



DEFRA PROJECT FO0108

**RESILIENCE OF THE FOOD SUPPLY TO
PORT DISRUPTION**

**FINAL ANNEX REPORT 4:
IMPORT CORRIDOR: FELIXSTOWE AND
SOUTHAMPTON
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1. EXECUTIVE SUMMARY

Just as Dover and the Channel Tunnel are the UK's key, high capacity connections with the Continent of Europe, Felixstowe and to a lesser extent Southampton are the country's high capacity 'gateways' for container freight coming to the UK from all over the world. Unlike Dover and the Channel Tunnel (Calais, Dunkerque and Coquelles) Felixstowe and Southampton are not dependent on a narrow range of overseas ports for the import containers received. The impact of disruption at overseas ports is therefore not as pronounced. It is the common feature of a concentration of traffic through single UK gateways that is of most concern.

Felixstowe and Southampton are the UK's most prominent deep sea container ports as a result of the deep water access channels and berths and their proximity to both the deep sea container trade lanes, through the English Channel, and the country's largest consumer market in the south east of England. Between them they handle over 60% (3.0 million containers) of all UK deep sea and short sea container traffic (DfT *Maritime Statistics 2010*), with London and Thamesport (Medway) handling a further 14% of the trade.

Port	Number of containers	% share
Felixstowe	2,074	42%
Southampton	945	19%
London	425	9%
Liverpool	400	8%
Medway	263	5%
Tees & Hartlepool	146	3%
Rest	676	14%
Total	4,929	100%

Source: DfT *Maritime Statistics 2010*, PORT0202

If disruption does occur at a major container port, shipping lines, agents, and receivers face several options. In the short term containers could be discharged at the next port of call (or previous port of call, if UK is the last European call) in the schedule and 'fed' back through various UK ports on other container services. However, this is a costly option and if possible the lines will simply change the port rotation in North West Europe, to accommodate the UK port call when the disruption is over (assuming it is a short term disruption). In the medium term there will need to be a mix of 'feeder' and the transfer to other services, either at source, or on route, that call at different UK ports, unless the shipping line can arrange an alternative UK port call.

In the longer term shipping lines will have to develop full new working schedules that by-pass the affected port and utilise an alternative UK port, if available, or utilise alternative transport options from other European ports (if port capacity, vessels, vessel capacity and inland transport capacity is available). A more detailed assessment of deep sea container service capacity and capacity utilisation is required to understand whether there is any slack in the system and how quickly alternative capacity can be put in place.

Certainly, a medium to long term closure of Felixstowe will prove much harder to overcome unless and until additional capacity is developed at Southampton and Thamesport, or London Gateway opens for business. Ports on the Continent can absorb some of the traffic prior to loading back to the UK on container feeder services, or on short sea RoRo and container services, but the feasibility and cost of such an operation, not to mention the problems in terms of shelf life for food commodities will need to be taken into account.

The total estimated volume of food entering the UK through Felixstowe and Southampton respectively is 2.5 million tonnes and 0.6 million tonnes, 9% of total UK food imports. Shipping lines and importers have developed some resilience to disruption in contending with closures at Felixstowe, when high winds have posed threats to health and safety and there is evidence that major retailers are taking precautions by arranging import traffic through both Felixstowe and Southampton, and other deep sea ports, to spread any risk.

Lessons have also been learned from closures at Southampton caused by a crane collapse and the 'big bang' introduction of an upgrade to the Port Community System a few years ago without any regression plan. Without any computerised terminal control system the terminal was forced to close for three days.

Terminal operators have also advised that lessons learned when port congestion and supply chain disruption was a feature in the middle of the decade, due to the pressure caused by peak traffic periods, have been dealt with by improving systems (such as the Vehicle Booking Systems, VBS) and operating procedures as well as by adding to handling capacity.

Further resilience will be built into the system when the London Gateway terminal opens on the north bank of the Thames, unless its opening and future expansion leads to the closure of other deep sea port capacity. It is being developed to handle the largest vessels currently in service and back-up land devoted to logistics services and adding value can attract further traffic to the port that would otherwise be discharged on the Continent.

On the downside, larger 425 metre long vessels will cause additional navigational hazards in the river Thames and movements will have to be closely monitored to avoid collisions and groundings and potential blockage of the main river channel. The development also further concentrates deep sea container handling in ports in the south east of England and places greater burdens on the inland transport networks (road and rail) and coastal feeding capacity.

The merits of the concept proposals for Deep Sea Transshipment Hub developments in Scotland (Hunterston and Scapa Flow), aside from the cost and timing issues, could certainly be enhanced by the argument that they would enhance the resilience of the supply chain and divert dependence away from ports in the south east of England and inland transportation over long distances from there. Such an argument, however, needs to win over the incumbent hubs in Rotterdam, Antwerp, Hamburg and Felixstowe.

It is suggested that some further, more detailed, work should be carried out to assess the Impact of disruption and feasible capacity diversion for deep sea container traffic and/or container services. Modelling the impact of port closure at Southampton, for instance, in terms of freight shift, vessel diversion, port capacity utilisation, inland transport capacity availability etc. would provide insight and highlight the issues. Issues that will be even more pronounced in the event of any medium term closure at Felixstowe.

2. INTRODUCTION & ACKNOWLEDGEMENTS

Given the importance of Felixstowe and Southampton to the UK supply chain for the movement of containerised freight traffic from and to all parts of the world this case study begins to assess the dynamics of the sector as they relate to Felixstowe and Southampton. This in turn throws light on the links between these two ports and other UK container handling ports and major container handling ports on the Continent of Europe.

The Case Study begins to penetrate the deep sea container sector, to confirm its growing importance and to assess the resilience of the UK food supply in the event of disruption at these major UK container ports and their counterparts on the Continent and around the globe.

The purpose of this Case Study is to delve deeper behind the statistics and through consultation with the container terminal operators in Felixstowe and Southampton, container shipping lines and their agents, government agencies, logistics service providers and importers, obtain a better understanding of the deep sea sector's importance to the food supply chain and the impact on the supply chain if port disruption occurs.

The analysis and assessment in Section 5 attempts to qualify and quantify the impact of disruption at Felixstowe or Southampton, or both, in terms of the extent, speed and duration of transmission of ports disruption into interruption of food imports arriving in the UK as deep sea container traffic.

The study will help to determine the extent to which particular features of domestic and international transport infrastructure and food supply chains, in Felixstowe, Southampton and elsewhere in the UK and on the Continent, are likely to ameliorate or exacerbate the impact of UK port disruption on the supply of food imports into the UK.

It will help to determine the extent to which UK food (import) security is contingent upon the resilience of overseas port infrastructure and it will explore the behaviour, over the short to medium run (up to six months), of individual port operators, shipping companies and land-based logistics and food supply agents in the event of port disruption.

Most of the container trade entering the two ports is from non-EU origin and statistics are therefore available from HMRC regarding the breakdown of commodities carried. They confirm the importance of the ports for food imports and this Case Study assesses that importance, the infrastructures and vessel configurations that make them important and the resilience of the supply chains they support.

A detailed analysis of shipping and port capacity and capacity utilisation for container handling was not possible within the remit of this project but through consultation with ports, shipping lines and agents and an overview assessment of available berth and terminal capacities it has been possible to gauge the options available for the transfer of freight (containers) and the re-scheduling of vessels in the event of port disruption.

In the following sections there is first an overview of the UK deep sea container sector of which Felixstowe and Southampton form such an important part. This is followed by sections containing detailed port, shipping service and hinterland descriptions and an insight into port trade and traffic (with reference to **Annex 1** on UK food commodity import trade and traffic). In Section 5 the importance and the irreplaceable nature of the routes are examined in more detail to assess the resilience of the food supply chain and the possibilities for transferring freight traffic, be it containers or full ships, to other routes.

3. SECTOR OVERVIEW

The deep sea container shipping sector has been characterised by annual double digit growth rates until recent years and the move to ever larger container vessels to bring about increasing economies of scale. In a highly competitive market, with increasingly competitive shipping rates, the shipping lines have sought to add to demand by attracting freight that would previously have moved in general cargo and bulk vessels, to load into containers and therefore add to the critical mass.

Name	TEU capacity	Length (m)	Beam (m)	Containers wide	Max Draft (m)
E-Class (Malacca max)	18,000	425	56.0	23	16.0
Ultra large container vessel (ULCV)	> 14,501	397	56.0	22	15.5
New Panamax (VLCV)	10,000 – 14,500	366	49.0	19	15.5
Post Panamax	5,101 – 10,000	300	42.0	17	13.5
Panamax	3,001 – 5,000	292	32.3	13	13.3
Feedermax	2,001 – 3,000				
Feeder	1,001 – 2,000	100	15.8	6	5.6
Small feeder	< 1,000	70	13.0	4	5.0

Table 3.1 gives an indication of container vessel development with the latest designs being over 400 metres in length and 56 metres wide. These vessels have a capacity to carry 18,000 twenty foot (6 metres) equivalent container units (TEU).

With the increasing size of vessels in a naturally cyclic market there has been consolidation in the market and during periods of weak demand there is consolidation between operators in order to reduce costs by sharing vessels in consortia operations. This is particularly evident currently on the Far East trades.

Image 3.1: Key container ports in UK and on European Continent



However, as shipping lines seek to achieve economies of scale by building and employing larger ships, so the ports have to try to keep pace, if physically possible, by developing and maintaining deep water access to container terminals and investing in ever-larger cranes with sufficient height and 'outreach' to discharge and load containers. There is competition among the deep sea ports to retain direct 'mother' vessel calls and if the ports cannot adapt, due to physical limitations and / or prohibitive development cost, they will lose those direct calls.

The market they serve will then face the extra cost of moving containers from another port, by feeder vessel, rail or road to and from their ultimate destination.

Port	Number of calls - Deadweight tonnes		
	1-4,999	5,000-19,999	20,000+
Felixstowe		619	1,713
Southampton	1	277	555
London	61	365	570
Medway	1	115	483
Liverpool		331	313
Tees & Hartlepool	46	534	36
Immingham	7	458	
Forth	49	312	34
Rest	275	1,097	104
Total	440	4,108	3,808

Source: DfT *Maritime Statistics 2010*, PORT0601

In the UK Felixstowe dominates the market in terms of container throughput and, due to the depth of water available and the proximity to markets and trade lanes, it handles the greatest number of the largest container vessels afloat. Figures in **Table 3.2** provide an indication of the number and size of container vessels calling at UK ports, suggesting that other UK ports can handle the larger container vessels but their location prevents them from developing and capturing market share.

The container market peaked in the UK in 2007 but has been showing signs of recovery with a total market size of 8.2 million TEU in 2010.

Size of container	2006	2007	2008	2009	2010
20' containers	1,769	1,892	1,818	1,546	1,665
40' containers	5,582	6,183	6,189	5,227	5,833
Containers >20' & <40'	61	61	46	63	116
Containers >40'	587	738	661	537	609
Total	7,999	8,874	8,714	7,373	8,222

Source: DfT *Maritime Statistics 2010*, PORT0209

Indicative information from the ports and from published information from the ports indicates that Felixstowe, Southampton, Thamesport and Tilbury handle over 70% of the UK's container traffic (deep sea and short sea). However, as indicated in **Table 3.4** there is spare capacity at the ports, although operators warn of the difficulties and pressures of operating at terminal utilisation levels above 70%. Only Thamesport, of the top four container ports, could be said to be working within its limits, although clarification is required at Southampton where parts of the terminal have been closed off to improve operating efficiency during a quiet period and at Felixstowe where berths 8 and 9 have extended the terminal working areas.

Port	Throughput TEU (millions)	Notional Capacity TEU (millions)	Estimated terminal utilisation	Estimated berth utilisation
Felixstowe	3.6	4.6	78%	56%
Southampton	1.5	2.2	68%	48%
Thamesport	0.3	0.85	35%	34%
Tilbury	0.5	0.7	71%	70%

Source: Direct from port publications

Port	Berths	Max depth of water (m)	Cranes	Calls per week	Estimated throughput ('000 containers)	Estimated berth utilisation
Felixstowe	9	16.0	34	30	2,074	56%
Southampton	4	15.0	12	8	945	48%
Thamesport	2	15.0	8	6	263	34%
Tilbury	2	13.5	9	14	425	70%
Tyne	N/A	13.1	1	N/A	30	N/A
Teesport	N/A	10.9	4	N/A	146	N/A
Liverpool	N/A	12.6	7	N/A	400	N/A
Bristol	N/A	14.5	5	N/A	44	N/A
Others	N/A		29	N/A	602	
London Gateway (Phase I)	3	17.0	8	N/A	N/A	N/A
Total	20		117		4,929	

Source: PRB Associates *UK Short Sea Freight RoRo and LoLo Capacity Analysis and Report*

Notes: Other key container handling ports (short sea); Hull, Belfast, Clyde, Forth, Immingham

Other ports around the UK handle container services and operate container cranes and terminal handling equipment. Liverpool handles direct deep sea calls from North Atlantic services but generally the scale of operations, the size of cranes and the limitations posed by the depth of water, even aside from being located away from the main trade lanes, means that these ports will only handle container feeder services from the main UK and Continental hub ports and intra European container services that link the UK with Ireland and mainland Europe.

Market	2006	2007	2008	2009	2010
Far East	1,744	1,938	1,832	1,613	1,964
India & Gulf	341	358	352	339	348
North America	439	379	390	329	308
Africa	133	143	147	136	146
Australasia	70	57	51	33	26
Other deep sea	119	161	183	168	160
Total	2,846	3,036	2,955	2,618	2,952

Source: DfT *Maritime Statistics 2010*, PORT0204

On the deep sea trades shipping lines generally operate a 'string' of vessels in 'loops' sufficient to provide a weekly call at every port of call in the 'loop'. On the Far Eastern trades, for instance, operators currently require 10 vessels in each loop, each vessel operating on a 70-day round trip between the Far East and North West Europe.

For the UK market the figures in **Table 3.6** indicate the relative importance of worldwide markets for the UK's deep sea container trade. The Far East stands out as the most important market in terms of the number of container movements.

4. PORT DESCRIPTION

4.1 Port infrastructure

Felixstowe and Southampton are the UK's premier container ports, handling 64% of the country's container import volume of 2.3m units. Container handling infrastructure is therefore a major feature at both ports, as detailed in **Table 4.1**.

At **Felixstowe** there are a total of 34 container gantry cranes serving over 3 kilometres of quay, sufficient berth space for 9 simultaneous deep sea vessel calls. Ultimate terminal handling capacity is estimated to be 4.6m TEU, although achieving capacity will depend on a number of factors: e.g. availability of labour gangs; optimization of ship arrivals and quay space; and increased manning levels to match any increased demand.

Felixstowe also has two riverside RoRo berths and back-up trailer storage areas, used primarily for the DFDS Seaways North Sea services to and from the Netherlands. Felixstowe has no other traffic, other than heavy lift and abnormal load cargoes handled through the container terminal.

Southampton is also equipped with RoRo handling infrastructure but this is used almost entirely for handling new trade car imports and exports. However it handles over 13 million tonnes of liquid bulk imports (mostly crude oil and petroleum products) and 400,000 tonnes of dry bulk cargo. Among the dry bulk imports there is approximately 70,000 tonnes of wheat handled through the port grain terminal. The only other identifiable food imports through Southampton will be shipped in containers to a separate container terminal dedicated to the Heulin Renouf Channel Islands service.

Terminal	Felixstowe		Southampton	Total
	Trinity	Berths 8&9	Berths 204-207	
Area (ha)	124.30	35.87	95.00	
Stack capacity TEU	98,000	20,000	34,000	
Handling capacity million TEU pa	4.6		2.2	6.8
Current volume million TEU	3.6		1.5	5.1
Length of quay (m)	2,354	730	1,350	
Deep sea vessel berths	7	2	3 (effectively 3.5 until berth 201/202 development)	12
Depth of water	910m @ 15m	730m @ 16m	420m @ 15m	
	918m @ 14m		292m @ 14.6m	
	300m @ 11.9m		300m @ 14.0m	
	226m @ 11.6m		338m @ 13.6m	
Quayside cranes (no. containers x wide)	27	7	12	46
	10 x 22	7 x 24	6 x 22 Berth 207	
	3 x 20		2 x 20 Berth 206	
	3 x 18		3 x 18 Berth 205	
	9 x 16		1 x 17 Berth 204	
	2 x 13			
Reefer points	1,638	168	520	

Notes: The access Channel at Felixstowe has a minimum depth of water of 14.5m so deeper drafted vessels have to meet tidal windows (tidal range of 5m)

At Felixstowe, the newly opened berths 8 and 9 are designed to accommodate the largest container vessels afloat (i.e. 15,000 TEU capacity). Provision has been made to allow the berths to be further deepened to 18m as needed, if and when 18,000 TEU capacity vessels are introduced. There is also provision in the plans to extend the quay and terminal area further eastwards if demand dictates.

At Southampton, where there is effectively space for only 3.5 simultaneous deep sea vessel calls, there are plans under consideration to deepen and re-activate berths 201 and 202, along with deepening and widening of the approach channel to accept the largest deep sea container vessels afloat. This would both add to the port's vessel handling capacity and increase permitted vessel size.

Furthermore, the Dibden Bay development is still a part of the port's plans for future expansion, although it previously failed to obtain final planning permissions. However, for current trading conditions, the terminal operators need only to use a part of the existing terminal space in order to minimise vehicle running times.

The summary details in **Table 2.5** demonstrate the importance of Felixstowe and Southampton for the UK's deep sea container handling requirements and the significance of the London Gateway development. For the handling of deep sea services, the size of the cranes in service and the depth of water available for access and on the berths are also important. Felixstowe, Southampton, Thamesport, and London Gateway stand out in this regard (see also **Annex 5**).

4.2 Services calling at the port(s)

Table 4.2: Indicative berth occupation at DP World, Southampton Container Terminal													
Berth	204E / 204W			205E / 205W			206E / 206W			207E / 207W			
Day	338m @ 13.6m			300m @ 14.0m			292m @ 14.6m			420m @ 15.0m			
Mon							EPIC						
				FAL 1									
Tue													
Wed				G6 LOOP 4			G6 LOOP 6						
Thu										G6 LOOP 7			
Fri							FAL 3						
Sat				G6 LOOP 1						ATX			
Sun							EPIC						
	54%			61%			50%			29%			48%

Source (Confidential): DP World Southampton

At **Southampton** there are now (from April 2012) four main services calling at the port on a weekly basis, generating 8 vessel calls. Between them they provide six direct weekly connections with the Far East; one weekly connection to the US East Coast; and another connection to India and Pakistan. In addition to this, the port is linked to other UK and Irish ports by regular container feeder services provided by X-Press Container Line.

With berth occupation details provided by the port and before any deep water development on berths 201 and 202 it is evident that overall berth utilisation is currently less than 50%, leaving scope for additional calls. However, throughput numbers and overall terminal capacity indications provided by the port indicate that terminal handling capacity would be reached (pre full use of terminal area, manning-up and adding to equipment fleet) before berthing capacity is threatened at Southampton.

Service	Full name	Alliance partners	Markets served	Other NW Europe port calls	Typical vessel size (TEU)
FAL 1	French Asia Line	CMA CGM, ANL, Delmas, MSC, UASC	Asia, Middle East Gulf	Hamburg, Bremerhaven, Rotterdam, Zeebrugge, Le Havre	13,830
FAL 3	French Asia Line	CMA CGM, ANL, Delmas, MSC, UASC	Asia, Red Sea, Beirut	Hamburg, Bremerhaven, Rotterdam, Zeebrugge, Le Havre	11,388
EPIC	Europe Pakistan India consortium	CMA CGM, ANL	Middle East, Pakistan, India	Rotterdam, Hamburg, Antwerp, Le Havre	5,700
ATX	Grand Alliance North Atlantic Service	Hamburg Sud, Hapag Lloyd, NYK, OOCL, ZIM	US East Coast	Rotterdam, Hamburg, Le Havre	5,344
G6 LOOP 1	Grand Alliance	Hapag Lloyd, NYK, OOCL, APL, HMM, MOL	Far East, Jeddah	Rotterdam, Hamburg, Le Havre	8,102
G6 LOOP 4	Grand Alliance	Hapag Lloyd, NYK, OOCL, APL, HMM, MOL	Singapore, China	Rotterdam, Hamburg, Le Havre	13,000
G6 LOOP 6	Grand Alliance	Hapag Lloyd, NYK, OOCL, APL, HMM, MOL	Far East, Sri Lanka, Jebel Ali	Hamburg, Antwerp, Rotterdam	8,749
G6 LOOP 7	Grand Alliance	Hapag Lloyd, NYK, OOCL, APL, HMM, MOL	Singapore, China	Hamburg, Rotterdam	8.749

Source: DP World Southampton and consultants' analysis

Typically, weekly NW Europe / Far East services employ ten (eleven with slow steaming) high capacity container vessels each operating on a 70-day round trip entailing a range of calls in North West Europe, usually including Rotterdam and other ports, ranging from Hamburg and Bremerhaven in Germany, Zeebrugge and Antwerp in Belgium and Le Havre in France. Other NW European countries are served either directly by road or rail from the 'hub' ports or by maritime feeder service.

Table 4.4: Felixstowe deep sea service summary

Day	Trinity Terminal berths / quays – length / depth of water						Berths 8&9 730m @ 16m
	Berths 7, 6 and part 5 - 910m @ 15m		Part berth 5 plus berths 4 & 3 918m @ 14m			Berth 2 300m @ 11.9m	
Mon	Maersk AE6 Far East	Maersk AE7 Far East	MSC India, Pakistan	Maersk / Nedlloyd ICON Middle east	TA1 US East Coast	Seago Line NETU	Seago Line NEEM
Tue		CYKH AEX5 China					
Wed	Maersk AE1 Far East	COSCO AEX 13 China	MSC Middle East	Sea-Land TA2 US East Coast	MSC North Med (1)	MSC North Atlantic	MSC East Med Levant Express
Thu			Maersk AE9 Far East	MSC Caribbean	MSC South Africa		WAF6 Loop 1 West Africa
Fri	Maersk AE2 Far East	CYKH AEX 12 China			MSC North Med (2)	Hamburg Sud NESM	
Sat		CYKH AEX 11 China	Maersk ME1 Middle East & India	ZIM AME Mediterranean & Far East	TA5 US East Coast	MSC West Africa	
Sun		Maersk AE7 Far East		Maersk / Nedlloyd ICON Middle east			Seago Line NEEM
		75%			71%		50%
							66%
							20%

Note: Indicative berth occupation at Felixstowe, before feeder service calls, based upon consultants' interpretation of published schedules

The French Asia Line currently employs the largest vessels but the newly-formed G6 consortium will be introducing larger vessels over the coming months and years as new tonnage comes into service.

Infrastructure capacity and service coverage at Felixstowe is a step-up in scale of a factor of two, over the second-ranked container port, Southampton. While Southampton receives eight deep sea vessel calls per week, Felixstowe consistently handles 30 or more calls per week.

World leading carriers, Maersk and the Mediterranean Shipping Company (MSC) respectively provide six and ten calls per week, and Maersk provides another two as the Mediterranean operator Seago, and three more as an alliance partner in Trans-Atlantic services. Behind Maersk and MSC, the China Shipping Company Limited, COSCO, and the CYKH alliance provide five calls per week linking North West Europe with a range of Chinese ports.

Overall **Felixstowe** has twelve Far East service calls per week, two Indian sub-continent services, two Middle Eastern services, five North Atlantic services, six Mediterranean services and three African services. All of these services offer a range of port calls in North West Europe, in addition to Felixstowe and in some cases they make calls in the Mediterranean and in Algeciras (Spain) where they could potentially tranship to other UK bound services.

With the range of Mediterranean and African services supplementing the Asian and North Atlantic services and 13 feeder service calls per week the average number of containers discharged and loaded to deep sea vessels calling at Felixstowe is in the region of 1,100 TEU each way, slightly less than the average turnaround per vessel in Southampton.

In general terms Felixstowe handles an entirely different range of shipping lines and companies compared to Southampton, but there are no obvious barriers to operators switching ports, either by design, or as a result of disruption and closure at one or the other port. There is flexibility in the market, particularly when utilisation levels are relatively low, as they are now, with shipping lines also operating services that do not include a UK call as part of their North West Europe rotation. In addition, both Felixstowe and Southampton handle service calls that are the first call in Europe as well as others that are the last call in Europe, providing some further flexibility, within service operations.

Berth capacity utilisation at Felixstowe is c.66% on the Trinity Terminal berths, before taking account of feeder services, while on the new berths 8 and 9 there is currently only a 20% utilisation level.

4.3 Port hinterland

Just as important as marine access to the ports, allowing deep drafted high capacity container vessels to berth, are the hinterland transport connections and capacity. The scale and frequency of import and export containers has to be matched by the capacity to move import containers to inland destinations and to collect containers to move them to the port for export.

While road is the only mode of transport used to move trailers to and from Dover and the Channel Tunnel, Felixstowe and Southampton (and to a lesser extent Thamesport, Tilbury and Liverpool) utilise three modes of transport (road, rail and maritime) for hinterland connections. All these links are important for resilience of the supply chain to and from the ports. Just as blockages on the M20 can cause disruption to traffic through Dover and the Channel Tunnel, so disruption on the A14 and M27 can cause disruption at Felixstowe and Southampton, respectively.

More important to the deep sea ports, however, are the freight train services that load and discharge containers within the port area and the shipping lines that provide container feeder services to take containers away from the hub ports to deliver them to more distant UK ports in northern England, Scotland and Ireland, providing the same service in reverse for export containers. There are also container feeder links from Felixstowe and Southampton to Scandinavia, the Baltic and Iberia.

Approximately 36% of the containers passing through Southampton are transported by rail (aided by rail gauge clearance work completed in March 2011 on the West Coast Main Line), with another significant proportion moved via feeder vessel (4 X-Press Container Line calls per week for Ireland and NW UK ports). The container terminal at Southampton is served by three rail freight terminals, operated by Freightliner and DB Schenker, with 22 trains per day departing for inland destinations and more train paths available if required.

This feature, mirrored in Felixstowe, does raise the scenario of problems with the rail network, or a rail strike leading to congestion and disruption at the port.

27% of Felixstowe's container throughput (approximately 500,000 containers / 10,000 per week) is fed to and from the port by rail. The port is served by 2 terminals with a new third rail terminal due to be completed in 2012. The South Terminal (ex Landguard rail terminal) and the North Terminal can handle 26 wagon train sets and the new Mid Terminal will be able to handle 30 wagon sets. Planning conditions linked to the South Terminal extension (Phase 2) require 'Section 106' investment in the dualling of the rail track between Felixstowe and Ipswich, gauge clearance to W10 to Doncaster on the East Coast main line, road improvements and provision of an Ipswich 'stabling' area.

Felixstowe also handles approximately 13 feeder vessel calls per week (4 per week in Southampton), supplying containers to and from other UK, Irish, Scandinavian, Baltic and Iberian ports. The development of container feeder services would take the pressure off road and rail links but aside from making the economic case there also has to be the available quay space to handle these calls.

The under utilisation at Thamesport is reflected in the fact that it does not utilise all of the train paths currently available to it and Southampton also has capacity to add to the number of train paths linking the port with the hinterland. Felixstowe container trains, however, utilise all of the 30 train paths currently available to it and require the dualling of the single track between Ipswich and Felixstowe in order to expand train capacity.

While it would be difficult to add to train capacity at short notice, to handle any increase in traffic caused by vessel diversions from other ports, road haulage operators serving the container market can adapt more readily, providing container terminals can handle the extra traffic through the Vehicle Booking Systems and the Terminal Control / Community Network Systems in operation.

In addition, one large road transport operator contacted has depots and trucks at each of the main container ports and could switch resources relatively easily.

5. PORT TRADE & TRAFFIC

5.1 Overall trade and traffic mix

Combined foreign import trade volume through Felixstowe and Southampton in 2010 amounted to 33.5 million tonnes with the majority of the traffic being containerised trade, when crude oil and oil product imports into Southampton are discounted from the figures. Foreign exports in the same year totalled 23.7 million tonnes, with a similar mix of traffics. Between them Felixstowe and Southampton handle 13% of all UK foreign import freight.

Felixstowe depends almost entirely on unit load traffic with trailers on the DFDS Seaways RoRo service to Rotterdam (180 thousand units) adding to the dominant container trades. Unit load traffic volume (tonnage) through Felixstowe, the UK's largest container port, is almost four times greater than through Southampton, the UK's second largest container port.

Port	Dry bulk	Liquid bulk	General	Unit load ¹	Total
Felixstowe			10	15,326	15,336
Southampton	399	13,619	11	4,220	18,249
Total	399	13,619	21	19,546	33,585
UK Major Ports Total ²	72,382	129,878	12,634	89,524	304,418

Source: Department for Transport, *Maritime Statistics 2010*

Note 1: Unit load imports include trade cars, amounting to 262 thousand tonnes through Southampton

Note 2: Foreign and domestic traffic total for Major Ports, not including Channel Tunnel

Other identifiable import trade types through Southampton, other than bulk fuels (oil), containers and trade cars include 'other liquid bulk products' (313,000 tonnes) and 'agricultural products' (234,000 tonnes). 'Agricultural products' are almost certainly food products from EU and non-EU origins, while there may also be food products among the other liquid bulk product imports. Further work would be required to give precise definition to these bulk food products but for the purposes of the Case Study it is the high volume of container traffic that is important and the country's dependency on Felixstowe and to a lesser extent Southampton. The analysis in Section 5.2 provides greater insight into the amount of food product entering the country through Southampton and Felixstowe.

Converted into unit numbers, the figures in **Table 5.2** from the Department for Transport's *Maritime Statistics 2010* show that Felixstowe handled over a million import containers in 2010 (average payload per container 13.6 tonnes) and Southampton handled 444 thousand containers (average payload per container 8.9 tonnes). Felixstowe's dominance in terms of the weight of containerised imports is therefore not as pronounced when it comes to the number of import containers handled.

Port	Containers	Trailers RoRo	Trade cars	Total
Felixstowe	1,039	90		1,129
Southampton	444		136	580
Medway (Thamesport)	135		255	390
London (Tilbury)	209	305	434	948
Liverpool	186	182	1	369
Total	2,013	577	826	3,416
UK Major Ports Total*	2,304	2,763	1,995	7,062

Source: Department for Transport, *Maritime Statistics 2010*

Notes: Passenger cars and passenger buses not included

* Foreign traffic only

64% of all UK container imports from foreign origins pass through either Felixstowe or Southampton (nearly 1.5 million units), demonstrating the importance of these two ports to the ever expanding deep sea container and short sea feeder trades.

The majority of the trade entering the ports is from non-EU origins and it is therefore possible to confirm the importance of the ports for UK food supply solely on the basis of a breakdown of identifiable food commodities obtained from HMRC data.

5.2 EU and Non-EU food imports

An analysis of HMRC trade data for 2010 shows that 11% of imports through the two ports from non-EU origins was food commodity based (2.9 million tonnes / 21% of all non-EU food imports) and several of the food commodities featured in the food commodity Case Studies figure prominently (frozen and chilled meat; fresh and frozen fish; citrus fruit; and sugar).

Fruit and vegetables feature strongly overall and Southampton also handles significant volumes of bulk wheat imports (70,000 tonnes). However, most of the food commodities imported from non-EU countries will be arriving in containers.

Commodity	Non-EU	EU est.	Total
Frozen and chilled meat (#0201, 0202, 0203, 0204, 0206, 0207)	83.568	197.000 (Estimated food via RoRo and short sea LoLo through Felixstowe)	
Fresh and frozen fish (#0302, 0303, 0304)	37.120		
Citrus fruit, fresh or dried (#0805)	110.369		
Palm oil (#1511, 1513)	0.858		
Sugar (#1701, 1702, 1703)	58.326		
Other commodities	2,627.487		
Total food import	2,917.729		
<i>Total foreign import, EU estimated</i>	<i>25,937.005</i>	<i>7,645.995</i>	<i>33,583.000</i>

EU imports through Felixstowe and Southampton feature RoRo ferry traffic and short sea container traffic through Felixstowe, some car imports and significant amounts of liquid bulk oil through Southampton. As a rough estimate, using Border Agency parameters, the amount of food import from EU sources, carried on RoRo ferry and short sea container service is approximately 197,000 tonnes, although this will be supplemented by some grain and fresh produce (from Canary Islands) imports through Southampton.

Port	2008		2009		2010	
	EU	Non-EU	EU	Non-EU	EU	Non-EU
Felixstowe		2,187		2,236	197	2,269
Southampton		713		612		648
Total		2,900		2,848	197	2,917

Source: DEFRA bespoke analysis of data feed from HMRC / DfT

6. PORT FLEXIBILITY

6.1 Issues and concerns / potential disruption scenarios

If there is short, medium or long term disruption at the port there are alternative options. In the short term, if the UK port is unavailable and advance notice is given the vessels can slow down and arrange to discharge the UK containers at the next scheduled port of call (say Rotterdam), from where they can be transhipped back to the UK on deep sea services, fed via feeder services, transported by road via Calais or the Channel Tunnel, or devanned and stored on the Continent before being transported to the UK on trailers.

However, questions surround whether systems can cope with the numbers and Deep Sea Conference members agree upon a single course of action. Other UK ports could be used but there has to be available capacity and the deviation cannot be too great and in any case the export traffic will not be available to load from the alternative port.

Current practice will involve shipping lines re-arranging the port rotation around North West European ports to defer the UK port call until the disruption is resolved. Such practice is only possible if the disruption is not long lasting and in practice it is usually short term.

Commercial 'muscle' will count with the shipping lines and they will give priority to repatriating containers carrying cargo for the larger shippers that shout loudest and react quickest such as Nissan, who have to maintain a Just in Time supply to manufacturing plants. Bigger customers will dictate unless there are emergency powers in place and smaller shippers such as in the fragmented food import sector will not have a strong voice. Government / Defra has to be aware of this in order to agree possible contingency plans with the shipping lines in order to prioritise food movements.

Shipping Lines, shippers and importers will all struggle to implement contingency strategies at the same time because of the immediate pressures on capacity that will arise, through other ports and with alternative hinterland, or container feeder options.

Potential and already encountered disruption scenarios at Felixstowe and Southampton, and other deep sea terminals, include:

- **High winds** at Felixstowe (Southampton is generally more sheltered) present Health and Safety issues for trucks and drivers in the terminal faced with the risk of insecure containers being blown from container stacks
- **Crane damage**, crane breakdown or even crane collapse caused by high winds, construction faults or collisions
- **Technical problems** with terminal control and port community systems will slow down and even lead to the stoppage of operations. Southampton was closed for three days when a system upgrade was introduced using the 'big bang' approach without any 'regression' plan in place in the event that the upgrade failed
- **Vessel damage** at the berth and / or sinking at the berth or in the access channel
- **A rail strike or rail network disruption** will cause disruption at the deep sea ports if road and maritime feeder services cannot pick up the slack
- **Public sector strikes** (Customs, Border Control, Port Health etc.) would cause delays and disruption unless controls are relaxed
- **A tidal surge** will effect operations for the duration of the high tide unless the surge causes damage to vessels on the berths, cranes and terminal handling equipment. It could cause damage and disruption to containers on the terminal in container stacks and most likely cause damage and blockage on inland transport connections (road and rail)

- A **power failure** and a lack of back-up will bring down essential terminal control systems and some terminal operating equipment

6.2 Traffic diversion

Without any detailed capacity utilisation evaluation among the shipping lines and at the ports it is difficult to assess the impact of medium to long term disruption. In the short term, containers are already en route to the disrupted port and would have to be repatriated from other ports of call on the Continent, utilising other deep sea services calling at alternative UK ports, container feeder services, or road haulage via ferry services and the Channel Tunnel.

In the short, medium and long term capacity will have to be re-positioned and/or geared up to cope with the extra burdens. Further work is required to assess the volumes of containers under consideration and the availability of transport capacity required to repatriate containers, from a range of alternative ports, on a daily and weekly basis.

6.3 Vessel diversion

With each deep sea vessel calling at Southampton discharging and loading approximately 1,500 TEU the inability to make the designated UK call would cause rapidly compounding problems at other ports in the NW Europe rotation burdened with the task of 'repatriating' the containers back to the UK.

If no other UK port can be used, the options include: re-loading containers onto other deep sea services still destined for a UK port of call; loading to a maritime container feeder service connecting with other UK ports (although available capacity might be limited and building capacity, by bringing in additional feeder vessels, may not be easy in the short term); utilising the range of short sea RoRo and LoLo services connecting the UK and Continent; or moving the containers by rail or road through the Channel Tunnel.

In theory, a closure at Southampton, Thamesport or Tilbury could be accommodated by diverting vessels to Felixstowe, where there are, potentially, spare slots (see **Table 6.1**). The opening of London Gateway will help to relieve the pressure on resilience but port operators will not wish to have spare capacity merely to serve UK supply chain resilience requirements.

Port	Deep sea berths	Slots available per week	Slots used per week	Spare slots
Felixstowe	9	63	35	28
Southampton	4	28	13	15
Thamesport	2	14	5	9
Tilbury	2	14	10	4
<i>London Gateway (Phase I)</i>	3	21	<i>N/A</i>	<i>N/A</i>
Total (ex London Gateway)	17	119	63	56

Note: Assuming 24-hour slots

While there appears to be considerable spare capacity at both Felixstowe and Southampton for additional diverted calls (28 and 15 spare slots respectively) the difficulty will come in accommodating particular services on the specific days scheduled for UK port calls.

Further work will be required to establish the true availability of spare slots and the feasibility of matching existing schedules with available slots. There needs to be a higher level of cooperation and transparency among all of the container terminals to achieve this.

One example of a degree of resilience in action is that during periods of short term disruption at Felixstowe some vessels have successfully diverted to Thamesport, another port belonging to the Hutchison Group.

7. FOOD SUPPLY RESILIENCE ASSESSMENT

The Felixstowe and Southampton Case Study assesses the disruption scenarios, the resilience and the flexibility among ports and shipping services to handle the transfer of traffic flows. The implications for specific food commodity flows and supply chains in the event of port disruption are illustrated in the four food commodity Case Studies:

- Frozen meat and fish (**Annex 7**)
- Citrus fruit (**Annex 8**)
- Sugar (**Annex 9**)
- Palm oil (**Annex 10**)

In **Annexes 7** and **8** the increasing reliance on the supply of meat and fish, and fruit and vegetables from the Continent, originally sourced from countries outside of the EU will be examined and longer term consequences and contingencies assessed. Given the extended voyage times for deep sea services, cycle times and stock levels are also examined.

8. MESSAGES & FINDINGS

The key messages and conclusions and suggestions for further work arising from this Case Study, concentrating on the Port of Felixstowe and the Port of Southampton are summarised in bullet point format below:

- There is an **over-reliance on Felixstowe** (and a growing dependency with the further berth extensions). More work is required to assess the range and mix of alternative port options if Felixstowe is closed and the availability of Continental port capacity, feeder capacity, road options via ferries and tunnel and inland transport capacity from other UK ports fed via the Continent. The same analysis is required for Southampton but not on such a large scale
- There is evidence to indicate that **major retailers** are taking precautions by arranging import traffic through both Felixstowe and Southampton, and other deep sea ports, to spread any risk
- The new berths 8 and 9 at Felixstowe provide much needed additional deep sea service capacity. On average **15% of containers on deep sea services are for the UK**. Felixstowe and Southampton handle approximately 40,000 and 18,000 containers per week through their respective terminals.
- **Felixstowe** terminal still closes on occasions, due to high winds, but the berth 8 and 9 extension has eased any capacity problems following disruption when additional vessels are calling at the port
- The introduction of **Vehicle Booking Systems (VBS)** at Southampton and Felixstowe has enabled a 24-hour spread of vehicle arrivals and forced decision-making back up the supply chain. It has educated hauliers and shippers regarding delivery and collection times and equipment utilisation and has forced hauliers to provide intermediate storage and shunting services to / from the port
- **Container terminal capacities** are being enhanced by importers moving towards merchant haulage operations and port-centric solutions to get containers out of the marine terminal as quickly as possible. This move has been prompted, in part, by disruptions at Felixstowe port caused by high winds, leaving containers stranded on the dock
- Feedback from **Maritime Transport** and an understanding of their organisation would suggest that they could handle disruption at one UK deep sea port by transferring trucks to other ports to handle the diversion of traffic and the shortage of resource that will be encountered at other ports not normally used to such traffic levels
- Problems with the **rail network**, or strikes would soon cause problems at the deep sea ports and it is not as easy to switch train capacity between ports, as it is for road haulage. There is some spare train path capacity available at Southampton but none at Felixstowe
- In the short / medium term, shippers can **switch to an alternative service** coming from the Far East, South America, North America, etc. that will call at a different UK port, although the options can become limited as many shippers try to do the same thing
- A change of **vessel rotation** in NW Europe can be arranged to overcome short term disruptions at UK ports. There should be no shortage of small and medium size container vessels to use as **feeder vessels** in the event that the UK had to be supplied from Rotterdam and other Continental ports, but actual capacity needs verification
- Security in the supply chain, on deep sea, is being provided by **separate and competing shipping line consortia**. The G6, MSC-CMA CGM and Green alliances are three consortia competing with Maersk to provide daily services from the Far East. To provide daily services each consortium needs to employ 7 'loops' each with 10 ships running between the Far East and Europe

- Although larger container vessels are being introduced into service, with fewer ports of call, they offer **options to tranship** along the route to the UK and North West Europe in the Mediterranean and Spain (Algeciras, Spain; Gioia Tauro, Italy), as well as in North West European ports
- Larger container vessels being employed are collecting more containers from the source markets, at hub ports such as Singapore, leading to **fewer direct service calls from Australasian markets**
- The **London Gateway** development (when Southampton's Dibden Bay has been declined) will be highly significant for UK supply both as a port and as an adding value / processing opportunity
- The opening of London Gateway will provide valuable extra container handling capacity but can the industry sustain lower **overall capacity utilisation levels** in order to provide supply chain resilience (same goes for RoRo facilities)? Will Thamesport close when London Gateway opens? Container ports are reluctant to publicise details concerning throughput capacity because it can depend on many variables, such as the availability of labour and equipment, etc.
- The merits of the concept proposals for **Deep Sea Transshipment Hub** developments in Scotland (Hunterston and Scapa Flow), aside from the cost and timing issues, could certainly be strengthened by the argument that they would enhance the resilience of the supply chain and divert dependence away from ports in the South East of England and inland transportation over long distances from there. However, such proposals would require examination and validation in the wider supply chain context
- **Spare capacity** is, in theory, available at the deep sea container ports under current trading conditions and all have plans in place for expansion, but it is not necessarily easy to handle more traffic at short notice as operations (personnel and equipment, ship / quay optimisation) are not 'geared' up

While there appears to be considerable spare capacity at both Felixstowe and Southampton for additional diverted calls the difficulty will come in accommodating particular services on the specific days scheduled for UK port calls.

Further work will be required to establish the true availability of spare slots and the feasibility of matching existing schedules with available slots. There needs to be a higher level of cooperation and transparency among all of the container terminals to achieve this

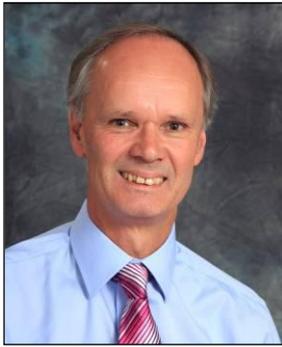
- More **inland rail terminal capacity** and intermediate road freight storage capacity will take the pressure away from the ports and could lead to more vendor managed supply operations (VMI)
- There is very little **warehousing and added value activity** around Southampton port and only marginally more around Felixstowe, apart from empty container storage depots. It will be different around London Gateway if developments go according to plan
- There are **'buffer' stock** operations, off-dock, in Felixstowe and Southampton operated by independent operators, but they do not provide significant 'buffer' stock and only for those customers that currently require it. Road transport operators such as Maritime Transport are also developing inland intermediate storage depots
- Development of **'buffer' stocks** just off the dock, or near to the port, provide some contingency if port operations are disrupted but current volumes are low. The development of more off-dock and intermediate container storage facilities will add to resilience, while it would also help if shippers and consignees could be more flexible in terms of collection and delivery times
- **Port-centric Logistics** and / or **Vendor Managed Inventory (VMI)** may be a part-solution towards getting stock into the UK. An investigation into whether such facilities can be encouraged (stock still owned by importer until called off by customer) needs to be undertaken. It should be noted however, that consolidation of certain food stocks for later call-off is already undertaken (see **Annex 2**)

- **Government agencies** are resourced and equipped at the main ports, for current volumes. If other ports have to be used there may not be sufficient Port Health or Border Agency resource and existing resource may not be sufficient to deal with additional traffic if one port has to handle diverted traffic from another port
- There should and could be greater coordinated use of MCP (DESTINATE) and CNS (COMPASS) **port community systems** (for EU as well as non-EU traffic) without building too much dependency on electronic systems, or placing too great a burden on shipping lines, ports and transport providers. (NB. Short sea terminal operators do not need links with community network systems and run their own terminal planning systems and interface with customers).

Standardisation of the commodity description on ship's manifests (coded rather than entered as description only) will help. These Port Community Systems could also be a good planning tool to aid the process of vessel diversion

- There have to be **Border Inspection Posts**, or adequately resourced posts at alternative UK ports, if containers have to be fed un-cleared from the Continent. or diverted from another UK port.

ABOUT THE AUTHORS



Peter Baker, the founder and owner of PRB Associates, specialises in operational, financial and market analysis in the ports and shipping sectors; with working experience in the ports sector and in RoRo ferry operations.

In addition to a range of project commissions in the UK and internationally, Peter has researched and produced the '*UK Short Sea Freight RoRo and LoLo Capacity Analysis and Report*' every year since 2000 and for the first time in 2009 produced an Irish equivalent. The report and database information provide a detailed analysis and assessment of the capacity provision and spread in the market, with comprehensive route, service, vessel and port information contained in detailed appendices.

PRB Associates Limited specialises in providing shipping and transport consultancy and analysis services for private and public sector organisations. Founded in 1998, PRB Associates has successfully completed commissions for freight generators, freight transport service providers (shipping lines and road transport operators), port operators and various public sector organisations. Assignments have ranged from service analyses, feasibility studies, financial modelling and economic impact studies, to market research and appraisal and national transport strategy formulation.



Andrew Morgan, the founder of Global 78, has extensive international business and logistics experience gained in projects across many industrial sectors, including food supply projects in Europe, Brazil and India. These advisory and implementation projects have ranged in scope from agri-business, through manufacturing and processing, to wholesale and retail distribution in final consumer markets.

A Chartered Member of the Chartered Institute of Logistics and Transport (UK), Andrew is the author of '*Making the Brazil Connection – managing risk in the international food supply chain*' and also co-author of the UKIBC Report '*India Agri-Food Supply Chains: Overview and Opportunities*'.

Global 78 Limited is focused on helping commercial clients discover new perspectives for success in local and international markets and for delivery of real bottom-line improvements. It also undertakes research for public sector policy-making. Food supply chains are complex. Innovation, resilience and sustainability are all vital elements for successful policy, strategy, and operations. The Global 78 team therefore provides clients with quality research, specialist advice, and support for implementation.

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