

Liner Trades



INSTITUTE OF
CHARTERED
SHIPBROKERS

2018 EDITION



LINER TRADES



INSTITUTE OF
CHARTERED
SHIPBROKERS

Published by the
Institute of Chartered Shipbrokers
30 Park Street
London SE1 9EQ
United Kingdom
Email: books@ics.org.uk
www.ics.org.uk

Published 2018
ISBN 978-1-911328-09-4

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without prior permission of the publisher and copyright owner.

Terms of Use

While the advice given in this book has been developed using the best information currently available, it is intended purely as guidance to be used at the user's own risk. No responsibility is accepted by the Institute of Chartered Shipbrokers (ICS), the membership of ICS or by any person, firm, corporation or organisation (who or which has been in any way concerned with furnishing of information or data, the compilation or any translation, publishing, supply or sale of the book) for the accuracy of any information or advice given in the book or any omission from the book or for any consequence whatsoever resulting directly or indirectly from compliance with or adoption of guidance contained in the book even if caused by a failure to exercise reasonable care.

Printed and bound in the UK by Cambrian Printers

Design and book production by Mark Clubb (www.carmarmedia.co.uk)

Front cover image: Port Pictures NL

Foreword by

Robert Woods, CBE

Liner shipping is the backbone of world trade. The majority of the world's exports of finished goods are borne by liner shipping companies. The efficiency and low relative cost of container shipping means that in the majority of cases transport costs are almost incidental to the landed price of exported goods whether they be chemicals, car parts, machine tools, foodstuffs or liquor and almost anything that can fit in a container.

The liner shipping industry has been the key to the shift of the world's manufacturing bases to initially low-cost countries and latterly high-tech centres. These manufacturing bases, particularly in Asia, require feeding with raw materials such as ore, coal, oil and minerals, and hence dictate the flow of bulk cargoes.

Liner trades are complicated, demanding and interesting. They are complicated because of the vast array of port pairs fitted into a fixed schedule of loading and discharging, often with six ports at each end of the voyage with concurrent load and discharge, demanding accurate stowage planning.

An added complication is the imbalance of cargo flows requiring empty box movements to allow demand to be met in the right place and the right time.

A large container vessel will have thousands of consignments aboard. All these will require their own bills of lading with accurate cargo details. These will form the basis for the cargo manifest. Also, their declared weights and types are key to efficient storage and to the safe operation of the ship. Accurate manifesting is the key to smooth customs clearance as well as port and canal requirements.

Given this complexity it is vital for a liner shipping company to have efficient IT. Everything interlinks from storage to manifesting to shipper details in an enormous volume of vital detail. It also enables costs to be controlled in the highly competitive container shipping environment.

In addition to being complicated, liner shipping is demanding not only because of the necessity of regularity and reliable schedules, but also because whole industries slow down following a disruption of service. They are demanding in capital terms, with a voracious appetite for new equipment, whether ships, boxes or IT. This requires an efficient and profitable operation, which is very demanding in management terms.

Lastly, in addition to being complicated and demanding, they are above all interesting. I have spent forty years in the industry and have never had a dull moment. The people involved, whether they be shippers, stevedores, agents, ship's crews and head office staff make for the most interesting corporate environment imaginable. I can recommend it as a career for anybody who is interested in world trade, economics, politics and business.

Robert Woods, CBE

Contributing editor

Patrick Neylan

From driving forklift trucks and lorries at freight forwarder Peters & May to being publishing director of Drewry Shipping Consultants, Patrick has been causing havoc in the maritime industry for over three decades. His baleful influence has also been felt at Crown Agents, where he bungled aid shipments on behalf of the British government, and Mitsui OSK Lines, where he personally sabotaged the rate restoration efforts of the Far Eastern Freight Conference. He also spent thirteen years as a journalist and eventually editor of Fairplay magazine, where, remarkably, he was never sued.

Acknowledgements

This substantially revised volume would not have been possible without the immense efforts and expertise of David Poore, whose long experience as both trade management and consultancy has provided new and up-to-date perspectives on the business. We are also indebted to Andrew Foxcroft, whose decades of studying the container building and leasing markets has given valuable insights into that sector.

We would also like to thank Nigel Gardiner of Drewry Shipping Consultants for allowing such generous access to the company's market data.

Caroline Fossey's work on editing the book is also much appreciated, as is the contribution of Danny Cornilissen, whose photographs have enriched the design, as well as Mark Clubb, who redesigned the book.

We are also indebted to those on whose earlier work much of the book is based: Tony Mason, Sean Douglas, Iain McIntosh, Subramaniam Sankaran, Christos Tsangaris, Simon Sharp, Andrew Lansdale and Jurgen Verreet.

Contents

Foreword by Robert Woods, CBE	III
Acknowledgements	IV
Chapter 1 Definition of Liner Trades	I
1.1 Evolution and development	2
1.2 Development of unitisation and containerisation	4
1.3. Some concepts of liner trades	7
1.4. Development of modern liner trade routes	11
1.5. Liner routes today	13
Chapter 2 Vessels on liner trades	19
2.1 Types of vessel used on liner services	20
2.2 Container ship capacity	27
2.3 The refrigerated cargo ship (reefer)	34
2.4 Conventional (breakbulk) vessels	36
2.5 Multipurpose vessels	36
2.6 The impact of bunker price	37
2.7 Future vessel developments	38
2.8 Shipboard handling equipment	40
2.9 Ro-ro access equipment	42
Chapter 3 Cargoes & cargo handling	45
3.1 Liner cargo	46
3.2 Dangerous goods	50
3.3 Special goods	54
3.4 LCL and breakbulk cargo	54
3.5 Cargo handling	55
3.6 Port-handling equipment	57
3.7 Delivery and collection of cargo	60
3.8 Cargo storage	61
3.9 Stowage of cargo	61
3.10 Port and terminal ownership	65
3.11 Terminal management and organisation	65
3.12 Container terminals	68

Chapter 4 Management and organisation 71

4.1 Structure of liner companies	72
4.2 Trades – network and services	72
4.3 Sales and marketing	73
4.4 Regions and agencies	74
4.5 Vessel operations	76
4.6 Contract management	80
4.7 Finance and accounting	81
4.8 Insurance	84
4.9 Agency activities	84

Chapter 5 Unitisation, containerisation and intermodalism 95

5.1 Unitisation	96
5.2 Containerisation	96
5.3 Intermodalism	96
5.4 Economy of scale	97
5.5 World container growth	98
5.6 Container dimensions	99
5.7 Types of container	102
5.8 Other container expressions	103
5.9 Container fleets	105
5.10 Inventory control	111
5.11 Container Safety Convention	116
5.12 FCL and LCL	117

Chapter 6 Co-operation between liner operators 121

6.1. Liner conferences	122
6.2. Operational and commercial co-operation	124
6.3. Evolution of global alliances	129
6.4. Regulatory environment: operational co-operation	130
6.5. Mergers and acquisitions	132
6.6. Alliances – recent developments	135
6.7. Current alliance structure and the future	136

Chapter 7 Environmental regulations	137
7.1 Marpol	138
7.2 Air pollution: emissions from ships	138
7.3 Ballast water management	140
7.4 Environmental issues delaying port projects	140
7.5 China's anti-pollution drive	141
Chapter 8 Development of service networks	145
8.1 Early concepts	146
8.2 Frequency – the weekly loop	149
8.3 Hub-and-spoke and relay services	150
8.4 Double dipping	153
8.5 Cascading of vessels	154
8.6 Capacity management	155
8.7 Limitations of co-operation in networks	159
8.8 Current and future networks	159
8.9 The main trade routes	161
Chapter 9 The bill of lading and other documentation	183
9.1 The bill of lading	184
9.2 Documentary credits	191
9.3 Bill of lading clauses	192
9.4 Other forms of bill of lading	194
9.5 The sea waybill	197
9.6 Other liner documents	197
9.7 International conventions: from Hague to Rotterdam	200
9.8 Paperless trading	206
Chapter 10 Tariffs, pricing and cargo selection	209
10.1 Demand for shipping services	210
10.2 Pricing of liner services	210
10.3 Tariffs and prices	210
10.4 Types of seafreight tariff	213
10.5 Contracts and special rates	215

10.6	Rate increases	215
10.7	Service contracts	216
10.8	Tariff filing in the US	217
10.9	Freight rate indices	217
10.10	Forward freight markets	218
10.11	Yield management	219

Chapter 11 Contractual aspects of the import-export business **223**

11.1	The international transfer of funds	224
11.2	Who are the merchants?	228
11.3	International contracts of sale – Incoterms	230
11.4	Incoterms and combined transport	233
11.5	Choice of Incoterms – commercial considerations	234

Chapter 12 Legal aspects of the liner trades **237**

12.1	The carrier	238
12.2	Insurance	238
12.3	Liability of the carrier for the cargo	240
12.4	Liabilities of the merchant	242
12.5	Liabilities of the agent	242
12.6	Legal aspects of the bill of lading	243
12.7	Cargo claims	244
12.8	Noting protest	244
12.9	General average	245
12.10	Agent's insurance	247
12.11	Security	247

Most documents referenced in this book can be found online, usually with a simple search. Definitive versions of IMO conventions are available from www.imo.org. Other sources are listed below:

Standard Liner & General Agency Agreement (SLGAA)

Fonasba: <https://www.fonasba.com/wp-content/uploads/2012/02/SLGAA-2001-FINAL.pdf>

ICC rules for Multimodal Transport Documents

Unctad: http://unctad.org/en/PublicationsLibrary/tradewp4inf.117_corr.1_en.pdf

Hague-Visby Rules

<http://www.admiraltylawguide.com/conven/sdrprotocol1979.html>

Hamburg Rules

Unctad: http://unctad.org/en/PublicationsLibrary/aconf89d13_en.pdf

Rotterdam Rules

www.rotterdamrules.com

Carriage of Goods by Sea Act 1992

UK government portal: <http://www.legislation.gov.uk/ukpga/1992/50/contents>

ICC Incoterms

International Chamber of Commerce: <https://iccwbo.org/resources-for-business/incoterms-rules/incoterms-rules-2010>



Chapter I

Definition of Liner Trades

I.1 Evolution and development

Seaborne trade arises from what economists call derived demand. Cargo ships only exist because cargo needs to move from where it is produced to where it is used and the demand is for the goods to be in a specific place at a specific time. Value is added to the goods by the act of transportation.

A cargo shipping service will generally fall into one of three categories: contract, voyage charter ('tramp') or liner.

Ships on long-term contracts generally carry a single type of bulk cargo for a single shipper or receiver. An extreme example is the LNG trade, where a vessel would typically be contracted to carry gas from the same gas field to the same receiver for its entire operating life of 25 years (such contracts still exist, but there is now a substantial LNG spot market as well).

Tramp ships are so called because they do not operate to any regular schedule but instead pursue the next opportunity to secure a suitable cargo. The label 'tramp' is not a comment on the type or condition of the ships but on their commercial operation. A tramp vessel is like a taxi – it takes a passenger from A to B and then has to find another fare, sometimes travelling empty to where an opportunity may arise.

A liner service operates more like a bus service. It runs according to a set schedule with pre-determined stopping points and departs at a fixed time, regardless of whether it is full. Of course, certain contingencies (bad weather, port labour strikes and so forth) may necessitate the omission or substitution of port calls in order to preserve the integrity of the schedule but generally the service will strictly observe a prescribed rotation.

Notwithstanding the importance of liner services, most global trade is now carried by specialised vessels.

Development of the liner concept



Black Ball Line's *Montezuma* on the world's first deep-sea liner trade, in service 1843-54

The first explosive growth in world trade routes developed with the colonisation by European countries of other continents. Much of the cargo exported from Europe was manufactured goods destined for the colonies. In return, agricultural and other raw materials were required to feed the industrialisation of Europe and support its growing population.

In the days of sail, the effects of wind and weather meant that arrival dates were unpredictable and there was a serious risk that the ship would not arrive at all: as late as the 1860s, an average of 170 British merchant ships were lost at sea each year. Ships sailed only when they were full, and this uncertainty did not meet the new needs of industrialised economies. Manufacturers needed more frequent delivery and more regular contact with a wide range of markets, allowing relatively small quantities of high-value goods to be delivered on pre-determined dates.

Liner services developed to meet these needs, with the first ships offering regular services operating on the world's most active sea route, the North Atlantic. In 1818, the American Black Ball Line started to operate a regular service of sailing ships between New York and Liverpool, leaving New York on the first day of every month, fully loaded or not. This liner concept proved very successful and over the next decade many imitators started scheduled services.

Steam power reinforced the success of the liner concept. The first sea-going steamship made its maiden voyage along the English coast in 1813, and the first trans-Atlantic voyage (assisted by sail) was made in 1819. In 1824, a number of steamship services started plying the open seas (Dublin to Liverpool, Naples to Genoa), and during the next 10 years steamship services started to operate on numerous short-sea and middle-distance routes.

The first British deep-sea liner service was inaugurated to the West Indies and Central America by the Royal Mail Steam Packet Company in 1839. A year later, the Peninsular and Oriental Steam Navigation Company started to transport passengers and mail to the Orient. By 1865, Europe was connected with every other continent by liner services, and liner shipping expanded to meet the demands of a growing world trade.

One of the most important developments in the evolution of ocean routes was the opening of the Suez Canal in 1869, enabling ships to reduce the distance between London and Bombay by one half and the distance from London to Hong Kong by a third and accelerating the growth in trade. In 1850, the world fleet comprised about 7m gross register tons (grt) of shipping, of which 90% was wind-powered. By 1900, tonnage had more than quadrupled to 29m grt, with 75% powered by steam.

The awarding of contracts to transport mail during the 19th century was a distinct incentive to shipowners to build faster and more reliable ships, capable of maintaining regular schedules and fast transit times. Many countries offered some form of subsidy for mail services to their colonies.

A combination of higher speeds at sea, more elaborate cargo gear to reduce port time, separate compartments for the carriage of special products, more intermediate decks and the provision of refrigerated space came to typify liner vessels. By the end of the 19th century, liner shipping had become the accepted way to transport cargo internationally, whether on short-sea or deep-sea routes.

20th century specialisation

All the major European countries were expanding their industrial exports and their shipping fleets at the beginning of the 20th century. North America was also producing industrial goods on a large scale. In addition, better standards of living were causing populations to increase, resulting in the need to move more food. In particular, emigration to the USA and Australia created new markets. The shape of modern liner shipping was already evident by the first decade of the 20th century.

These services were run by general cargo ships – that is, they would carry any cargo that could be loaded into the holds or on deck. Although most of them were built mainly to carry general cargo outwards from manufacturing countries, a number were designed principally with inward trades in view, that is, raw materials. Ships operating to New Zealand already included refrigerated capacity by the end of the 19th century, and later some ships for the Far East route had tanks to carry latex or palm oil. Nevertheless, the prime purpose of most ships remained to carry general cargo and often passengers.

In the 20th century, specialised ships were developed to carry particular cargoes. For example, oil tankers were introduced to carry oil and dry bulk carriers to carry dry cargoes that moved in large homogeneous loads, such as iron and manganese ores, coal, grain, bauxite and phosphates.

1.2 Development of unitisation and containerisation

Post-war trade expansion

Between 1918 and 1939 the liner trades proliferated, with the fleets of the developed countries of Europe and the USA multiplying, although the ships remained small, typically the five-hatch type of between 8,000 and 15,000 deadweight tonnes.

By far the most significant change to the carriage of liner cargo came after worldwide rebuilding and restructuring following the Second World War. The unitisation of cargo developed as owners tried to reduce costs, largely to compete with owners from emerging countries who were using cheap tonnage and cheaper crews. In addition, the pace of trading worldwide was speeding up, and shippers and purchasers alike were looking for much faster shipment time. Air freight was also developing in volume and coverage of the globe, putting pressure on deep-sea passenger services.

Unitisation

Cargo-handling methods had remained unchanged for centuries with individual barrels, bales, cases and bundles of goods being handled manually. Cargo was carried or hand-trucked from quayside to ship's side and stowed manually in the hold, with the reverse on discharge. Even the use of cranes with devices such as cargo nets for lifting several items at a time made little difference to the need for a large labour force.

Conventional cargo vessels were sometimes spending up to four weeks in port discharging and loading cargo. More time was being spent in port than at sea, which is where the vessel earns its keep, while shippers and receivers suffered financially from the delays.



Traditional cargo handling was labour-intensive and time-consuming (photo: Kuehne & Nagel)

At the same time, wage levels and living standards in developed countries were increasing dramatically. The manual handling of small single items was labour-intensive and rendered cargo vulnerable to breakage and pilferage, with the effect of raising insurance costs. Restrictive labour practices in many countries, entrenched by the power of trade unions, made matters worse. Only one shift per day was worked in many ports, with limited possibilities for overtime and usually at exorbitant rates.

In the late 1950s and early 1960s, attempts were made to unitise cargo on pallets or strapped into larger bundles to speed up cargo handling and, with the employment of forklift trucks, this saved some effort. Palletisation was seen as an economic form of unitisation, with the advantage that small pallet units of between one and two tonnes were suitable for stowage in traditional liner ships. However, these improved conventional handling systems were still slow and highly labour-intensive.

Containerisation

A more radical solution was devised by an American trucker named Malcom McLean. He was frustrated with delays in moving goods between the USA and Puerto Rico and so developed a system whereby a metal box could be lifted direct from a truck to a ship. Crucially, he made the technology available to anyone, so the system could spread worldwide.

The system was rapidly adopted by European and other shipowners for the deep-sea trades. The first purpose-built container ships entered service around 1970, first in the Europe-Australia trade, with the Europe-Far East trade and the North Atlantic trades following shortly afterwards. Other key trade routes followed in the next ten years, and within two decades virtually all significant liner trades had been containerised.



Malcom McLean, whose container concept revolutionised not just shipping but the world economy (photo:AP Møller)

Unitisation is seen at its most efficient in the container concept. Packing the goods in a standard container provides protection and makes possible mechanical handling and rapid intermodal transfers, while reducing casual pilferage to almost zero.

It is possible to stow a limited number of containers on conventional cargo vessels, but for cheap and rapid handling (the justification for containers) they are best carried in ships specially designed for them.

The economic gains from unitisation are:

- Reduced costs for the shipowner as well as the shipper
- Speedier turnaround of vessels
- Shorter transit times
- Better protection of goods

The main drawbacks for containerisation in the modern liner system – which have to be offset against the overall economic gains – are:

- The high capital cost of purchasing specialised cellular vessels for the container trade
- The high cost of specialised port facilities and equipment
- The extra land needed for container storage
- The cost of providing the containers themselves, their maintenance and repair and the cost of moving them empty to where they are required for loading

I.3. Some concepts of liner trades

The common carrier

A common carrier is a carrier that is ready to carry from one terminus to another the goods of any person who chooses to employ them for the purpose. A cargo liner is a vessel engaged in transporting goods for reward and offering space to all who wish to take advantage of the offer; the space being available and the terms mutually satisfactory.

The liner service



Cruise ships are often called 'liners', but the nature of the service is different

(photo: Andy Newman/Carnival)

The idea of liner trading is to operate scheduled services to specified ports with the required frequency and regularity.

The public perception of a 'liner' is a large passenger vessel. This attitude is a relic of pre-airline days when deep-sea passenger liners were the most visible form of intercontinental travel. Today, such ships are more properly called cruise ships and, while some of them operate on schedules that are regular enough to be called liner services, their purpose is to provide a leisure experience rather than transport their human cargo from one place to another.

Ferries operate genuine liner services, but most people in the industry regard liner trades as cargo services on container ships.

Liners are vessels that ply on a regular scheduled service between groups of ports. It is this function and not the size or speed that defines a vessel as a liner. Liner services offer cargo space to all shippers who require it. Liners sail on scheduled dates, irrespective of whether

they are full. The regularity of the scheduled service is an aspect of particular importance and it is critical that everything is done to keep to advertised sailing and arrival dates. The constant reassurance of this scheduling constitutes the essence of liner service.

Contrast the liner service requirements described with the operation of the tramp business where each voyage is individually contracted and scheduled subject to cargo availability. While liner vessels are essentially common carriers and are required by law to accept without discrimination the legal cargoes of any shipper, tramp vessels are contract or private carriers and in the main carry full cargoes of one commodity for one voyage. The charterer and the ship operator draw up terms and obligations that form a contract called a charter party. These terms may differ from voyage to voyage and charterer to charterer.

Tramp vessels are generally designed for worldwide general service with the emphasis on carrying bulk cargoes. Some are designed to be used exclusively for the carriage of one or two types of cargo while others are built to simple specifications and are able to carry different types of bulk cargo.

A large and complex organisation onshore is required to maintain a liner service company, while a small office with limited staff numbers can reasonably run a tramp shipping business.

A liner service requires branch offices or established agents at every port of call, each with a substantial staff to handle marketing and documentation as well as looking after the ship itself. The tramp ship may use a broker to negotiate the cargo and will appoint agents simply to look after the ship at loading and discharge ports, with such appointments usually just for that occasion (although many owners like to appoint the same agent should they make further visits to the same port).

Liner operations

In the early days of trading, a ship was almost invariably bought and traded by an owner, who would often be the ship's Master. If trading was successful, other ships were bought and a company formed to run the ships. The company was responsible for securing the cargo to be carried, often using agents around the world to act on its behalf. This method of operation continues today with liner trading, with the main difference being the sophistication of the ships used and the methods of securing the cargoes to be carried.

The ship operator decides the route on which the ships will trade and then opens a branch of the company or secures the services of an agent at each port of call. For the most part, the nature of the work undertaken is the same whether it is the company's own in-house office or a third-party agent. For convenience, the term 'agent' will be used to describe this function throughout this book; indeed, even if it is an in-house office it is still officially recognised as the agent of the ship in most countries.

The owner will require cargo to be booked and loaded or discharged. The ship will need various services such as stores, bunkers (fuel), water and cash for the crew, and possibly repairs (i.e. ship's husbandry). Customs and immigration authorities will need to be arranged and medical facilities may be required.

Cargo agents and ship's agents

Before liner operators existed there was, in fact, a form of 'liner agent' occasionally referred to as a 'loading broker'. In the days when ships were owned by the Master or by small groups of businessmen, others with an entrepreneurial flair set themselves up as specialists in locating cargoes and persuading ships to carry them.

As the commercial world evolved, some of these brokers concentrated on bulk cargoes and their successors can be found on the Baltic Exchange. The others concentrated on general cargo and specialised in certain trades. This eventually secured formal recognition as the loading broker for individual lines as they became established and it is still possible to find liner agents who are able to trace their company's history back to those early days.

As liner operating companies grew, some found it expedient to take on the agency function themselves, not only in their own countries but overseas. Others continue to use independent agents. Such a decision would take into account the volume of business a liner operator was handling and any conflicts of interest in cases where the agent represented other competing parties.

Port organisations and operations

The ownership model of ports varies widely around the world. A port may be totally government owned, including the provision of all port and terminal facilities and labour. It may be completely privately owned. Most commonly it is fragmented, with the infrastructure and navigation in the hands of a public body while terminal operations and the provision of dock labour are carried out by private operators.

The line or its agent will make the arrangements for the loading or discharge of a vessel with the terminal operator, who will be responsible for the provision of the stevedore labour that will load or discharge the ship.

The ship's Master has ultimate responsibility for the safe loading, carriage and discharge of the cargo. This responsibility begins as the cargo comes over the ship's rail and ends as the cargo is passed over the rail at the discharge port. However, in reality the terminal operator is responsible for the provision of dock cranes or gantries and the labour, both ashore and on board, to load and stow or discharge the cargo. As the ship's personnel are obliged to ensure that the cargo is loaded undamaged, they must be involved throughout these operations. The Master usually delegates responsibility for cargo operations to the chief officer or first mate.

The stowage of container ships is usually planned on shore by computer with the terminal working in association with the line's ship planning department and in computer contact with the other load and discharge ports. With breakbulk or roll-on/roll-off cargo, the chief officer will plan the stowage of the cargo and attend to any ventilation requirements. The deck officers, usually a second and a third officer, work under the direction of the chief officer in attending to the carriage of cargo.

For this to take place without hindrance, the owner delegates to the Master the responsibility for the sea carriage, and the Master relies on the agents to arrange delivery of the cargo to the ship, together with the necessary documentation and customs clearance.

Hazardous cargoes such as dangerous chemicals need specific documentation and have to be given special stowage positions on board. It is therefore vital that the terminal and the ship's personnel are aware of the arrival of such cargoes.

So that the ship planning can be carried out efficiently, identification of the intended location and details of each container are vital and the agents must ensure that accurate information is available from the shippers. Similarly, at the discharge port, all the various parties have to be involved to ensure cargo is not delayed in discharge from the ship or in delivery from the port

While cargo work is in progress, the ship has to receive stores, water, bunkers and cash, and crew members might have to be changed or taken ashore for medical or dental attention. The agents also have to arrange for any ship repairs to be carried out.

The engineering and technical side of running the vessel will be under the direction of the chief engineer, who also reports to the Master.

Documentation process

The following chart is a simplified list of the activities and documentation that are required to complete a single liner cargo movement. On a typical deep-sea container ship sailing, this will be replicated several hundred times for both the import and export containers. How all these movements are regulated and controlled as well as the financial and legal implications that arise are covered in the course of this book.

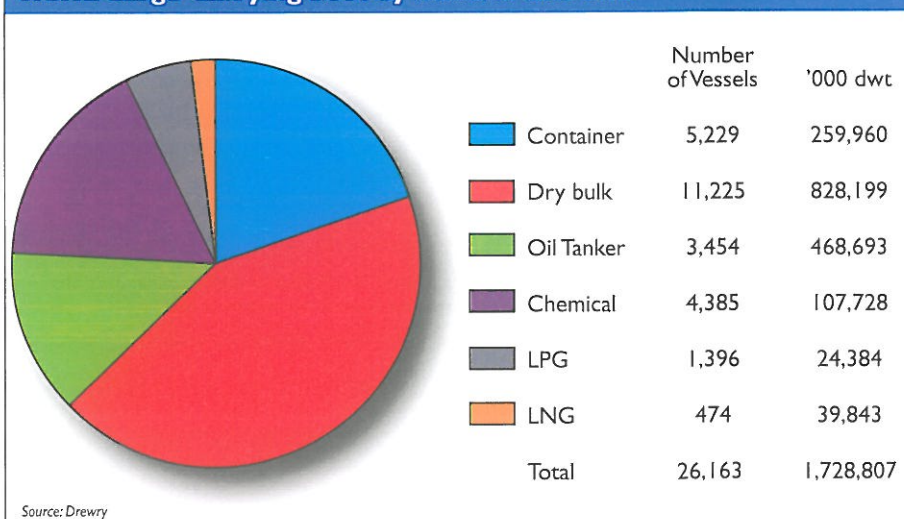
This sequence shows the typical movement of a door-to-door container shipment and its associated documentation. The terms involved are explained later in the book.

Activity	Parties involved	Physical activity	Documentation/communication
Booking cargo	Shipper		Makes cargo offer
	Carrier		Agrees rate and accepts booking
	Shipper / Exporter		Preparation of shipping instruction
Cargo to port	Shipper / Carrier / Haulier	Empty container available	Merchant or carrier to arrange carrier release note for unit Equipment interchange document
	Haulier / Exporter	Container to load point and then to terminal	Export consignment note
Cargo at port	Haulier/Terminal Operator	Unload container to stack	Equipment interchange document
	Terminal Operator / Agent		Cargo / mate's receipt
	Shipper/Exporter		Customs documentation, licences

Activity	Parties involved	Physical activity	Documentation/communication
Load onboard	Terminal Operator / Ship's Officers	Move container to ship, lift on board and secure in cell	Stowage plan, loading note or computer record
	Carrier / Agent		Bill of Lading issued
Carriage by ship	Carrier		
Cargo discharged	Terminal Operator	Discharge to stacking area	Discharge record
Cargo delivery	Customs / Health etc / Importer	Customs inspection	Customs entry and clearance
	Carrier / Agent	Deliver to importer	Release cargo against Bill of Lading
	Importer / Carrier / Haulier	Cargo to delivery point	Receipt for cargo
	Haulier	Empty container to depot	Equipment interchange documents

1.4. Development of modern liner trade routes

World Cargo-carrying fleet by number and dwt



Until about 50 years ago, the important liner trade routes were predominantly those that connected the major European countries with their colonial empires and the USA with its spheres of influence. The geographical routes were mainly in the north-south orientation: Europe to Africa, Australasia, India and South America; USA to Central and South America

and the Pacific. Raw materials were carried north and manufactured goods to the south. After the Second World War, a number of important political and economic changes occurred that eventually altered this trading pattern completely.

Post-colonial independence

The most important of all these was the independence of nearly all the countries that had previously been part of the European empires. In particular, this enabled the newly independent countries to establish much wider trading relationships than had previously been possible. The countries could look for markets for their raw materials and agricultural products that had previously been closed to them, particularly trading opportunities with the Far East and America. Many of the newly independent countries also formed national shipping companies to carry a share of their own cargo in the liner trades.

Trading blocs

Closed trading systems based on colonial empires have gradually been replaced by regional trading blocs. These vary from free-trade areas, such as the North American Free Trade Area (NAFTA), to full customs and monetary unions, such as the one covering most of the European Union (EU).

These agreements have led to the growth of overland and short-sea trades, sometimes at the expense of deep-sea trade. For example, the UK had imported much of its butter from New Zealand, but the EU produced huge surpluses of butter, so New Zealand looked to Japan and the emergent Asian countries for its replacement market. In Europe, the trade between countries moves overland by rail or road as well as by sea because most European countries are part of a single land mass and the land transport infrastructure is well developed.

The intra-Asia trade is now one of the largest container trades. As Asian countries increase in prosperity, they are trading raw materials and consumer goods with their neighbours rather than just trading with the so-called developed world.

Unlike Europe, several of the key Far Eastern economies are island nations (for example, Japan, Taiwan and Indonesia) and overland connections on the Asian mainland are poor. The main road and rail networks are designed to connect a country's hinterland to its main ports rather than to provide overland connections to its neighbours. The result is that intra-Asia trade is carried predominantly by container services, with a whole network of services linking the main Asian countries.

The negative impact of regional trading blocs on deep-sea liner shipping has to a certain extent been masked by the huge growth in world trade over the same period and the influence of the World Trade Organization (WTO) in preventing excessive protectionism.

Industrialisation and globalisation

Standards of living rose in the period after the Second World War, leading to an increase in wage costs in the developed countries. Meanwhile, certain Asian countries were starting to

develop a manufacturing base – initially in Japan and Hong Kong – supplying consumer goods at a lower price than European and US manufacturers.

While importers therefore turned their attention to Asian suppliers for cheaper goods, European and US manufacturers saw there was no alternative but to change their business model. One approach was to manufacture components in low-cost countries and then ship the parts to Europe or the USA for assembly. This approach was adopted by some car manufacturers.

As skills and technology improved in the developing countries, it became possible for the whole manufacturing process to be carried out there. These changes resulted in massive growth in the main East-West trades – Asia-USA and Asia-Europe – while the North-South trades of the colonial era grew at a much slower rate.

The evolution of container shipping services has played a vital role in the development of globalisation – and indeed it is probable that without the container revolution, the global economy would never have developed as far or as fast as it has done. Modern globalisation in its true sense can be traced back to China's accession to the WTO in 2001, by which time, after 30 years or so of existence, containerisation had reached a degree of maturity.

The trades from Asia are now predominantly finished manufactured or consumer goods (otherwise known as fmcg, or fast-moving consumer goods). With the decline in the manufacturing bases of Europe and the USA, less trade moves from these regions and these routes are heavily imbalanced in favour of the trade from Asia. Major commodities that move from Europe to Asia include paper, scrap steel and plastic. Asia is now also a bigger supplier than Europe of consumer goods to the Southern Hemisphere.

1.5. Liner routes today

Liner routes can be categorised as follows:

East-West trades

These are the trades connecting Europe, the Middle East, Asia and North America. The most important of these are:

- Asia-North Europe
- Asia-Mediterranean
- Trans-Pacific (Asia-North America)
- Trans-Atlantic (North Europe-North America Atlantic coast)
- Far East-South Asia plus Middle East

North-South trades

These are the trades linking the main northern land masses with those largely south of the Equator; that is: Asia, Europe and North America to sub-Saharan Africa, Latin America and Oceania.

Intra-regional trades

As already mentioned, the most significant intra-regional liner trade is within Asia. There is a smaller intra-Europe liner trade.

Intra-regional liner trade is much smaller along the coasts of North America and Latin America. In North America in particular, most of it is moved overland rather than by sea.

The table below shows the volume of container traffic moving through the main regions, comparing volumes in 2000 (just prior to China's entry into the WTO) with those of the past five years.

Container activity by region								
	2010	2011	2012	2013	2014	2015	2016	2017
Asia	284,455	312,119	329,834	343,990	362,545	367,839	379,169	401,637
Europe	102,019	109,597	112,170	115,407	120,555	118,201	122,085	128,826
North America	49,118	50,483	52,301	53,489	55,696	58,343	59,126	63,863
Latin America	36,352	39,714	41,745	42,325	42,540	42,794	42,093	45,328
Middle East	30,600	32,395	34,979	34,539	36,816	38,719	38,729	40,588
South Asia	16,799	17,636	17,700	18,581	20,834	22,046	24,410	27,110
Africa	19,161	20,941	21,611	23,384	24,362	25,067	24,675	26,253
Oceania	9,769	10,392	10,704	10,826	11,308	11,590	11,832	12,673
World	548,272	593,277	621,044	642,541	674,655	684,599	702,119	746,279

Note: Includes empties and transhipment
Source: Drewry Maritime Research, Container Forecaster 1Q18

It is important to remember that these figures are based on terminal-handling figures, so each container is counted once on loading and again on discharge. Empty container movements are counted and containers that are transhipped are counted four times in all (when loaded, twice at the transhipment port and then on discharge).

Growth has slowed down in all areas since 2010, with growth out of China now half what it was in the first decade of the century. South Asia is now the fastest growing market, but it still has some way to go to catch Europe, let alone East Asia. Africa and Latin America have returned to growth after contracting in 2016.

There are few reliable tonnage statistics covering the whole international movement of liner cargo. The United Nations Conference on Trade and Development (UNCTAD) publishes substantial annual statistics, but these are concerned with proportionate economic growth rather than with the weight and volume of cargo shipped. Most other figures focus on the value of trade, because this affects monetary trade balances between countries and countries' foreign exchange concerns. Readers are recommended to determine what international trade statistics are available in their own countries and to relate these to their national and regional liner trades.

Several international shipping research and consultancy organisations – including Drewry, Clarkson, IHS Global Insight, CTS and Alphaliner – publish estimates of liner trade volumes, but their work generally has to be purchased.

Types of liner service

Conventional liner services were normally straightforward out-and-back services between two countries, or sometimes between a small range of ports in those countries. For example, a conventional liner service operated between the UK and Australia, with different vessels loading at UK West Coast ports from those loading at UK East Coast ports. Separate services operated from ports in northern Europe and the Mediterranean.

This was because conventional liner vessels were relatively small and took a long time to load and discharge. Therefore the aim was to call at as few ports as possible while still filling the vessel.

When container vessels were introduced on liner routes, the vessels tended to follow similar routes. However, because the vessels were much larger and were faster at loading and discharging, they could collect cargo from a wider area. For example, when the trade between Europe and Australia was containerised in 1969/1970, one container service covered the whole range of European loading ports, replacing a number of individual conventional breakbulk services.

As more routes were containerised and container vessels increased in size, container lines developed innovative ways to use them more effectively, the aim being to get the maximum productive use from them.

Concepts were developed such as:

- **Hub-and-spoke services** – feeding cargo into and out of a hub port rather than calling direct at every port
- **Pendulum services** – linking a service from A to B with one from B to C into one service running A to B to C. (for instance, Europe to Asia to US West Coast and back)
- **Round-the-world services** – where a service continues in one direction round the world, rather than turning back on its route at any point

The major ports

The table below shows the top 30 container ports and the number of teu (millions) that they handled in 2016 and 2017.

Top 40 container ports in 2017

Port Name	Country	Throughput ('000 teu)		Growth (%)
		2017	2016	
Shanghai	China	40,233	37,135	8.3%
Singapore	Singapore	33,667	30,904	8.9%
Shenzhen	China	25,209	23,980	5.1%
Ningbo	China	24,607	21,565	14.1%
Hong Kong	Hong Kong	20,755	19,813	4.8%
Busan	S Korea	20,490	19,432	5.4%
Guangzhou	China	20,356	18,859	7.9%
Qingdao	China	18,310	18,050	1.4%
Dubai	UAE	15,368	14,772	4.0%
Tianjin	China	15,065	14,523	3.7%
Rotterdam	Netherlands	13,734	12,385	10.9%
Port Klang	Malaysia	11,977	13,167	-9.0%
Antwerp	Belgium	10,451	10,037	4.1%
Xiamen	China	10,382	9,614	8.0%
Kaohsiung	Taiwan	10,271	10,465	-1.9%
Dalian	China	9,707	9,584	1.3%
Los Angeles	USA	9,343	8,857	5.5%
Hamburg	Germany	8,820	8,910	-1.0%
Tanjung Pelepas	Malaysia	8,261	8,029	2.9%
Laem Chabang	Thailand	7,784	7,227	7.7%
Cat Lai (Ho Chi Minh)	Vietnam	7,600	7,547	0.7%
Long Beach	USA	7,545	6,775	11.4%
New York	USA	6,711	6,250	7.4%
Yingkou	China	6,278	6,087	3.1%
Colombo	Sri Lanka	6,209	5,735	8.3%
Tanjung Priok	Indonesia	6,072	5,515	10.1%
Suzhou	China	5,880	5,479	7.3%
Bremerhaven	Germany	5,514	5,489	0.5%
Tokyo	Japan	4,964	4,735	4.8%
Valencia	Spain	4,830	4,722	2.3%
Manila	Philippines	4,826	4,427	9.0%
Lianyungang	China	4,711	4,829	-2.4%
Jawaharlal Nehru Port	India	4,689	4,475	4.8%
Algeciras	Spain	4,381	4,761	-8.0%
Jeddah	Saudi Arabia	4,154	4,003	3.8%
Piraeus	Greece	4,140	3,750	10.4%
Savannah	USA	4,046	3,645	11.0%
Dongguan	China	4,011	3,640	10.2%
Mundra	India	3,998	3,266	22.4%
Salalah	Oman	3,946	3,325	18.7%

Source: Drewry Maritime Research

The dominance of Far East ports is apparent, with nine of the top 10 ports, and 15 of the top 20 located there. Jebel Ali in Dubai is the only non-Far East port to make the top 10, while the European ports of Hamburg, Rotterdam and Antwerp are joined by Los Angeles in the top 20. If Los Angeles and Long Beach are counted as one – as they often are – the combined port would be ninth in the rankings.

There have been some noteworthy changes since the previous edition of this book (2014 data). In the top 10, Hong Kong has lost fourth place to Ningbo, Guangzhou has overhauled Qingdao and a resurgent Rotterdam has overtaken Port Klang. The Malaysian port suffered in the 2017 realignment in carrier alliances, losing Ocean Alliance, while Algeciras has lost transshipment traffic to direct services in the Mediterranean and competition with Tanger Med in Morocco.

Within the top 30, a number of ports rely heavily on their role as transshipment hub ports to generate high volumes.



Chapter 2

Vessels on liner trades



2.1 Types of vessel used on liner services

There is nothing to prevent a liner service being operated with any type of vessel, providing it operates regular timetabled services. Liner shipping has become almost completely identified with the regular services operated by container shipping lines, but there are also services operated by different types of vessel, for example:

- Reefer ships
- Ro-ro ships
- Multipurpose ships

While container ships are employed almost exclusively in liner services (you do not find tramp container services), ship types such as those above can operate both liner and tramp services.

Since the 1970s, the main vessel type used in the liner trades has been the container ship, which has dominated the business because of the opportunities to use a single cargo-carrying unit for both land and sea transport. Packing goods in a standard container provides protection from damage and pilferage while making possible rapid intermodal transfers and mechanical handling.

The words 'intermodal' and 'multi-modal' are products of the container trade. Both terms refer to the use of different modes of transport in one movement of cargo, which can be many and varied. For example, a loaded container may leave the exporter's premises on a truck to go to a rail depot. There it may be transferred to a rail wagon which will take it to the port, where it may be loaded on to a small feeder ship. This may carry it to another port where it is transhipped to the deep-sea carrier. The whole process could take place in reverse at destination. Such a complex sequence may be unusual but even the most simple container move will involve at least three modes (ocean carriage with a truck at each end).

The two terms are often used interchangeably, with the only real distinction being that a multi-modal movement is made under a contract with one carrier while an intermodal movement involves separate contracts with different carriers.

Cellular container ships (gearless)

The standard type of container ship used in the main deep-sea trades is the gearless cellular container ship. Cellular means that the vessel's holds are fitted with frames, known as cell guides, into which boxes are slotted from the top and so secured from any movement fore, aft or sideways.

The holds are covered with substantial hatch covers, and further stacks of containers can be stowed on deck. The bottom rows of on-deck containers will sit on securing positions on deck. As subsequent rows of containers are placed on top, a twist lock is placed at each corner to secure one row of containers to the row underneath.

However, this arrangement leaves each stack of containers free-standing, and to be able to withstand the significant lateral forces when a container ship encounters heavy weather, the on-deck stacks of containers are secured to each other using lashing rods.

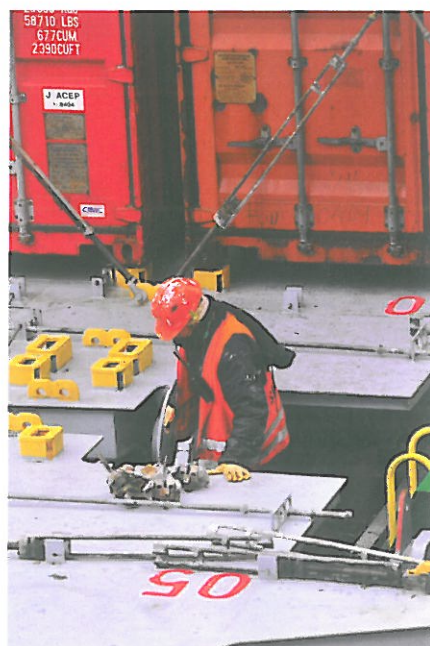


Container stowed under deck

Securing on-deck containers with twist locks and lashing rods

The further a container is placed away from amidships, the greater the acceleration forces will be on the container. Containers stacked on deck, near the stern, have generally had a greater incidence of loss than those carried in other locations. To compensate for this, some companies have built lashing bridges or cell guides on the afterdeck, for the purpose of stacking and securing containers that are stowed on the stern. Some owners have extended this system to the foredeck.

In spite of these securing arrangements, from time to time containers are lost from the decks of container ships in heavy weather:



Geared container ships

These vessels have cranes on board that can be used to load and discharge the vessels at ports with no cranes available suitable to work container ships. As container trades extended to developing regions, these ships were used extensively before container terminals were built in areas such as Latin America, West and East Africa and parts of Asia. There are still a number of areas where geared ships are required, particularly for their flexibility in the wider range of ports that they can cover.

Because of the areas and trades in which geared vessels operate, they are relatively small, with the largest commonly available being about 2,000-2,500 teu.



Geared container vessel

Feeder vessels



Small feeder ship

It is uneconomic for large deep-sea container ships to call at several small ports to load and discharge a very small number of containers, and such ports are usually unable to cope with the size of modern deep-sea vessels. To deal with these difficulties, smaller feeder container ships were introduced to run between hub ports and smaller ports, moving incoming boxes to their eventual destination and fetching back outbound containers.

Roll-on/roll-off (ro-ro)



Freight ro-ro discharging

There are a number of different types of roll-on/roll-off (ro-ro) ships. Many are also capable of carrying containers as well as vehicles, unit loads and other cargoes that can be wheeled aboard.

Loading and discharging from a ro-ro vessel is usually via a ramp, which in modern ships is capable both of sustaining loads of up to several hundred tonnes and sometimes of being rotated in an arc. Other ramps inside the ship, and sometimes lifts, are provided for distributing the cargo over various decks, including the weatherdeck, which provides large open spaces on which containers, vehicles and heavy cargoes can be stowed.

Ro-ro vessels' ramps can be at the stern, side or bow of the vessel. Some ships can operate stern and bow ramps together so cargo can be loaded via one ramp and discharged via another.

Passenger and freight ferries

The most common use of ro-ro ships today is for ferry services. These may be primarily for passengers accompanied by cars; they may operate for the carriage of freight only; most usually, they may be a combination of the two. There is little difference between the operations of the two types of ferry. A passenger ferry will have substantial accommodation and public areas for the passengers, which will not be required on a cargo ferry. However, the design of the two ships is essentially the same below the accommodation deck.

Ferries may have more than one deck, in which case the other decks are accessed by ramps within the vessel which can be secured away during the sea passage.

A conventional or container ship is divided into watertight compartments. Ferries need a large open garage space in which the vehicles can be stowed, which makes them vulnerable if water enters the open car decks. The free-surface effect leads to rapid instability and was the cause

of serious losses in the last quarter of the 20th century. This has led to considerable tightening of IMO regulations relating to the structural stability of ro-ro passenger vessels, though the through vehicle decks with bow and stern doors are still allowed on decks above the water line.



A typical freight ro-ro vessel loading via stern ramp

Deep-sea ro-ro/container ships (conro)



Grimaldi is now one of the few operators of ro-ro/container ships

These are hybrid vessels, the largest of which are comparable to 4,000-5,000 teu container ships. They are used mainly in liner trade routes where there is a substantial volume of vehicles

(including constructional and agricultural machinery, private cars and lorries) as well as a regular and consistent movement of containerised cargo.

The flexibility of these vessels has proved most successful in services such as between the USA and the Middle East or North Europe. Others operate between Europe and East or West Africa. These large ro-ro/container ships are extremely expensive to build and maintain, and face competition from the more economic large container ships and specialised vehicle carriers. Some of the more recent vessels of this type have cell guides on deck.

They are now in the hands of a few specialised shipping companies, Grimaldi and Messina (both Italian companies) being the most notable. Atlantic Container Line (ACL), now a subsidiary of Grimaldi, has operated this type of ship on the North Atlantic trade since the late 1960s. Its latest ships, the G4 class, were delivered in 2015-16. They have capacity for 3,800 teu together with 28,900 cubic metres of ro-ro space (including space for 1,307 cars).

ACL boasts it has never lost a container over the side during the last 30 years but despite moderate newbuilding activity, the conro fleet as a whole has been in decline for several years.

Car carriers and car & truck carriers



Höegh Target is the world's largest car carrier: some PCCs and PCTCs still operate on liner schedules

The 1970s saw an upsurge in vehicles being built for export in large volumes. The Japanese car manufacturers were at the forefront of this development, but subsequently all the major car manufacturers established substantial export markets. This led to the development of specialist ro-ro vessels, designed to carry only vehicles.

Since then, the way car manufacturers organise their markets has become considerably more complex, with the assembly of vehicles being moved into overseas markets. Nevertheless, there is still a massive movement of vehicles between the place of assembly and where they are sold.

One type is the pure car carrier (PCC). As the name implies, the decks are designed to carry cars only, and therefore have limited height clearance in order to maximise the number of decks, and hence cars carried. They are likely to have more than one ramp access in order to speed up the loading and discharge.

A variation on this is the pure car and truck carrier (PCTC) which can carry a mixture of cars and larger wheeled vehicles or equipment (buses, tractors, earth movers and so on). This type of cargo is referred to as 'high and heavy'. To achieve this, the height of some of the decks is adjustable so that the mix between cars and higher vehicles can be varied. Deck heights will vary between about 1.5m for cars up to 7m for high and heavy units.

Some operators run liner services with these vessels (that is, regular services, on which anyone can ship vehicles) but more often these vessels are chartered to and operated by car manufacturers, which then load a vessel completely with their own vehicles, according to their export requirements. The largest of this type of vessel (sometimes called an LCTC – large car and truck carrier) can lift up to 8,500 cars, or their equivalent.

Forest product and other specialised carriers



Forest products on skids

Another area where the ro-ro vessel has been successful has been the carriage of pre-unitised cargoes such as forest products. In this case the cargo is made up into a pre-packaged unit, which may be the same size as a container. Regular traffic includes timber; liner board, wood pulp and any commodity that can move in fairly standardised large units.

The cargo is moved onboard on slave trailers that travel with the ship and are used to discharge the cargo at the port of destination. These vessels are also designed to carry standard road trailers, which in turn can carry either unitised loads or ordinary standard containers. They were successful in the short and middle-distance trades such as moving forest products from Scandinavia to other parts of Europe. The vessels are also suited for the carriage of containers or unitised general cargo in the reverse direction.

Refrigerated cargo on container ships

When container ships were designed for trade routes where reefer (refrigerated) cargo was carried, the question arose as to how chilled cargo could be carried and refrigerated in containers. Two systems were developed: insulated containers and integral containers. Insulated containers had cold air supplied from a refrigeration plant on the ship and at the terminals. Integral reefer containers are also insulated but have refrigeration machinery built into the container, so they only need to be plugged into electrical power on the ship or on land.

The insulated system was thought to be cheaper for those trades with large volumes of homogeneous reefer cargo (that is, carried at the same temperature), as it avoided having expensive machinery in every container. It was introduced to the trades between Europe and South Africa, South America, Australia and New Zealand. However, it was found to be too inflexible, as the ships could then only operate on their designated trades and expensive equipment had to be installed in all the terminals. The integral reefer container has therefore become the standard system and the last ships using insulated containers were phased out in the early 2000s.

2.2 Container ship capacity

Container standards



Each hold can take one 40-foot or two 20-foot containers

The capacity of a container ship is normally described as a number of teu (20-foot equivalent units). One 20ft container occupies one teu and one 40ft container occupies two teu. The growing popularity of 40ft boxes has made the term 'feu' (40-foot equivalent unit) more common since the early 2000s.

Ship capacity is split between containers stowed on deck and under deck. Most holds can accommodate 20ft and 40ft containers, but reefers must be stowed next to reefer plugs and there are limitations to where certain types of hazardous cargo can be stowed. Container capacity is also limited by the vessel's deadweight capacity, which includes bunkers, and by the need to distribute the load evenly for the purpose of ship stability.

When the industry needed some form of standardisation of container sizes, it turned to the International Organization for Standardization (ISO) and the agreement reached was to base the length on multiples or fractions of 20 feet, the width 8 feet and (initially) a height of 8 feet. Quite quickly it was agreed that there should be an optional height of 8 feet 6 inches, which soon became the standard height. More recently, the high-cube or super-cube container – which is 9ft 6in high – has emerged, and in many trades this is now the most popular unit because of the extra space in the container. High-cube refrigerated containers are particularly popular. High-cube 20ft units are rare.

Initially there were containers of 10, 20, 30 and 40 feet in length, but the sizes now in general use are 20 and 40 feet with some 45ft units. The latter are used in both the American trades and in intra-European trades, where their extra carrying capacity can be used effectively on the long inland legs. However, a European Union directive came into force in 2007 ruling that 45ft units may only be used with chamfered corners – that is, corners reduced by about 10cm so that close-coupled road haulage can be used without the turning circles of vehicles being restricted. Most containers used in intra-European trades meet this requirement but about 100,000 45ft units that do not comply are in use in deep-sea trades. There are also 53ft units, but these are restricted to inland road haulage, mostly in North America.

The space for one teu is colloquially referred to as a slot. Any ship with some degree of dedication to the container trade, even if all it has is a series of eye-bolts to lash containers down, will have a plan of how containers may be loaded and the total number.

The ISO standards for containers include many more specifications than just the dimensions (for example, strength, door design and lashing points), and these will be discussed in a later chapter.

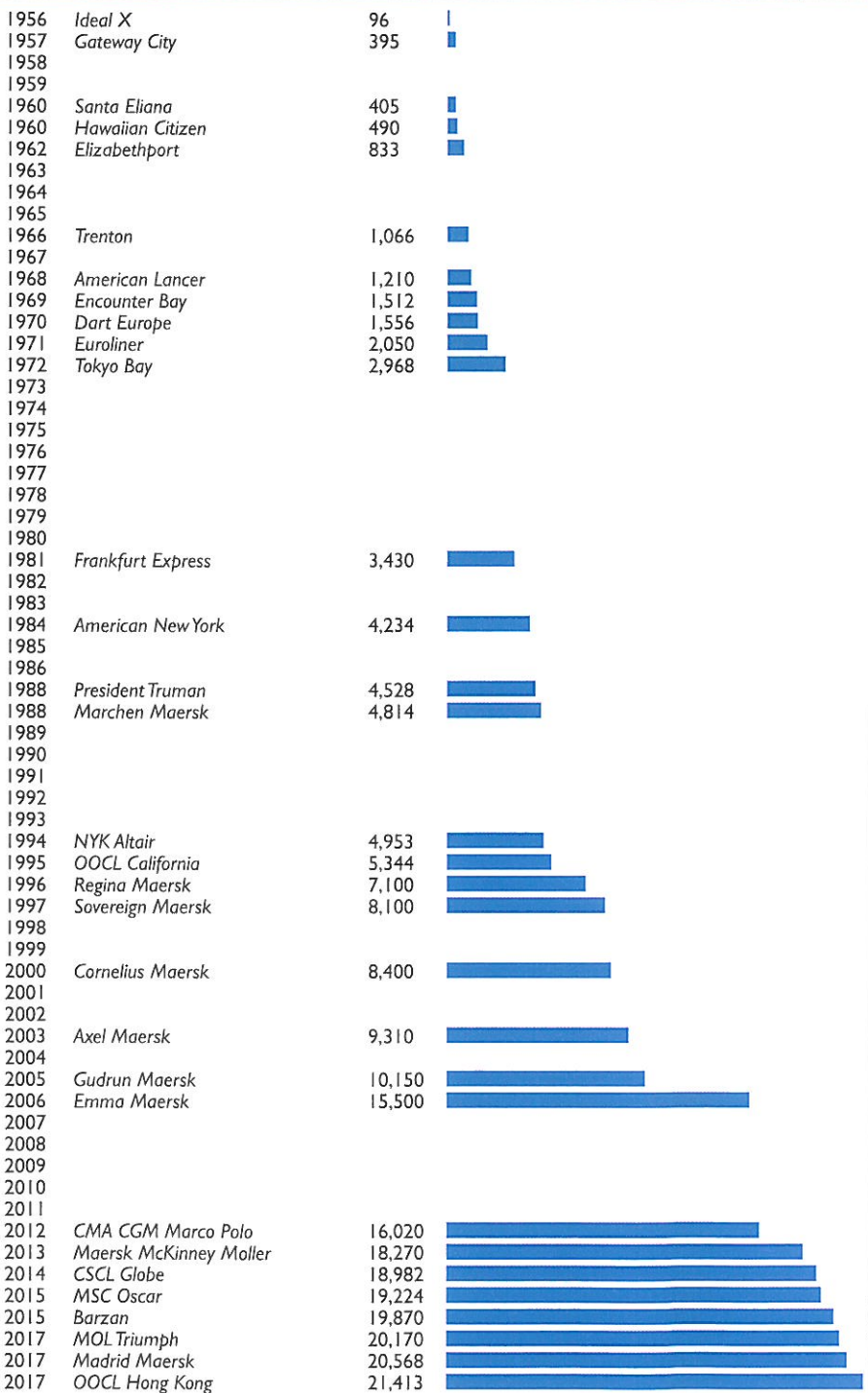
Container ship development

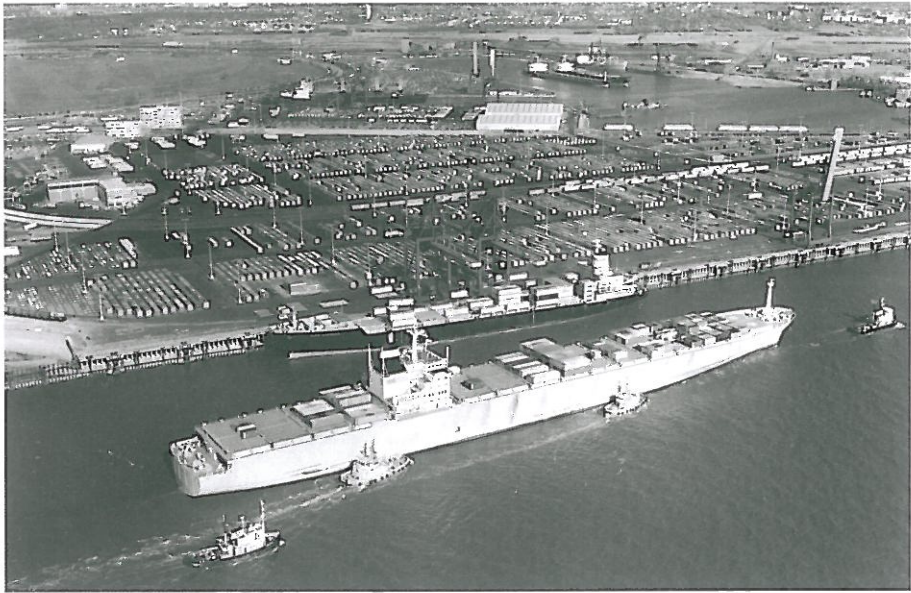
What might be referred to as the first generation of container vessels appeared in the mid-1960s and had a capacity of between 500 and 700 teu, and most were conversions of other ship types (usually tankers).

The first purpose-built container ships for the deep-sea trades were constructed in the late 1960s with a carrying capacity of about 1,200 to 1,600 teu (of which about 40% were carried on deck). The vessels had a service speed of 22 to 25 knots. The Trio consortium's *Liverpool Bay* class, introduced in 1971, had a capacity of 3,000 teu and a maximum speed of 27 knots.

Further development led on the one hand to super-fast ships with speeds of up to 33 knots and carrying capacities of only about 2,000 teu, and on the other hand to larger container ships of 4,000 teu and speeds of 25 to 26 knots. However, the 1970s oil crises substantially increased the price of oil and hence bunker fuel for ships, which led to a considerable reduction in operating speeds. Several ships saw their steam turbines refitted with more efficient diesel engines.

Container ship size development





Bremerhaven in 1974: Nedlloyd Delft, at 2,952 teu almost the world's largest container ship, dwarfs the 1,100 teu Elbe Express (photo: Bremenports)

Until the 1990s, all container ships were built to Panamax dimensions, which limited their capacity to about 4,500 teu. These vessels were the largest that could navigate the Panama Canal before it was expanded, and had dimensions up to:

Length: 294.1m

Beam: 32.3m

Draught: 12.8m

In the early 1990s, liner operators decided that Panamax was an unnecessary restriction because their main trade routes – Transpacific, Transatlantic and Asia-Europe – did not use the Panama Canal. As a result, the size of container ships increased dramatically, more than doubling over the next decade, and doubling again over the following 10 years. Maersk Line has led the field in pushing the boundaries of vessel size over this period, as it has used technological development to achieve cost leadership, as well as to support its growth in market share.

In 2013, Maersk Line started to take delivery of a series of 20 ships of just over 18,000 teu capacity – the *Triple-E* class. Since then, other lines have exceeded the capacity of the *Triple-Es*. When the 2015 edition of this book was published, the largest container ship in operation was the *MSC Oscar* with a claimed capacity of 19,244 teu. There have been eight new record holders since then, with the largest as of January 2018 being the *OOCL Hong Kong* at 21,413 teu. Its dimensions are:

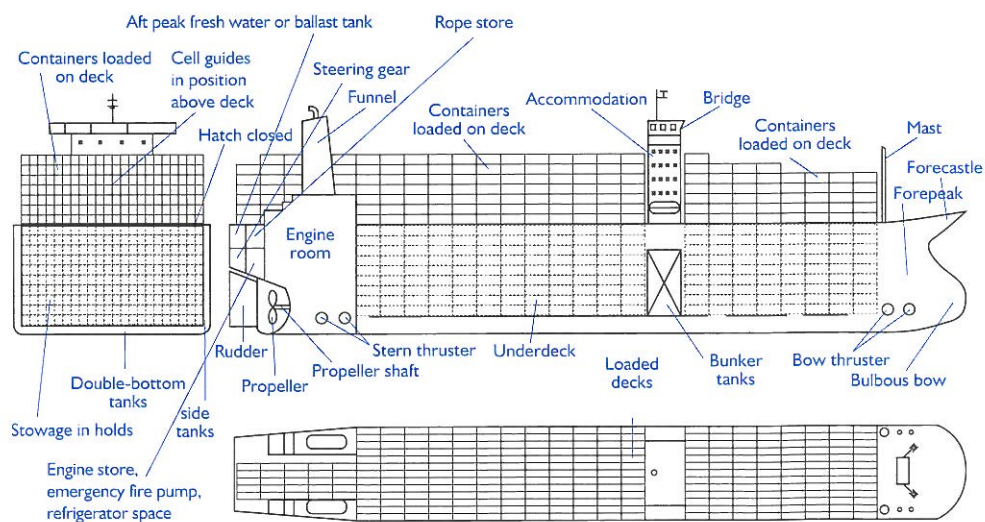
Length: 399.9m

Beam: 58.8m

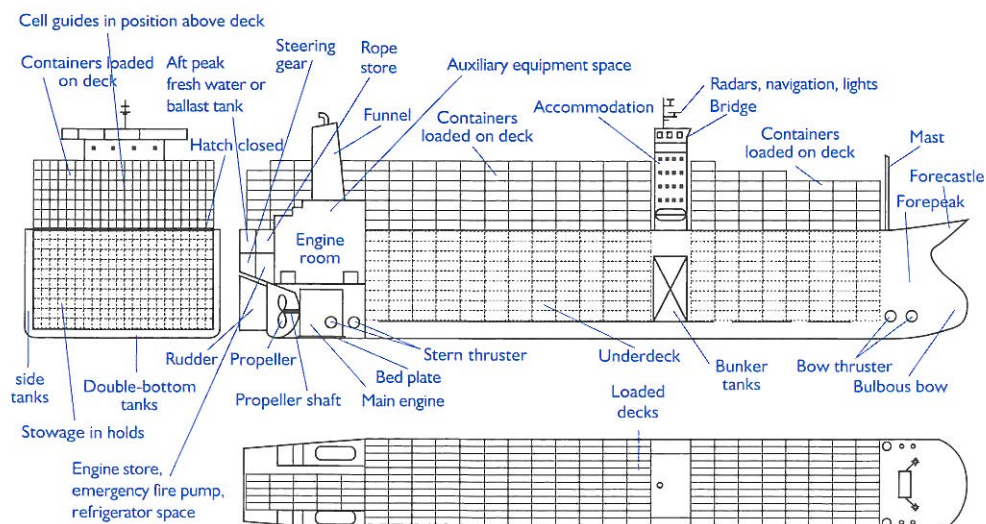
Draught: 16.0m

The near doubling of the beam size obviously had implications for the outreach capability of shoreside gantry cranes.

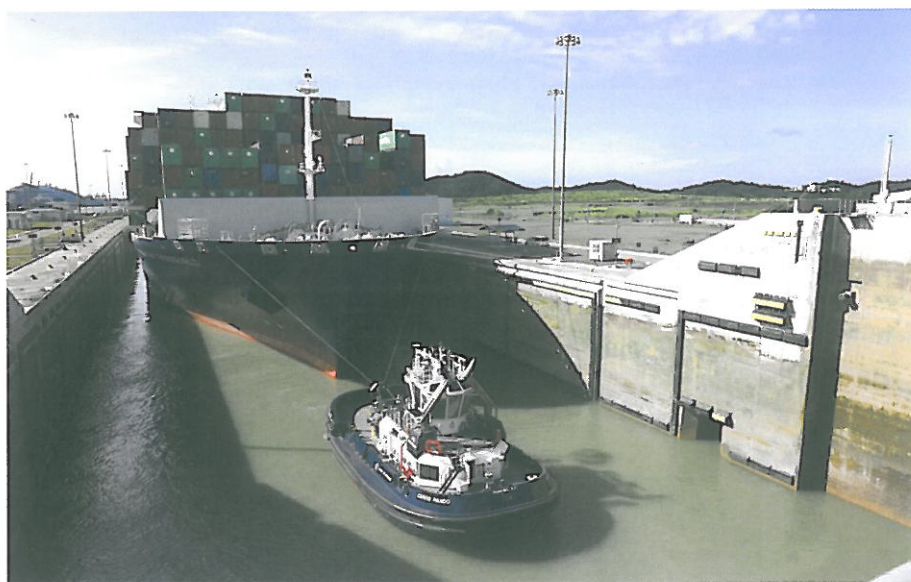
A typical Panamax vessel



A typical Post -Panamax vessel



Panama Canal expansion



Transiting the widened Panama Canal

The Panama Canal Authority completed its expansion project in 2016, building new sets of locks. The maximum dimensions for the new Panamax size are now:

Length: 366m

Beam: 51m (increased from 49m in 2018)

Draught: 15.2 m

This will enable the waterway to service vessels of 12,000 teu and possibly slightly larger. The term 'neo-Panamax' has been coined for ships that will fit through the new locks. One impact is that many vessels of the old Panamax size could become obsolete, and vessel scrapping rates did indeed rise considerably in 2017.

With the changes to the Panama Canal and the rapid growth in vessel size, new ship classes have come into being, although not everyone agrees about the terminology and the Drewry classification used here might not find universal acceptance.

World cellular container ship fleet by size range (1 January 2018)

Drewry classification	Size range	No of (teu)	vessels	Capacity ('000 teu)	Share (%)	Average top speed (knots)	Average age (years)	Million gt
Small Feeder	100-2,000	2,273	44.0%	2,373	11.4%	17.8	14.8	25.36
Large Feeder	2,000-3,000	619	12.0%	1,568	7.5%	21.6	12.6	16.98
Classic Panamax & wide-beam	3,000-5,300	906	17.5%	3,845	18.5%	23.5	10.6	40.35
Small neo-Panamax	5,300-10,000	930	18.0%	7,026	33.8%	24.5	9.5	77.78
Large neo-Panamax	10,000-12,500	131	2.5%	1,398	6.7%	24.2	5.1	15.18
VLCV – Maxi neo-Panamax	12,500-14,500 (<49m beam)	97	1.9%	1,279	6.1%	24.2	5.3	13.72
VLCV – Neo post-Panamax	13,000-18,000 (>49m beam)	142	2.7%	2,052	9.9%	23.6	4.1	21.91
ULCV – Ultra-large container vessel	18,000+	66	1.3%	1,267	6.1%	22.7	2.0	13.02
Grand Total		5,164	100%	20,808	100%	20.9	11.9	224.30

Source: Drewry Maritime Research

2.3 The refrigerated cargo ship (reefer)



Handling palletised fruit in Hamburg (photo: HHLA/Anke Maurer)

The first shipment of refrigerated cargo on a liner vessel was frozen lamb shipped from New Zealand to England by the Albion Line sailing vessel *Dunedin* in 1882, which was equipped with machinery using ammonia to keep the cargo frozen. By the beginning of the 20th century, refrigerated space was increasingly provided on cargo liners as technology improved and consumer markets were established. Initially, the main movements were of frozen meat and fruit such as apples, oranges and pears from Australia, New Zealand, South Africa and South America to Europe and to the USA.

Specialised reefer ships were developed to carry refrigerated cargo exclusively. These vessels can easily move from trade to trade according to the particular season for the commodity they are carrying. They are sometimes referred to as reefer trampers.

The pallet is the main method of handling fruit and vegetables, so new ships are designed to enable the best use of forklift trucks for loading and discharging. When the hatches are open, the refrigerated cargo is exposed to the higher temperature outside, so discharge and loading must be carried out without delay.

Cargo gear fitted on most reefers is usually light. Palletised cargo is generally less than two tonnes per lift, so cranes or derricks offering five tonnes Safe Working Load (SWL) are adequate. There would be a need for heavier cranes or derricks if the vessel had to be re-employed on another trade during the off-season.

Reefer ships have the machinery and accommodation all aft, which enables cargo compartments to maximise pallet intake. Some also have very wide hatches stretching across the full width of the ship, which has the advantage of improving accessibility but the disadvantage of larger spaces being harder to keep cool. Modern reefer ships can load a significant number of reefer containers on deck, so enhancing their flexibility.

Reefer ships are suited to both liner services and tramp services. A liner service can carry a variety of reefer cargoes from different shippers, with different holds maintained at different temperatures. On a tramp service, the ship is chartered to carry a complete load of one commodity for the account of one shipper. Tramp reefer services are a feature of the fruit trade, particularly bananas, which move in large volumes.

A major revolution in the carriage of refrigerated cargo came with the development of special reefer containers. Each container has its own built-in refrigeration machinery, which allows the temperature of each container to be individually controlled. All the container requires is a supply of electrical power – on the ship or at the terminal. They can also be powered by a diesel generator when on a train or truck, ensuring door-to-door maintenance of the cold chain, which is essential when carrying temperature-sensitive commodities.

Large container ships have enough electrical plugs for more than 1,000 reefer containers, making this a significant and profitable business for the container lines, which have progressively gained market share at the expense of the specialised reefer ships and their operators. Container lines that carry reefer cargo have to invest not only in the required hardware but also in properly trained staff and efficient processes, since mistakes when carrying such cargo can lead to expensive cargo claims.

As a result of the flexibility offered by the container, and the ability to move the container under refrigeration to and from feeder and inland destinations, reefer ship operators are now more focused on tramp business. As a result, orders for new specialised reefer ships are rare.

2.4 Conventional (breakbulk) vessels

Following the development of containerisation, the number of breakbulk liner services declined rapidly. There are still a number of breakbulk vessels in service for the carriage of general cargo but these are mainly confined to shorter routes, often within island archipelagos, particularly in developing countries that lack the facilities for handling container vessels.

Most general cargo liners are classed as tweendeckers: that is, ships with two or more decks, the upper weather or main deck and one or more tweendecks. Having these tweendecks adds to the variety of commodities that a vessel can carry as each deck acts as a separation. (The word 'tween' derives from 'between' decks, that is, those decks between the uppermost deck and the ship's bottom).

During the last 50 years, the conventional cargo liner has not changed fundamentally. There has been a slight increase in size from 15,000 dwt to a maximum of 25,000 dwt and an increase in speed from 14 to 20 knots or more. The biggest change has been in the equipment, with cranes replacing derricks, steel hatch covers replacing wooden slabs, tween deck hatch covers becoming flush, better ventilation and improved deep tank arrangements.

The design of the later (1980s) general cargo ship did lead to some reduction in the time spent in port. The introduction of large centre-line hatches, or of two or three rows of hatches side by side, lets the crane load the commodities in the holds directly where they are to be stowed. However, up to a month could still be spent loading or discharging at a range of ports at each end of the voyage.

2.5 Multipurpose vessels



Multipurpose vessels have gone from being mainstream to niche

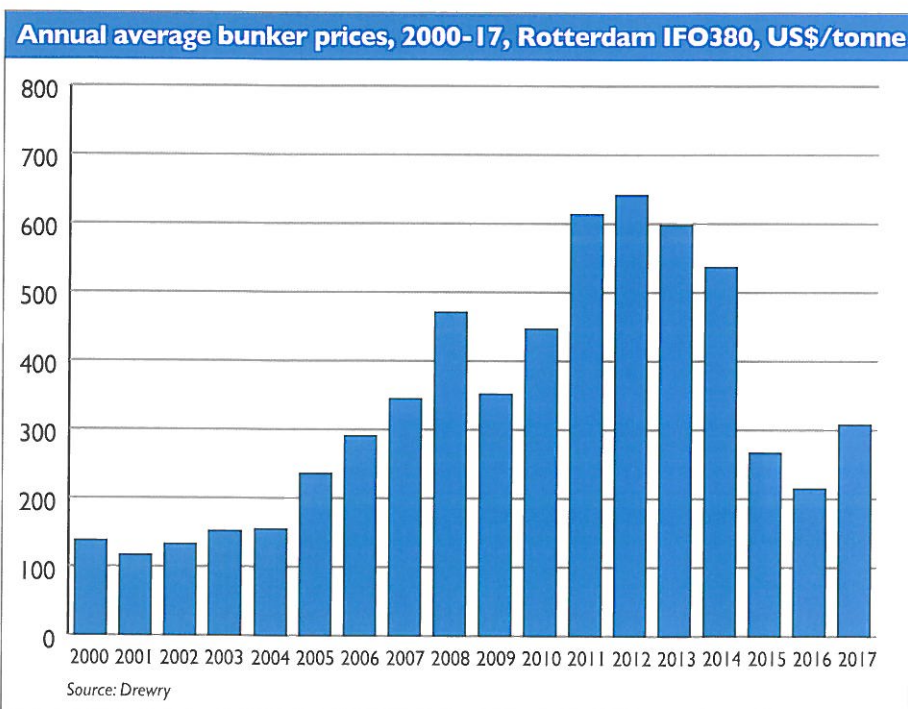
With the decline in the availability of liner services using conventional breakbulk vessels, there was a gap in the market for services that catered for cargo that could not be stowed easily in containers.

One sector of the market was project cargo, where a mix of cargo might require to be shipped for a capital construction project, which might include breakbulk cargo (for example, cement, timber, steel), heavy lifts (machinery, pre-fabricated steelwork) and other parts and equipment that could be stowed in containers.

Various classes of multipurpose vessels have therefore been developed which can carry a mix of these cargoes. These vessels are likely to have on-board cranes with a lift capability up to 100 tonnes or so, in order to be able to handle heavy lifts without the need to hire shore-based cranes. Some of these types of vessel also have ramps or vehicle decks in order to carry ro-ro cargo, increasing their flexibility still further:

The increasing importance of project cargo means that new multipurpose vessels are generally built with high-capacity cranes. New orders for the simpler type of multipurpose vessel are now rare.

2.6 The impact of bunker price



The cost of bunkers has a significant impact on developments in the type, size and speed of liner vessels. The first impact of bunker price on vessel design and operation was in the 1970s when the oil crisis led to a dramatic increase in bunker prices. Owners rapidly reduced speed, and ships were built with more fuel-efficient engines and lower maximum speeds. By the end of the 1970s the maximum speed of container ships had reduced from 30+ knots to 20 knots or less.

However, after this initial shock, fuel prices fluctuated, and generally declined, and in real terms, by the end of the century, were lower than at the time of the oil crisis. As a result, speeds of new container ships crept up again, and as ships increased in size, the maximum speeds for the larger container ships were about 25 knots.

However, another price shock followed, and in the first 10 or so years of the 21st century, the bunker price quadrupled. The outcome was that by 2009/10, cost economies were foremost in lines' planning rather than promoting high-speed services. Reducing operating speeds (slow steaming) became the new operating philosophy, and the impact on newbuilding orders was:

- More pressure to build larger vessels, since these were more fuel-efficient than smaller vessels
- Vessels were designed (again) for slower-speed operations, with maximum speeds of about 22-23 knots, and optimum operating speeds considerably lower (18-19 knots, or lower)

There was a general expectation that IFO prices would continue at around \$600 a tonne, perhaps higher, so the collapse of prices at the end of 2014 to below \$300 was completely unexpected. Although the price has recovered, there is no sign of it returning to the levels of the early 2010s. The fall in bunker prices has reduced the efficiency savings gained by a 20,000 teu vessel relative to a 15,000 teu unit from around \$70 per slot to \$40.

2.7 Future vessel developments

Before containerisation, increases in the size of general cargo vessels tended to take place slowly and by evolution. Breakbulk general cargo ships were in the main using ports with size and draught limits, and particularly enclosed docks within those ports with limited lock entrances. New port developments tended to take place over very long timescales. In London, for example, there were no new docks built between 1921, when the King George V Dock was completed, and the late 1960s, when work began on the Tilbury container extension.

The new container terminals were mainly built as continuous quays with open water frontage and not as enclosed docks that constrained vessel size.

Economies of scale

There are particular economies of scale available to ships. The capital cost of building an 8,000 teu ship is by no means twice that of a 4,000 teu vessel. Its engines do not need to be twice as large to achieve the same speed, so less fuel will be consumed for each container carried. Crew cost has already been identified as a significant element of running costs, but the larger ship requires no more crew members than the smaller. It will be evident that similar economies are available in many other areas such as dry-docking, surveys and so on.

However, there is no point in operating a large ship if there is not sufficient cargo to fill it on most of its voyages. It is also important that time spent loading and discharging the larger cargoes does not extend the voyage time to the point where it becomes uncompetitive.

Future container ship design

It is clear that containers will continue to be the dominant method of transporting general cargo for the foreseeable future. There is a continuing search for further refinement of operating efficiency, both on board the vessels and ashore. On the vessels, the focus is on the economy

and efficiency of vessels' main engines, changes to hull design, greater automation and reliability of ancillary systems. Ashore, greater speed of loading and discharge and improvements in the terminal reception and delivery landside are among the improvements being sought.

There is the potential for further reductions in the number of people employed, although this is more likely on shore terminals than afloat where, arguably, the point has been reached where any further reductions in crew may compromise safety. Ashore there are still opportunities for further development of unmanned terminal operations, for which the technology is already in use in some ports.

With 20,000 teu ships now in service, the question arises – will the size of container ships increase yet further in the future? Shipyards speak of designs for ships up to 24,000 teu, so from a purely technical perspective, there seems no constraint to increasing size still further:

Container lines remain under pressure to operate with the lowest possible slot cost. Lines are also expected – by their customers and by international regulators – to reduce their environmental footprint, and in particular to reduce CO₂ emissions per container carried.

Technological developments are therefore likely to be driven by the requirement both to drive costs down and to improve the energy efficiency of container carriage. Every increase in vessel size over the past 40 years has brought increases in energy efficiency, so engine manufacturers can be expected to design an engine that can economically drive a vessel larger than 20,000 teu.

However, it is still necessary to have ports, terminals and landside infrastructure that can handle even larger vessels, as well as economies that can provide the cargo to fill them. Each sector will have different problems to overcome:

Ships

- Any increase in draught beyond 16m will prove a challenge for access to some ports, as well as for the depth of water alongside berths, and expensive dredging may be needed
- Any increase in length beyond 400m will cause difficulties for ports with restricted access and limited turning circles

Terminals

- The largest ship-to-shore (STS) cranes at present are designed to lift across 23 rows, which is enough for today's largest vessels. If vessels get broader, a new generation of larger cranes will be required
- Lines expect that larger ships will maintain the same port time as the ships they replace, otherwise the lines' bunker costs will increase. This will require more STS cranes available to work a vessel and technological and operating solutions to improve crane productivity
- Larger vessels, with more container exchanges, will worsen the problem of peaking in the container terminal. This will probably require more yard space and equipment and additional capacity for road and rail movements to avoid congestion and queuing

Trade volume

- Carriers also need to fill the larger ships; otherwise the cost economies will not translate into improved profits

- Trade routes need to have enough volume to support the larger capacity of the ships, otherwise carriers will need to reduce the number of loops offered, which may make their service less attractive to customers
- The nature of consumption is changing: many consumer goods are smaller and some are starting to disappear altogether. An example is music: vinyl records were replaced by smaller CDs, which themselves are being replaced by streaming, which involves no movement of goods at all. 3D printing could extend this process to many other products

One solution is to form more and larger alliances to maintain the same frequency of service with the larger vessels. However, this has already happened in response to the increase in vessel size to 20,000 teu, and it is not clear what further scope exists to increase the size of the alliances, even if regulators would allow it.

Carriers could fill their ships by calling at more ports or by carrying more hub-and-spoke (transshipment) cargo. However, more port calls will mean more costs, so will reduce the net cost benefit from investing in the larger vessels. And with lines increasing the range of direct calls, the amount of transshipment cargo available is also reducing.

Taking all these factors together, it is not clear that there will be a net financial benefit from moving to even larger vessels, and at some point economies of scale may turn to diseconomies. At what stage in the growth in ship size this will happen is not yet clear.

2.8 Shipboard handling equipment



MSC Daniela, fitted with Velle derricks, at Antsiranana in Madagascar, 2005 (photo: Clipper)

The derrick

The simplest form of cargo-handling equipment used on board a ship is the derrick, which was developed from the spars of sailing vessels as a means of lifting and transferring cargo from ship to quay and vice versa. It is essentially just a mast and a swinging boom that allows a load to be lifted and moved sideways. While there are some improved modern versions of derricks in use, they have mainly been replaced by cranes or gantries on modern vessels.

Typical arrangement of a pair of derricks

There are also some heavy-lift derricks in general use where a very heavy load capacity is needed. These derricks are permanently rigged at the hatch. Some of the principal modern derrick designs are:

Hallen derrick: The derrick is labour-saving as one man positioned at a control console can operate it. The lifting capacity of the Hallen derrick can be up to 200 tonnes.

Velle derrick: The design allows very wide slewing angles and, because of the arrangement of the topping lifts, they act to aid recovery when the derrick is slewed outboard. This is particularly useful when handling heavy lifts against an adverse list. It is used for loads in the range 35 to 100 tonnes.

Stuelcken derrick: This is perhaps the best known of all heavy-lift derrick types. The derrick is supported by two outboard inclined masts and employs a twin lifting span. It is operated by four winches and has a very high capacity (in excess of 300 tonnes is not uncommon) and high speed of operation.

Deck cranes

Although cranes existed in ships from the beginning of the 20th century, it was not until the late 1960s that more vessels started to operate with them. At the beginning, cranes were expensive compared with derricks, were slower to operate, their capacity and outreach were limited and they required highly skilled operators.

With the increase in the carriage of unitised cargo, the practical value of the cranes' accurate spotting ability became more apparent. Therefore cranes, often with a capacity of 25 to 40 tonnes and sufficient outreach to plumb two holds as well as overside, are now commonly found on ships.

Placed between two hatches, the crane can slew around 360°, enabling it to operate two hatches without changing the rig.

Gantry cranes

Certain types of container/ro-ro ships and barge carriers are equipped with travelling-portable gantry cranes that straddle the full width of the ship and move along the weatherdeck on rails situated outboard of the hatch coamings. The hoist can be slewed to port and starboard and

plumb over any part of the area under the gantry. With the gantry being able to move fore and aft, all of the weatherdeck can be used to stow cargo.

Containers are usually handled by shore terminal equipment but gantry cranes can be seen occasionally, either in large ships as an interim measure while port facilities are still being developed, or in smaller ships for self-sufficiency when operating to less well-equipped ports.

2.9 Ro-ro access equipment

Ramps – bow/stern doors



Twin bow clamshell doors on *Stena Scandinavica* (photo: Sören Håkanlind/Port of Göteborg)

The characteristic feature of ro-ro vessels is their ramps. Ramps are used externally to convey wheeled vehicles between quay and ship and internally to provide access from deck to deck. External ramps can take three forms:

- Axial bow and stern ramps
- Angled quarter ramps
- Slewing ramps

Internal ramps can either be fixed or moveable, serving two or more decks. An axial stern ramp can also act as a stern door where the ramp is short. When the axial ramp is long, then a separate watertight door is used, closing before the ramp is raised.

Bow openings allow access to cargo spaces through the forward end of the ship. The bow visor is a portion of the ship's bow, hinged at the weatherdeck level, and is raised upwards when entry is required. A separate inner watertight door is provided along with the axial ramp.

Twin bow clamshell doors are located in the plating around the stem and are hinged to open outwards from the centre line. Their operation, sealing and securing arrangements are similar to that of a bow visor and they also have an internal watertight door and axial ramp.

Internal ramps and lifts

In ships having several vehicle decks, a multipurpose internal moveable ramp is used so that less space is wasted. Elevators or lifts are employed as an alternative to ramps for transferring vehicles from one deck to another.

Advantages of elevators over ramps are:

- They require less internal space
- Cargo can be stowed on them

Disadvantages of elevators over ramps are:

- Positioning of elevators within a ship must be carefully chosen
- They are more complicated in terms of electric and mechanical equipment and hydraulics
- If too close together when serving different decks, manoeuvring space is likely to become restricted
- They have an interrupted cycle of operation, unlike ramps, which can be used continuously

There are various forms of elevators:

- Wire-operated – the simplest form – can have a lifting capacity of around 50 tonnes. A complete cycle to load a vehicle, lower, discharge and rise again would be about three minutes
- Chain-operated, using heavy roller chains to lift the platform, can provide a weathertight means of closing the deck when stowed at its upper limit
- Scissor lifts have a platform supported by a system of levers and hydraulic ramps. They do not need guides and are stowed in the double bottoms of vessels. The upper openings must, therefore, have a separate hatch cover to close.

Side loaders

Side loaders (doors or side ports) are found in some ro-ro vessels and their purpose is to augment the main cargo accesses. Side doors are most useful on vessels when their draught remains fairly constant. It would be no use to have side doors on a ship whose draught varies greatly so that the doors at times are below quay level or way above. There are numerous designs of side doors and the design depends on type of vessel and cargo expected to be carried. Forklifts are used to convey cargo to the door for loading then transferred to the hold by another forklift working in the vessel.

The following designs are possible:

- Side swinging door, hydraulically operated. It opens outwards and stows along the ship's side
- Upward folding door, usually supplied with a loading platform
- Side door/hatch cover, which has the benefit that it can handle cargo that was too high for the previous design
- Side port conveyor and elevator, which facilitates the transfer of cargo to the lower deck
- Side door or ramp, with an external loading platform so forklift trucks can drive up ramps and place cargo on board
- Side door or ramp for ro-ro operation. These come in two or three sections and when folded become a weathertight door. Side ramps are used mainly in car carriers and vessels that use trailers or forklift trucks to stow cargo



Chapter 3

Cargoes & cargo handling

3.1 Liner cargo

General cargo

Liner cargo comprises all goods that are carried in ships on a regular and advertised route. These cargoes range from small consignments of just a few hundred kilos to very large shipments of hundreds of tonnes, as well as indivisible loads such as railway locomotives. While many cargoes are harmless, special attention is required for those that are dangerous. Because of this mixture of very different commodities and methods of packing used, liner cargo is usually referred to as general cargo.

Cargoes are often grouped for convenience by the type of packaging used. Some examples of important classes of cargo are listed below, but there are many others. In most cases the packages of cargo described will be consolidated on to pallets for ease of handling in factories and warehouses.

Because general cargo can comprise just about anything, these lists are only examples and are by no means definitive.

Cases, cartons and crates



Almost anything can be shipped in containers

In many of these examples the case or carton will contain items that are already individually packed for reselling.

- Consumer goods or general department store merchandise (GDSM)
- White goods: Washing machines, refrigerators, freezers
- Electrical and electronics: Computers, TV and other audio-visual equipment

- Clothing: Items that are usually sold folded such as jeans, underwear and so forth
- Footwear
- Textiles: Bed linen, towels, fabrics
- Pharmaceuticals
- Toiletries: Make-up, creams and lotions, patent medicines
- Drugs: Prescription medicines for humans and animals
- Oils and chemicals
- Harmless chemicals: Dry chemicals for all sorts of purposes
- Fertilisers: Mainly smaller packs for gardeners or smallholders
- Paints: Retail packs of small tins in cartons or cases
- Lubricating oils: Retail packs in cartons
- Foodstuffs
- Canned foods: For humans and pets
- Non-perishable dry goods: Tea, biscuits, confectionery
- Food in bottles and jars: Sauces, instant coffee, mayonnaise
- Consumable liquids: Alcoholic and non-alcoholic drinks, fruit juices
- Machinery and parts
- Factory machinery: Machine tools, production machinery, food processing, refining, milling, and so forth
- Electrical machinery: Generating equipment, switchboards
- Automobile parts
- Spare parts for machines: Spares for all and any types of machine
- High-value cargo: Precious metals, jewels, antiques and works of art

Loose and bundled cargo

This may comprise large single indivisible pieces, such as large machines, or it may be a number of smaller pieces bundled together. It is often awkward cargo to handle.

- Manufactured steel
- Long pieces: Railway lines, reinforcing rods, lampposts
- Steel plate and tinplate: In 'envelopes', a bundle in a steel wrapper
- Constructional steel: Frames for buildings
- Rubber tyres: Car, truck and large earthmover tyres – on pallets
- Vehicles
- Agricultural machinery: Tractors, harvesters
- Earthmoving machines
- Reels and coils
- Wire and cable: Often on a wood or metal core
- Cardboard: Liner board
- Loose cargo on pallets
- Building materials: Bricks, blocks, tiles
- Metal ingots: Aluminium, copper
- Sanitary earthenware: Sinks, basins, lavatories, pipes

Drums and barrels

While these packages are most often associated with liquids, they are often also used for the convenient and secure shipment of dry goods especially powders. Barrels are not often used today.

- Oils and paints: Frequently dangerous cargo
- Chemicals: Many dry powders as well as liquids
- Beverages
- Fruit juices: Also syrups and concentrates used in soft drinks
- Whisky: Shipped in barrels for local blending

Bales and bundles

These goods do not need any rigid protection from knocks and bumps. They only need minimal protection from wet or dirt.

- Textiles
- Raw textile fibres: Cotton, wool, coir, sisal
- Textile waste: Rags
- Hides: Unprocessed hides and skins, leather
- Forest products
- Wood pulp: Bales
- Timber: Sawn, in bundles

Bags and sacks

Like bales, the goods do not need protection from knocks but they do need to be leak-proof. The bags may be textile, plastic or paper.

- Foodstuffs
- Grains: Rice, wheat, barley, maize
- Sugar: Refined, white or brown
- Beans: Including coffee and cocoa beans
- Animal feeds: Oil-cake, fish meal
- Building materials: Cement, plaster, sand
- Chemicals
- Fertiliser
- Harmless dry chemicals

Unpacked motor vehicles

Cars are carried on the major trade routes (for example, from Japan) in pure car carriers (PCCs) which carry only cars, while on some routes there are vessels carrying cars and trucks (PCTCs). However, there are still large numbers of cars and other vehicles (lorries, buses, earthmovers) carried on liner trades worldwide, either in containers or on ro-ro services.

Hanging garments

The use of specially fitted containers has enabled a very large proportion of fashion goods, especially suits, dresses, shirts and blouses, to be shipped on hangers on rails in the container. The only protection then needed is a plastic cover over the individual item to protect it from dirt. The advantage is that considerable labour costs are saved in the folding, packing and unpacking process as well as the need for pressing before the clothes are placed on display for sale.

Containers with these special fittings (often called hangertainers) require careful tracking. Normally the fittings are removed at destination, so the container can be used for other cargo on the return leg, and the fittings are then consolidated into a single container to be returned to where they are required for the next hangertainer shipment. This requires careful logistics control to ensure that the fittings are not lost.

3.2 Dangerous goods



One of the most sensitive issues in shipping is the carriage of dangerous cargoes and potentially polluting cargoes. For many years, the major maritime countries have required specific action by all those concerned with the movement of dangerous goods both on land and afloat.

The international maritime carriage of dangerous and polluting goods is governed by the International Maritime Organization (IMO) through the International Maritime Dangerous Goods (IMDG) Code. These rules supplement any local or national rules that apply, to the extent that they represent the minimum standards that must be adopted. In some countries there are national regulations (or local port rules) that have more stringent requirements and the liner operator must be fully aware of any variations applying to cargoes in transit as well as being loaded or discharged at ports in the vessel's itinerary.

Corrosive cargo in drums



Corrosive cargo in drums

Most countries also apply similar laws on shore to the shipper or manufacturer, who is required to label anything containing dangerous goods and to complete documentation that specifies the nature and hazards of the goods when they are on the move by any form of transport. Within the European Union, the relevant legislation is the European Agreement Concerning the International Carriage of Dangerous Goods by Road (ADR). These rules closely follow the IMDG Code. Under ADR, all dangerous goods must be accompanied by 'Instructions in Writing' in case of emergency (previously and still colloquially known as a Transport Emergency – TREM – Card). This provides full details of the hazard and details of emergency telephone numbers for technical assistance in the event of accidents.

The dangerous cargo information is passed to the line's booking agents, freight forwarders and ship's port agents. The port authorities are informed and arrangements can be made for the goods to be stored in a safe place until loaded. Similarly, those responsible for loading the ship are advised. The stowage of these dangerous goods requires special consideration.

IMO International Maritime Dangerous Goods Code

The IMDG Code is published as two bound volumes that are reissued every two or three years as required by the volume of amendments. The cover colour varies with the edition. It is published in English, French and Spanish.

The code amplifies the requirements of Part A of Chapter VII of the 1974 SOLAS convention as amended and also Annex III of MARPOL 73/78 and has had mandatory status since 1 January 2018. The current edition is Amdt 38-16. A supplement to the code is published separately and gives guidance on a number of safe handling and transportation issues related to the code.

Local additions or modifications to the rules are often made by individual governments for local enforcement and these are published as Notices to Mariners by the respective governments or as port regulations.

Dangerous goods declaration

Every known dangerous commodity is listed and is allocated a class and a UN number. The listing describes in detail the nature of the hazard and the type and amount of packing that is required for that particular dangerous commodity. The person actually packing the goods is required to sign a declaration included in the Dangerous Goods Shipping Note (known as the DGN or Declaration) confirming that the goods have been packed in accordance with the code. The declaration must include the proper technical name of the substance as well as any trade name, the class and the UN number.

A modified version of the dangerous goods declaration is authorised for multi-modal transport and this complies with the SOLAS and MARPOL regulations. The signature must be that of the person controlling the container/vehicle operation.

When this Dangerous Goods Form is used as a container or vehicle packing certificate only, not a combined document, a dangerous goods declaration signed by the shipper or supplier must have been issued to cover each dangerous goods consignment and must be packed in the container. The container packing certificate is not required for tanks carrying liquid.

It is vital that those putting LCL (less than container load) cargo into containers follow all the rules regarding dangerous cargo, particularly those relating to the incompatibility of certain substances within the same unit and the labelling of the container.

Cargo segregation

The other essential feature of the requirements is to segregate the cargoes on board ship, recognising that some, when mixed together, can produce catastrophic results and to instruct ships' crews on dealing with leakage and fires.

To this end the cargoes are divided into the following classes:

Class 1 Explosives (military and commercial)

Class 2 Gases

Class 3 Flammable liquids

Class 4 Flammable solids

Class 5 Oxidising agents

Class 6 Poisonous (toxic) substances

Class 7 Radioactive substances

Class 8 Corrosives

Class 9 Miscellaneous dangerous substances

The purpose of the different classes is to ensure that:

- a) The goods are packaged safely and properly labelled by the manufacturer
- b) They are stowed correctly during land transport and on board ship
- c) Personnel involved with the transport of these goods know how to deal with spillage and what action to take if fire breaks out in the same compartment
- d) Personnel know whom to contact for advice

It may be necessary for two different classes to have between them either one steel bulkhead, or in certain cases, two steel bulkheads. This gives some indication of the serious consequences of allowing two different classes to combine.

Container ships and conventional vessels usually have enough decks and bulkheads as well as the separation of steel containers themselves to be able to carry most of the dangerous cargo offered on any one voyage, although even this may be a problem for cargo that must be carried on deck. The rules are interpreted for container ships so that existence of the container itself is recognised for segregation.

The carriage of dangerous cargo on ro-ro ferries is especially critical. A ferry may not have enough decks or bulkheads to achieve a proper segregation of trucks that may be carrying incompatible categories. Great care must therefore be taken when dangerous cargoes are booked to ensure that proper separation is possible. Usually ships carrying Class 5 goods do not carry any other classes, and the ferry operators try to arrange that no more than one class is carried on one ship.

Explosives – Class I

Special rules apply to the carriage of Class I cargo. Without examining the detailed requirements, it should be noted that many ports do not permit any Class I cargoes within port limits. Others do permit the IMDG Code exceptions, such as fireworks and safety ammunition in limited quantities and on the basis of direct removal from the port area. Most ports also have very strict restrictions on Class I cargoes remaining on board in transit.

Most countries have one or more special berths or anchorages where explosives may be handled.

Dangerous goods manifest and cargo plan

Vessels carrying dangerous goods must have on board a dangerous goods manifest and a copy of the dangerous goods declaration for each item of cargo. Throughout the European Union, in the USA and in many other parts of the world there are stringent rules relating to the ability of the carrier (through its nominated local ship's agent) being able to provide details of dangerous cargoes carried to the authorities on demand.

3.3 Special goods

There are several classes of cargo that need special security. These include:

- Valuable items such as currency, jewellery, bullion and works of art
- Registered mail
- Small consignments of dangerous goods
- Medicines and drugs
- Firearms and military equipment

When shipped in containers, the units should be locked, sealed with high-security seals and placed in stows where the container doors are inaccessible (door-to-door stowage). On conventional vessels, these goods should be given lockable stowage, ideally in a fireproof compartment.

3.4 LCL and breakbulk cargo

Where cargo is carried in full container loads, the packing can be limited to that needed to protect the contents during final distribution and at the point of sale, particularly if all the packages are the same size and weight.

LCL (less than container load) cargoes are smaller consignments that are too large to be sent by air (usually over 100kg) but too small to fill a whole container. These are usually booked with freight forwarders or similar consolidators, who then load a full container with cargoes for many different small shippers and distribute them at the destination.

LCL and breakbulk cargoes need to be properly packed to protect the cargo during additional handling and also to protect it from other commodities that may be sharing the same cargo hold or container. Proper attention must be given to arranging suitable packing, taking into account the vulnerability of the particular type of cargo. Careful consideration needs to be given to the use of cardboard cartons or light plywood cases, to ensure they will not be damaged during loading or unloading, or by the forces inside the container, particularly when packages are stacked on top of each other:

LCL cargo needs to be carefully managed in the packing depot and grouped according to the destination of the cargo, so that the cargo arrives at the correct unpacking depot. Mixed LCL containers, where loose cargo has to be moved long distances in the destination country, will give rise to extra expense and the risk of delay and damage.

Sometimes an LCL container will be packed with cargo that is all destined for the same consignee, enabling the container to be delivered as an FCL (full container load) at destination, rather than unpacked at the operator's depot. This will be referred to as an LCL/FCL container, or a consolidated container.

3.5 Cargo handling

Palletised cargo



Palletised drums stowed in a container

The most familiar type of pallet is the roughly made tray about one metre square comprising two layers of wood separated by wooden blocks. The separation allows the blades of a forklift truck to be inserted so that the cargo placed on the pallet can easily be moved around.

Cargo may be secured on the pallet by metal or plastic bands, or transparent plastic may be used. This can either be a form of shrink-wrapping, which is a plastic sleeve that shrinks when heat is applied, or the pallet can be wrapped in a scaled-up version of the clingfilm used in a domestic kitchen. Both these forms of plastic wrapping not only secure the goods to the pallet but also provide some security against pilferage, because it is plainly obvious if the plastic has been disturbed.

Cargo is often loaded on such pallets in the shipper's own premises, so that the cargo and pallet remain together from the moment the goods come off the production line until they reach the consignee. For this reason, these are often referred to as one-way or disposable pallets as the shipper makes no attempt to reclaim them. In fact, thrifty merchants either reuse the pallets themselves or sell them to dealers trading in refurbished pallets.

With the containerisation of most general cargoes, disposable pallets have now been designed with dimensions that are precise fractions of the interior of a container; and research continues to find even cheaper materials for pallet construction.

Other methods of lifting cargo

Strong wooden cases can be lifted with wire or rope strops. These are wires some 3m long with a loop or eye at each end. The strop is passed around a case, and one end passed through the eye at the other end and then taken to the lifting hook. As the hook is lifted the strop tightens around the crate.

Strops made of nylon webbing 75 or 100mm wide are used in the same way for lighter cargo. They are easier to handle than wire and can lift heavier loads than rope, but usually less than wire. In some cases such strops are left in place after the cargo has been put in the hold so that they may be used at the discharging port to speed discharge. This procedure gives rise to the expression that the cargo is pre-slung.

Chains are used in the same way to lift heavier items such as railway lines, metal lampposts and lengths of steel. Most damage occurs as the cargo is dragged into place on deck or in the hold. Containerisation has removed this problem.

Containerisation

Containers are typically 20ft (6.10m) or 40ft (12.20m) long and 8ft (2.45m) wide. Originally 8ft high, a height of 8ft 6 inches (2.6m) later became standard, although the 9-foot-6-inch high-cube is increasingly dominating among 40-foots. These dimensions, as well as several other specifications, are covered by a worldwide convention under the auspices of the International Organization for Standardization (ISO).

Within this standard framework there are many variants beyond the basic box, such as open-tops, tanks, side-curtains and so on, together with high-cube containers measuring 40 × 8 × 9ft 6 inches high. These are particularly in demand for carrying lightweight cargoes such as empty cans and paper tissue products, where the cubic capacity will be utilised before the deadweight capacity of the container is reached. Other containers measuring 45ft (13.7m) long have also been introduced to take advantage of the maximum length permitted on American roads, although there are problems in using these in Europe.

Containers can carry any cargo that will fit into them and all major trade routes are containerised. Purpose-built refrigerated containers have now taken from the dedicated refrigerated ships (reefers) a significant proportion of the world's trade in chilled and frozen cargo.

Containers can be filled (stuffed) by the shipper at their own premises, and this is known as a 'full container load' (FCL). Alternatively, if a shipper has insufficient cargo to fill a container completely, they can tender this less than a container load (LCL) cargo to the carrier at a depot where it will be put into a container with other shippers' cargoes. Such depots or container freight stations (CFS) may be at the port of shipment or at a convenient inland location.

Heavy-lift and out-of-gauge cargoes

Although highly specialised ships can lift up to 3,000 tonnes by crane – and much more if they are of the submerging hull type – some conventional cargo liners are provided with derricks or cranes capable of lifting up to 500 tonnes.

Large loads are often carried on deck. Items that can be carried in one container are described as 'out-of-gauge' and are carried on flat-racks or, if they are only over-height, open-tops. Bigger, 'uncontainerisable' cargoes are secured on a bed of two or more flat-racks or platforms, usually placed on top of the hatch covers. This can cause port rotation problems because they therefore have to be moved before work in the holds can begin.



Uncontainerisable cargo on a bed of flat-racks

3.6 Port-handling equipment

Cargo-handling equipment at ports around the world varies from none to that capable of handling the largest and heaviest of goods. What is provided depends on the nature of the cargo normally handled, the frequency of heavy goods handled and the finance available to the port.

Gantry cranes



Container cranes are growing in size as ships get bigger

Gantry cranes are used on all container terminals. They are also found on some other berths for specialised cargo such as forest products. They are large structures that take up a good deal of space. They are usually rail-mounted and can traverse the length of a jetty. The gantry arm or boom is at right angles to the quayside and must span right across the ship to reach the

containers on the far side. The boom must also be high enough to clear the topmost tier of containers carried on the ship's deck.

Smaller versions, often referred to as transtainers, are used in some ports to transfer containers in and out of the stacks in the port area and are also placed over railway tracks to transfer containers between rail and road. They may be rail-mounted or tyre-mounted.

Dock cranes

For the movement of normal breakbulk cargo, an ideal type of crane is that known as level luffing. This is named because the hook remains level while lateral movement is effected by means of the jib being raised and lowered. Such cranes have capacities ranging between five and 25 tonnes and can generally be moved along the jetty on rails. They usually have a jib height that is enough to enable even tall loads to clear the ship's rail, and some have a span wide enough to handle cargo on a barge moored on the far side of the ship.

Mobile cranes

With capacities of up to 20 tonnes or sometimes more, mobile cranes are used to move heavy loads within the dock area or to supplement dock cranes for loading and discharging.

Heavy-lift cranes

For large or heavy loads, mobile cranes that may be either land-based or floating are provided. The usual maximum capacity of port-based cranes is 100 tonnes. This is exceeded by some floating cranes able to lift up to 1,500 tonnes, which may be chartered for special lifts and are found mainly in Northern Europe, North America and the Far East. Two such cranes can be used in tandem when the weight to be lifted exceeds the capacity of one.

Scotch derricks

These are still used in some of the smaller feeder ports. They are a simple form of derrick with a limited reach and height but provide a cheap way of handling very small volumes of containers.

Spreaders

Whatever type of equipment is used to lift containers it will use a spreader. These are usually extendable to lift 20ft and up to 45ft units and are equipped with twist locks to engage with the container corner castings.

Forklift trucks

The most common piece of equipment found in virtually all ports is the versatile forklift truck. They come with various add-on appliances in addition to the ordinary fork used. For example, attachments are available to lift cylinders or drums and to lift reels of paper, clamps to lift bales

and suchlike and even adapters to enable them to act as miniature cranes with hooks for use with rope slings. They are usually driven by internal combustion engines but many of them use bottled gas or batteries as fuel so that dangerous emissions inside the dockside sheds are minimised.

Larger versions may be used to move containers and so have a capacity of 30 tonnes or more.

Straddle carriers



Straddle carriers are used to move containers around the stacking area

Used purely for the movement of containers, most can lift one container above two others (or even three) and so are very tall. They have wheels at each corner and the driver sits at the top of the structure. These machines move containers around the stacking area, to and from the ship-side gantry, and on and off road vehicles.

Ro-ro ramps

Roll-on/roll-off ships that trade deep-sea routes usually have large ramps fitted at the stern. These are carried in the raised position during a voyage and are long enough so that they can be lowered on to the jetty of any port that does not have specific ro-ro ramps. Some ships have only openings and ramps fitted to each side somewhere along the parallel part of the hull.

Ro-ro link-spans

Some ports use ramps (often referred to as link-spans), hinged to the jetty, which float at the outer end and are guided vertically by columns fixed into the sea bed. This obviates the need for the ramp to be lifted to ship level by powered hoists, which is the case with non-floating ramps.

Terminal tractors

Ports accommodating ro-ro ships have equipment designed to speed the loading and discharging processes. Most freight intended for ro-ro is carried on articulated units and in many cases the tractor unit does not leave the country. The trailer is taken on board by shore tractor units, leaving the local haulier free to return inland with another imported trailer.

This method also results in reduced ferry charges as less space is occupied on board. Trailers are also provided by the line or the terminal operator for large loads and containers, designed to allow carriage to the port of destination. The load is then transferred to a haulage unit for onward delivery and the trailer returned to the base port.

Mafi tractors and trailers

The trailers described above together with the tractors are known as Mafi units; the term originating from the German manufacturer. These trailers have no suspension or brakes, and the tractor driver can connect and disconnect the trailer from the driving position. Mafi tractors can also handle conventional sprung and braked trailers.

3.7 Delivery and collection of cargo

The major requirement for any terminal operator, after providing for the ships themselves, is to have appropriate accommodation to accept cargo from shippers for export and from ships for import. This inevitably requires much land space.

A container terminal needs many hectares of land, not only to accommodate the containers but also to give room to sort them into their loading pattern or to stack conveniently for delivery after discharge.

For conventional (breakbulk) cargo, the requirement is for transit sheds. These are warehouse-like structures alongside the berths, with doors at one side adjacent to the quay and at the opposite side giving access to the road (or railway), sufficient to cope with the delivery and removal of cargo.

Space is inevitably limited and so arrangements have to be made with the merchants or their forwarding agents to ensure that cargo for export does not arrive too early (or too late) and import cargo is cleared as quickly as possible.

When a cargo is booked, the shipper will complete some form of shipping note or consignment note to accompany the goods to the port. This usually comprises several copies and fulfils various purposes relating to the handover of the cargo from one party to another. It frequently doubles as an interchange receipt relating to the superficial condition of the container:

1. The shipper keeps a copy that may be signed by the haulier that has collected the container or cargo
2. The haulier presents the cargo at the terminal and retains a copy signed by the terminal operator as its receipt

3. The terminal operator will use its copy for its dealings with dockers, stevedores and tally clerks and for a notification to the line's agent of the arrival of the goods
4. The final copy serves as the mate's receipt, confirming that the goods have been shipped on board.

On a modern container terminal it is probable that the functions covered by (3) and (4) will be dealt with electronically. The terminal operator will enter the details of the unit received into the system and this will link it to data already provided by the carrier and shipper. When it is confirmed that the cargo is loaded, the bill of lading (B/L) is produced by the line's agent, signed on behalf of the carrier and issued to the shipper.

The same details as appear in the B/L are entered in a manifest, which is a list of all the cargo on the ship. Copies of this go to the different discharging ports so that they are aware of the cargo they will be receiving and can notify the consignees and statutory authorities accordingly.

Any dangerous goods would be the subject of special treatment so that all concerned are made aware of the precautions they should take. Special treatment would entail a separate dangerous goods declaration and shipping note and either a separate section of the manifest or an extract on to a dangerous cargo manifest.

3.8 Cargo storage

A particular advantage of the container is that it needs no protection from the elements, but this does not apply to all breakbulk cargo. Much of this cargo may be packaged in cardboard cartons, which would suffer greatly from damp or wet conditions. Equally, goods not substantially packaged can be damaged by frequent handling and are subject to pilferage.

The terminal operator therefore has to provide suitable space for all kinds of storage, including lockable space for high-value goods and those subject to customs duties or other taxes.

Dangerous goods require special segregated stowage, not only from ordinary goods but also by class.

3.9 Stowage of cargo

The safe and efficient stowage of cargo on a ship is one of the most important operational activities in a liner company. A ship has to be seaworthy in all respects before sailing, and this is one of the fundamental responsibilities of the Master of the ship. As a ship in a liner trade goes from port to port, discharging and loading cargo, the criteria for seaworthiness have to be rechecked at every port.

However, the stowage of the ship is a commercial issue as well as one of safety. The line will want to get as much cargo on to the ship as possible, within safety limits. It will also want to stow the ship so that cargo or containers do not have to be moved in the course of the voyage, as this will increase costs and delay the ship (which also reduces efficiency).

With a conventional ship, the cargo to be loaded will be a heterogeneous mixture of different commodities, with different packaging, sizes, shapes and weights to be fitted into the ship's holds, which will themselves be of different dimensions.

With a container ship, the challenge is of taking thousands of containers of only two sizes (20ft and 40ft) and allocating them to designated slots on the vessel in the optimum way.

Basic principles – stability

The term 'seaworthy' means, among other things, that a ship must be capable of remaining upright or stable at all stages of the voyage and in all weathers. To remain upright, the centre of gravity of a ship must be below a point where a line drawn vertically upwards from the centre of buoyancy when the ship is upright meets a line drawn vertically upwards from the centre of buoyancy as the ship heels.

As the voyage continues, oil and water are consumed and the centre of gravity rises. Should bad weather be experienced, heavy seas can land on deck, causing it to rise even further.

Therefore, the chief officer must ensure some heavy cargo remains low in the ship or ballast water is taken into the tanks at the bottom of the ship.

Stowage of conventional ships

With a conventional liner ship, the Master will normally delegate the responsibility for the safe loading and discharge of the ship to the chief officer (first mate). The cargo plan will be the critical document, as the chief officer has to decide where best to stow each item of cargo.

As with a container ship, the calculations must take into account the stability of the ship (heaviest cargo at the bottom), rules of separation of hazardous cargo, the need to access the cargo for discharge without moving other cargo and the size and weight of individual packages, as some cargo has to be moved into the 'wings' once it is in the hold.

The planner also needs to consider whether the cargo could be damaged by seawater (some cargo will need to be stowed on deck, such as large items of machinery, long steel girders, and so forth).

Meeting all these criteria, as well as planning ahead for what is going to happen in subsequent ports, calls for enormous skill and experience on the part of the chief officer.

Stowage of container ships

While the basic principles are the same, the way in which a container ship is stowed is significantly different. With the objective of a fast turnaround in port, all the planning has to be carried out before the ship arrives.

The container line employs a ship planner who will take charge of the overall plan for the ship and designate which sections of the ship will be loaded from Port A to Port B. Cargo for a



Row markings in a 20ft hold

particular port will be concentrated in a hold or on-deck stack, in a system known as block stowage.

Every position in which a container can be stowed on a vessel is allocated a unique six-digit number, which is determined as described below.

First the bay identifies the position of the container fore and aft. Each block or bay is given a two-digit number, odd numbers for a 20ft bay, and even numbers for a 40ft bay. The number increases from bow to stern. So, 20ft bays will be numbered 01, 03, 05, and so on, from the bow, and 40ft bays will be numbered 02, 04, 06, 08, and so on.

Next the row identifies the position left to right in the ship. Starting from the centre line, rows to the right (starboard) have odd numbers, and rows to the left (port) have even numbers, when facing forward. If there is an odd number of rows in total, the centre row will be numbered '00'.

Finally, the height is identified. Containers at the bottom of the ship are numbered 02, and then continuing 04, 06, 08, and so on, moving upwards in the under-deck stack.

Containers on deck start from 82 for containers stowed on the hatch cover; and then 84, 86, 88, and so on, moving up the on-deck stack.

So, for example, the container in position '020584' is in the 40ft bay nearest the bow, in the third row to the right from the centre line, and in the second tier on deck.

A bay plan is a diagram used for stowage planning purposes which will show the cross-section of a ship, with each container in the designated stowage position, usually with the container number, destination, weight and any hazardous class.

Such plans are now normally produced by computer, and the line's records will show the exact stowage position of any container loaded on a ship.



StowMan bay plan software used for stowage planning purposes

The planning of a container ship can be aided by computer software which can instantly calculate all the required parameters to ensure that the ship is in a seaworthy condition. The GM (or metacentric height) is important to ensure the stability of the vessel, but there are other parameters that have to be within required limits (which will be specified in the design of the ship).

These include:

- Vessel draught
- Forces that may twist or bend the hull of the vessel (shearing, bending, torsion)
- The trim of the vessel (ensuring the weight is distributed bow to stern in the vessel)

Reefer containers will, of course, have to be stowed in a position adjacent to an electrical socket (reefer plug) and hazardous containers put in a position which conforms with IMO regulations, as set out in the IMDG code.

Ship planners will also need to plan the stowage of containers to make the operation as efficient as possible. They will need to consider:

- Avoiding the need to move containers in order to access containers underneath (moves needed to access other containers are called restows)
- Distributing containers to be worked at a particular port along the length of a ship, in order to maximise the number of cranes that can be used to unload and load the vessel

Computerised tools are therefore vital in order to be able to test different options, and these can be used to optimise the stowage of a vessel through modelling different alternatives.

3.10 Port and terminal ownership

It is important to have some understanding of the ownership and the organisation operating the facilities that liner vessels will be using when calling at a port. A distinction is normally made between:

- The port – the land, the channel, the marine services associated with the port call (tugs, pilots, and so on) and the management of the port area
- The terminal – the facility at which cargo is loaded and unloaded, together with the associated equipment, labour and systems

The port is more likely to be a government-owned and controlled organisation (either directly by central government or a local government authority or elected body), which is looked on as an important part of the national infrastructure, and where the port has a number of statutory duties. However, in some places, the entire port has been transferred to the private sector. In the UK, for example, a private company, Associated British Ports, owns a number of major ports (including Southampton), having bought them from the government some years ago.

A much more diverse pattern of ownership is found with the terminals. In some ports the entire operation may be carried out by the port authority. However, more typically, the individual berths or terminals in the port will be leased to private operators who will be responsible for providing the labour force to work the vessels and all of the berth equipment, including cranes, gantries, transit sheds and indeed everything concerned with handling the vessel and its cargo.

Ports generally contain numerous different berths and terminals, and many of these will be specifically allocated and equipped to handle a particular type of cargo operation, for example, containers, timber, coal, and so forth.

Both general cargo and specialised berths may be available to any vessel, as common user berths, or the berth may be leased to or dedicated to a particular shipping line, cargo interest port user or group of operators.

3.11 Terminal management and organisation

Loading and discharging terminals have to provide some or all of the following:

- Space to accommodate cargo and containers waiting to be exported or imported, also vehicles awaiting transit
- Segregated area for hazardous cargoes
- Electric sockets for plugging in reefer containers
- Sufficient quay length to accommodate the normal trade flows without unduly delaying ships

- Adequate loading and discharging equipment for normal cargo operations, including movement around the port area
- Facilities for the necessary documentation to take place, including Customs and Excise and port health checks
- Facilities for foot and car passengers awaiting transit. Passenger terminals are usually segregated from freight-handling areas
- The means to deal with emergencies

In order to provide these activities at terminal level, a management organisation overseeing a number of departments will be required.



HHLA Container Terminal Burchardkai in Hamburg

Terminal management

Operations manager or terminal manager

With overall responsibility for the operation of the terminal, the manager will have some or all of the following duties. In large ports, some duties may be delegated to other staff.

- Ship berthing, berth rotation, timetabling. May arrange tugs and shore handling of ship's ropes if under the control of the terminal
- Cargo handling
- Supply and maintenance of cargo-handling equipment. This is sometimes done under a contract or rental agreement with outside firms

- Provision of labour: Most private port operators now employ multi-discipline staff who can be moved from job to job as required, for example, from maintenance work to ship loading to training
- Liaison with stevedore managers
- Movement of cargo into and out of transit sheds

Stevedore manager

- Liaison with terminal manager on future labour requirements. Organisation of labour gangs for loading and discharge
- Recruitment and discharge of labour
- Organisation of cargo-handling gear
- Liaison with line or ship's agents on cargo movements in the dock area
- Liaison with the Master and ship's officers regarding cargo stowage and discharge

Health and safety officer

With the increasing emphasis on health and safety issues in ports, this role has much greater prominence. Responsible for:

- Safe working practice throughout the terminal and health of employees
- Safety of all equipment
- Compliance with dangerous goods rules
- Provision of emergency services, internally or external arrangements. Provision of training facilities

Commercial manager

- Commercial relationship with terminal users
- Marketing port services
- Negotiating contracts with port users
- Port charges and tariffs

Technical or engineering manager

May have responsibility for the maintenance of sectors of the infrastructure such as lock gates, dry-dock facilities as well as all the mechanical equipment and technical facilities used within the terminal.

Stevedores (or dockers)

This is the labour force employed to load and discharge the cargo. They work under the instruction of the stevedore manager who in turn has to meet the requirements of the ship's chief officer. They move cargo to and from the ship's side.

Dockers in container terminals include gantry crane operators, straddle carrier drivers, lashing gangs and tally clerks. In North America, dockers are more commonly referred to as longshoremen.

Planners

In many ports where a large amount of cargo is to be loaded, the shipping line or the terminal will employ planners to draw up cargo stowage plans prior to arrival of the vessel. This is obviously vital when the ship is at sea and the chief officer cannot obtain the necessary information. It is particularly important with large container ships because of time constraints and the need to use sophisticated computer programs which can incorporate or be interfaced with the requirements of other ports.

Tally clerks

They are traditionally employed in unsophisticated general cargo ports, literally to tally or count the packages of cargo in and out from a ship's hold. In addition to physically checking the cargo as it is loaded or discharged, they may undertake other duties such as preparing the mate's receipts (or the part of the shipping note which serves that purpose). The tally company may prepare a daily working report and may also check the weight or measurement of some items of cargo to ensure that such details have not been mis-declared by the shippers.

Containerisation has eliminated much of this work but some form of checking still has to be done to ensure an accurate record of the serial numbers of the containers loaded and discharged.

3.12 Container terminals



Trinity terminal at Felixstowe, showing the layout of a large, modern container port

(photo: Hutchison Ports)

Liner cargoes are loaded and unloaded by personnel employed by the port or terminal concerned. The terminal operator is responsible for receiving the cargo from barges, railway wagons or lorries, and for storing the cargo or containers in the terminal area. For containers this is called the stacking area or container yard (CY). Breakbulk cargo or less than container load (LCL) cargo for containerisation at the port is delivered to transit sheds or a container

freight station (CFS). The inward cargo discharged from the vessel needs to be stored until such time as it is claimed by the importers after being cleared through customs by the importer or their agent.

The majority of liner business will be handled by specialised container terminals where container vessels are loaded and discharged. Most of these terminals have been purpose-built to provide the facilities required for a modern container operation. These facilities will include:

- Enough berths to handle the number of container ship calls, a quay length suitable for the largest container vessels that call at the port, and the required depth of water
- Gantry quay cranes – again the number required will need to be calculated according to demand, and they will need sufficient outreach to be able to handle containers on the outermost row of ships
- A sufficient yard area with hard standing where containers are stacked before loading and after discharge, together with yard lifting equipment – straddle carriers, or gantry cranes – either rail-mounted (RMGs), which run on rails in fixed positions over a yard area, or rubber-tired gantries (RTGs), which can more easily be moved from one yard area to another, as they run on wheels directly on the yard surface
- Internal movement vehicles, which move containers between the yard and the quay crane (or if the yard is run with straddle carriers, these can also move the containers to and from the ship)
- A segregated area for storing hazardous containers and an area for reefer containers, with reefer plugs
- Gate operations for road vehicles providing inspection, documentary and security control, and an area to exchange containers between road vehicles and the terminal
- Rail sidings, and berths for barges and feeder vessels if needed
- Possibly a shed for stuffing and unstuffing containers, with access docks for loading and unloading of lorries, although many container terminals do not provide for on-dock packing and unpacking, so containers have to be moved to an off-dock depot

Normally, a terminal operator would provide some on-dock storage space for a line's empty containers from which units could be drawn either for loading onto a ship bound for an area with inventory deficit or else released to a merchant prior to export stuffing at his premises. In addition, the carrier is likely to have its own privately contracted off-dock container depot where merchants and truckers can pick up and drop off, as well as serving as a site for box maintenance and repair.

The change from conventional cargo handling to containers dramatically reduced the labour required for port operations, and automated container terminals are now in operation where cranes and internal movement vehicles are controlled remotely. This has further reduced labour costs, but perhaps more importantly it has increased productivity and improved safety within the terminal.



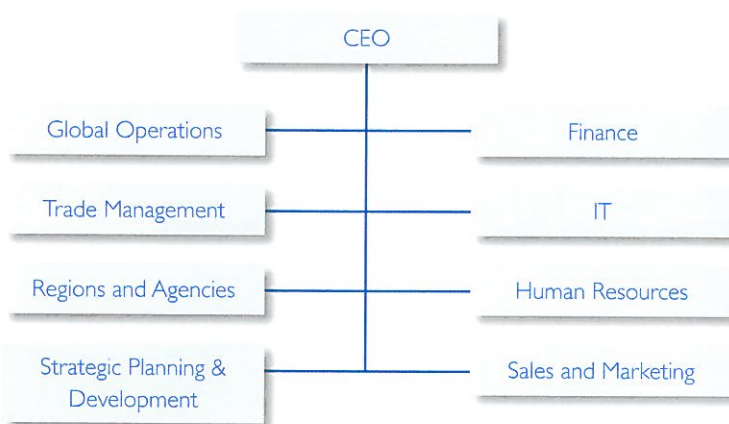
Chapter 4

Management and organisation

4.1 Structure of liner companies

Liner shipping companies vary significantly in terms of their overall size and ownership. They may be subsidiaries of larger multinational organisations with interests outside transportation; they may be state-owned or privately owned companies. The size and ownership of a liner shipping company has some bearing on the way it is structured and managed, but there are some areas of activity that are necessary in all liner companies

A number of functions mirror those of any large company, but a liner shipping company also needs to be organised so as to manage business activities effectively across many continents and countries. While the exact structure and responsibilities at executive management level will vary, most liner companies will have the following main functions reflected at senior management or board level.



4.2 Trades – network and services

The heart of a liner shipping company is the network of routes that it provides. The planning of that network and its constant evolution in line with market developments, together with the allocation of the appropriate ships, is a vital part of ensuring that the company has an attractive and cost-effective service to offer to its customers.

Network planning is therefore likely to be an important centralised function in the company. For most liner companies, their joint service arrangements with other liner companies will be an integral part of their network planning activity.

Trade management – profit centres

To ensure effective profit management within any large company, the business is usually broken down into individual profit centres so that management is focused on bottom line results. This helps to ensure there is a clear picture of which parts of the business are more profitable and which are less profitable or loss-making.

There are different ways to do this within a liner company, but the most common is to break the business into individual trades, with a management team responsible for the profits in that trade and for producing a return on the assets (largely ships) allocated to the respective route.

The individual trade managers will be responsible for the main decisions affecting the services within their jurisdiction and will report to the director of trades.

In some liner companies, those managers and their teams will be located in the companies' regional offices, with the logic that in order to run a business, you need to be close to the market.

Other liner companies put all their trade management in their head office to facilitate optimum communication and co-operation between the different trade teams, none of which can operate in isolation from the others. This also makes working together with the other head-office functions easier.

4.3 Sales and marketing

Booking cargo

Liner service routes and timetables are circulated to exporters, forwarders and traders, and the services are advertised in the shipping press and on the internet. Most liner companies also employ sales staff to contact clients by email or by calling on them in person to canvass support for their services.

A booking is made when the shipper offers cargo to the line, the freight rate is agreed and the line accepts the cargo for carriage. These three elements create the contract of carriage, which will be evidenced later when the B/L or other document is issued. It is important to remember that the contract is made at this point whether the arrangements were agreed by telephone, fax, email or letter. Under English law and in many other jurisdictions, the contract does not even have to be in writing.

Sales is a function that is executed at a local level, by the line's country office or agent, although at a regional or even head-office level there may be a so-called Global Accounts sales team that oversees prestigious corporate accounts that support the carrier on a multi-trade basis.

E-commerce or e-business

For many years the shipping industry envied the way a travel agent was able to book an air passage instantaneously on almost any airline in the world. However, the sales and marketing structures of the two industries are different.

The development of the internet and web-based technologies has enabled shipping businesses to explore electronic solutions. Sophisticated websites with both open information pages and closed subscriber or customer pages enable lines to provide facilities for online booking, cargo documentation and cargo-tracking to their clients. Nearly all liner companies now have in place sophisticated IT networks to handle vessel and cargo information.

It is important that the sales strategy of a company has a central direction; however, this will be provided by the director of sales and marketing together with a small central team.

They will also develop a sales strategy, which will cover such important elements as:

Segmentation of business: What is the company's desired mix – medium or large accounts; beneficial cargo owners (BCOs) versus intermediaries (NVOs); different commodity groups? Ensuring maximum profit potential will be the goal while at the same time maintaining some degree of diversity so that not all eggs are placed in one basket.

Sales organisation and methods: How will the sales force be organised and managed? What tools will it need to make it effective, particularly recognising the global nature of the business, for example, using a customer relationship management (CRM) system? Training issues, such as negotiation skills, will also need to be covered. Sales targets will need to be set and monitored down to the level of each country and individual salesmen.

Key accounts: How the company will handle its most important accounts, particularly those whose business covers more than one country (global or regional accounts).

Tenders: Increasingly, instead of negotiating prices and contracts for individual pieces of business, route by route, large customers issue a tender once a year to obtain rates for all their business on all the routes they use. On the basis of the rates obtained, the customer chooses a few preferred carriers on each route. Responding to tenders therefore requires organisation and resources, because without the ability to produce a suitable, researched response, a line may be excluded from participating in that customer's business.

4.4 Regions and agencies

Much of the day-to-day activity in a liner operation is carried out at a local level. This activity will include:

- Selling the line's services to customers, including face-to-face selling, telephone selling, advertising and other means to raise the profile of the liner company
- Customer services – providing the necessary customer support, including providing service information and quotations. Booking the cargo and producing all the associated documentation for the shipment
- Organising the calls of the line's ships in the port and making arrangements with the container terminal for the loading and unloading of containers
- Arranging the movement of containers between the terminal and the customer's premises
- Controlling the stocks of empty containers, ensuring they are repaired and cleaned, and moving them as needed to be available for packing when required
- Collecting freight from customers and paying suppliers on behalf of the line

The agent

Traditionally in the liner business, the shipping line (the principal) employed an agent in each country or port to carry out these activities on its behalf, paying the agent a commission or agency fee. A line may choose to engage one agent to look after the ship and its requirements and another to look after the commercial side of the business including procuring cargo, or one agent may carry out both these roles.

An agent might act for a variety of shipping lines, effectively making available its local expertise and contacts to the shipping lines on whose behalf it was acting.

As the global container lines grew, they no longer wished to leave their local business in the hands of companies that they did not control. Consequently, many lines either bought local agency companies or set up their own in-house offices, so that local activities were fully integrated into the company's business and systems. Such entities are variously referred to as agencies or country offices, according to the type of organisation, but they essentially perform the same functions.

The agent tells the terminal operator of the ship's requirements some time before arrival. Information needed includes the main details of the vessel, the number of hatches or bays to be worked and the amount of cargo to be loaded or discharged. For containers, information is needed on the weight and number of containers.

In the case of alliance or vessel-sharing agreement (VSA) services, the agent of the respective ship operator would be the lead party liaising with the terminal operator; at the same time keeping in close contact with the agents representing the other members of the alliance.

Regional centres

These front-line activities are vital to the success of a liner shipping company and therefore they need to be properly overseen both to ensure high standards of service and to make sure that costs are properly controlled.

With the use of global IT systems, standardisation of processes across all agencies and countries will be important. This part of the organisation therefore needs control from head office, but it will be impractical for all countries to report direct to headquarters. Several regional offices will be set up to control the local offices in their own area. Typically, there will be one each in Europe, Asia and the USA with perhaps others in the Middle East, South America and Africa.

Shared service centres

The growth in IT and communication systems means that some of these functions can be carried out anywhere and do not need to be geographically close to the customer or the port. These so-called back-office functions include the production of documentation, invoices and monitoring payments.

Many lines have centralised these functions in low-cost locations, keeping staff costs low and achieving better productivity through economies of scale. This concept can also be extended to routine head-office functions if the line's head office is in a high-cost area.

Lines have established these shared service centres in China, India and the Philippines. Most have at least two centres, since the risk of centralising all this activity in one location is very high in case of some local catastrophe, such as flood, earthquake or a breakdown in communication systems. Local offices still handle most direct customer interface, although service centres are likely to become more involved as they have in other industries.

4.5 Vessel operations

Liner companies need a central function to control the main operational assets of the company – the ships and the containers. The detailed organisation of this part of the company will vary, but the following activities will need to be covered.

Technical ship management and operation

The way in which these ship management services are provided and especially how the various functions are grouped together differs from company to company. They all need to be provided either from within the company or by contracting out to independent ship management or crewing companies.

While the focus here is on the technical, operational and cost management of the ships, there are many commercial aspects that also affect the ships – size, speed, route requirements, and so on – so ship management departments have to work closely with their commercial counterparts.

Acquisition of vessels

The traditional way of procuring ships is to buy them outright. The company either uses its own cash resources to buy the vessel or, more likely, obtains a loan or mortgage secured on the vessel.

The largest companies may employ their own naval architects and design staff to create the type and size of newbuilds they require, or this function may be delegated to independent naval architects. Smaller companies may buy vessels built to a pre-existing shipyard design.

Other companies may concentrate on building up their fleet by buying second-hand tonnage and will use the services of a sale-and-purchase broker.

However, liner companies are increasingly procuring new ships through intermediaries. This is because either:

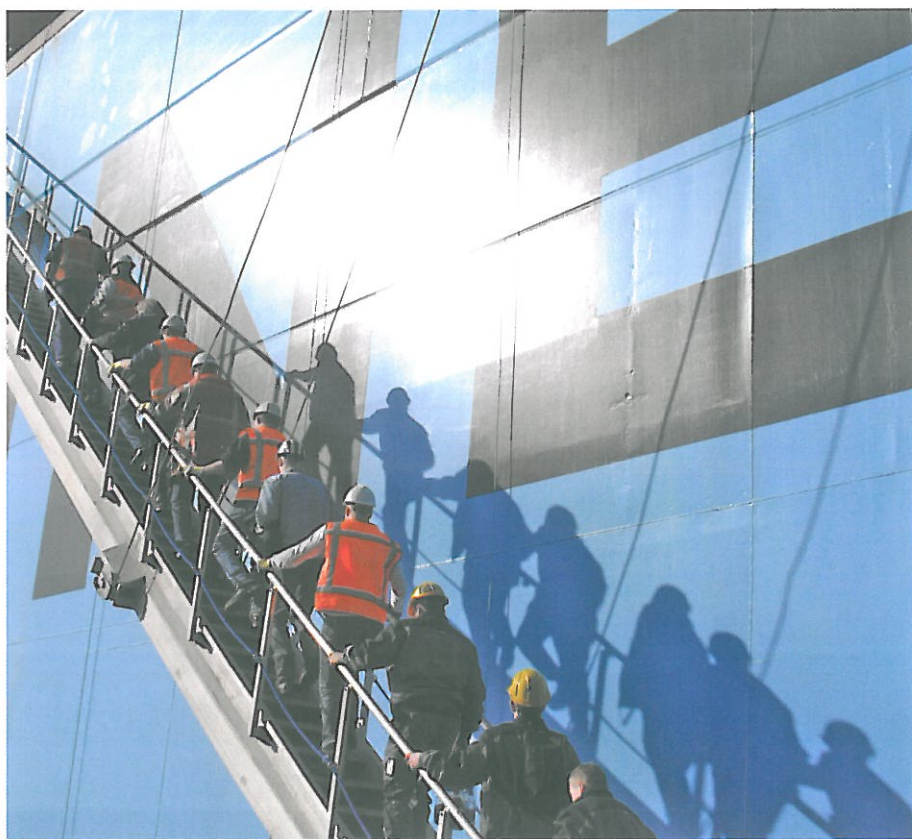
- The company does not have sufficient borrowing capability for all the ships it wants to operate or
- An intermediary is in a better position to obtain tax benefits from purchasing ships than the liner company. In concept, the approach is akin to leasing rather than owning a car.

The shipowner may still be heavily involved in the design of the ship and may intend to operate the vessel for most of its commercial life, sometimes with an option to purchase for a nominal sum after maybe 25 years.

Ships under these arrangements can be bareboat-chartered (where the charterer is responsible for crewing, maintenance, and so on) or time-chartered, where the actual owner performs these functions.

Other companies, especially those in the middle-distance and short-sea trades, time charter suitable tonnage from shipowning companies that specialise in the operation of container ships and small ro-ro ships. Time charters are also used to acquire tonnage to meet short-term fluctuations, perhaps to replace tonnage during a dry-docking or to meet a seasonal high level of demand for space. The duration of time charters can range from a few months to a number of years.

Crewing department



Wages are a major cost element

Owning a fleet of ships creates the need for crews to operate them. Crew wages form one of the largest single operational cost elements. A ship's operational success or failure will depend on its officers and crew, which in turn makes it imperative to have a well-run crewing department.

The flag of registration of the vessel is important because the precise number and competence of the officers and crew will be laid down according to the size and type of ship and will be enforced by the law of the country of registration. Crews from some countries are very much cheaper than others. For example, the wage levels in the Philippines are less than half those of Norway. Some maritime countries insist that ships under their flag employ their own nationals. Others, while retaining many of the safety aspects of ship manning, are more relaxed about the nationality of the crew. This has given rise to companies that undertake to provide entire crews. Many such crewing contractors directly supervise the training of the required personnel and ensure that they are replaced at the appropriate times.

Manning levels also form part of any labour agreements in countries where trade unions are able to negotiate crew standards and manning levels.

Technical departments

These are responsible for the supervision of all technical matters relating to ships' structure and machinery, much of which needs a regular programme of maintenance. A merchant ship that is not kept in a seaworthy condition will be unemployable, especially in liner trades, where there is a strong emphasis on reliability.

Seaworthiness does not just mean that there is no danger of the ship sinking, although that is a vital element. The term can also be considered as meaning cargo-worthiness. No matter how sound the hull of the ship is against springing a leak and how good the engine is, if the hatches let water into the holds or the ventilation is inadequate so that cargo becomes damaged, a merchant ship is considered unseaworthy.

Looking after the physical structure of the ship falls into two distinct sections, which are usually referred to as deck and engine-room. The term engine-room includes the main engine plus auxiliary machinery such as electricity generators, pumps, the propeller shaft and the propeller at the end of it. Reference to deck means all the rest of the ship, which is the responsibility of the deck department.

These departments usually employ shore-based ship's deck officers and marine engineers, customarily referred to as marine or engineering superintendents. They are together responsible for overseeing the routine servicing, maintenance and replacement of the whole structure of the vessel.

Failure to ensure efficiency in the technical departments will quickly lead to the ship being in trouble. That can vary from classification being temporarily withdrawn pending seaworthiness being restored to the extreme of a major catastrophe with human lives as well as goods being put at risk.

Most maritime countries have enacted laws that permit port state control, a procedure that enables a ship to be detained until substandard items are put right. Such detention is one of the risks owners run if their technical departments are inadequate.

The International Safety Management (ISM) Code is another international code of practice that sets out the minimum levels of training, administration and management of ships and has been adopted by most maritime countries.

Provision of stores

In addition to the purchasing needs of the technical departments, there are other requirements for equipment, maintenance materials and spares. The officers and crew have to be housed and fed and worldwide purchasing requires specialist skills, especially if maximum economy is to be achieved without skimping. Food can be a particular problem because different nationalities of crew have different eating habits, some of which have to be strictly adhered to. Personnel in the stores department have to be aware of this and to be sure that adequate supplies of the appropriate foods are bought, particularly if the ship is trading to an area where such items are unobtainable.

Operations

Having covered the essential tasks of maintaining the ship in a seaworthy and commercially sound condition, the line must ensure the ship carries out the tasks to which it has been committed by the commercial or trade departments.

The operations department will know from the technical departments that the ship is ready to carry out revenue-earning work and the commercial people will have explained what the commitment is. It is up to the operations staff to fulfil this commitment. For example, an essential job is to ensure that the ship is sent to the right place at the right time and then told where to go next. Decisions have to be made as to how much bunker fuel will be the ideal quantity and where this should be taken on board.

Similarly, it is vital to ensure that the agents at all ports of call are advised and their responses acted on. Crew changes have to be organised at appropriate intervals and dry-docking has to be harmonised with commercial commitments. While many specialist tasks can be passed to the appropriate departments, the operations staff have to co-ordinate it all so that the published schedules are maintained.

Stowage planning

Another vital function is the planning of where the containers will be stowed on the ship. Containers destined for the same port will need to be stowed together for maximum efficiency when unloading. Containers should also be stowed on the ship so that it is not necessary to move them to get to the ones to be discharged, otherwise there will be extensive delay and extra restow costs.

There are also vital safety factors in planning stowage. Heavy containers must be stowed at the bottom of the holds and lighter containers on top, otherwise the ship will be unstable with the risk of capsizing. Hazardous cargo must be stowed and segregated according to the international regulations to maintain the safety of the vessel. Refrigerated containers need to be stowed next to the ship's reefer plugs.

The stowage plan therefore needs to be updated before each port of call, identifying the containers that are to be discharged and deciding where to stow the containers that are to be loaded. This plan is then sent to the container terminal, which will actually carry out the loading and discharging according to the plan.

Lines will have land-based ship planners, usually sitting in their regional centre offices, where they will remain in close contact with the terminal stowage planners when their ships are on the coast.

Independent ship management

The shipowner has to decide who to use for the work described above. The largest companies hire the personnel and set up all the necessary departments. This in-house approach has much to commend it. The main benefit is the close control by the owner of all aspects of management activity. The amount of money tied up in the owning and operating of a ship makes the need to have day-to-day control of all those involved in its care such an advantage that the decision seems clear.

If the owner has very few ships, the costs to be allocated against each ship to cover the management function become disproportionate and, with only a few ships to manage, the senior personnel may not have enough work. These smaller companies may choose to employ an independent ship management company.

There are now many such companies based in different parts of the world. These companies contain all the different departments needed to provide an efficient service. Because of their size they are able to attract top-class executives and the large numbers of ships under their management enable them to enjoy economies of scale.

Some operators prefer to sub-contract only a part of the management function, which is possible in view of the clear demarcation between the different activities in ship management.

Container management

Managing the hundreds of thousands of containers of different types that are needed by a large liner company is a complex management and logistical activity. The container management department will be responsible for:

- Ensuring that the company has the right number of containers of all the different types to carry the planned level of container flows
- Buying or leasing containers
- Tracking the containers and ensuring they are properly repaired and maintained
- Making sure containers are in the right place at the right time to meet customers' bookings
- Authorising the sale or scrapping of owned containers at the end of their sea-going life

4.6 Contract management

With operational activity being carried out in every port and country where the company operates, it would not be sensible or realistic to control this centrally. Most day-to-day operations are delegated to the country or agency offices under the supervision of the regional offices.

However, there will be a number of significant operational contracts that companies may decide to negotiate centrally, or at least approve the contract terms centrally.

The main operational expenditure is the cost of lifting containers on and off ships, together with other handling and storage fees in the terminal area.

Most companies will have central guidelines for these contracts and may have an expert central team that will negotiate the main contracts, sometimes as part of a procurement department. Some container terminals are part of global terminal companies (examples include Hutchison and DP World) so it may make sense to negotiate a global deal with these companies rather than individual local contracts. Shipping alliances may negotiate stevedoring contracts on behalf of their members, bundling individual carriers' volumes together in order to obtain better handling rates.

4.7 Finance and accounting

The main financial activities of the company will include:

- Raising the capital necessary for the business – liner companies need significant amounts of capital to finance the ships and containers needed for their activities
- Collecting the revenue from customers all over the world and ensuring that cash not needed to meet local costs is remitted to head office
- Managing all the different types of costs incurred by the company in day-to-day operation
- Producing budgets and management accounts to track the profit performance of the different parts of the company

Budgets and management accounts

In the case of liner services, each route must be subject to advanced budgeting and subsequent comparison of the actual performance against that budget. Lines will have individual approaches to budgeting and the attribution of various cost factors and overheads, but the following are some of the main operational issues that have to be taken into account.

The cost of the vessels used is determined by making an estimate of the costs of the voyage, which is derived from a combination of three cost areas.

The first are the fixed costs, which are those that occur whatever the ship is doing, whether it is sailing on a voyage, working in port or simply lying idle. The main item here is amortisation (or depreciation), which is the term used to cover the need, during the working life of the ship, gradually to write off the initial cost of the ship. Frequently a ship is paid for with money borrowed from a bank or other financial institution and the cost of the instalments repaying the loan plus the interest charged by the lender is also essentially a fixed cost. With a chartered vessel, the hire cost needs to be taken into account.

Operating costs are incurred only if the ship is active. Hence crew's wages are a typical operating cost, as are maintenance and repairs. The total of fixed costs and operating costs are often converted to a daily running cost (DRC) for a particular vessel.

Voyage costs are those expenses directly resulting from undertaking that voyage such as bunker fuel and port expenses. The voyage estimate will provide an estimate of how many days the voyage will occupy. The distance involved divided by the ship's average speed will tell how many days at sea and the ship's fuel consumption will indicate how much fuel will be used at sea at that speed. Obviously a ship uses far less fuel when stationary in port.

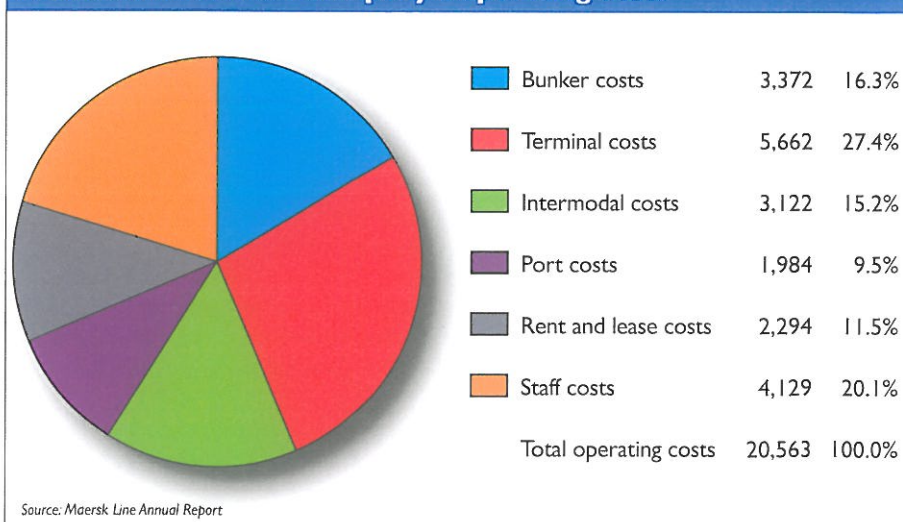
The rates of loading and discharge will provide an idea of the number of days in port and experience of the trade will make this part of the estimate more accurate. The port costs are the direct costs of calling at a port (pilots, tugs, port dues, mooring, and so forth) and can be calculated from the port tariff together with commercial quotations from, for example, tug companies. The cargo-handling costs (stevedoring terminal handling quay rent) are more difficult to estimate for breakbulk vessels. For container vessels, an estimate of the number of containers to be loaded and discharged will be required, which is then multiplied by the terminal handling charge plus an estimate for storage costs and other items that are charged separately.

The anticipated freight earnings plus surcharges and less commission will provide a total income for an individual voyage. Given that this is the gross profit, it should exceed the costs by a substantial amount.

In the case of a breakbulk service or a port-to-port ferry operation, this completes the voyage-related estimate. But for a container operation or a ro-ro service providing through transport, equipment costs also need to be included.

Owned containers may be costed in much the same way as a ship, with fixed costs (including depreciation of their value) and operating costs (such as maintenance and repair, surveys, empty storage). Leased containers incur a daily hire rate, as well as operating costs.

Breakdown of a liner company's operating costs



More complex is the calculation of costs for moving empty containers from surplus to demand locations, as this will depend on the balance of in and out movements in any given location, and some form of computer model may well be used.

Finally, any through transport operator's budget will include costs and revenue arising from the pre- and on-carriage operations, which will include feeder ships as well as inland transport by road, rail and barge. The line will aim to operate these services based on cost recovery, although this will not always be possible. For example, if the line has chosen to serve a port with a feeder while its competitors call direct, the line will have to absorb the cost of the feeder service.

Voyage estimate – Illustration

	Headhaul	Backhaul	Total	per teu
Teu loaded	1,659	1,213	2,872	
Revenue (\$'000)	1,535	607	2,142	\$745/teu
Minus variable costs (\$'000)				
Inland transport	83	49	132	\$46/teu
Terminal costs	216	146	362	\$126/teu
Feeder costs	33	24	57	\$20/teu
Agency	75	55	130	\$45/teu
Contribution	1,128	333	1,461	\$509/teu
Minus container costs (\$'000)				
Daily cost	58	36	94	\$33/teu
Storage	17	12	29	\$10/teu
Imbalance	100	6	106	\$37/teu
Maintenance and repair	10	7	17	\$6/teu
Ship costs (\$'000)				
Operating costs			325	\$113/teu
Depreciation			115	\$40/teu
Bunkers			490	\$171/teu
Port costs			75	\$26/teu
Insurance			23	\$8/teu
Profit before overheads			188	\$65/teu
Overheads			120	\$42/teu
Net profit			68	\$24/teu

The revenue and a number of the costs can be attributed to an individual voyage. However, some costs will be allocated to a voyage through an agreed system, so that the total costs involved are recovered over the course of a year. This method will be applied, for example, to container and imbalance costs, and to the costs and overheads associated with offices.

While the results of an individual voyage will be of interest to management, liner shipping is a continuous business, tied to the business model of providing regular (generally weekly) sailings. Therefore the voyage estimates are likely to be aggregated on a monthly, quarterly and yearly basis in order to monitor and interpret the financial results of the business.

4.8 Insurance

Insurance is another significant item of cost to the liner operator. It falls into two distinct categories, the first of which is the insurance against loss or damage to the ship itself. This is referred to as hull and machinery insurance. The best known provider of this type of insurance is Lloyd's of London. Access to the underwriters is only possible through a Lloyd's broker, who acts on behalf of the shipowner in seeking the best cover possible at the lowest premium.

Marine insurance is by no means the monopoly of Lloyd's and many of the bigger insurance companies include this type of cover among their activities.

The other sort of insurance is third-party insurance. This includes such things as claims against the ship by a port authority for damage done by a ship hitting a jetty, claims by crew members for personal injury when negligence is alleged against the shipowner and claims by cargo owners when their cargo is not delivered in the same 'apparent good order and condition' as it was when it was loaded. In other words, it covers any claim made against the ship by another person or company.

For historical reasons, underwriters were reluctant to offer this sort of cover. As a result shipowners joined together and formed associations referred to as P&I clubs (protection and indemnity associations). Protection involves the legal help that the clubs give to fight against unfair claims while indemnity covers the repayment to the owners for any third-party claims that have been legitimately made and settled.

4.9 Agency activities

In many cases, a liner operator will choose to form a subsidiary company as a branch office to carry out the duties of an agent, and this is the preferred route of most of the larger lines. This is referred to as in-house agency. The line maximises its own image in marketing terms and has full control of local activity. However, this does need a minimum throughput of containers at that place for it to be financially viable.

There are still some large operators that prefer to appoint an independent agent in each country, arguing that this way is often cheaper and secures local expertise. In other countries, national law does not permit foreign-owned companies to act as ship agents.

In some cases, lines aim to get the advantages of both approaches by setting up a joint-venture company with a local agent, so that both the principal and the agent have a stake in the successful operation of the agency.



Agents can be independent, line-owned or joint ventures (photo: Patrick King/GAC)

Whether the operation is in-house or carried out by an independent agency, the duties are the same and the wholly owned local subsidiary will still be in an agency relationship to its parent company and to the vessel.

An agent acting on behalf of a liner operator may fall into one of four categories:

- A port agent appointed to look after the ship while in port but having no responsibility for any sales function in regard to obtaining cargo
- A sales agent who has no actual contact with the ship and whose duties are entirely those of selling the ship's cargo-carrying space. Such an agent will be allocated a sales area that may be adjacent to the port or may cover inland areas, if there are major centres of population and commercial activity away from the port
- The most usual situation, where an agent is appointed to carry out the duties of (a) and (b) within the same agency contract
- A general agent whose additional duties will be to supervise the work of other agents within a geographical area. Those agents would report to the general agent rather than directly to the principal

The liner agent's duties

Unlike a tramp agency, which may be for a single call and with the appointment being a very simple fax message or email, a liner agency is usually the subject of a written contract signed by both parties. Even in-house agents usually have some form of contract because the operating company and the agency company are separate legal entities and there are good legal and often financial and taxation reasons for defining the individual responsibilities.

Such contracts can vary widely to meet the individual needs of the line and local requirements of the country and trade. The Federation of National Associations of Ship Brokers and Agents (Fonasba) has published a Standard Liner and General Agency Agreement (SLGAA), which is a good basis for the negotiation of the agency contract and many principals have used it in its entirety. It is approved by the shipowners' organisation Bimco. This form provides a useful summary of the relationship between the line and its agents and the duties each has to the other. Fonasba also publishes a Standard Liner Sub-agency Agreement for use when the agent appoints a sub-agent in a particular area or port.

Territories

It is normal in the container trades for an agent's territory to be an entire country. But if the ship calls at two ports with different agents, or the agency is a sales-only one covering the hinterland (for example, the industrial heart of Germany), it can create difficulties. An example might be where the goods are produced in Munich, the shipping manager is based in Frankfurt and the exporter's forwarding agent is in Rotterdam. All three have some influence on the choice of line and all therefore have to be canvassed. It might not be easy to decide who actually made the sale.

There is also the case where a confirming house is based in the UK but has contracted on behalf of an overseas buyer for goods produced in Germany. Such a situation is covered by the SLGAA's remuneration schedule, which allows for the commission to be split between 'booking only' and 'handling only'.

Conflict of interest

An agent for tramps or tankers could easily be attending to, for example, a Shell tanker and an Exxon tanker in the same port on the same day and no one would be worried. With liner vessels it is quite different. Because of the sales and commercial activities that are an integral part of liner agency work, it would be most unusual for an agent to act for more than one principal whose schedules cover the same routes.

In the SLGAA, the services and routes operated by the line are stated, and the agent undertakes not to represent any competing services. This has become an increasing problem, with most liner operators aiming to provide global services and the reduction in the number of independent agents available in many major ports.

An agent may represent line A from, say, Europe to the Middle East, line B serving the Far East and line C covering Australia. Should line A decide to extend its run to the Far East, or line B to include the Middle East in its schedule, or either line to accept cargo for Australia and tranship it at one of the many transshipment ports in South-East Asia, both the line and the agent could face a difficult choice.

One solution has been to establish separate sales and marketing organisations within the agency to sell the services to shippers and receivers. The agent can still achieve economy of scale by centralising non-competitive services such as husbandry, container control, accounting, and so on. These are often referred to as back-office activities because they do not directly affect the customer.

Marketing versus sales

The sales aspect is to turn all the 'identity building' into an actual customer base that will ship cargo with the line on a regular basis. The sales function can be undertaken in many ways with emphasis on telephone or electronic communication, supported by advertising and mailshots or greater use of face-to-face contact with clients. Time must be spent on research into the market where new customers may be found using trade statistics, reading export or import magazines as well as retaining contact with peers and competitors through trade associations (providing that does not infringe upon any anti-trust regulations).

However, the main thrust of sales is direct, as shipping is a people business and personal contact is an important factor. A critical decision is how many, if any, fulltime cargo sales representatives to 'put on the road'. It is never an easy decision because there is always scope to devote more people to the task of making direct contact with customers to persuade them to support the service. The aim always is to achieve the best possible market share, but the time will come when even doubling the number of representatives canvassing the market might only result in a 1% increase in cargo.

Depending on the size and philosophy of the liner agency, the sales representatives will either be attached to the section taking the bookings for a single or group of lines or trades, or be part of a separate sales department working for all the services represented.

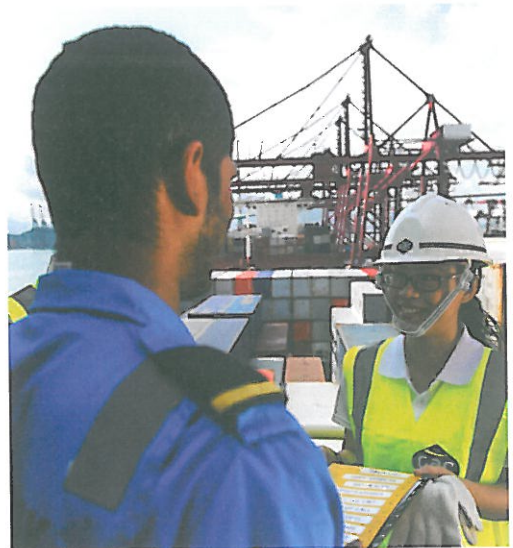
Separating the sales force from the line and trade management has particular merit when the agency has several lines to sell. There is more than simple economy of scale in such a case, although one canvassing call covering several lines is obviously a more efficient use of labour. The additional benefit is that the shipper may not be exporting to the same areas all the time, but if the sales executive has a variety of routes to talk about they may always have something to sell to the shipper.

Full-time outdoor representatives are not the only sales tool. There is specific mention in the SLGAA of advertising and other promotional activities.

The agent in the port

The agent's duties include taking care of the crew's needs (photo: Patrick King/GAC)

If the agency attends the ship itself, the relationship with the principal and the agent's duties will be similar to those of an agent for a tramp vessel. The shipowner will need to keep the agent advised as to a ship's movements and expected time of arrival. The agent will know from the schedule when the next vessel is due. The owner and agent will be in constant communication regarding changes to the schedule and all the other expected requirements for the ship.



The ship's Master will also contact the agent to advise of the ship's requirements, giving the agent as much warning as possible, although this is not always feasible (as with damage or illness,

for example). The agent will contact the ship with any information of which the Master should be aware. Equally, agents will contact their opposite numbers in the next port of call as a ship leaves, to advise the agent there of any requirements about which there is not the time or the need to contact the principal.

The following is a list of some of the routine matters that are handled by an agent, before, during and after a ship calls at their port.

Before arrival

- Arranging a berth and discussing the cargo-handling programme with the terminal operator or stevedore
- Booking a pilot and tugs
- Arranging customs and immigration attendance
- Arranging for a doctor to attend, either for routine inoculations or in case of illness
- Arranging for the delivery of food, water, bunkers and stores of all kinds
- Preparation of ship's papers such as inward and outward clearance, light and port dues
- Collecting mail for the ship ready to be taken on board
- Arranging for a government official or consular officer to be present if crew are to sign on or off
- Arranging for transportation to and from airports and railway stations for crew arriving and leaving

On arrival

- The agent will board the ship immediately on arrival and meet the Master, chief officer and chief engineer to discuss their various requirements. These may consist of:
 - Arranging for cash to be brought on board for disbursement to the crew. A large amount of cash may be needed if a crew is to sign off
 - Arranging for crew needing medical or dental treatment to visit a doctor or dentist.
 - Further and more precise details concerning the cargo work, involving discharge and loading of, for example, livestock, hazardous goods, heavy lifts and valuables
 - Arranging to report to the principal of any details concerning insurance and general average claims
 - Arranging for the attendance of surveyors for either cargo or ship damage, or both

During the ship's call

- Daily liaison with the ship's personnel and cargo superintendent on continuing cargo work
- Towards the end of the call, arrange for the signing of mate's receipts and bills of lading (though with modern containerised liner services, this function has disappeared and the agent will sign the bills of lading, based on loading lists supplied by the terminal)
- Payment of bills and invoices for goods and services supplied to the ship
- Frequent and regular communication with the principal concerning the ship's progress and sailing prospects

On departure

- Advising the agent at the next port of the ETA and the requirements of the ship on arrival (for example, water and bunker needs) as these may be urgent after a long voyage. The ship may have to wait at anchor for a berth, and bunkers, stores and provisions might need to be delivered by boat, though most liner services will be planned so that they can proceed directly to the berth or container terminal on arrival.
- Any special medical or crew welfare needs so that there is sufficient time to make the necessary arrangements

Stowage plans

Breakbulk ships

One problem concerns the transmission of cargo plans, which are still used by breakbulk cargo ships. These describe the position of all cargo carried and are needed by the port stevedoring officials to identify where and what cargo is to be discharged. From the plan they will allocate the necessary gangs and arrange for any special needs such as heavy-lift equipment.

Ideally, the plan needs to arrive before the ship but will not be available for dispatch until the time of the ship's departure. Therefore, it will be sent by airmail or courier service and may well arrive after the ship. In this event the agent will have to communicate the essential information electronically, leaving the ship to advise further details on arrival. The chief officer will usually maintain a Master cargo plan on board.

Container ships

Bay plans indicating the position of every container on board the vessel are produced by the terminal operators. Because of the speed at which container ships discharge and load and the detailed information required, electronic systems must be used to transmit this data so that there is no delay to loading and discharge. Where major ports are involved within a usual geographic range, the main terminal operators have established routines and systems for exchanging this information between themselves and the line's operators will require this facility to be available within their terminal contract.

Cargo control

In the SLGAA there is a summary of the extra tasks that have to be undertaken by the agent of a container or ro-ro service.

Advising the terminal, the ship and the principal of bookings is a straightforward task. Those who plan the ship's loading are most concerned with the numbers of 20ft or 40ft containers, what they weigh, which ones contain dangerous cargo and any special containers (such as refrigerated, flat-racks, open-tops, and so on) that will require particular stowage. Container terminals will use computers to assist the ships in arranging the containers to meet the optimum requirements of 'heavy at the bottom/light at the top', plus availability for discharge with minimum re-stowage.

Lines that accept LCL cargo remote from the port require a duplication of the port liner agent's work to supervise the inward and outward cargo handled at the LCL depot. Ro-ro services also have an equipment control requirement for trailers and Mafi units as well as containers. Some larger agencies find it more efficient to operate a container control and inland haulage department serving all of the agency's lines. Apart from the economy of scale, it is often possible to provide return loads for road vehicles when several lines are being serviced.

In the case of a conventional breakbulk service, precise arrangements have to be made to direct the cargo to the export transit shed, with very careful timing in the case of heavy, awkward or hazardous cargo.

Discussions with the stevedores before the ship's arrival and with the ship's command before and on arrival are very important contributions to the task of getting the cargo loaded as quickly as possible in the right order; for trouble-free discharge at destination. This will involve the compilation of booking lists with heavy, awkward and hazardous cargo on separate sheets.

Documentation

Computerisation has changed the face of liner documentation, which is almost entirely produced by building up a base of data in respect of each consignment and vessel.

This will often start at the cargo booking stage, particularly when bookings are made by shippers through a facility on the carrier's website or email system. That data will often interface with a port community data system, providing links to all other parties involved. Consignment information will be created as information regarding each part of the total becomes available.

Once loading is completed, electronic manifests will be provided to all parties needing them. A major part of the information will be used to create the bills of lading – still for the most part distributed in hard copy because of the needs of the international trading and banking communities.

The bill of lading and manifest tasks are usually carried out in a separate section from the staff whose job it is to board the ships and tend principally to the physical requirements of the vessel and its personnel.

Import documentation: Consignees and notify parties have to be informed about the arrival of import cargo. The line needs to help its importers avoid incurring demurrage charges from the terminal operators or container detention charges.

The consignee has to prepare a customs clearance and in many cases pay import duty and taxes. The documentation often takes time to prepare and to work its way through the customs bureaucracy although port community computer systems have improved this in many major ports.

It is customary to keep the inward freight department separate from the export or outward freight department. The jobs and the customers are usually quite different. Furthermore, it is in the inward freight department where an agent needs to be especially alert against fraud.

Many bills of lading that consignees present for the release of their cargo are entirely straightforward and tally exactly with the manifest. The release of import cargo becomes a routine, perhaps even boring undertaking but there will be the occasional job that does not tally, is not properly endorsed or simply looks wrong. It may not be a fraud: it may be that there was an error in the manifest that should have been notified by the loading port agent via a manifest corrector:

Export documentation: The first task is to check the loading list, mate's receipts or other forms of dock return against the B/Ls and then to compile the manifest. If there is a discrepancy between the return from the dock and a particular shipment, the shipper should be advised. Again, this is not obligatory but makes good commercial sense because part of the consignment may have gone astray on the way to the docks and it could be that the documentary credit will be invalidated through lack of the missing part.

For container vessels, the process is more straightforward and the container terminal will normally supply a list of containers confirmed to have been shipped on board. This will enable the B/Ls to be released and a shipped manifest prepared and dispatched.

It is at this checking stage that each B/L has to be freighted so that the correct payment may be requested from the shipper. Alternatively in the case of freight collect consignments, the freight is annotated on the face of the B/L or in the freight list.

The department producing the manifest will always be under some degree of stress and the shorter the voyage time the greater the stress because the discharging port agent needs the manifest for its port as far in advance of the ship's arrival as possible. The customs authorities in some ports insist on manifests being submitted several days in advance of arrival, failing which a fine is imposed. Such ports are prone to look on late manifest correctors as attempts at smuggling. This is quite apart from the needs of shippers, who want their B/Ls as soon as the ship has sailed.

With tighter security requirements, the importance of early manifest availability is more crucial than ever. Vessels sailing to the USA must provide all cargo details to the authorities 24 hours before loading at port of origin, and similar regulations exist for Europe and other countries.

Accounting

A large liner vessel calling at a busy port can involve the collection of hundreds of thousands of dollars of freight and other charges. At the same time, an enormously varied number of disbursements will have to be met, especially with a container service.

It is of fundamental importance for an agent to be clear about the credit policy of the line. At one time this was easy. Either the shipper actually paid the freight before getting a freight-paid B/L or a bank-endorsed guarantee promising to pay within 15 days was provided. The latter period of grace would give the shipper enough time to present its documents under the letter of credit and so have the funds available to pay the freight.

Fierce competition among lines now favours those who will give credit without demanding a bank guarantee. Whoever grants that credit accepts the cash-flow disadvantage and accepts the risk of incurring a bad debt. Principals can exploit competitive pressures and pass the risk on to the agent.

In theory, the agent might argue that granting credit without a bank guarantee is normal practice in the trade and so the line should incur the bad debt if the shipper defaults, provided that the agent had taken normal precautions. Even when the agent has been proven to be negligent, their liability under the tort of negligence is the loss suffered by the principal. This is likely to be no more than the actual charges for lifting the cargo on and off unless the ship was absolutely full with other cargo turned away.

In practice, agents frequently do accept liability for all freight due whether the shippers have paid it or not. Whatever the policy determined by the agency contract, a well-versed accounts department with a clear-cut credit control function is important to any liner agency.

Remuneration

The agreement between agent and principal should cover not only payment for normal activities but also remuneration for extraordinary duties such as running a cargo claims section, which can be a time-consuming task requiring skilled staff. In the rare event of General Average, it can present a substantial work burden for a liner agency's staff. The additional costs and charges incurred will form part of the general average adjustment.

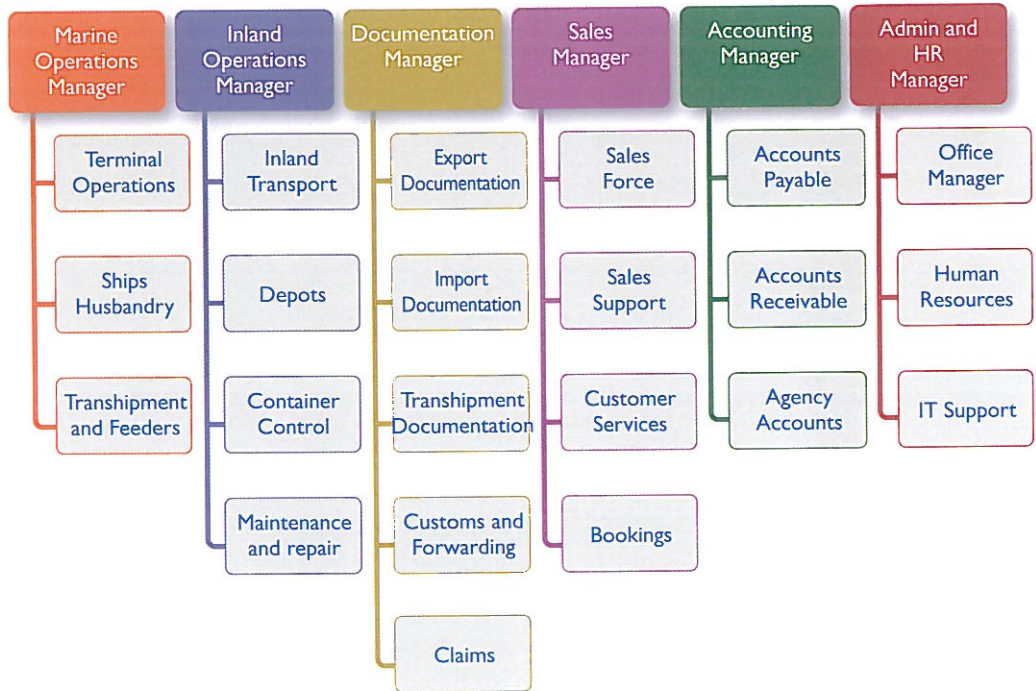
Liner commissions before containerisation were fairly simple and more or less uniform. There was a total of 7.5% on the net freight split three ways: 2.5% for booking the cargo, 2.5% for handling it at the loading port and another 2.5% for handling it at the discharging port. As most cargo was controlled at the port of loading, this tended to work out as 5% for outward freight and 2.5% for inward.

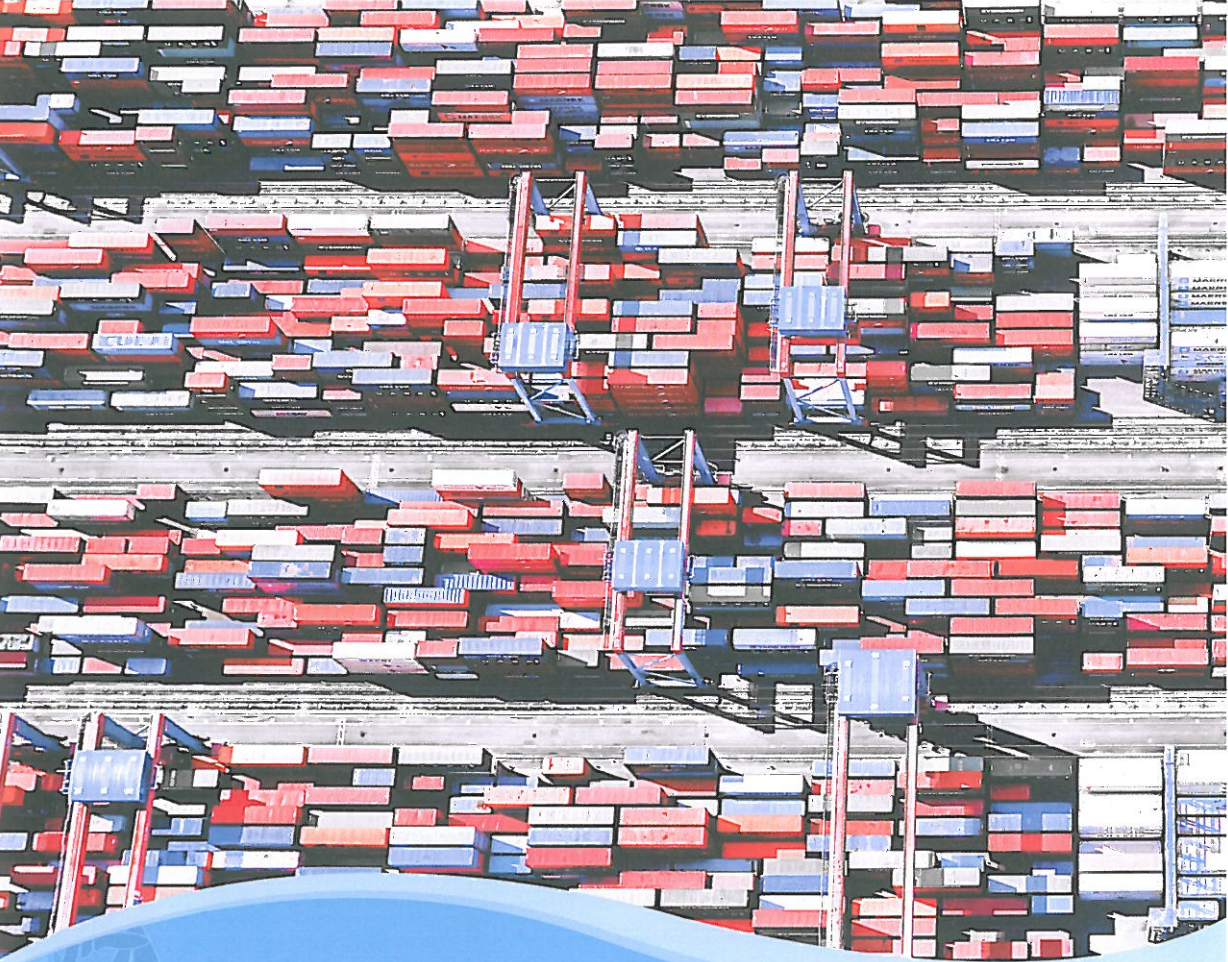
The complications involved with positioning and keeping track of containers, hiring road vehicles and staffing offices to supervise inland depot operations and various other duties are all products of the container age. Fonasba has attempted to cover every eventuality in its remuneration schedule.

The main problem for liner agents today is that competition and technical advances have, in many cases, halved the cost of moving a container half way across the world, with a commensurate reduction in the agent's commission. Some savings have been made through computer technology, but this in itself imposes costs, while the competitive environment has put relentless pressure on sales staff. Commission based on traditional percentages often now means much lower gross income for the same amount of, or perhaps more, work.

Agency organisation structure

In order to carry out all the activities described in this section, an agency office will be organised into a number of separate departments, all of which will need to work closely together. While the exact structure will depend on the size of the agency office, the range of functions for which it is responsible and the geographical area covered, a typical organisation structure might look like the flow chart shown.





Chapter 5

Unitisation, containerisation and intermodalism

5.1 Unitisation

There was dramatic growth in world trade after the Second World War. Advances in methods of mass production made sophisticated consumer goods much cheaper in real terms, leading to a rise in consumerism, while newly independent and developing countries were trying to develop their industrial bases by taking advantage of improved industrial processes and cheap labour.

This created the conditions for globalisation, but traditional breakbulk cargo handling was slow and expensive. Ships and berths were under-utilised and required a lot of expensive labour. Throughout the 1950s and early 1960s a series of investigations and experiments took place to determine how cargo might be more effectively handled in larger units and by mechanical means.

Initially, thoughts focused on improving existing methods, which meant palletisation. The ideal was to have most cargo palletised before the ship arrived for loading with the rest palletised at the terminal. Existing ships could be modified to allow forklift trucks to enter through hatches cut in the sides of the hull. Newly designed ships would have side hatches and multiple decks in which forklift trucks could operate. Pallets would be placed into position with the minimum of manual labour.

The argument seemed compelling, requiring no change in the infrastructure while the same vehicles would bring the cargo to the ship. There was no need for elaborate shore or shipboard cranes as a simple ramp to access the side hatches was all that was necessary. No new sophisticated ships were required as existing ones could be modified or new ones built with only minor design changes. On top of that, the terminals already used forklift trucks, and most shippers already palletised their cargo for their own convenience.

So why did this form of unitisation fail and containerisation succeed? The simple answer was speed and labour costs. Palletisation raised productivity in the docks from 1.7 to 4.5 tonnes per man hour, but containers raised it initially to 30 tonnes and subsequently very much higher.

5.2 Containerisation

The concept of stowing small items in a large reusable container dates back to the first quarter of the 20th century when lift vans were used in Europe and the USA for removing household goods in a unit that could be carried on road or rail vehicles. In the early 1960s, US operators led by Malcom McLean, the creator of Sea-Land, and Matson Lines developed the concept of using a standard-size unit that could be carried on a road trailer or in a ship. Surprisingly, it was the European lines that took the lead in transferring the concept to mainstream deep-sea trades and developing purpose-built container ships.

5.3 Intermodalism

The idea of containers was rapidly accepted, not only for the productivity benefits. Both shippers and consignees could see the advantages of greater protection for their cargo and the door-to-door concept that arose from the ability of containers to be carried by different transport methods, giving birth to the words intermodalism and later multimodalism.

In a full multimodal movement, the empty container could be filled (stuffed) at the exporter's premises and moved by truck to a rail terminal. Then it would be taken by train to the loading port, then by straddle carrier from the dockside railhead to the ship. A feeder ship might take it to a transshipment port to be loaded on to the ocean carrier.

On arrival at the discharging port, the whole procedure would happen in reverse, meaning that, theoretically, nine separate modes of transport could be used for a single consignment.

Within 20 years, some form of containerisation was introduced into every major route and within 30 years the containerisation of world liner trades was largely complete.

5.4 Economy of scale

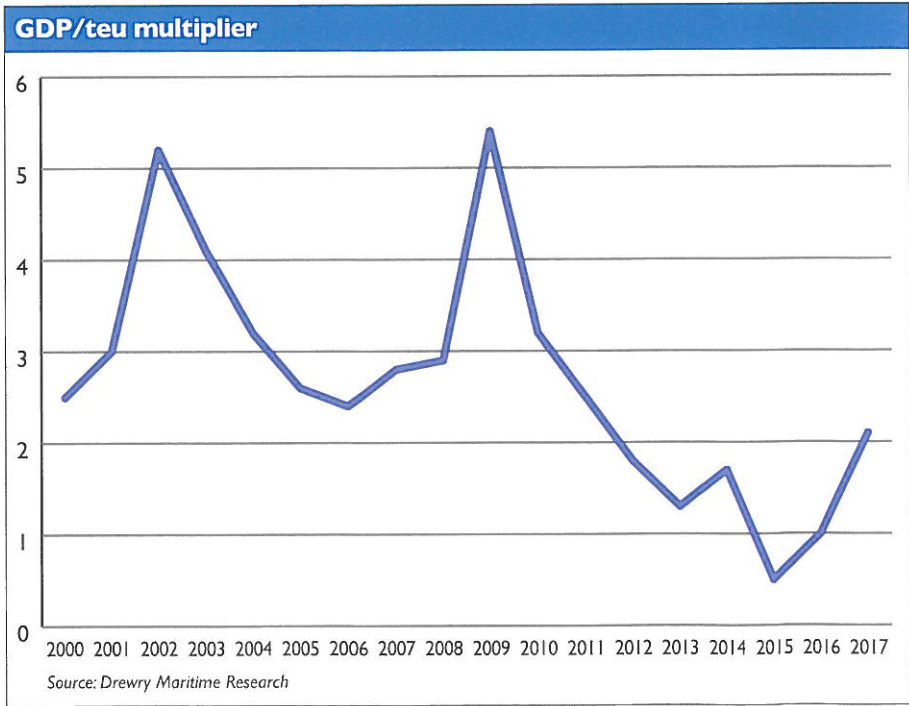
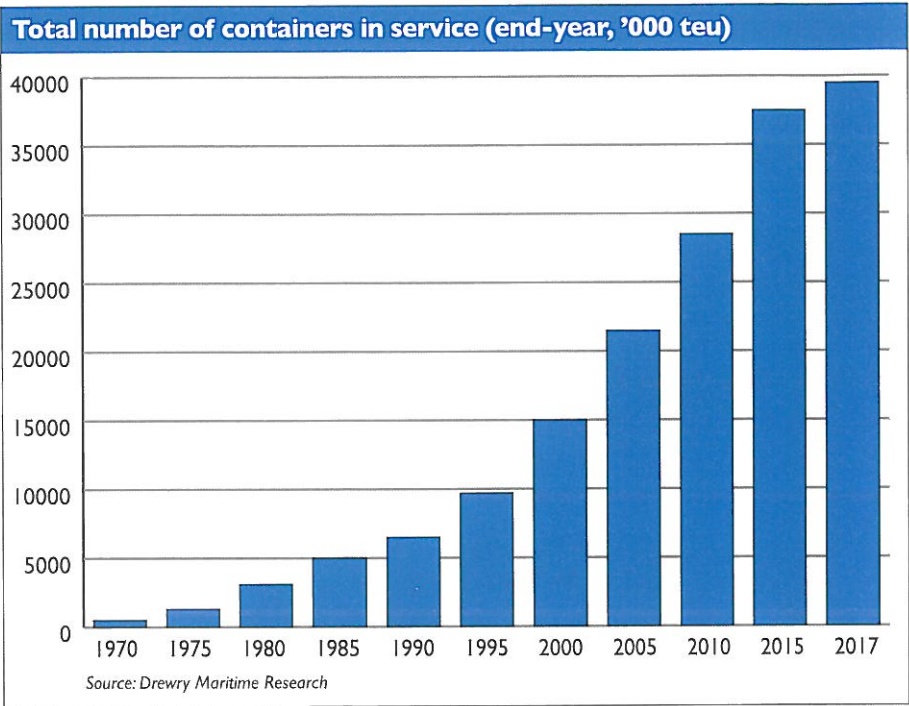
With larger ships, more cargo can be carried for virtually the same number of crew, while the motive power is more productive (i.e. the engine of a ship of 40,000 tonnes is not four times the power of a ship of 10,000 tonnes at the same speed, although much more power is needed to achieve higher speeds).

Economies of scale stem from the improved ratio of enclosed space to the dimensions of the steel hull. Consider the following comparisons:

Changes in liner vessel specifications					
	Breakbulk	Container	Container	Container	Container
Year	1960	1970	2001	2006	2018
Length	149m	227m	318m	347m	400m
Dwt	16,000	29,000	82,000	120,000	197,317
Teu	-	1,500	6,000	10,000	21,413
HP	8,000 bhp	20,000 shp	75,000 shp	-	80,707 shp
Speed (knots)	16	19	25	25	23

5.5 World container growth

The following graph shows the growth of the total number of containers in service at five-year intervals since 1970.



The former strong and sustained growth, occurring from the 1970s until the late 2000s, was the result of the initial rapid expansion of containerisation in the liner trades. As a consequence, the requirement for containers initially grew at a faster rate than growth in trade flows. This continued until the 1980s. The container fleet resumed its strong growth through the 1990s and continued into the 2000s as the globalisation of world trade drove up demand, although the pace of growth has slowed down since 2009.

A common metric applied to the liner industry is the relationship between global GDP growth and container trade growth (measured by the number of containers handled at ports throughout the world). It is known as the trade/GDP multiplier or teu to trade multiplier. Growth in containerised trade has always been expected to be higher than overall economic growth, chiefly as a result of two factors:

- Trend of outsourcing manufacturing, principally to Asia
- The progressive containerisation of breakbulk cargoes

Before 1990, the multiplier was in the range of 2.0 to 2.5 – that is to say, for each percentage point of global GDP growth, there was a corresponding 2.0% to 2.5% growth in container volume. During the last decade of the 20th century, as the shipping lines rapidly expanded their global network of services, the multiplier rose above 4. And in the early years of this century, it still hovered around 3 as world trade flourished following China's accession to the WTO in 2001.

Since 2009, the multiplier has been falling and by 2015, the expansion rate of containerised trade had dipped to almost zero. Outsourcing had peaked – in fact several manufacturers were starting to bring production back closer to home (known as 'near-shoring') – and the conversion of most commodities to containerisation was more or less complete.

In addition, several types of goods had been miniaturised. The old cathode-ray-tube televisions and computer monitors had given way to less bulky flat-screen models; purchases of home music systems declined as more people turned to downloads and streaming. Packaging methods had improved to allow for better utilisation of a container's space.

5.6 Container dimensions

The ISO standard container

When the container concept was being developed, the owners involved agreed that standard dimensions were essential to make the intermodal concept practical.

The International Organization for Standardization (ISO) quickly devised standard dimensions that made containers interchangeable in national and international trade. Their decision to use feet and inches rather than the metric scale was a reflection of the original development of containerisation in the US.

The end profile was originally set at 8ft by 8ft, with lengths of 10, 20, 30 and 40ft. Two × 20ft or 1 × 40ft container can usually be carried on one road trailer or 1 × 20ft plus 1 × 40ft on a railway wagon. The 10ft and 30ft types have long since become irrelevant to international trade.

The ISO also introduced an 8ft 6in height standard for 40ft containers in 1973 and for 20ft containers in 1976, thereby rendering the 8ft height obsolete.

The most important ISO standards are:

- ISO 668, which covers the standard dimensions and associated ratings of containers
- ISO 6346, which provides a system for the coding identification and marking of freight containers, including container numbers and size and type codes.

The high-cube



Container stack onboard with 40ft standard and 40ft high-cube containers

The high-cube container, which is greater than the standard height, was introduced in the late 1970s. High-cube containers are now in majority use, accounting for over 50% of the standard fleet and over 90% of reefers. These containers have the standard dimension of 40ft long but are 9ft 6in in height. They are mainly used for the shipment of lightweight goods such as empty cans for the food industry, paper tissue products, textiles or electronic goods where the extra cubic capacity of the container can be utilised without compromising the gross weight.

There has always been a demand for 45ft (and greater length) containers in US markets, but there has also long been a growing 45ft market in the intra-European trades to enable greater competition with 13.6m road trailers. There is also a stable demand for 30ft bulk units. It was illegal for 45ft containers to be carried on European roads until 2007, when EU Directive 96/53/EC was amended to allow boxes with 'chamfered' (reduced) corners to be carried as part of an intermodal movement. The rules were further relaxed in 2015 under Directive 2015/719.



Container showing weights and dimensions, with hazardous label (photo: breihenports)

the weight of the cargo.

and 34 tonnes for a 40ft container.

The payload weight is restricted by the 'all up' or gross weight that can be carried under the rules governing inland transport in any particular country. In the case of road transport, this includes the weight of the carrying vehicle. Even within the European Union this varies between different countries. The highest figure generally allowed is 44 tonnes (including the weight of the vehicle and trailer), though there are some exceptions.

Container numbers

Every container is allocated a unique number that comprises four letters and seven numeric digits, according to the standard laid down in ISO 6346 – for example, ABCU 1234567.

The first three letters designate the owner of the container (the owner must register its three-letter code to avoid duplication). The fourth letter is always U for a marine freight container. The owner then allocates the first six digits, according to their own numbering system, while the seventh digit is a check digit, which is calculated according to a formula from all the other letters and numbers. A check digit is used in computer systems to help validate the accuracy of the container number input. For example, if one digit is incorrectly entered, or two are transposed, the calculated check digit will not match the one entered and the container number will be rejected for further checking.

5.7 Types of container

Different types of containers accommodate different types of cargo. The ISO has standard size and type codes that assist in recognising units. The following types are in general use:

- Standard 'dry van' general purpose containers: 20ft or 40ft x 8ft x 8ft 6in
- High-cube containers: 40ft containers that are 9ft 6in high for the carriage of light but bulky commodities – ISO Code 45G0 (or 45G1)

All standard types are built from corrosion-resistant Corten Steel with container doors at one end only – ISO Code 22G0 and 42G0 (or 22G1 and 42G1 for containers with passive vents at the upper part of the cargo space)

- Bulk containers: usually 20ft (or 30ft pallet-wide) for the carriage of dry bulk cargoes, such as malted barley for the beer trade. The container may have hatches in the roof for top loading. It may have an inner lining usually made of plastic – ISO Code 22B0
- Open-top containers for heavy, bulky or over-height cargo. Both 20ft and 40ft, they can be loaded by crane from above or through doors if a removable header bar is fitted. They are supplied with a tarpaulin 'tilt' cover. Some open-top units have a removable steel roof – hardtop containers – ISO Code 22U1 and 42U1
- Half-height 20ft open-top containers, used for heavy cargo where the deadweight requires limited cubic capacity (low stowage factor). They can be stowed two-high in the same space as a standard height container
- Platforms for awkwardly shaped or heavy breakbulk cargo, 20ft and 40ft. These units have no sides or top, just a base with lashing points and lifting lugs – ISO Code 29P0 and 49P0

- Flat-racks are platforms with ends that enable the units to be stacked on top of each other in the same way as general purpose (GP) units. These ends are usually collapsible to enable the units to be locked together for ease of return when empty – ISO Code 22P3 and 42P3 and other codes for special types
- Ventilated containers for commodities such as coffee and cocoa beans; usually 20ft – ISO Code 22V0
- Tank containers for bulk liquids. These are usually in the form of an oval tank, supported in a skeletal rectangular frame, ISO Code 22T0. There are other codes for pressure-tested units. Tank containers can also be heated for the carriage of certain liquid cargoes that need to be kept in a fluid state for unloading and so on
- Refrigerated (reefer) containers, 20ft and (mainly) 40ft high-cube. These are equipped with a refrigerating unit that is plugged into an electrical supply on the ship or the terminal. Those with their own integral refrigerating machinery are fully versatile and can move any distance by road or rail after the sea passage, using a diesel generator if needed to provide active refrigeration when on a road vehicle or rail wagon. They are, however, much more costly to construct – ISO Code 22R1 and 42R1 with other codes for variant units

5.8 Other container expressions

Container business has its own jargon; terms whose full meaning is familiar only to those involved in the day-to-day running of the business. Many of the abbreviations have already been mentioned and LCL, FCL and teu are the most well known.

Container yard (CY)

This is a place for handling loaded containers away from the terminal where the ship is loaded or discharged. It may be at the port or inland. It will be a point where FCL containers are interchanged between the carrier and merchant or where there is a change of transport mode, for example, from rail to road. It may or may not also be an ICD (see below).

Inland clearance depot (ICD)

A depot, away from the port terminal, where containers and their contents may be cleared through the customs authorities for import or export. Confusingly, the abbreviation ICD is often used to indicate 'inland container depot' instead of CY, and this use should be avoided.

Stuffing or vanning

These are the terms used to describe the loading of a container with goods. These words avoid using the word loading, which is reserved for the act of placing the container on the ship.

Container freight station (CFS) or stuffing depot

LCL cargo is delivered to a consolidator, which may be the carrying line or may be a third-party operator. The individual LCL lots are loaded into containers at the depot. This depot can be within the port area or inland:

- To take advantage of cheaper land rent
- To be nearer to centres of industry

- To be able to use non-dock worker labour (a prime reason when the industry was growing and dock labour was expensive to use in many countries and ports)

A CFS will usually also de-van import cargo, often also acting as an ICD.

Stripping

The emptying of a container; also called de-vanning or unstuffing.

Sealed

A container must be sealed by the shipper as a safeguard against pilferage, or a seal may be attached by the customs authorities when it is required for the container to move 'in bond' from one customs area (for example, a port) to another customs area (such as an ICD). In either case, the intactness of the seal(s) on arrival is a reassurance that the goods have not been tampered with. With increased security requirements on vessels and in port, there is growing international pressure for minimum standards of security seals to be applied to all units with associated records of seals being maintained. There is also a shift towards development of smart electronic seals and other ID or tracking systems, enabling the container to be monitored on-line.

House-to-house or door-to-door

This is the system of moving a container loaded at the shipper's premises to be unloaded at the ultimate receiver's premises. A shipper using this service will be said to use an FCL, even though the container may not actually be full.

Alternatives to door-to-door include container yard to container yard (CY to CY) and quay-to-quay or port-to-port movements.

Groupage or consolidation services

If a shipper does not have sufficient goods to justify using a full container, this shipper may utilise the system by sending their goods LCL possibly via a freight forwarder specialising in grouping or consolidating goods into containers.

However, some lines offer their own LCL service with the advantage that the shipper gets a line's (actual carrier's) bill of lading rather than a forwarder's house bill of lading, although many are content to leave this business to groupers or NVOCs. In the US, consolidators are also known as integrators. Many of these groupers have grown into major global supply-chain management service providers or 3PL (third-party logistics) operators offering warehousing, transportation and additional value-added services (such as labelling, bar-coding, etc).

Box rate

This should not be confused with FAK (freight all kinds). A lump sum rate is charged per container, which may be higher or lower depending on the commodity carried but will not vary because of the weight or measurement of the cargo in the container.

FAK (freight all kinds)

Shippers argue that it makes no difference what is in an FCL as the handling cost is the same for the carrying line, so a single freight rate per box should be charged for all kinds of cargo. Liner operators prefer variable freight rates depending on what the commodity will bear in relation to its value.

5.9 Container fleets

The development of container services presented liner shipping companies with a new challenge – providing and managing an expensive fleet of containers that are highly mobile and move to many different places other than the ports at which the ships call.

The main objective for a liner company in managing its fleet of containers is to ensure that it has the right number of containers of different types, properly maintained, in the right place and at the right time to fulfil customer demand.

Insufficient containers will lead to a loss of customer support, while too many will be wasteful and increase costs unnecessarily. A stack of empty containers in the wrong location is also of little use and wasteful. To achieve this objective, the following requirements will need to be addressed:

- Determine the optimum size for the container fleet
- Decide on a split between owned and leased containers – and buy or lease the appropriate numbers
- Ensure containers are properly maintained, meet regulatory requirements and, at the end of their useful life, are scrapped or sold
- Redistribute empty containers from surplus to demand areas to ensure that forecast bookings can be covered
- Track the movement and status of all containers to ensure proper management of the assets under the line's control

Lines have specialist container management departments to ensure that all these requirements are effectively managed throughout the organisation.

Even with only one type of container, the above tasks would be complex. Even within a basic container type, differences can be found between containers from different manufacturers and, over time, specifications are changed and improvements are made. Details such as whether a container is plywood-lined, the number and locations of lashing points and internal dimensions of door openings may appear small but could be of particular importance to a customer who packs cargo in a specific way.

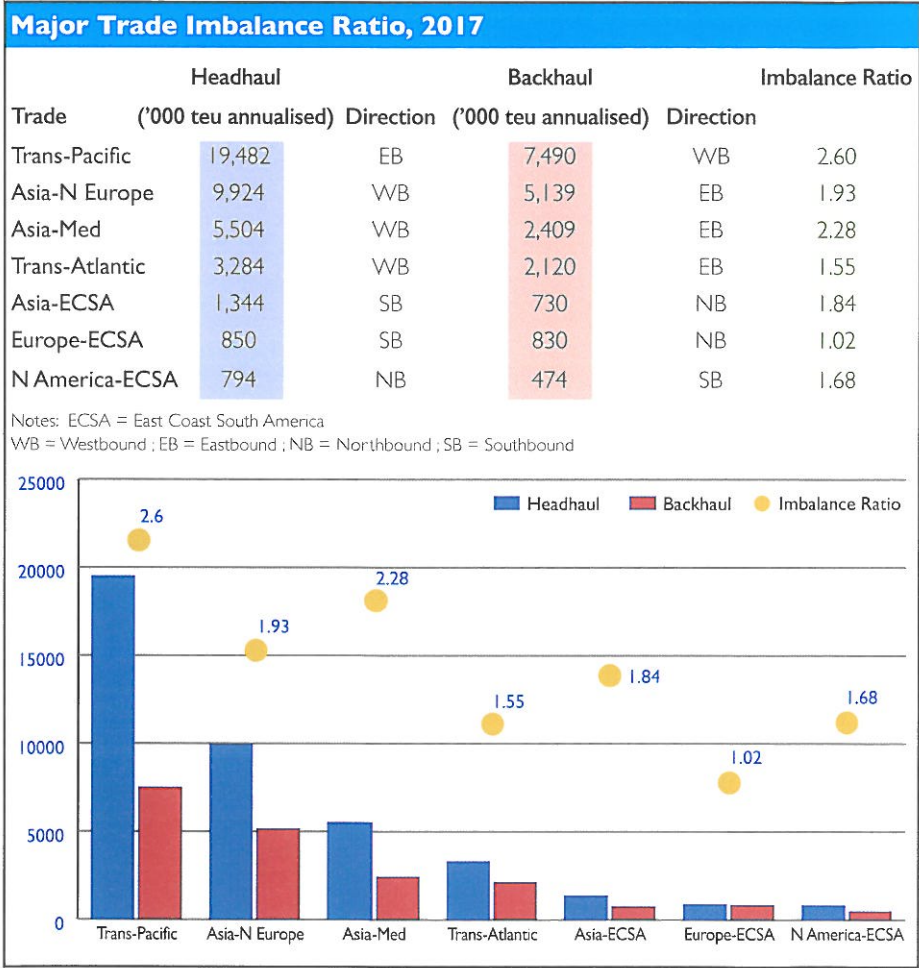
Routes and locations

An operator that only operates one trade route, serving two ports, would have a relatively simple container control task. All that is required is an adequate supply of containers in two locations and to balance the flow of containers in the two opposite directions.

In practice, however, each trade route will serve a number of ports and each port may well be linked to a number of inland locations with container depots. Most operators will have more than one trade route, with the larger operators having a whole network of interconnecting services. As the number of locations served and the interconnecting routes increase, so does the complexity of achieving the most cost-effective solution to the container supply problem.

Rarely are the cargo flows in any given trade perfectly balanced in each direction; trades have what is called an imbalance ratio. In a simplified example, if the movement of loaded containers on one leg over a period of time totals 100,000 teu, while in the opposite direction there is a flow of only 60,000 teu, then the trade is said to have an imbalance ratio of 1.67. The former leg is regarded as the headhaul or dominant leg whereas the latter is the backhaul.

The chart below identifies the imbalance ratio in some of the major liner trades using cargo flows reported for 2017.



The imbalance ratio or headhaul/backhaul status of any given trade can of course change depending on demand circumstances. In 2008, the trans-Atlantic trade was more or less evenly balanced, whereas in 2017 exports out of North Europe formed the dominant leg with an imbalance ratio of 1.5. Similarly back in 2008, northbound loaded container flows out of East Coast South America to Europe were far greater than those moving on the weaker southbound leg. By 2017, that situation had reversed itself with southbound movements marginally ahead of those on the northbound leg.

Often container operators, even if in competition with each other, arrive at interchange arrangements so that one can use the other's containers (with an appropriate financial arrangement) rather than each operator incurring empty movement costs.

There is an argument that overall costs could be reduced if there were a global pool of containers from which any operator could draw as required, minimising the cost of provision and reducing the number of unnecessary imbalance moves. The containers would be built to a standard specification, without the colours or marks of any individual operator. This is known as the 'grey box' concept.

Against this concept are the problems of ownership of the containers and who would ensure the overall efficient management of the worldwide supply. Container leasing companies would argue that they already fulfil such a role, and grey box seems to have fallen out of favour in recent years.

Determining the fleet size

A simple approach to determining the number of containers required to operate a particular service is to consider that at any time each ship will require a set of containers to fill it. Then an estimate is needed of how many additional sets are required on land at any one time to allow for the time taken to unpack containers after discharge, and the time required to pack containers and transport them to the port before the arrival of a vessel.

This approach depends on using a particular ship schedule pattern to establish intervals between calls at a particular port, and probably some complex modelling to determine the proportion of containers that can be loaded back on the next call, the next but one, and so on. Distribution patterns for the numbers of containers to each port of call will also be required, as will a method to break down the total number of containers by container type.

An alternative approach, particularly suited to the control and monitoring of a trade that is already being operated, is to consider the problem in two parts: namely the demand for containers and the container velocity.

The demand for containers is assessed by forecasting the volume of business to be moved over a given period, for example, one year. Such an assessment should in any case be central to the company's forward planning. Where a service covers a number of countries, the assessment will at least have to be broken down by location as well as the type of container required.

It will also be necessary to identify the dominant direction of the trade, since it will be the volume in this direction that will determine the number of containers required.

The container velocity (or turnaround time) is a measure of the time it takes a container in the trade to perform a complete circuit. For example, in the trade from the UK to Hong Kong this would be the number of days from being loaded in the UK to completing a trip to Hong Kong loaded with return cargo, discharged in the UK and to be ready for commencing a second trip.

This can normally be measured statistically by recording the average number of days spent on the various elements of the journey:

- Under export load in UK
- At sea UK-Hong Kong
- Under import load in Hong Kong

- Empty available in Hong Kong
- Under export load in Hong Kong
- At sea Hong Kong-UK
- Under import load in UK
- Empty available in UK

The 'empty available' times can be reduced by holding a smaller stock of containers. The other times will be determined by the pattern of the service and the geographical and other operating features of the countries in which the containers are under load.

Where the movements of all containers are being recorded on a computer file, mean times for these various activities can easily be extracted. The turn-time for a deep-sea trade such as UK-Hong Kong might be of the order of 100 days.

With a turn-time of 100 days, a container would make 3.65 round trips a year. Combining this data with the number of container moves to be made in the dominant direction in a year, it is possible to calculate the theoretical number of containers required. For example, to cover 10,000 moves a year with containers doing on average 3.65 round trips a year would require:

- $10,000 \text{ divided by } 3.65 = 2,740 \text{ containers}$

This does present a relatively simplistic picture as there will be other factors to consider, for example:

- Is the business spread evenly over the year, or are there peaks and troughs to consider?
- To what extent does the calculation need to be varied to allow for empty imbalance moves to match up areas of supply and demand?
- What is the effect of extending the calculation to a number of different container types?
- To what extent should an allowance be made for safety stock to ensure that there are always containers available to meet customer demand and to deal with unforecast increases in business?

Owning versus leasing

Having determined the number of containers needed, there is the choice of providing them by buying or leasing them. The merits of owning versus leasing containers are not substantially different from those of other capital assets, but are set out in brief below.

Advantages of owning

- Cheaper in the long run, as it avoids the element of cost that pays the leasing company's profits

- Containers can be built to the operator's design and the operator is able to control the maintenance and repair specification
- The operator can paint the containers in its colours and display its logo, which increases awareness of the company

Disadvantages of owning

- The purchase has to be financed, so ultimately the cost comparison will depend on the operator's ability to raise the necessary capital at a reasonable cost
- If demand reduces unexpectedly, it will not be easy to dispose of unwanted owned containers. Containers have a life of up to 18 years and, while there is a second-hand market for containers, newer containers can only be sold at a substantial loss

Advantages of leasing

- It is easier to adjust the size of the fleet to cope with fluctuations in demand, for example, by off-hiring back to the leasing company those not needed (subject to the terms of the leasing contract)
- The need for capital financing is avoided
- It is possible to lease containers on terms that make maintenance and repair the responsibility of the lessor, thereby avoiding overheads in this area (although at a higher daily rental)
- With certain types of lease (see below) it is possible to reduce imbalance costs by taking on leased containers in one part of the world and returning them in another

Disadvantages of leasing

- If an operator increases its business rapidly, it may find it hard to increase rapidly the number of leased containers it needs to handle the business at cost-effective rates
- Returning unused containers to the leasing company may incur significant financial penalties, which could damage an operator's cash flow

Buying containers

The vast majority of containers (over 95%) have for many years been built in China, although there are still a few smaller factories producing more specialised containers elsewhere. The approximate cost of a new container (as of early 2018) is as follows:

20ft general purpose	\$2,200
40ft general purpose	\$3,520
40ft high-cube	\$3,750

40ft high-cube integral reefer \$16,000

The exact price will depend on the detailed specification of the container and the prevailing market conditions (that is, how keen the manufacturers are for business).

Containers are normally built to order and specification, so the line will need to agree a contract with the container manufacturer, which will then build the containers to an agreed timescale. Depending on how busy the factory is, it may be some months before containers ordered can be built and delivered, so advance planning of when the owned containers will be required is important.

Leasing containers

While many operators will come to tailor-made arrangements with leasing companies, there are three broad types of leases:

Long-term lease (LTL)

The operator commits to lease a fixed number of containers for a fixed period of time; anything from one year up to the life of the container. The longer the period of the lease, the cheaper the rate is likely to be (since the leasing company has a longer period of guaranteed income). LTL has for many years been the most popular rental option and is favoured by leasing and shipping firms alike.

However, the longer the period of the lease, the less the operator's flexibility to reduce the fleet size by redelivering leased containers, since it is committed to pay until the end of the term.

Some operators secure term leases where the containers can be redelivered early on payment of a penalty. If the operator is faced with an unexpected fall in demand, it can assess whether it is worth paying the penalty rather than continue to pay daily hire for the remainder of the term for containers that are no longer required.

Short-term (or trip) lease

An alternative approach is to hire containers as required, with no commitment to use the container beyond its current trip. This ensures the maximum flexibility to adjust fleet size to demand and avoids having under-utilised containers.

There is of course a risk that leasing companies will be unable to supply the particular type of container needed at the location and time required.

Trip leasing tends to be extremely expensive, often more than double a long-term lease rate. This is because the leasing company incurs high overheads in maintaining stocks of containers readily available for leasing, and in dealing with the costs and administration associated with on-hiring and off-hiring containers. Moreover, it is high-risk business for the leasing company, since it is only likely to receive income from the container for a short period of time and will then have to seek another customer for the container; hence the premium rate charged.

Master lease

This type of lease combines a commitment to lease a fixed number of containers with the 'service' element of leasing that operators require to get the benefits of flexibility.

Briefly, the lessee guarantees to lease a fixed minimum number of containers for a defined term (usually at least one year; possibly up to five).

The agreement has provisions for the lessee to take on-hire additional containers at defined locations, and to off-hire containers at listed locations (subject only that the number of containers on-hire at any one time must not fall below the defined minimum). A charge that varies by location may be applied on pick-up or drop-off. Occasionally, the leasing company may give a credit, if, for example, it is very short of containers at a drop-off location).

The lessee pays an agreed daily rate per container for all containers on the lease. The rate is likely to be somewhat more expensive than for an equivalent term lease. The same rate will normally be payable for additional containers picked up under the lease and the operator is not subject to 'spot' rates when picking up additional containers to cover an upsurge in business.

This type of lease therefore provides (within limits) the flexibility for the operator to adjust fleet size. Additionally, with suitable pick-up and drop-off locations incorporated in the lease, it may be possible to avoid moving empty containers from one point to another:

Container leasing companies

The larger leasing companies have the advantage of being able to support a worldwide network giving full coverage of areas where the operator may wish to pick up and drop off containers. Moreover, the larger the leasing company's fleet of containers, the more likely it is that it will have a container available at the right place and time for the operator:

However, container leasing is a service as well as a financial business. Many of the smaller companies attract business by identifying a requirement in a limited segment of the market, that is, particular types of containers or a particular geographical area, and ensuring that their customers' needs are met in that sector:

Over the past decade (since the 2009 recession), the role of leasing companies has been expanding as the major lines have avoided direct investment in favour of the greater flexibility offered and in response to their own weaker financial state. Long-term rental has also gained further ground (over master and other types of service lease agreement) and now accounts for roughly 90% of all the lessors' business.

The initial LTL has for many years averaged five years, with a term extension of another three or five years normally agreed. However, in very recent years (2017 onwards), the trend has been towards a longer initial term of eight or 10 years or even greater. By 2018, the container lease sector controlled over half of global teu inventories, compared with nearer 40% at the end of 2009. Leasing companies have increased their holding of the global reefer fleet from below 30% in 2009 to almost 50% in 2018.

5.10 Inventory control

The liner operator's major requirement is for empty containers to be in the right place at the right time to meet customer demand. There is no advantage in having a stock of suitable empty containers in Rotterdam if there are insufficient containers in Hong Kong to meet customer demand.

The problem in physical distribution management (PDM) terms is, therefore, one of stock control at a number of locations.

For a simple type of operation, there are relatively simple solutions. Taking the operation of a ship between two ports only on a regular frequency, it should be possible to avoid running out of containers at either end by applying a simple rule. That is, however many containers are discharged the same number (full or empty) must be loaded back on to the ship.

However, this will not necessarily ensure the most cost-effective solution and, as soon as the picture becomes complicated (by additional ports, more ships and services, seasonal fluctuations, and so on), it is clear that more sophisticated methods are required.

As with any form of stock control, the first requirement is to have a forward forecast of supply and demand of units at each location. To this is added the need to retain a small safety stock to ensure availability to meet customer demand and to cope with short-term demand fluctuations. This forecast will identify potential surpluses and shortages that must be balanced out if possible. There are three basic ways to do this:

Imbalance movement

The operator positions empty containers from a location of surplus to one of deficit.

Cabotage

The first operator finds another operator that can use the container between the surplus and deficit location. By giving this operator the free use of the container (for a limited period), the first operator avoids the cost of transporting the empty container.

Leasing pick-up and drop-off

Subject, of course, to having suitable arrangements with leasing companies, containers can be off-hired at surplus locations and picked up at deficit locations.

Of the above options, cabotage is the most attractive. Its success depends on finding another operator with a requirement for containers between the two points in question. Such arrangements are only likely to be possible in a limited number of instances.

The choice between repositioning empty containers and using leasing pick-up and drop-off facilities will depend on a number of factors.

For locations in the same area, it is likely that repositioning will be the cheapest solution. The cost of road or rail haulage is likely to be less than the costs associated with picking up and dropping off containers, for example, haulage to and from depot, lift costs at depot, repair charges on redelivery.

When considering the feasibility of adjusting surpluses and deficits by leasing pick-up and drop-off, it is necessary to consider not only the costs but also the scale of charges or credits imposed by the leasing company at that location. If the leasing company gives a credit for a pick-up (which is likely if it has a surplus of containers in that area) this can be a very attractive proposition.

This presupposes that the operator has enough containers of the particular leasing company at the surplus location. This will not pose a problem if all the operator's fleet is obtained from the same leasing company. However, if, as is more likely, the fleet is partially owned, partially leased, or the leased containers are obtained from several leasing companies, the operator must consider whether they have suitable containers to effect the drop-off.

Otherwise the consequence could be that the pick-up of containers at the deficit location will take place, but with no balancing drop-off, meaning an increase in overall costs.

Where the surplus and deficit areas are in different parts of the world and the line needs to move empty containers to balance the supply, there will also need to be space available on the ships.

The operator must decide how far in advance to plan empty positioning movements. If decisions are made too far in advance, containers could be moved to meet a demand that does not materialise. To avoid running out of stock, a lead time of up to two months may be required. This allows not only for the sea transit but also for inland movement and time organising the necessary space on a ship.

Therefore, while overall plans should be made as far forward as is feasible, empty containers should not be moved until the last possible moment (within reason) in case an alternative, lower-cost solution develops as the operational situation changes.

An alternative, particularly for an operator with a small market share, is actively to seek business that will reduce the number of unprofitable (that is, empty) container moves.

If the operator consistently has a surplus of empty containers in a particular port it may choose to dissuade the sales team from securing business to that port and instead pursue business to a destination that has a shortage of containers. Very good internal control systems are needed if the efforts of the company's sales teams are to be geared to securing business that will reduce overall costs, particularly as the situation can change rapidly.

A further way to reduce imbalance costs is to look for so-called marginal cost business to fill empty containers. If there is a regular movement of empty containers from Port A to Port B, it can be argued that, as the containers will have to move anyway, any revenue is better than none. Extremely low freight rates can be offered to encourage commodities to move that otherwise would not be shipped at all, or not in containers, because of their low value.

This is a valid method of reducing costs and increasing profits, but does have its dangers. If, for example, the surplus of containers at Port A dries up because of a change in the general imbalance of trade and the operator has a commitment to carry the marginal cargo, it may well do so at a loss because of the cost of supplying additional containers.

Most operators now have yield management systems that help them to determine when, and at what freight rate, the cargo movements are profitable. Their systems will also include an assessment of whether the company's imbalance costs are increased or decreased as a result of shifting the particular cargo.

Planning empty container stocks

The table below shows a practical example of how a line would forecast and plan its empty container stock requirements for one container type at one location. The calculation starts with the known empty container stock at the beginning of the first week. Activities that will increase the empty stock are then added, for example, unpacking imports, or the arrival of empty container imbalances that are already planned.

It should be noted that the line has already arranged to on-hire some leased containers, and is picking up some owned containers (new production), which must have been ordered some time previously.

Activities that will decrease stock are then subtracted. This mainly relates to containers being packed, though some containers are expected to be sent for repair, leased containers off-hired and owned containers that are life-expired are sold.

The resultant stock at the end of the first week is carried forward to the start of the second week. Forecast weekly stock is then compared with the target. If stock is expected to fall below the target level, plans will need to be made to increase stock. If the stock rises substantially above target, then maybe containers should be imbalanced out or a reduced number imbalanced in.

In this case, although the stock level is consistently above target, Hong Kong always needs inward imbalance movements, so the surplus will soon disappear. Alternatively, some of the planned imbalance movements could be delayed if the containers are needed elsewhere.

Location	Hong Kong				
Container type	20ft GP				
Target stock	800				
Week commencing	01 Oct	08 Oct	15 Oct	22 Oct	29 Oct
Opening stock	1,000	880	915	1,160	1,730
<i>Plus</i>					
Imports unpacked	300	350	600	405	340
Imbalance received	200	500	300	300	0
Returned from repair	10	20	25	20	25
Lease – on-hire	50	0	100	100	0
Sub-lease returns	15	15	15	15	15
New production	0	0	0	500	0
<i>Minus</i>					
Export packing forecast	650	800	750	720	850
Imbalance dispatched	0	0	0	0	0
Moved to repair	20	25	20	25	20
Lease – off-hire	5	5	5	5	5
Sub-lease – out	0	0	0	0	0
Container sales	20	20	20	20	20
Closing Balance	880	915	1,160	1,730	1,215

Missing containers



Containers can suffer a lot of damage and still be worth repairing

Should a container not have its status altered for some considerable time, checks are carried out and the agent or depot at the last known location of the container will be asked to verify the status. Should this not be possible, then either the container has been stolen or moved on without notification. If this latter is the case, it may then be necessary to ask all port and inland agents to check for the missing box – which is no easy task.

Damaged containers

Containers have to be regularly inspected to ensure that they are maintained in good condition and are safe for the carriage of goods. Superficial damage may be ignored, but anything structural or that affects the suitability of the container to carry cargo (for example, holes that may let in water) must be repaired. A container that is properly maintained will also last longer.

Sometimes it may not be economic to repair a container, particularly an older one. The cost of the repair will be compared with the current value of the container and its remaining useful life, as well as with the resale value in its present condition. It could be sold for scrap, or for second use as a storage unit. A decision will then be taken on whether to repair or to sell the container.

If a container has been damaged by a third party (such as a haulier, a terminal operator, or a customer) the operator will try to recover the cost of the repair. However, often it will not be possible to establish exactly where the damage occurred or who caused it, so the cost will be for the operator's own account. Lines can take out insurance to cover such costs, but the insurance tends to be expensive. Lines will normally have a high 'deductible' on the policy, so that the insurance only pays out if a number of containers are lost or damaged in a single incident.

Lease agreements normally state that a leased container has to be repaired to a given standard before being returned to the leasing company. Leasing companies offer a facility where the operator pays an additional premium on top of the container hire and the operator does

not then have to meet the cost of damage to the container. This is referred to as a damage protection plan (DPP).

Container loss

The incidence of loss of containers generally is in direct inverse proportion to the efficiency of the control system operating. In the best cases the loss is very small and represents a small fraction of the capital cost. Containers that have been written off do occasionally reappear; making accurate record keeping difficult.

The agent's role in container control

The prime responsibility for tracking containers and maintaining up-to-date records rests with the line's country offices or third-party agents. For third-party agents, their responsibilities will be clearly laid down in their agency agreement.

While some agents may operate their own tracking system, typically it will have access to the line's container tracking system. The agent will have to capture data from third-party contractors to use in updating the system, for example, container terminal operators and depot operators.

In some cases, rather than getting the data manually from the contractor for input to the line's system, the contractor may be required to input the data itself – often through an internet/web-based system – to avoid the delay and possible error in manually transferring the data.

The agent will be expected to take a proactive role in looking after the containers under its control, ensuring, for example, that containers are inspected when transferred between the control of different parties, that costs of damage to containers are recovered from the party responsible for causing the damage and that missing or overdue containers are properly followed up.

5.11 Container Safety Convention

Relatively early in the development of containerisation, the International Maritime Organization examined the safety aspects of this new system of freight transport by sea. While the ships were already covered by existing IMO regulations, it was felt that standards were needed to ensure that the containers themselves would be operated safely.

The result was the 1972 International Convention for Safe Containers (commonly referred to as the Container Safety Convention, or just CSC).

To quote from IMO:

The 1972 Convention for Safe Containers has two goals. One is to maintain a high level of safety of human life in the transport and handling of containers by providing generally acceptable test procedures and related strength requirements. The other is to facilitate the international transport of containers by providing uniform international safety regulations, equally applicable to all modes of surface transport. In this way, proliferation of divergent national safety regulations can be avoided.

One part of the convention lays down the structural requirements for containers to ensure they are safely designed and constructed. The other part sets out the requirement for regular safety inspections to ensure that containers are maintained in a safe condition.

The CSC safety approval plate shows important information about the container including the approval number, which shows that the design was approved by a competent authority (appointed by a government).

Safety inspections can be carried out in two ways:

- A periodic examination, which requires that the container be inspected not less than five years after it was built, and then at intervals of no more than 30 months
- An approved continuous examination programme (ACEP). In this case the owner/operator must have its routine inspection procedures, accepted by the authority. These procedures have to demonstrate that in normal operation, the container will be inspected at least as often as under the periodic examination system

A plate or decal on the container shows either the date when the next inspection is due or details of the approval of the ACEP scheme, if operating under this system. Most owners and operators now choose to operate under an ACEP.

5.12 FCL and LCL

The expression 'full container load' (FCL) means more than a simple statement that the container is full (in fact, it may only be partially filled). It essentially means that the shipper has assumed the responsibility of packing the goods into the container then closing its doors and attaching a seal. Except for the possibility of the customs authorities wishing to inspect the contents (in which case they reseal the container with their own seal), an FCL reaches the consignee just as it left the shipper's premises.

The reference to 'shipper' may refer to the actual exporter, its agent or a consolidating forwarder whose 'consignee' would be another forwarder (in some form of partnership with the one at the loading end) and whose job it is to ensure each separate consignment reaches the right ultimate consignee.

The principal legal implication in all this is that the shipper remains responsible for the manner of packing and for the contents of the container. The carrying line has no responsibility for the condition of the goods on their arrival unless the seal has been tampered with or the container has been handled with excessive roughness.

In the early days of containerisation there were many problems with FCLs because shippers tended to load their goods into containers in the same way as if they were loading a truck, which was only going to travel by road or rail. It took some time for them to realise that the tremendous forces exerted by the movement of the sea could be far more damaging to cargo in a container than anything they had experienced with land transport. Over the years this problem has almost disappeared. In fact shippers, by adapting their techniques and the shapes of their packaging, are taking maximum advantage of the protection a container affords and goods are now often travelling across the world in no more than point-of-sale packaging.

Quay-to-quay or door-to-door



With FCL, carrier liability is limited as long as the seal is intact

While the term FCL is clear, some other terms used in connection with through movement are ambiguous. It makes a difference both to cost and to liability depending on who undertakes the movement from the shipper's premises to the loading port and from the discharging port to the consignee's premises.

Be careful of use of the term 'house-to-house'. While this is often used to indicate a door-to-door contract, it is also used in the US trades to indicate only FCL status without reference to the contracted terms of pre-carriage and on-carriage. If provided by the carrier, this is called point-to-point.

If the contract is door-to-door (point-to-point), it means the line provides the inland transport (for example, truck or rail) and becomes responsible as the carrier as soon as the container is sealed and placed in the custody of the carrying line's haulier. The carrier continues that responsibility right up to the moment the seal is broken at the consignee's premises. The handling of the inland movements is referred to as carrier haulage.

It is important to remember with an FCL container that, because the shipper packed the container, the carrier's liability is strictly limited so long as the seal is intact.

Where the contract is quay-to-quay, sometimes referred to as port-to-port, the shipper collects an empty container from one of the carrier's depots, takes it to its premises, stuffs it and then presents it to the container yard at the terminal where the ship is due to load. The carrier's responsibility does not, therefore, start until the container is off the shipper's truck. At the discharging port the carrier places the container on the ground close to where the ship is discharged and the consignee has to collect it from there. In this case, the inland movements are by merchant haulage.

There are of course variations on this. One may have door-to-quay or quay-to-door arrangements where the carrier hauls at one end and the merchant at the other.

There can be a further complication because some container lines allow a 'change of place of inland destination', which allows the consignee, for example, to request the line to deliver an FCL container direct to its premises instead of simply to the container yard at the discharging port. A charge is made for the additional costs.

Less than full container loads (LCL)

To all intents and purposes, so far as the merchants (shippers and consignees) are concerned, LCL cargo is the same as conventional cargo. Some container lines offer an LCL service of their own, while others prefer to encourage non-vessel-operating carriers (NVOCs) to consolidate such cargo. The procedure is almost the same, the main difference being that if the line is offering the LCL facility, the shipper gets the line's bill of lading whereas if an NVOC is consolidating the cargo it will be their house bill of lading.

Many forwarders set themselves up as NVOCs, also called NVOCCs – non-vessel-operating (common or container) carriers. As such, they accept the same liability as a carrier and will issue a carrier's bill of lading. Such bills of lading are usually accepted under a documentary credit in accordance with the banks' Uniform Customs and Practice for Documentary credits (UCP600) as having the same security as a line's bill of lading. The liability for LCL cargo is virtually the same as for breakbulk cargo.

Shippers of LCL cargo will present their goods to a designated depot (CFS) and will get a simple receipt. Because of the additional handling and the fact that there will be all sorts and shapes of cargo in an LCL container, the shipper will have to use more substantial packaging than might be the case with FCL. Experience has nevertheless shown that the packaging of LCL cargo can still be less than would have to be used for cargo being loaded directly into a breakbulk carrier's hold.

It is not unusual to have LCL/FCL consignments. A typical case would be a contractor constructing something in the country of destination. Components may be drawn from several subcontractors in the exporting country but, of course, all go to the same consignee. With LCL/FCL the line bears the same liability as for LCL/LCL because the stowing of the cargo in the container was done by the carrying line or its subcontractors, not the actual shipper.

FCL/LCL movements are rarer: one shipper wishes to supply more than one consignee. In such a case the shipper is responsible for stuffing the container and indemnifies the line if, when the container is opened at the discharging port, there are not the exact quantities for each of the consignees.

Inland clearance depots (ICD)

The designation 'Inland Clearance Depot' actually predates containerisation as facilities existed in some landlocked countries to move cargo under the customs seal of the importing port up to the inland border where it would be cleared for import.

Regrettably, the expression ICD is often adopted for any depot used to assemble or distribute cargo even though the original name implies that it is inland and has a customs officer in attendance to clear the cargo. Some trades prefer to use the expression container freight station (CFS) to cover any depot used for LCL cargo – inland or not; customs-served or not.

Many ICDs do, however, comply with the two criteria and the customs services have special procedures to allow containers, un-inspected but suitably sealed, to travel from the port to the ICD to be cleared through customs by each of the individual importers with locally based customs officers.

In the European Union, a number of newer arrangements exist to facilitate the movement of goods to and from merchants' premises without customs clearance. These have largely removed the need for ICDs.

Elsewhere, ICDs still play a major role in removing cargo quickly from the port area to inland locations for clearance. As with all container operations, an ICD requires a lot of space, and five hectares is not unusual. This was a particular problem in some less-developed countries where the port had been developed for conventional cargo, probably much of it being loaded and discharged via lighters at anchorages. Such ports had a cluster of industrial and domestic development around them, leaving little room for the tremendous spread of land that containers demand. So ICDs had to be developed for quite different reasons from the original concept.

A typical ICD needs adequate road access in order to cope with trucks delivering goods and containers moving to and from the port. Then there needs to be plenty of outside space to stack and manoeuvre the containers.

A large warehouse building is required in which to receive the individual items of LCL cargo. Each destination will need a clearly demarcated area of the shed with plenty of floor space so that the cargo can be spread out. In the case of imports it has to be easy to find each consignment quickly when the consignee arrives to claim it.

In the case of exports, the goods are sorted after delivery for correct stuffing into a container. Stuffing a container needs much of the same art of stowage as has to be employed by the chief officer in a conventional ship, taking into account light and heavy cargoes, hazardous cargoes and the forces that will bear on the container during transport.



Chapter 6

Co-operation between liner operators



6.1. Liner conferences

Liner shipping is unusual in that companies competing for business also co-operate with each other. The first manifestation of this was the development of 'shipping conferences'. These were groups of shipowners who agreed to co-operate on a particular trade route in order to:

- Co-ordinate the sailings of their ships so as to provide a regular service for customers
- Charge the same rates of freight (and other terms and conditions) to customers

The first conference was formed in 1875 in the trade between the UK and Calcutta and was the result of freight rates dropping to unprofitable levels as the Suez Canal opened the trade to wider competition. The system was then replicated across most deep-sea trades. Given the near-monopolistic method of operation and the way they rapidly spread to cover almost all liner trades, they inevitably faced criticism that they curtailed free competition and prevented other lines from entering a trade.

In 1906, a Royal Commission on Shipping Rings was set up in London, which reported in 1909. In 1911 the first actions were brought in the United States by the Department of Justice against three conferences for violations of American anti-trust laws.

The two investigations reported similar conclusions: they agreed that unrestricted competition in the liner trades was undesirable and that conferences enabled more regular sailings, more rate stability and higher standards of ships. However, legislation was brought in to curtail their more restrictive practices, while shielding them from the strict application of ever-more stringent anti-trust laws that were enacted over the course of the 20th century.

Demise of conferences

The container revolution saw the development of a number of well-funded independent operators, both European and Asian, such as Maersk, MSC, CMA and Evergreen. Changing attitudes in business in general and shipping in particular provided the stimulus for the liberalisation of liner shipping. Shippers wanted to negotiate their own rates and terms and no longer wished to be controlled by rigid conference rules.

The power of conferences was progressively weakened by further regulatory restrictions and by inroads made by independent lines and competition among conference members themselves, undermining their own tariffs. Outside the US, most conferences were of the closed type where in order to be admitted, new members had to apply and meet certain specific conditions. New, aspiring carriers had no appetite to apply for conference membership whose conditions generally served only to inhibit those aspirations. These independents or 'outsiders' gradually eroded conference market share.

The US Ocean Shipping Reform Act of 1998 and the 2008 repeal of conference exemption from restrictive practices laws in the EU effectively ended the conference system on most trades. The Far Eastern Freight Conference or FEFC – one of the largest bastions of conference authority and which presided over the Europe-Asia trade – closed its doors on 18 October 2008 when EU Council Regulation 4056/86, which provided for a block exemption of liner conferences from anti-trust legislation, was withdrawn from the statute books. In its latter

years, the FEFC became heavily embroiled in legal disputes and litigation with the European Commission and the European courts.

The writing had been on the wall since 2002 when the OECD Secretariat issued a report entitled *Competition Policy in Liner Shipping* (OECD, 2002a), wherein it stated that the liner shipping industry had failed to demonstrate that conference or cartel price-fixing was indispensable to the provision of regular, efficient and sustainable liner shipping services.

Some so-called Discussion Agreements remained, whereby carriers discussed issues of general interest in the trade such as capacity requirements, forecast growth levels and surcharges, but they did not set rates. The most significant remaining grouping is the Intra-Asia Discussion Agreement.

Despite the trend towards greater trade liberalisation, instances of cargo reservation schemes still exist today – mainly in the form of cabotage. The US Jones Act requires that all goods transported by water between US ports be carried on US-flag ships, constructed in the United States. Critics of the act describe it as protectionist, serving only to drive up shipping costs and stifle competition.

Elsewhere, shipping services carrying domestic cargo between Brazilian ports remain restricted under the country's cabotage laws – vessels have to be Brazilian-owned, -flagged and -crewed. This, however, does not prohibit foreign companies operating domestic carriers with Brazilian subsidiaries – Maersk owns Aliança while CMA CGM recently took over Mercosul. Again, the criticism levelled against this cabotage scheme is that it drives away competition: Mercosul and Aliança combined cover some 80% of Brazil's coastal movements.

Conferences – the present situation

Conferences still play a limited role outside the European trades. As most countries have similar competition policies governing liner conferences (generally, they are prevented from unduly limiting competition and need to demonstrate tangible benefits to customers), so the nature of liner conferences has changed to a more voluntary basis and a more open structure.

A more modern example of a liner conference is the Transpacific Stabilization Agreement (TSA), which was established in 1989 as one of the first carrier discussion agreements formed after passage of the 1984 Shipping Act in the US. The agreement became a research and discussion forum for liner operators in the Asia-US trade. Its purpose was to exchange market information and represent the interests of carriers in consultations with regulatory bodies and shipper associations. It also sought to standardise terms of service, documentation standards, information systems and other activities. All its guidelines were voluntary. Even the TSA could not survive and on 8 February 2018 the organisation was dissolved. A couple of months earlier, the leading global shipping line Maersk had resigned from the agreement and the wave of carrier consolidation that followed the collapse of Hanjin in August 2016 finally left it with only seven carriers as members.

Several commentators have drawn attention to the wide fluctuations in freight rates, particularly in the Asia-Europe trade, in the decade since conferences were outlawed in Europe. They contend that neither carriers nor shippers have benefited, and suggest that these disruptions would have been avoided if some form of continuing conference structure had been permitted. The case is not proven since this period also covers the major disruption to trade caused by the

global financial crisis, so it is not clear what is the root cause. The relentless onslaught of new and larger tonnage introduced into the Asia-Europe trade during this ensuing period and the resulting imbalance of supply and demand were also factors that placed rates under immense pressure. Any conference system would probably have been powerless to counteract this pressure.

Conferences in other jurisdictions

Australia

Under Australian anti-trust legislation, any unincorporated association between two or more liner carriers is considered to be a conference. This includes discussion agreements, vessel-sharing agreements (VSAs), slot exchange agreements and consortia.

The main anti-trust regulation in Australia is the Trade Practices Act of 1974, administered by the Australian Competition and Consumer Commission. Liner conferences receive a limited exemption, on the condition that the agreements are registered with the Registrar of Liner Shipping and are open to public scrutiny.

Singapore

On recommendation of the Competition Commission of Singapore (CCS), a block exemption was granted for liner shipping agreements in 2006 as long as participants' market share is not more than 50%. The agreement allows the parties to offer individual service arrangements and does not require them to adhere to a tariff or to disclose confidential information concerning service arrangements. The agreement has been extended to 2020.

Japan

The Japanese government considers that conferences are indispensable for a stable supply of international maritime transport services, as the liner industry has a structural tendency towards excessive supply causing destructive competition. Hence, shipping agreements are granted immunity by Articles 28 and 29.2 of the Maritime Transportation Law.

China

The regulations on international maritime transport, effective since 2002, do not include any prohibition on co-operation between operators in liner trades. However, an international shipping operator engaged in liner services to and from Chinese ports needs to be registered.

Article 27 of the regulation stipulates that carriers may not provide a service at a freight rate lower than is 'normal and reasonable', nor offer secret rebates to shippers or abuse a dominant market position.

6.2. Operational and commercial co-operation

The introduction of the container irreversibly changed the liner trades. The turnaround of ships in ports became much quicker; allowing ships to grow larger and make more use of economies of scale. The service offered to customers improved, while the extra protection a container offered to its cargo was a significant benefit to shippers.

The effects of containerisation also increased the rationale for operational co-operation among lines. As container ships were so much larger than the conventional ships they replaced, it was

difficult for any single owner to build and operate enough of them to provide a regular service. A group of owners would therefore pool their vessels in order to operate a joint service, ideally with weekly strings using vessels of similar specifications.

Today these forms of co-operation are at least as important to the economics of container shipping as they were at the outset of containerisation.



Consortia and alliances enabled lines to share space on each other's ships

Consortia

The first way in which lines responded to the challenge of investing in and operating these new container services was to pool their interests in a consortium. Consortia were generally developed trade by trade, so a line would have a different set of partners in each of the trades in which it operated. There were two different models through which this pooling or sharing took place.

The first was the joint-venture company. Two early examples were Atlantic Container Line (ACL), founded in 1967, and Overseas Containers Limited (OCL), founded in 1965.

The ACL consortium was initially formed in 1965 by four shipping companies: Wallenius, Swedish America Line, Transatlantic Steamship and Holland America Line; on the North Atlantic trade. In 1967 they were joined by Cunard and Compagnie Générale Transatlantique (CGT). The consortium remained active until 1990, when Transatlantic acquired 100% of ACL. ACL is now part of the Grimaldi group.

A more radical approach was taken when OCL was founded by four British shipping companies, British and Commonwealth Shipping, Furness Withy, P&O and the Ocean Steamship Company. They agreed to combine their interests in all the trades in which the parent companies operated when the trades were progressively converted from conventional to container services.

Over time, OCL therefore became a global operator. Its original owners were eventually bought out, and in 1987 OCL became wholly owned by P&O and its name changed to P&O Containers.

These consortium arrangements enabled members to share the high costs of new container ships and investment in shore equipment, remove duplication between their organisations (for instance, in agency arrangements), reduce competition between lines and ensure that the consortium could develop its business with a single vision provided by the consortium's management.

The second model entailed commercial and operational co-operation without full integration. The first consortium set up along these lines was the Australia Europe Container Service (AECS), which started operation in 1970 as a co-operative agreement between seven lines that operated in that trade.

Each line invested in its own ships and containers, which it put at the disposal of the consortium. The consortium operated a joint service with the ships provided by the lines and one of the consortium members was appointed as a marketing organisation in each country in which the service operated so as to avoid duplication of agencies. The lines' containers were put into a common pool, with the consortium having day-to-day control of the container pool, and the revenue earned by each marketing organisation was pooled and the profit shared among the members.

Such agreements could achieve many of the same benefits as a full joint-venture consortium. The administrative arrangements were complex and decision-making problematic, however, as members would tend to consider their own internal interest ahead of the joint interest of the consortium. Nevertheless, AECS survived until 1993 (having expanded to include New Zealand in 1977 as ANZECS), although with several changes in its membership and internal structure along the way.

The challenges of economies of scale

The AECS model worked well enough for co-operation on a specific route. However, as more services were containerised, lines that had interests in several trades found that by operating agency arrangements and container pools that were different in each individual trade they were losing the opportunity to combine and rationalise their own activities across the globe.

Also, with increasing competition from new lines, relationships with customers became more important. An individual line wanted to be able to sell its services in all its trades to a customer and not be constrained by consortium agreements which designated its own marketing organisations country by country.

When the Trio Consortium was set up in 1972 it therefore had a slightly different type of agreement. Trio was an agreement between five lines in the North Europe-Far East trade (the name 'Trio' referred to the three countries of its members: the UK (OCL & Ben Line), Germany (Hapag-Lloyd) and Japan (NYK & MOL). This was a much larger trade, with more competition.

Each line invested in its own ships, which it put at the disposal of the consortium in a joint service. There was still a profit pool, but lines marketed independently of each other and operated their own container fleets. Allowances were paid for the ships that the lines provided and operated in the service, but the costs of booking cargo, inland movement, providing containers and suchlike were for each line's own account. A consortium office was set up to operate the joint schedule, allocate space, and so forth. To improve decision-making, each member line placed a representative in that office and the representatives of the lines were jointly responsible for decision-making.

Trio operated for nearly 20 years, until there was a major realignment of the co-operative arrangements between lines in the Europe-Far East trade.

When Trio was formed, conferences could still dictate how much cargo a member could move in a certain trade, and this was incorporated in the consortium agreement through the allocation of space. For example, in 1972 Hapag-Lloyd had no trading rights between the UK and Japan while MOL had no entitlement to carry cargo between the UK and Southeast Asia.

In addition, there was a code administered by UNCTAD, whereby the national shipping lines of the exporting and importing nations were entitled to carry equal volumes of their mutual foreign trade. Third-country shipping lines were reserved only 20% of the available cargo, leaving a 40% share for the national carriers. The 40-40-20 formula for cargo sharing was aimed at enabling less developed nations to play a more active role in the movement of their foreign cargo.

By the late 1980s, with more emphasis being given to free competition and trade liberalisation, these restrictive entitlements had largely fallen by the wayside. The code was never recognised by the United States, and as admirable as the underlying principle of the UNCTAD code was, many developing nations simply did not have the necessary funds to invest in their own container shipping fleets. Consortia such as Trio had therefore become dinosaurs.

Joint services, vessel-sharing agreements and slot charters

Some lines looked for a simpler form of co-operation than those set out above. They focused solely on joint schedules and sharing of space, so that they could employ the largest container ships and offer an improved service through having space on more sailings.

These arrangements could be as simple as having two lines, each operating its own service, and exchanging slots between the services. More typically, several lines would each provide a number of ships to operate one or more loops.

Lines would need to agree mechanisms to regulate:

- The number of slots allocated to each line on every sailing
- The way in which the cost of the ships, bunkers and port costs would be shared

Various types of financial mechanism used:

- Slots are swapped one for one between lines, so that no money changes hands
- Slots are bought and sold between the lines on each sailing at an agreed and fixed slot rate; the slot rate compensates the seller for a share of the ship's operating, bunker and port costs
- A line operating a ship is paid for a notional charter hire plus bunker and port costs for each voyage, and these costs are shared among the lines that use the ship (including the ship operator) in proportion to their allocation share – a cost pool

These are only examples, and many variants have been developed. It is also possible to have a situation where one line does not provide ships at all and charters all its slots from other lines.

Such agreements leave the lines entirely free to operate their own service on the landside and to compete with each other where they choose.

This type of agreement has the following benefits for a line:

- It focuses solely on the aspects of the co-operation that are considered to add value to the parties
- There is no commercial constraint on the parties through pool shares/revenue sharing and so on
- Lines are free to pursue their own economies of scale across all their trades without being hampered by single trade arrangements with other lines
- With such agreements often being relatively short-term, services and partners can be changed to match the line's business requirements as they develop
- A line can have more than one joint service arrangement in the same trade

In the 1980s and 1990s, there was a progressive move to this type of agreement, as lines wanted to be in direct control of their own business as far as possible but still needed partners to provide frequent, cost-competitive services. The vessel-sharing agreement (VSA) then became the most common label for this type of agreement.

It is also worth noting that changes in the regulatory environment would probably prevent a highly integrated consortium such as ANZECs or the former Europe-South Africa trade grouping SAECS from operating today, as their revenue sharing, plus limitations on competition, would be in contravention of competition law.

6.3. Evolution of global alliances



Alliance partners need ships of comparable sizes to run effective services (photo:APMT)

But by the 1990s, lines found that even joint services and VSAs imposed constraints on their flexibility to run their own businesses efficiently. As a VSA usually covered only one trade, any switching of ships between trades, which was often necessary in order to match space to cargo demand, became a complex negotiation with two sets of partners.

At the same time, lines felt the need to make longer-term plans for vessel deployment in the main East-West trades as they invested in larger ships that could only operate in a few trades, and they needed to make sure they had partners with similar-sized ships and similar service objectives.

A further factor was the increasing pace of consolidation between lines through merger or acquisition, which reduced the number of potential partners and increased the size and scale of individual lines.

The solution was to form global alliances. These were enhanced VSAs, but with the following features:

- They covered the three main East-West trades (Asia-Europe, Trans-Pacific, Trans-Atlantic) in a single agreement

- They involved a longer-term commitment, with an understanding between the lines on future developments in vessel size and deployment.

The advantages over the previous arrangements were:

- Flexibility to move tonnage between the East-West trades
- The ability to operate pendulum services covering two East-West trades within one VSA
- Reduced administration in having three trades within one agreement
- Longer-term certainty of arrangements, working with like-minded lines

This type of arrangement also enhanced the number of individual services or loops that a line could offer to customers on each East-West trade. This was important as large customers increasingly wanted to do business with a small number of suppliers, while expecting those suppliers to offer an extensive range of services and shipping opportunities.

The first global alliances were formed in the mid-1990s and were called (perhaps confusingly) the Global Alliance and the Grand Alliance.

Alliances do still suffer from an inherent instability when mergers and acquisitions take place between lines in different alliances. No sooner had the Grand and Global alliances been set up than P&O Containers (Grand Alliance) and Nedlloyd (Global Alliance) merged in 1997, necessitating a change to alliance partnerships. While the changes from that merger were still being negotiated, Neptune Orient Lines (Grand Alliance) acquired American President Lines (Global Alliance), resulting in a further realignment.

Eventually there emerged from these changes the following alliances:

Grand Alliance – Hapag-Lloyd, NYK, P&O Nedlloyd (until 2006), OOCL, MISC (until 2008)

New World Alliance – APL, MOL, Hyundai

CKYH, sometimes called the Green Alliance – Cosco, K Line, Yang Ming, Hanjin

This structure remained broadly unchanged for a decade; the main change being when the Grand Alliance lost PONL to Maersk in 2006, so reducing the size of the Grand Alliance's fleet and number of loops.

6.4. Regulatory environment: operational co-operation

These new forms of co-operation between companies focus solely on operational co-operation in the port-to-port service and do not include any price-setting mechanism or discussions on the revenue side of the business. Very often these forms of co-operation still have to receive permission from competition regulators, as they are likely to be thought to restrict competition within the market.

Most competition regulators do not have any separate regulation for consortia, and the regulatory frameworks are the same as the ones applied to conferences. Generally, fewer restrictions will apply, as the agreements do not involve price-fixing.

European Union – consortium regulation

The exception to this approach is in the European Union, where separate regulations control the exemption of consortia from aspects of competition law.

Confusingly, the EU uses the word 'consortium' to cover any form of operational co-operation, such as joint services, vessel-sharing agreements and alliances, rather than the narrower definition set out earlier in this chapter. The terms of the exemption were substantially updated in 2009, and to be eligible for an exemption, the consortium has to meet the following requirements:

- The combined market share of the consortium members cannot exceed 30% in the relevant market
- To establish the market share of a consortium member; its lifting on services outside the consortium in the relevant market is also included
- There is some flexibility allowed if the 30% share is exceeded for limited periods, particularly when the excess is due to the withdrawal from the market of a carrier which is not a member of the consortium

The regulation lists the type of activities that are eligible for exemption:

- Joint operations of liner shipping services, including co-ordination or joint fixing of sailing timetables and the determination of ports of call
- The exchange, sale or cross-chartering of space or slots on vessels
- The pooling of vessels or port installations
- The use of one or more joint operations offices
- The provision of containers, chassis and other equipment and the rental, leasing or purchase of contracts for such equipment
- Capacity adjustments in response to fluctuations in supply and demand
- The joint operation or use of port terminals and related services, such as lighterage or stevedoring services

It also emphasises the activities that are definitely not covered. These are:

- The fixing of prices when selling liner shipping services to third parties
- The limitation of capacity or sales, except for the capacity adjustments in response to fluctuations in supply or demand
- The allocation of markets or customers

Previously, exemptions were obtained by making a specific application to the Directorate General of Competition (DG Comp), but now lines are required to self-assess their consortia agreements; that is, they should carry out their own evaluation as to whether an agreement falls

within the exemption. Such self-assessment will not protect lines from subsequent legal action if DG Comp takes a different view.

Regulation 906/2009 provided exemption under these terms until April 2015. After an investigation and public consultation, the EU extended the block exemption until 2020.

China's anti-monopoly law – impact on alliances

Until recently, China's competition law had not caused any difficulties for VSAs, alliances and similar agreements. Then, to the surprise of many commentators, China's Ministry of Commerce announced in June 2014 that it was blocking the P3 alliance between Maersk, MSC and CMA CGM.

Much of the surprise was the use of anti-merger provisions of China's competition law, when an alliance does not involve the merger of the parties and they continue to operate independently commercially.

The objection was on the grounds of market concentration (reportedly, 47% of the Asia-Europe trades), putting competitors at a disadvantage and increasing barriers to entry. The parties were unable to offer any changes to satisfy the Chinese regulator, and P3 was abandoned. Maersk and MSC then announced they would form an alliance (2M) without CMA CGM.

Uncertainty remains about the approach of China to alliances in future, and there has been much talk about the regulators in China, Europe and the USA co-operating in their approach to the regulation of alliances.

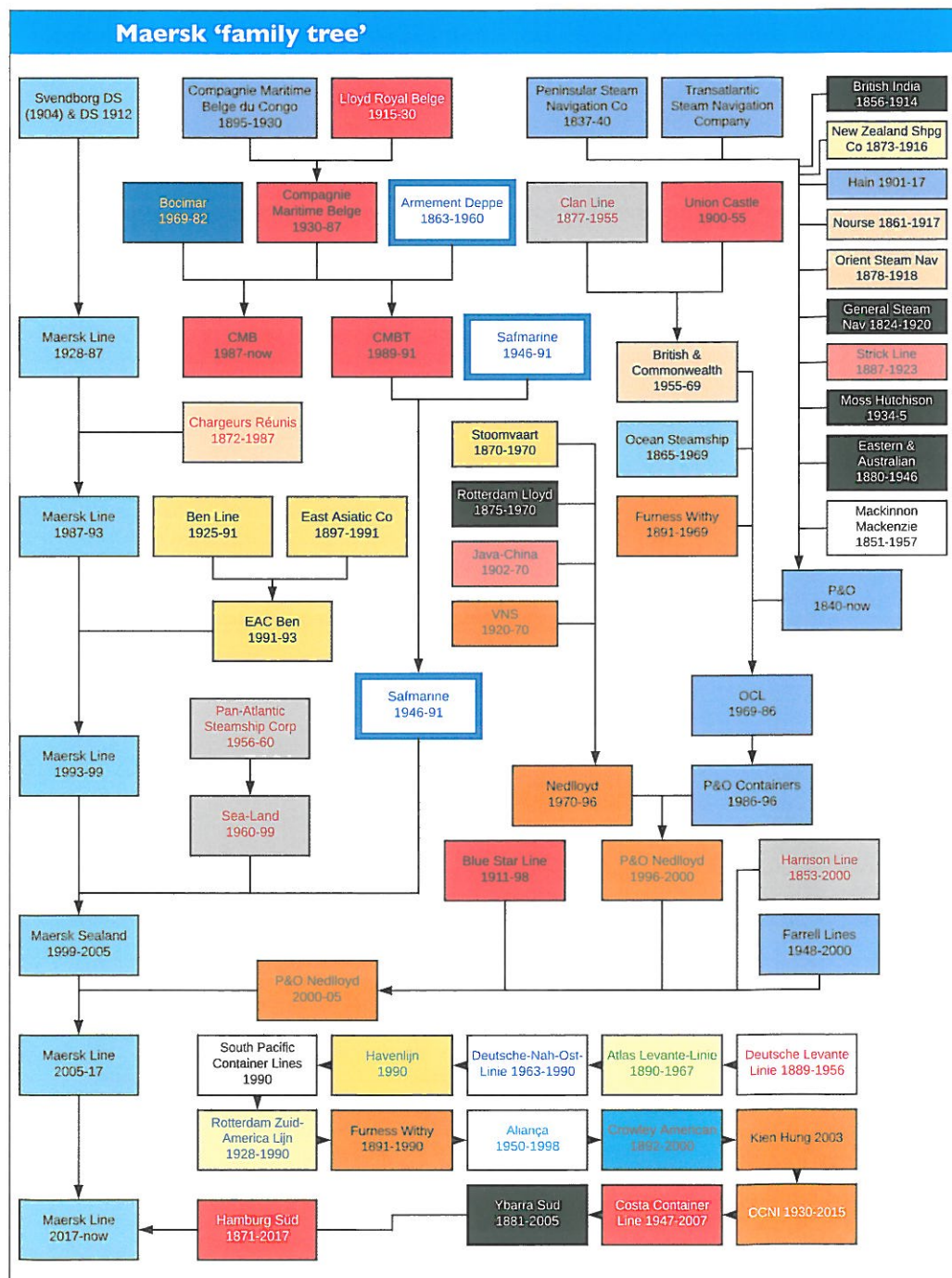
6.5. Mergers and acquisitions

Another way for shipowners to achieve economies of scale is through mergers and acquisitions. Long before the rise of containerisation, smaller companies were being acquired or merged into larger ones to reduce costs and improve the reliability and frequency of their services. An example is how today's Maersk Line, after decades of isolation and independence, embarked on a series of acquisitions that devoured dozens of earlier companies.

The era of containerisation brought further consolidation as larger companies acquired smaller companies. Three of the most 'acquisitive' companies were:

- CP Ships (acquired Contship, ANZDL, Ivaran, TMM, Italia Lines); later absorbed by Hapag-Lloyd
- Hamburg Süd (acquired DNOL, Ybarra, Furness Withy, Transroll, some Ellerman services, Aliança, Kien Hung, Fesco, Costa Container Line, CCNI); now absorbed by Maersk
- P&O Containers (Trans Freight Line, ACTA, NZL, Ellerman's African services, Harrison, Blue Star); now also part of Maersk

Some acquisitions involved buying the company, while in other cases only the services and the associated ships were bought.



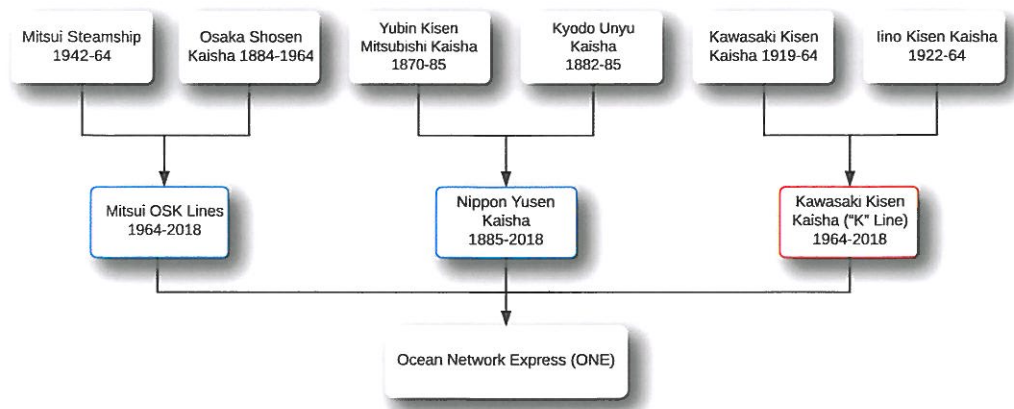
Dozens of old shipping names have been absorbed under the Maersk banner – and it's impossible to show them all

It was relatively easy for a larger line to absorb a smaller one, running the smaller company's ships and services, often with little need for any increase in staff. By the late 1990s, however, financial pressure on container lines was such that companies and shareholders considered the benefits of consolidating two much larger lines into a single line. Large cost-savings could be made, but integrating two substantial businesses always has major risks, particularly when there are cultural differences, IT systems are not compatible and managements have different aims and objectives. Such issues arise in all industries and are not unique to the liner industry.

Interestingly, from 2006 to 2014 there was no similar major consolidation, despite the pressure caused by the global financial crisis that began in 2008. Then, in 2014, Hapag-Lloyd took over the much smaller Chilean line CSAV, which had experienced several years of poor financial results. Technically this was a merger, but it was effectively a takeover. The following year, the other German carrier, Hamburg Süd, acquired outright the other (much smaller) Chilean line, CCNI, before itself being absorbed by Maersk.

Elsewhere, Orient Overseas Container Line has agreed a takeover by China Cosco (Cosco Shipping), which was the result of an earlier merger between Cosco and China Shipping. United Arab (UASC) has been merged into Hapag-Lloyd while CMA CGM has taken over Neptune Orient Lines. The French carrier has risen to the top three in the global carrier league largely as a result of its policy of buying companies. Its purchase of Mercosul from Maersk in 2017 (a sale forced on Maersk as a concession to obtain approval from Brazil's anti-trust regulator for its planned takeover of Hamburg Süd) represented CMA CGM's 12th liner acquisition since the 1996 merger when CMA bought France's state-owned CGM.

There was further consolidation with the merger by the three Japanese carriers of their liner services into a new entity called ONE, which was agreed by the various competition authorities after initial reluctance.



The amalgamation of Japan's shipping lines

Not all major shipping companies have followed the acquisition trail. MSC's rise to second place in the world's rankings has come mainly from organic growth.

While many commentators believe there is scope for further consolidation in this industry, all the main container lines now have major controlling shareholders or are part of much larger conglomerate groups with interests outside shipping. Acquisitions are therefore hard to pursue unless the present owner or controlling shareholder is willing to sell.

6.6. Alliances – recent developments

Since the crisis of 2008-09, the liner industry has been under financial pressure, while at the same time there is pressure to invest in ever larger ships in order to reduce unit costs and improve the industry's environmental performance.

With no sign of further significant mergers or acquisitions happening, continued development of co-operation between liner companies is increasingly important as the only means available to achieve further economies of scale and reduce costs.

The following chart shows the top 20 container lines, based on their operated container ship capacity, together with their new capacity on order.

Top 20 carriers by operated fleet (1 January 2018)			
#	Operator Group	TEU	Share
1	Maersk Line	4,094,471	19.7%
2	MSC	3,075,577	14.8%
3	Cosco	2,488,401	12.0%
4	CMA CGM	2,468,803	11.9%
5	Hapag-Lloyd	1,521,054	7.3%
6	ONE	1,411,205	6.8%
7	Evergreen	1,057,316	5.1%
8	Yang Ming	607,042	2.9%
9	Zim	374,549	1.8%
10	HMM	349,885	1.7%
11	PIL	339,424	1.6%
12	Wan Hai	233,926	1.1%
13	X-Press Feeders	150,190	0.7%
14	KMTC	125,079	0.6%
15	SITC	99,127	0.5%
16	IRISL	86,322	0.4%
17	Arkas Line	80,449	0.4%
18	TS Line	73,296	0.4%
19	Simatech Shipping	62,499	0.3%
20	Regional Cont Lines	55,023	0.3%
Top 20		18,753,638	90.1%
Top 10		17,448,303	83.9%
Note: Includes subsidiaries and treats all recent M&A deals as complete			
Source: Drewry Shipping Consultants			

As shown, over the years, there has been a progressive concentration of liner business into the top 20, which now represent 90% of the globally operated fleet, compared with 61% in 1993. Three years ago, a carrier needed to operate over 76,000 teu to get into the top 20. That figure is now 55,000, and the concentration is such that those outside the top 10 are mostly regional or feeder operators.

With the latest reshuffling in response to the creation of 2M and the bankruptcy of Hanjin in 2016, the other carriers reorganised themselves into Ocean Alliance and the confusingly named THE Alliance.

6.7. Current alliance structure and the future

With virtually all the lines in the main East-West trades now operating in one of the big alliances, there seems little scope for further change. It seems unlikely that, after the concerns expressed with P3, the regulators will permit an amalgamation into fewer alliances. A period of stability is likely – until some external factor affects the balance.

Effective annualised capacity, January 2018 (m teu)					
Alliance Members	2M Maersk, MSC	THE ONE, Yang Ming, Hapag-Lloyd	Ocean CMA CGM, Evergreen, OOCL, China Cosco	Others	Total
Route/market					
FE-North Europe services	6	5	6	1	18
FE-North Europe capacity	4.31	2.68	3.89	0.26	11.14
FE-Med services	9	6	10	5	30
FE-Med capacity	2.75	1.50	2.65	0.39	7.29
FE-East Coast North America services	5	5	7	2	19
FE-East Coast North America capacity	1.51	1.70	2.60	0.54	6.35
FE-West Coast North America services	5	12	13	22	52
FE-West Coast North America capacity	2.26	3.87	5.61	3.99	15.73
Trans-Atlantic (North Europe) services	5	5	2	12	24
Trans-Atlantic (North Europe) capacity	0.93	0.97	0.69	1.19	3.77
Trans-Atlantic (Med) services	2	1	1	14	18
Trans-Atlantic (Med) capacity	0.50	0.18	0.23	1.68	2.58
Total number of services	32	34	39	56	161
Total capacity	12.26	10.89	15.66	8.05	46.86
Trans-Atlantic (N Eur & Med) capacity	1,422,887	1,143,371	920,166	2,866,196	6,352,620
Note: Based on headhaul capacity					
Source: Drewry Maritime Research, Container Forecaster IQ18					

The above is only a snapshot taken at the time of publishing and the flexible nature of the alliances means that these numbers will change over time. With the relentless pressure on financial performance and on achieving cost economies, further mergers or acquisitions among the top 20 lines remain a possibility.

While shippers undoubtedly benefit in the form of lower freight rates from the cost economies that are achieved from the combination of larger ships and bigger alliances, shippers' bodies have expressed concern about market concentration. While alliance members continue to sell their services separately, there is undoubtedly a reduction in choice for the shipper when lines operating within an alliance are essentially offering the same port-to-port service. For this reason, there will be pressure from shippers and their representatives to ensure the present three-alliance structure is not reduced further.



Chapter 7

Environmental regulations

Compliance with anti-competition laws was one of the major concerns for carriers in managing their business during the closing years of the last century and the early years of the current one. In recent years, however, this has been supplanted by regulatory pressure of a different kind – that from the environmental lobby. It is affecting the industry from a variety of angles, including the cost of operating services in the future, the development of new port facilities and the flow of cargo itself.

7.1 Marpol

The International Convention for the Prevention of Pollution from Ships (Marpol) was adopted by the International Maritime Organization (IMO) in 1973 and, after amendments in response to a series of oil spills from tankers, came into force in 1983.

It has since developed to cover other areas including the prevention of pollution by the carriage of liquid noxious substances, the prevention of pollution by harmful substances carried in packaged form, the prevention of pollution by sewage and garbage from ships and the prevention of air pollution. A chapter adopted in 2011 covers mandatory technical and operational energy efficiency measures aimed at reducing greenhouse gas emissions from ships.

The details of Marpol and its six annexes are beyond the remit of this book, but some aspects of environmental regulation – emanating from the IMO and elsewhere – have had a direct influence on the recent development of the liner trades.

7.2 Air pollution: emissions from ships



Rules on clean air are being progressively tightened, with sulphur emissions the latest target

Annex VI to the International Convention for the Prevention of Pollution from Ships (Marpol) was adopted in 1997 by the IMO to address air pollution from shipping, and the measures came into force on 19 May 2005.

The regulations seek to control airborne emissions from ships including sulphur oxides (SO_x), nitrogen oxides (NO_x), ozone-depleting substances (ODS) and volatile organic compounds (VOC). The regulations to reduce sulphur oxide emissions introduced a global limit for the sulphur content of ships' fuel oil, with tighter restrictions in designated Emission Control Areas (ECAs).

Changes in bunker regulations from 2020

The current global limit for the sulphur content of ships' fuel oil is 3.50% m/m (mass by mass). The new global limit will be 0.50% m/m with effect from 1 January 2020.

Since 1 January 2015, the sulphur limit for fuel oil used by ships in SO_x Emission Control Areas (SECAs) established by the IMO has been 0.10% m/m. The SECAs designated under Marpol Annex VI for SO_x are: the Baltic Sea area; the North Sea area; the North American area (covering specific coastal areas off the US and Canada); and the United States Caribbean Sea area (around Puerto Rico and the US Virgin Islands).

Ships can meet the requirement by using compliant low-sulphur fuel oil (LSF). Alternatively, ships can use marine gas oil (MGO) or LNG as a fuel, which leads to negligible sulphur oxide emissions; there is no particulate matter and there is an 85% reduction in NO_x. Container vessels may also meet the SO_x emission requirements by adopting approved equivalent methods, such as exhaust gas cleaning systems or 'scrubbers', which clean the emissions before they are released into the atmosphere.

Policing of the 2020 regulation will be the responsibility of the administrations (Flag States) that have signed up to Marpol. Ships taking on fuel oil for use on board must obtain a bunker delivery note that states the sulphur content of the fuel oil supplied. Samples may be taken for verification.

Ships must be issued with an International Air Pollution Prevention (IAPP) Certificate by their Flag State. This certificate includes a section stating that the ship uses fuel oil with a sulphur content that does not exceed the applicable limit value as documented by bunker delivery notes or uses an approved equivalent arrangement. Port and coastal states may also use surveillance – for example, air surveillance to assess smoke plumes – and other techniques to identify potential violations.

Some shipowners still believe the implementation date for the 2020 regulation will need to be extended because of a lack of readiness, with concerns ranging from the limited availability of low-sulphur fuel, scrubber installation capacity and inadequate LNG infrastructure.

For the existing container fleet, using low-sulphur fuel is the most likely solution since owners are wary of the cost implications of retrofitting exhaust SO_x scrubbers or installing LNG engines. Retrofitting LNG-capable power plants will not be economical for ships more than 15 years old. So far, four 2011-built container vessels have gone for retrofitting.

However, the availability of sufficient supplies of low-sulphur fuel continues to be a worry, and of course LSF is considerably more expensive than so-called heavy fuel oil (HFO). Even if supplies are adequate (Drewry calculates that about a million barrels a day will be needed), operators will have to pay an additional premium in the early years.

Because HFO is the waste product of the refinery process (residual fuel), it is a relatively inexpensive fuel, whereas a tonne of distillate fuel can cost almost twice as much. Consequently, owners are bracing themselves for additional opex and capex costs associated with the legislation. Quite how they intend to recover these additional costs from the market is open to conjecture – possibly the restitution of some form of Bunker Adjustment Factor (BAF) or LSF surcharge or simply a general rate increase at the time.

One likely consequence of the new bunker standards is that more owners will opt for LNG-powered engines for newbuild orders. In November 2017, CMA CGM announced it had ordered nine LNG-fuelled 22,000 teu container ships, with the first units due to be delivered when the new regulations come into force. As of early 2018, LNG bunkering is only available in 60 ports, all in North America, North Europe and Northeast Asia, although this number is likely to increase rapidly.

7.3 Ballast water management

Ships have been blamed for transporting invasive species to new environments, where they have thrived at the expense of weaker, native species. Ships' ballast water can contain bacteria, microbes, small invertebrates, eggs, cysts and larvae of various species, which can wreck sensitive ecologies.

The International Convention for the Control and Management of Ships' Ballast Water and Sediments (BWM Convention) was adopted in 2004 and came into force in 2017. The Convention requires all ships to implement a ballast water management plan. All new ships must have approved ballast water management systems installed, while existing ships must install such a system at their next special survey after 2019.

7.4 Environmental issues delaying port projects

Various port development projects have also been adversely affected in recent years by objections from environmental pressure groups. Environmental opposition to deepening the River Elbe is holding up plans to dredge about 130 km of the river that, once complete, will enable the Asia-Europe mega-ships with a draught of 14.5 metres to reach Hamburg: (one metre deeper than the current limit). The present restrictions on the river and the limited tidal windows are not allowing the carriers to load their large ships optimally.

Plans for dredging the Port Everglades entrance channel to accommodate the higher-capacity ships that can now pass through the widened Panama Canal bound for the US Gulf and US East Coast ports have been delayed as a result of a lawsuit by environmental groups concerning potential damage to the local coral reef.

Conservation groups have also caused delays to the completion of new container terminal facilities at Moin on Costa Rica's Caribbean coast. Lobbyists have warned that construction

would threaten valuable ecosystems and protected species, such as turtles that nest on nearby beaches in Limon.



Dredging projects such as Port Everglades are facing stronger opposition (photo: Broward County's Port Everglades)

7.5 China's anti-pollution drive

From 1 April 2017, all manufacturers of shipping containers in China were due to have switched over to water-based container paint instead of the traditional solvent paints used in the past. This paint is much more environmentally friendly and is designed to reduce VOC emissions, but it also takes approximately 20 hours to dry naturally as opposed to around four hours for a solvent-based paint. Drying time is a particular problem in the temperate regions of China during winter.

The additional time to manufacture a container is therefore likely to result in higher purchase costs for container operators. Some 95% of the world's container production takes place in China and the industry is regarded as a substantial contributor to the high level of air pollution.

China has started to shift its economic policy away from growth at any cost to one more focused on quality of life issues, acknowledging that its growing middle classes no longer want to live in cities where the air is scarcely fit to breathe and where the landscape is choked with garbage. The government's immediate target is air pollution, caused by China's rapid industrialisation since joining the WTO in 2001. The authorities are now enforcing environmental regulations and have conducted a nationwide crackdown on polluting factories.

New rules on water-based paints could make Chinese-built containers more expensive (photo: Maersk Container Industry)

Similarly, the world's largest producer has made it clear that it no longer wants to be Europe's or the USA's landfill site. From January 2018, China implemented a ban on several grades of contaminated waste material from overseas. The US is by far the biggest exporter of waste to China, shipping two-thirds of its used paper across the Pacific Ocean, amounting to 13.2 million tonnes in 2016. In the same year, of the 56.4 million tonnes of paper EU citizens threw away, some 8 million ended up in China for recycling.

The effect of both these measures might not be too severe for the liner industry. Factories that have been closed because they did not meet emissions requirements have so far been mainly heavy industry plants whose products would not normally be shipped in containers, at least not overseas.



The export of waste paper, plastic and metal scrap is a significant staple on the backhaul trades out of North Europe and North America to Asia but it is a low-freighted commodity. Nonetheless, that freight was at least a contribution to the cost of what would otherwise have been an empty move back to Asia.



The PierPass scheme encourages truckers to avoid peak periods on the roads in Los Angeles

Nor is the liner industry only just waking up to its social responsibilities. At the start of this century, the rapid rise in the volume of traffic passing through the ports of Los Angeles and Long Beach caused severe congestion on the roads and highways and in the neighbourhoods around the ports, with thousands of idling trucks adding to air pollution. As a result, in 2005, the PierPass scheme was introduced to provide incentives for truckers to dray containers to and from the ports outside peak periods (Monday to Friday, 3am to 6pm).

In a world where health and human welfare are progressively being prioritised over the negative consequences of rampant consumerism, one must expect further regulation that may not necessarily alter the way liner operators co-operate with one another but could change their behaviour – and that of other stakeholders in the industry – and the way they manage their business.



Chapter 8

Development of service networks



Early container services imitated the conventional services they replaced, by sailing end-to-end along the main trade routes previously served by conventional vessels. Given the relatively small size of conventional vessels and the length of time taken to load and discharge, they would load at a few ports in one country or area and then proceed direct to the destination country or area, likewise serving a few ports there.

Increased efficiency in loading and unloading containers from ships cut the time spent in port drastically, allowing for better earnings and the use of economies of scale not seen before in the liner trades.

As more trades were containerised and vessels increased in size, lines used more innovative concepts in designing their networks.

- Services could be combined to cover a wider geographic area
- Hub locations were developed, so that smaller trades could be served using the same vessels as the larger East-West trades
- Relay services provided opportunities to cover a wider range of ports by switching cargo between services at key locations

The objective of all lines is to provide the most attractive services (frequency, transit time, range of ports and so forth) to their customers with lowest possible slot costs. To achieve this they have developed ever larger vessels and identified, and in some cases invested in, hub ports where transhipment between services can be carried out efficiently and cheaply.

8.1 Early concepts

End-to-end services

The early decisions to containerise a service were generally taken one trade at a time, and the new container services imitated the conventional services that they replaced. Container vessels were much larger than the conventional vessels they supplanted, and could load and discharge much faster. End-to-end container services therefore differed from the conventional services that went before in the following ways:

- A single container service could cover a wider area than a conventional service. For example, separate services operated to Australia from both the east and west coast of the UK, from the North Continent and from Scandinavian and Baltic ports. These services gave way to a single North Europe-Australia container service
- While container services covered a wider area than conventional services, they called at fewer ports, with cargo being consolidated at one port in a given country or area

In the UK for example, container lines initially concentrated their services in two ports, Tilbury and Southampton, and cargo was moved by road or rail to these ports while other ports were demoted to feeder ports, served by small container vessels, often with their own crane for loading and discharging. The reasons for establishing feeder ports were:

- Small volumes of cargo, making direct calls uneconomic (for example, Tasmania)

- Lack of cranes (Adelaide)
- Limited draught (Bangkok)
- Distance from the main route, needing extra steaming time and bunkers (Scandinavia and the Baltic)

From the customer's point of view, these end-to-end services were little different from the conventional services that preceded them, although in many cases they were faster and more reliable. The exception was if a business was located near a port that no longer received direct calls. In that case, the cargo could be delayed because of the time taken to feed to the main port, and the business might have to pay more. In the early days of containerisation, lines often subsidised the move to the main port so that the customer paid a haulage rate as if the container had moved to the nearest port where there had previously been a conventional service. This subsidy was called equalisation or centralisation and was progressively phased out.

Nevertheless, end-to-end services still form an important part of the portfolio of services offered by lines. Several North-South direct connections still exist that might otherwise have been covered by means of relay over an East-West trunk route hub. A typical example is NYK and MOL's joint service between Asia and West Coast South America (prior to the establishment of ONE), deploying 11 vessels on a 77-day rotation:

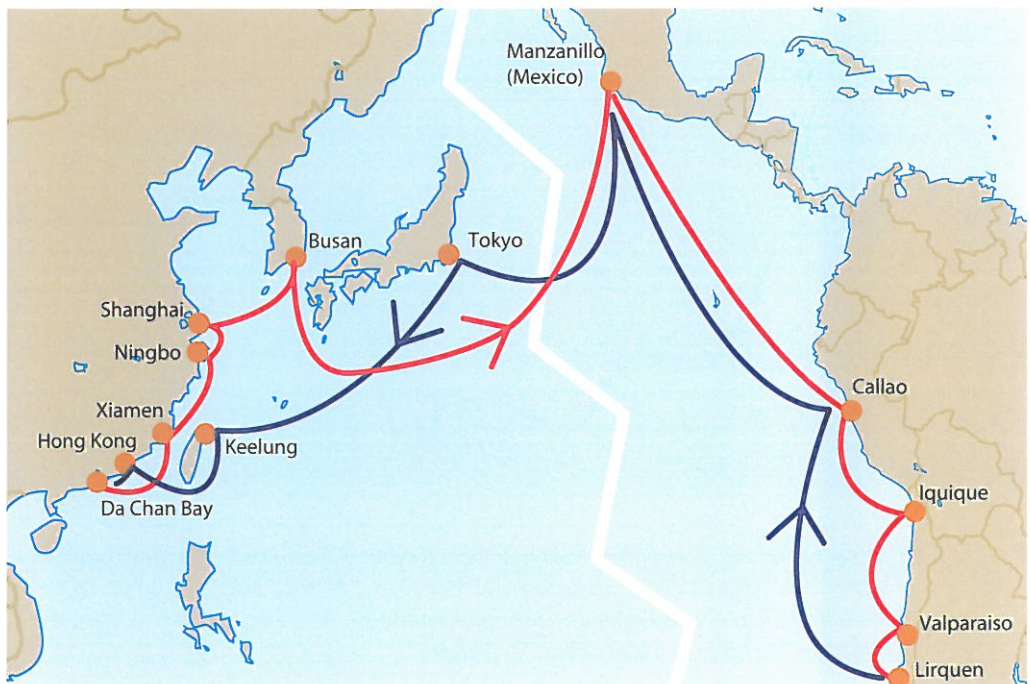
Da Chan Bay/Xiamen/Shanghai/Ningbo/Busan

Manzanillo (Mexico)

Callao/Iquique/Valparaíso/Lirquen

Callao/Manzanillo

Tokyo/Keelung/Hong Kong/Da Chan Bay



Pendulum services

One disadvantage of an end-to-end service from an operational perspective is that at each end the service will cover the same coastal route in both directions. For example, a service between North Europe and the Far East could spend more than a week en route from Singapore to North China and Korea, and then a further seven to 10 days returning in the opposite direction to load cargo.

This can be avoided by calling at different ports on the way in and out of a region, but that can create long transit times between certain port pairs. In the NYK/MOL example, the transit time from Busan to Iquique is 28 days, but the return from Iquique to Busan takes 47 days.

Joining services together to form a pendulum or 'butterfly' string can solve these problems. For example, a service between North Europe, Asia and the US West Coast can discharge cargo from Europe in Asia at the same time as loading cargo to the US West Coast. An example is the former Maersk-Hamburg Süd-MSL pendulum with a 112-day rotation:

Los Angeles/Yokohama/Ningbo/Shanghai/Yantian/Tanjung Pelepas

Sines/Antwerp/Felixstowe/Le Havre/Port Said

Singapore/Nansha/Hong Kong/Xiamen/Los Angeles



The main advantage of a pendulum service is that it reduces the number of ships required for the service as well as bunker costs because of the reduced distance steamed (comparing the pendulum service with running the two services separately). A further advantage is that they can increase the range of trades offered to shippers.

On the negative side, the same size of ship has to be used for both trades in the pendulum, while with separate services the size of ship can be tailored to each trade. And because containers are being both loaded and discharged at all ports in the middle of the pendulum (Asia in this example), careful operational planning is required to ensure that sufficient containers are discharged to make room for the containers that are to be loaded. There is a risk that re-stows will be required, increasing costs.

Round-the-world services

The round-the-world service (RTW) is an ambitious form of pendulum service that continues round the world until it returns to its initial port of departure. It therefore increases the cost benefits of a pendulum service by avoiding any duplication of coastal routes as the ship never turns back. It can offer shippers the ability to load and discharge their containers at any point en route.

In the 1980s there were two main proponents of such round-the-world services. One was US Lines, which invested in a series of Panamax vessels and counted Malcom McLean, the pioneer of containerisation, as a major investor. It operated eastbound only and did not call in North Europe, proceeding directly from the US East Coast to the Mediterranean. North European cargo was to be transhipped at Fos.

The service suffered major difficulties from the outset – commercially, because it was difficult to fill for much of its route, and operationally, because there was no opportunity to position empty containers back to their port of origin (they had to continue round the world). Moving North European cargo to and from Fos proved to be a costly exercise. The ships also seem to have been under-specified and could not maintain the required speed. US Lines filed for bankruptcy in 1986, the service was closed and the ships were sold.

Evergreen was more successful with a round-the-world service that operated in both directions and included North Europe in its itinerary, so providing a cost-efficient service in all the three major East-West trades – North Europe-Asia, Asia-USA and North Atlantic.

The limit on vessel size imposed by the Panama Canal was the major constraint, and as its competitors introduced larger vessels on the Europe-Asia and Asia-US West Coast services, the cost advantages of the round-the-world concept were outweighed by the loss of economies of scale on these two trades. The service was eventually withdrawn.

At present there are no true round-the-world services, but the concept could be revived now that the Panama Canal expansion project has been completed.

8.2 Frequency – the weekly loop

From the outset of containerisation, lines had to trade off the size of vessel they operated with the frequency of the service. While larger vessels gave lines better economies of scale, they had to sail less frequently to get good vessel utilisation – varying from seven to more than 10 days according to what the line, or group of lines in a consortium, decided. This was less satisfactory for shippers wanting a regular service and could put the line at a competitive disadvantage.

Lines could also adjust the frequency relatively easily. If cargo volumes increased, they could add another vessel and improve the frequency by a day or so. If volumes reduced, they could likewise reduce the number of vessels and frequency.

In the 1980s there was a rapid move to weekly services (or Fixed Day Sailings – FDS), particularly in the East-West trades. This was because:

- New and rapidly growing lines (for example: Evergreen, Maersk) saw the introduction of weekly services as a useful selling point against the established lines
- Shippers that were developing supply chains saw the advantage of weekly shipping services, as they could plan their stocks and logistics on a weekly cycle
- There was pressure on container terminals to offer guaranteed berthing and productivity. Terminals could not do this when services were irregular, so they offered guaranteed slots only to those lines whose service arrived at the same time every week

These factors meant that weekly services rapidly became the norm in the East-West trades. The North-South trades followed, despite the smaller volumes in these trades.

While good for customers and for container terminals, the weekly concept made it harder for lines to adjust the space they offered in a trade. No longer being able to add an additional ship to an existing service, they had little alternative but to grow by introducing a second weekly service, or loop.

If the service operates on a 63-day round voyage, an operator needs nine vessels to operate a loop. Loops are also sometimes called strings.

Lines or groups of lines (VSAs or alliances) may therefore operate a number of loops in a given trade, and the main way in which space is added or subtracted is to add or remove a loop. The other way is to change the size of the ships on a loop, but this depends on having a complete set of ships of the new size, and there is a significant operational cost in phasing vessels into and out of a service.

With the growth in the Asia-North Europe trade, Maersk Line reached the position of operating seven loops in the trade in 2011. By co-ordinating these loops it was able to announce a 'Daily Maersk' service from some key Asian ports to main European ports. Other lines and alliances reacted by combining their services to increase the frequency, but the market was not prepared to pay the premium required to justify the service, and Daily Maersk was dropped in 2015.

8.3 Hub-and-spoke and relay services

The establishment of global networks by the main container operators has given rise to the development of hub ports at the crossing points of trade lanes. In the mid-1990s, intermediate hubs started to emerge along the main East-West trades.

Hub ports enable lines to employ vessels that maximise economies of scale on the main East-West routes, while increasing productivity by limiting the number of ports at which they call. The characteristics of these hubs are:

- Nautical accessibility
- Proximity to major trade lanes
- Provision of efficient and cost-effective transhipment of containers

In many cases, lines have invested in the hubs themselves while others were established by international terminal operators.

Almost all deep-sea container services today use the hub-and-spoke concept to some extent to maximise both the efficiency of the network and the port coverage offered to customers. The system works on the basis of a mainline ship that will call at the key ports or gateways (hubs) on the route, with perhaps only one or two in each sub-continental area. From these hubs, feeder services are operated to other local areas and spoke services to other accessible trade routes.

The use of hub ports has been extended to provide links between two different deep-sea services, so extending the range of ports offered on the service. Most commonly this involves a link between East-West and North-South services. The additional services created are called relay services.

Ports near the Strait of Gibraltar (such as Algeciras and Tangiers) are ideally placed so that East-West services from Asia to North Europe or the US East Coast can be linked with North-South services between North Europe or the Mediterranean and West Africa.

Advantages of the hub-and-spoke/relay services

The main advantage for the line is that it needs fewer ships than if all the ports were to be served with direct calls. This allows for substantial savings for the operator, because it gains economies of scale in between hubs and the bundling of cargo on to the mainline ships, thereby allowing for higher load factors and reducing the overall cost of the hub-and-spoke network.

The relative ease of adding or removing spokes to the network gives it the flexibility to react to changes in cargo volumes.

Weaknesses of hub-and-spoke/relay services

Running a hub-and-spoke service network requires complex scheduling and precise timing to connect feeder services with the sailings of the mainline ships between the hubs. Proper scheduling by the operator can greatly improve the transit time of the goods. To be able to reduce the transit time, feeder services and the inter-hub services need to arrive in close succession, increasing the risk of bottlenecks at the hubs.

Transit times in a relay system are usually longer than for an end-to-end service, because of the time taken to pass through the hub as well as possibly taking a longer route. With an extra load and discharge movement as well as time on the terminal at each hub, these additional container movements mean extra time and money. The additional handling costs are generally met by the line, thereby reducing the economies of scale savings.

Another drawback is that delays can rebound through the system. If a vessel is held to make an advertised connection, it may then be too late to make a connection elsewhere. Missed connections can harm the shipper's business and the line's reputation for reliability.

Shippers may therefore favour a direct service over a hub-and-spoke service as they perceive there is less risk involved. On the other hand, in some markets direct services have disappeared entirely or are much less frequent than the hub-and-spoke services, so there is less choice for a shipper – a good example being the Asia-East Africa trade. Sometimes lines offer a lower freight rate to persuade the customer to use a relay service rather than an equivalent direct service.

Estimated transshipment volumes at main hub ports, 2016 ('000 teu)

Rank	Port	Country	Throughput	Transshipment	T/S incidence
1	Singapore	Singapore	30,904	26,268	85%
2	Busan	S Korea	19,378	9,797	51%
3	Port Kelang	Malaysia	13,167	9,064	69%
4	Tanjung Pelepas	Malaysia	8,029	7,545	94%
5	Jebel Ali	UAE	14,772	7,238	49%
6	Hong Kong	Hong Kong	19,813	5,060	26%
7	Ningbo	China	21,565	4,891	23%
8	Kaohsiung	Taiwan	10,465	4,881	47%
9	Shenzhen	China	23,980	4,459	19%
10	Shanghai	China	37,135	4,456	12%
11	Algeciras	Spain	4,760	4,382	92%
12	Colombo	Sri Lanka	5,735	4,306	75%
13	Rotterdam	Netherlands	12,385	3,795	31%
14	Antwerp	Belgium	10,037	3,483	35%
15	Hamburg	Germany	8,900	3,316	37%
16	Bremerhaven	Germany	5,489	3,129	57%
17	Salalah	Oman	3,325	3,126	94%
18	Piraeus	Greece	3,750	3,094	83%
19	Marsaxlokk	Malta	3,086	2,963	96%
20	Tanger Med	Morocco	2,964	2,831	96%

Source: Drewry Maritime Research

Role of transshipment hubs

Many hub ports fulfil a dual role of serving a local market and providing a hub location for nearby areas and ports. Rotterdam (North Europe) and Busan (Korea) are examples of such ports.

However, some transshipment hubs have been built primarily to transfer cargo between ships rather than to move cargo to the immediate geographic hinterland. The importance of a transshipment hub is clear in a hub-and-spoke network, with these ports being nodes in the network of the operator where containers from smaller regional ports or ports with limited draughts are collected.

The following characteristics are needed for a successful transshipment hub:

- Strategic location along an important trade route

- Easily accessible (for example, deep draught, available berths, berth length)
- Modern crane installations for fast vessel turnaround times
- Large areas available for storage of transhipment containers

Impact of the increase in ship size

The cost advantages of a hub-and-spoke system depend on the operator using large ships on the routes between hubs. Maximising the gains from economies of scale, container ships have rapidly increased in size over the past 30 years.

The number of ports able to handle these ships was initially limited, as many ports did not have the facilities or the physical capabilities (for example, draught) to receive the newest generation of container vessels. However, some ports have invested heavily in dredging, expansion and new handling equipment, while new ports have been built when existing facilities had no scope for expansion.

Two examples illustrate the trend. Rotterdam has built a huge new facility on reclaimed land at Maasvlakte, while in Thailand deep-sea container traffic was moved out of the congested river in Bangkok to a new port over 100km away at Laem Chabang.

So many new, large container ships have been delivered in recent years that carriers struggled to deploy them, with the result that more direct ports of call were added to their schedules simply to soak up the new tonnage. Many ports that had not seen direct, deep-sea services since before containerisation were added to the schedules, reducing the need for transhipment. Ho Chi Minh City in Vietnam is a good case in point.

8.4 Double dipping

The operator will look at all possible ways to maximise the number of freight earning units carried on any particular service. One technique to achieve this is called double dipping.

Double dipping is when a slot on a container ship is used for two or more loaded container moves during the same voyage leg. For example, a container ship following a route between Rotterdam and Shanghai with stops in Algeciras and Salalah can carry one container from Rotterdam to Salalah and another container in the same slot from Salalah to Shanghai.

The importance of Salalah in this example is its status as a hub port. Very little cargo is actually destined for or originates from Salalah. The port's hinterland is limited to Oman, a relatively small country in respect of cargo generated. However, lines that call at Salalah use it as a hub for the Middle East Gulf, East Africa, the Indian Ocean islands, Pakistan and West Coast India.

Algeciras is used in a similar way. For example, cargo from Rotterdam to Algeciras can be relayed to West Africa or East Coast South America. Cargo from Algeciras to Shanghai might have originated in West Africa, East Coast South America, North Africa or other Spanish ports.

The use of hub ports to double dip and to add flows to and from other areas can help to achieve high slot utilisations in both directions on the main service.

Another technique is to add an extra port in one direction only. For example, one of the problems with Asia-Europe services is that the flows are much stronger (and revenue better) in the westbound direction than eastbound. The reverse is true for the trades between Europe and the Middle East, where eastbound flows are stronger.

Several lines therefore operate an Asia-Europe loop that goes direct from Asia to Europe westbound but stops at Red Sea or Middle East ports on the eastbound leg. To avoid delaying the return of the vessel to Asia, the service will probably call at only one or two Red Sea or Gulf hub ports, using feeders to cover other ports in the region.

One such service is 2M's AE7 service, which calls at Tangiers, Salalah and Jebel Ali on the eastbound leg but goes straight from Tanjung Pelepas to Rotterdam westbound:

Hamburg-Bremerhaven--Antwerp-Felixstowe-Le Havre-Tangiers-Salalah-Jebel Ali-Yantian-Qingdao-Ningbo-Shanghai-Yantian-Tanjung Pelepas-Port Said-Hamburg

8.5 Cascading of vessels

Much has been said about the growing size of vessels as lines pursue economies of scale. There are two important limitations on this process, however:

- There is an effective limit on the maximum size of vessel in any given trade because of physical constraints and the size of the market
- A container ship has a typical life of 25 years, so a line that builds larger vessels to reduce slot costs will still need to employ its smaller vessels

The practical solution is that a line will introduce its new large vessels on the trades that can best benefit from the additional scale. This will displace existing large vessels, which can then be moved to the next best trade to utilise the vessel's size.

The process of displacing vessels and moving them to the next trade that can take advantage of their size is referred to as cascading, and for the major lines it is an almost continuous process as their fleets evolve.

There is an approximate order of trades through which lines cascade their vessels, shown below from largest to smallest.

1. Asia-North Europe
2. Trans-Pacific (US West Coast) Asia/Med Asia/Middle East
3. Smaller East-West trades (such as Europe-Middle East, Trans-Atlantic) and larger North-South trades (such as East Coast South America)
4. Smaller North-South trades (Africa, Australasia) and Intra-Asia
5. Other coastal and feeder trades

There is no right or wrong approach to cascading and each line will decide what is best for its own network. In some of the weaker markets since 2010, cascading has caused disruption to smaller trades and led to a collapse in freight rates.

One interesting effect of cascading is that it may help to restore some direct end-to-end services. For example, as larger ships were placed on the Asia-Mediterranean trade, areas such as the Black Sea and the Adriatic were covered by hub-and-spoke services. Cascading meant that some lines have been looking for a home for smaller vessels displaced from other trades. Now these smaller ships are being used to provide direct services in these areas, competing with the transshipment services offered by other lines.

More recently, the phenomenon of 'reverse cascading' has been observed, where smaller tonnage has been redeployed back into the major trades to cover niche services directly without transshipment. A good example of reverse cascading is CMA CGM's SEANE loop (South East Asia-North Europe), which deploys ships of around 5,000 teu and, when it was launched in 2017, produced the first direct link between North Europe and Jakarta.

8.6 Capacity management

Overcapacity has blighted some of the major trade routes in recent times, mainly as a result of the race to build ever larger container ships. A vicious circle formed: shipping lines ordered bigger units to take advantage of lower slot costs and counter the effects of declining freight rates and rising costs. But the ensuing oversupply of tonnage simply became the catalyst for another round of rate reductions, and so the spiral continued.

Capacity management programmes

At the turn of this century, some of the consortia or alliances in the Asia-Europe trade considered so-called Capacity Management Programmes, with a view to artificially capping the slot capacity of their ships. That scheme fell by the wayside because there was no effective policing mechanism and it was felt that regulatory bodies such as the European Commission (EC) would regard such schemes as a way to manipulate freight rates to the disadvantage of the shipper. Carriers were fearful that it could jeopardise the anti-trust block exemption granted to container shipping by the competition authorities.

Although shipping conferences have been widely banned since 2008, consortia or alliances have enjoyed exemption from anti-trust laws so long as the individual members do not discuss commercial matters or collude to prevent, restrict or distort competition in the internal market. The key precept is that consumers of shipping services can enjoy a fair share of the benefits resulting from lines forming joint schedules.

Article 101(1) of the Treaty on the Functioning of the European Union (TFEU) prohibits agreements that restrict competition. However, Article 101(3) TFEU declares such agreements compatible with the internal market provided they contribute to improving the production or distribution of goods or to promoting technical or economic progress, while allowing consumers a fair share of the resulting benefits.

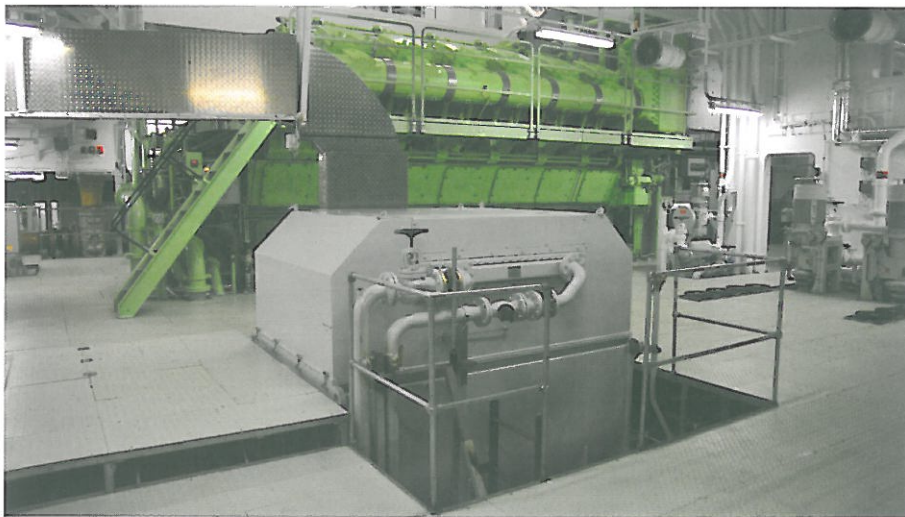
The EC has acknowledged that shipping consortia can create economies of scale and better utilisation of capacity. A fair share of the benefits resulting from these efficiencies can be passed on to users of those services in terms of:

- Better coverage of ports (improvements in the frequency of sailings and port calls)
- Enhanced services (improvements in scheduling and better or personalised services through the use of more modern vessels, equipment and port facilities)

Beginning with Regulation (EC) No 870/95, which was adopted by the Commission through the power granted to it by Council Regulation (EEC) No 479/92, the authorities in Brussels endorsed a series of consortium block exemption regulations (BERs), each effective for a period of five years. The current regulation for shipping consortia, No 906/2009, adopted under authority of Council Regulation (EC) No 246/2009, will run until 25 April 2020.

Were the BER to expire in 2020, it would not mean that consortium agreements would become unlawful, but that they would be examined under the general rules on competition similar to co-operation agreements in other sectors.

Slow steaming



Slow steaming saves huge costs, but engines become less efficient if run too slowly

Bunker prices continued to rise during much of the first decade of this century, and with the BAF surcharge increasingly being discounted in the more mature liner trades, lines were forced to adopt other measures to counter rising costs.

Between July 2007 and July 2008, marine fuel oil doubled from \$350 to \$700 per tonne and it was at this time that the concept of slow steaming was first introduced to reduce round-voyage costs. The greater benefit was that it also acted as a capacity management tool by absorbing some of the new tonnage that was being delivered, thereby relieving some of the pressure to cascade ships to other trades.

It was the longer-distance deep-sea trades that stood to gain most from slow steaming. For many years, the service norm on the Asia-North Europe route was for a complement of nine ships performing a round-voyage time of 63 days at an average speed of just above 21 knots. By slowing the fleet down, that same weekly string could be served by 10 vessels on a 70-day rotation, or even 11 ships on a 77-day round-trip basis. If an alliance had, say, five services a week, it meant that up to 10 additional newbuilds could be absorbed within the group's overall fleet.

Of course, it resulted in longer transits for customers' consignments, but with much of the slow steaming applied to the eastbound leg of the trade – where the majority of goods carried are not so time-sensitive as those in the opposite direction – protests from shipper bodies were generally muted. Speeds on the backhaul leg to Asia dropped to as low as 14 knots, and anything below 18 knots came to be known as super-slow steaming. Some eastbound ships even routed via the Cape of Good Hope, thereby saving some of the costs resulting from the Suez Canal dues despite the extra distance steamed.

At the time, Maersk calculated that its flagship, the 14,000 teu *Emma Maersk*, could save 4,000 tonnes of fuel oil on a Europe-Singapore voyage by slow steaming. At a typical 2008 bunker price of \$600-700 per tonne, this worked out to fuel savings of \$2.4-2.8 million on a typical one-way voyage. Slow steaming was also promoted as a more environmentally friendly operation, reducing carbon emissions.

However, there was always going to be a limit to how far slow steaming could be applied, leaving aside the commercial considerations of longer transits. A ship's engine and propeller are designed to operate within a certain range of revolutions per minute. Steaming too slowly will place the engine and propeller outside their most efficient range and will therefore begin to counteract the benefits.

In a fiercely competitive environment, carriers therefore had to look to other means to conserve their operating costs.

Service suspensions

Of course, poor demand can dictate that a whole string has to be withdrawn permanently or merged with an adjacent service. Short-term suspensions are a less draconian measure.

Some services have been introduced in recent years on a seasonal basis in order to cope with a peak in demand. Such services have been a feature especially of the trans-Pacific trade where during the period July to September there are strong flows of Christmas and Thanksgiving goods, as well as the so-called Back To School merchandise. Come November time, those additional services have been mothballed for the slack season.

On a more ad hoc basis, some individual weekly sailings are cancelled – 'blanked' or 'voided' – when it is predicted that demand will be weak. These periods include:

- The two or three weeks following Chinese New Year when factories in China are closed
- The first week in May when China and other Asian countries celebrate extended holidays
- The first week in October – otherwise known as Golden Week – when again China enjoys an extended holiday

- The first week of January when, after factory closures during the Christmas-New Year festive season, there is a drop in demand
- The period of Ramadan – particularly significant in the Middle East trades

Whereas artificially capping the capacity of ships could be construed as manipulating the market to gain some unfair commercial advantage against the shipper, dropping individual sailings when demand was slack could be portrayed as an exercise in efficiency. It was less wasteful and at the same time promoted the carriers' green credentials by reducing the industry's carbon footprint. Competition authorities have never demurred.

Lay-ups

If the time that a ship is taken out of service is of a relatively short duration – say less than three months – it will be held in what is termed a hot lay-up. Engines and machinery are kept running in much the same way they are when a ship on active service is in port. A number of crew are retained on board. The vessel will probably be moored at a safe anchorage close to a port so that it can quickly be brought back into service when the programmed lay-up ends. These short-term lay-ups may also coincide with the vessel's dry-docking requirements.

When a ship is removed from service for a longer period of time, it may enter into what is described as a cold lay-up. Engines are shut down and only minimum manning levels are retained to oversee the safety of the vessel (fire, leakage, mooring) and its general security. A class survey may have to be undertaken before the ship re-enters service.

The ship would be moored in an area that is not susceptible to heavy winds or strong currents, and its location would certainly not be in a part of the world prone to typhoons or hurricanes. Malaysia's Johor river estuary has been a popular cold lay-up anchorage area in recent times. Another option is a cheap lay-up berth. This choice avoids supply problems for the watchkeepers and grants easy access to the vessel for surveyors and crew. However, it comes at the cost of renting the berth.

Monitoring the idle fleet

The global idle container ship fleet – when vessels are formally laid-up as opposed to simply undergoing dry-dock maintenance – is constantly monitored and can be regarded as a useful barometer of the industry's health. By the end of 2009, as a result of the global financial crisis, a record of 1.52 million teu of the worldwide fleet had been temporarily taken out of service, equating to 11.7% of all box ships on the water;

At the end of March 2016, during a severe downturn in global demand and when there were 352 container ships above 500 teu capacity registered unemployed, the total slot supply suspended from service exceeded that of five years earlier, at 1.57 million teu. However, in percentage terms this latest spike in the idle fleet registered only 7.8% because in the intervening years global tonnage had grown from 13 million teu to 20 million teu.

Nor did the 2016 contingent of idle ships comprise only small units. One-third of the laid-up capacity at the time was made up of 55 ships ranging from 7,700 teu to 19,000 teu as carriers faced difficulties keeping their larger vessels fully employed in the face of weak demand.

In contrast, at the start of 2018 there were 99 vessels, equating to some 378,000 teu, anchored in hot or cold lay-up. This compares with 351 ships totalling 950,000 teu a year earlier. At 1.8% of the global cellular fleet, idled container tonnage in January 2018 recorded its lowest level since mid-2015.

8.7 Limitations of co-operation in networks

Liner operators can co-operate through vessel-sharing agreements (VSAs) or alliances with other operators to optimise their networks, increase their scale or simply offer a wider geographical coverage. Although co-operation between operators has clear benefits for the companies involved and for shippers, there are also limitations and drawbacks.

A specific problem of any form of co-operation is the inherent inflexibility that comes with the need for an agreement between two or more companies. In today's fast-moving economic environment, the markets do not wait for an agreement to be made. A sudden increase in cargo at a specific point in the network may be snapped up by a competitor before the members of an alliance have agreed how best to cover the cargo and which alliance member will provide any additional vessels needed.

Also, the alliance members might use different terminals within the same ports or have different hubs along the same trade route, which increases operating costs as the operators need to provide additional transport between the different terminals or hubs (or ships have to make more hub port or terminal calls, which also increases costs).

8.8 Current and future networks

As the size of container ships increases, more pressure will be placed on ports and terminals to handle these ships with their larger dimensions and greater volumes of containers to be exchanged. In particular, lines will expect to see increases in the productivity of terminals so that the ships do not have to stay in port for extended periods.

Port equipment is being developed to keep turnaround times in line with operator and shipper expectations. Increasingly, automated, driverless lifting equipment is playing a key role in this respect. The bigger cargo volumes will also need better connections to the hinterland to deal with the increased flow of containers.

In the future it is likely that the constraints on the size of vessels will not be the technical capabilities of the ships but the ability of ports to deal with the cargo volumes on the land side, especially in already congested areas.

Emerging economies

Everybody is familiar with the effect that China's economic growth has had on world trade since the early part of this century. This remains significant, but growth is no longer at the same dramatic rate. Apart from India, the other 'BRICS' countries (Brazil, Russia and – later – South Africa) have faltered.



Lázaro Cárdenas: Mexico could be one of the next growth champions (photo: APM Terminals)

Investors have more recently championed 'TICKS' – Taiwan, India, China, South Korea – but the emphasis on technology suggests these countries might have a lesser impact on the liner trades. Mexico and Indonesia are seen as more likely additions, while Vietnam has become a major manufacturer.

As new markets grow in importance, they will also need more investment in ships, infrastructure (terminals and road and rail networks) and personnel. But will these emerging economies be in a position to make the necessary investment themselves? Might there be an opportunity for the global terminal operators to expand their operations, or will the lines themselves invest to ensure their services are not compromised by poor terminal facilities?

In many developing economies the answer depends not only on the willingness of interested parties to invest, but on the legal, financial and political systems of these countries to provide an acceptable and transparent structure to accommodate the necessary finance and expertise from overseas.

Impact of the Panama Canal expansion

The redevelopment of the Panama Canal, completed in 2016, has created a further classification of ship size, the new Panamax. This class has a length of 427m, a maximum breadth of 55m and a draught up to 15m. Container ships with a capacity of around 15,000 teu can now use the canal.

This especially affects services from Asia to the US East Coast. As a result, many of the East Coast ports in the USA from Miami to New York have launched expansion programmes to be able to accommodate the new Panamax ships.

Probably the largest such investment programme is the raising of the road on the Bayonne Bridge in New York, connecting New Jersey and Staten Island. Ships have to pass under the bridge to reach all but one of New York and New Jersey's container terminals, and the original bridge clearance effectively limited vessel size to around 7,000 teu. The redeveloped bridge with air draught of 215ft (65.5m) was opened in 2017, enabling the new Panamax vessels to pass underneath.

The full impact of the Panama Canal expansion on lines' networks will not be known for a few years yet. Undoubtedly we shall see ships of up to 12,000 teu employed on the main East-West routes via Panama. Some loops that currently are routed via Suez are already going via Panama instead, and there could also be a change in how parts of South America are served from Asia (particularly the West Coast), with fewer direct services and more hub-and-spoke services from the hubs at both ends of the Panama Canal.

There has been occasional talk of a rival canal through Nicaragua and some initial work started in 2016 as part of a \$50bn project, but the project is effectively dead for now.

Further in the future, a fundamental change in the networks of lines and the use of the Panama Canal could come from the opening of the Northern Sea Route between Europe and Asia across northern Russia, and possibly (though less likely) across North America via the Northwest Passage. For now, no marine infrastructure exists north of the American continent, and the Northern Sea Route is used mostly for shipping gas from the Yamal Peninsula. There are already considerable concerns about the environmental impact of Arctic shipping, and it is unlikely to have much impact on the routeing of liner services in the near future.

8.9 The main trade routes

Having considered the principles of how liner service networks are developed, this section looks at the structure of individual services and trade routes, using data supplied by Drewry Maritime Research. On some of the lesser trades, only headhaul volumes are shown.

It will be noted that the main alliance groupings are mostly active on the East-West trades, with members making their own, separate arrangements on North-South trades.

This overview is based on the situation in early 2018. While the trades themselves will change only gradually, finer details such as vessel sizes and marginal port calls can change quite suddenly. So, while there will definitely be a service between Rotterdam and Shanghai throughout the lifetime of this book, we can be less certain of a direct link between, say, Salerno and Antofagasta.

Asia-North Europe

Trade volumes 2017

Westbound: 9.9m teu

Eastbound: 5.1m teu

Service structure

End-to-end services usually calling at ports in the UK, Germany, Belgium or Netherlands and France and travelling via Suez to Southeast Asia, South Korea, China and Japan. In recent years,

some services have extended into the Baltic, added hub ports in the Mediterranean and omitted Japan. The trade is heavily imbalanced, not only in terms of volume but also in terms of equipment, with lightweight 40ft cargoes moving westbound and heavier 20ft cargoes moving eastbound.



Main direct ports of call

Asia: Port Kelang, Tanjung Pelepas, Singapore, Laem Chabang, Hong Kong, Shenzhen, Shanghai, Ningbo, Dalian, Qingdao, Tianjin, Xingang, Kaohsiung, Busan, Kwangyang, Tokyo, Yokohama, Kobe

North Europe: Felixstowe, Southampton, Thames Gateway, Le Havre, Dunkirk, Antwerp, Zeebrugge, Rotterdam, Hamburg, Bremerhaven, Gdynia, Sines

Wayport trades

Red Sea: King Abdullah Port, Jeddah

Middle East: Jebel Ali, Khor Fakkan

Main hub ports

Algeciras, Malta (Marsaxlokk), Salalah, Colombo, Tanjung Pelepas, Singapore

Main feeder areas

Europe: Scandinavia, Baltic Sea, Northern UK and Ireland, Atlantic France, Spain, Portugal

Asia: Indonesia, Thailand, Vietnam, Cambodia

Lines and alliances

Alliances: 2M, G6, CKYHE, Ocean Alliance, THE

Non-alliance carriers: Hyundai Merchant Marine, Zim

Main commodities

Westbound: Finished/consumer goods (electronic goods, clothes and textiles, footwear; timber products), reefer (fish, prawns)

Eastbound: Paper, scrap metal and plastics, chemicals, machinery, car parts, luxury goods (cosmetics, bottled water; wine, brandy, whisky)

Vessels and capacity

Largest vessel: *OOCL Hong Kong* class: 21,413 teu

Average vessel size: 15,291 teu

Annual headhaul capacity: 11.1m teu

Key developments

The continued increase in the number and size of the largest container ships employed in this trade, together with the pressure this puts on ports and inland infrastructure, provides the main challenge for the lines and terminal operators.

Asia-Mediterranean

Trade volumes 2017

Westbound: 5.5m teu

Eastbound: 2.4m teu

Service structure

End-to-end services usually calling at ports in the West Mediterranean (Italy, Spain and France) or the East Mediterranean (usually Egypt, Greece and Turkey), and travelling via Suez to Southeast Asia, South Korea, China and Japan. Black Sea calls have been added in recent years, either as extensions of existing services or as dedicated services. As with North Europe, the westbound trade dominates.

Main direct ports of call

Algeciras, Valencia, Barcelona, Fos, Genoa, La Spezia, Gioia Tauro, Marsaxlokk, Piraeus, Istanbul, Port Said

Asia: Port Kelang, Tanjung Pelepas, Singapore, Hong Kong, Shenzhen, Shanghai, Ningbo, Dalian, Qingdao, Tianjin, Kaohsiung, Busan, Tokyo, Kobe

Wayport trades

Red Sea: King Abdullah Port

Middle East Gulf: Jebel Ali, Khor Fakkan

Main hub ports

Algeciras, Malta (Marsaxlokk), Gioia Tauro, Piraeus, Port Said, Salalah, Colombo, Singapore, Tanjung Pelepas

Main feeder areas

Mediterranean: North Africa, Adriatic, Black Sea

Asia: Indonesia, Philippines, Thailand, Vietnam, Cambodia

Lines and alliances

Alliances: 2M, Ocean Alliance, THE

Non-alliance carriers: Zim

Main commodities

Westbound: Finished consumer goods (electronic goods, clothes and textiles, footwear; timber products), reefer (fish, prawns)

Eastbound: Paper; scrap metal and plastics, chemicals, machinery, car parts, luxury goods (cosmetics, bottled water; wine, brandy, whisky)

Vessels and capacity

Largest vessel: *Emma Maersk* 17,816 teu

Average vessel size: 10,998 teu

Annual headhaul capacity: 7.3m teu

Key developments

The continued increase in the number and size of the largest container ships employed in this trade, together with the pressure this puts on ports and inland infrastructure, provides the main challenge for the lines and terminal operators.

Asia-North America (trans-Pacific)



Trade volumes 2017

Westbound: 7.5m teu

Eastbound: 19.5m teu

Service structure

This is another trade with a substantial imbalance in volumes between the two directions, resulting in large numbers of empty containers being shipped from North America back to the Far East. Lines operate separate services to the West Coast and to the East and Gulf coasts via the Panama Canal. Some East Coast services go westbound via the Suez Canal, but the expansion of the Panama Canal has made these less popular: Gulf and East Coast services compete with rail services from West Coast ports.

Main direct ports of call

Asia: Port Kelang, Singapore, Laem Chabang, Hong Kong, Yantian, Shanghai, Ningbo, Kaohsiung, Busan, Tokyo, Kobe

USWC: Prince Rupert, Vancouver, Seattle, Los Angeles, Long Beach, Oakland

PNW (Pacific North West): Prince Rupert, Vancouver, Seattle, Tacoma

PSW (Pacific South West): Oakland, Los Angeles/Long Beach

USEC/USGC: Halifax, New York/New Jersey, Norfolk, Charleston, Savannah, Miami, Houston

Main hub ports

Singapore, Tanjung Pelepas, Manzanillo and Balboa (Panama), Kingston (Jamaica), Freeport (Bahamas)

Main feeder areas

Asia: Indonesia, Philippines, Thailand, Vietnam, Cambodia

Mexico/US Gulf Ports via Freeport/Kingston

Central America and Caribbean via Manzanillo, Freeport or Kingston

West Coast South America via Balboa

Lines and alliances

Alliances: 2M, Ocean Alliance, THE

Non-alliance carriers: Matson, PIL, Westwood, Wan Hai, Evergreen, SM, Hyundai, Zim

Main commodities

Westbound: finished/consumer goods (electronic goods, sporting goods, home furnishings, building and garden supplies)

Eastbound: reefer commodities (chilled meat, fruit), waste paper, scrap

Vessels and capacity

Largest vessel: CMA CGM *Theodore Roosevelt*, 14,414 teu

Average vessel size: 7,828 teu

Annual headhaul capacity: 1.9m teu

Key developments

The opening of the new Panama Canal locks in 2016 has enabled container ships up to around 13,000 teu to operate on the Asia-USEC trade via Panama. This is likely to bring significant changes to how trans-Pacific services to the US East Coast are structured.

Europe-North America (trans-Atlantic)



Trade volumes 2017

Westbound: 3.3m teu

Eastbound: 2.1m teu

Service structure

Different loops cover different ranges of ports at the North American end of the trade:

Montreal via Saint Lawrence Seaway (ice-class vessels)

North Atlantic ports (including Halifax, New York/New Jersey)

South Atlantic ports (Charleston/Savannah + Miami)

Some services from Asia to the US East Coast via Suez also call in the Mediterranean

Main direct ports of call

North Europe: Felixstowe, Southampton, Liverpool, Antwerp, Rotterdam, Le Havre, Hamburg, Bremerhaven, Gothenburg, Sines

Mediterranean: Gioia Tauro, Genoa, Salerno, Naples, La Spezia, Livorno, Fos, Valencia, Algeciras, Barcelona, Tangiers, Haifa, Izmir

Canada: Montreal, Halifax

USA: Boston, New York/New Jersey, Norfolk, Baltimore, Wilmington, Charleston, Savannah, Port Everglades, Miami, New Orleans, Houston

Bahamas: Freeport

Mexico: Veracruz, Altamira

Main hub ports

Freeport (Bahamas), Algeciras, Tanger Med (Morocco)

Main feeder areas

Caribbean, Central America, other US ports via Freeport, other Caribbean ports

Lines and alliances

Alliances: 2M, Ocean Alliance, THE

Non-alliance carriers: Atlantic Container Line, Independent Container Line, Melfi Marine, Nirint, Eimskip, Hugo Stinnes, Turkon, Grimaldi

Main commodities

Westbound: Foodstuffs, beer, wine, spirits, cigarettes, machinery, chemicals, car parts

Eastbound: Car parts, oil products, construction materials, forestry products, agricultural machinery, agricultural products

Vessels and capacity

Largest vessel: *Cosco Vietnam*, 8,501 teu

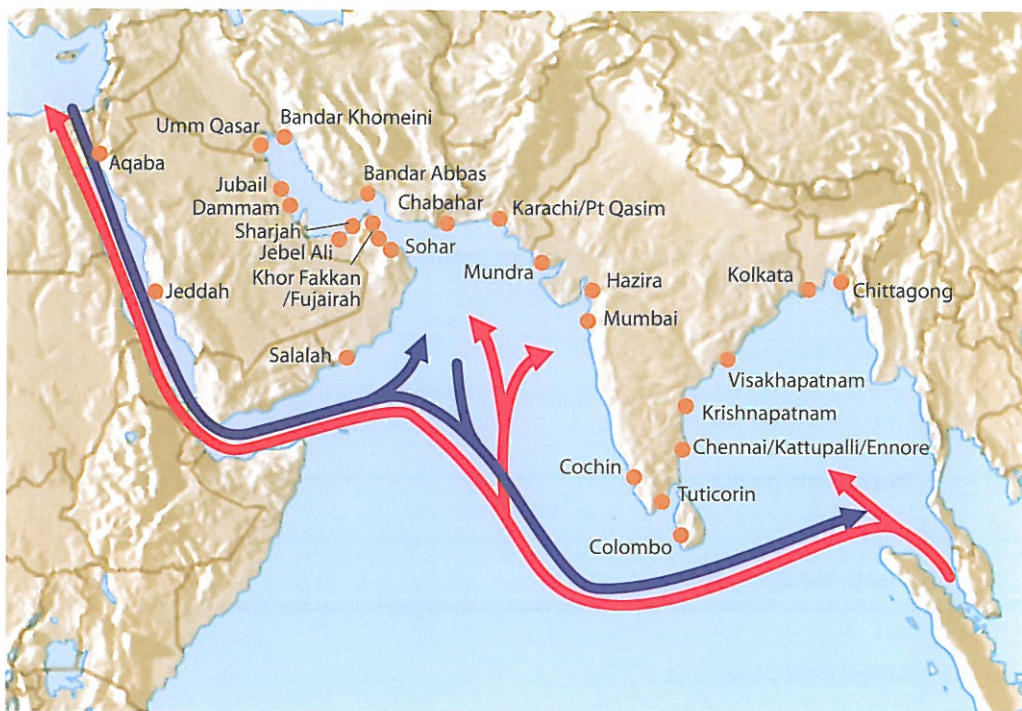
Average vessel size: 4,703 teu

Annual headhaul capacity: 3.7m teu

Key developments

The raising of the Bayonne Bridge has enabled larger vessels to call at all the New York/New Jersey terminals, with the 14,414 teu *CMA CGM Theodore Roosevelt* passing under the new bridge in September 2017.

Middle East/South Asia



Trade volumes 2017

Middle East: 40.6m teu

South Asia: 27.1m teu

Service structure

With a combined 9% of world trade, these paired regions are increasingly important to liner operators. Both regions are served by a combination of dedicated direct services and relays from the main Asia-Europe trade, which makes capacity calculations impractical.

Main direct ports of call

Middle East: Aqaba, Jeddah, Salalah, Sohar, Fujairah, Khor Fakkan, Sharjah, Jebel Ali, Abu Dhabi, Dammam, Jubail, Umm Qasr, Bandar Abbas, Bandar Khomeini, Bushehr, Chabahar

South Asia: Colombo, Visakhapatnam, Cochin, Chittagong, Chennai, Kolkata, Tuticorin, Kattupalli, Krishnapatnam, Mumbai, Mundra, Hazira, Pipavav, Port Qasim, Karachi

Main hub ports

Jebel Ali, Salalah, Colombo

Asia-East Coast South America (ECSA)



Trade volumes 2017

Southbound: 1.3m teu

Northbound: 0.7m teu

Service structure

All lines in the trade run direct loops from the Far East via the Cape of Good Hope to Brazil, and thence to Argentina and Uruguay. One loop makes an eastbound wayport call in South Africa. Because of draught restrictions in Buenos Aires, loops on ECSA run southbound discharging cargo and then return northbound to complete loading. Not all loops go all the way to Buenos Aires and Montevideo. Santos is the biggest port, but suffers from silting.

Main direct ports of call

Far East: Busan, Qingdao, Shanghai, Ningbo, Chiwan, Yantian, Hong Kong, Singapore, Port Kelang

ECSA: Sepetiba, Santos, Paranaguá, Navegantes, Itajaí, Buenos Aires, Montevideo, Imbituba, Rio Grande

Wayport trades

Nqura (South Africa)

Main hub ports

Santos

Main feeder areas

Southern Argentinean ports via Buenos Aires, Paraguay via river feeders from Buenos Aires or Montevideo

Lines and alliances

MSC/Maersk/MOL

Hamburg Süd/CMA CGM/Hapag-Lloyd/Hyundai

Evergreen/Hapag-Lloyd/Cosco/CMA CGM/Yang Ming/Zim

PIL

Main commodities

Southbound: Vehicle spares, manufactured consumer goods, electronics, components

Northbound: Tobacco, coffee, sugar, reefer foodstuffs, fruit

Vessels and capacity

Largest vessel: *CMA CGM Carl Antoine*, 10,926 teu

Average vessel size: 9,236 teu

Annual headhaul capacity: 1.3m teu

Key developments

Rapid growth in the early years of the century was followed by a slump, made worse by the rapid increase in vessel size as tonnage was cascaded from the main East-West trades. Carriers have been culling capacity even as trade recovered, with southbound utilisation recovering from 72% in 2015 to 103% in 2017.

Europe-East Coast South America (ECSA)

Trade volumes 2017

Southbound: 0.85m teu

Northbound: 0.83m teu

Service structure

There are five services from North Europe and two from the Mediterranean, mostly on weekly schedules, with round voyages ranging from 35-63 days. A reshuffle of services in 2017 has left the MSC/Hapag-Lloyd joint service dominant with a 43% share. Capacity is sometimes added and removed seasonally in response to the northbound reefer market.

Main direct ports of call

North Europe: Hamburg, Bremerhaven, Rotterdam, Antwerp, Tilbury, London Gateway, Le Havre, Bilbao, Sines, Lisbon

Mediterranean: Marsaxlokk, Gioia Tauro, Livorno, Genoa, Fos, Barcelona, Valencia, Algeciras, Tanger Med, Las Palmas

ECSA: Vitoria, Vila Do Conde, Santos, Buenos Aires, Zarate, Montevideo, Paranagua, Rio de Janeiro, Suape, Rio Grande, Navegantes, Natal (Brazil), Fortaleza, Itapoa (Santa Catarina), Itajai, Salvador, Pecem, Degrad des Cannes



Wayport trades

West Africa (Grimaldi service), Caribbean

Main hub ports

Algeciras, Santos

Main feeder areas

Maersk feeds cargo between Algeciras and the rest of the Mediterranean. Santos is the main South American hub, but southern Argentinean ports are served via Buenos Aires and Paraguay via river feeders from Buenos Aires or Montevideo.

Lines and alliances

CMA CGM, Hamburg Süd, Maersk, MSC, Hapag-Lloyd, Marfret, Grimaldi

Main commodities

Southbound: Manufactured consumer goods, vehicle parts, chemicals, CKD trucks and cars

Northbound: Coffee, reefer foodstuffs (beef and chicken), sugar; cotton, forest products

Vessels and capacity

Average vessel size: 6,500 teu

Annual headhaul capacity: 1.1m teu

Key developments

Volumes are similar in each direction but southbound capacity is greater at 1.6m teu, meaning utilisation is about 75% northbound but about 50% southbound. Imports to South America have grown strongly since 2016 but exports have made less progress.

North America-East Coast South America

Trade volumes

Southbound: 0.47m teu

Northbound: 0.79m teu

Service structure

Five weekly services are competing in an increasingly unbalanced trade, with CMA CGM joining the trade in 2017. All services are weekly, with seven, eight or nine vessels.

Main direct ports of call

ECNA: New York, Philadelphia, Norfolk, Charleston, Jacksonville, Port Everglades, Savannah, Houston, New Orleans, Veracruz, Altamira

ECSA: Suape, Santos, Buenos Aires, Rio Grande, Itapoa (Santa Catarina), Rio de Janeiro, Pecem, Montevideo, Navegantes, Itajai, Paranagua, Sepetiba, Manaus, Vitoria

Wayport trades

Freeport (Bahamas), Caucedo, Cartagena, Colon (Cristobal), Colon (Manzanillo), Kingston

Main hub ports

Santos



Lines and alliances

Hamburg Süd, Hapag-Lloyd, MSC, NYK, CMA CGM

Vessels and capacity

Average vessel size: 5,050 teu

Annual headhaul capacity: 1.1m teu

Key developments

The trade imbalance – favouring northbound traffic – is getting worse as the volume of North American exports continues to fall.

North America-West Coast South America



Trade volumes

Southbound (headhaul): 544,000 teu

Service structure

Thirteen services, 12 of them weekly, serve West Coast South America from the US East Coast and Gulf through the Panama Canal, or on trans-Pacific services through Mexico.

Main direct ports of call

ECNA: Boston, New York, Port Elizabeth (USA), Baltimore, Philadelphia, Charleston, Miami, Houston

WCNA: San Diego, Manzanillo (Mexico), Lazaro Cardenas

WCSA: Buenaventura, Guayaquil, Callao, Paita, Arica, Coronel, Lirquen, Iquique, San Vicente, San Antonio, Valparaiso, Puerto Angamos

Wayports and hubs

Kingston, Colon (Manzanillo), Ensenada, Puerto Quetzal, Balboa, Cartagena

Lines and alliances

Maersk, Hamburg-Süd/Hapag-Lloyd, Dole, PIL/Wan Hai/Yang Ming/Evergreen/ Cosco, CMA CGM/MSK/HMM, NYK/MOL/K Line, Seaboard

Vessels and capacity

Average vessel size: 6,700 teu

Annual headhaul capacity: 1.14m teu

Europe-West Coast South America

Please see map on previous page

Trade volumes

Southbound (headhaul): 416,000 teu

Service structure

Of the trades between the world's major regions, this is one of the smallest. Six weekly services run on turnarounds ranging from 49-70 days, taking in calls on the US East Coast and the Caribbean. Vessels are generally old Panamaxs of 2,500-4,000 teu, although CMA CGM/ Hapag-Lloyd/Hamburg Süd and MSC have introduced vessels of over 10,000 teu. Two Maersk/ Safmarine services only call at Guayaquil, focusing on the banana trade, and extend their northbound strings to St Petersburg and Novorossiysk.

Main direct ports of call

Europe: Rotterdam, Thames Gateway, Hamburg, Antwerp, Le Havre, Bremerhaven, St Petersburg, Sines

Mediterranean: Salerno, Livorno, Genoa, Barcelona, Ambarli, Izmir, Izmit, Yuzhny, Novorossiysk

WCSA: Buenaventura, Guayaquil, Puerto Bolivar, Callao, Paita, Coronel, Antofagasta, San Antonio, Valparaiso, Puerto Angamos

Wayport trades

US East Coast, Caribbean

Main hub ports

Marsaxlokk, Algeciras, Tanger Med, Caucedo, Kingston, Colon (Manzanillo), Colon (Cristobal), Ensenada, Puerto Quetzal, Balboa, Cartagena

Lines and alliances

Maersk/Safmarine, CMA CGM/Hapag-Lloyd/Hamburg Süd, MSC

Vessels and capacity

Average vessel size: 5,600 teu

Annual headhaul capacity: 770,000 teu

Asia-West Coast South America



Trade volumes

Southbound (headhaul): 1.3m teu

Service structure

There are currently eight weekly services on 70-84-day turnarounds, all of them including calls in Mexico. The trade is heavily imbalanced in favour of southbound.

Main direct ports of call

Asia: Kaohsiung, Keelung, Yantian, Xiamen, Shekou, Hong Kong, Ningbo, Shanghai, Busan, Kwangyang, Yokohama

WCSA: Buenaventura, Guayaquil, Callao, Coronel, Lirquen, San Vicente, San Antonio, Valparaiso, Puerto Angamos

Wayport trades

West Coast North America, occasionally Oceania

Main hub ports

Manzanillo (Colon), Manzanillo (Mexico), Balboa, Cartagena

Vessels and capacity

Average vessel size: 7,600 teu

Annual headhaul capacity: 550,000 teu

Europe-Africa

Trade volumes: Europe to West Africa

Southbound (headhaul): 1.1m teu

Service structure

There are around two dozen services from Europe, mostly to West Africa but some sailing directly to South Africa, with one service covering East Africa from the Mediterranean. The southbound leg is dominant in all cases.

Grimaldi runs three con-ro services to West Africa: one each from Europe, the Mediterranean and East Coast North America, with one continuing to South America. There are also two other direct services from the US Atlantic Coast, carrying about 200,000 teu a year: Reefer cargoes are a staple of the northbound trade from Southern Africa.

Main direct ports of call

North Europe: Antwerp, Rotterdam, Amsterdam, Le Havre, Bremerhaven, Felixstowe, Southampton, Tilbury, Sines, Lisbon, Leixoes

Mediterranean: Salerno, Fos, Genoa, Valencia, Barcelona, Tarragona, Las Palmas, Casablanca, Beirut, Mersin

West Africa: Nouakchott, Dakar, Banjul, Abidjan, Monrovia, Conakry, Lomé, Tema, Takoradi, Apapa, Onne, Sao Tomé, Douala, Cotonou, Owendo (Libreville), Pointe Noire, Luanda, Lobito

Southern Africa: Cape Town, Durban, Ngura, Port Elizabeth, Walvis Bay, Maputo, Nacala

Main hub ports

Algeciras, Tanger Med



Lines and alliances

MSC, Ignazio Messina, Maersk/Safmarine, Deutsche Afrika, MACS, Grimaldi, Deco, MOL, PSL, Hapag-Lloyd, Arkas

Vessels and capacity (West Africa)

Average vessel size: 3,000 teu

Annual headhaul capacity: 1.4m teu

Vessels and capacity (Southern Africa)

Average vessel size: 5,000 teu

Annual headhaul capacity: 800,000 teu

Asia-Africa



Trade volumes: Asia to Southern Africa

Southbound: 772,000 teu

Northbound: 499,000 teu

Trade volumes: Asia to West Africa

Southbound: 1,229,000 teu

Northbound: 441,000 teu

Service structure

Most services sail directly to Southern Africa, with some continuing to West Africa or South America, although the latter is less common than it was. West Africa used to be served by feeders from South Africa, but now most services are direct. Maersk has one service to West Africa through the Mediterranean.

West African trade is heavily imbalanced, with volumes from Asia nearly three times the volume moving the other way. Southern Africa is a more balanced trade, so the ratio on combined services is roughly two to one.

Main direct ports of call

Asia: Yokohama, Nagoya, Kobe, Busan, Kwangyang, Inchon, Xingang, Qingdao, Shanghai, Ningbo, Xiamen, Nansha, Shekou, Yantian, Fuzhou, Chiwan, Hong Kong, Keelung, Kaohsiung, Tanjung Pelepas, Singapore, Port Kelang

West Africa: Nouakchott, Dakar, Abidjan, Monrovia, Lomé, Tema, Apapa, Onne, Douala, Cotonou, Owendo (Libreville), Pointe Noire, Luanda, Lobito

Southern Africa: Port Louis, Toamasina, Pointe Des Galets (Réunion), Cape Town, Durban, Ngqura, Port Elizabeth, Walvis Bay, Maputo, Beira, Nacala

Main hub ports

Colombo, Salalah

Lines and alliances

MSC, CMA CGM, Maersk/Safmarine, Niledutch, PIL/ Cosco, Evergreen, K Line, MOL, Zim

Vessels and capacity (West Africa)

Average vessel size: 5,400 teu

Annual headhaul capacity: 2.4m teu

Vessels and capacity (Southern Africa)

Average vessel size: 6,350 teu

Annual headhaul capacity: 1.0m teu

Asia-Australasia

Trade volumes

Southbound: 2.62m teu

Northbound: 1.61m teu

Service structure

Most lines operate separate services from Southeast Asia and Northeast Asia, and there are services taking in calls in the Americas as well. Because of the vast scope of Oceania and the proliferation of small islands, services have to be tailored to each group of destinations, so there is little consistency. Other services include odd calls in the region, such as Matson's USA-Hawaii-Guam-China service, or Maersk's Triple Star service, which takes in Tauranga on its way back to Southeast Asia from South America.

Australia is the dominant market, accounting for 85% of southbound trade, while the most profitable northbound trade is refrigerated cargo from Australia and New Zealand. Southbound is easily the dominant leg.

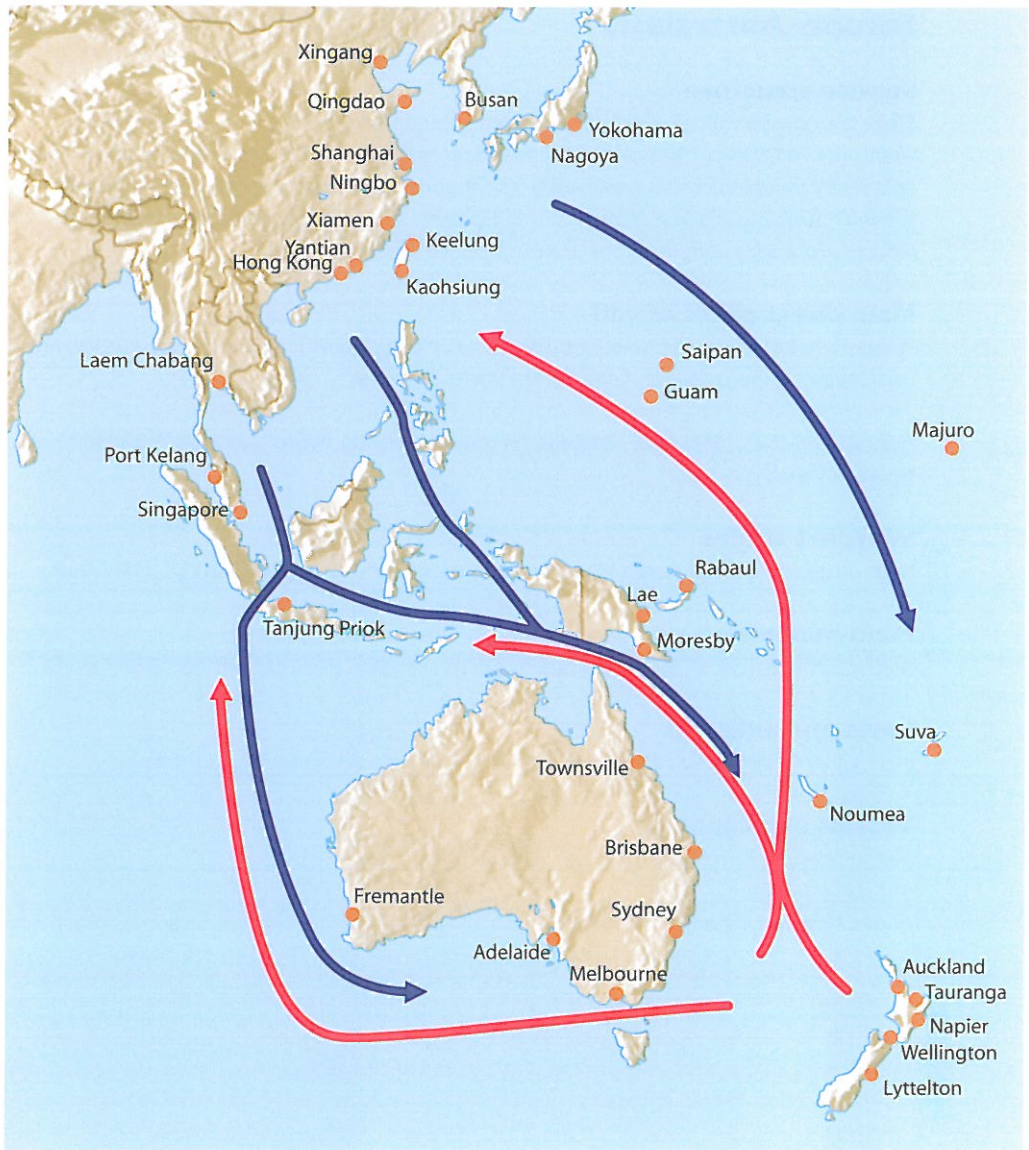
Main direct ports of call

Asia: Port Kelang, Singapore, Tanjung Pelepas, Laem Chabang, Hong Kong, Keelung, Kaohsiung, Yantian, Shekou, Xiamen, Nansha, Shanghai, Ningbo, Qingdao, Xingang, Busan, Yokohama, Kobe, Osaka

Australasia: Sydney, Melbourne, Adelaide, Brisbane, Townsville, Fremantle, Auckland, Lyttelton, Napier, Tauranga, Wellington, Noumea, Papeete, Guam, Lae, Rabaul, Port Moresby, Suva, Majuro, Naha, Saipan

Wayports

Indonesia, Philippines



Lines and alliances

AAL, ANL, APL, CMA CGM, Cosco, Evergreen/Yang Ming/Sinotrans/TS Line, Hamburg-Süd, Hapag-Lloyd, Hyundai MM, K Line, Maersk, MEL, MOL, MSC, NYK, OOCL, PIL, Swire Shipping/MCC Transport

Vessels and capacity

Average vessel size: 4,600 teu

Annual headhaul capacity: 3.8m teu

Europe-Australasia

Service structure

There are now only three direct services from Europe to Australasia, one of which goes westwards via Panama. Most of the direct services of old have been supplanted in the past two decades by transshipment services, usually via Singapore, and only the Panama service takes in non-Australian ports. The amount of transshipment makes volume estimates unreliable. All services are weekly, using 13 or 14 vessels on 91- or 98-day rotations.

Main direct ports of call

Europe: London Gateway, Hamburg, Rotterdam, Antwerp, Dunkirk, Le Havre, Algeciras, Valencia, Fos, Genoa, La Spezia, Naples, Gioia Tauro, Piraeus, Damietta

Australasia: Sydney, Melbourne, Adelaide, Fremantle, Lyttelton, Napier, Tauranga, Wellington, Noumea, Papeete

Wayport trades

Krishnapatnam, Chennai, Pointe Des Galets (Réunion), Port Louis (Mauritius), US East Coast

Main hub ports

Algeciras, Marsaxlokk, Piraeus, Colombo, Singapore, Kingston (Jamaica), Cartagena, Manzanillo

Lines and alliances

MSC, CMA CGM/Hapag-Lloyd (via Suez), CMA CGM/Marfet/Seatrade (via Panama)

Vessels and capacity

Average vessel size: 6,600 teu via Suez, 2,650 teu via Panama

Annual headhaul capacity: 780,000 teu



Chapter 9

The bill of lading and other documentation

The liner business is not only involved with the movement of cargo but also with the documents that are associated with trading goods. These are increasingly created through electronic data transfer, although hard-copy documents are still required in some circumstances.

Bringing goods across national borders is subject to customs and health regulations and is increasingly affected by security constraints. Lines are therefore responsible for declarations to government authorities, usually by means of a document called a manifest, which lists the details of all the cargo on a vessel.

The bill of lading (B/L) is a document of title to the goods being shipped, which enables the parties who are buying and selling the goods to carry out their transaction securely.

Dealing with documentary requirements and the legal processes of international trade is therefore an important part of a liner operation.

Knowledge of the different types of B/L as well as of the carriers' and merchants' obligations in international and national law is essential to an understanding of the liner business. This leads on to a consideration of the liabilities of the parties involved and the need for insurance cover.

The most important document by far is the bill of lading (B/L), the use of which is inseparable from the international conventions relating to the Carriage of Goods by Sea, the Hague Convention and the Hague-Visby and Hamburg Rules.

Other important documents are waybills, booking notes, shipping notes, mate's receipts, manifests, packing lists, hazardous lists and indemnity letters. Electronic documentation has had a huge impact on the liner business.

9.1 The bill of lading

The movement of goods from one country to another has always involved the question of ownership. In the early days of trading, a ship's Master would buy goods at a foreign port, knowing that they could be sold at a profit elsewhere. The ownership of, or title to, the goods transferred from the original owner to the Master and then to another purchaser later in the voyage.

As trading patterns developed, Masters no longer bought and sold the goods as before. The issue of who actually owned the goods during the intervening voyage therefore came into question. In addition, once the goods were no longer owned by the Master and the ship became the carrier, shipowners naturally charged for their services, the charge being called freight. A document was therefore needed to provide evidence of the two items: that of title to the goods and proof of carriage (so that freight could be charged).

A typical example of a B/L is the Conlinebill, a simple form of port-to-port B/L. A port-to-port B/L is the basic type of liner contract. The carrier takes responsibility for the cargo when it is loaded on to the vessel and completes the contract when the cargo is delivered from the vessel at the named port of discharge. Traditionally under liner terms, the responsibility transfers to or from the shipowner when the cargo 'passes over the ship's rail'.

		COMBICONBILL 2016 NEGOTIABLE COMBINED TRANSPORT BILL OF LADING Page 1	
		Shipper	Bill of Lading No.
Consigned to order of		Notify address	Vessel
Place of receipt		Port of loading	
Place of delivery		Port of discharge	
Marks and Nos	Quantity and description of goods	Gross weight, kg	Measurement, m ³
Particulars above declared by Shipper			
Freight payable at		RECEIVED the goods in apparent good order and condition and, as far as ascertained by reasonable means of checking, as specified above unless otherwise stated. The Carrier, in accordance with and to the extent of the provisions contained in this Bill of Lading, and with liberty to sub-contract, undertakes to perform and/or in its own name to procure performance of the combined transport and the delivery of the goods, including all services related thereto, from the place and time of taking the goods in charge to the place and time of delivery and accepts responsibility for such transport and such services. One of the Bills of Lading must be surrendered duly endorsed in exchange for the goods or delivery order. IN WITNESS whereof TWO (2) original Bills of Lading have been signed, if not otherwise stated below, one of which being accomplished the other(s) to be void.	
Freight and charges			
Shipper's declared value of subject to payment of above extra charge. Note: The Merchant's attention is called to the fact that according to Clauses 9-12 and Clause 25 of this Bill of Lading, the liability of the Carrier is, in most cases, limited in respect of loss of or damage to the goods and delay.			
		Place and date of issue	Number of original Bills of Lading
Carrier: (insert name) Signature: (Carrier*/Master*/Agent*) <i>*Delete as appropriate</i> If signed by an Agent indicate with a tick ☒ whether for and on behalf of: ☐ Master: or ☐ Carrier Agent: (insert name)			

Copyright © 2016 BIMCO. All rights reserved. Any unauthorised copying, duplication, reproduction or distribution of this document will constitute an infringement of BIMCO's copyright. Printed by BIMCO's IDEA2
 v. 1.1. Dated 26 May 2016. Clause 23 (General Average) updated to refer to York-Antwerp Rules 2016.

Standard B/L 'COMBICONBILL 2016' as issued by BIMCO, although most lines produce their own form bearing their corporate identity

There is ample historical evidence dating back to the second half of the 16th century of documents fulfilling the role of a B/L. By the 18th century there was reference to B/Ls in legal disputes and the negotiability of a B/L was judicially recognised as long ago as 1794 (Lickbarrow v Mason).

It was not, however, until the mid-19th century that the first statute law relating to B/Ls emerged. On 14 August 1855, the UK Parliament passed the Bills of Lading Act. Most countries involved in international trade have similar legislation.

Under English common law, a contract cannot be assigned to a third party. In a contract of carriage between a shipper and a carrier, the shipper can pass the title to the goods to the consignee via a B/L. The rights and liabilities under the contract of carriage cannot be transferred, leading to an unsatisfactory situation for the carrier.

The Bills of Lading Act made it possible for the rights and liabilities relating to the contract of carriage and evidenced in the B/L to be transferred with the title to the goods. In the process of clarifying this crucial point the act also clearly established the threefold function of a B/L.

i) Receipt for goods

It is a receipt for goods, which is self-evident from the wording of the incorporation clause on the face of the bill. The carrier acknowledges receipt (or shipment, in the case of a shipped bill) of the goods.

The receipt covers both the quantity and the apparent quality, the latter usually being described as 'in apparent good order and condition'.

ii) Evidence of contract of carriage

On the reverse is incorporated the evidence of a contract of carriage and in the case of liner trades the terms and conditions on the back of the bill are the whole contract.

The expression 'evidence of a contract' cannot be over-stressed. The B/L does not come into being until the goods pass into the custody of the carrier; but the agreement to carry the goods would have been made, perhaps only by a telephone call, some time beforehand, and that is the moment when the contract is established.

A verbal agreement at the time of booking the cargo can actually vary the terms from those on the reverse of the B/L. A well-known case is that which dealt with a consignment of oranges in the Ardennes (1951). The agent for the line assured the shipper that the vessel would sail direct to London but it actually went via Antwerp. The delay meant that the goods arrived after an increase in import duty. The judge found the line in breach of contract and liable for the extra costs the shippers had to bear.

iii) Document of title

This is probably the most crucial function of the B/L and it is almost impossible to visualise how international trade could take place without it.

The moment the B/L has been signed by (or for) the Master of the ship, whoever is shown as the consignee can claim the goods when they arrive at the discharging port. Furthermore, providing the B/L has been made out 'to order' of the named consignee, the first consignee can, by endorsing the B/L, transfer that right (the title to the goods) to another person. That transfer by endorsement may take place any number of times. This transfer of title also transfers the rights and liabilities under the original contract of carriage to the new owner of the goods.

Important though this transferability is, the B/L's other value as a document of title is even greater in that it becomes a security for payment. This permits it to be the vital element among the documents required under a letter of credit.

In 1992, the UK Bills of Lading Act of 1855 was repealed and replaced by the Carriage of Goods by Sea Act (COGSA) 1992. The 1992 Act extended the provisions to include sea waybills and delivery orders, but the most important change was to provide any lawful holder of a B/L with the entitlement to the rights under the contract of carriage.

The use of the bill of lading in liner trades

In the case of bulk cargoes under a charter party, one B/L may well cover the entire shipment, but in liner trades, where a ship may carry many hundreds of individual shipments, there may be one B/L for each. The actual role of the B/L, however, remains the same.

It is usual for B/Ls to be issued in sets of two or three originals. The wording above the space for the signature in the Conlinebill states, 'one of which being accomplished, the others to stand void'.

The reason for more than one original dates back to the era of sail and the early days of steam when one original was sent by fast mail ship to the consignee, another would be addressed to the consignee and placed in a sealed envelope in the care of the Master and the third would be retained by the shipper against unforeseen eventualities.

Today there is often no reason other than tradition for B/Ls to be issued as sets of two or three. In most cases, a single original copy would suffice.

The bill of lading as a receipt for goods shipped

Marks and numbers

The first requirement is the need to identify the goods under the heading in the B/L marks and numbers. With container movements the container number and the container seal number appear here. In the case of breakbulk or LCL cargo, the marks are just what appears on the outside of the packages. Frequently this will be just an abbreviated name or address, although these sometimes include patterns or symbols, as a pattern is more easily recognised than a word, especially in countries where literacy is not guaranteed. Any number in this column, however, is concerned only with identification, not with quantity.

Number and kind of packages: description of goods

The first part speaks for itself as the principal way of expressing quantity (two cases, three bales, one container, and so on). The description of goods can, however, be a little more involved than it at first appears.

If the piece of cargo is a second-hand, double-decker red London bus, there is no problem about description. More often than not, however, the cargo could best be described as 'one wooden box with a number on the side'. But the crucial role the B/L plays is in payment via a letter of credit. The banks involved will want more reassurance about the actual cargo. In any case, the line itself may want to know what is in the box to establish the correct freight rate if a commodity tariff is used.

This is satisfied by the application of Article III, Rule 5 of the Hague-Visby Rules, which states that the shipper is 'deemed to have guaranteed' to the carrier the accuracy of any information supplied by the shipper for inclusion in the B/L. Therefore a description of the contents of the

box will appear in the B/L in wording that will satisfy the letter of credit. Care must be taken to avoid wording that may extend the liability of the carrier, such as a value.

Weight and measurement

Freight charged for some types of cargo may be based on its weight and some on its measurement, while some will be charged on either weight or measurement (W/M), whichever yields the highest amount of freight. The weight and measurement are declared by the shipper and it is rare for the carrier to verify these. However, local regulations or employment rules require that some ports still weigh and measure to check the accuracy of shippers' declarations.

In apparent good order and condition

The final and all-important element of the B/L as a receipt is the words in the printed clause above the space where the B/L is signed.

The description and quantity is not only a receipt as between shipper and carrier but also commits the carrier to deliver accordingly to the consignee whether they are the actual consignee shown in the B/L or another party at the end of a string of endorsees. Whoever has the right to claim the cargo has the right to proceed against the carrier if the entire consignment is not delivered exactly in accordance with the B/L.

‘Clean’ and ‘dirty’ (claused) bills of lading



Liability for damage can be contentious (photo: US Customs)

It is important that when the cargo is loaded into the ship or stuffed into the container it is in good condition. If cargo arrives at the depot or dockside and is seen to be faulty it should not be loaded. The reasons for this are straightforward. There is no point in carrying a cargo that may be rejected by the purchaser. Furthermore, the shipowner, Master and crew do not wish to be accused of damaging the cargo while it is being loaded, carried or discharged.

The faults may cover matters that do not actually prevent shipment and the shipper may prefer the goods to be loaded rather than ship an incomplete consignment or have the problem of replacement when the damage is only superficial. If the goods are loaded in a damaged condition, the B/L must show the nature of the damage or such other comment as may be appropriate. Such a clause means that the B/L is no longer a 'clean' bill.

Such clauses may cover missing, broken, wet or stained cartons, insufficient strength to crates, unprotected machinery, second-hand cases, rusty steel, dented drums and so on.

However, the matter is more crucial if the B/L has to pass through the banking system in order for the shipper to obtain payment for the goods by documentary credit. The 'dirty' bill of lading no longer evidences shipment in 'apparent good order and condition', and the transaction will fail at the first hurdle – the B/L will be rejected when the shipper presents to the confirming bank.

This creates a difficult situation because the seller will have incurred all the costs of producing the goods but will be unable to obtain payment, even though the goods have gone to the consignee. A further paradox is that, unless the shipper can arrange a modification to the contract of sale that will enable them to transmit the B/L to the consignee, there will be no one to claim the goods when they reach their destination.

All manner of problems can flow from goods damaged before shipment. Ruthless shippers may threaten to withdraw all further support for the line if the goods are not accepted and a clean B/L issued. Yielding to such harsh tactics will result in the consignees claiming against the carrier as being the perpetrator of the damage. The Hague-Visby Rules will probably limit the ship's contribution, with the major share being paid by the consignee's insurance company.

On the face of it, that may seem a reasonable outcome. The consignee has admittedly suffered some delay while the goods are repaired to the original standard, but it has cost them nothing in cash. However, the facts are that the carrier conspired with the shipper to make a false statement on the B/L ('apparent good order and condition'). That, very simply, constitutes fraud against the insurance company.

A shipper threatened with its B/L being 'claused' might also offer a letter of indemnity, undertaking to reimburse the carrier for any claim made against it. But this is still fraudulent because the shipper and carrier are conspiring to mislead the consignee that the goods were in apparent good order when they were shipped. Furthermore, because of the B/L's role as a document of title, the piece of cargo may be sold and resold several times while the goods are in transit and each buyer is paying for what they have a right to believe are sound goods. Such a letter of indemnity is unenforceable because it has been issued in pursuit of an illegal act.

Bill of lading as evidence of a contract

When studying the mass of wording on the back of a liner B/L, it may be difficult to believe that it is only evidence of a contract and not the contract itself.

However, the contract itself will almost invariably have been made well before a B/L is signed. Indeed if the carrier damages the cargo (for example, during the course of stowing it in the ship), the fact that no B/L has been signed in no way invalidates the shipper's claim against the line.

In any event, only the carrier, the Master or their agent signs the B/L. A true contract would require both parties to sign. But contracts do not have to be in writing and most liner shipments are the results of a verbal contract when a telephone booking is taken by the line.

As far as the shipper and the line are concerned, if the booking varies the terms as printed on the back of the B/L, the booking (because it is taken to contain the express intentions of the parties) takes precedence.

In theory, this can cause problems should the B/L be transferred, as it will be unless the consignee and the shipper are one and the same. Such problems would be even more apparent if the first consignee sells the B/L to a third party. The courts look upon the B/L in the hands of an endorsee for value as conclusive evidence of a contract, sometimes called the best evidence of a contract. They will ignore anything agreed between the line and the original shipper on the basis that the latter has now dropped out of the picture.

Fortunately, in practice, bookings or booking notes that vary the B/L terms in the liner trades are very rare and are usually only concerned with matters that affect the loading end of the voyage. Those exceptions make interesting reading for the law student but have minimal impact on liner operators or agents.

The development of sophisticated data handling in the liner business has tended to improve the availability of evidence of bookings and the contract created. While the actual contract is still most usually made during the telephone call making the booking, it is now usual that the line's agent will enter that information into a computer that will generate a booking confirmation message sent back to the customer by email.

Bill of lading as a document of title

Any document of title can be defined as a piece of writing that confirms the right to ownership of property with or without possession. In the case of a B/L, this means that it can serve three purposes:

1. It enables the holder to claim delivery of the goods at the port of discharge
2. It permits the holder to transfer ownership of the goods during transit by means of an endorsement provided that the B/L is consigned 'to order' or 'to order of [named party]'
3. It can be used as security for payment (for example, by a bank)

Presentation at port of discharge to claim delivery is perhaps the simplest of a B/L's functions in its role as a document of title. So simple is it, indeed, that if neither (2) nor (3) above are likely to be involved, there is a strong case for a sea waybill to be used instead of a B/L.

Many commodities, however, are traded while the ship is on passage. To transfer ownership, the first consignee simply has to endorse the B/L and hand it (or them if there is more than one original) to the new consignee in exchange for payment. Endorsement usually involves imprinting the firm or company's rubber stamp and an executive's signature on the back of the bill. There is no limit to the number of times this may take place so long as the goods are still in transit when it is carried out.

In some cases, a breakbulk consignment may be sold to more than one endorsee, which will necessitate the B/L being split. This will require delivery orders to be issued for the separate parcels.

When the B/L is used as security for payment, it becomes the key document when settlement is effected via a documentary credit, or a letter of credit as it is more commonly known.

9.2 Documentary credits

Although the documentary credit is a tool of the banking system and not a part of the shipping documentation, the two are so fundamentally associated that it is appropriate to take a brief look at its main points. A documentary credit is a method of providing maximum safety to both parties in an international financial transaction while at the same time minimising any unnecessary burden on either party's cash flow.

While the B/L is one key document required by a documentary credit, there will be several others such as invoices and certificates of quality. Because payment for the goods sold against a documentary credit is made against the evidence of the shipping documents, those documents (including the B/L) must identify the cargo exactly as it is described in the credit.

The sequence of events is as follows:

1. The buyer and seller agree a sales contract providing for payment by documentary credit
2. The buyer instructs their bank – the issuing bank – to issue a credit in favour of the seller
3. The issuing bank asks another bank, usually based in the country of the seller, to advise or confirm the credit
4. The advising or confirming bank informs the seller that the credit has been issued
5. As soon as the seller receives the credit and is satisfied that they can meet its terms and conditions, they are in a position to load the goods and dispatch them
6. The seller then sends the documents covering the shipment to the bank where the credit is available
7. The bank checks the documents against the credit. If all is in order, the bank will pay, accept or negotiate according to the terms of the credit
8. The bank, if other than the issuing bank, sends the documents to the issuing bank. The issuing bank checks the documents and, if they meet the credit requirements, either:
 - i) Makes the payment in accordance with the terms of credit, either to the seller if they have sent the documents direct to the issuing bank, or to the bank that has made the funds available to them in anticipation, or
 - ii) Reimburses in the agreed manner the confirming bank, or any bank that has paid, accepted or negotiated under the credit

9.3 Bill of lading clauses

The following are the usual items of information appearing on the face of standard B/Ls:

The name of the shipper

This is the first party to the contract of carriage and for this reason it should be the name of the cargo owner and not that of its agent.

Name of consignee or 'order' and notify party

It is possible to simply insert the words 'to order' in the consignee box and then complete the name of a notify party below it.

This is invariably done when the B/L is to be negotiated through a documentary credit. If the bill is drawn to order, the shipper (consignor) must endorse the bill on the back and this opens it. This is how the B/L takes on its role as security for payment because an order bill properly endorsed becomes like a cheque drawn to cash or to bearer, in that title to the goods belongs to whoever holds the bill. This enables all the parties in the documentary chain to exchange the bill for cash.

Theoretically, such an order bill endorsed by the shipper could confer title to anyone accidentally finding such a B/L in the street if the line had no reason to suspect any irregularity. In fact, there are very few actual problems in practice.

Even so, you may wonder why anyone involved should take even this small risk, rather than put the name of the bank in the consignee box. The answer is very simple: the banks in the chain only want the bill as security for payment. If a bank is named as consignee, it would have to accept the liabilities as well as the benefits that flow from title to the goods. Unless one of the parties is unable to meet its commitment then the bank would have to claim the goods itself, and it prefers a simple security for payment.

What happens in practice is that the carrier advises the notify party (who is usually the buyer or their agent) of the arrival of the goods just as if they are the consignee, although there is no legal obligation for the carrier to do so.

A B/L made out to a named consignee without the words 'to/or order' appearing is known as a straight B/L. It cannot be endorsed to a third party. It has been argued that as a straight bill is not negotiable, it is not a B/L covered by the Hague-Visby Rules. One case, *The Rafaela S*, was taken to appeal at the UK House of Lords, the highest English law court at the time, which held that a straight B/L is subject to the convention. While the decision clarified one aspect of the law, it raised a number of other detailed legal questions about the relative status of negotiable bills, straight bills and waybills, which the court did not determine. There may be further developments in this area.

It has been argued in another case that because cargo covered by a straight B/L can only be delivered to the named consignee, it is not necessary to produce the actual B/L. The court held that the carrier can insist that it be produced because it is still a document of title.

Ship's name

This is the name of the carrying vessel. If a transshipment is involved in the voyage it is customary for the deep-sea or main leg carrying vessel's name to appear in this space. There will be a

separate B/L issued with the deep-sea line as shipper and the feeder operator as carrier issued for all the deep-sea line's cargo on that particular feeder vessel.

Place of receipt/port of loading

In the case of combined transport bills or through bills, the place of receipt will be shown. In all cases the port of loading will be shown.

Port of discharge

The port of discharge is shown and in the case of combined transport or through bills, the place of delivery.

When and where freight to be paid

'Freight paid', or 'payable at destination' is often called 'collect'. Generally, liner operators prefer freight being prepaid. This often suits the shipper too, because a B/L is not a clear document of title until the freight has been paid and the B/L is endorsed by the carrier to that effect with the words 'freight paid'.

If, however, the sale of the goods is on an FOB (free on board) basis, it could well suit the consignee to pay the freight at destination. There is provision, in the box in the bottom left-hand corner, for the line to show how the freight is calculated with the total amount due. It is rare for this facility to be used, except in some trades where the importing country insists on it appearing as part of its exchange control rules. It also enables the consignee to present the correct payment with the original B/L at the discharging port, to convert the bill into a clear document of title. The freight box is only used when freight is to be paid at destination. If the freight is prepaid it would be quite wrong to show the consignee how the freight is calculated on the B/L. How the shipper arrives at their total CIF (cost, insurance and freight) price is their own business.

Number of 'original' bills of lading

There are usually two or three although only one original is actually needed.

Full description of the cargo

Marks, numbers, weight and cubic volume have been dealt with above.

The place and date of issue of the bill of lading

In the case of a received bill, it is the date the goods were received for shipment. On a shipped bill, it is the date the goods were loaded. This is not usually known for the individual consignments, so the sailing date of the vessel is given. Almost all documentary credits demand a Shipped on Board B/L and it is now very rare for breakbulk cargo (that is, not in a container) not to be shipped on board. With containers, the goods may pass into the custody of the carrier well before actual shipment and so all container bills are printed as 'received for shipment'. If the shipper requires a shipped on board bill, the carrier has to add an endorsement stating when the goods were actually shipped, with a second signature validating that endorsement.

Signed 'for the carrier'

Traditionally, the Master of the ship signed the B/Ls, but this is not practical for the large volumes of consignments on liner vessels. The modern form of signature must identify the carrier and show whether the bills are signed by an agent on its behalf, for example:

'Signed for the carrier (...)' or 'Signed (...) as agent for the carrier (...)'

It is the signature that converts an innocuous-looking piece of paper to a document of title to goods that may be worth many thousands of dollars. People working in a freight department, possibly handling many hundreds of B/Ls, must never lose sight of how important a document a B/L becomes once that signature is added.

Contract terms

On the reverse of the Conlinebill is the small print that spells out the terms of the contract of which the B/L is the evidence. The one thing that such clausings cannot affect, assuming the country concerned has ratified one of the international conventions, is the minimum liability of the carrier.

On the Conlinebill, immediately after a short clause dealing with definitions, there is the paramount clause (clause 3), which incorporates the Hague or Hague-Visby Rules. Clauses 3 and 8 make it clear that this is a port-to-port B/L. Another international agreement is incorporated under clause 12, namely the York-Antwerp Rules 1974, which deal with general average.

The law in the USA differs from most of the rest of the world in regard to collisions between two ships and clause 13 (the Both to Blame Collision clause) is incorporated to ensure that if a collision case is brought under US jurisdiction, the outcome will be the same as elsewhere in the world.

Clause 15 is of particular interest to liner agents as it is the Himalaya clause and is included because a clause protecting servants of the carrier is not included in the Hague Rules, although it does appear in the Hague-Visby Rules (Article IV).

Most of the other clauses are self-explanatory. You are advised to study all the clauses, but bear in mind that this form is designed to cover a wide range of situations when 'liner terms' are required.

9.4 Other forms of bill of lading

Through bill of lading

The Conlinebill has provision on the front for the goods to be received by a pre-carrier and to be delivered by an on-carrier. These items are asterisked and the footnote explains that those entries only operate when the form is being used as a through B/L. The pre-carrier and on-carrier may be feeder ships or land transport, but there is a significant difference between a through B/L and a combined transport B/L.

Under a through B/L, the ocean carrier acts only as an agent for the shipper in arranging the pre-carriage and on-carriage. The carrier will arrange the pre- and on-carriage and will charge the merchant for the service, but will have no direct liability for any loss or damage during those parts of the journey. This is set out in clause 8, beginning, 'When the carrier arranges pre-carriage...'. Through bills are rarely used today in liner services, with the alternative of a combined transport bill of lading as described below (where the carrier accepts a level of liability throughout the through transport movement) now being more common.

Combined transport bill of lading

Containerisation created the need for a different document to be developed because an important part of containerised systems is to provide a door-to-door service that combines various modes of transport. The through container service operator may be referred to as a combined transport operator.

In the case of the door-to-door movement of a full container load (FCL), with carrier haulage at both ends, it is logical that the carrier accepts some degree of direct liability from the time the goods are put in the container at the shipper's factory until the container is presented to the consignee at its premises. Unlike breakbulk cargo, for which the responsibility begins and ends at the ship's rail, with any container cargo the goods will pass into the custody of the carrier or Combined Transport Operator at some point before they reach the ship (see clause III.9).

An FCL delivered by the shipper to the docks and taken away from the discharging port by the consignee will show as place of receipt something like 'Felixstowe CY' and place of delivery 'Singapore CY' (CY = container yard). Even less than container loads (LCL cargo) will be placed in the carrier's care at the depot where the different items are consolidated into containers. Therefore the place of receipt could show 'Birmingham CFS' and the place of delivery 'Colombo CFS' (CFS = container freight station).

Combined transport B/Ls are almost invariably printed as received for shipment bills. This allows for taking over custody before actual loading and so the shipper will need a further endorsement confirming when shipment actually took place. This does not apply with the breakbulk B/L where the signature is clearly preceded by the words 'shipped on board'.

A combined transport B/L does not have the clause paramount as such because the provisions of the Hague or Hague-Visby Rules are incorporated elsewhere. Neither of those international conventions covers land transport, so combined transport bills have to acknowledge this. They make the point that if loss or damage takes place during road transport, the provisions of the Convention on the Contract for the International Carriage of Goods by Road (CMR) will apply and if on rail then the Uniform Rules concerning the Contract of International Carriage of Goods by Rail (CIM) will apply. If it cannot be proved where the damage occurred, it is assumed to be at sea, so the Hague or Hague-Visby Rules will apply.

Several other clauses are especially relevant to containers, making it clear that if, for example, the shipper has placed their own goods into the container (FCL house-to-house), the carrier is not responsible for the condition or quantity of the contents (clause IV.17).

All combined transport B/Ls allow the carrier to tranship the containers (clause II.6). They also permit containers to be loaded on deck without stating so specifically on the face of the bill (clause I.1.7.(2)).

A combined transport B/L no longer contains all the terms of the contract clause I.3, which incorporates the terms of carrier's applicable tariff. This has become inevitable because of the many other variations that containerisation introduces. There is, for example, the question of container demurrage and the restitution (redelivery) of empty containers to be dealt with. Several pages of the tariff cover such refinements as change of place of inland destination, which allows the consignee, on payment of an extra charge, to have the container delivered to their premises instead of just to the CY at the port of discharge.

Clause IV.19 deals with the responsibility of the consignee to return the container after delivery of the cargo and states that demurrage will be payable in the event of delayed return. The quantum of that demurrage will, however, be set out in the tariff.

Clause V.20 establishes that the freight is earned as soon as the carrier has taken the goods into its charge, but also refers to the detailed regulations regarding currency adjustments and similar contingencies that would be dealt with in the tariff.

Non-vessel-owning carriers

Until the 1980s, there was a fairly clear division between the roles of liner operators as carriers and forwarders who acted as agents on behalf of the merchant. Many forwarding agents already acted as consolidators, combining small lots of cargo into larger parcels, truck or container loads, while others put together through transport packages for their customers. In most cases, they would then issue a forwarder's B/L, sometimes called a house bill, under which they only accepted responsibility as the agent of the merchant, so that when things went wrong, any action had to be taken by the holder of that B/L against the actual carrier of the goods at the time of the incident.

The increasing sophistication of containerised services has blurred this separation of activities, with forwarders becoming carriers in their own right. Such a forwarder is acting as a non-vessel operating carrier (NVOCC), because their role is that of a principal who contracts to arrange the movement of the cargo with the shipper and accepts the carrier's responsibilities.

This abbreviation often contains a second letter C – NVOCC. This is because the concept originated in the USA where there are rules concerning the way in which common carriers operate and they included those words in the title. 'Common carriers' must be registered with the US Federal Maritime Commission and comply with tariff filing requirements and the US Ocean Shipping Reform Act in the same way as the liner operating companies are required to do. In other parts of the world this is irrelevant, but that second C is still used as a matter of custom and taken to indicate container. So NVOCC may stand for either non-vessel operating common carrier or non-vessel operating container carrier.

The governments of some countries have given encouragement to NVOCCs (or, as they might more accurately be called, MTOs – multi-modal transport operators) as a way of achieving greater national involvement in international transport without the cost of direct participation as a vessel operator.

As NVOCCs have developed their services, they have become important customers of the lines in respect of FCL traffic. They have used their buying power to secure special rates for volume, enabling them to retail FCLs to merchants. The usual method of operation is for the NVOCC to negotiate a box rate with a container line, that being a straight price for carrying the container on a port-to-port basis regardless of the contents. The NVOCC's profit is the difference between the box rate from the line and the amount of freight charged to the individual shippers, plus a margin from arranging pre- and on-carriage documentation and other value-added services.

Another important activity of NVOCCs is the consolidation of LCL cargo. While some liner operators do provide LCL facilities to shippers, most only wish to carry FCL cargo. The NVOCC operates an LCL stuffing depot and presents the cargo to the line as an FCL. Because the line

accepts the container from the NVOC as an FCL, only one bill of lading is issued by the line to the NVOC as the shipper.

The NVOC has to issue each shipper with an individual house B/L or waybill. The NVOC will consign the container to an agent at the discharging end, and that agent is responsible for delivering the individual consignments to the consignees against presentation of the NVOC house bills. A standard form of NVOC bill of lading is published by the international forwarders' organisation, FIATA.

9.5 The sea waybill

Another development of the container age has been the growth in the use of an alternative document to a bill of lading: the sea waybill.

Although a waybill looks very much like a B/L, it fulfils only the first two functions of a bill. While it is a receipt for cargo and evidence of the contract of carriage, it is not a document of title and so is not a B/L. It cannot, therefore, be used to transfer right of ownership of the cargo. The waybill must be made out for delivery of the cargo to a named consignee.

The possibility of using waybills in letter of credit transactions is now recognised by the International Chamber of Commerce (ICC) in its Uniform Customs and Practice for Documentary Credits (UCP600). There are still a number of problems to be overcome, particularly by some insurers and banks, before the use of waybills becomes universally acceptable, but progress is being made.

There are, however, very many consignments where the consignee has no intention of parting with them to another and plenty of trade that does not involve documentary credits. As much as 85% of all trans-Atlantic trade does not need a negotiable document and can therefore be covered by waybills. The principal advantage of a waybill, particularly for voyages with a short transit time, is that the consignee does not have to present the waybill to obtain delivery, so the agent at the discharging port can manage with electronically transmitted information to effect correct delivery. Air waybills are the standard document for airfreight shipments.

9.6 Other liner documents

Booking note

A written contract preceding a liner B/L is rare and, when it occurs, it is called a booking note. Such a document can be in any form, even an exchange of letters, but Bimco has produced a standard Conline booking note.

If such a booking note is produced, it is an actual contract. As it expresses the specific intentions of the parties, it can override the clauses on the B/L. This can, in theory, cause complications because if the bill is 'sold' to a third party, the precise relationship between that third party and the two parties to the actual contract may be obscure.

In practice, a booking note is generally only used when a special agreement has been negotiated. A typical example may be when a civil engineering contractor is undertaking a major overseas project. To reduce the number of unknowns, the contractor may negotiate special rates for the

wide variety of goods that such projects involve, as well as perhaps a cheaper overall rate. The booking note will also commit the carrier to providing a specific amount of space on each of a number of sailings.

Mate's receipt

Traditionally it is the duty of the chief officer (first mate) to supervise the loading and stowing of the cargo on behalf of the Master and, as each consignment is tallied on board, a mate's receipt is produced and signed. These fairly simple documents recording the quantity and description of the cargo are, in theory, handed to the shippers, who are then able to exchange them in due course for signed B/Ls. In practice they are sent back to the agent's office to be checked against the B/Ls.

For most container services, the mate's receipt is replaced by port or terminal documentation – typically a list of containers loaded on board a vessel – and in most ports this is now handled electronically.

There is a separate and very distinctive shipping note for use when dangerous goods are being tendered for shipment, which includes the mandatory dangerous goods declaration.

Export shipping instruction

At one time it was the responsibility of the shipper or their agent to prepare the required number of original and copy B/Ls and lodge them with the shipping line for verification and signature. With the faster turnaround and voyage times of modern vessels, coupled with almost universal computerisation, this practice has fallen into disuse in most countries.

The practice now is for the shipper to supply the line with precise shipping instructions, usually by email or through the line's interactive website. This includes all the information needed for the documentation from which the line can then produce as many B/Ls as are required, together with freight accounts, all necessary manifests, and so on.

Ship's cargo and freight manifests

The cargo manifest is a document that lists all the cargo loaded in the ship and can best be visualised as a record of the details of each B/L presented across the page. It is produced by the line or its agent at the loading port.

At one time it was customary for the manifest to be completed and placed on board before the ship sailed. After containerisation, even with sophisticated computerised production methods, ships turned round so quickly that the manifest had to be completed and distributed electronically as soon as possible after sailing. This situation changed after 2001, with the US authorities insisting that manifests had to be submitted to them for security screening 24 hours before the vessel began loading in the foreign port. Faced with the risk that their cargo would not be shipped, shippers found they were able to submit their export shipping instructions at an earlier stage, and therefore the manifests could be completed on time. The US requirements have subsequently been extended to other countries, including all EU states.

There will be separate manifests for each discharging port so that each port will see what cargo it has to deliver. It can serve as a check against fraud because the B/L that the consignee presents should tally exactly with the entry in the manifest.

Copies of the cargo manifest have to be lodged with port authorities, customs, health and maritime safety authorities at load and discharge ports. Copies are often also required for transit ports and canals en route.

A separate version of the manifest, the freight manifest, gives details of all the freight and charges payable on the cargo and states whether these are pre-paid or to be collected at destination. This manifest is principally for the internal use of the line for collection and accounting purposes, but in some countries a copy also has to be lodged for exchange control or taxation reasons.

Because of the need for special treatment, dangerous cargo is usually recorded in separate manifest sheets from the rest of the cargo.

Letters of indemnity

As previously explained, the use of letters of indemnity in exchange for 'clean' B/Ls is a fraudulent act. There are nevertheless other occasions when letters of indemnity have a legitimate use.

The most likely case is when the cargo reaches its destination before the original B/L has progressed through the banking system. There is an absolute duty on the carrier only to deliver cargo covered by a B/L to the holder of the B/L. Technically, any device that involves delivery of cargo without the presentation of the original B/L is a breach of contract.

Having said that, breach of contract (unlike fraud, which is a crime) is a commercial matter and commerce must continue. It is, therefore, quite acceptable practice to deliver cargo against a letter of indemnity, but it has to be taken seriously. This means that any such letter of indemnity should be fully comprehensive and should be countersigned by a known and reputable bank. It is also essential that the agent at the port of destination obtains authority from the port of shipment before releasing cargo in case the shipper or the loading port agent is deliberately holding the original B/Ls, for whatever reason.

Usually the original B/Ls will arrive within reasonable time and these can be duly presented and the bank-endorsed indemnity can be handed back. Consignees will want this done quickly because banks charge substantially for underwriting indemnities and also set them, as a contingent liability, against the client's overdraft limits.

A similar problem can arise at a loading port when the original B/Ls go astray. This presents a potentially difficult situation because the line or its agents may be partly responsible for the loss. Nevertheless, a letter of indemnity is the only way to cover the risk of there being two sets of originals in circulation at the same time.

The other dilemma with such letters of indemnity is that delivery without the B/L is a breach of contract. This means that the time bar and the limitation of liability in the contract no longer apply. The wrongful delivery, in law, becomes the tort of conversion. The statute of limitations on tort is six years in the UK but longer in some other countries. The indemnity should be retained for this length of time, but the customer will not be happy to pay bank charges for six years.

Commercial judgement has to be applied. Banks will often try to limit the value of the indemnity to the value of the goods, but this is not acceptable because the liability in tort could be much greater than this. For example, the true owner of mis-delivered goods might be relying on them to keep its factory operating and may face consequential losses because work stops and orders are lost.

9.7 International conventions: from Hague to Rotterdam

Almost all countries have now adopted one of the international conventions that deal with the liability of the parties under a B/L.

Hague Rules

The first of these conventions was the Hague Rules, which were originally agreed in 1921, although it took until 1924 for the countries concerned to adopt the rules. Although the main pressure to regularise the liabilities of shipowners came from the British Empire, the foundations of the Hague Rules were probably laid in the American Harter Act of 1893.

Before the rules were agreed, liner operators made up their own minds how much liability they would accept for loss or damage to merchants' goods. There was wide variation, with some lines limiting their liability to a very low level. The object of the rules was to set a minimum standard so that merchants and their insurers would know where they stood.

To work effectively, such international conventions have to be passed into each country's national law. In the UK, a 1924 Act of Parliament adopted the Hague Rules and another act in 1971 the Hague-Visby Rules. These became the Carriage of Goods by Sea Acts of 1924 and 1971. Similar statutes will be found in most maritime countries, but in those countries that have not yet ratified the Hague-Visby Rules, the older Hague Rules still apply.

Article III

Articles I and II give the basic definitions and scope. The rules themselves begin in Article III, which sets out the responsibilities and liabilities of the parties. It is interesting to note that the owner's duty to provide a seaworthy ship applies only 'at the beginning of the voyage' (clause 1).

There is a clause insisting on a duty of care for the goods (clause 2). The next clause insists on the carrier issuing a B/L and makes it clear what must be included. It acknowledges that there is no obligation to include anything that cannot be checked (clauses 3, 4 and 7). In clause 5, the shipper is deemed to have guaranteed the accuracy of the information given to the carrier.

Next comes the action the merchant has to take if there is any loss or damage to their goods. The initial notification has to be made within three days of removing the goods and the claim will be time-barred 'unless suit is brought within one year' (clause 6). The article ends with a clause making it clear that any attempt to include wording in an agreement to lessen the carrier's liabilities shall be null and void (clause 8).

Article IV

Article IV is concerned with the rights and immunities of both the carrier and the shipper (clauses 1 to 4). Clause 2 (a) exempts the carrier from liability for loss arising from 'act, neglect

or default of the Master ... [and so on] ... in the navigation or in the management of the ship', which may seem surprising. In fact, this clause recognises that the sea is a dangerous place and that even today navigation can be a challenging task, with the Master or crew perhaps having to make critical operating decisions in adverse weather, under time constraints or with mechanical problems.

Clause 2 (q) is a widely stated clause that removes liability from the carrier from 'any other cause arising without the actual fault or privity of the carrier...' To rely on this defence, the burden of proof is on the carrier:

The last clause in this article emphasises the obligation of the shipper to declare dangerous cargo properly. If the shipper fails to do so, the carrier may take whatever action it thinks fit, even to the extent of destroying the cargo (clause 6).

Article X provides that the rules apply to cargo loaded in a contracting state or where the B/L is issued in the contracting state, or where the contract is subject to the law of a contracting state.

Hague-Visby Rules (1968 and 1979 protocols)

By the middle of the 1960s, containerisation was a fact of life and the old rules were clearly not adequate, so an international convention known as the Brussels Protocol was signed in 1968 to amend the Hague Rules. The amended form became known as the Hague-Visby Rules.

The most immediate problem to be addressed was the per-package limitation. Even with the Gold Clause Agreement, a £400 maximum for a 40ft container load was unrealistic. The new rules make it clear that if the B/L states that the container contains, for example, 20 washing machines, each machine is treated as a separate unit rather than counting the container as one unit.

Any change in rules such as these can create problems as well as solve them. One particular advantage of containerisation is that the goods are so well protected by the actual container that they need no more packing than is required at the point of retail sale. A container carrying 2,500 cartons of canned baby food might make the new rules unrealistic in the other direction.

The problem of inflation was finally overcome in 1979 when most maritime nations agreed to adopt the special drawing right (SDR) as a unit of currency. The prescribed limitations are now 666.67 SDRs per package or two SDRs per kilo, whichever is the greater:

The new rules extended the scope to coastal traffic for the first time. Also, Hague-Visby talks in terms of bills of lading 'or other similar documents of title'. Because a waybill is not a document of title, such documents must specifically incorporate the rules (both Hague and Hague-Visby allow for specific incorporation).

One other addition in Hague-Visby of special interest to agents is that the rules incorporate the equivalent of a Himalaya clause to give the carrier's servant the same rights and immunities as the carriers themselves.

Neither Hague nor Hague-Visby apply to live animals nor to goods on deck unless special agreement is made to incorporate them.

Hamburg Rules

The initiative behind Hague and Hague-Visby came mainly from the industrially developed maritime countries. Other countries considered the Hague-Visby Rules favoured the carrier and were detrimental to the merchant.

In reaction to this perceived imbalance, an international conference in Hamburg in 1978, sponsored by UNCTAD, drafted an international convention known as the Hamburg Rules. These rules put a much higher level of responsibility and liability on the carrier and have not achieved universal acceptance, but enough countries have ratified the convention for it to come into force.

Most of the opposition to the Hamburg Rules comes from the established maritime countries, which argue that any set of rules simply determines whose insurance policy will pay, should a claim be made. The Hague and Hague-Visby Rules, they argue, have stood the test of time in terms of case law and therefore to introduce entirely new rules would simply line the pockets of lawyers by increasing the number of disputes taken to law and could well put costs up rather than down. There are also serious objections to the way in which some of the articles in the Hamburg Rules shift responsibility.

There are many detailed variations set out in 34 articles (compared with Hague Rules' 16), but the main liabilities that the Hamburg Rules seek to impose, which are excluded from Hague-Visby, are:

1. Live animals and deck cargo are included (Article 1.5)
2. Almost all contracts of carriage, not just B/Ls and similar, are brought in (Article 1.6)
3. The carrier is liable for loss caused by errors in navigation
4. The carrier is liable to pay compensation for delay as well as for loss or damage (Article 5)
5. Compensation is raised to 835 SDR or 2.5 SDR per kilo (Article 6)
6. Time bar extended to two years (Article 20)

One of the prime objectives of the Hamburg Rules is set out in the brief Annex II, which states: 'The liability of the carrier is based on the principle of presumed fault or neglect. This means that, as a rule, the burden of proof rests on the carrier'. The exceptions available to the carrier set out in Hague and Hague-Visby are no longer available and are replaced by the stringent requirement to prove that 'he, his servants and agents took all measures that could reasonably be required to avoid the occurrence and its consequences'.

Such a radical departure makes nearly all the case law that has developed around the Hague Rules since 1924 irrelevant. It leads to uncertainty in the courts and, as a result, insurance premiums will tend to increase.

Finally, the scope of application is extended to include the port of discharge as well as the port of loading (Article 2). This can lead to so-called jurisdiction shopping. If a cargo is loaded in the UK (a Hague-Visby signatory) and discharged in Morocco (a Hamburg signatory) both sets of rules apply and a claimant can seek the jurisdiction most favourable to them.

Rotterdam Rules

The original purpose of the Hague Rules was to create a single international basis of liability and compensation relating to losses to cargo arising during carriage by sea. The subsequent changes to the original rules, the ratification of the Hamburg Rules and the voluntary adoption by some carriers of intermodal rules have led to wide variance in application of these rules. In addition, some countries have enacted rules that incorporate parts of both Hague-Visby and Hamburg. Uniformity has disappeared.

With support from the OECD, UNCTAD instructed UNCITRAL (the UN Commission on International Trade Law) to develop a new convention. Discussions were concluded at an UNCITRAL working group meeting in Vienna in January 2008. At almost 100 articles, the new instrument is far longer than the Hague or Hague-Visby Rules but it is also more comprehensive.

The central objective was to produce a modern maritime liability regime. Accordingly, while the new instrument continues to regulate traditional port-to-port carriage, it also recognises the needs of door-to-door traffic with optional provisions to facilitate pre- and on-carriage ancillary to the underlying requirement for an international sea transport sector. The outcome is most accurately described as a 'maritime plus' convention.

The main provisions of the Rotterdam Rules

- In what circumstances are the rules applied?

Port of loading or discharge, or place of loading/delivery in a contracting state.

- What parts of a through transport movement are covered?

From place of loading to place of delivery, but inland transport is only covered if there is not already in place an international convention which covers that part of the movement.

- Which contracts are covered?

Any through transport movement as long as part or all of the journey is by sea. Transport documents – includes negotiable and non-negotiable documents. Applies equally to electronic documents but excludes charter parties, unless specifically incorporated.

Specific provisions apply when documents are transferred to third parties.

- Cargo on deck

Covered, if in a suitable container; if required by law to be carried on deck, or if customs and practice of the trade. Otherwise, if carried on deck and damage caused as a result, carrier loses right to limit liability.

- Notification of damage/time bar

Notification at time of delivery, or if damage not apparent within seven days, right to claim for delay lost if not notified within 21 days; action to be commenced within two years.

- Limitation of liability

Three SDRs per kilo, or 875 SDRs per package, whichever is the higher

- Liability for delay

Only applies where the parties have expressly agreed a delivery date, liability for economic loss limited to 2.5 times freight payable; also the amount payable is capped by the total limit of liability.

- Carrier's general duty of care

Obligation to make the ship seaworthy and cargo-worthy. Obligation to make it seaworthy now extends throughout the voyage. Specific obligation to deliver the goods is provided.

- Carrier's defences

Similar to Hague-Visby, but 'error of navigation' defence is removed.

- Burden of proof

Detailed wording is provided on how the burden of proof operates (unlike Hague-Visby and Hamburg Rules where the general burden of proof is on one party or the other).

- Specific rules for volume contracts

Carriers and shippers can agree to increase or decrease liabilities under volume contracts, although carrier cannot exclude seaworthiness obligation.

- Jurisdiction and arbitration

There are rules on jurisdiction and arbitration, but they only apply if the state has opted in to these provisions at the time of ratification.

- Claimant's right of action

Claimant has a right of action against a contracting party but cargo interests may also elect to proceed directly against the operator of a carrying vessel, stevedores and terminals although such maritime performing parties are given protection similar to a Himalaya clause.

After approval by the UN General Assembly, the new convention was adopted by governments at a diplomatic conference in Rotterdam in September 2009; the new convention being designated the Rotterdam Rules.

The Rotterdam Rules will come into force internationally one year after the convention has been ratified by 20 states, although it will only apply in those countries that incorporate the rules into their national law. Other countries may choose to continue to use the previous conventions – or introduce their own rules.

Shipowners are generally lobbying for the new convention to come into force because, although they see it as by no means perfect (it substantially increases their liability compared with the Hague-Visby Rules), they see merit in having a modern and generally accepted international convention that applies to all international through transport movements.

Associations representing shippers and forwarders are divided on the issue. The European Shippers Council opposes the Rules while the World Shipping Council and the US association representing shippers, the National Industrial Transportation League, strongly support them.

To date, 25 governments have signed the convention, which indicates an intention to ratify it and introduce it into national law. However, as of April 2018, only four governments (Cameroon, Congo, Spain and Togo) have actually ratified the new convention so it is unlikely to come into force for some time.

Legal and insurance implications in combined transport

When a through bill of lading is signed (for example, when the goods first travel in a coaster for later transshipment into the ocean carrier) the line only acts as an agent for those parts of the journey that take place in vehicles or in other owners' ships.

Containerised goods are invariably carried under a combined transport bill of lading. The significant difference is that the carrier under the contract evidenced by such a bill of lading accepts responsibility as a principal for the whole of the carriage that it undertakes.

That contract of carriage could well commence from the exporter's own premises with the line providing the road vehicle to transport the goods to the ship, referred to as carrier's haulage or line haulage. When the exporter provides the truck and delivers the container to the docks (merchant's haulage) the goods pass into the custody of the line in the container yard adjacent to the loading berth, which is some distance (and time) from the ship's rail.

At this stage the shipper can be given a bill of lading stating that the carrier has received the goods for shipment at whichever point is appropriate, the shipper's premises, the CY or the port.

The printed combined transport bill of lading is invariably worded as a 'received for shipment' bill of lading. In order to comply with most contracts of sale or letters of credit, it will need to have a separate endorsement stating that the goods have been shipped on board followed by the date of loading and the line's (or its agent's) signature.

There is a limit to the carrier's liability set out in international conventions such as the Hague or Hague-Visby Rules, but those rules do not cover inland transport. So how does the carrier limit its liability? There are other international conventions to solve the problem.

There is the Convention relative au contrat de transport international de Marchandises par Route (Convention relating to contracts for international transport of goods by road), referred to as CMR.

Within Europe, most railways are signatories to the CIM Convention, its full name being Convention Internationale Concernant le transport des Marchandises par Chemins de Fer

(International convention concerning transport of goods by railways). The CIM Convention is part of a wider convention, COTIF, which also covers passengers.

So the carrier under a combined transport bill of lading takes care to include in its conditions of carriage the fact that if loss or damage takes place on road or rail then the limitation of liability appropriate to the convention concerned will apply. If it is impossible to be certain where the loss or damage occurred, then it is assumed to have happened at sea so that the Hague-Visby Rules or equivalent will apply.

ICC rules for a combined transport document

Some years ago, an attempt was made to draft a convention to cover loss or damage to goods carried under a combined transport document. Known as the Tokyo Rules, it failed to secure widespread support. The International Chamber of Commerce took up the draft and made it commercially more attractive. This is published as the ICC Rules for a Combined Transport Document and has found wider acceptance. Most large operators apply terms and conditions that are based on the ICC rules, if not precisely complying with them.

9.8 Paperless trading



The industry is still wrestling with electronic documentation and non-paper systems

Before containerisation, the lengthy time spent in port enabled manually produced documents to keep up with the ship for the most part. Now, ship transit times are becoming shorter to such an extent that the ship often overtakes the paper.

As the use of computerised and electronic information transfer was advancing, it was recognised that there was a need to rationalise the documentation so that more use could be made of modern equipment. The basic problems concerning documentation were, and still are, those of speed and cost. By the mid-1960s, many trade and shipping organisations were pressing for a system of documentation using a standard size and format. The European Economic Community established a standard master format for shipping documentation which has subsequently been

adopted almost worldwide under the UNCTAD trade facilitation programme. This is the format still familiar today.

International data transmission has made a vast improvement in the transmission of shipping documentary information. The distant agent is anxious to receive details of the cargo destined for their port as soon as possible both to satisfy the consignees' needs and to comply with the requirements of customs officials. Internet links allow the manifest to be printed in the distant office at the same time as it is being printed in the office of the loading agent. Data can be stored in the Cloud where it is equally accessible to all authorised parties.

Parallel with the electronic transmission of the manifest and accounting information has been the increased use of waybills. As these are not documents of title, the consignee does not need to have an original in order to claim the cargo. Wherever a B/L is not required, electronics can be certain of overtaking the ship.

This still leaves the cases where it is necessary for B/Ls to be processed through a documentary credit or to be used as a means of selling title to the goods. The underlying problem is what should replace the hard copy B/L as the document of title and how this can be made secure. Whatever is used must be acceptable to every country and meet the requirements of national B/L acts, as well as the international conventions. Security coding is not an insurmountable problem with modern computer facilities, but some governments are reluctant to authorise the use of encryption systems.

Several groups and commercial companies have pursued solutions to this challenge with varying degrees of success. There are now three competing electronic systems that satisfy the requirements of the International Group of P&I Clubs as meeting the three basic functions of a bill of lading. These are Bolero, EssDOCS (approved in 2010) and e-title (2015). Other products may be available, but so far these have not satisfied the requirements of the P&I clubs.

The use of electronic documents in transactions via a letter of credit has been facilitated by a supplement to UCP600, eUCPV 1.1, which sets out how electronic documents can be used, as long as the credit specifically states that it is subject to eUCP.



Chapter 10

Tariffs, pricing and cargo selection

10.1 Demand for shipping services

Shipping is a service that can be purchased, rather than a product. It has two particular features of note:

- It cannot be stored. Once a ship has sailed with empty space, the opportunity to use that space is lost (unlike the situation with physical commodities, which can be stored and sold later)
- It is a derived demand. Its only purpose is to transport goods from place to place, and the value of shipping only relates to the goods that are transported. If there are no goods to transport, there is no reason for having a shipping service

Shipping services are also subject to competition, as many lines may offer services on the same route. Like the goods being shipped, shipping is subject to the laws of supply and demand. If there are more ships and space available than needed, it is likely to drive the price down. Conversely, if there is a shortage of space, the price will go up.

10.2 Pricing of liner services

This chapter covers how tariffs – the published scales of charges – are structured in the liner shipping business, how lines set the prices that they actually charge to customers, and how they decide what cargo is attractive to them from a business and financial perspective.

The following factors are important in how lines set their prices for services:

- Cost: The line will wish to cover its costs in operating the service
- The economic value of the goods: If the price of the goods at destination is too high, people will not buy them. So the price of shipping must be set to ensure that the trade will take place
- Competition: The issue here is what the other liner shipping services are charging, and whether there is a surplus or shortage of space available

Other factors may influence the price that the line decides to charge. For example:

- Are the goods shipped regularly, all through the year? This is more attractive for the shipping line than one-off shipments
- What is the volume to be shipped? Higher volumes may attract a discount
- Are there additional costs associated with the cargo? A premium may be charged for reefer or hazardous cargo, or if a port is particularly expensive

10.3 Tariffs and prices

While conferences no longer exist in many trades and have lost their pre-eminence in others, the underlying tariff structure that was originally created by conferences to cover liner services is still used in many trades.

A tariff is the published scale of charges that a line may advertise. It will probably consist of several elements for different services and may well include additional and surcharges. The tariff structure describes all these elements. The price describes the actual amount paid for the service. It may be calculated from the tariff.

Lines may be prepared to offer a price that is lower than the tariff, perhaps in return for a contract to carry a shipper's cargo for a period of time, or purely as a means to secure some cargo that would otherwise be shipped with a competitor.

Seafreight rate

This is charged to carry the goods on the vessel from Port A to Port B. There are various ways this may be calculated, which are described in more detail below.

Terminal-handling charges (THC)

This is the charge for lifting the container on (or off) the vessel and for storing it in the terminal. It will also normally include the cost of lifting the container on to or from a road vehicle in the terminal, though in some cases an additional lift charge may be levied.

THCs are normally levied per 20ft or 40ft container. An extra charge is applied for reefer containers to compensate for the cost of refrigerating them while on the terminal.

Surcharges

The most common surcharges are:

- Currency adjustment factor (CAF)

Tariffs are normally charged in US dollars while the lines' costs will be in a variety of currencies. A CAF is charged (as a percentage of freight) to compensate for variations in exchange rates between a basket of currencies which reflects the costs incurred by a line and the tariff currency.

- Bunker adjustment factor (BAF)

BAFs are charged to compensate the line for changes in bunker (oil) prices between the time when the tariff rate was set and when the shipment actually takes place.

Although described as surcharges, CAFs and BAFs can in some circumstances be negative, for example, if bunker prices have fallen since the base reference point was established.

Many lines introduce surcharges for a variety of other reasons. While in theory they are to cover particular unexpected cost items, some of them are more opportunistic:

- Suez and Panama Canal surcharges – to cover increases in canal tolls
- War risk surcharges – when insurers introduce a war risk premium in a particular area

- Congestion surcharge – when there are excessive delays at a particular port
- Piracy surcharge – introduced by some lines to cover the extra cost of security when passing through an area where there is a risk of pirate attacks
- Peak-season surcharge – to cover the 'extra' costs of providing space and containers in the peak season
- Terminal Security Charge – to cover ISPS requirements. For instance, all containers imported into Germany incur a charge of €10.50

Other freight additional

Special containers – mostly open-tops, flat-racks and reefers – incur extra costs for the line in providing, storing and repositioning the container. Demand for such containers is limited, perhaps in only a few trades or in one direction only. They are normally charged at a separate rate rather than as a surcharge on the dry van rates.

Reefers might incur a different charge for frozen and chilled cargo, because more power is required to maintain the temperature of chilled cargo.

A levy will also be charged for shipping hazardous cargo because of the additional costs involved. These costs arise from ensuring the proper handling stowage and separation of these cargoes as well as additional risks and liabilities. A different level of surcharge may apply according to the nature of the hazard.

Inland charges

The majority of lines will have a comprehensive tariff of rates for carrier haulage to important inland locations. If alternative modes of inland transport are available (such as rail, barge) then there is likely to be a different rate according to the mode used, or a so-called intermodal rate for a combination of rail and road. There may be different prices for 20ft and 40ft containers and for heavy and light boxes.

Where containers are delivered or collected by merchant haulage (that is, haulage organised and paid for by the customer) there is normally no additional charge. A pick-up or drop-off charge may apply for inland depots to compensate the line for the cost of moving the empty container between the inland depot and the terminal.

Ancillary (or local) charges

These will be different according to the location. They include:

- Demurrage charges, when the container or cargo is left in the port beyond the free time stipulated
- Detention charges, when a container is taken away by merchant haulage and not returned within the time allowed

Other local charges may be levied for documentation, customs entry (if this service is provided to the customer) and container cleaning.

Tariff rules

The B/L is the evidence of the contract and the terms and conditions of carriage are set out on the reverse. Therefore, any freight quotation must make it clear that it is subject to the terms and conditions of that carrier's B/L. In addition, certain rules relate only to monetary aspects of the contract and do not necessarily appear in the B/L conditions.

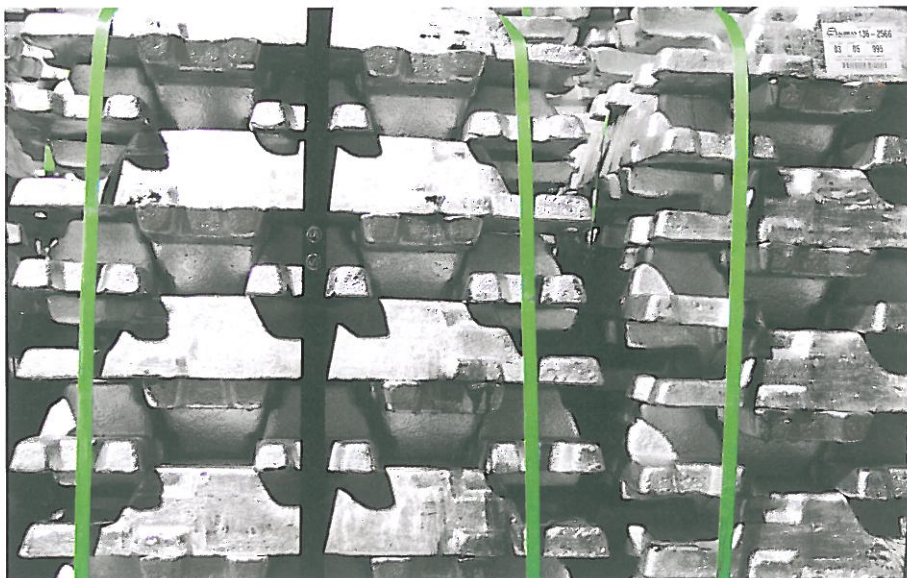
Examples of these rules include:

- The collection and return of the line's container and the financial penalties incurred in respect of container detention, demurrage and quay rent
- Payment of freight in currencies other than the tariff currency and how this will be calculated for both prepaid and collect freight
- Pre- and on-carriage of containers under carrier haulage
- Requests from merchants for changes to the ultimate destination of the cargo
- Documentation and other additional charges
- Forward validity of rates and notice of changes
- Forward validity of surcharges, additional and notice of changes

10.4 Types of seafreight tariff



Volume cargo: pipes



Weight cargo: ingots

For conventional liner services, the freight rate would be charged on what was known as a 'freight tonne'. This was calculated from the weight and space occupied, where one tonne was the equivalent of one cubic metre. A package of two tonnes and one cubic metre would be charged as two freight tonnes, while a package of two tonnes and three cubic metres would be charged as three freight tonnes. A freight rate based on this formula is called a weight measurement rate (W/M) and is still used as the basis for charging LCL and breakbulk cargo.

This ensures that the line maximises the freight it can earn whether the ship is filled by using all the available deadweight or filling all the available space.

Conferences created a value-based tariff structure whereby high-value commodities subsidised low-value commodities, without which it would be uneconomic to ship low-value commodities. This increased the overall volume carried so lines could operate larger and more efficient ships and services, which in turn increased profits.

Conference tariffs therefore had literally hundreds of entries, where a freight rate was quoted for every individual type of cargo shipped, based to a large extent on what the cargo could bear. This system was undermined by non-conference lines, which skimmed off the higher-paying cargo but had no desire or obligation to carry the low-rated cargo.

In many trades, the inevitable outcome of this competition was FAK (freight all kinds) container rates, where the same freight rate is charged irrespective of what is in the container. The lines therefore base their freight rates on their costs rather than on the commodity carried.

Simple commodity tariffs still survive in some trades, for example, where most of the cargo moved is raw materials rather than finished goods, or where there are low-value commodities that lines wish to encourage to move (which is often in backhaul trades where the lines are happy to have low-rated cargo to fill otherwise empty containers).

Examples of this are special commodity rates for movement of scrap metal and plastic from Europe to Asia and the movement of hay from the USA to Asia – cargo that undoubtedly would not move at all if the freight rate was too high.

10.5 Contracts and special rates

In many cases, lines will offer 'service' or 'contract' rates to regular, high-volume shippers. Also in the US, the term 'individual confidential service contract' is used to distinguish such contracts from those negotiated with conferences.

A line may also offer special rates for individual shipments without any contractual commitment. This may be because the shipper offers a particular volume of cargo, or indeed it may simply be that the shipper has an offer of a better freight rate from a competitor.

10.6 Rate increases

The conferences used to adjust their tariffs, usually once a year, by applying a general rate increase (GRI). Such increases were often backed up with supporting statements demonstrating that their costs had gone up as a result of inflation.

Now, lines make their own decisions on when to introduce rate increases and the shipping press usually carry these announcements. If all the rate increases that are announced were actually achieved, freight rates would be astronomically high, which suggests that lines do not follow their own tariffs and points to the prevalence of special rates in most trades.

What happens in practice is as follows:

- The rates actually charged to customers progressively decrease because of competition
- In an attempt to restore its earnings, a line will announce an increase in its rates of a given quantum (say \$600 per teu) as a signal to the market that rates are going up
- Other lines may follow and announce their own increases, which may be of a similar amount and starting on a similar date
- However, a line then needs to apply the increase in practice to individual contracts and special rates and to its tariff. In a strong market, the shipper may have no alternative but to pay the increase. However, in a weak market, if its competitors are not implementing an increase, the line may in practice not apply the rate increase in line with its public statement in order to avoid losing cargo
- The rate increase may therefore never happen in practice, or only partially succeed. In such cases it is likely that within a few months, the line will try again by announcing another increase

Tariff rates, whether published by conferences or by individual lines, are normally made available so that anyone can access them. However, with the majority of cargo being shipped on contract or other special rates (which will be private agreements between the line and the customer), it has been very difficult to establish what is the general market rate at a particular time.

With this lack of information, lines would find it hard to establish if their rates were above or below the market rate, and shippers would be uncertain if they had a good rate or not.

In the years following the global financial crisis, rates out of Asia for traffic bound for Europe were prone to extreme volatility. There were periods when carriers were declaring large GRIs almost every other month. The European Commission became suspicious that the lines were again colluding. In November 2013, the Commission opened an investigation into 14 shipping companies active in the trade amid concerns that the lines' GRI announcements did not provide full enough information on new prices to customers but were designed more as a signal allowing carriers to be aware of each other's pricing intentions and thereby make it possible for them to co-ordinate their behaviour.

The case was not proven but the shipping lines had to commit that they would stop publishing and communicating GRI announcements that did not specify the maximum ocean freight (before surcharges) to be applied. The point was not lost on the lines: the Commission would not tolerate any hint of collective price-fixing and would remain watchful of such concerted practices. Thereafter, the carriers ceased making their rate increase notices so public.

10.7 Service contracts

Many of the larger importers on the major trades who negotiate rates directly with the shipping lines – as opposed to delegating that function to a freight forwarder – look to obtain rate cover for 12 months or more. These so-called direct accounts or beneficial cargo owners (BCOs) will include many well-known multinational corporations. Each year they will invite a selection of shipping lines to bid for their business for a particular trade lane, and some even submit a global tender covering several trades. The number of port pairs a carrier may be asked to quote for can run into hundreds.

In return for a volume commitment (MQC or minimum quantity commitment) the merchant would expect a rate that stood at a substantial discount to the line's tariff or the prevailing market level. They would also expect weekly space guarantees, especially during peak periods, and possibly other privileges. For the successful bidders, a service contract would be prepared incorporating everything agreed during the course of the tender.

A service contract is a legally enforceable agreement concerned with mutual obligations and specific terms. If, at the end of the 12-month period, the merchant has failed to achieve his MQC with a particular carrier then the latter could in theory claim for compensation of the unused slots that the line reserved for the BCO. In reality, given the competitive nature of this business, such penalties for underperformance have almost never been enforced by the shipping lines. There have been instances, however, where carriers have demanded a higher freight for bookings substantially in excess of the BCO's weekly space allocation – again especially during a busy peak period when the line could otherwise quite easily fill its ships with higher-paying cargoes.

Annual service contracts on the trans-Pacific headhaul trade generally run from 1 May, while those governing the Asia-Europe westbound market usually begin at the start of the calendar year.

10.8 Tariff filing in the US

Right from an early stage, US policy makers took issue with British-style shipping conferences. They felt that collusion among shipping lines within a conference would create unfair trade practices of an anti-competitive nature. They embraced the concept that individual lines could make their own decisions (that is, to take independent action, or IA) and not be governed by the dictates of a collective. This was the nucleus of the 1984 US Shipping Act, which sanctioned the pricing of liner services via negotiated contracts, rather than exclusively by public tariffs.

IA was a complete anathema to the shipping conference system. Even within the shipping lines, the two differing philosophies created a division between staff who managed trades into and out of America and those who worked in departments handling trades where the conference system prevailed (above all Europe). Not until the demise of the conference system during the first decade of this century did this silo effect within liner organisations start to disappear.

The Federal Maritime Commission was set up in 1961 as an independent agency with its prime objective to regulate the ocean-borne foreign commerce of the United States, and subsequently to oversee the provisions of the Shipping Act of 1984. Above all, it was created to ensure that American merchants were protected from unfair costs that might arise from the activities of liner shipping and the laws of foreign government. As a consequence, the FMC required all service contracts to be filed with the Commission, and that regulation still exists today.

10.9 Freight rate indices

Several organisations have launched their own publication of an index of freight rate levels to satisfy demand for more transparent information on whether freight rates are rising or falling. These include:

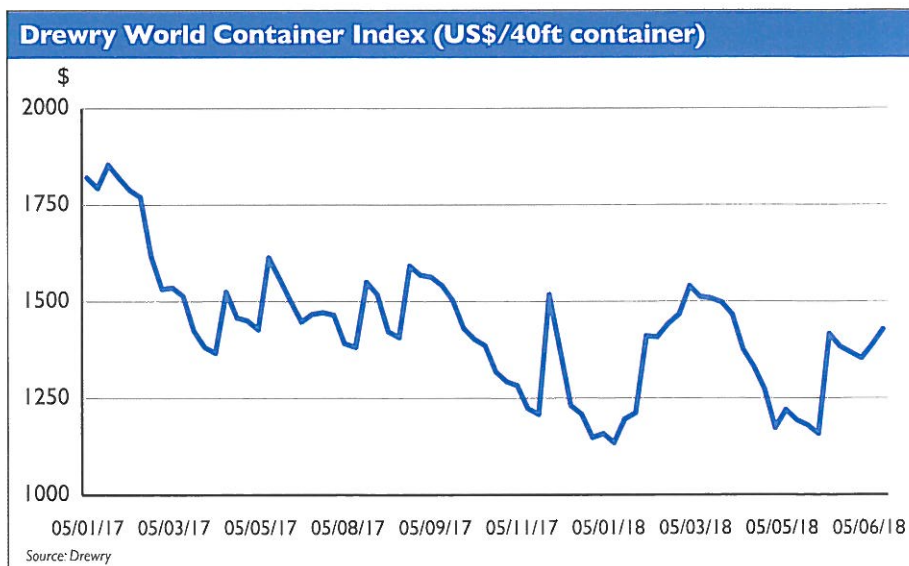
- Shanghai Containerized Freight Index (SCFI)

This is published by the Shanghai Shipping Exchange and provides spot freight rates on 15 routes from Shanghai, and also a composite index reflecting a weighted average of all routes from Shanghai.

The freight rates are compiled by getting data from a panel – that is a number of shipping lines and forwarders who agree to provide examples of current freight quotations on a regular basis.

- World Container Index (assessed by Drewry)

This weekly index is a composite of container freight rates on eight major routes between the US, Europe and Asia. Like the SCFI, it is compiled from spot freight rates provided by a panel of major market participants.



- Container Trade Statistics

This is a company (owned collectively by the major liner companies) that obtains actual volume and freight rate information from most of the major shipping lines and publishes aggregated data showing both volume and freight rate trends in 447 trades.

The major difference between its statistics and the indices mentioned above is that it reflects actual data provided by lines of freight and volume, and therefore shows trends in average freight rates, which will include both contract and special rates rather than just the spot rates used by the other providers.

Other organisations have also developed various indices.

10.10 Forward freight markets

In many markets, it is possible to enter into contracts that are based on future rather than current prices. This happens with stocks and shares, foreign exchange and commodities.

Companies can use such arrangements to reduce the risk in their business (for example, buying foreign currency forward if you have a known future requirement for a large amount of a specific currency to settle a contract), but they can also be used by professional speculators who bet on future movements in markets.

A shipper might think it is worthwhile locking in their future freight rate costs, rather than being exposed to uncertain possible increases in freight rates.

For futures markets to operate effectively, one requirement is the availability of an index that can give a reliable measure of actual movements in the market. There have been markets for many years in bulk shipping, and indices such as those mentioned above could provide a benchmark for a forward market in container freight.

10.11 Yield management

The business objective for a container line is not just to carry a given volume of cargo to fill its ships, but to maximise profits through the mix of cargo that it carries.

While the market will have a strong influence on the general level of freight rates, the line will have to set its own prices for individual shipments. It will also need to plan what cargoes it wants to carry and which customers it wants to serve on a particular route, what its price levels should be and indeed which routes may be more profitable than others. The technique used to take these types of decisions is generally referred to as yield management.

How to measure the yield (or contribution) from a shipment

Yield management requires consideration of both the revenue and costs associated with carrying a container of cargo. But what costs are relevant? Here is the example of a 40ft container from Factory Shanghai to Warehouse Hamburg (all local charges converted to US dollars for ease of comparison).

Stage 1: Door-to-door revenue

Revenue	\$ per container
Inland haulage tariff factory to Port Shanghai	300
THC Shanghai	180
Seafreight (incl surcharges)	900
THC Hamburg	280
Inland haulage tariff Hamburg Port to Warehouse	230
Total revenue	1,890

Stage 2: Cost of moving loaded container

Costs of moving loaded container (haulage plus terminal load/unload)	400
Cost of providing a container for the movement	50
Agency – organisation costs	100
Contribution after voyage cost	1,340

Stage 3: Imbalance cost

Shanghai is a shortage or deficit area for 40ft containers, while Hamburg is a surplus area. As a result of carrying this cargo, it will be necessary to move an additional empty container into Shanghai and an additional container out of Hamburg.

Shanghai – empty lift cost	100
Hamburg – empty lift cost	50
Contribution after imbalance	1,190

Stage 4: Fixed costs – voyage

While the cost of running the ship is incurred irrespective of the number of containers carried, those costs must be covered. One method is to take the total cost of providing the ship for a round voyage (for example, charter hire, bunkers and port costs) and divide by the number of slots provided on the round voyage. So for a 15,000 teu ship, that is 30,000 slots provided on the round voyage, or 15,000 each way.

Ship system cost per 40ft slot	800
Contribution after ship costs	390

Stage 5: Fixed costs – business overheads

A liner shipping company will also incur overheads in running the business. By dividing the total overheads by the number of containers forecast to be carried, we get an estimate of how much we need to earn on each container to pay for the overheads.

Average overheads per 40ft container carried	200
Net profit from shipping this container	190

Treatment of ship costs



Cost calculations must take empty slots into account

The above illustration takes a somewhat simplistic view of how to apply ship costs in a yield management calculation. In practice, there are a number of other considerations:

- Not all slots on a vessel will be utilised with full containers. If all the ship system costs are to be recovered, the rate used above (\$800 per teu) will have to be increased to take account of this factor
- The majority of trades have a dominant leg (where a high level of slot utilisation is achieved) and a non-dominant leg (with a lower slot utilisation). The labels headhaul and backhaul are also used

Given that there will be stronger competition with other lines for business on the nondominant than on the dominant leg, it may be sensible to seek a higher level of cost recovery of ship costs on the dominant than on the non-dominant leg.

In the example quoted above, the line might choose to put ship system costs of \$900 per teu into its yield management model on the dominant leg and \$500 on the non-dominant leg. This is a matter of commercial judgement. The line's management must remember that for the business to make a profit, total ship costs must be covered through the freight rates charged.

In some circumstances and for particular shipments of cargo, the line may choose to put a ship system cost of zero into its yield management calculation. For example:

- On the backhaul leg, the line is likely to be shipping empty containers back to the stronger market locations (container deficit areas). It is therefore possible to justify that any freight rate that pays something towards the cost of repositioning the empty container – thereby avoiding the cost of shipping it empty – is worth having even if it pays nothing towards the ship costs
- If the ship is not expected to be full, the line might consider dropping its freight rates to fill the vacant space, even if the rates quoted will not fully pay for the ship system costs. The argument is that as the ship cost of the voyage will be incurred anyhow, any contribution to ship costs is better than none

These examples are generally referred to as marginal pricing – where prices are only required to cover the variable or cash costs associated with the shipment. The latter example in particular can have unintended consequences. If you quote marginal prices for a particular week when there is vacant space, shippers may expect to get these rates regularly, with the result that the level of market rates is dragged down to a position where ship costs are not being covered on any of the cargo carried. This will certainly result in a financial loss for the line.

How to use yield management measures

To use yield management properly, it has to be part of all the business systems of the company so that it is used in all decision-making at all levels, from a salesman discussing rates with a customer through to the board of directors taking strategic decisions on investments in ships or routes.

Complete books have been written on this subject, but the intention here is just to give some illustrations of how it is used in decision-making in liner shipping using some of the basic questions that businesses need to address.

'We have empty slots forecast on a sailing in two weeks' time – what cargo should we book?'

'If the contribution after imbalance (Stage 3) is positive, we should book the cargo, even if the contribution at Stages 4 or 5 is negative. The ship system costs and overheads will be incurred regardless of whether we book the cargo, so it is better to have a contribution to those costs even if they are not fully covered.'

'Space on this sailing is tight – we have been offered two shipments of 10 containers, but can only accept one shipment – which one should we take?' Select the cargo with the higher contribution after imbalance (Stage 3). This tells you which cargo will make the greater contribution to ship costs. You may also want to take account of factors not shown in the yield

management system, such as which customer gives you regular support or is more valuable in the longer run.

A weekly service loads at three ports, and the agents want more allocation than is available on the ship. How should we divide up the space between the agents at the ports? Again, we look at the average contribution after imbalance for cargo from the three ports. We would want to allocate more space to the one with the highest contribution. We will probably also want to consider the benefit of spreading our risk across the three ports, since the market may change.

"We are preparing the sales strategy for the budget year and want to assess the value to the company of different customers. What financial measure should we use?" Contribution after ship costs (Stage 4) would probably be appropriate. We want to ensure that, taking a longer-term perspective, the cargo that we carry will cover the full costs of the ship space that is used. The value of a customer is therefore what we earn from that customer after having paid all the costs, including the ship space.

"The budget for the company is being prepared, showing the profitability of each service and route. It will be used to compare the performance of the various routes and show the directors the profitability of the business. What financial measure should we use?" If looking at the overall profitability, then net profit (Stage 5) should be used. While overheads probably cannot be changed in the short term, they still have to be paid for out of the earnings of the business, so cannot be ignored when assessing the performance of the different services and routes, since these will in total add up to the total net profit of the business.

Note that in some of the examples, yield or contribution is calculated at the level of the individual container. In other examples, it is aggregated across a number of containers, for example, for a customer or even for a complete service. The principles applied to the calculation of yield (contribution) are the same, however.



Chapter 11

Contractual aspects of the import-export business

The buying and selling of goods involves the creation of a contract or agreement between two parties: one offering goods for sale and the other offering something in exchange for those goods. It does not matter how many other agents become involved. The contract binds the two parties but does not necessarily have to be in writing and both sides of the contract have an obligation. If either party fails to fulfil its obligation, there are remedies in law.

Within the same country this is straightforward. We can use credit cards, cash, cheques or one of the various forms of electronic transfer. Sale and purchase contracts or deals are virtually instantaneous in a shop or via the internet.

Liner operators and their agents need to have an insight into some of the merchants' problems regarding the financing of their trade in order to provide a supportive service. It is worth remembering that cargo shipping is a derived demand, so if the carrier fails to satisfy the merchant, there is little point in running the service.

11.1 The international transfer of funds



With most money transfers now electronic, the opportunities for fraud have increased

The ease with which money can be sent from one country to another varies considerably. Some countries have no barriers at all while others have extremely strict exchange controls. The stringency of the control usually reflects the balance of payments weakness of the country concerned or the extent to which it operates a centralised, command-style economy.

Where no controls are imposed, the simplest method is for the payer's bank to arrange a credit transfer to the payee's bank. Such a transfer is normally now carried out through some form of electronic communication. The charge the banks make is commensurate with the speed of transfer demanded. One particular advantage of a credit transfer is that the payer can arrange to absorb all the charges even to the extent of stipulating the precise amount that should be credited to the payee's bank in his own currency.

This can be very important to an agent who requires payment for disbursement and naturally wants the exact amount paid out on the ship's behalf.

Methods of payment in international trade

Where the buyer and the seller are part of the same group of companies or when the parties are known to each other and trust each other, they can operate open-account trading using bank drafts and credit transfers. The one issue that remains to be addressed is when the payments are to be made.

Both parties will wish to conserve their cash flow to the maximum extent so that an ideal method for the shipper would be cash with order. Conversely, the buyer would be happier with cash on delivery, but neither of these is generally satisfactory because one or the other will feel their money is outstanding for too long.

A more usual method with open-account trading is for the parties to agree to use the direct system, which requires the seller to airmail their invoice and the B/L as soon as shipment has been effected and the buyer transfers the cash on receipt of the documents.

Open-account trading particularly lends itself to short-sea passages, when the voyage would be completed long before documents could be processed through the banking system if a documentary credit were involved.

The assistance of liner operators or their agents may be sought when merchants are using open-account trading. In cases where the consignee will not want to sell the goods to a third party, there is an ideal situation for the use of a sea waybill. There is no point in having a document of title in circulation when one is not required. In the case of container shipments, a 'received for shipment' B/L may be adequate for the merchant's needs.

Liner operators and their agents should ensure that their sales staff are aware when their customers are operating open-account trading. They can then, diplomatically, check whether the shipper is fully aware of the existence and possible advantages of the alternatives to 'shipped on board' B/Ls.

Bills of exchange

Those working in liner trades should be aware of the existence of bills of exchange. In simple terms, this method of payment is more secure than ordinary open-account trading but not as protected as a documentary credit.

In essence, a document is prepared that resembles a cheque drafted on plain paper. Where it differs significantly from a cheque is that, in most cases, it stipulates that payment is to be made at some future date, for example, in 90 days.

The advantage of this method is that it permits both parties to conserve cash flow to the maximum. The buyer will not have their account debited until the 90 days have expired so that they could well have retailed the goods before having to pay for them. The seller may choose either to wait the 90 days and be credited with the full amount or (because bills of exchange are negotiable) may negotiate the sale of the bill with a bank at slightly less than its face value (known as discounting the bill). Assuming the seller allowed for the discounting charge when negotiating the sale of the goods, both parties can conserve their cash flow without penalising the other.

Documentary credits

These are often referred to loosely as letters of credit, but with a letter of credit one may only have to identify oneself to draw from it. A documentary credit is so called because it requires several documents to be presented to receive payment.

Documentary credits are the most frequently used method of payment for long-distance commerce and the seller must stipulate that payment shall be via a 'confirmed, irrevocable documentary credit'. 'Confirmed' means that a bank in the seller's country will pay as long as all the stipulations are adhered to by the seller, even if the buyer and their bank both become bankrupt. 'Irrevocable' means that the buyer cannot cancel the credit.

When the goods have been loaded, the seller gathers all the documents stipulated in the credit and presents them to the bank. The bank compares them meticulously with the instructions sent by the issuing bank. It is this close scrutiny that may have an impact on the liner operator or agent.

The confirming bank has no discretion in terms of how it deals with documentary credits. It has to obey its instructions to the letter as the slightest variation between the confirming bank's instructions and the documents presented by the seller will result in payment being refused. A major London bank has stated that nearly 80% of documentary credits are refused on first presentation, so it is vital that the shipping line or its agent words the B/L in accordance with the shipper's instruction.

Similarly, anything endorsed on the face of the B/L that remotely resembles a clause may result in the bank refusing to pay. However, the line or agent needs to be careful not to succumb to pressure to remove such clauses if they are justified.

The confirming bank is given no discretion because it is the strict adherence to instructions that protects the buyer. Furthermore, that adherence has to be almost automatic to cope with the thousands of documentary credits that have to be processed every day under the pressure of ever-shorter ship transit times.

Despite this care, there have been some spectacular frauds with documentary credits where criminals have succeeded in producing apparently genuine documents for non-existent cargo supposedly loaded on a non-existent ship or a real ship that was on the other side of the world at the time.

Some people have been quick to blame the banks when such frauds have taken place, but if banks had to check the whereabouts of every ship involved in every documentary credit, the cost would become prohibitive and the whole system would grind to a halt. Ships are already moving faster than the accompanying paperwork.

When documentary credit frauds have been investigated, the weakness is usually found to be gullibility, ineptitude or collusion on the part of someone connected with the buyer.

Perhaps the biggest mystery is why buyers are still encouraged to insist on a set of three original B/Ls and then quite rightly insisting on all three being presented by the sellers to the confirming bank. Even if the buyer wishes to endorse their title to the goods to another, that endorsee will also want all three bills, as there would be no secure title without them.

Uniform Customs and Practice for Documentary Credits (UCP600)

There is close liaison between the major banks and the International Chamber of Commerce (based in Paris), which has published the Uniform Customs and Practice for Documentary Credits since 1933. The sixth and current edition, UCP600, came into force in 2007. It reduced the number of articles from 49 to 39 and brought in more clarity and precision to ensure documentary credits were more commercially friendly than in the previous version. The requirement for shipped on board B/Ls is still an essential feature of the documentary system.

It is important that the face of the B/L describes the goods in precisely the wording the shipper requires, but it is also important that the lengthy cargo descriptions sometimes required in letters of credit are not copied into the B/L, as this may well include statements as to value that could affect the carrier's liability under the Hague-Visby Rules.

Under UCP600, a letter of credit is now always irrevocable; that is, the buyer cannot alter it in any way without the seller's consent. It will have an expiry date after which it becomes null and void. It may also include stipulations about a latest shipment date, which might be before the expiry date.

There will always be occasions when sellers encounter delays in manufacture and will be arranging shipment very close to the final shipment date or expiry date of the credit. It is easy to visualise the frustration, possibly disaster, if the goods have been dispatched but the credit has expired. The shipper's money is tied up in the goods on their way to a distant country while the only person who has title to the goods is at the loading port with a B/L but no immediate way to obtain payment. One can also visualise the strong bargaining position in which such a situation places the buyer:

A shipper in this unfortunate position might ask the liner operator or its agent for a B/L that falls within the expiry date of the credit. A letter of indemnity might even be offered in exchange for such a document, which is known as a pre-dated B/L.

Other reasons for seeking a pre-dated, or even a post-dated, B/L include a change in the price of a commodity where a higher price could be gained by proving that shipment had taken place on a different date. The expiry of an import or export licence might also lead to such a request.

All of these practices are fraudulent and a liner operator or its agent acceding to such requests would be guilty of condoning the fraud and liable to possible criminal and civil prosecution. The International Group of P&I Clubs has also made it clear to members that cover is withdrawn if the carrier is guilty of such malpractices.

11.2 Who are the merchants?

The word 'merchant' has been used extensively in this book, but it is important to identify and differentiate between the various people and entities falling under that general heading.

Shippers

This is the first name and address to appear on a B/L or waybill. So self-evident is the shipper's role that there is a temptation to leave it at that. However, apart from being important to the line in marketing terms, the shipper is also important legally. No matter how simple the establishment of the contract is (just a telephone call in many cases), a contract needs two identifiable parties. The carrier is one, the shipper is the other.

The shipper might not be the one who delivers the goods to the port. For example, if the shipper is an export car dealer, they could have purchased the car from the manufacturer on a free on board (FOB) basis so that the manufacturer delivers it to the docks but does not appear on the B/L.

Although the shipper is important as the first party to the contract, they may not be involved in the transaction for very long. If the sale is FOB, their job is finished as soon as the goods cross the ship's rail and the ship becomes the custodian of the goods on the consignee's behalf. Even in a cost, insurance and freight (CIF) sale, the shipper will have been careful to ensure that the insurance policy is assignable to the consignee.

Where the sale is covered by a documentary credit, the B/L will have been made out 'to order' and it is important that the shipper endorses the bill so that the title is available to the bank as security for payment.

No matter how quickly the shipper removes themselves from the transaction, it is they who are the contracting party. However, the liner B/L permits them to assign by endorsement both the benefits and the liabilities under that contract.

Problems may arise especially if the line has delivered a freight paid B/L against the promise of payment, not the actual money. It is important to ensure that the shipper is indeed the one with whom the contract was made. Sometimes a forwarder will show their name as the shipper when they have no authority from the exporter to do so. Conversely, a forwarder may claim to be only an agent and will enter an exporter's name in that box only for the line to discover that the exporter was under the impression that they had a contract with the forwarder, not the line.

There is nothing wrong with a forwarder appearing as the shipper, if that forwarder is a genuine NVOCC. It is important to exercise care when granting credit because once a B/L is endorsed 'freight paid', the line has no lien on the cargo but has an absolute obligation to deliver that cargo to the B/L holder at the port of discharge.

Forwarders

The role of a forwarder is often ambivalent in that they may be clearly an agent for the shipper so far as the export customs entry is concerned and may indeed still be an agent when lodging the B/Ls showing the actual exporter as the shipper. However, if the forwarder undertakes to get the goods from the factory to the docks they will probably be, technically, a contractor: in other words, a principal (carrier) rather than an agent for that part of the carriage.

Forwarders in many parts of the world take on far wider duties as contractors including, for example, most of the booking of cargo, negotiating concessionary rates or rebates where available and arranging the road, rail or barge haul from the hinterland to the port. Often it is the forwarder who decides which port of exit will be used.

Forwarders also have a vital role at the discharging port where the often complex ritual of clearing customs authorities and paying duty needs expert knowledge if delay and incorrect duty payments are to be avoided.

In many cases, the forwarder will be the one who will apply to the line for the release of the cargo and it is vital to ensure that the B/L has been properly endorsed by the consignee to enable the cargo to be legitimately released to the forwarding agent.

NVOCs and NVOCCs (non-vessel operating cargo/common carrier)

The main difference between an NVOC and a forwarder who acts as a freight contractor is one of approach. The forwarder, even though they lose the pure agency status through taking on contractual commitments in their own right, tends to represent the exporter and seeks to handle all its cargo regardless of destination. The NVOC advertises itself as a contractor to specific destinations (in law described as 'deemed to be the carrier though not actually the carrier') and will also carry goods presented by other forwarders.

As the role of the NVOC has become more common in international trade, there has been an increasing need to identify more clearly who does what and who is responsible for the carriage of goods. Increasingly, government and inter-governmental organisations have adopted two terms to separate the functions of the NVOC from those of the actual carrier, as below.

Contracting carrier

This is the term used to describe the party who makes the contract of carriage with the merchant, that is, the NVOC or, in some cases, a consortium or alliance member, issuing B/Ls in respect of cargo carried on another party's vessel. The contracting carrier is responsible to the merchant for the proper performance of the contract and is the person against whom any claim for loss or damage will be made. The contracting carrier is the carrier recognised under UCP600.

Performing carrier

This is the actual owner or operator of the vessel carrying the goods. Its contractual responsibility is to the NVOC or slot charterer and not directly to the merchant.

NVOCs are principally a product of the container trade, especially when the lines themselves would rather not be concerned with LCL cargo.

Consignees and endorsees

These are taken together because of the essential negotiability of a B/L, so that the named consignee may well not take delivery of the cargo because they have endorsed the B/L and so handed title to someone else.

The important point to watch is that if the B/L is made out to the order of a named consignee then they will have to endorse the bill if someone different is going to collect the cargo. Remember also that there is no limit to the number of times a B/L can be bought and sold, so long as it is properly endorsed each time.

Notify party

Often, especially when a documentary credit is involved, there will only be the words 'to order' in the consignee box and below that will be the name and address of the notify party. Usually this is the actual consignee but they cannot assume that role until payment has been made and the bill of lading handed over by the bank that issued the letter of credit.

You may ask why the B/L is made out 'to order', given the theoretical risk that it could fall into the wrong hands. Why not put the bank's name in as the consignee and let the bank endorse the bill when payment has been made? The bank, however, only wants the B/L as security for payment and does not want to assume the liabilities of a consignee. The bank will only reluctantly adopt that role if the intended consignee becomes bankrupt.

A notify party has no legal status under a B/L, and the line is under no obligation to communicate with whoever is named in that box. However, all lines take care to do so for sensible commercial reasons.

11.3 International contracts of sale – Incoterms

The terms of the sale between the seller and buyer will determine who pays what. It must be clearly understood that these terms relate to the sale of the goods and not to the contract of carriage.

Many standard terms of sale are in everyday use and, to ensure these terms are universally understood, the International Chamber of Commerce publishes an agreed set of definitions called Incoterms. The current edition is Incoterms 2010. Many of the recent amendments have been to facilitate the increased use of electronic data interchange.

Incoterms define the duties of both the buyer and the seller at every stage in the transport chain. Incoterms establish the division of costs and the stage at which payment must be made, property passes and risk is transferred from buyer to seller. If the parties to a contract intend to be bound by the definitions in Incoterms, they must state this explicitly. Unless they do, there is no certainty that the clarity of the definitions afforded by Incoterms will apply.

There are 11 Incoterms (previously 13), and they fall neatly into four groups:

- The E term (ex-works), where the seller makes the goods available at its factory or premises

- The F terms, where the seller must deliver the goods to a carrier named by the buyer
- The C terms, in which the seller has to arrange the carriage, but without bearing the risk for loss or damage after shipment and dispatch
- The D terms, whereby the seller bears all the costs and risks needed to deliver the goods to the country of destination

Ex-works (EXW)

Under ex-works, it is the responsibility of the buyer to collect the cargo from the shipper's premises, so it is the buyer's responsibility to arrange for all transport from the seller's premises to the ultimate destination. This often means that all freight and charges including pre-carriage and THC (or FOBs for breakbulk cargo) will be payable at destination.

Free on board (FOB)

FOB is one of the most popular international sales terms. The seller has responsibility to present the goods for loading over the ship's rail or, in the case of container traffic, to the terminal. They then become the buyer's responsibility. Freight and insurance, being concerned with matters after loading, are the responsibility of the buyer.

The buyer is under a duty to nominate the port at which the goods are to be loaded and to nominate the vessel, so from the point of view of marketing a liner service it is the buyer who controls the cargo. This nomination must be made within the time specified in the contract. The buyer usually books the space on the vessel they have nominated.

Once the nomination has been made, it is the seller's duty to deliver the goods for loading. Risk will pass at the same time and the price will become payable. The passing of property will be delayed if the transfer of the bill of lading is delayed, as this document signifies the transfer of ownership. It is for the buyer to arrange their own insurance. If the seller fails to give sufficient information, the risk will remain on the seller.

Cost and freight (CFR) and cost, insurance and freight (CIF)

CIF is still the most popular form of international sales contract. As its name implies, it involves the seller in the arrangement of the carriage and the insurance as well as the provision of the goods. The price of goods shipped CIF will obviously be considerably higher than FOB. The contract is based on the discharge port rather than the load port.

The seller must arrange a contract of carriage on the usual conditions for the trade in question. Similarly, they must arrange an assignable insurance for reasonable value on the usual terms for the trade in question. Finally, the seller must tender all the relevant documents to the buyer; their agent or bank. The relevant documents are the invoice, the bill of lading and the insurance policy.

The buyer may refuse to accept the documents if they are not in accordance with the contract, although they may be re-tendered by the seller in a satisfactory condition within the contract

period. Property passes when the documents are transferred. Risk, however, is deemed to have passed at the moment of shipment. If anything has happened to the goods during the voyage, the buyer will be protected as they will receive the insurance policy when the documents are transferred.

The transfer of the document is, in law, the transfer of the goods, so even if the goods are lost, the sale can be performed by the transfer of the documents. The CIF contract has been judicially described as a contract for the sale of goods performed by the sale of documents. This is an apt description.

The CFR contract excludes the requirement for the shipper to arrange insurance and the buyer takes on this responsibility; otherwise the terms follow CIF.

Delivered at terminal (DAT)

The seller delivers the goods and places them at the disposal of the buyer at a named terminal at the named port or place of destination. The seller bears the risks involved in bringing the goods to the terminal and unloading them at the named port or place of destination.

The parties are advised to specify as clearly as possible the terminal and, if possible, a specific point within the terminal, as the risks up to that point are for the account of the seller. The seller is advised to procure a contract of carriage that matches the choice precisely.

If the parties intend the seller to bear the risks and costs involved in transporting and handling the goods from the terminal to another place, then the DAP or DDP rules should be used.

DAT requires the seller to clear the goods for export, where applicable. However, the seller has no obligation to clear the goods for import, pay any import duty or carry out any import customs formalities.

Delivered at place (DAP)

This means that the goods are placed at the disposal of the buyer ready for unloading at the named place of destination. The seller bears all risks in bringing the goods to the named place. As with DAT, the agreed place of destination must be precisely specified and the seller clears the goods for export. If the parties require the seller to clear the goods for import, pay import duty and carry out any import customs formalities, the DDP term (see below) should be used.

Free alongside (FAS)

Under FAS, the buyer nominates the port and possibly the berth where the goods have to be delivered, and usually the date of delivery. The seller's obligations cease when the goods are alongside the vessel at the required time. Property and risk will pass at this point, and the duty to pay will arise.

Free carrier named point (FCA)

In this term of sale the seller has to arrange delivery to the carrier at a named point. At this point the risk passes to the buyer, which is responsible for the arrangement and payment of insurance and carriage. FCA may be used to cover a single mode of transport or multi-modal transport.

Carriage paid to (CPT) and carriage and insurance paid (CIP)

Here the seller is responsible for paying all the freight or carriage to the destination named by the buyer. The risk, however, passes to the buyer once the goods are delivered to the first carrier, regardless of the type of transport used and whether it is multi-modal. Under CIP the seller is responsible for insuring the goods to the final destination, whatever the form of transport.

Delivered duty paid (DDP)

Here the seller is responsible for all costs until the goods are delivered to a named destination. This will include the payment of all import duties and taxes that have to be paid on the goods. On some occasions, goods will be delivered DDP where the buyer will be responsible for meeting any import duties or taxes due.

Readers may come across such expressions as FOT, EX-QUAY, C&F and CIPFO. They are all likely to be variants of one or more of the terms defined in Incoterms 2010. The FOB contract is particularly suitable for adapting to particular circumstances.

11.4 Incoterms and combined transport

It might be considered that the two terms EXW and DAP would be those best suited to FCL house-to-house traffic as these terms provide for one party to be responsible for the whole of the transport arrangement. There are reasons why FOB and CIF are still the more popular:

- Tradition still plays a part and even today the legacy of breakbulk shipping with the transfer of goods at the ship's rail lingers on
- It is often more convenient for the seller to have control of the pre-carriage, as they can deliver to the port when it best suits them. They can also ensure that export customs formalities are properly complied with, including recovery of any export tax refunds or VAT rebates
- It may also be more convenient for the buyer to have control of the delivery to their premises including the option of delaying the cargo at the terminal or ICD if it suits them. Similarly, they have control of how and when they clear customs and pay tax and duty
- In some countries with strong exchange control rules, it is not permitted to pay for pre- or on-carriage in another country

11.5 Choice of Incoterms – commercial considerations



Arranging haulage in a distant country is one drawback of EXW and DDP (photo:APMT)

There are clear drawbacks in expecting one party to deal with all aspects of international transport. If, for example, you are based in Canada and wish to purchase a consignment of washing machines from Korea, your obligations under an EXW contract would be daunting. You would be responsible for arranging and paying for every stage of the transport chain, even the labour and equipment to load the goods at the manufacturer's factory. All the risks involved would be your responsibility and you would be expected to sort out customs formalities for both exporting and importing countries with a minimum of assistance from the seller.

Given this burden of cost, responsibility and risk, one might imagine that all sellers would prefer to sell on EXW terms and that buyers would prefer DDP. The reality is that most goods are sold on terms where both parties have some responsibility for their end of the transport chain. In the example above, it would be easier (and almost certainly cheaper) for the Korean manufacturer to arrange and pay for forklift trucks to load the washing machines and deliver them to the nearest port than for a non-Korean-speaking buyer based in a distant continent and time zone to accomplish the same exercise. At the other end of the journey, our Canadian buyer will be in a much better position to deal with import customs entry, duty payments and to co-ordinate delivery to its depots in Toronto or Vancouver than the seller.

Apart from practical considerations, there may be advantages to one party or the other in controlling the sea transport leg, cargo-handling and insurance. For a seller, arranging all aspects of shipment through to a port in the buyer's country could be a valuable service, leaving the buyer with only local arrangements to make. They can also earn extra profit, or at least a share of the commission, by arranging insurance cover and sea freight, especially if they are used to making such arrangements and have their own shipping department.

The development of tightly managed supply chains and the 'just in time' approach has favoured Incoterms where the buyer controls the majority of the transport chain, and certainly the sea transport leg. When the goods in transit are planned as an integral part of the buyer's stock of goods, the buyer will want to have control of decisions taken on carriers and routes, and will want to have visibility of the stock in transit. This cannot be easily achieved if the contract is under one of the C or D terms, where significant control is in the hands of the shipper.

Under normal, stable market conditions, trading partners may well be used to dealing on FOB or CIF terms as a matter of course, but a sudden swing in the market for those goods may have a marked effect on the basis of sale. In a seller's market, a producer is in a position to dictate the terms on which it is prepared to sell its goods, which will probably be those that involve it taking the minimum of risk and ensuring the best and fastest payment method. In a buyer's market, a seller will be forced to adapt their terms of sale to the buyer's requirements if they are to stand any chance of doing business.

So the terms on which goods are sold in international markets are a compromise, negotiated in the same way as all the other aspects of the business between the parties that make the deal.



Chapter 12

Legal aspects of the liner trades

In liner trades, some contact with the law of carriage and shipping law is an everyday occurrence, and a working knowledge of the laws that affect the carriage of goods by sea and of the insurance of those goods is essential if problems are to be avoided. Knowing when to turn to professional lawyers to prevent a bad situation becoming worse is vital.

Every company and individual involved from the moment the goods leave the shipper's premises until they are delivered to the consignee has some degree of responsibility and therefore liability for the proper performance of the contract of carriage.

In most cases, the different entities are able to limit their liability. This does not involve complex legal arrangements that leave one of the parties without any redress for wrong done by another. Almost all risks can be insured against and the limitations of liability, be they international agreements such as the Hague-Visby Rules or the Standard Trading Conditions published by an association of agents or hauliers, are there to tell all concerned where one insurance policy stops so that it is clear where another should start.

Liability cannot always be limited as you cannot insure against criminal acts or reckless breaches of good faith.

12.1 The carrier

At one time it was customary simply to talk about the shipowner, and only lawyers tended to refer to the owner as the carrier. Containerisation, with its door-to-door facility, has made reference to the carrier more common. The expression has the advantage that it also embraces operators using time-chartered ships and NVOCs.

It is also important to distinguish between the contracting and performing carriers. Frequently the line will be referred to as a liner operator, which is taken to include the operation of owned, leased and chartered tonnage as well as slot allocations on another operator's vessel.

12.2 Insurance



Underwriters will insure hull & machinery but are reluctant to cover third-party claims

The first thing a shipowner needs to do is to insure the ship itself, that is, its hull and machinery. There is no law to state that a shipowner must insure their ship and it is possible to be self-insured.

The best-known way of insuring the ship is through Lloyd's of London. Lloyd's itself does not provide insurance. This is still done to a large extent by the underwriters, grouped into syndicates, who cover the risks that they have accepted. What Lloyd's provides is the marketplace with many modern facilities, plus, most importantly, the overriding discipline over the members. This includes a fund to ensure that all commitments are met regardless of any disaster that might befall an individual member.

Access to Lloyd's underwriters can only be made through brokers, who are the agents of the assured and whose job it is to cover the risk at the best possible rate.

The size of the risk to be covered will determine the number of underwriters involved whose share of the risk will be annotated and initialled on the broker's slip. The broker may not necessarily confine themselves to Lloyd's because many insurance companies also underwrite marine risks and the broker will usually aim for a convenient mixture of both Lloyd's underwriters and other insurance companies.

Lloyd's agents

Lloyd's has agents all over the world. Usually they are carefully selected port agents, whose routine task is to report all shipping movements in their area to Lloyd's List Intelligence, although their duties go well beyond this routine reporting. Their particular value is in making sure that the truth is ascertained in connection with any incident that might give rise to a claim under a policy of insurance.

They are able to bring in surveyors, expert in all maritime affairs from minor damage to a piece of cargo to serious damage to a ship or anything with which a ship may have been in collision. When action has to be taken or instructions have to be given on behalf of the insurers, the Lloyd's agent is usually the medium chosen.

P&I associations

For legal reasons, underwriters could not cover more than 75% of shipowners' collision risks and were not at all keen to cover third-party claims. This was mainly because the liability for such claims is much more difficult to quantify. While the ship itself has a finite value, compensation to a port authority for damage to an installation or death or injury claims from crew or contractors is incalculable in advance. This meant that shipowners had no protection against claims made against them for lost or damaged cargo.

Some way of insuring against such claims had to be established, and the answer was found in the creation of mutual 'protection and indemnity' associations, or P&I clubs. The expression comes from their two main activities: protection being the fighting of legal battles on behalf of the member and indemnity being the reimbursing of the member for claims they have had to settle.

A P&I club is run by its members for its members. A board of directors is elected from the membership and invariably they appoint a firm to manage the day-to-day affairs. Instead of

premiums, the clubs levy 'calls' on their members based on the size of each member's fleet and an assessment of the risk. For example, an owner regularly operating in the general cargo trades will be far more prone to cargo claims than one carrying low-value bulk minerals. The member's claims record will also influence the size of the call it has to pay.

The club managers calculate the cost of running the club and settling the claims for the current year and then levy an advance call. If more claims than expected have to be met, the club may have to make a supplementary call during the course of the year.

The P&I clubs have representatives in many parts of the world. While a liner agent may have little reason to become involved with an owner's hull and machinery underwriters, there can be many occasions when the agent may have to contact the P&I club or its local representative.

A typical third-party claim may be made by a port or terminal operator if a ship damages part of its installation. In many jurisdictions the law gives special powers to ports and harbours to seize a ship that has caused such damage. Failing special powers, the ports may always resort to arrest in rem (meaning 'against an object', that is, against the ship itself rather than a person or corporation).

Liner agents have to move quickly in such circumstances to avoid delay to the ship. The wronged party will want a letter of guarantee from the owner's P&I club, undertaking to pay whatever is found to be legally due.

However, most contact between a liner agent and the principal's P&I club is likely to be in connection with claims by consignees for loss or damage to cargo.

Most P&I clubs offer their members a variety of other services, such as free, prompt legal advice. The clubs either employ their own legal experts or retain the services of outside law firms in order to be able to give the sort of timely advice that will often avoid a problem arising or being made worse.

Although oil or chemical pollution is normally associated with tankers, spilled bunker oil or hazardous cargo can also pollute the sea and the shoreline. The cost of clearing and compensating those affected by an oil or chemical spill is another type of third-party claim that falls to the P&I clubs to settle.

12.3 Liability of the carrier for the cargo

Limitation of liability under the Hague, Hague-Visby and Hamburg Rules does not permit the owner to contract out of all responsibility as was the case before the Hague Rules were agreed in 1924. Prior to that date, shipowners sought to impose on shippers contracts with very wide-ranging exclusion clauses in order to defend themselves against common law arguments that might demand total liability.

Under the Hague, Hague-Visby and Hamburg Rules, provided that they fulfil certain basic obligations such as to provide a seaworthy ship, owners are able to limit their liability to a specific amount. Compensation for loss or damage above that figure has to be covered by the merchant through its own insurance.



Deck-loading can have implications on insurance, but these do not apply to containers

This may seem unfair on the merchant, particularly as there is no protection against negligence on the part of the ship's crew. In practice, however, the rules are a sensible compromise. If the shipowner had to cover all the risk, the insurance would have to consider the worst possible claim and so the premium (which would have to be incorporated in the rate of freight) would be far higher than each individual merchant could negotiate with insurers.

The nature of seaworthiness is twofold. The ship itself must be sound enough and properly manned to undertake the voyage and it must also be in a fit state to carry the cargo. Leaking hatches would not prevent a ship proceeding safely from A to B but the cargo being carried would suffer damage, making the ship unseaworthy according to the rules.

Other fundamental breaches of the rules include deviating from the contract voyage except for the purpose of saving life or property including, of course, saving the ship or its cargo. With a liner service, the contract voyage can be extremely complex, but if the line has a defined route and schedule, any deviation from that will be deemed unacceptable.

Failures to fulfil obligations under the rules place the owner beyond the protection of any limitation of liability and bring them face to face with a claim for damages by the merchant.

Most of these obligations fall on the shoulders of the shipowner and there is little that the liner agent can do to influence matters apart from drawing problems to the principal's attention. The agent can, however, create problems through negligence such as failing to carry out the principal's instructions to notify shippers of a radical change in the scheduled route that will significantly affect the transit time.

Neither the Hague nor the Hague-Visby Rules extend to deck cargo, so loading on deck without consent (or failing to endorse the bill of lading to that effect) will leave the owner unable to limit

its liability. But this does not apply to a containerised service, where the bills of lading clearly state that the owner always has that right. Nevertheless, some types of container, such as open-tops and flat-racks, are usually unsuitable for deck stowage. If it is likely that they will be loaded on deck, the carrier can clause the bill of lading with 'Shipped on deck at Shipper's risk' or similar.

If shipment is under a letter of credit, it is essential that the shipper informs the buyer at the time of booking so that amendments can be made to the credit and deck shipment specifically allowed. In effect, this will cancel the effect of Article 26 (a) in UCP600 and the buyer may wish to extend their cargo marine insurance to cover the additional risk.

12.4 Liabilities of the merchant

The rules impose some basic obligations on merchants as well as carriers. Perhaps the simplest is that the shipper is deemed to have guaranteed the accuracy of the description and quantity of the goods at time of shipment. However, unlike some of the fundamental breaches that would place the owner beyond the protection of the rules, the carrier can only demand to be indemnified for any loss or damage caused by such mis-description by the shipper. The carrier is still bound to take proper care even of mis-described cargo – with one significant exception.

Should the shipper fail to disclose the nature of any dangerous cargo, not only may the carrier claim for loss or damage, but it also has the right to dump such mis-described dangerous cargo anywhere it chooses without the shipper having any recompense.

The shipper is also expected to pack and mark their goods properly otherwise the ship is not liable for any loss or damage resulting from any inadequacies in these areas.

There is no obligation on the shipper to insure their cargo, but they are well advised to do so and they usually arrange for the cover to run from the time the goods leave their premises until they cease to be their responsibility.

12.5 Liabilities of the agent

In the liner trades, there is usually a written contract between the principal and the agent, but a contract is not necessary for an agency to exist. The leading legal textbook, *Scrutton on Charterparties and Bills of Lading*, defines the creation of any agency as where a person professing to act as an agent can bind a principal if the principal has done the following:

1. Given the agent actual authority to make a contract
2. Placed the agent in a position of apparent authority and allowed them to represent the principal as having such authority
3. If the agent having performed a task for the principal without the principal's express authority, the principal subsequently ratifies the agent's action

Actual authority will be contained in a line agency agreement. Apparent authority will apply if the action is not specifically mentioned in the agreement but would be something reasonably done in the course of attending to the line's affairs.

Subsequent ratification (3) is self-evident, but what are the implications if the principal does not 'subsequently ratify' what the agent has done?

Consider the case where time zone differences mean the principal cannot be contacted, but ordering two hours of overtime on a Friday will get the ship away before the weekend and save the owner two days' costs. It would be a poor principal-to-agent relationship if such a decision were not to be ratified. On the other hand, if overtime was ordered in the middle of the week because a ship belonging to another principal wanted to get on the berth, that would be a betrayal of trust and a refusal to ratify would be reasonable.

There will, of course, be occasions when the agent has to take a decision in an emergency that was not foreseen in the agency agreement and when contact with the principal proves impossible. This rare situation creates an agent of necessity.

12.6 Legal aspects of the bill of lading

Because the bill of lading is a document of title, carriers run a risk by issuing a 'freight paid' B/L so the shipper can draw funds from the documentary credit, from which the freight to be paid. Ideally, this situation is covered by a bank-supported 'freight guarantee' under which the shipper undertakes to pay within a given period, but it has become common for credit to be granted without any such safeguard.

So what happens if no payment is made and the goods are still on passage? The carrier cannot tell the agents at the discharging port not to release the goods because the consignees hold a bill of lading showing that the freight is paid and they are entitled to the goods. Even if the B/L is obtained by deliberate fraud, there are still no grounds for withholding the cargo because a negotiable document of title to the cargo has been issued. Once a bill of lading has been signed and endorsed 'freight paid', the carrier is under an absolute obligation to deliver the goods represented by that bill of lading to the consignee or the 'endorsee for value'.

Himalaya clause

The Himalaya Clause gives servants of the owner (employees and agents) the same protection as the actual owner. Such a clause is part of the Hague-Visby and Hamburg Rules, but not of the original Hague Rules. If operating in a country that has ratified the Hague Rules but has not yet changed to the Hague-Visby or Hamburg Rules, it is important to ensure that the bills of lading incorporate a Himalaya clause. Otherwise a claimant might attempt to claim against the agent who will not be protected by the carrier's limitation of liability.

Delivery of cargo

A carrier, and therefore its agent, is under an absolute obligation to deliver the cargo to the legitimate holder of the bill of lading (or to the party named in a sea waybill).

If delivery of cargo is made without presentation of the bill of lading, the risk is that the rightful holder of the bill of lading will appear on the scene and demand their cargo. The law looks on wrongful delivery as wilful misconduct and so the injured party does not have to take action under the bill of lading with its limitation and one-year time bar. Instead, the action will be for the

tort of conversion. By losing the entire protection of the bill of lading the liability is for the full value of the cargo and the time limit is not one year but that of the normal statute of limitations – six years in many jurisdictions and possibly longer. This highlights the importance of proper and careful checks being made by inward freight departments when cargo is released at destination. The following checks are essential:

- The bill of lading presented is superficially in order and corresponds to the manifest information or copies in the agent's possession
- The bill is properly endorsed by the original consignee and the endorsement chain is complete up to and including the claiming receiver
- Especially with straight bills and sea waybills, the identity of the claimant is confirmed as being the person the document is consigned to
- In the case of NVOC operations, the line's bill has been produced to release the cargo to the NVO
- Freight and any other charges have been paid

12.7 Cargo claims

All insurance policies demand that the insured should act always as if they were uninsured. Marine insurance taken out by merchants is no exception, so the first claim for shortage or damage by an importer will arrive in the office of the line's agent at the discharging port.

To avoid the agent giving their principal a bad name, consignee's cargo claims should be dealt with speedily and sympathetically – although all insurance policies demand that the insured never gratuitously admits liability. So prudence has to temper any sympathy.

The Hague and Hague-Visby Rules limit the carrier's liability in most cases so the agent might repudiate the claim outright. If, for example the Master has noted protest, it may be clear that the damage suffered by the cargo is not something for which the ship is liable. In the case of shortage in the contents of a sealed FCL container, there is no liability as it was the shipper's 'load, stow and count'.

Otherwise, the claim should be acknowledged and the details passed to the owner's claims department or P&I club.

Some owners give their agents a franchise to settle claims below a certain figure without referring the case to them or their P&I club. This may be because the owner has accepted a deductible in P&I cover, or because the P&I club is prepared to reimburse such settlements without becoming involved.

12.8 Noting protest

This is lodged with a notary public, a consular official, magistrate or similar authority, detailing any anticipated damage to cargo that was beyond the control of the ship's staff, and the reasons for it, such as bad weather, failure of the hold ventilation machinery or breakdown of refrigeration

equipment. Extracts from the ship's deck or engine-room logbooks are submitted, giving, for example, meteorological conditions.

The procedure followed is that at the first opportunity on arrival at the first port of call on a voyage, the Master or one of the ship's deck officers has to go ashore and lodge the protest with one of the officials mentioned above. It must be done before the hatches are opened, and the presence of the ship's agent is essential.

Statements on oath may also be taken from the Master and other crew members. At the time of noting protest the Master should also reserve the right to extend it later at other ports.

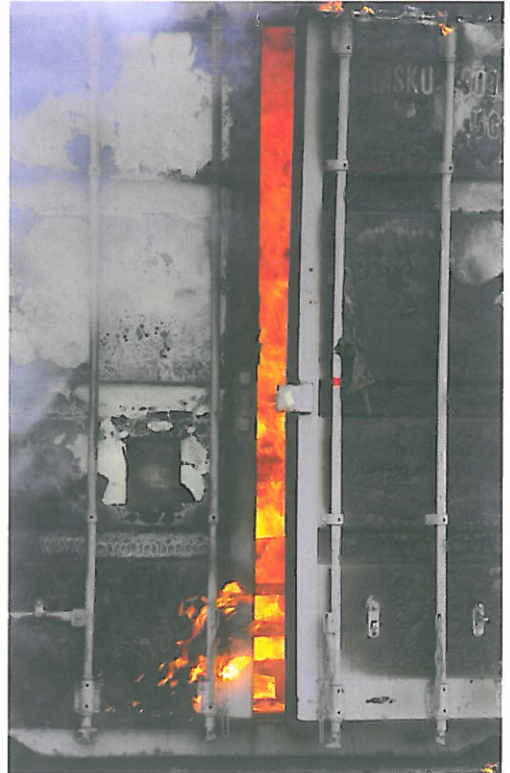
Protests are admissible in evidence before legal tribunals, and in many cases are essential to the establishment of a claim. They are particularly necessary in continental Europe, where they are received by courts in evidence as a matter of course, but in the UK they are not acceptable as evidence in favour of the party making the protest (the Master) unless both parties consent. It is obviously unlikely that the cargo owner would do so.

12.9 General average

General average (GA) is a legal principle of maritime law whereby all parties share any losses resulting from a deliberate sacrifice of part of the ship or cargo in order to save the venture (that is, ship and cargo) as a whole.

The origin of general average can be traced to ancient maritime law. If, for example, cargo had to be jettisoned in an emergency and there was no time to decide which or whose cargo to throw overboard, the practice arose that those whose cargo was saved would make a financial contribution to those whose cargo was lost. The principle was extended to include the ship, which may have been saved as a result of action taken that led to damage to cargo.

General average will cover cargo damaged by fire-fighting, but not cargo damaged by the fire itself



The modern law of general average was laid down in the York-Antwerp Rules of 1890, according to which:

There is a general average act when, and only when, any extraordinary sacrifice or expenditure is intentionally and reasonably made or incurred for the common safety for the purpose of preserving from peril the property involved in a common maritime adventure.'

The York-Antwerp Rules have been regularly updated, and the latest version was drafted in 2004.

The York-Antwerp Rules do not have the same status as an international convention, such as Hague-Visby. They are entirely voluntary and apply only if incorporated in the bill of lading contract, although it would be unusual to find a bill of lading that did not refer to the York-Antwerp Rules.

It is fairly easy to understand the concept of GA in the case of cargo becoming damaged by water used to extinguish a fire on board. If the fire had not been put out, the ship and all the cargo may have been lost. Consequently, it is fair that those whose cargo was damaged should be able to share that loss among all those who benefited.

However, such a claim is complicated by the fact that the cargo that actually burnt is not part of the general average, because that damage was not caused by the deliberate act that saved the rest. That loss would be borne solely by the owner of that cargo. General average is concerned only with deliberate sacrifice made to save the whole of the venture.

GA becomes more difficult to interpret when a damaged ship diverts into a port to carry out repairs. The principle is still the same, however, in that if the ship had not incurred the expense of going into the port of refuge and making the repairs, it would have run the risk of sinking.

The York-Antwerp Rules require four elements to be present for general average to apply. These are:

- Danger or peril to the common adventure: No recovery can be made in general average unless there exists a peril. The danger or peril must affect the whole adventure and not only one interest
- Extraordinary expenditure or sacrifice: To make a claim under general average, the shipowner must have provided a seaworthy vessel at the start of the voyage
- Voluntary, or intentionally and reasonably made: For general average, there must be a deliberate act, and it must be judged as having been reasonably made to benefit the whole venture
- To preserve property imperilled: There are clear definitions of what comprises property under general average. If nothing is saved, then general average does not apply

When general average is declared, it normally produces a heavy additional workload for the line and the agent. As soon as the manifest is received from which it is possible to identify all the cargo that will be affected, the consignees should be notified that GA has been declared. The owners of leased containers have to make their contribution as well as the ship and the cargo.

The shipowner is under an obligation to beneficial cargo owners to ensure that proportional contributions are made towards their loss. In our earlier example of the fire, the damage could well have been only to cargo, but it is the owner who will have to declare GA.

All the parties must provide an irrevocable undertaking that the amount of money due in respect of their interest will be paid. This security comes in two parts:

- (a) The consignee's signature to an average bond, which is usually on a Lloyd's form and is usually accompanied by a valuation form
- (b) An average guarantee, which is usually provided by the cargo insurers or by a bank

In the absence of such a guarantee, a cash deposit will be required, the amount of which will be prescribed by the average adjusters appointed by the shipowner. The job of the average adjusters is to calculate all the costs of the GA, determine the value of all the contributing interests and so assess each party's contribution.

It is important to keep meticulous accounting records of disbursements related to the general average for submission to the adjusters. In addition to actual expenses (such as communication costs), the adjusters will also accept such items as overtime payments to staff plus a reasonable fee for agents' expertise, but they will reject any items that are inadequately justified.

Incidentally, it is possible that a consignee may present their bill of lading and be given a delivery order before the ship's arrival and before the news of the GA declaration has reached the agent at port of discharge. This is why all delivery orders should include in the printed wording a statement to the effect 'Subject to safe arrival and general average, if any'.

12.10 Agent's insurance

Under the law of agency in almost all jurisdictions, the principal indemnifies the agent against any action brought against the agent for anything the agent does properly on the principal's behalf. Such indemnity does not, however, cover negligence or misconduct on the agent's part and it is always advisable for the agent to cover this risk with insurance.

The easiest way is for the agent to become a member of one of the mutual associations providing such cover. The International Transport Intermediaries Club (ITIC) specialises in the affairs of brokers and agents and its cover embraces all the problems likely to be encountered. Similar, but not so comprehensive, cover can be obtained through some insurance companies.

In some cases, cover may be limited to errors and omissions made by the agent itself. It would not cover mistakes made by others for which the agent may be liable, so liability cover would also be needed.

Cover should also include breach of warranty of authority. Such an action would not be a mistake because it was done deliberately and in good faith, but if the principal repudiates what the agent has done, the third party's claim becomes the agent's responsibility.

12.11 Security

Throughout the second half of the 20th century, there was a strong international thrust towards the maximum possible relaxation of border controls, especially in relation to the movement of goods. Particular attention was paid to the simplification of the documentation required for entry and exit, together with modernisation of procedures. Risk assessment was employed to focus on high-risk countries and particular types of service or movement patterns.

The two main issues that changed this were:

1. An enormous increase in the number of migrants moving around the world and in particular seeking to enter more developed countries
2. The threat of international terrorism and attacks on ships or aircraft and also the movement of weapons



The US has led initiatives to tighten security across the transport chain (photo: US CBP)

Immigration controls

Many countries impose fines on carriers whose equipment has been used by stowaways. Carriers often have to pay for accommodation costs and the cost of repatriation. The carrier is faced with increased security costs, including inspection of vehicles before and during the voyage and sealing containers. There may be congestion and delays arising from immigration searches or the use of scanning equipment at entry points.

Terrorism

The USA introduced a law in 2003 that required cargo manifests to be lodged with US customs authorities 24 hours before loading in a foreign port. This applied also to any cargo that was going to be transhipped at a US port for a non-US destination. Failure to comply could result in the ship being refused entry to a US port. This was referred to as the 24-hour rule.

US Customs and Border Protection (CBP) clearly could not study the manifest of every container in such a short period, but it developed sophisticated computer routines that aim to identify suspect shipments for further evaluation.

As shippers realised that they had no choice but to comply or have their containers left behind, there was a rapid improvement in the speed and accuracy of shipper documentation, and this has helped the lines to greatly improve the timeliness and accuracy of their own documentation, which has in turn helped reduce costs and improve efficiency.

However, as there was no physical inspection of the contents of the container, the US authorities developed further initiatives.

Customs-Trade Partnership Against Terrorism (C-TPAT)

C-TPAT is a voluntary programme that focuses on security procedures, physical security, personnel security, education and training and conveyance security. US companies that sign up to the programme and demonstrate appropriate levels of security in their own supply chains can benefit from reduced levels of scrutiny from CBP.

Importer Security Filing requirement – the 10 + 2 Initiative

The US CBP decided that it needed additional information over and above what was on the manifest and initially expected lines to provide this data. Lines argued that what was required included commercial information to which they were not a party.

Eventually, the Importer Security Filing Regulation, commonly known as the 10+2 Initiative, required importers and vessel-operating carriers to provide additional advance information on non-bulk cargo shipments. As the name implies, importers had to file an additional 10 data elements, while carriers had to file an additional two. On transshipment cargo where there is no commercial party in the US, the lines have to provide five additional data elements.

100% container scanning



Despite practical difficulties, the US has not abandoned its ambition to scan every import container (photo: US CBP)

In 2007, the US Congress adopted a requirement for 100% security scanning, by 2012, of every import container, to be conducted at the port of loading overseas. There was considerable concern by both industry and overseas governments about the practical implications of this measure and its potential to disrupt trade.

Apart from the huge costs and logistics involved in X-ray scanning every box, such a measure could cause port congestion and force ports to expand, since boxes would need to be stored for longer periods while waiting to be scanned. The measure also runs counter to the risk-based approach to security that is at the heart of the other measures taken by the US government and favoured in other countries.

Small-scale trials conducted at a few overseas ports identified many practical problems that would arise in any full-scale implementation, with the result that implementation was pushed back until many thought the measure would be quietly dropped. However, it remains on the books and attempts are periodically made to move it forward.

Measures in other countries

The EU introduced its own version of the 24-hour rule, the Advance Cargo Declaration Regime, which came into force in 2011 and applies to both imports and exports. Canada, China, Japan and Australia have introduced similar rules.

The EU is running into further difficulties with both carriers and shippers. It has stated that it requires details of the commercial contract involving the cargo, in order to identify the producer and the end-user. It expects the carrier to collect this information on its behalf, giving the carrier access to confidential commercial information. The proposed arrangement suits neither the carrier nor the commercial parties, and it remains to be seen how this will be resolved.

It is clearly problematic for the through transport industry if the need to address security concerns leads to a proliferation of different measures and standards around the world. The World Customs Organization (WCO) therefore launched an initiative to agree an international framework for such measures, the SAFE framework of international customs standards, with which measures taken by individual governments should comply.

International Ship and Port Facility Security (ISPS) Code

At the same time as the US, the EU and many other countries were creating their own legislation, the IMO produced an international code for both ship and port terminal security. This is a part of the SOLAS Convention and received almost immediate ratification and came into force in 2004.

The ISPS Code is very much a reaction to terrorism but it does include elements of two other problems – piracy and stowaways – that have been of concern for many years.

As the full name suggests, the ISPS Code works on two levels: ships (it applies only to those over 500 gt) and ports. Governments and maritime administrations must appoint recognised security organisations (RSOs) to certify the security arrangements that have been made in ports, on ships and in the shore offices of shipping companies. Exactly what sort of organisation can become an RSO is entirely at the discretion of national governments. Within the UK, only

the Maritime and Coastguard Agency (MCA) has the power to vet ships, but many flag states have delegated the work to classification societies, while Panama has awarded a monopoly to a specialist security company founded by former staff from US intelligence and military organisations.

The ISPS Code imposes responsibilities on governments, ports, ships and shipping companies. Governments set security levels (Normal, Heightened and Exceptional) and ports must maintain adequate security. ISPS allows a port state that has ratified the code to deny entry to its ports to any ship that does not have a valid certificate and to any ship coming from a port that has not been certified as complying with the code.

Initial difficulties were overcome and adherence to the ISPS Code has become another routine issue of regulatory compliance to which ships, shipping companies and ports have to pay careful attention.

Liner Trades

Container ships have largely taken over the job of carrying goods to international markets. In previous decades, these trades had been undertaken by numerous small, general cargo ships, multipurpose ships and tweendeckers. Today, large container ships provide enormous economies of scale and have been important drivers of globalisation.

Liner Trades has been written, compiled and edited by professionals. It provides an up-to-date guide to every aspect of the maritime liner trades. This book covers the history of liner trades as well as providing a comprehensive description of modern container ship operations and management. It describes different classes of ship as well as different cargo operations.

The Institute of Chartered Shipbrokers is the major provider of educational opportunities within the shipping industry.



INSTITUTE OF
CHARTERED
SHIPBROKERS

ISBN 978-1-911328-09-4



9 781911 328094 >