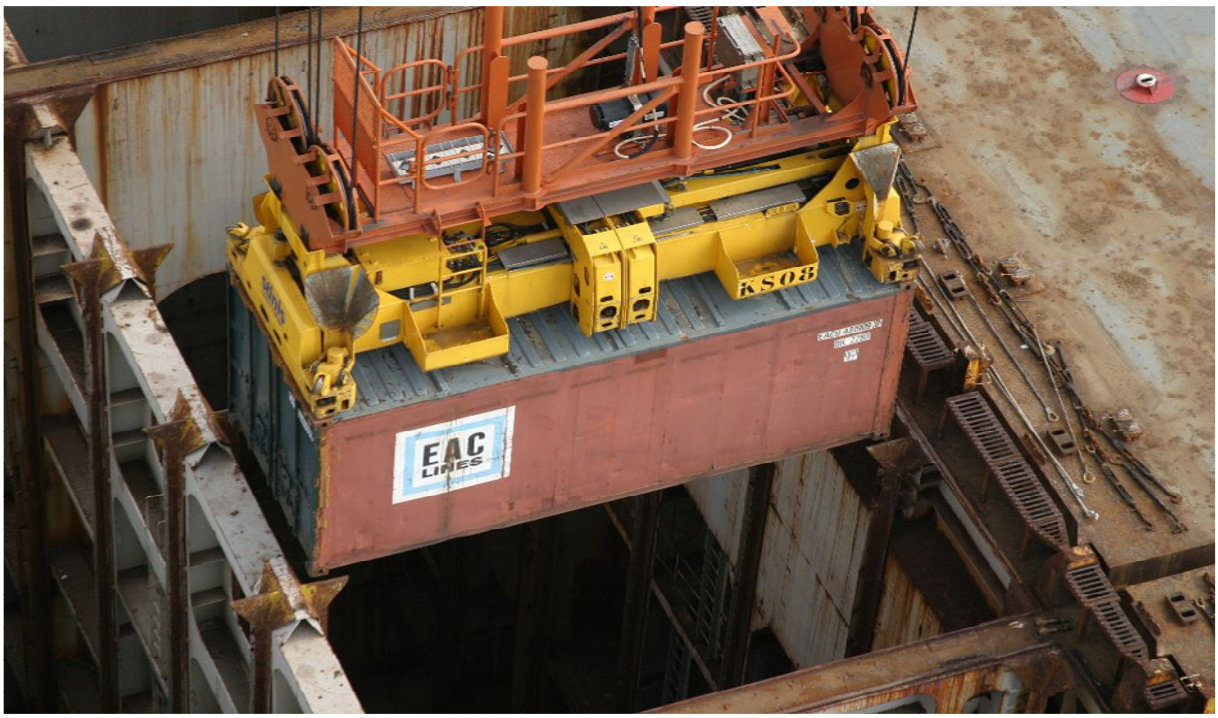
Case Study 1 How a sofa from China is delivered to a home in Newcastle

A DEEP-SEA CONTAINER END-TO-END FREIGHT JOURNEY

A Deep-Sea Container End-to-End Freight Journey considers the movement of a deep-sea container through a British port and the delivery of its contents to the final consumption, focusing on efficiencies, causes of delay, delivery challenges, modal shift and issues that the industry faces.

The case study is based on discussions with non-food retailers, road hauliers, intermodal rail operators and port authorities. The journey is not intended to carry the weight of statistical evidence; rather, its purpose is to illustrate some of the common issues faced by freight operators and to assist readers in understanding where opportunities for efficiency improvements may exist. It follows the movement of a container through the Port of Felixstowe, its journey on a strategic freight corridor to a National Distribution Centre (NDC) in the East Midlands and its consequent destuffing. The study continues with the road transportation of the sofa to a Regional Distribution Centre (RDC) in Durham and final delivery to a home in Newcastle.

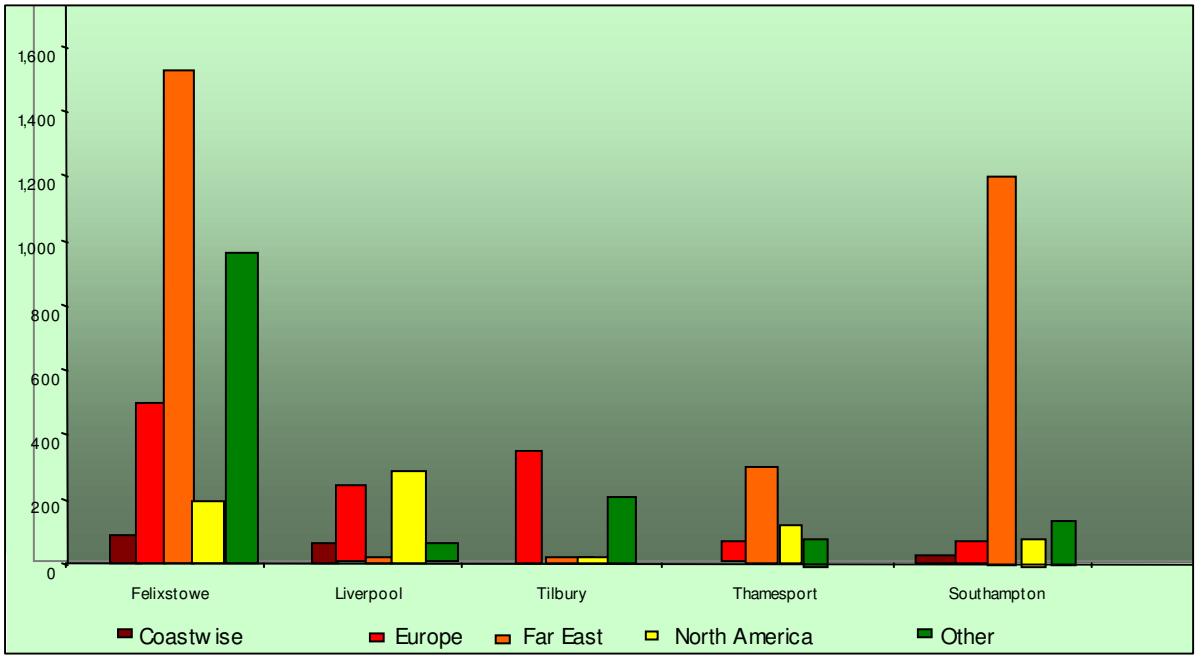


Courtesy of Ceres Paragon Terminals

Key facts about the container market in the UK

- Since the early 1990s, world container traffic has been growing at almost three times world GDP growth and growth in UK container traffic has mirrored this trend (MDST, World Bank).
- Growth in UK container traffic has risen from just under 6 million Twenty-foot Equivalent Unit (TEU) containers in 1997 to just over 8 million TEUs in 2006 (Maritime Statistics, DfT, 2006).
- Around 90% of the UK's container traffic is carried through the five largest deepwater ports (see Figure 1).
- Container traffic is projected to increase by 182% (in TEU terms) by 2030 (MDST); an average annual increase of 4%. This is driven by increased imports from the Far East, principally China, and India.
- Growth forecasts assume long-term UK economic growth and the continued outsourcing of manufactured goods to the Far East.

Figure 1: UK container ports by main trading area: 2006: Thousand TEUs



Source: Maritime Statistics, DfT (2008)

- Common commodities moved in containers include: electrical machinery and equipment, clothing and accessories, footwear, furniture, toys, games, sportswear, plastics, iron and steel products. In 2006, entire UK trade imports were valued at £325 Billion and exports valued at £244 Billion (Overseas Trade Statistics, HMRC, 2006).

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The scenario

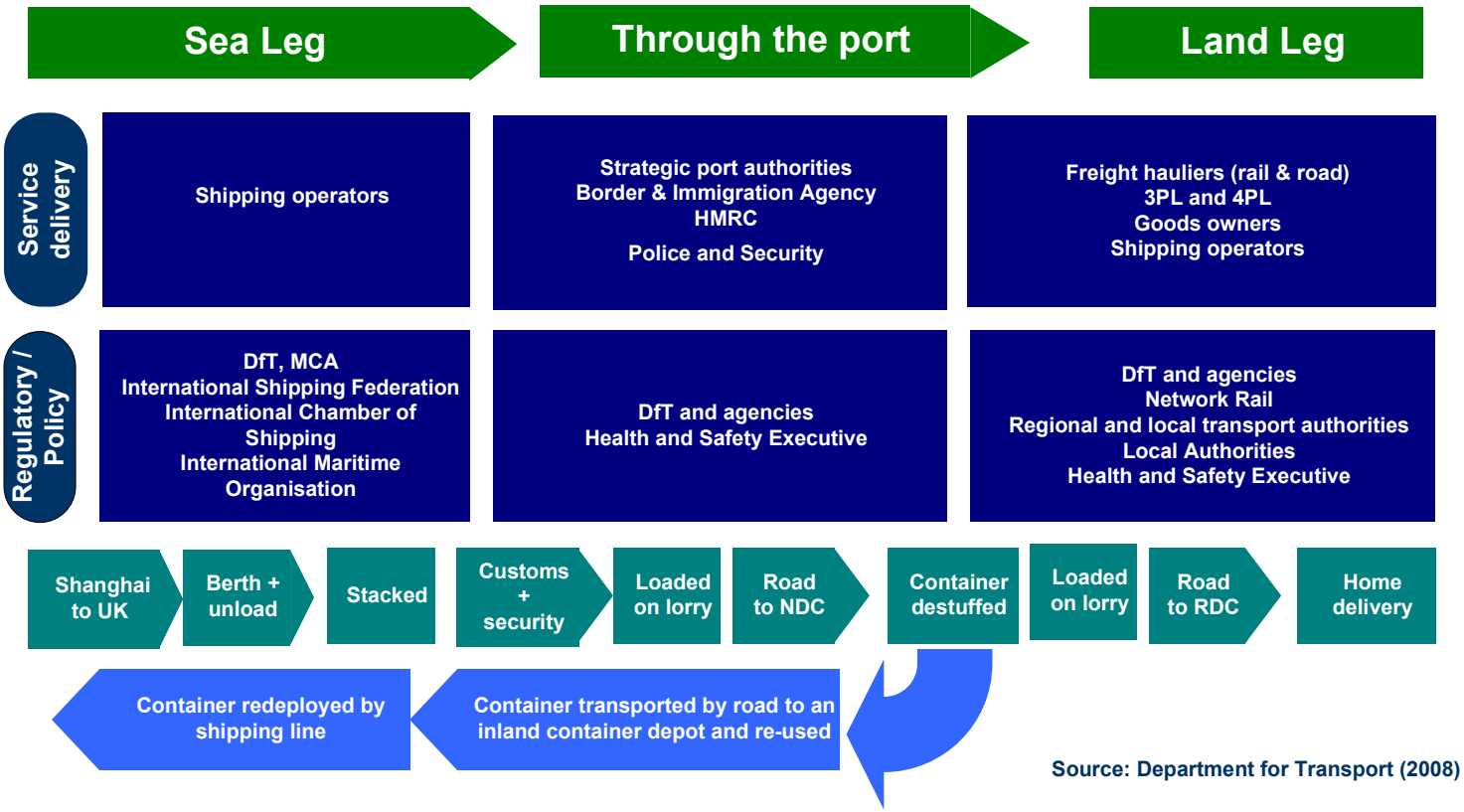
Courtesy of the Port of Felixstowe

A British retailer purchases sofas from a manufacturer in China. One batch of 18 sofas is transported to Shanghai, loaded into a container and placed onto a large vessel at the Shanghai terminal. We are following one of these sofas through to its delivery to a customer's home in Newcastle.

This case study takes each stage of the journey in turn. Figure 2 provides a simplified overview of the end-to-end journey, considering each segment: what happens, who has service delivery responsibilities and who has regulatory and policy roles. Responsibilities between buyer and seller will also vary depending on the international commercial terms accepted by the parties. For example, they may enter into an "ExWorks" arrangement whereby the buyer has responsibility for the goods from the factory premises, or the seller may pay for shipping, insurance, duties and delivery to the buyer's premises.

The journey described is a case study only: the road haulage and logistics industry has a diverse range of business practices in differing circumstances. For example, larger hauliers may conduct "drop and swap" operations whereby the driver will leave a container at a warehouse to be unstuffed and drive elsewhere for another job; in which case the empty container may be returned to the port by another lorry or by rail. The container may also be transported to another location and be loaded with goods for export. Likewise, the movement of containers after departing the UK is varied.

Figure 2: An end-to-end journey of a container of sofas from China to Newcastle



Source: Department for Transport (2008)

The journey from China

1. Day 1 The retailer is a large player in the British market and has purchased enough sofas from a Chinese manufacturer to fill several containers. The retailer has forecasted sofa sales and placed the order (Day 1). The manufacturer sources supplies and manufactures the sofas to order and on Day 50, eighteen sofas are loaded into a container. The container is loaded onto a lorry at the factory and transported by road to the Shengdong Terminal at the Port of Shanghai. On Day 56 the container is loaded onto the ship.

2. Day 56 The ship departs Shanghai and is sent to Felixstowe via the Suez Canal (the vessel continues its onward journey to Rotterdam before returning to Shanghai). The journey from Shanghai to Felixstowe takes 24 days, therefore, the time between placing the order and the sofas arriving in Britain is approximately 80 days.

Up to three days prior to its arrival at Felixstowe, the Shipping Line transmits cargo details electronically to the port and HMRC on the Felixstowe Port System (Destin8). The Shipping Line will also inform their customs clearance agent of their expected arrival time. “Cargo details” may include the number of containers, hazardous containers and rail-allocated containers.

Vessel size trends

Trends in ship building show a swing towards larger (300m+) vessels of 9,000+ TEU capacity. The trend towards larger vessels means that they take longer to unload and fewer vessels can be handled in a day. Additionally, these larger vessels require a much larger, deepwater berth. This concentration of incoming goods has a consequent impact upon a freight strategic corridor as domestic freight patterns adapt to shifting world trends.

Berthing and unloading at Felixstowe

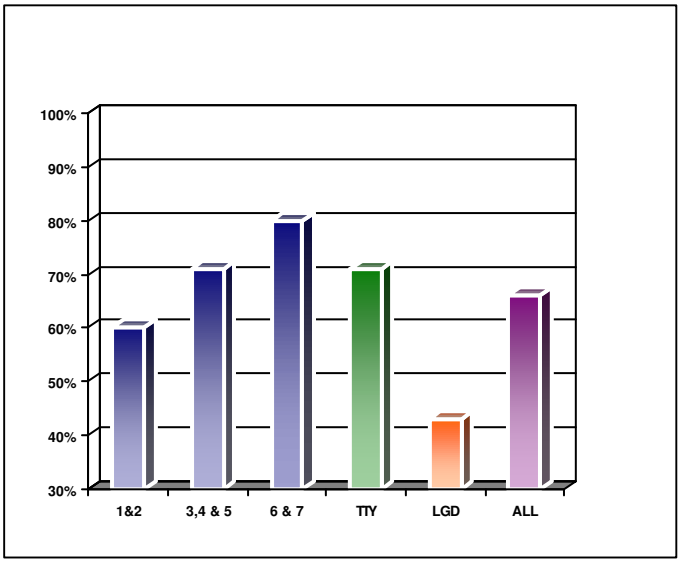
3. Day 80 Arriving at Felixstowe at 7am, the vessel is on time to meet its scheduled berthing slot at the port and berths at Trinity Terminal 7, one of the five berths that can receive the 300m+ vessels. Figure 3 graphs Felixstowe's 2007 berth utilisation rates and shows that its deeper berths dredged to 15 meters (berths 6 and 7) are the most utilised, with 80% berth utilisation for terminals 6 and 7.

4. Day 80 Once berthed, the UK-destined containers are unloaded by quayside crane onto the terminal in 20 hours.

Berth capacity, the size of the ships arriving and departing, container volumes, and weather conditions will determine the daily number of ships that can pass through the port. Port delays have a consequent impact on the strategic freight network and on hauliers, causing backlogs and delays with vehicle arrivals and subsequent delays at inland destination points.

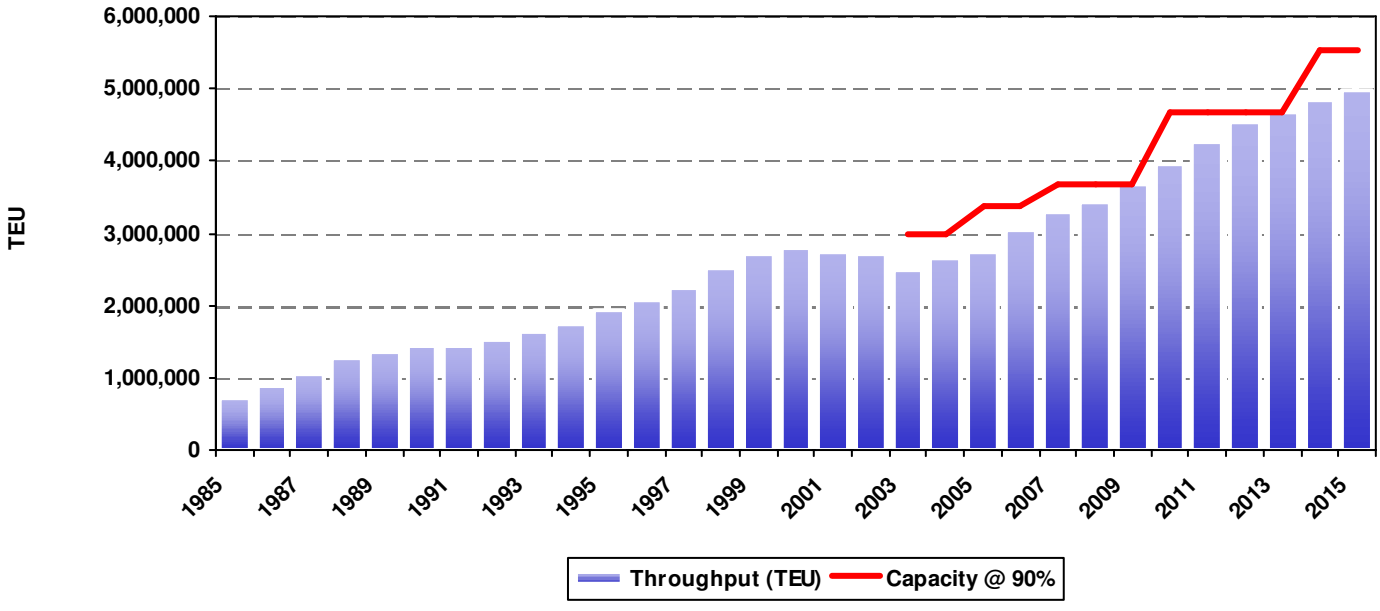
Figure 4 graphs the growing throughput at Felixstowe. The less spare capacity there is, the less buffer for delays, and single events (such as the closure of a crane) will have a general overall impact on port performance. Figure 4 also shows that capacity at Felixstowe is forecast to grow steadily to 2015.

Figure 3: Port of Felixstowe: Berth utilisation %: 2007



Source: Hutchison Ports UK

Figure 4: Port of Felixstowe: Throughput (TEUs): 2007



Source: Hutchison Ports UK

Unloading and collection

5. Day 80 Containers are shifted by Internal Movement Vehicles to stacks. They are placed in the stacks by Rubber Tyred Gantry Cranes (straddle carriers or rail mounted gantry cranes in other ports) where they await collection. The port provides the yard where the containers "dwell".

Containers can be placed in different stacks for an assortment of reasons. For example, a refrigerated container will be in stack with access to a power supply, while a rail allocated container will be in a stack near the rail terminal. In this case study, the container of sofas is unloaded off the vessel just after midday and placed in its appointed stack.

6. Day 81 The VAT and duties have been paid by the agent, including an £8.70 Customs Import Entry levy per container, and the container is cleared for customs on arrival. On this occasion, HMRC have not requested a container inspection.

The container is now available for the haulier to collect, but the retailer does not require the sofas until Day 85, hence the container remains in the stacks for four days without an additional port charge. (This is an example of utilising the supply chain as a form of warehousing.)

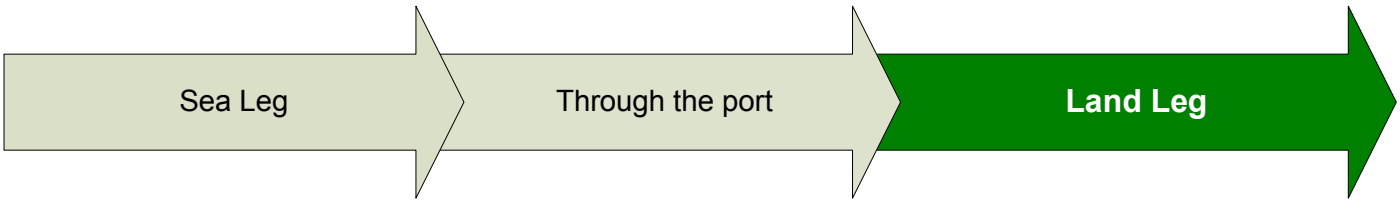
The retailer informs its agent when it requires the container. The agent instructs the Shipping Line, who instructs the road haulier. The road haulier subsequently books a 5am slot for Day 85 through the port's vehicle booking system.

Berthing times

Once the unloading is complete and additional containers are loaded onto the vessel, it departs at 3am the following day. Average berthing times have increased with the size of the vessels. Average berth times at Felixstowe in 2004, for example, was around 18 hours spent at the port, compared to just over 22 hours in 2007.

Dwell times

Average dwell times are highest for empty containers waiting to be exported and are lowest for full, imported containers. Dwell times for empty containers for export have shown wide historical variation. In 2007, full imported containers at Felixstowe had average dwell times of just over four days.



Lorry collection at the port

7. Day 85 Road hauliers are given notice by the shipping lines of orders and delivery times and then rationalise work to ensure that the containers are delivered with the best use of assets and working within drivers' hours regulations. The collection at the port must also be balanced with an allocated slot at the buyer's National Distribution Centre (NDC). Slots at NDCs can vary anywhere between 30 minutes and three hours. The lorry can only collect a container once three conditions are met: the container is in the stack, duties are accounted for and customs have released the cargo.

With the introduction of the Vehicle Booking System (VBS) it is feasible for a lorry to spend just 35-45 minutes within the port gates, but this doesn't include waiting outside the port gates for the three conditions to be met. Stakeholders report that the average time to collect a container, including waiting outside the port, is 1.5 hours. Consequently, hauliers generally allow 1 – 1.5 hours in their planning for the delivery and collection of a container at any of the major ports (depending on time of day).

8. Day 85 The lorry arrives at the haulage firm's depot near the port from a previous job at 4am. The typical lorry transporting containers in the UK are five or six axle articulated vehicles with a maximum gross weight of up to 44 tonnes, using a "skeleton" trailer. At 4.45am a new driver commences his shift and keys in the job's VBS number at the port gates and proceeds to the holding area until instructed. At 5.10am he proceeds through the port to the stacks where the lorry is parked and the crane lifts the container off the stack and onto the semi-trailer. The lorry then proceeds to the out-gate. At Felixstowe the haulage firm pays the port a £10.50 security charge and a £5.50 infrastructure charge per container (while a ship delay charge of US$145 (£74) is imposed on customers by shipping lines calling at Felixstowe that is not dependent on a particular vessel being delayed). These charges are paid on account and not by the driver. The lorry exits the port gates at 5.40am.

Figures 5 and 6 summarise the results of a Department for Transport analysis of congestion around ports using data taken from HGVs equipped with Global Positioning System (GPS) devices. The purpose of the analysis was to test the theory that the road systems supporting port areas are more congested than similar roads on the network. If this was the case then average speeds on port roads should be slower than on roads not carrying port traffic, and slower inbound (due to queuing) than outbound. The results for port roads generally, shows that there is little or no evidence to suggest that ports are particularly congested. This corresponds with the results of the HA traffic flow data (see Figure 7) which shows that, even on the road immediately outside the port gates, only a quarter of the traffic flow are lorries.

This analysis looks at roads in the same area with similar characteristics (road class, speed limit and number of carriageways) to the port roads. The variable road speeds in Figures and 5 and 6 are, in part, a product of the nature of the roads being looked at. The port roads of both Dover and Teesport are partly dual carriageway and hence likely to have faster speeds than Southampton or Liverpool, or roads near the town centre.

Figure 5: Average lorry speed (mph): inbound and outbound comparison by port: 2006

	Average lorry speed (mph)	
Port	Inbound	Outbound
Dover	36	37
Felixstowe	32	33
Hull	29	30
Liverpool	21	20
Teesport	35	31
Tilbury	44	40
Southampton	24	23
Bristol	35	36

Source: Statistics Roads, DfT (2006)

Figure 6: Average lorry speed (mph): port road and similar road comparison: 2006

	Average lorry speed (mph)	
Port	Port roads	Similar roads
Dover	37	41
Felixstowe	31	29
Hull	29	25
Liverpool	21	22
Teesport	33	39
Tilbury	42	46
Southampton	22	27
Bristol	36	25

Source: Statistics Roads, DfT (2006)

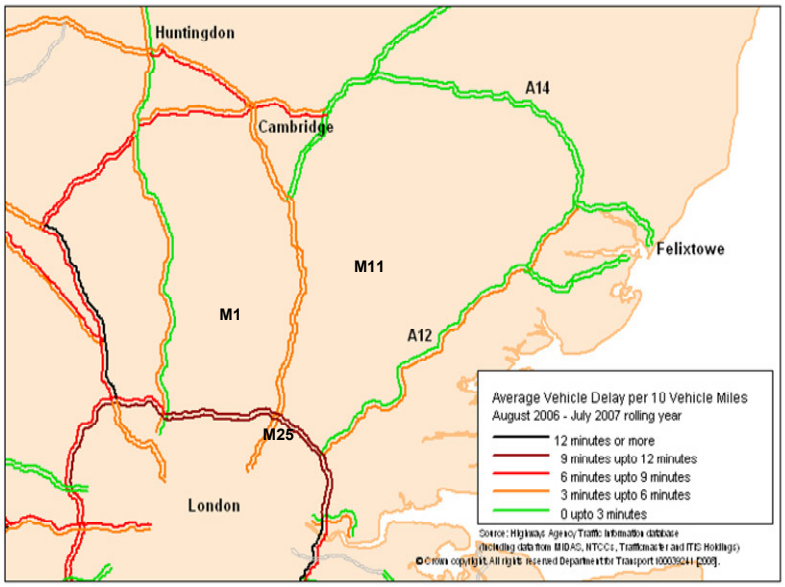
The journey by road

9. Day 85 The lorry travels west on the A14 which gives direct access to the Midlands and the northern motorway network. At 8am, after experiencing morning peak traffic on the outside of Cambridge and Huntingdon, he stops at a Truckstop on the A14/A1 junction at Alconbury, Huntingdon and has breakfast. He rests for the required 45 minutes and at 8.45am he continues west on the A14 to Kettering in the East Midlands.

The NDC is located at Kettering by the A14 and the lorry arrives at 9.15am for a 9-midday delivery slot, 15 minutes behind schedule due to heavy congestion around Cambridge and Huntingdon.

Figure 7 represents the average vehicle delays per 10 vehicle miles from data gathered between August 2005 and July 2007. The main arterial roads leading to and from the Port of Felixstowe (the A12 heading south to London and the A14 to the Midlands and the North) are coloured green, indicating the average vehicle delay per 10 vehicle miles from zero up to 3 minutes. However, this data is based on a weekly average and does not reflect congestion levels at peak periods of use. Furthermore, after road freight has left Ipswich it is largely absorbed into mixed traffic (haulage, commercial vans and private cars). Figure 9 shows the percentage of lorries on the A14 outside the Port of Felixstowe.

Figure 7: Average vehicle delay per 10 vehicle miles



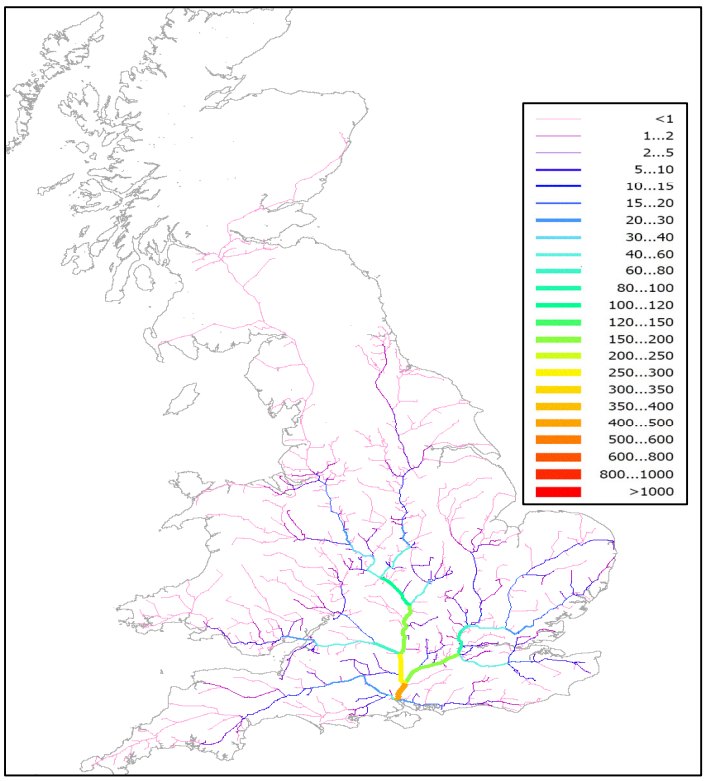
Source: Congestion Monitoring, DfT (2007)

Figure 8: Traffic data at Trimley Heath on the A14 outside the Port of Felixstowe

- **Eastbound** (towards Felixstowe)
  - ❑June 2007 annual average daily flow = 19,000 (lorry % was 24%)
  - ❑July 06 to June 07 flow = 18,590 (lorry % was 23%)
- **Westbound** (towards Ipswich)
  - ❑June 2007 annual average daily flow = 19,500 (lorry % was 23%)
  - ❑July 06 to June 07 flow = 19,140 (lorry % was 22%)

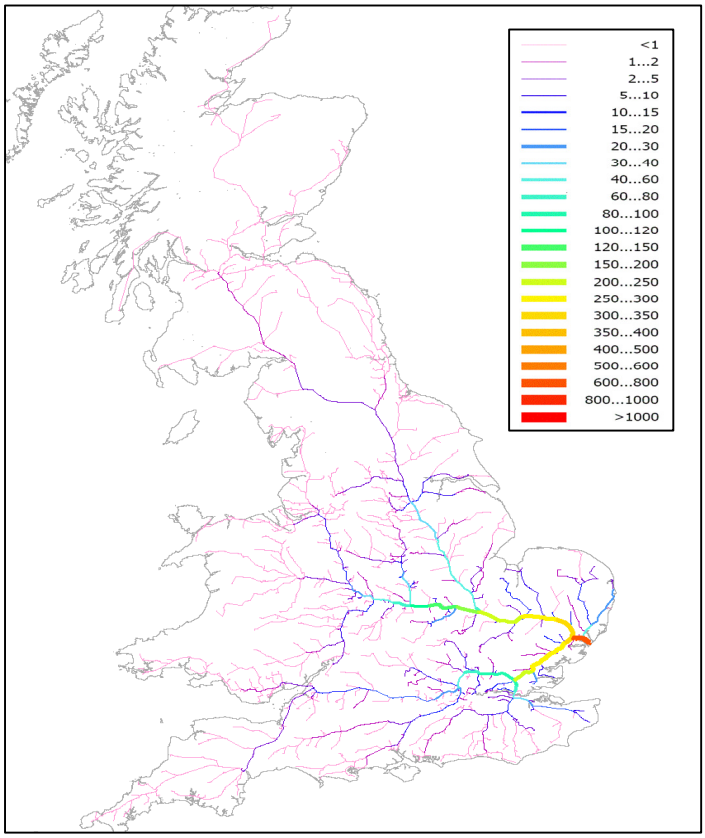
Source: Annual Average Weekday Traffic, HA (2007)

Figure 9: International lorries from Southampton: Thousand lorries per year: 2006



Source: GBFM 5, MDS Transmodal (2008)

Figure 10: International lorries from Felixstowe: Thousand lorries per year: 2006



Source: GBFM 5, MDS Transmodal (2008)

Lorry flows on the national network out of Southampton and Felixstowe (import traffic only)

Figures 9 and 10 map international lorry flows from the ports of Southampton and Felixstowe respectively. They relate to external trade only (imports and exports) and show flows on the road network of freight originating from the ports. The road assignment is determined by an origin/ destination lorry matrix. The origins and destinations are ports or postcode districts (approximately 2,500 zones) and for each origin to destination the least generalised cost road route is found and all the traffic for that origin to destination is allocated to that route. This is an all-or-nothing assignment.

Results for Southampton (Figure 9) indicate that the A34 and M3 carry a significant amount of Southampton port traffic which disperses on the western sector of the M25, M4, M40 and M1.

Results for Felixstowe (Figure 10) indicate that the most impacted links adjacent to the port are the northern sections of the M25, A14, A12 and A1 (M1) to the north. Port flows appear to disperse on the A3 and M3 to the west of the M25, M6 and A14 to the north.

Both ports service a wide range of destinations across Britain, notably to the Midlands and Greater London.

Rail freight

Figure 11: Rail forecasts maps: Average daily trains 2007

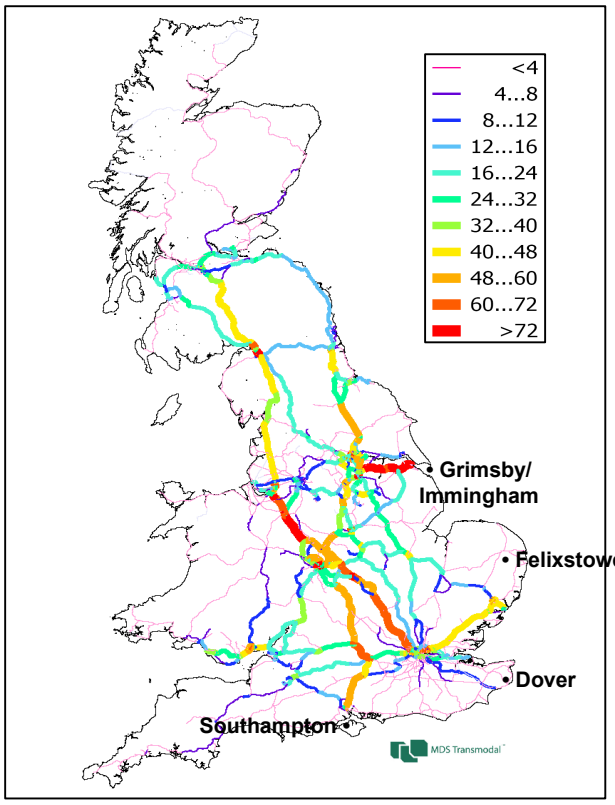
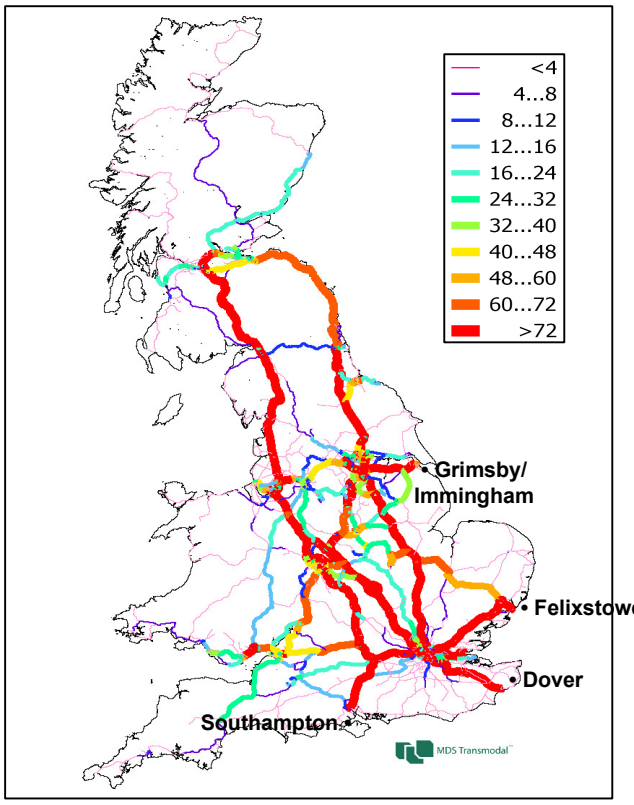


Figure 12: Rail forecasts maps: Average daily trains 2030



The case study does not use rail as the distance between the port and Kettering is too short, however, the movement of freight by rail is a key alternative to road, especially for longer distance movements. For example, an intermodal freight company operates a daily service to Leeds via the East Coast Mainline (24 wagons) that departs Felixstowe at 4.49pm and first container is lifted off at 1am. A container can be booked onto a train as late as 10.30am on the day of departure. The final journey will be by road from the rail terminal to the warehouse. Rail favours longer distance journeys, is reliable and can have supply chain advantages. A challenge for the rail sector is that warehousing located in the East Midlands is near to the busiest ports and, in these circumstances, road has a competitive advantage for these short distance flows.

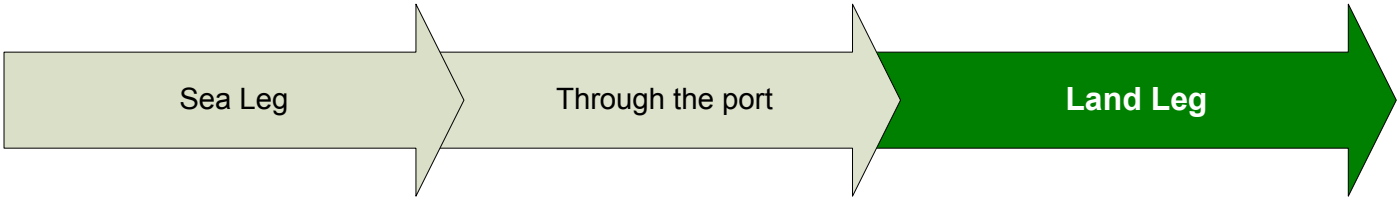
Network Rail forecasts that between 20-21 million tonnes of maritime containers will be lifted by 2014/15, a growth of 82-90% from 2004 (Freight RUS 2004). MDS Transmodal forecasts growth at an annual increase of 2% to 197.8 million tonnes lifted in 2030 (MDST, 2008). By comparison, road freight is forecasted to increase by only 0.6% in the same period – from 1,968 million tonnes lifted in 2030 (with lorry tonne kms set to increase by 0.7% each year between 2004 and 2025). Figures 11 and 12 plot the forecasted growth areas for rail freight. The maps indicate that the high-use container ports are rail connected and major ports are expected to have 72+ freight trains exiting the port daily by 2030 (MDST, 2008).

Felixstowe has a combined container rail capacity of 400,000 units pa, servicing 17 inland terminals, averaging 24 trains per day. This represents 24% of the port's landside modal share (Hutchison Ports UK, The Port of Felixstowe and Rail Growth Report, 2006). See Case Study 4 for more information about the Department's rail grants scheme.

The following is the maximum grant-aided contracted container volumes freight operators have undertaken to move by rail out of Felixstowe in the 2007-08 (Rail Environment Benefit Procurement Scheme, DfT, 2006). The destinations reflect the importance of the Midlands and the North West for the movement of freight ex-Felixstowe.

Tilbury	11,740
Yorkshire	87,825
North West	135,141
Midlands	128,413
TOTAL	**363,119**

There is other rail traffic from the port that is not grant-funded.



Key facts about drivers' hours

Drivers of vehicles over 3.5 tonnes must comply with EU Drivers' hours regulations (EC 561/2006) where vehicles are used between the UK or between the UK and other EU, EEA countries or Switzerland. "Driving time" is the duration of driving activity recorded and after a period of no more than 4.5 hours a driver must immediately take an uninterrupted break of at least 45 minutes, unless he takes a rest period. Alternatively, a full 45 minute break can be replaced by one break of at least 15 minutes followed by another break of at least 30 minutes, but within the 4.5 hour period. Once the 45 minute break is taken the driver "wipes the slate clean."

The daily driving limit is 9 hours, but this can be increased to 10 hours twice a week (with a maximum weekly driving limit of 56 hours). Daily rest periods must be taken within each 24 hour period. A regular daily rest period is 11 hours or more, but a driver may reduce this to 9 continuous hours no more than three times between any two weekly rest periods. A rest is an uninterrupted period where a driver may freely dispose of his time and cannot include working in other employment. Appropriately located, secured and appointed lorry parking facilities are, therefore, integral to supporting drivers' hours legislation. The Department, working with County and Local authorities, is dedicated to developing secure and properly appointed facilities at the right places on the national network. *The following are two scenarios illustrate the impact of, and interaction between, drivers' hours and lorry parking facilities.*

Scenario 1: Thamesport to Manchester – Manchester to Thamesport (2 days)

The container is loaded onto the lorry (1.5 hours) at 10am and the vehicle travels on the A228, A2 and M25 northbound, crossing Dartford Tunnel to Jn 21 and then northbound on the M1 to Jn 19 to the M6 and M62 (alternatively the M1, M11, A14 and M6 to avoid road works).

This journey is 252 miles and takes 6 hours. The driver must take a 45 minute rest break in this period and there are numerous motorway services on the main route but few are designed for lorries and do not provide secure sites, suitable washroom facilities or rest areas for drivers. While Lymm in Cheshire, for example, has lorry parking facilities, but is only 22 miles from Manchester and the driver's destination. In this instance, the driver takes a 45 minute break at Rugby, the first Motorway Service on the M6 after nearly three hours driving time. The Rugby Truckstop is a secure and guarded facility designed for lorries and with ample showers, TV rooms and freshly cooked food. The lorry unloads at Manchester and reloads with a container of waste (1.5 to 2 hours) and the driver has his daily rest period sleeping overnight in the lorry cabin at Lymm. The driver makes the return journey to Thamesport with another 45 minute break at Rugby Truckstop.

Scenario 2: Southampton to Lutterworth – Duxford to Thamesport (1 day)

The container is loaded at Southampton and the lorry drives north on the M271, M3, A34 and M40; left at Jn 9 and the A43 towards Northampton to the A5. Within the first two hours of driving, the driver stops off the A34 at Chieveley. Alternative lorry parking is at Cherwell Park on the M40 or the Rugby Truckstop; however, both Chieveley and Cherwell Park are service areas and not designed for lorries with low levels of security and occurrences of fuel theft.

The container is unloaded at Lutterworth in the Midlands: a distance of 129 miles in 3.5 hours. The trailer is decoupled and the driver is at Lutterworth for 1.5 hours. The vehicle then drives on the M1, A421, A603, A1 and A505 to Duxford (87 miles in 2 hours). A second trailer (with a full container loaded on it) is coupled to the vehicle and it now drives south from Duxford to Thamesport on the M11, M25, A2 and A228. In such examples journey times and drivers' hours are finely balanced and any significant delays (at port, on the network or unloading) can stop the operation for a day because the driver is unable to continue driving.

At the National Distribution Centre

10. Day 85 The lorry arrives at the National Distribution Centre (NDC) at 9.15am. The driver has a three hour delivery slot between 9am and Midday but the NDC is experiencing a backlog and the driver must wait for two hours before his container is destuffed, remaining near his vehicle because he doesn't know how soon his vehicle will be called. There is also limited parking for lorries at the NDC and, as he waits, more lorries arrive that queue on the road outside. Such events may cause additional congestion, especially at peak times.

At 11.15am the driver is called and he reverses his lorry into the loading bay; the rear doors are opened and the sofas are manually removed from the container in one hour. While the delay at the NDC had only a slight impact on the journey of the sofas that have been in transit for over 30 days, the contracted haulage company may be seriously impacted if the delay impacts on a later job and their ability to meet a later VBS at the port and client schedules.

The road haulier does not make the bookings with the NDC (or Regional Distribution Centre). In this case study it is the haulier's clients, the shipping lines, who make the delivery arrangements with the goods owners. The challenge with NDCs and RDCs is that road hauliers have a working, dependent relationship on them, but no economic relationship and no influence on the process. Even communication with distribution centres is usually indirect and through the shipping lines.

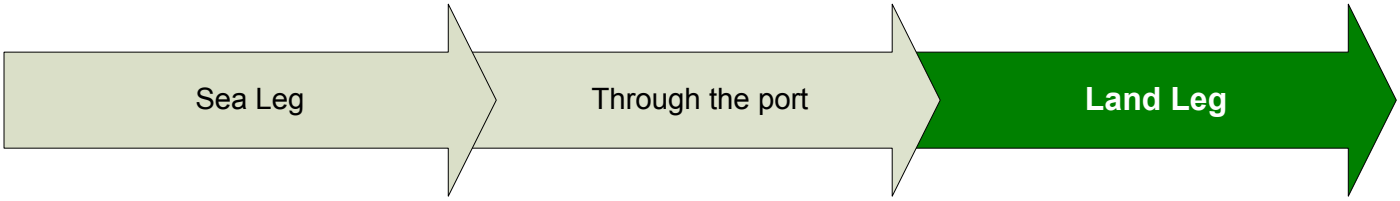
The NDC (or Import Centre or Primary Consolidation Centre) is the central reception point for goods in the supply chains of large retailers and importers. The principle behind NDCs is that it is more efficient for a business to consolidate primary loads into a central location, then mix loads to match each Regional Distribution Centre's requirements. It also reduces lorry congestion at the ports.

Distribution centres are often 24 hour operations, however they specify the times the vehicles can be there to unload and there is no general window of availability. Practices vary, but stakeholders reports that delivery windows from 30 minutes to 3 hours. Both are problematic: a 30 minute window provides little buffer for unplanned congestion or delays; while a lorry that arrives at the start of a 3 hour window may still have to wait the full 3 hours before unloading.

If the vehicle is late, it is usually moved to the back of the queue, and the lorry can then be waiting up to 4-6 hours: there is a very tight turnaround situation to attempt to ensure that this doesn't happen. The challenge for industry, local authorities and Government is to encourage best practice at distribution centres and to raise skills levels in the logistics sector.

Destuffing the box

Unloading at British warehouses is taking longer with the growth of imports from China, where cargo is not transported on pallets but is often in loose cartons in the container. Known as hand-balling operations, it is the preferred method in China where labour is cheaper and it is an efficient way to maximise space in the container (depending on the goods); but this method creates more work unloading in the UK where centres are not always calibrated for this operation.



The driver then transports the empty container to another warehouse in Rugby where it will be stuffed with a mixed-load, including pharmaceuticals and hospital supplies. A second driver will then transport the container to Southampton to be loaded on a USA-bound ship.

Discussions with stakeholders indicate that a drivers' time can be broadly categorised into three areas (see opposite) and this suggests that it is standard within the haulage industry that over half a driver's time is not spent driving. This is also consistent with our KPI benchmarking results (discussed in Case Study 4).

- Loading/unloading at the port (25-30% of time)
- On the roads (25-30% of time)
- Distribution centre delivery (25-30% of time)

Redeploying containers

Due to the trade imbalance in containerised goods, a significant proportion of containers are leaving the UK empty. Overall, 49% of containers loaded onto vessels in the UK are empty (this includes domestic traffic). The average figure for empty containers leaving Felixstowe is 51%; rising to 80% for services to many deep sea destinations such as China.

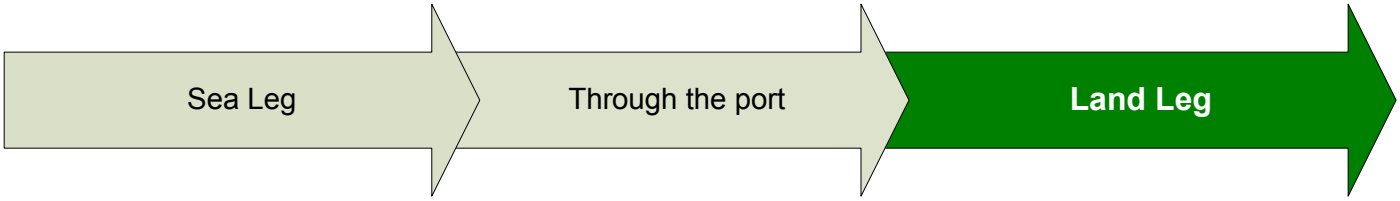
However, not all containers originating from China will be returned to China (either empty or full) and shipping lines may deploy them elsewhere; for example, to send whiskey to the USA or pharmaceuticals to Africa. Containers are not just shuttled between countries on a closed route and logistics operators utilise containers in various combinations.

Distribution centres do not have space to hold empty containers and they're returned to port or an inland container depot from where they will be redeployed elsewhere to be reloaded. This is reflected in the end-to-end case study. Haulage operators will either charge the same rate for moving empty containers - or a lesser rate but balanced with a higher rate for loaded containers.

11. Day 85 The sofas are sorted and allocated to RDCs, estimated on the expected demand within that region. They remain at the NDC until nightfall for overnight trunking. From this point on in the journey the retailer controls the movement of the sofas.

The container arrives at the NDC before forward transport is arranged, this is because shipping delays and arrival times at the NDC can occur and there needs to be a degree of certainty before the sofa is in the system and the customer is contacted to arrange a delivery day and window.

The sofas will be dispersed throughout Britain: to the retailer's six regionally-based warehouses and directly to stores and homes that are within a region covered by the NDC. The dwell time at the NDC varies considerably. From same-day dispatch through to many days or weeks. There are many factors causing this, including type of goods or seasonal factors such as the weather.



The journey north to the Darlington RDC

12. Day 85/ 86 The sofa is trunked by lorry to the RDC at Darlington, County Durham, departing 10pm on the evening of the sofa's arrival at the NDC. The trunking journey is a mixed load of non-palletised goods and includes three other sofas from the same container, white goods and televisions. Following the A43 and A1 north, this is a journey of 280 kms and takes the lorry 4.5 hours, including a 45 minute break on the A1 south of Doncaster. The lorry arrives at Darlington at 2.30am. The lorry is part of an overnight trunking service that shuttles nightly between the NDC and RDC: on its return to the NDC next morning it will deliver goods that the retailer has sourced from the Durham region. The benefit of night trunking is that it avoids road congestion but requires late delivery windows at warehouses or stores.

The journey to the RDC…

⇒ Route taken: A14, M1 and A1
⇒ Planned time from Kettering to Darlington: 4 – 4.5 hours (280 kilometres)
⇒ This journey will be undertaken 2-3 times a day (usually at night)
⇒ Loads depend on the demand from the RDC

At the Darlington RDC

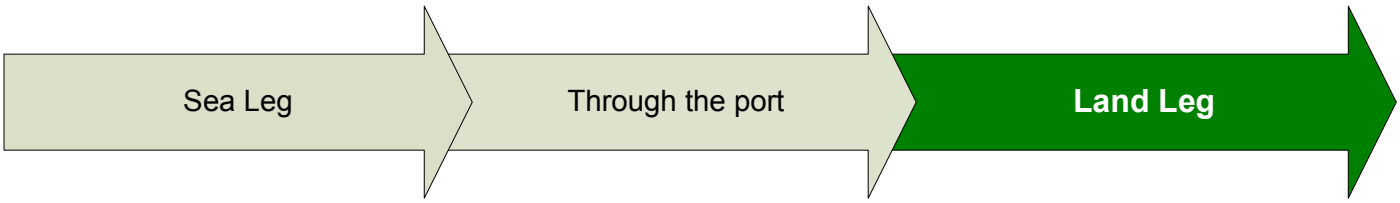
13. Day 86 There is no queue or booking system and the contents of the container immediately commence manual unloading by crews (palletised goods are unloaded by automated equipment). This takes 1.5 hours and at 3.30am the sofa is scanned in at the bay and assigned a warehouse location.

On arrival at the RDC the sofa is entered into the warehouse inventory system. On this occasion the product has already been sold to a client and it will be allocated on the retailer's booking system and available to be booked by the client, who will receive a phone call from the retailer. The retailer aims to ensure that it is delivered to the home within five days of arrival at the RDC.

Day 86 The booking team has access to the fleet profiles and planned routes for the next seven days and will be able to identify when a delivery will be possible. At 9.30am the retailer's booking team contacts the client and arranges delivery for two days time in the morning (Day 88). Until then, the sofa is stored at a stock holding; all directions and movements at the RDC are determined by computer and the sofa will be moved by a forklift. Customers are offered delivery windows (AM, Midday or PM) rather than specific delivery times to ensure an efficient schedule and route for the delivery team.

The scheduling team determine the schedule for the next seven days by utilising software that will plot the most efficient routes and will take into account weight, drivers' hours, road speeds and road restrictions.

Day 88 At 5.15am the morning's home deliveries are loaded onto a rigid lorry (7.5 tonnes) which is a common urban delivery vehicle. The sofa is moved into position at the loading bay by forklift and a loading crew loads it into the rigid. Again, it is a mixed load but the rigid deliveries specialise in two-man movements and the loads are large household items such as beds, sofas and white goods. The rigid departs the RDC at 6.30am. The last item placed in the rigid will be the first drop.



From the RDC to the customer's home in Newcastle

14. Day 88 The rigid travels north from Darlington on the M1 into Newcastle. The journey takes 45 minutes and it arrives in the area at 7.15am for the first deliveries at Washington and Gateshead. Congestion builds in the urban areas and the delivery team experiences inner city delays. They continue into the morning undertaking deliveries: completing one area of Newcastle before progressing to the next to enhance delivery efficiency. After completing deliveries in the south and south east of Newcastle, the rigid heads north and, passing through central Newcastle the team will deliver the sofa. The order of deliveries is determined by planning software rather than customer preference. The final leg of the journey, is the most time sensitive and the most expensive; requiring two staff members and less likely to be a full load. See Case Study 4 for more information about deck utilisation for tertiary loads.

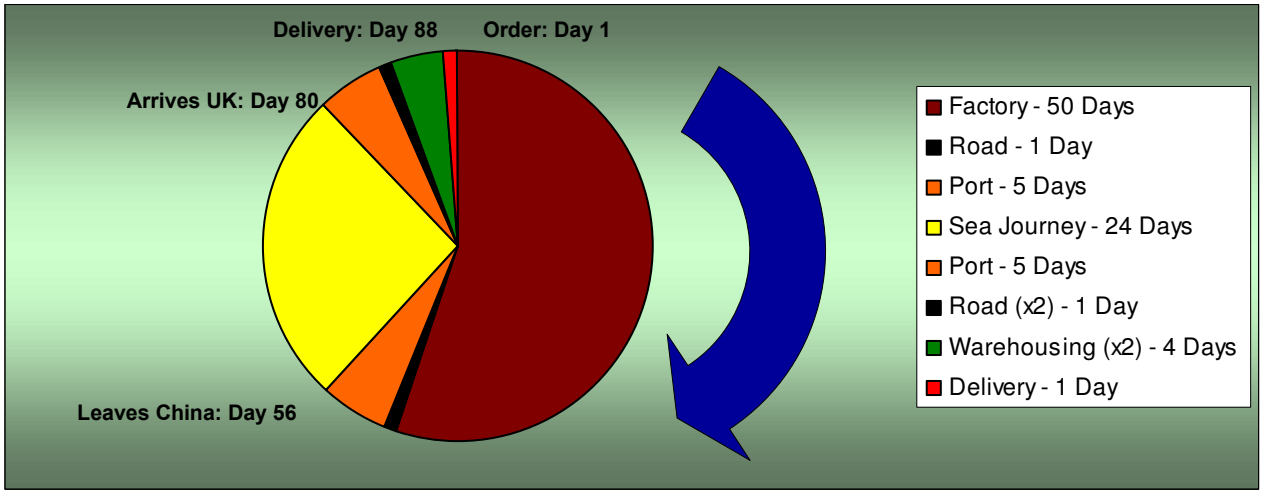
15. Day 88 At 8.20am the rigid arrives at the home in Newcastle and delivers the sofa within the expected morning delivery slot.

Delivery operations are conducted during the day, when customers want their goods delivered. This means that delivery vehicles are unavoidably competing on the roads with peak daytime traffic.

Many operators use computer vehicle routing and scheduling (CVRS) software to plan delivery routes. CVRS combines various features (including digital maps, customer locations, delivery and collection windows, quantity and type of goods to be delivered, vehicle capacity and driver shift patterns) into one package. They are particularly useful in complex or very busy companies of ten or more vehicles with "multi-drop" operations.

The sofa has been ordered by the retailer, manufactured and transported from China to a home in Newcastle by ship and road in 88 days. Of the time spent on the end-to-end journey, 56% was manufacturing time, 27% was at sea, 5% at a UK port, 4% at warehouses and 1% on the road between port and NDC and RDC and less than 1% on the road to the home. Figure 13 graphs the proportion of time spent on the end-to-end journey (remembering that some of the transport time, eg at the port, was used as warehousing).

Figure 13: The end-to-end journey from China to Newcastle: days



Source: Department for Transport (2008)

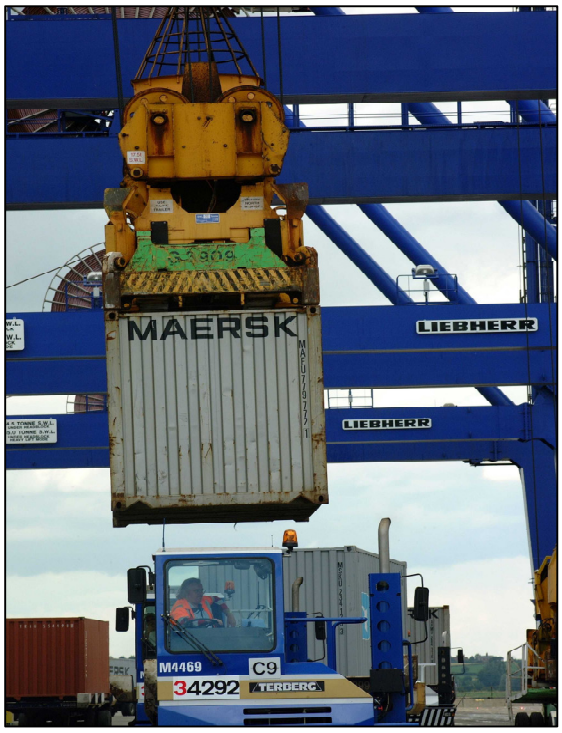
Stakeholder views

Listening to industry stakeholders in the context of the end-to-end journey we have heard the following from end users in the container transport sector:

Port infrastructure Trade with the Far East and the trend towards larger ships has limited the number of operational deep-sea container ports in the UK. These ports (notably Felixstowe and Southampton) are becoming stressed and at near-capacity levels with the current port infrastructure.

Port congestion is exacerbated by infrastructure breakdown (such as a crane failure or closure) which leads to additional stress: not only increasing ship berthing times, but also delays vehicle and rail freight planning for the onward journey as containers take longer to be unloaded.

Our stakeholders have also requested better and more timely information from the shipping lines when there is an expected delay.



Courtesy of the Port of Felixstowe

Vehicle Booking System The major UK container ports now have a VBS for lorry collections and deliveries and they are recognised as a mechanism for alleviating lorry congestion at container ports. However, by only allowing lorries to load or unload at scheduled times, ports are placing more pressure on haulage operators who are balancing fixed times at both the port and inland destination.

The VBS is also an additional administrative burden for the road haulier because, when there is a delay, it is the haulier who has to cancel the booking and reschedule a slot. This includes circumstances when there are delays caused by inclement weather or when the ship itself is late: it is up to the haulage operators to ring through and re-schedule, and they will be charged a fee if they miss their slot (with no compensation if they are at the port ready to collect but there is an unforeseen delay). Haulage and logistics operators, therefore, have to predict congestion on the road, impacts on drivers' hours and loading time, etc, to determine if they can make their collection slot at the port and, if not, at what time to reschedule. VBS, therefore, creates an additional cost and operational complexity for hauliers.

Warehouse delivery The experience of road hauliers delivering from the port to NDCs and RDCs varies widely. Warehousing practices may require hauliers to meet a 30 minute delivery window, which can be difficult to meet when travelling long distances and encountering unplanned port and road congestion. Alternatively, a much longer window (such as three hours) may be easier to meet, but there is no certainty as to when the vehicle will be unloaded within that window.

Stakeholders have also told us that there is often not enough land for parking at many warehouses. Parking facilities are critical for HGVs to queue as they wait for a bay to unload, and it is not uncommon for HGVs to be forced to wait on the roadside, a practice which can be dangerous for drivers and other vehicles and raises congestion levels in local areas.

Case Study 1 How a sofa from China is delivered to a home in Newcastle

Lorry parking The end-to-end journey has highlighted the importance of planning driver's hours and working time regulations into freight journeys. To ensure driver safety and quality of life, road hauliers rely on safe and secure lorry parks that provide suitable amenities such as restaurants and showers. These are some of the common problems that we have heard from stakeholders in relation to lorry parking:

- For safety reasons many haulage companies implement a no parking in lay-bys policy, which means drivers are dependent on the network of lorry parking
- Lorry parking is expensive in a low-margin industry
- The quality of authorised lorry stops is often inadequate (eg: poor security and lighting)
- There are not enough lorry parking sites in the right places with enough security (lorry parks are sparser where land is more expensive, for example in the south and south east of England. There is also a noticeable shortage of lorry parks around Dover and Southampton.
- Security needs are critical with the growth in fuel theft and organised crime
- Sites can be full and there is no room for additional HGVs.

The private sector is the delivery agent for parking and rest facilities, together with local and regional planning authorities. Identification of suitable land for lorry parking is a sensitive issue for local planning authorities as these facilities could potentially be unpopular with those living close to them. This is further complicated by pressure for identifying suitable land for housing. The Department and Highways Agency (HA) have started a study that is expected to identify demand and supply for lorry parking and drivers' rest facilities in broad geographical areas. This in turn will mean that industry can make investment decisions based on demand and will inform local and regional planning bodies in a way that will hopefully facilitate planning applications. In addition the Department will continue to facilitate meetings between representatives of the road haulage trade associations, the HA, Motorway Service Area operators and other lorry parking providers in order to identify the issues that can promote an increase together with improvement in these facilities.

Logistics skilling, and the value and recognition of logistics within society, is critical for the efficiency and competitiveness of freight transport in the UK. Skilling in logistics is much wider than training lorry drivers and the UK Government has initiated Skilling for Logistics that may cover a breadth of practices, including operational, warehousing and port logistics skilling.

Summary

- **Deep-sea container traffic in the UK is growing and is underpinned by its appetite for Far East imports**
- **The major UK container ports are near capacity in terms of berthing and handling capacity**
- **The growth in container traffic places additional stress on lorry and rail access into the ports to meet demand**
- **The Vehicle Booking System rationalises lorry activity at the ports, but creates new logistical issues for hauliers who must now balance both collection and delivery windows.**
- **Skilling for logistics is fundamental for efficiency improvements in the industry; not just in terms of lorry driving, but logistics, port-side and warehousing operations.**