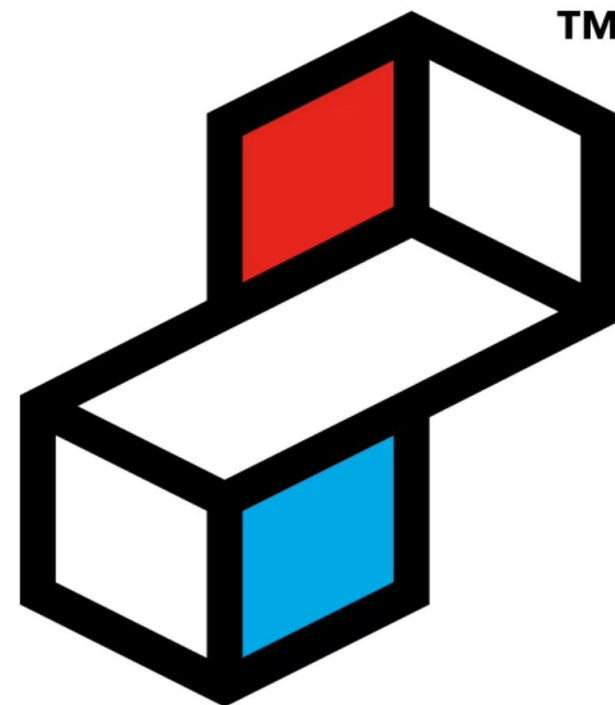




End-to-End Road Freight Shipment Process

A complete operational, compliance, and control-tower-grade process covering every stage from RFQ intake to data archiving – designed for logistics operations managers, control-tower teams, compliance officers, and freight planners in road haulage.

MAXIMUM-DETAIL VERSION



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CHAPTER 1

Pre-Booking & Feasibility

01

RFQ Intake & Qualification

Receive and validate requests via email, EDI, API, portal, or sales rep.

02

Routing & Feasibility

Assess direct vs. hub-and-spoke, intermodal options, and border crossings.

03

Quotation & Booking

Calculate all cost components, issue quote, receive acceptance, confirm booking.

Pre-booking sets the operational and compliance foundation for the entire shipment. Every downstream activity depends on the accuracy and completeness of information captured at this stage.

1.1 RFQ Intake & Qualification

Micro-Steps

- Receive RFQ via email, EDI, API, portal, or sales rep
- Validate cargo type: FTL, LTL, Groupage, or Express
- Confirm commodity – HS code, ADR class, temperature sensitivity, high-value status
- Check pickup/delivery windows and access constraints (ramps, docks, forklift)
- Establish equipment needs: tautliner, box, mega, reefer, tilt, flatbed, low-loader
- Identify special services: tail lift, two-man crew, inside delivery
- Confirm border/transit requirements (T1, export docs) and security level (TAPA TSR1/2/3)

Controls & Compliance

- Sanctions screening on shipper/consignee
- ADR feasibility assessment
- GDP compliance check (pharmaceutical cargo)
- TAPA route risk assessment
- Cabotage rules verification (EU operations)
- Weekend/holiday driving ban calendars
- Low-emission zone restrictions confirmed

Key Documents & Systems

- RFQ, MSDS (ADR), product data sheet, technical drawings
- CRM, TMS, compliance screening, rate management platform

1.2 Routing & Operational Feasibility

Route Structure

- Direct vs. hub-and-spoke determination
- Cross-dock requirements identified
- Intermodal options assessed (rail/road, RoRo, ferry)
- Border crossing points selected
- Toll roads vs. toll-free alternatives evaluated

Feasibility Checks

- Transit time feasibility against delivery windows
- Driver hours compliance (AETR / EU 561/2006)
- Vehicle access restrictions: bridges, tunnels, city bans
- ADR tunnel codes (B, C, D, E) validated per route
- Weather and seasonal risk assessment

Route Controls

- Route risk scoring (cargo crime hotspots, pilferage zones)
- ADR tunnel code compliance confirmed
- Reefer corridor availability validated
- High-value secure routing (TSR-compliant paths)

1.3 Quotation & Booking

Cost Components to Calculate

Linehaul

Fuel Surcharge

Tolls

Waiting Time

Loading Fees

Border Fees

Ferry / Train

Booking Process

- Send quotation to shipper/customer with full cost breakdown
- Receive written or electronic acceptance
- Confirm booking with carrier or subcontractor
- Assign unique booking reference in TMS

Controls

- Rate validity period confirmed before acceptance
- Surcharge accuracy cross-checked against live indices
- Carrier compliance verified: insurance, licences, safety rating

Cargo Preparation at Shipper

Proper cargo preparation is the single most effective way to prevent transit damage, regulatory non-compliance, and delivery disputes. This chapter covers packaging, palletisation, labelling, and the full suite of transport documentation required before a vehicle is loaded.

→ 2.1 Packaging & Palletisation

Physical cargo preparation – pallet quality, load securing, ADR packaging, tamper-evident seals.

→ 2.2 Documentation Preparation

Commercial invoice, CMR instructions, ADR DGD, export declarations, T1 transit documents.



2.1 Packaging & Palletisation

Verification Checklist

- Pallet quality: EUR/EPAL, CHEP, or block pallets – no broken boards
- Shrink-wrap tension and stretch uniformity
- Corner protectors applied to all vulnerable edges
- Load stability verified (centre of gravity, no overhang)
- Moisture protection: desiccants and VCI film where required
- UN-approved ADR packaging for dangerous goods
- Temperature-controlled packaging (EPS, PCM, active reefer)

Labels & Seals Applied

- Handling labels (fragile, keep dry, stacking limit)
- ADR diamond labels and placards per UN class
- Orientation arrows on all four sides
- Temperature labels and cold-chain indicators
- High-value tamper-evident seals with unique serial numbers

Controls

- Packaging integrity inspection before loading
- Pallet stability test (tilt/shake check)
- ADR packaging compliance against UN packing instruction
- Shock and tilt indicators fitted where contractually required

2.2 Documentation Preparation

Commercial & Transport Docs

- Commercial invoice with full commodity description and declared value
- Packing list (lines, quantities, gross/net weights, dimensions)
- CMR consignment note with special instructions

Regulatory & Compliance Docs

- ADR: Dangerous Goods Declaration (DGD) and Tremcard per UN number
- Temperature instructions for GDP / cold-chain shipments
- Export declarations: EX1, EUR1 movement certificate, Certificate of Origin

Transit & Security Docs

- T1 transit document (NCTS) where EU external transit applies
- High-value security protocol document if TAPA TSR applies

Document Controls

- Document consistency cross-check (invoice vs. packing list vs. CMR)
- HS code validation against commodity description
- Licence and permit validation for restricted goods

First-mile execution translates planning into physical action. Vehicle assignment, equipment verification, site access, and the loading operation must all be executed to specification – any shortfall here cascades through every subsequent stage of the shipment.

Vehicle Assignment

Assign truck and verify equipment readiness.

Loading & Securing

Load freight and secure for transport compliance.



Arrival & Access

Check in, obtain site clearance and instructions.



3.1 Vehicle Assignment

Assignment Tasks

- Select vehicle type matched to cargo (box, tautliner, reefer, flatbed, low-loader)
- Assign named, qualified driver with required certifications
- Equip trailer: straps, load bars, dunnage blankets, load locks
- Pre-cool reefer unit to target temperature and verify PTI (pre-trip inspection)
- Install security equipment: high-security locks, seals, GPS tracker, panic button

Verification & Controls

- Driver certification check: ADR, GDP, pharma, high-value endorsements
- Vehicle inspection checklist completed and signed
- Tachograph calibration certificate in date
- ADR equipment on board: fire extinguishers, PPE kit, written instructions, ADR kit
- Reefer temperature validated and logged before departure to shipper
- TAPA compliance confirmation for high-value loads

3.2 Arrival at Shipper & 3.3 Loading



3.2 Site Arrival & Access

- Driver checks in at gatehouse with ID, vehicle registration, and booking reference
- Security validates all three and issues dock assignment
- Driver receives site safety instructions and required PPE
- **Controls:** Access control log, safety induction record, PPE compliance



3.3 Loading Operation

- Driver supervises; warehouse loads using forklift or pallet jack
- Count check, condition check, pallet integrity check performed
- Weight distribution planned; ADR segregation applied
- Straps, load bars, dunnage, anti-slip mats, and seals applied
- Temperature probe inserted and calibration confirmed (reefer)
- **Docs:** CMR signed, ADR declaration, temperature log commenced

Linehaul Transport

The linehaul phase is where operational planning meets real-world complexity. Control towers must maintain continuous visibility through GPS, temperature telemetry, and tachograph data – reacting swiftly to deviations, border delays, or security events across the entire transit corridor.



4.1 Departure & 4.2 En-Route Operations

4.1 Departure

- Driver departs and TMS status updated to "In Transit"
- GPS tracking activated and geofencing start trigger fires
- Tachograph recording commenced; seal integrity confirmed at departure
- Route compliance verified against planned itinerary

Driver Obligations En-Route

- AETR driving and rest rules strictly observed (4.5 h drive / 45 min break)
- ADR route restrictions followed including tunnel code compliance
- High-value secure routing maintained; no unplanned stops
- Mandatory vehicle, reefer, and security checks at each stop

Control Tower Monitoring

- GPS position and speed monitored continuously
- Reefer temperature telemetry with threshold alarms
- Geofencing alerts on deviations, unexpected stops, and ETA changes
- Weather and traffic feeds integrated for proactive rerouting
- Toll payment compliance tracking

Active Controls

- Reefer alarms: immediate escalation protocol
- Panic button functionality tested and operational
- Speed limiter compliance logged
- Driver fatigue monitoring via tachograph remote download

4.3 Border Crossings

1

Arrival at Border

Driver positions in correct lane; notifies control tower of arrival time.

2

Document Presentation

CMR, invoice, packing list, T1/T2, ADR DGD, and driver ID presented to customs.

3

Customs Inspection

Document check, physical inspection, X-ray scan, and seal verification performed.

4

Clearance & Continuation

Transit document updated in NCTS; TMS status updated; driver resumes route.

Border crossing controls include document completeness, ADR compliance verification, driver ID check, and seal integrity confirmation. Any mismatch triggers immediate hold and escalation to the compliance team.

4.4 Hub / Cross-Dock (LTL & Groupage)



Operational Steps

- Inbound vehicle arrives at hub; driver checks in and presents CMR
- Cargo unloaded and each unit scanned into WMS with inbound reference
- Sortation by destination, delivery window, and commodity class
- ADR commodities staged in designated compliant zones
- Cargo consolidated onto outbound vehicle by destination run

Hub Controls

- Damage inspection at inbound scan – exceptions raised on CMR
- Temperature continuity maintained throughout (cold-chain freight)
- ADR segregation enforced in staging and loading
- High-value cargo moved directly to secure zone with access log

CHAPTER 5

Destination Handling

Destination handling closes the physical chain of custody. Arrival controls, unloading procedures, condition verification, and proof-of-delivery capture must be executed with the same rigour as the loading operation. POD quality directly impacts billing accuracy and claims resolution.



5.1 Arrival at Consignee & 5.2 Unloading

1

Driver Check-In

Driver reports to gatehouse. Security verifies driver ID, vehicle registration plate, and seal number against the advance shipment notification. Dock assignment issued.

Controls: Access control log, seal integrity check, temperature reading on arrival.

2

Unloading Operation

Cargo unloaded unit by unit. Count check and condition check performed against CMR and packing list. Temperature check completed and logged at point of handover. ADR unloading compliance observed per UN class requirements.

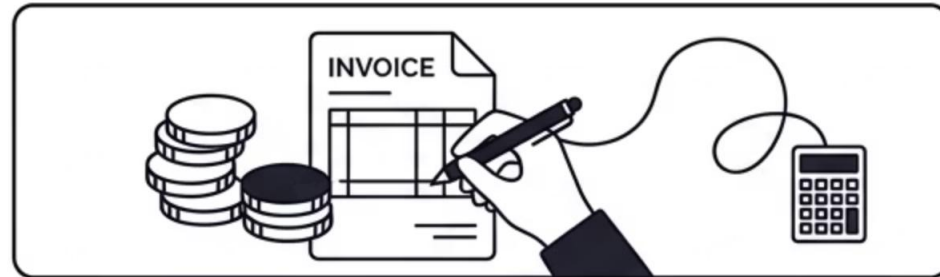
3

POD Capture

Driver obtains signed POD from authorised consignee representative. CMR countersigned. Any damage or shortage noted on POD before signature. Temperature log handed over to consignee (GDP requirements).

Documents closed: POD, signed CMR, temperature log, damage report if applicable.

Post-Shipment Activities



6.1 Billing

invoice linehaul, surcharges, tolls, extras, reconcile subcontractor invoices



6.2 KPI Reporting

OTP, OTD, damage rate, temperature excursions, ADR compliance



6.3 Claims Handling

damage, loss, delay, temperature deviation, ADR incident



6.4 Data Archiving

CMR 1-3 years, ADR docs 5 years, temperature logs 5 years, security logs 1-3 years

Post-shipment processes close the financial, operational, and regulatory loop. Accurate billing, rigorous KPI tracking, structured claims management, and compliant data archiving are essential to continuous improvement and regulatory defensibility.

6.1 Billing & Invoice Reconciliation

Customer Invoice Components

- **Linehaul:** base rate per agreed tariff or spot quote
- **Fuel surcharge:** applied per current index rate
- **Tolls:** actual toll receipts or toll system data
- **Waiting time:** free time per contract, excess billed per hour
- **Extra services:** tail lift, two-man crew, inside delivery, storage
- **Border fees:** T1 guarantee, customs clearance disbursements

Subcontractor Reconciliation

- Subcontractor invoices matched against agreed sub-rates in TMS
- Accessorial charges validated against actual event logs (waiting time, extras)
- Discrepancies flagged and disputed before payment run

Billing Controls

- Rate accuracy: invoice rate vs. contracted rate vs. quote reference
- Accessorial validation: each extra charge supported by event evidence
- Credit note process for billing errors or disputed charges

6.2 KPI Reporting

OTP

On-Time Pickup

% of collections within agreed pickup window

OTD

On-Time Delivery

% of deliveries within agreed delivery window

DR%

Damage Rate

Damaged shipments as % of total shipments moved

TE

Temp Excursions

Number of cold-chain breaches per period

ADR

ADR Compliance

% of DG shipments with zero regulatory non-conformances

DHC

Driver Hours

% of journeys with zero AETR/561 infringements

SI

Security Incidents

Count of theft, tampering, or TAPA breach events per period

6.3 Claims Handling & 6.4 Data Archiving

6.3 Claims Handling

A structured claims process protects revenue and ensures regulatory compliance. Claims are categorised on receipt and assigned to the responsible party (carrier, shipper, or third party).

Damage

Loss

Delay

Temp Deviation

ADR Incident

Each claim type triggers a defined evidence-gathering protocol: photos, signed CMR exceptions, temperature logs, GPS track replay, and witness statements where applicable.

6.4 Data Archiving Requirements

- **CMR consignment notes:** 1–3 years (jurisdiction-dependent)
- **ADR transport documents:** minimum 5 years per ADR regulations
- **Temperature logs (GDP):** 5 years from date of shipment
- **Security logs (TAPA):** 1–3 years per TSR certification requirement
- **Tachograph data:** 12 months on-board, 24 months at operator
- **Digital records:** tamper-evident storage, audit trail maintained



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End-to-End Process — Key Takeaways

- Compliance is non-negotiable at every stage
ADR, GDP, AETR, TAPA, and customs requirements must be embedded into standard operating procedures — not treated as exceptions.
- Documentation accuracy drives everything downstream
Errors in the CMR, invoice, or ADR declaration at the preparation stage cascade into border delays, claims, and regulatory exposure.
- Real-time visibility is the control tower's core tool
GPS, temperature telemetry, and tachograph remote download give control towers the data needed to intervene before exceptions become incidents.
- Post-shipment closes the quality loop
Billing accuracy, KPI measurement, structured claims handling, and compliant archiving are as operationally critical as the physical transport itself.

