evaluate technical acceptance, resources and capability, schedule, interfaces, conditions, liability and payment terms.

Exercise 27B. Drawings-route-permit path = 4 + 6 + 3 = 13 days. Drawings-packing path = 4 + 7 = 11 days. Earliest transport start is Day 13 and packing-path float two days under the stated sequential model. Actual calendars and approvals still require confirmation.

Chapter 28 answers

1. Commitments are accepted obligations, estimates forecast cost and allowances reserve a defined amount for stated uncertainty.

2. Eligible cost categories, percentage or method, purpose, authority and drawdown process.

3. Probability-weighted cost is not the amount needed if the event actually occurs.

4. Storage, equipment, labour, standby, cancellation and remobilisation can have separate rules.

5. The resource may not be available later or the alternative may add delay.

6. Baseline, requested change, cause, scope, technical and schedule effects, cost, alternatives, authority and deadline.

7. Spending authority does not establish safe or lawful execution.

8. It allows changes and final variance to be explained.

9. Forecast includes committed and remaining expected work, not only invoices received.

10. It changes a specific future control and defines how effectiveness will be checked.

Exercise 28A. Contingency = 160,000 × 12% = USD 19,200. Authorised planning budget = USD 179,200. Forecast = 160,000 + 8,000 + 4,500 = USD 172,500. Headroom = USD 6,700. It is not automatic authority for further unapproved changes.

Exercise 28B. Storage = 4 × 900 = USD 3,600. Standby option = 3,600 + 4 × 1,800 = USD 10,800. Remobilisation option = 3,600 + 5,500 = USD 9,100. Saving = USD 1,700. Confirm resource return availability, approved preservation/handling and revised site readiness, along with any additional cost not included.

Chapter 29 answers

1. It gives the provider enough cargo, service, timing and scope information to state a usable offer.

2. It remains a cost or uncertainty outside the quoted amount.

3. Source or stated assumption, date, direction, rate and treatment of later changes.

4. Applying it to the wrong base changes the charge.

5. Booking, departure or another event defined by the offer.

6. Reservation and acceptance require their own confirmation.

7. Measurements, locations, timing, handling, care, release, delivery and excluded work.

8. It reduces revenue while cost may remain fixed, so profit falls faster proportionately.

9. They preserve what was offered, accepted and superseded.

10. Recheck rate, scope and availability through the authorised process.

Exercise 29A. A = 980 + 160 + 220 + 140 = USD 1,500. B = 850×1.08 + 140 + 180×1.08 + 150 = 918 + 140 + 194.40 + 150 = USD 1,402.40. B is USD 97.60 lower under the stated conversion and equivalent scope.

Exercise 29B. Price = 1,500 ÷ 0.80 = USD 1,875. Conditions should define provisional dimensions and remeasurement, cargo acceptance, included scope and exclusions, service timing, validity, payment and amendment approval. State that final measurements can change acceptance and price; do not present the provisional result as an unconditional fixed service.

Chapter 30 answers

1. It can ignore the causes and consequences of service failure.

2. Procurement, operations, finance, sales and other users may value different outcomes.

3. Capability, geography, commodity, capacity, credit, implementation and expected economics.

4. Explain the requirement it serves, the control used and the measurable result.

5. Critical suitability cannot be compensated by a cheap price score.

6. Defined criteria, weights, evidence, common scoring and sensitivity review.

7. Identify baseline, method, assumptions and whether benefit is demonstrated or conditional.

8. The proposed service requires data, people, processes and tests before it can operate.

9. Accepted scope, pricing, promises, exceptions, priorities, open items and approvals.

10. New products, suppliers, channels or demand can change the operating model.

Exercise 30A. A = 4×0.50 + 3×0.25 + 4×0.15 + 5×0.10 = 3.85. B = 3×0.50 + 5×0.25 + 4×0.15 + 3×0.10 = 3.65. A ranks higher after mandatory gates pass. A failed required care condition makes a proposal unsuitable regardless of its weighted total.

Exercise 30B. Suitable controls include a readiness check with a late-booking measure, issuer-led document validation with first-pass error measurement, and a priority-stock milestone process with launch-availability measurement. Specify supplier forecasts, accurate source documents, priority assortments, decision authority and system data. Do not claim guaranteed savings from introducing the controls.

Chapter 31 answers

1. Margin uses revenue as denominator; markup uses cost.

2. Cost can remain unchanged, so the discount reduces profit dollar for dollar.

3. Taxes, disbursements and agency arrangements may have different accounting treatment.

4. Suppliers may be paid before customers, creating a growing funded balance.

5. Entity, purchase order, portal, supporting evidence and submission timing requirements.

6. Obtain authorised credit approval or an accepted payment arrangement before additional exposure.

7. It records expected incurred cost before final invoicing so profit is not overstated.

8. Recovery depends on the selling agreement and approved changes.

9. Delivery and equipment obligations differ from complete billing, cost and dispute reconciliation.

10. Rate, quantity, scope, time, currency and error.

Exercise 31A. Profit = 1,600 − 1,240 = USD 360. Margin = 360 ÷ 1,600 = 22.5%. Markup = 360 ÷ 1,240 = 29.03%. After discount, revenue is USD 1,500 and profit USD 260; margin = 260 ÷ 1,500 = 17.33%.

Exercise 31B. Funding gap is 30 days. Simple funding cost = 15,000 × 0.10 × 30 ÷ 365 = USD 123.29. This assumes collection on Day 40 and measures timing cost, not the probability or amount of non-payment. Credit risk requires a separate assessment.

Chapter 32 answers

1. It supports a decision through facts, consequence, action, owner and next time.

2. Different readers need different operational or commercial decisions from the same facts.

3. Label the status and retain source and timestamp.

4. An owner, action and next update, rather than an unsupported guess.

5. They explain changes and preserve the customer's experienced timeline.

6. Event, commitment, tolerance, population, actual source and exception rule.

7. They change the denominator and can otherwise conceal failure.

8. Count orders satisfying both conditions and divide by the defined population.

9. Missing evidence is a data condition, not proof of completion.

10. It names a specific change, owner, due date and verification measure.

Exercise 32A. Original-commitment result = 96 ÷ 120 = 80%. Eligible population = 120 − 8 = 112, so eligible-job result = 96 ÷ 112 = 85.71%. Report both with the eight agreed customer-change exclusions and the applicable definition.

Exercise 32B. Credit an update that states the one-day plan impact, verified location, unconfirmed recovery departure, the receiving-shift decision needed by 15:00 and a next update before that decision where feasible. It should explain the uncertainty and options without promising tomorrow's delivery.

Chapter 33 answers

1. Liability is legal responsibility under applicable law and contract; cargo insurance is policy cover for an insured interest and risks.

2. It protects the forwarder against specified professional liabilities under its policy, not automatically the full value of every customer's goods.

3. Mode, route, role and law can change the basis, limits and procedures.

4. Limits can be revised and applicability still requires review.

5. Acceptance of cover, value, transit scope, conditions, exclusions, deductible and effective period.

6. They may be needed for survey, cause, mitigation and claim assessment.

7. Observation states what was seen; cause requires additional evidence.

8. Law, contract and policy can impose different requirements and deadlines.

9. Insured value defines a policy basis; settlement depends on accepted loss and policy terms.

10. Insurance payment does not prevent recurrence or prove the service was satisfactory.

Exercise 33A. Assumed settlement = 18,000 − 1,200 − 300 = USD 16,500. The arithmetic does not establish real cover, liability, causation, compliance with notice requirements or the insurer's acceptance of loss and salvage.

Exercise 33B. Obtain shipment and package identity, invoice/value evidence, transport contracts and records, packing information, receipt exceptions, photographs, custody timeline, inspection or survey, monitoring data where relevant, notices and mitigation records. Contact the authorised claims/legal and insurance parties promptly to establish deadlines and instructions. Acknowledge the reported damage without admitting unsupported liability or rejecting the claim prematurely.

Chapter 34 answers

1. A correction restores accurate authorised facts; a false record deliberately misrepresents them.

2. Commercial pressure does not grant legal or technical authority.

3. Parties, ownership, goods, services, end use and jurisdictional links may matter.

4. Preserve the alert and identity evidence and refer it to the authorised reviewer.

5. Custom does not establish a lawful official basis or remove anti-bribery obligations.

6. Disclosure allows impartial management of actual or apparent influence.

7. Commercial and personal data should be shared only through authorised arrangements for the needed purpose.

8. Named contacts, required facts, paused actions and timely decision paths.

9. Changing a status without evidence falsifies the record and misleads users.

10. Targets focused only on speed or revenue can encourage concealment or bypassing controls.

Exercise 34A. State that the description must accurately identify the equipment and battery facts. Pause the affected acceptance process, preserve the request and seek qualified dangerous-goods review with exact product, chemistry, configuration, rating and condition information. Escalate the concealment request under company procedure and offer the lawful accepted service path.

Exercise 34B. Disclose the relationship and gift, follow gift and conflict policy, remove or control the employee's influence as required, and arrange independent capability, compliance and commercial evaluation. Retain criteria, evidence and approvals. The relationship alone does not prove misconduct, but concealment prevents a fair decision.

Chapter 35 answers

1. Visibility shows information; control assigns decisions, actions and closure.

2. Identity, event definition, status, time, location, source and source timestamp.

3. An absent update cannot prove the planned event occurred.

4. Acknowledgement confirms receipt; resolution requires the accepted action or evidence.

5. Safety, care, deadline and data conflicts have different urgency and consequences.

6. Defined validation, calculations, comparisons and routing with known inputs and expected outputs.

7. It converted a schedule into actual departure and invented an on-time assurance.

8. Approval is meaningful only when the claim can be checked.

9. Precision is the share of raised alerts that are real; recall is the share of real exceptions detected.

10. Accuracy, misses, false alerts, time saved, downstream errors and practical decision value.

Exercise 35A. Precision = 40 ÷ 50 = 80%. Recall = 40 ÷ 48 = 83.33%. Investigate whether false alerts arise from stale or misdefined events and whether misses arise from missing data, incorrect thresholds or unmodelled exception types. Use reviewed cases rather than simply suppressing alerts.

Exercise 35B. Customs clearance and tomorrow's delivery are unsupported. Suitable correction: “The container was discharged Monday. Customs review remains pending, and the receiving appointment is not yet confirmed. The appointed representative is checking release status while our destination team reviews delivery availability. We will update you by the agreed time with the remaining conditions and feasible delivery plan.”

Chapter 36 answers

1. It defines the activities included and prevents unlike comparisons.

2. Shipment mass in metric tonnes multiplied by distance in kilometres.

3. They are expressly invented arithmetic inputs, not measured or published defaults.

4. They form part of the complete alternative and contribute emissions.

5. State source, period, assumptions, coverage, units and method.

6. Numerical formatting does not remove uncertainty in the inputs.

7. It compares incremental cost with the modelled emissions difference for those options.

8. It may delay stock and trigger urgent transport or other extra work.

9. Different shipment counts can use the same or different vehicle activity and allocation.

10. Emissions-related activity, service, cost, utilisation, exceptions and comparable baseline conditions.

Exercise 36A. Road = 8 × 500 × 0.10 = 400 kg CO2e. Alternative rail = 8 × 400 × 0.025 = 80 kg; road = 8 × 100 × 0.10 = 80 kg; terminals 30 kg; total 190 kg. Reduction is 210 kg or 52.5%. The factors and common boundary are fictional; actual service feasibility and verified data are not established.

Exercise 36B. Request shipment mass, complete route legs and distances, activity and allocation, factor sources and units, energy boundary, terminal coverage, method version, data period and service differences. A useful trial measures a defined consolidation or empty-running change with actual activity, service and cost evidence before claiming a reduction.

Chapter 37 answers

1. Operations, customer service, pricing/procurement, sales/solutions, warehouse, project, analysis/control tower and finance/credit.

2. A role title does not identify every decision the person may authorise.

3. A defined task, standard, timeframe, evidence and reviewer.

4. The result must be understood within its assumptions and commercial or operational consequence.

5. State the discrepancy, required decision, owner and deadline.

6. Systems, scope, contacts, terminology, observation and controlled practice.

7. Regulated functions can require specific training and authorisation.

8. Original, labelled work with traceable assumptions and an honest description of the student's role.

9. Reuse can breach confidentiality or privacy even if it demonstrates skill.

10. Task, evidence, feedback, correction and next practice.

Exercise 37A. Accept different role choices. Each stage should have three bounded goals with evidence and a suitable reviewer. Early goals should emphasise understanding and supervised accuracy; later goals can add a limited workflow and a measured improvement. Do not award full credit for vague goals such as “become an expert”.

Exercise 37B. A credible introduction states that the portfolio contains fictional training cases and identifies demonstrated work such as quotation calculations, document reconciliation, milestone planning and exception writing. It expresses readiness for supervised entry-level work without claiming customer assignments, employment or regulated competence that the student does not have.

Chapter 38 answers

1. It prevents alternative scenarios from earlier chapters being added to one inconsistent order.

2. 600 shirts ÷ 40 = 15 cartons.

3. Cartons, shirts, values, net and gross weights, volume and parent-order references.

4. Gross 150 kg exceeds dimensional 100 kg under the stated rule.

5. USD 810 air + USD 1,603 LCL = USD 2,413.

6. FCL has five days' balance margin versus three for LCL, two additional days.

7. It must receive and allocate the two portions without treating the first as an unexplained shortage or complete order.

8. Acceptance, documents and physical planning still rely on the true dimensions.

9. The early launch assortment is already available, changing the customer's consequence and recovery need.

10. Any affected declaration team, bank, customer system, provider or other recipient of the incorrect version.

Exercise 38A. Early quantity is 20 cartons, 800 shirts, USD 4,000, 200 kg gross, 180 kg net and 0.80 m^3. Balance is 280 cartons, 11,200 shirts, USD 56,000, 2,800 kg gross, 2,520 kg net and 11.20 m^3. Air dimensional weight is 800,000 ÷ 6,000 = 133.33 kg, so gross 200 kg controls. Air cost = 200 × 4.20 + 180 = USD 1,020. LCL = 11.2 × 95 + 520 = USD 1,584. Total = USD 2,604. Reconciled totals remain 300 cartons, 12,000 shirts, USD 60,000, 3,000 kg gross, 2,700 kg net and 12 m^3.

Exercise 38B. A strong submission recommends an initial feasible split, compares the FCL alternative, assigns milestone owners and links all records to the parent order. It recalculates changed measurements without inventing a price change, assesses the USD 900 recovery against the buyer-confirmed USD 1,400 consequence and obtains issuer-led invoice correction across affected users. Award alternative recommendations when supported by explicit, consistent assumptions.

Chapter 39 answers

1. 48 + 12 + 6 = 66 tonnes.

2. It has a different package, transport, acceptance and commissioning requirement.

3. Drawings, route review and permits total 12 days, longer than the nine-day packing path.

4. Its USD 12,000 reduction is outweighed by USD 14,000 additional required work.

5. M1 and M3 can occupy both positions before prerequisite M2 arrives.

6. Preservation, custody, handling and the revised shipping and installation sequence must remain acceptable.

7. Internal profitability and customer budget use different perspectives; mixing them distorts totals.

8. USD 11,700 − USD 11,300 = USD 400 for three days.

9. Existing route, handling and permit evidence may no longer match the cargo.

10. Technical and legal suitability require their own authorised decisions.

Exercise 39A. Storage = 5 × 1,500 = USD 7,500. Standby = 5 × 2,400 = USD 12,000, so total USD 19,500. Remobilisation total = 7,500 + 6,800 = USD 14,300. Saving = USD 5,200. Confirm later resource availability, approved storage and preservation, handling implications, site release and any other costs.

Exercise 39B. The proposal should use the fixed cargo and sequence, compare normalised costs, show readiness gates and the urgent spare's separate records, and preserve commercial versus technical approval. It should assess both foundation delay and drawing revision through change control. Unsupported engineering approval, hidden exclusions or mixing selling price with supplier cost are material weaknesses.

Chapter 40 answers

1. They represent one operation whose quantities, prices, dates and scope must agree.

2. Supplied facts, external requirements, assumptions, unresolved questions, sources and owners.

3. It may omit the acceptance, release and receiving conditions that control execution.

4. Formula, units, substitution, rounding, result and interpretation.

5. It identifies the conditions supporting the choice and the trigger for reassessment.

6. Good logistics requires responsible decisions and usable information as well as arithmetic.

7. Whether the documents and reasoning remain connected when a material fact changes.

8. It shows what changed and supports accountability and learning.

9. Follow applicable disclosure rules, verify output and never treat generated prose as event evidence.

10. It prevents unsupported decisions and identifies the right supervision or specialist.

Exercise 40A. Use the 100-mark rubric: operations 25, calculations 25, justification 20, risk and compliance 15, communication 15. Review the nine connected outputs, their reconciliation and the change response. Full marks require traceable assumptions and appropriate authority boundaries, not one predetermined service choice. Record the evidence behind each mark and a specific correction where credit is withheld.

Exercise 40B. Feedback should cite five material claims and three calculations, explain the evidence checked, identify two supported strengths and two concrete corrections, and propose one measurable learning task. Avoid praising appearance while overlooking false release claims or incorrect units. A respectful review can be direct about a material error.

Workshop marking guidance

Chapter 12 Transfer delay and two clocks

At Tuesday 18:00, 36 hours have elapsed from Monday 06:00. Option A reaches the receiver after 74 hours, leaving 22 hours of the stated packaging duration and four hours before the delivery deadline. Option B reaches the receiver after 100 hours, four hours beyond the stated 96-hour duration and 22 hours after the delivery deadline. These calculations identify questions; they do not approve product use or acceptance. A is the stronger timing candidate only if the operator, quality owner and receiving team approve the actual plan. C is an unresolved proposal until the intervention is authorised and its effect documented. In the extension, Thursday 14:00 delivery is 80 hours after packout but two hours after the customer deadline. Credit a response that keeps the product clock and commercial clock separate, names each decision owner and avoids describing an unaccepted flight as confirmed.

Chapter 16 Seasonal order at a transshipment port

The priority quantity is 1,800 ÷ 10 = 180 cartons, leaving 720 cartons. The revised Day 25 plan misses the priority Day 20 requirement by five days but remains three days before the balance deadline. Alternative sea on Day 21 is still one day late for the priority goods. The proposed air option can protect the priority date if accepted. Under the explicitly assumed five-day loss model, avoided loss is 5 × USD 800 = USD 4,000 and the net benefit after USD 3,100 extra freight is USD 900. This supports further confirmation, not automatic approval. Reconcile carton marks, commercial documents, release instructions and the split receipt. For Day 22 air delivery, establish the buyer’s precise loss-counting convention and revised benefit before deciding. Strong answers identify the deadline for accepting recovery, the authorised payer and the next customer update.

Chapter 20 Regional distribution network

Rail adds two days of stock time: USD 100,000 × 15% × 2 ÷ 365 = USD 82.19. Its comparable cost is USD 1,122.19, a USD 77.81 saving against road. Water adds three days: USD 123.29, giving USD 1,053.29 and a USD 146.71 saving against road. These are simplified financing comparisons, not complete inventory-cost models. The timetable must also fit: a Monday rail departure with three elapsed transit days points to Thursday, beyond a Wednesday requirement. The missed weekly water departure further changes the apparent four-day service. Obtain actual next departures and event definitions. Group A’s daily demand needs a different replenishment and buffer design from B’s twice-weekly or C’s monthly demand. Credit a lane-by-lane recommendation with service, stock and fallback implications instead of a network-wide cheapest-mode declaration.

Chapter 24 Warehouse peak and a data defect

Planned capacity is 1,000 × 85% = 850 pallets. The peak of 920 exceeds that by 70. Preserving the assumed 85% policy requires 920 ÷ 0.85 = 1,082.35, rounded up to 1,083 nominal positions; alternatively, change the accepted stock and replenishment plan. Picking needs 6,000 ÷ 75 = 80 productive hours, or 16 people at five productive hours each. Packing completes 900 × 6 = 5,400 lines, leaving a 600-line daily deficit. Adding pickers alone does not remove it. The case-to-unit mapping defect can multiply quantities by twelve, while duplicate dispatch can corrupt stock and customer messages. Both require correction, repeat testing and acceptance before the affected launch scope is released. A phased launch is credible only if the unaffected scope is genuinely separated and authorised. Assess the plan for owners, test evidence, capacity and fallback arrangements.

Chapter 28 Project change meeting

The authorised teaching budget is USD 180,000 + USD 18,000 = USD 198,000. Four days of storage and standby cost 4 × (1,100 + 2,200) = USD 13,200. Storage plus demobilisation/remobilisation costs USD 4,400 + USD 6,000 = USD 10,400, an apparent USD 2,800 saving. With an extra storage day the alternative becomes USD 11,500, reducing the saving to USD 1,700 before any further consequence. The return date is not confirmed, so the cheapest arithmetic is not yet an executable plan. The changed transport height requires renewed technical and permit review against the actual configuration. A USD 15,000 spending approval establishes a commercial limit; it does not approve the route, lift or foundation. Credit minutes that separate decisions, unresolved conditions, owners and hold points, with a revised forecast that avoids counting contingency as spent cost.

Chapter 30 Retail tender with hidden scope

Average weekly volume is 1,200 ÷ 52 = 23.08 containers; peak volume is 1,200 × 35% ÷ 10 = 42 per week. The peak is about 82% above the annual weekly average. The third proposal’s comparable stated cost is USD 1.68 million + USD 70,000 + USD 40,000 = USD 1.79 million, before any unresolved scope. Price alone cannot establish a winner while appointments, integration and implementation differ. Retain the case’s mandatory capability gates and stated weights: service design 40%, cost 30%, implementation 20% and reporting 10%. Do not invent supplier scores without evidence. Clarifications should cover demand peaks, receiving conditions, data integration, charge bases, service exceptions and transition responsibility. Credit a reasoned conditional recommendation and an implementation plan tied to the accepted scope.

Chapter 35 Control tower prioritisation board

AR03 requires immediate escalation through the defined product-quality process; AR01 requires urgent deadline recovery. AR04 requires reconciliation of conflicting delivery evidence; AR02 needs a source-data follow-up; AR05 belongs to financial closure unless further facts create an operational consequence. Preserve original evidence and distinguish missing data from a confirmed delay. The alert sample gives precision 70 ÷ 100 = 70% and recall 70 ÷ (70 + 20) = 77.78%. Automatic internal checks can request evidence or flag a discrepancy within their permission; outward customer claims need verified facts and the appropriate review. Quality release, customs action and technical approvals remain with the authorised decision maker. Credit a board showing next action, owner, deadline and closure evidence, rather than merely a ranked list of colours.

Chapter 36 Consolidation and the whole-chain result

Road emissions are 12 × 700 × 0.09 = 756 kg CO2e. Rail contributes 12 × 550 × 0.025 = 165 kg; connecting road contributes 12 × 150 × 0.09 = 162 kg; terminals add 45 kg. The alternative totals 372 kg, a reduction of 384 kg or 50.79% under the fictional compatible factors. Added financing cost is USD 90,000 × 16% × 2 ÷ 365 = USD 78.90. Together with USD 120 extra transport, added cost is USD 198.90, or approximately USD 517.98 per modelled tonne avoided. State the boundary and assumptions. An emergency air movement could change the result; its likelihood and activity are not supplied, so no numerical adjustment should be invented. A useful six-week pilot measures all actual legs, exceptions, stock and service outcomes using a consistent allocation method.

Working glossary

Terms are used in the context of this book. A contract, law, tariff or technical standard may use a more specific definition. Check the governing source for the actual activity.

A

Accrual. A cost or revenue recognised for work already performed before the final invoice is received or issued, under the relevant accounting policy.

Actual event. An event supported by evidence that it has occurred

Ad valorem duty. Duty calculated as a percentage of the applicable customs value

Agent. A party acting on another party's behalf within its authority

Aircraft ULD. An aircraft container or pallet-and-net assembly used to group cargo for an accepted aircraft configuration; operator approval governs use.

Allocation. Assignment of shared cost, capacity or emissions using a stated and appropriate basis.

Amendment. An authorised change to a record through the relevant correction process

ATA and ATD. Actual time of arrival and actual time of departure; identify the location and event

Available inventory. Stock in a status authorised for the relevant fulfilment activity, distinct from stock merely present in the building.

B

Blank sailing. A planned sailing or call that is cancelled; establish the effect on the booked cargo and accepted replacement plan.

Booking. An accepted service arrangement, subject to its terms and requirements

Bottleneck. The stage whose effective capacity constrains the completed output of the stated process.

Breakbulk. Cargo handled as individual non-containerised units, under the applicable service and handling arrangement.

C

Cargo. Goods being transported or handled

Cargo care. Measures and decisions needed to preserve the goods' required condition

Cargo insurance. Insurance for cargo interests under an agreed policy, distinct from a service provider's liability insurance.

Carrier. A party undertaking carriage; distinguish contractual and physical roles

Cash conversion gap. The period between the relevant cash outflow and collection in a stated transaction or operating cycle.

CBM. Cubic metres, a measure of volume

Change control. A documented process for assessing, approving and implementing changes to agreed scope or conditions.

Chargeable weight. Weight basis selected under the applicable service's rating rules

Classification. Placement of goods within the applicable tariff or hazard system; specify which system

Combined transport. An intermodal concept involving a principal rail, inland-waterway or sea leg with associated road legs; definitions and regulatory use should be checked.

Commercial invoice. The seller's record of the goods and sale amount invoiced

Consignee. The receiving party identified in a transport document or arrangement

Consignment note. A transport record whose use and legal effect depend on the service and framework

Consolidation. Combining consignments for a shared movement

Contingency. A visible allowance for defined uncertainty, separate from an undisclosed omission in the base scope.

Contract logistics. A continuing outsourced logistics operation with a defined scope

Control tower. A coordinating function that connects visibility, exception assessment, decision rights and action across a defined logistics network.

Cost to serve. Cost attributable to serving a customer or requirement within a stated scope, including relevant activity differences.

Critical path. The longest dependency path controlling the earliest completion in the stated project schedule.

Cross-docking. Transfer from incoming to outgoing flow with limited storage, under a planned and controlled process.

Customs procedure. The legal treatment requested for goods under the applicable customs system

Customs value. Value determined under the applicable customs valuation rules

Cutoff. A deadline for a specified acceptance, submission or handling requirement

Cycle count. A scheduled count of selected inventory that supports ongoing stock accuracy and investigation.

D

DC. Distribution centre

Deconsolidation. Separating consolidated consignments for subsequent handling or delivery

Dedicated vehicle. Vehicle capacity reserved for the stated customer or movement; the service scope still needs definition.

Delivery point. The location and event defining delivery in the relevant agreement

Demurrage. A contract-defined charge often associated with container equipment remaining at a terminal beyond free time; local and combined-clock rules vary.

Dependency. A condition that must be satisfied before another activity can proceed

Detention. A contract-defined charge often associated with equipment held outside the terminal beyond free time; verify the actual tariff.

Dimensional weight. Commercial weight equivalent calculated from space under a stated rule

E

EORI. Economic Operators Registration and Identification identifier used in EU customs operations where required

ETA and ETD. Estimated time of arrival and estimated time of departure

External dimensions. Measurements of the outside envelope of the package presented for transport

F

FCL. Full container load service; commercial use of container capacity does not imply that every available unit of space is filled.

FEFO. First expiry, first out: a stock-selection principle based on expiry, subject to customer and quality requirements.

FIFO. First in, first out: a stock-selection principle based on receipt sequence, subject to the operating requirements.

Flat rack. Container equipment with a platform and end structures used for suitable loads; dimensions, support and securing need specific acceptance.

Float. Time by which an activity or path can move within the stated schedule before affecting the relevant controlling milestone.

Forecast at completion. The current estimate of the final total cost of a project, including relevant approved changes and expected remaining work.

Free time. A defined period during which a particular charge is not incurred, measured using specified start, end and counting rules.

Freighter. An aircraft configured for cargo carriage; actual payload, dimensions and acceptance depend on aircraft and operator.

G

Gross density. Gross mass divided by external volume within the stated measurement boundary

Gross margin. Gross profit divided by revenue, expressed as a percentage under the defined cost scope.

Gross profit. Revenue less the direct job costs included in the stated calculation

Gross weight. Goods plus the relevant packaging

Groupage. Consolidation of smaller road consignments within a shared service network.

H

Handling unit. A unit moved or controlled as one item, such as a carton, pallet or crate

Handover. Transfer of cargo or responsibility for an activity, supported by a record

House document. A transport document at the forwarder–customer level in the arrangement described

I

Incoterms rule. An ICC trade rule allocating specified sale-delivery obligations, costs and risk

Intermodal transport. Movement using more than one mode with the goods remaining in the same loading unit or road vehicle at the mode change, under the stated definition.

Inventory carrying cost. A stated cost of holding inventory over time; distinguish financing alone from a broader carrying-cost model.

K

KPI. Key performance indicator with a defined event, population, calculation, source and reporting period.

L

Laydown area. An allocated area for temporary placement of project cargo, subject to accepted ground, access and handling conditions.

LCL. Less than container load service, in which consignments share container capacity and associated consolidation activities.

Load envelope. The complete external configuration presented for transport, including frames, packing and projections.

M

Markup. Gross profit divided by the stated cost base, expressed as a percentage.

Master document. A transport document at the carrier-contract level that may cover several house shipments

Milestone. A defined event used to plan and follow progress

Multimodal transport. A movement involving at least two modes; the contractual responsibility and document arrangement must be established separately.

N

Net weight. Goods weight under the stated measurement convention, excluding the relevant packaging

Non-preferential origin. Origin determined for purposes other than claiming a particular tariff preference

O

Operational hold. A controlled status preventing a specified next action pending a decision

OTIF. On time in full: the share of the defined population meeting both agreed timing and completeness conditions.

P

Packing hierarchy. The relationship between product units, inner packages and outer handling units

Packing list. A record explaining packages and their contents

Pallet position. A storage or transport space for a pallet under an explicitly defined equipment or layout arrangement.

POD. Proof of delivery in the form used for the relevant service

Precision. In an alert evaluation, true positive alerts divided by all alerts raised in the reviewed population.

Preferential origin. Origin status relevant to eligibility under a specified trade arrangement

Principal. A party acting in its own name in the relevant contractual arrangement

Project logistics. Coordination of cargo movements and interfaces against a project's physical requirements, dependencies, installation sequence and schedule.

Putaway. The controlled movement of received stock to an assigned storage location and status.

Q

Quality release. An authorised decision that goods may enter the relevant usable or available status

Quotation. A commercial offer based on stated scope, assumptions and conditions

R

Rate break. A threshold in a tariff that changes the applicable rate; rules determine whether rating at a higher weight is permitted.

Recall. In alert evaluation, detected true exceptions divided by all real exceptions in the reviewed population.

Reefer. Refrigerated container or vehicle equipment; its suitability depends on the product, preparation, settings, monitoring and accepted operating plan.

Revenue unit. The quantity used for rating under a stated tariff, such as the greater of cubic metres and metric tonnes in a fictional LCL example.

Ro-ro. Roll-on/roll-off carriage for accepted wheeled or otherwise suitably conveyed cargo under the vessel and terminal arrangements.

Rollover. A booked shipment not moving on its planned sailing and being carried forward to a later plan; obtain the specific cause and confirmed next step.

S

Schedule margin. Time between planned completion and the latest required completion

SDR. Special Drawing Right, the IMF unit used in certain liability regimes; applicability, conversion and limits require the relevant legal framework.

Sea waybill. A non-negotiable ocean transport document without bill-of-lading title functions

Service-level agreement. An agreed definition of service responsibilities, measures and management arrangements, read with the governing contract.

Shipper. The party identified as shipping or tendering the goods in the transport arrangement

Slot. An allocated time or capacity opportunity, such as a receiving appointment or terminal booking; specify which.

SSCC. Serial Shipping Container Code, a GS1 identifier for a logistics unit; identity is distinct from physical verification.

Standby. Resources retained available while the next activity cannot proceed, under a defined commercial arrangement.

Superseded version. A retained record clearly identified as replaced by a later authorised version

T

Tare. Weight of the packaging or equipment included in the stated boundary

Temperature excursion. Departure from the specified temperature conditions, assessed using the relevant evidence

Tonne-kilometre. One metric tonne transported one kilometre; a transport-activity measure, not an emissions result by itself.

Transaction value. A customs valuation basis linked to the price paid or payable, subject to applicable conditions and adjustments

Transit. A customs-controlled movement under the applicable transit procedure

Transit time. Time between specified journey events; always define the endpoints

Transshipment. Transfer between transport services at an intermediate point, with the associated custody, timing and acceptance dependencies.

U

UN number. An identification number used for a substance or article under the dangerous-goods system

V

VGM. Verified gross mass of a packed container under the applicable SOLAS requirements.

W

WMS. Warehouse management system supporting stock identity, location, status and controlled warehouse events.

Work in progress. Units released into a process but not yet completed at the stated measurement boundary.

Practice worksheets and templates

These reusable sheets bring the shared learning materials together. Copy a sheet for a new case and retain the source of every input. The spaces are intentionally blank. They are educational planning aids, not carrier forms, regulated declarations or technical approvals.

Worksheet 01 Shipment instruction....258
Worksheet 02 Cargo measurement record....259
Worksheet 03 Document discrepancy log....260
Worksheet 04 Clearance readiness note....261
Worksheet 05 Cargo exception record....262
Worksheet 06 Air acceptance timeline....263
Worksheet 07 Comparable quotation....264
Worksheet 08 Ocean cutoff and release matrix....265
Worksheet 09 Free-time calculation....266
Worksheet 10 Road dispatch and delivery....267
Worksheet 11 Multimodal option comparison....268
Worksheet 12 Warehouse scope and responsibility....269
Worksheet 13 Warehouse capacity and labour....270
Worksheet 14 Implementation acceptance....271
Worksheet 15 Project cargo register....272
Worksheet 16 Project change request....273
Worksheet 17 Tender evaluation....274
Worksheet 18 Job profit and cash record....275
Worksheet 19 Customer exception update....276
Worksheet 20 Claim evidence register....277
Worksheet 21 Control tower exception board....278
Worksheet 22 Emissions comparison....279
Worksheet 23 Professional learning log....280
Worksheet 24 Capstone submission cover sheet....281

Worksheet 01 Shipment instruction

Chapter 3 • Create a single agreed brief before requesting a booking. State the unit, event and source for each important field.

Field	Your record, evidence or decision
Customer and job reference	
Cargo description and package hierarchy	
Collection and delivery places	
Required delivery event and deadline	
Measurements and special requirements	
Service scope and named trade term	
Charge responsibility and approval	
Unresolved facts, owner and deadline	

Prepared by: _____ **Case/date:** _____

© 2026 Quazi Asif Newaz. For personal study; retain this notice.

Worksheet 02 Cargo measurement record

Chapter 5 • Group only packages with identical measurements. Distinguish measured values from estimates and account for added packing.

Field	Your record, evidence or decision
Package group and count	
External length, width and height with units	
Gross weight and weighing source	
Net weight and packing boundary	
Added pallets, frames or other packing	
Volume calculation and totals	
Rating conversion, rounding and minimum	
Stackability and handling questions	

Prepared by: _____ **Case/date:** _____

© 2026 Quazi Asif Newaz. For personal study; retain this notice.

Worksheet 03 Document discrepancy log

Chapter 6 • Preserve the original record. An authorised correction needs both a source and evidence that affected users adopted it.

Field	Your record, evidence or decision
Record, reference and version	
Conflicting field and original value	
Observed or proposed replacement	
Supporting evidence and source	
Affected parties and downstream records	
Authorised approver and decision	
Distribution and adoption evidence	
Closure date and retained superseded version	

Prepared by: _____ Case/date: _____

© 2026 Quazi Asif Newaz. For personal study; retain this notice.

Worksheet 04 Clearance readiness note

Chapter 7 • Collect evidence for the appointed specialist. Do not treat a supplier statement as a customs determination.

Field	Your record, evidence or decision
Exact goods description and intended use	
Importer identity and appointment	
Classification evidence and reviewer	
Value, adjustments and commercial records	
Origin evidence and requested preference	
Procedure and applicable controls	
Funding, guarantees and release dependencies	
Delivery readiness and next review	

Prepared by: _____ **Case/date:** _____

© 2026 Quazi Asif Newaz. For personal study; retain this notice.

Worksheet 05 Cargo exception record

Chapter 8 • Record what was observed without inventing cause or unseen condition. Immediate danger follows the site emergency procedure.

Field	Your record, evidence or decision
Time, place, package identity and observer	
Instruction compared with observation	
Visible condition and inspection limits	
Photographs or other evidence references	
Affected movement or stock status	
People notified and specialist owner	
Authorised next action and conditions	
Follow-up time and closure evidence	

Prepared by: _____ **Case/date:** _____

© 2026 Quazi Asif Newaz. For personal study; retain this notice.

Worksheet 06 Air acceptance timeline

Chapters 9–12 • Work backwards from the provider's actual cargo and document acceptance deadlines. Record time zones explicitly.

Field	Your record, evidence or decision
Required customer delivery event	
Confirmed acceptance cutoff and source	
Terminal processing allowance	
Planning margin and latest truck arrival	
Collection drive and loading duration	
Booking and special-cargo acceptance	
Document, security and release dependencies	
Exception owner and decision deadline	

Prepared by: _____ **Case/date:** _____

© 2026 Quazi Asif Newaz. For personal study; retain this notice.

Worksheet 07 Comparable quotation

Chapters 11, 15 and 29 • Use the same cargo, scope and currency basis for every offer. Keep estimates and exclusions visible.

Field	Your record, evidence or decision
Offer source, date, currency and validity	
Accepted cargo and service boundary	
Rating quantity, divisor and rounding	
Main freight and minimum/rate break	
Origin and destination charges	
Delivery, percentage bases and extras	
Comparable total and confidence	
Service acceptance, approval and revision	

Prepared by: _____ **Case/date:** _____

© 2026 Quazi Asif Newaz. For personal study; retain this notice.

Worksheet 08 Ocean cutoff and release matrix

Chapters 14–16 • Track each deadline and release separately. A vessel schedule is not evidence that the shipment has met its acceptance conditions.

Field	Your record, evidence or decision
Booking and equipment release	
Stuffing and cargo readiness	
Shipping instructions and document approval	
VGM method, submitter and acceptance	
Gate-in and terminal conditions	
Regulatory and carrier releases	
Receiving appointment and transport	
Owner, evidence and next review	

Prepared by: _____ **Case/date:** _____

© 2026 Quazi Asif Newaz. For personal study; retain this notice.

Worksheet 09 Free-time calculation

Chapter 15 • Copy the exact applicable tariff rules before counting days. Use a separate row or sheet for each charging clock.

Field	Your record, evidence or decision
Charge name, provider and tariff version	
Start event and first-day convention	
End event and last-day convention	
Calendar or working-day basis	
Free period and extension evidence	
Rate tiers and currency	
Scenario dates and counted days	
Calculated amount, payer and approval	

Prepared by: _____ **Case/date:** _____

© 2026 Quazi Asif Newaz. For personal study; retain this notice.

Worksheet 10 Road dispatch and delivery

Chapters 17–19 • Connect customer instructions, vehicle suitability and accepted receiving conditions. Driver compliance is assessed under the applicable rules.

Field	Your record, evidence or decision
Vehicle, cargo and equipment requirements	
Collection contact, access and time	
Loading and securing responsibility	
Route, border and permit dependencies	
Accepted delivery windows and service time	
Driver and dispatch communication	
Exception process and proof of delivery	
Empty return, waiting and cost implications	

Prepared by: _____ **Case/date:** _____

© 2026 Quazi Asif Newaz. For personal study; retain this notice.

Worksheet 11 Multimodal option comparison

Chapter 20 • Include connecting legs, terminal activity, departure calendars and destination receipt. Compare stock time on a stated basis.

Field	Your record, evidence or decision
Common origin and destination events	
Road option cost, time and scope	
Rail option legs, terminals and departures	
Water option legs, terminals and departures	
Inventory value and time-cost assumptions	
Delivery requirement and usable margin	
Recovery options and acceptance status	
Recommended option and conditions	

Prepared by: _____ **Case/date:** _____

© 2026 Quazi Asif Newaz. For personal study; retain this notice.

Worksheet 12 Warehouse scope and responsibility

Chapters 21–22 • Define the event that starts and ends each activity. Allocate physical work, data, approvals and exceptions.

Field	Your record, evidence or decision
Inbound receiving boundary	
Inspection, discrepancy and quality status	
Putaway and location control	
Inventory ownership and adjustment rights	
Replenishment, picking and packing	
Dispatch confirmation and customer data	
Returns and disposition	
Billing units and excluded activities	

Prepared by: _____ **Case/date:** _____

© 2026 Quazi Asif Newaz. For personal study; retain this notice.

Worksheet 13 Warehouse capacity and labour

Chapter 23 • Keep nominal capacity, working policy and actual demand distinct. Test the complete process for bottlenecks.

Field	Your record, evidence or decision
Layout and nominal position count	
Working occupancy policy and capacity	
Peak stock and replenishment assumptions	
Daily lines, orders and handling units	
Validated productivity and work mix	
Productive hours per person	
Required people and downstream capacity	
Constraint, proposed action and validation	

Prepared by: _____ **Case/date:** _____

© 2026 Quazi Asif Newaz. For personal study; retain this notice.

Worksheet 14 Implementation acceptance

Chapter 24 • Tie each requirement to a test result and an accountable acceptance. Separate critical defects from tolerable limitations.

Field	Your record, evidence or decision
Scope and agreed launch criteria	
Master-data and interface tests	
Process and exception tests	
Physical resources and competence	
Critical defects and corrective owners	
Repeat test and evidence reference	
Contingency and rollback arrangement	
Authorised launch decision and conditions	

Prepared by: _____ **Case/date:** _____

© 2026 Quazi Asif Newaz. For personal study; retain this notice.

Worksheet 15 Project cargo register

Chapters 25–26 • Use the actual transport configuration and drawing revision. This record supports coordination and does not replace engineering approval.

Field	Your record, evidence or decision
Unit identity and installation priority	
Final packed dimensions and mass	
Drawing and configuration revision	
Centre-of-gravity and handling information owner	
Vessel and terminal acceptance	
Road route, survey and permit conditions	
Site, foundation and laydown readiness	
Unresolved interfaces and technical owner	

Prepared by: _____ **Case/date:** _____

© 2026 Quazi Asif Newaz. For personal study; retain this notice.

Worksheet 16 Project change request

Chapters 27–28 • Describe the changed fact before proposing cost approval. Assess technical, schedule, commercial and document consequences separately.

Field	Your record, evidence or decision
Change reference and initiating evidence	
Original scope and changed requirement	
Technical and permit review needed	
Schedule dependencies and alternatives	
Incremental cost, currency and validity	
Budget, forecast and funding effect	
Approvals and execution conditions	
Affected records and closure evidence	

Prepared by: _____ **Case/date:** _____

© 2026 Quazi Asif Newaz. For personal study; retain this notice.

Worksheet 17 Tender evaluation

Chapter 30 • Apply mandatory conditions before weighted scores. Normalise excluded work and preserve the evidence behind the rating.

Field	Your record, evidence or decision
Customer requirement and demand peaks	
Mandatory acceptance conditions	
Comparable scope and cost boundary	
Evaluation criteria and weights	
Supplier evidence and scored reasoning	
Open clarification and cost estimate	
Implementation, transition and governance	
Recommendation, approval and conditions	

Prepared by: _____ **Case/date:** _____

© 2026 Quazi Asif Newaz. For personal study; retain this notice.

Worksheet 18 Job profit and cash record

Chapter 31 • Separate revenue, direct cost and cash timing. Use accrued costs where the service has occurred but the invoice is outstanding.

Field	Your record, evidence or decision
Selling revenue and currency basis	
Confirmed supplier costs	
Accrued costs and supporting estimate	
Gross profit, margin and markup	
Supplier due dates and cash outflow	
Customer due dates and collection	
Credit exposure and funding assumptions	
Reconciliation, disputes and closure	

Prepared by: _____ **Case/date:** _____

© 2026 Quazi Asif Newaz. For personal study; retain this notice.

Worksheet 19 Customer exception update

Chapter 32 • Write an update the customer can use to make a decision. Distinguish observed events, estimates and unaccepted alternatives.

Field	Your record, evidence or decision
Confirmed event and evidence source	
Original commitment and current estimate	
Effect on the customer requirement	
Available options and acceptance status	
Decision requested and deadline	
Incremental cost and approval owner	
Next action and accountable person	
Next update time and closure evidence	

Prepared by: _____ **Case/date:** _____

© 2026 Quazi Asif Newaz. For personal study; retain this notice.

Worksheet 20 Claim evidence register

Chapter 33 • Start the applicable notification and deadline review promptly. This register supports the claims owner and does not decide liability.

Field	Your record, evidence or decision
Shipment, contract and policy references	
Incident observation and discovery time	
Custody events and condition records	
Commercial value and quantity evidence	
Notices, recipients and deadline owner	
Survey, mitigation and preservation decisions	
Claim calculation and supporting records	
Outcome, recovery and improvement action	

Prepared by: _____ **Case/date:** _____

© 2026 Quazi Asif Newaz. For personal study; retain this notice.

Worksheet 21 Control tower exception board

Chapter 35 • Prioritise the consequence and required decision, not merely the colour of a status. Preserve missing and conflicting data as distinct conditions.

Field	Your record, evidence or decision
Shipment and business requirement	
Source event, timestamp and confidence	
Exception and likely consequence	
Immediate specialist escalation if needed	
Next action, owner and deadline	
Permitted automation and review boundary	
Customer communication evidence	
Closure criteria and learning	

Prepared by: _____ **Case/date:** _____

© 2026 Quazi Asif Newaz. For personal study; retain this notice.

Worksheet 22 Emissions comparison

Chapter 36 • Use a common boundary, compatible factors and a transparent allocation. The worksheet does not supply real emissions factors.

Field	Your record, evidence or decision
Compared service and system boundary	
Mass, distance and actual transport legs	
Factor source, unit, version and basis	
Terminal and other included activities	
Allocation and data-quality limitations	
Each leg calculation and chain total	
Cost, stock and service implications	
Measured pilot result and qualified claim	

Prepared by: _____ **Case/date:** _____

© 2026 Quazi Asif Newaz. For personal study; retain this notice.

Worksheet 23 Professional learning log

Chapters 37 and 40 • Use fictional or authorised anonymised material. Explain what you learned and the evidence that changed your judgement.

Field	Your record, evidence or decision
Role or competency being developed	
Task and level of supervision	
Evidence used and calculation method	
Decision and limits of authority	
Feedback and error correction	
Revised work or demonstrated improvement	
Next learning action and date	
Portfolio evidence and confidentiality check	

Prepared by: _____ **Case/date:** _____

© 2026 Quazi Asif Newaz. For personal study; retain this notice.

Worksheet 24 Capstone submission cover sheet

Chapters 38–40 • Connect the case brief, calculations, plan and change response into one consistent submission. Use the assessment rubric in Chapter 40.

Field	Your record, evidence or decision
Case choice and version	
Customer objective and service scope	
Cargo, commercial and measurement record	
Option comparison and recommendation	
Milestones, owners and readiness gates	
Risk, exception and change response	
Cost, price, cash and performance measures	
Assumptions, references and reflection	

Prepared by: _____ **Case/date:** _____

© 2026 Quazi Asif Newaz. For personal study; retain this notice.

Calculation and measurement guide

Use consistent units and the exact assumptions in the quotation or exercise. The formulas below explain the classroom method. They do not supply a live tariff, legal limit, engineering rating or emissions factor.

Measure	Method and checks
Rectangular package volume	Length × width × height, all in metres, gives m³. Multiply by package count only when dimensions are identical.
Unit conversion	100 cm = 1 m; 1,000,000 cm³ = 1 m³; 1,000 kg = 1 metric tonne. Keep mass and volume distinct.
Gross density	Gross kg ÷ external m³. State whether pallets, frames or other packaging are included.
Dimensional weight	External volume in cm³ ÷ the stated divisor in cm³/kg. Apply the agreed package/shipment comparison and rounding rules.
Chargeable air weight	Under the teaching assumption: greater of gross and dimensional weight, then apply the actual tariff rules and minimums.
LCL rating units	Under the stated teaching rule: greater of m³ and metric tonnes. Do not assume this rule applies to every charge.
Minimum freight	Greater of calculated freight and the minimum, unless the actual tariff defines a different treatment.
Gross profit	Selling revenue − included direct cost. Define the cost boundary and include relevant accruals.
Gross margin	Gross profit ÷ revenue × 100%. For target margin m as a decimal, selling price = cost ÷ (1 − m).
Markup	Gross profit ÷ cost × 100%. For markup u as a decimal, selling price = cost × (1 + u).
Simple funding cost	Funded amount × assumed annual rate × funded days ÷ stated year basis. This is not a complete cash-flow model.
Working stock capacity	Nominal accepted positions × assumed working occupancy. Round required nominal capacity upward where appropriate.
Required productive hours	Workload ÷ validated output per productive hour. Required people = productive hours ÷ productive hours per person.
Project forecast	Current estimate of all remaining and incurred cost, including relevant approved changes; avoid double-counting commitments and invoices.
On-time performance	Eligible events meeting the defined time requirement ÷ eligible population × 100%. Disclose exclusions and changed commitments.
OTIF	Orders meeting both on-time and in-full conditions ÷ eligible orders × 100%. Do not multiply separate percentages without evidence.
Alert precision	True positive alerts ÷ all raised alerts.
Alert recall	Detected real exceptions ÷ all real exceptions in the reviewed sample.
Transport activity	Metric tonnes × kilometres for the stated leg and allocation.

Measure	Method and checks
Teaching emissions	Activity × compatible assumed factor, plus other included chain elements. Keep the system boundary and data quality visible.
Percentage change	(New value − original value) ÷ original value × 100%. Define the original reference.
Cost per modelled tonne avoided	Additional comparable cost ÷ modelled tonnes CO2e avoided. Not a carbon-credit price or a verified abatement claim.

A reliable calculation record

Write the question, input values, source, units and assumptions before the arithmetic. Show intermediate quantities where they affect the interpretation. Round only at the stated stage. Check that the answer has a sensible size and unit. Finally, explain what the calculation can decide and which operational acceptance remains outstanding.

Sources and photograph credits

Primary institutional and provider sources were checked for Edition 1.0 on 31 October 2026. The short labels used inside the chapters refer to the entries below. Some sources recur across parts because they support different teaching applications. They do not validate the fictional prices, schedules, emissions factors or case outcomes.

Official rules and provider requirements can change. Read the applicable edition and the actual contract for a shipment. The book explains concepts in original language; it does not reproduce complete proprietary manuals or replace specialist review.

Foundation sources — Chapters 1–4

[P1-01] FIATA. About Freight Forwarding. Overview of the scope of forwarding services. https://fiata.org/about-freight-forwarding/

[P1-02] FIATA. FIATA Updates Model Rules on Freight Forwarding Services, 3 October 2019. Explains the agency and contractual-carrier context and the role of applicable local law. https://fiata.org/n/model-rules-on-freight-forwarding-services-update/

[P1-03] Government of Canada, Trade Commissioner Service. Printable interactive export documentation checklist. Used for general document-consistency principles; Canadian regulatory requirements are not presented as universal rules. https://www.tradecommissioner.gc.ca/en/step-by-step-guide-exporting/resources/documentation-checklist.html

[P1-04] ICC Digital Library. Incoterms and Commercial Contracts. Scope of the rules, contract relationships and use of named places. https://library.iccwbo.org/clp/clp-incoterms-qa-2020.htm?AGENT=ICC_CHE

[P1-05] ICC. Incoterms 2020 Introduction. Mode groups and introductory guidance. https://2go.iccwbo.org/explore-our-products/ebooks/incoterms/incoterms-2020-introduction-free-document-pdf.html

[P1-06] ICC Digital Library. Incoterms 2020 rules for any mode or modes of transport. Authoritative provisions and explanatory notes; consult the complete publication for the full obligations. https://library.iccwbo.org/content/tfb/BOOKS/BK_0049/BK_0049_04_RulesAny.htm

[P1-07] ICC Digital Library. Incoterms 2020 rules for sea and inland waterway transport. Authoritative provisions and explanatory notes. https://library.iccwbo.org/content/tfb/BOOKS/BK_0049/BK_0049_05_RulesSea.htm

[P1-08] ICC Academy. Incoterms 2020 C rules vs D rules: Risk transfer explained, Miguel Angel Bustamante, 20 January 2026. Educational commentary; author views are identified by the publisher. https://academy.iccwbo.org/incoterms/article/incoterms-2020-c-or-d-rules/

[P1-09] ICC. Incoterms 2020 Checklist and Flowcharts, 2024 update. Guidance on selecting an appropriate rule. https://library.iccwbo.org/content/clp/Others/incoterms_2020_checklist_2024-update.pdf

[P1-10] ICC. Incoterms 2020. Explains key changes, including the insurance-cover distinction between CIP and CIF. https://iccwbo.org/business-solutions/incoterms-rules/incoterms-2020/

[P1-11] ICC Academy. DAP and DPU Incoterms 2020 explained: Key differences, Miguel Angel Bustamante, 17 March 2025. Educational commentary on unloading obligations. https://academy.iccwbo.org/incoterms/article/incoterms-2020-dpu-or-dap/

[P1-12] United States International Trade Administration. Common Export Documents. Used for general document functions; US filing rules are outside this part's scope. https://www.trade.gov/common-export-documents

[P1-13] IATA. Air Cargo Tariffs and Rules: What You Need to Know. Used for the basic air-waybill function and non-negotiability, rather than paper-copy or current tariff requirements. https://www.iata.org/en/publications/newsletters/iata-knowledge-hub/air-cargo-tariffs-and-rules-what-you-need-to-know/

[P1-14] United States International Trade Administration. Trade Finance Guide. Introductory payment-method guidance. https://www.trade.gov/report/trade-finance-guide

[P1-15] United States International Trade Administration. Letter of Credit. Introductory guidance on the documentary payment undertaking. https://www.trade.gov/letter-credit

[P1-16] United States International Trade Administration. Documentary Collections. Distinguishes collections from a letter-of-credit undertaking. https://www.trade.gov/documentary-collections

Cargo and operational sources — Chapters 5–8

[P2-01] International Plant Protection Convention. ISPM 15, Regulation of wood packaging material in international trade. Publication page dated 13 July 2021. Supports the distinction between regulated raw-wood packaging and processed-wood exclusions in Chapter 5. https://ippc.int/en/publications/640/

[P2-02] IMO, ILO and UNECE. Code of Practice for Packing of Cargo Transport Units, 2014, and IMO overview. Supports the distinction between a geometric packing exercise and a complete packing/securing assessment, and the consideration of moisture and compatibility in Chapters 5 and 8. https://www.imo.org/en/ourwork/safety/pages/ctu-code.aspx

[P2-03] US International Trade Administration. Common Export Documents. Supports the different purposes of commercial invoices, packing lists and transport documents. US filing requirements are not presented as worldwide requirements. https://www.trade.gov/common-export-documents

[P2-04] IATA. E-freight and e-AWB. Supports the role of the air waybill and the importance of data quality in paperless cargo processes in Chapter 6. https://www.iata.org/en/programs/cargo/e/efreight/

[P2-05] UNECE. Executive Guide on e-CMR, October 2023. Supports the introduction to the CMR framework and electronic road consignment notes in Chapter 6. https://unece.org/trade/documents/2023/10/executive-guide-e-cmr

[P2-06] Maersk. Sea waybill vs bill of lading: What is the difference in ocean freight shipping? Updated 10 April 2025. Carrier explanation used for document-family distinctions; the chapter directs readers to the actual issuer's terms and release process. https://www.maersk.com/de-de/logistics-explained/shipping-documentation/2023/10/03/difference-bill-of-lading-sea-waybill

[P2-07] World Customs Organization. Harmonized System frequently asked questions and What is the Harmonized System? Supports the six-digit international structure, current edition reference and need for jurisdiction-specific classification review in Chapter 7. https://www.wcoomd.org/en/topics/nomenclature/overview/harmonized_system_faq.aspx

[P2-08] World Trade Organization. Technical Information on Customs Valuation. Supports transaction value, the valuation framework and the distinction between value-based and specific duties. The calculations in Chapter 7 use explicitly fictional assumptions. https://www.wto.org/english/tratop_e/cusval_e/cusval_info_e.htm

[P2-09] European Commission, Taxation and Customs Union. Calculation of customs duties. Supports the EU example connecting tariff classification, value and origin, and the role of valuation adjustments. https://taxation-customs.ec.europa.eu/customs/common-customs-tariff-cct/calculation-customs-duties_en

[P2-10] European Commission, Taxation and Customs Union. Rules of origin for goods. Supports the distinction between origin and dispatch, and between preferential and non-preferential origin. https://taxation-customs.ec.europa.eu/customs/rules-origin-goods_en

[P2-11] European Commission, Taxation and Customs Union. Proof of origin. Supports the need to establish the proof required by the particular preferential arrangement. https://taxation-customs.ec.europa.eu/customs/rules-origin-goods/preferential-rules-origin/proof-origin_en

[P2-12] European Commission, Taxation and Customs Union. Economic Operators Registration and Identification number. Supports the named EU registration example in Chapter 7. https://taxation-customs.ec.europa.eu/customs/customs-procedures-import-and-export/customs-operations/economic-operators-registration-and-identification-number-eori_en

[P2-13] European Commission. Transit Manual, June 2020, introductory explanation of how transit works. Used for the conceptual EU transit example, not for current system instructions or procedural deadlines. https://taxation-customs.ec.europa.eu/system/files/2021-06/transit_manual_june_2020_en.pdf

[P2-14] UK Health and Safety Executive. Safe driving: loading and unloading. Supports the loading-area, stability and inter-company coordination questions in Chapter 8. UK guidance is identified as such. https://www.hse.gov.uk/workplacetransport/factsheets/loading.htm

[P2-15] IATA. Guidance Document for Lithium Batteries and Sodium Ion Batteries, 2026; read with the applicable 67th edition Dangerous Goods Regulations and current requirements. Used for awareness of battery information, configuration and edition-sensitive assessment. No packing instruction is reproduced. https://www.iata.org/contentassets/05e6d8742b0047259bf3a700bc9d42b9/lithium-battery-guidance-document.pdf

[P2-16] US Federal Aviation Administration. How to Ship Dangerous Goods. Supports the need for correct classification, attention to article condition, appropriate use of an SDS and carrier-specific acceptance checks. US regulatory detail is not presented as a global checklist. https://www.faa.gov/hazmat/safecargo/how_to_ship

[P2-17] International Maritime Organization. IMDG Code publication page. Confirms the 2024 Edition including Amendment 42-24 and its mandatory date of 1 January 2026. https://www.imo.org/en/publications/pages/imdg%20code.aspx

[P2-18] UNECE. ADR 2025, applicable from 1 January 2025. Supports the identification of the road dangerous-goods framework and the hazard-class orientation. Actual applicability and obligations require review for the route and activity. https://unece.org/adr-2025-files

[P2-19] World Health Organization. Good storage and distribution practices for medical products, WHO Technical Report Series 1025, Annex 7, 2020. Supports the discussion of controlled conditions, monitoring, records, segregation and authorised release. The temperature plots are fictional teaching data, not product-stability evidence. https://www.who.int/publications/m/item/trs-1025-annex-7

[P2-20] World Customs Organization. SAFE Framework of Standards to Secure and Facilitate Global Trade, 2025 edition. Supports the broader supply-chain security and cooperation context in Chapter 8. https://www.wcoomd.org/en/topics/facilitation/instrument-and-tools/frameworks-of-standards/safe_package.aspx

[P2-21] UK Health and Safety Executive. Introduction to workplace transport safety. Supports the separation of people and vehicles and the need to consider sites, vehicles and drivers together. https://www.hse.gov.uk/workplacetransport/about.htm

[P2-24] European Commission, Taxation and Customs Union. European Binding Tariff Information. Supports the distinction between a formal EU classification decision and informal advice. https://taxation-customs.ec.europa.eu/online-services/online-services-and-databases-customs/european-binding-tariff-information-ebti_en

Service and professional-practice sources — Chapters 9–40

[N-01] IATA. What is aircraft ULD in air transport? 13 August 2021. Background on unit load devices; actual equipment and aircraft acceptance remain operator-specific. https://www.iata.org/en/publications/newsletters/iata-knowledge-hub/what-is-aircraft-uld-in-air-transport/

[N-02] IATA. What to know about air cargo handling; and IATA Cargo Handling Manual overview, 2026 edition. Used for the separation of receiving, acceptance and transport events. https://www.iata.org/en/publications/newsletters/iata-knowledge-hub/what-to-know-about-air-cargo-handling/

[N-03] UPS Air Cargo. Completing the Air Waybill. Provider example of the information associated with an air waybill; it is not a universal document-completion instruction. https://aircargo.ups.com/en-us/completing-air-waybill

[N-04] IATA. Special Cargo Manuals. Overview of specialist cargo guidance and the need to use the applicable current requirements. https://www.iata.org/special-cargo-manuals/

[N-05] Maersk. Understanding ocean freight. 15 December 2023. Carrier introduction to FCL and LCL service concepts. Actual contracts, handling and schedules govern a shipment. https://www.maersk.com/it-it/logistics-explained/transportation-and-freight/2023/12/15/understanding-ocean-freight

[N-06] Hapag-Lloyd. Containers. Equipment-family information and the need to check actual container specifications and manufacturer variations. https://www.hapag-lloyd.com/en/services-information/cargo-fleet/container.html

[N-07] International Maritime Organization. Verification of the gross mass of a packed container. SOLAS VGM overview, methods and shipper responsibility. https://www.imo.org/en/ourwork/safety/pages/verification-of-the-gross-mass.aspx

[N-08] Maersk. Demurrage and detention terms. Illustrates separate or combined equipment clocks and country-specific application; no published tariff is used in the exercises. https://terms.maersk.com/dnd

[N-09] European Commission. Driving time and rest periods. EU framework overview; the book does not supply a complete driver-hours compliance calculation. https://transport.ec.europa.eu/transport-modes/road/social-provisions/driving-time-and-rest-periods_en

[N-10] UNECE. Executive Guide on e-CMR. October 2023. Road consignment-note context. See also UNIDROIT, CMR 1956 convention materials: https://www.unidroit.org/instruments/transport/cmr-1956/ https://unece.org/trade/documents/2023/10/executive-guide-e-cmr

[N-11] UNECE. Terminology on Combined Transport. December 2000. Conceptual distinctions between multimodal, intermodal and combined transport; contractual use must still be checked. https://unece.org/transport/publications/terminology-combined-transport

[N-12] GS1. GS1 Logistic Label Guideline. SSCC and logistics-unit identification context; a scan does not by itself verify physical quantity or condition. https://www.gs1.org/docs/tl/GS1_Logistic_Label_Guideline.pdf

[N-13] UK Health and Safety Executive. LOLER overview; Planning and organising lifting operations. UK guidance used to explain competent planning and the distinction between coordination and technical approval. https://www.hse.gov.uk/work-equipment-machinery/loler-overview.htm

[N-14] FIATA. Electronic FIATA Bill of Lading frequently asked questions; and Model Rules on Freight Forwarding Services update, 3 October 2019. Context for freight-forwarder liability and cargo insurance. https://www.efbl.fiata.org/faq

[N-15] ICAO. 2024 Revised Limits of Liability under the Montreal Convention of 1999. Dated example of the cargo limit of 26 SDR/kg effective 28 December 2024, subject to applicability and the Convention. https://www.icao.int/secretariat/legal/LEB%20Treaty%20Collection%20Documents/2024_Revised_Limits_of_Liability_Under_the_Montreal_Convention_of_1999_en.pdf

[N-16] US Office of Foreign Assets Control. A Framework for OFAC Compliance Commitments. Used for programme-level compliance principles within the US sanctions context. https://ofac.treasury.gov/system/files/126/framework_ofac_cc.pdf

[N-17] UK Ministry of Justice. Bribery Act 2010 guidance. Publication page updated 22 January 2025. UK example supporting anti-bribery awareness and organisational procedures. https://www.gov.uk/government/publications/bribery-act-2010-guidance

[N-18] European Commission. Principles of the GDPR. EU data-protection principles; actual obligations depend on the organisation, information and applicable law. https://commission.europa.eu/law/law-topic/data-protection/information-business-and-organisations/principles-gdpr_en

[N-19] Digital Container Shipping Association. Track and Trace standards. Context for standardised event definitions and information exchange. https://dcsa.org/standards/track-and-trace

[N-20] US National Institute of Standards and Technology. Artificial Intelligence Risk Management Framework: Generative Artificial Intelligence Profile. 26 July 2024. Used for evidence, evaluation and human oversight in AI-assisted work. https://www.nist.gov/publications/artificial-intelligence-risk-management-framework-generative-artificial-intelligence

[N-21] Smart Freight Centre. Global Logistics Emissions Council Framework overview, including version 3.2. Used for boundaries, transport-chain elements and transparent emissions calculation; all numerical factors in this textbook are fictional. https://smartfreightcentre.org/page/glec

Photograph credits and licences

[P2-22] Photograph 5.1: UNICEF pallets 02, photographed 3 March 2011 by Wikimedia Commons user Heb. Source: https://commons.wikimedia.org/wiki/File:UNICEF_pallets_02.jpg

Licensed under Creative Commons Attribution-ShareAlike 3.0 Unported: https://creativecommons.org/licenses/by-sa/3.0/

Reproduced without cropping or other alteration, apart from proportional display scaling. Attribution: Wikimedia Commons user Heb. The photograph retains its stated licence; its inclusion does not imply endorsement of this textbook by the photographer or UNICEF.

[P2-23] Photograph 8.1: Damaged fragile parcel delivered to doorstep, 20 June 2022, by Meanwell Packaging. Source: https://commons.wikimedia.org/wiki/File:Damaged_fragile_parcel_delivered_to_doorstep.jpg

Original photographer source: https://www.flickr.com/photos/195311218@N08/52159853896/

Photographer website: https://meanwell-packaging.co.uk/

Licensed under Creative Commons Attribution 2.0 Generic: https://creativecommons.org/licenses/by/2.0/

Reproduced without cropping or other alteration, apart from proportional display scaling. The photograph is used to practise factual observations of external packaging; it is not evidence of the cause, contents or outcome of a freight claim. No endorsement by the photographer is implied.

Photograph 9.1. B-LIB, Cathay Pacific Boeing 747-467ERF at VGHS, 5 February 2022. Md Shaifuzzaman Ayon. Creative Commons Attribution-ShareAlike 4.0 International.

Source: https://commons.wikimedia.org/wiki/File:B-LIB_-_Cathay_Pacific_-_Boeing_747-467ERF_-_36867_-_VGHS.jpg

Licence: https://creativecommons.org/licenses/by-sa/4.0/

Photograph 13.1. Container ship in the Pacific Ocean off San Francisco, 18 October 2012. Basil D Soufi (BDS2006). Creative Commons Attribution-ShareAlike 4.0 International.

Source: https://commons.wikimedia.org/wiki/File:Container_ship_in_Pacific_Ocean_off_the_coast_of_San_Francisco,_CA.JPG

Licence: https://creativecommons.org/licenses/by-sa/4.0/

Photograph 17.1. Flatbed semi-trailer truck, Russia, 4 March 2024. Georg Pik. CC0 1.0 Universal public-domain dedication.

Source: https://commons.wikimedia.org/wiki/File:Flatbed_semi-trailer_truck,_Russia.jpg

Licence: https://creativecommons.org/publicdomain/zero/1.0/

Photograph 25.1. Broshuis low-loader trailers at IAA, Hanover, 30 September 2014. Spielvogel / Wikimedia Commons. CC0 1.0 Universal public-domain dedication.

Source: https://commons.wikimedia.org/wiki/File:Broshuis_low_loader_trailers_2014._Spielvogel.jpg

Licence: https://creativecommons.org/publicdomain/zero/1.0/

All six photographs are reproduced without cropping or other alteration, apart from proportional display scaling. Each photograph retains its stated licence. No endorsement of this textbook or its fictional cases is implied. The 60 numbered instructional figures are original teaching diagrams, schematics and plots.

List of figures and photographs

Illustrations are listed in chapter order. Captions explain the teaching boundary and identify any fictional numerical inputs.

Figure 1.1 Cargo information and money in the teaching case....12
Figure 2.1 Working relationships around the shipment....18
Figure 3.1 Reading a shipment instruction....23
Figure 3.2 The Riverbend teaching schedule....25
Figure 3.3 Shipment decisions and feedback....26
Figure 4.1 CPT in the fictional case....31
Figure 4.2 Four agreements around one transaction....33
Figure 5.1 Measuring a transport package....40
Figure 5.2 Riverbend pallet proposal....41
Photograph 5.1 Palletised cartons at the UNICEF world warehouse in Copenhagen, photographed in 2011.42
Figure 6.1 House and master reconciliation in the teaching consolidation....48
Figure 6.2 A controlled correction....51
Figure 7.1 Three distinct customs questions....55
Figure 7.2 A simplified border-process swimlane....59
Photograph 8.1 Damaged external packaging....63
Figure 8.1 Recognition and escalation....64
Figure 8.2 Recorded observations against a fictional 2–8°C instruction....68
Photograph 9.1 A Cathay Pacific Boeing 747 freighter at Dhaka, 2022....73
Figure 9.1 Service boundaries around an air movement....74
Figure 10.1 Backwards planning from a fictional air cargo acceptance deadline....78
Figure 10.2 Air shipment events and evidence....79
Figure 11.1 A transparent air-rating sequence....82
Figure 11.2 The fictional 100 kg rate-break comparison....83
Figure 12.1 Recovery decisions for a special-cargo delay....86
Photograph 13.1 Container ship off San Francisco, 2012....92
Figure 13.1 Common ocean equipment families....93
Figure 14.1 Separate export readiness streams....97
Figure 14.2 Delivery readiness combines regulatory, commercial, terminal and receiving conditions....98
Figure 15.1 The fictional FCL comparison by cost stage....100
Figure 15.2 Delay-related costs under the chapter's fictional tariff....102
Figure 16.1 Recovery options for a delayed retail shipment....105
Photograph 17.1 Flatbed semi-trailer truck, Russia, 2024....111
Figure 17.1 Vehicle features answer different delivery questions....112
Figure 18.1 Elapsed job time includes more than driving....116
Figure 19.1 The costed vehicle cycle includes the stated empty return....120

Figure 19.2 Delivery windows create scheduling constraints....121
Figure 20.1 Three complete inland chains for the same port-to-DC requirement....125
Figure 21.1 A contract-logistics scope connects physical activities, information and decision rights....130
Figure 22.1 Warehouse stock changes location and status through controlled events....134
Figure 23.1 Nominal and planned working capacity under the stated occupancy assumption....137
Figure 23.2 An unbalanced picking and packing process creates work in progress....139
Figure 24.1 Implementation gates connect design, data, testing and operational readiness....142
Figure 24.2 The same error population produces different line and order accuracy....143
Photograph 25.1 Low-loader trailers at an industry exhibition in Hanover, 2014....148
Figure 25.1 Equipment dimensions and the transport envelope are different planning records....149
Figure 26.1 A route constraint register connects each location with evidence, an owner and an approval condition....153
Figure 27.1 Two prerequisite paths converge before transport....157
Figure 27.2 Arrival order must support installation and laydown capacity....158
Figure 28.1 The teaching project budget separates base categories and contingency....161
Figure 28.2 A change is assessed across scope, technical conditions, schedule and cost before authorised execution....162
Figure 29.1 A quotation comparison preserves both the cost boundary and the confidence of each input…167
Figure 30.1 Discovery links business needs to service controls, measurable outcomes and implementation requirements....171
Figure 31.1 Revenue, gross profit and cash timing answer different management questions....176
Figure 32.1 A useful update connects evidence to consequence and action....180
Figure 32.2 On-time and complete populations overlap....181
Figure 33.1 A claim file joins commercial value, carriage records, custody and condition evidence....185
Figure 34.1 A responsible response preserves facts, pauses the affected action and seeks an authorised decision....190
Figure 35.1 A control tower connects source events, validation, exception rules, accountable decisions and feedback....193
Figure 35.2 Precision concerns the alerts raised; recall concerns the real exceptions that should have been found....194
Figure 36.1 The teaching comparison includes the alternative's road and terminal stages....198
Figure 37.1 Early development moves from observation to supervised execution and then a bounded improvement task....203
Figure 38.1 The fixed retail case splits one order into linked air and ocean records....208
Figure 38.2 The retail case separates measurement, service and document decisions....210
Figure 39.1 The industrial case combines the major-unit sequence with a separate urgent-air path....212
Figure 39.2 Commercial approval, engineering acceptance and site release are separate decisions....214
Figure 40.1 The portfolio rubric balances execution, numeracy, reasoning, responsible practice and communication....217

Alphabetical subject index

Page references point to the main teaching chapters, including their figures, cases and exercises. The complete chapter contents is at the beginning; definitions and answers have their own consolidated sections.

A

Accrual 103, 175, 177–178

Actual event 11, 16, 26, 28, 35, 76, 80, 102, 190, 194, 214

Ad valorem duty 56

Agent 18, 21, 47, 72, 184

AI assistance 51, 183, 192–196, 218–219

Aircraft ULD 73, 75

Allocation 19, 30–31, 34, 36, 112, 121–122, 129, 139–140, 192, 198–199, 204

Amendment 32, 35, 51, 66, 77–78, 84, 166, 168, 177, 188

ATA and ATD 26

Available inventory 134

B

Blank sailing 104, 108

Booking 10, 16, 18, 20–22, 24–25, 31, 34, 36, 38, 43, 45–46, 49–51, 53–54, 62, 69–70, 74–75, 77–78, 80, 86–89, 93, 96, 99, 104, 106, 113, 125–126, 130, 150, 166–168, 170–174, 181, 192–193, 195, 202–203, 208–209, 218

Bottleneck 137–138, 140

Breakbulk 92, 94–95

C

Cargo 10–20, 22, 24–28, 30–32, 34–35, 37–38, 41–46, 48–49, 59–60, 62, 64, 66–80, 84–87, 89–97, 99, 101, 103–105, 107, 110–113, 115–117, 123–124, 146–158, 162–163, 166, 168–169, 174, 180, 182, 184–186, 192–193, 206–209, 211, 213–216

Cargo acceptance 45, 72, 77–78, 80, 193

Cargo care 37, 62, 66, 69

Cargo insurance 30, 184, 186

Carrier 11–13, 15, 17–19, 21, 23–24, 26, 28–31, 34, 38, 40, 42, 46–48, 59–60, 65–66, 77, 79, 81, 91, 98–101, 131, 134, 180, 184–185, 202, 206

CBM 13, 24, 27, 35

Change control 143, 146, 154, 160

Chargeable weight 44, 71, 81–82, 84, 208, 210

Classification 54–56, 58–62, 64, 85, 206, 217

Combined transport 123

Commercial invoice 34, 36, 45, 49, 52, 60, 78, 184

Consignee 17, 20–21, 34, 46–48, 50, 52, 188

Consignment note 46–47, 116

Consolidation 11, 16–17, 19, 21, 30–31, 47–48, 72, 74, 76, 91, 94, 199–200

Contingency 138, 160–161, 163–164, 212–213

Contract logistics 13, 15, 128–129, 132

Control tower 183, 192–193, 195

Customs classification 54–56, 58–62, 64, 85, 206, 217

Customs procedure 54–55, 57, 61, 106, 116

Customs value 54, 56, 61

Cutoff 13, 24–25, 51, 53, 72, 74, 77, 80, 96–97, 99, 123–127, 130–131, 138, 143, 167, 181, 192, 203, 206, 216

D

DC 23–28, 33, 104, 107, 125–126, 172, 179, 206, 208, 210

Deconsolidation 17, 48, 94

Dedicated vehicle 110

Delivery point 30–31, 34, 36

Demurrage 101

Dependency 23, 25, 28, 78, 99, 159, 211–212

Detention 101

Dimensional weight 40–41, 44, 81, 83–84, 193, 207–208, 213, 217

E

Empty return 99, 102–103, 117, 119–120, 122

EORI 58

ETA and ETD 26, 28

Evidence and authority 17–19, 21, 34, 45–46, 51–52, 54, 57–60, 66, 68, 70, 75, 86–87, 89, 93–94, 98–99, 107, 117, 130, 142, 150, 157, 162, 179, 181, 183, 185, 188, 190, 194–195, 203–204, 212, 217–219

External dimensions 12–13, 40, 44, 58, 81

F

FCL 91, 94–95, 100–101, 103, 206–207, 209–210

Flat rack 92

Float 156, 159

Forecast at completion 162–164

Free time 101

Freight forwarder 10–11, 14–21, 23–24, 26, 29–30, 32, 38, 46–47, 49, 54, 57, 65–66, 68, 72–75, 77–78, 85, 87, 106–107, 149, 151, 157, 163, 166, 170, 184, 186, 198, 208

Freighter 72–73, 75

G

Gross density 40, 44

Gross margin 83–84, 119, 122, 168–169, 175, 177, 213

Gross profit 28, 83, 168, 175–178

Gross weight 12–13, 22, 35, 38–41, 44, 48–49, 52, 66, 81–84, 207

Groupage 110, 113

H

Handling unit 38, 133

Handover 10, 16, 19–21, 23, 29–31, 33–36, 62, 66–69, 77–78, 87, 93, 96–97, 110, 116, 125, 127, 134, 156, 158, 163, 172–173, 186, 202, 204, 214, 216–217

I

Incoterms rules 12, 23, 29, 31–32, 36, 49, 56, 206

Insurance and claims 17–21, 27, 30–34, 36, 55–57, 61, 63, 72, 85, 87, 89, 106, 125, 156, 160, 163, 168, 177, 183–187, 194, 196–200, 204, 214, 217, 219

Intermodal transport 123

K

KPI 143, 158, 190–191

L

Laydown area 147, 156, 159, 211

LCL 91, 94–95, 100–101, 103, 206–207, 209–210, 217

Lithium batteries 22, 38, 52, 62, 64–65, 69–70, 85, 87, 89, 191, 213

M

Markup 83–84, 175, 177–178

Master document 47, 51

Milestone 22, 24, 26, 75, 77, 94, 96, 156, 158, 171, 192, 196, 202–203, 208, 210, 214, 216–217

Multimodal transport 123

N

Net weight 12–13, 35, 38–39, 207

Non-preferential origin 57

O

Operational hold 64, 132

OTIF 180, 182

P

Packaging 13, 21, 25, 35, 37–40, 42–43, 62–63, 65, 67, 69, 85–89, 97, 99, 112–113, 117, 139, 185–187, 199

Packing list 21, 23, 25, 34–36, 38–39, 45, 49, 52–53, 78, 80, 116, 203, 209

Pallet position 112, 114, 119, 121, 144

POD 27

Precision 77, 161, 194–196

Preferential origin 57

Principal 10, 36, 45, 55

Professional portfolio 201, 204–205, 216–219

Project feasibility 14, 16, 27, 75, 106, 120, 127, 146–148, 150–152, 164, 200

Project logistics 13–15, 146–147, 211, 215

Putaway 129, 133, 136

Q

Quality release 68, 132, 134, 141

Quotation 13–15, 19, 22, 24, 36, 38, 40–41, 44, 46, 57, 72, 75, 81, 84, 101–103, 112, 114, 121, 129, 165–169, 177, 197, 203–204, 216

R

Rate break 41, 81, 203

Rate comparison 14, 33, 36, 81, 83, 100, 126, 138, 156, 159, 165–167, 169, 172–173, 179–180, 197, 200, 212

Recall 194–196

Reefer 92–94

Revenue unit 101, 103, 167, 207

Risk transfer 29, 31, 36

Ro-ro 92, 94–95

Rollover 104, 108

S

Sales and tenders 11, 17, 20, 22–23, 31–32, 34–35, 43, 58, 61, 81, 87–88, 91, 119, 130, 165, 170–173, 176, 202, 204, 206

Schedule margin 24, 28

SDR 184
Sea waybill 46–47, 52, 98
Service-level agreement 131
Shipper 17, 21, 42, 65, 85, 93–94, 97
Slot 13, 15–16, 24, 27, 60, 79, 98, 104, 108
SSCC 133, 135
Standby 156, 161, 163, 213, 215
Superseded version 50, 162
Sustainability 125–127, 183, 197–200

T

Tare 38–39, 41, 44, 96–97, 99
Temperature control 62, 67–69, 85–86, 88, 92–94, 110–111, 124, 185, 193, 195
Temperature excursion 62
Tonne-kilometre 197, 199–200
Trade terms 12, 23, 29–34, 36, 49, 206
Transaction value 56
Transit 25, 31, 34, 43, 57, 60, 94, 116, 123, 126, 184–185
Transit time 25, 94
Transshipment 57, 61, 94–95, 104, 107, 185

U

UN number 65

V

VGM 96–97, 99

W

Warehouse implementation 128–129, 139, 141–145, 170–174, 192
Weight and volume 12–13, 22, 35, 38–41, 44, 48–49, 52, 66, 81–84, 193, 207–208, 213, 217
WMS 144
Work in progress 138–139
Working capital 58, 79, 176, 178, 213



A practical education in global logistics

How does a shipment move from a factory to a customer across the world? This illustrated textbook explains the people, processes, documents and decisions behind freight forwarding and logistics, guiding students and newcomers from core concepts to practical application.

INSIDE THE BOOK

- Air, ocean and road freight operations
- Contract logistics and warehouse management
- Project cargo and multimodal solutions
- Pricing, quotations and worked calculations
- Customs, cargo care, risk and customer service
- Control towers, AI and career development

Learn through realistic cases, sample documents and practical exercises.

ABOUT THE AUTHOR

Quazi Asif Newaz

Quazi Asif Newaz brings more than two decades of logistics experience, beginning in 2004. He joined GEODIS Bangladesh in 2013 and became Managing Director in 2020. His work spans freight forwarding, contract and project logistics, trade lane development and business leadership. He also develops practical digital tools that connect industry experience with AI.

EXPLORE THE AUTHOR'S WORK

quaziasifnewaz.com