
# The Tramp Shipping Market

***Produced by Clarkson Research Studies***
***April 2004***

*This report is presented as an economic description of the Tramp shipping market. Clarkson Research has no experience of the terms or expressions used under competition law.*

*This report has been prepared by Clarkson Research and commissioned by the European Community Shipowners' Associations (ECSA) (supported by the International Chamber of Shipping).*

# Executive Summary

**MAIN CHARACTERISTICS OF THE TRAMP MARKET**

1. Globally competitive markets
2. Close to perfect competition model
3. Different sub-market segments in response to customer needs
4. Competition between sub-market segments for cargo
5. Volatile and unpredictable demand
6. Many small entrepreneurial shipping companies
7. Global ship trading patterns including "cross trades"
8. Ease of entry and exit
9. Very cost effective
10. Responding to the development of markets and shippers' needs

1. This report is intended to provide a briefing on the organization and competitive economic structure of the tramp shipping industry.

*The nature of the world shipping business*

2. The international shipping industry transported 6.2 billion tonnes of cargo in 2003 (Table A1.4), with a fleet of 26,280 deep sea cargo ships (see Table 3 below). With the exception of the cruise and ferry business, shipping companies mainly serve industrial customers not consumers (paragraph 2.1, p9).

**Merchant fleet by company size**

| Company Size | World Fleet | | | | European Union Owners | | | |
|---|---|---|---|---|---|---|---|---|
| | #Companies | # Ships | m. Dwt | Avg. Ships | #Companies | # Ships | m. Dwt | Avg. Ships |
| **(# owned vessels)** | | | | | | | | |
| **300+** | 4 | 2,099 | 59.5 | 525 | | | | |
| **200-299** | 3 | 794 | 40.3 | 265 | 1 | 261 | 12.7 | 261 |
| **100-199** | 9 | 1,201 | 61.4 | 133 | | | | |
| **50-99** | 45 | 3,010 | 124.0 | 67 | 14 | 912 | 30.4 | 65 |
| **10-49** | 469 | 8,898 | 321.8 | 19 | 193 | 3,772 | 136.5 | 20 |
| **5-9** | 584 | 3,856 | 107.2 | 7 | 245 | 1,612 | 52.2 | 7 |
| **2-4** | 1,404 | 3,731 | 73.3 | 3 | 460 | 1,246 | 32.6 | 3 |
| **0-1** | 2,277 | 2,194 | 23.3 | 1 | 538 | 503 | 8.0 | 1 |
| **Unknown** | | 497 | 7.1 | | | 17 | 0.5 | |
| **Total** | **4,795** | **26,280** | **817.9** | **5** | **1,451** | **8,323** | **272.9** | **6** |

Includes deep sea vessels, including bulk, specialised and liner
Source: Clarkson Research Studies

3. Merchant Shipping is an international service. The ships, which are the primary business unit, are owned by 4,795 companies with an average of 5 ships each (see table above); registered under 144 different flags; and subject to international and port state regulations. The business is conducted in international market places using the US dollar as currency with has no tariffs or other impediments to free trade.

4. The deep sea trades are served by about 3000 ports and the cargo carried by the shipping industry consists of many millions of separate consignments, of different sizes and with different physical characteristics (Figure 2, p11). Providing an efficient transport service between ports for this wide range of cargo parcels calls for a complex logistics operation, which the shipping industry has developed to handle.

5. The ships themselves are expensive, with some gas ships costing over $100 million each (Table A1.2, p31) and they have an economic life of over 20 years. Earnings are highly volatile and this makes the investment process in shipping both risky and complex. One of the primary functions of shipowners is to manage this investment process.

6. The commodities carried by sea cover energy products; agricultural products; raw materials for the steel industry; forest products; industrial materials including chemicals; textiles machinery and consumer goods (Figure 1, p10).

7. Trade growth is influenced by the world business cycle and is very volatile and unpredictable. Keeping an adequate supply of ships at all times is essential for the free flow of world trade and one of the principal roles of the shipping industry is to invest in anticipation of future growth. Given the complexity of the cargo flows to be transported, this difficult task is tightly controlled by market forces.

*The global sea transport system*

8. The transport system the shipping industry has developed to carry this diverse range of commodities involves several separate but overlapping segments of the shipping business, each handling a different group of trades. This specialization is based on parcel size (i.e. the size of the individual consignment of cargo) and the cargo's physical characteristics (section 3.3, p11).

9. The industry can be divided into three broad segments, each of which handles a specific set of cargoes.

    a. *Bulk shipping*; handles large cargo parcels in "bulk carriers" and oil tankers designed for the efficient transport of the very large parcels (10 to 450,000 tonnes) of homogeneous cargoes such as iron ore, coal, grain, oil etc.
    b. *Specialized shipping* transports large quantities of "specialized" trades (e.g. chemicals, gas, motor vehicles, forest products), generally using ships built for the purpose. Although these ships are purpose built, they are often designed to allow the carriage of other cargoes. Specialized cargoes are often subject to competition from both the liner and bulk shipping segments.
    c. *Liner shipping*; specializes in the transport of small cargo parcels, which do not fill the hold of a ship, on regular services. Today most liner cargo is

carried in containerships, but some are still transported in multi-purpose vessels or ro-ros.

10. In this report we refer to the bulk and specialized shipping segments collectively as "tramp" shipping.

*The "tramp" shipping competitive process*

11. Although freight rates are highly volatile, with extremes in both directions, on average transport costs fell by 80 per cent in real terms during the second half of the 20th century (see Figure 5, p16). This demonstrates the long term cost effectiveness of the tramp shipping business.

12. During the 1990s major cargo shippers such as the oil companies and large liner companies progressively reduced their owned fleets (Figure 7, p18), preferring to rely on the tramp market and to charter ships when required. This strategy was partly motivated by liability concerns; but the low return on capital from shipowning (by the standards of international corporations) and the flexibility offered by the charter market were also important. It may be taken, therefore, as evidence of the highly competitive nature of the tramp market.

13. Tramp shipping revenues are determined competitively in the international market place, generally through the well developed network of shipbrokers and agents to transact the business. However the precise nature of the process differs for the bulk, and specialized segments.

14. The *bulk shipping markets* are highly competitive, and satisfy many of the characteristics of the perfect competition model. The commodity is homogeneous; entry costs are very low; many companies are competing for business (arguably each ship is a separate competitive unit); and information flows make the markets very transparent. Business is carried out in four different ways, the voyage charters (Section 9.2, p23); consecutive voyage charters (Section 9.3); contracts of affreightment (Section 9.4); and time charters (Section 10, p25). The freight rates achievable in these markets are highly volatile, depending on market circumstances (Table A1.5, p33). Typically bulk shipping freight rates are twice as volatile as the US S&P 500 stock index.

15. The *specialist shipping markets* generally have fewer customers and fewer shipping companies (Table A1.2, p31). Since the aim is to provide an improved service to these clients, there is sometimes a degree of product differentiation. However there is intense competition between specialized shipping companies, and outside competitors (for example small tankers compete for chemical parcels or containerships competing for reefer or vehicle business).

16. The *liner business* serves a range of clients from substantial shippers who enjoy service contracts to intermediaries which group cargoes to negotiate volume

discounts and with whom the liner companies compete for shipper support. As the cargo capacity of containerships has got bigger, there has been intense competition between the liner, bulk and specialized segments for specific commodities, especially reefer cargo.

*Commercial organization of "tramp" shipping*

17. *General market structure*: The commercial structure of the shipping business is very fluid, allowing free entry and exit of companies. In April 2004 the deep-sea merchant fleet (including bulk, specialized and liner fleets) was owned by 4,795 companies (Table 3). Only 16 of these companies (0.25%) owned more than 100 ships and the average shipping company had 5 ships. The ownership structure of the individual tramp sectors is shows in appendix 2 (p35) and table A1.2 (p30). These ships are often spread over several market segments. Consequently the bulk shipowners are generally in the position of price takers, being too small to influence the overall market. An analysis of 7,000 Dry Cargo fixtures found that 97% of the owners had a market share of less than 0.5 per cent of the fixtures.

18. *Ease of entry:* Tramp shipping has relatively few barriers to entry. New investors require equity, but commercial shipping banks will provide loans to acceptable credits against a first mortgage on the ship. There is a comprehensive network of support services to which new investors can subcontract most business functions (subject to sound management controls). Ship management companies will manage the ships for a fee; chartering brokers arrange employment, collecting the revenues and dealing with claims; sale and purchase brokers will buy and sell ships; maritime lawyers and accountants undertake legal and administrative functions; classification societies and technical consultants provide technical support.

19. These services make it easy for new investors to enter segments of the bulk shipping markets during profitable periods (example - two of the largest tanker companies operating today were only set up in 1997). In addition shipowners in one segment will move into new markets if they see an investment opportunity (example - recently several oil tanker companies have ordered LNG tankers). However some specialist sectors require specialist expertise which is difficult to acquire quickly.

20. *Information availability*: Information systems in bulk shipping business are very open, giving buyers and sellers of ships, operators and charterers a timely flow of commercial data. Information about revenues and asset prices are published daily and widely circulated in the industry to both shipowner's and charterers by the shipbroking business and information publishers. These information services ensure a high degree of transparency. In addition the costs of operating different types of ships are well known (several companies publish reports documenting them) making it easy for potential investors to estimate prevailing profit levels.

21. *Shipping pools* operate in every sector of the tramp shipping business. A "pool" is a collection of similar vessels, under different ownerships, operating under a single administration. The pool managers market the vessels as a single, cohesive fleet unit, collect their earnings and distribute them under a pre-arranged "weighting" system. Pools are generally developed for two reasons. *Firstly* to allow participants to provide the service levels required by their major customers. *Secondly* to improve transport efficiency by special investment and increased ship utilization e.g. by arranging backhaul cargoes more effectively than a small group of ships could do.

# Contents Sheet

# Introduction to Tramp Shipping

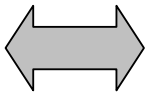
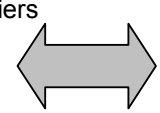
# Appendices

# 1. Introduction

## *1.1 Methodology*[1]

Since the main purpose of this analysis is to provide a clear basis for discussing competitive conditions in the tramp shipping market, we have structured the analysis to focus on the traditional perfect competition supply/demand model which many economists[2] believe operates in some segments of the tramp market, but not fully in others. The shipping market segments discussed in this paper are summarized in Table 1[3] below. This divides them into three broad groups, Bulk Transport; Specialised transport; and Liner. Although the study is specifically not concerned with the liner business, we have included this segment because there is competition between the segments for some cargoes.

**Table 1: Shipping market segments by vessel type**

| 1. Bulk Transport | | 2. Specialised Transport | | 3. Liner Transport |
|---|---|---|---|---|
| Bulk carriers |  | Forest Product Carriers |  | Containerships |
| Crude oil tankers | | Vegoil tankers | | Multipurpose ships |
| Product tankers | | Chemical Carriers | | Ro Ro carriers |
| Combos | | Gas Carriers | | Ro Ro freight carriers |
| | | LPG Carriers | | Ro Ro trailer carriers |
| | | LNG Carriers | | |
| | | Reefers | | |
| | | Car/vehicle carriers | | |
| | | Ro Ro carriers | | |

In this paper the aim is to describe the characteristics of the tramp shipping market.

The key issues we focus on are: -

1. Type of product: the aim here is to briefly describe the product offered by each of the 15 segments of the market and how they mutually overlap.
2. Differentiation: the degree of differentiation th exists in the transport product offered (in competitive terms differentiation offers the opportunity to reduce market size).
3. Number of firms: this measures the number of companies in the Segment. The plan in due course is to quantify this column. A point made in the text is that in many cases the competitive unit is, in effect, the ship not the company.
4. Entry Conditions: measures how easy it is for an outsider to become a viable force in the business.

[1] It should be stressed that there is no clear cut distinction between bulk, specialized and liner services. For example companies "specializing" in carrying forestry products and refrigerated cargoes would do so in competition with "pure container line services", and at the same time be competing for other parcel shaped cargoes and also traditional "bulk cargoes" in the tramp market to reposition the vessel.
[2] Shipping is often cited as an industry that displays the characteristics of perfect competition.
[3] It should be stressed that there are differing degrees of specialization of the vessel types listed in Table 1. Ro Ro carriers could be categorized as specialized rather than liner.

## 2 The product provided by the shipping industry

### *2.1 The transport service*

In 2003 the shipping industry transported 6.2 billion tons of cargo with a deep sea fleet (ships mainly over 2,000 dwt including bulk, specialised and liner) of 26,000 cargo ships. Another 40,000 service vessels are engaged in fishing, research, port services and the offshore industry. The annual freight revenue of the cargo transport business in 2000 was $380 billion and annual investment in new ships was $34 billion, with another $8 billion a year spent on second-hand ships[4].

With the exception of the cruise and ferry businesses, shipping serves industrial customers not consumers. The clients include large corporations like oil companies, chemical companies, steel mills, car manufacturers, sugar refiners, traders and a host of other manufacturing companies which source raw materials and distribute their products in the international market. The product sold is sea transport.

### *2.2 The commodities traded by sea*

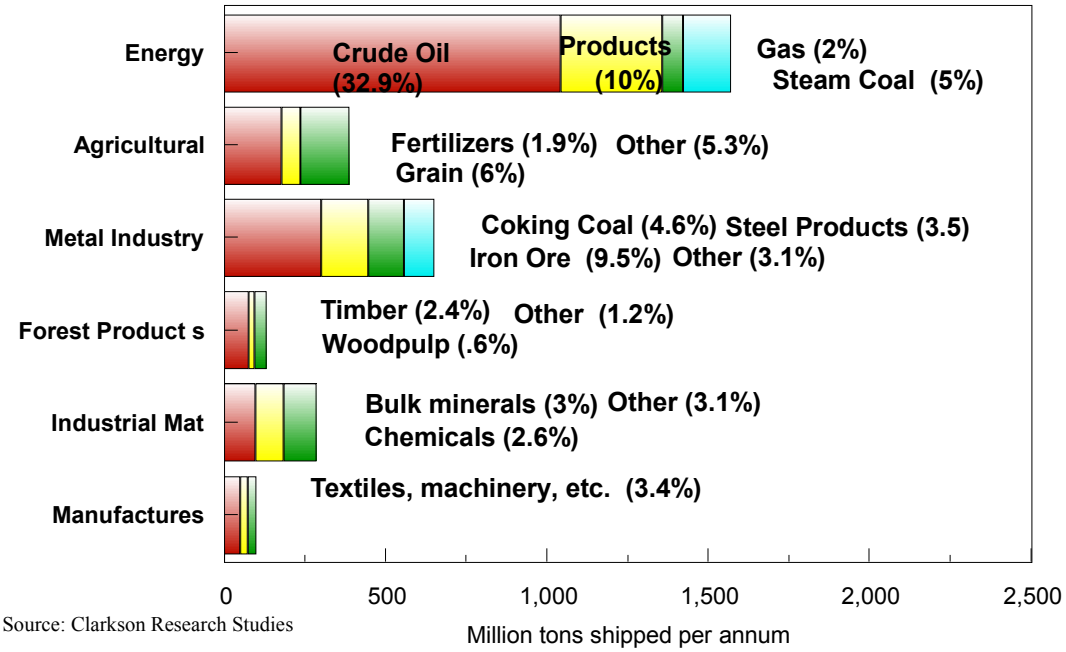
The shipping industry transports everything from a 4 million barrel parcel of oil to a cardboard box of Christmas gifts. The main seaborne commodity trades are shown in Figure 1 arranged into six groups reflecting the area of economic activity to which they are most closely related. These groups can be summarized as follows:

1. *Energy trades*: Energy dominates bulk shipping. This group of commodities, which accounts for close to half of seaborne trade, comprises crude oil, oil products, liquefied gas and thermal coal for use in generating electricity.
2. *Agricultural trades*: A total of twelve commodities, accounting for 13 per cent of sea trade, are the products or raw materials of the agricultural industry. They include cereals such as wheat and barley, animal feedstuffs, sugar, molasses, refrigerated food, oil and fats and fertilizers.
3. *Metal industry trades*: This major commodity group, which accounts for 25 per cent of sea trade, including raw materials and products of the steel and non-ferrous metal industries, including iron ore, metallurgical grade coal, non-ferrous metal ores, steel products and scrap.
4. *Forest products trades*: Forest products are primarily industrial materials used for the manufacture of paper, paper board and in the construction industry. This section includes timber (logs and lumber) wood pulp, plywood, paper and various wood products, totalling about 145 mt. The trade is strongly influenced by the availability of forestry resources.
5. *Other industrial materials*: There are a wide range of industrial materials such as cement, salt, gypsum, mineral sands, alumina, chemicals and many others. The total trade in these commodities accounted for 9 per cent of sea trade. They cover a whole range of industries.

[4] UNCTAD Review of Maritime Transport (2002) Table 41 page 66 and estimates

6. *Other Manufactures*: The final trade group comprises the remaining manufactures such as textiles, machinery, capital goods, vehicles, consumer goods, etc. The total tonnage involved in this sector accounts for only 3 per cent of sea trade, but many of these commodities have a high value so their share in value is probably closer to 50 per cent. They are the mainstay of the liner trades and their impact upon the shipping industry is much greater than the tonnage suggests.

**Figure 1 World seaborne trade by main commodity groups**




Source: Clarkson Research Studies

**Viewing the trade as a whole, over 70 per cent of the tonnage of seaborne trade is associated with the energy and metal industries so the shipping industry is highly dependent upon developments in these two industries.**

These trade statistics convey the scale of the merchant shipping business, but disguise its physical complexity. Cargo is shipped between over eighty countries. Some shipments are regular, others irregular; some are large, others are small; some shippers are in a hurry, others are not; some cargoes can be handled with suction or grabs, while others are fragile; some cargo is boxed, containerized or packed on pallets, while other cargo is loose. The shipping systems have evolved to deal efficiently with this complexity.

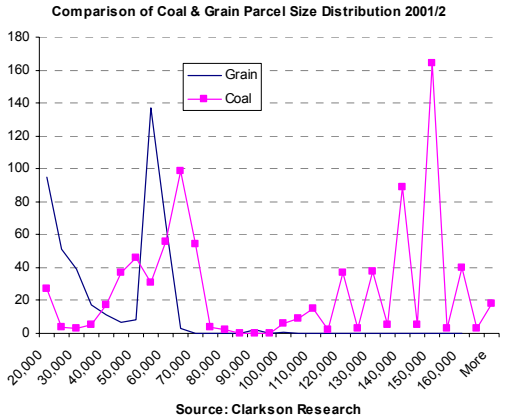
## 3 Organization of the demand for sea transport

### *3.1 The liner and tramp system*

Until the 1950s the sea transport business had two main segments, the network of regular *liner services*, who carried small cargo parcels of cargo on defined routes, and *tramp shipping* which ships to carry irregular cargoes which did not fit in with the regular liner services. These two services were defined by Fayle (1932) as being distinguished by the organisation structure rather than the ships used, as follows:-

*"A liner service implies a fleet of ships, under common ownership or management, which provides a fixed service, at regular intervals, between named ports, and offer themselves as general carriers of any goods requiring shipment between those ports. A fixed itinerary, inclusion in a regular service and the obligation to accept cargo from all comers and to sail, whether filled or not, on a date fixed by a published schedule; these, and not the size and speed of the ship are what distinguish the "liner" from the "tramp" – the ship which can be hired as a whole, by the voyage or the month, to load such cargo and to carry it between ports as the charterer may require."*[5]

**Figure 2 Parcel Size Distribution for Coal**




Under this system the ships used by the liners and tramp businesses were of similar size, with multiple decks designed for stacking mixed cargo parcels, or carrying bulk cargo in the bottom hold. A key aspect of the system was the ability of the tramp ships to switch between carrying bulk cargoes such as grain, and being chartered by the liner services when extra capacity was needed. This system was very flexible, but also very labour intensive.

### *3.2 Development of specialized shipping services 1950-2000*

As the world economy grew in the second half of the 20th century new trades appeared which could not be handled efficiently by the conventional liner and tramp system. Bulk trades grew rapidly as heavy industry started sourcing raw materials overseas, stimulating the raw materials trades; Semi-manufactured cargoes like chemicals, forest products and liquid gases started to be traded in volume, and the wholesale and retail marketing systems, became much more international and needed a more efficient system for shipping goods between regions. This mix of cargoes and customers defines the market that the modern sea transport industry was developed to serve.

### *3.3 The influence of cargo parcel size on ship demand*

A key concept in defining the organisation structure which is in use today, and in particular the market segmentation, is the *Parcel Size Distribution* (PSD). A `parcel' is an individual consignment of cargo for shipment and the PSD function describes the range of parcel sizes in which a particular commodity is transported. For example the PSD function for coal shown in Figure 2 shows that parcels range in size from under 40,000 tons to over 200,000 tons, with the majority concentrated in the 70,000 ton and 150,000 ton ranges. A similar analysis for grain in the same figure shows a very different parcel size distribution, with grain shipments concentrating in the under 80,000 ton category, and only a few of over 100,000 tons.

Most commodities shipped by sea travel in a wide range of parcel sizes. However small parcels call for a different transport system from large parcels, so a single commodity may be carried by ships operating in different segments. For example motor cars could be carried in specialized car carriers designed to carry 6,000 vehicles; a reefer ship taking them as backhaul cargo; a containership using specially fitted containers; or even a bulk carrier with special decks (not much used today). This means that even where there are relatively few companies in the

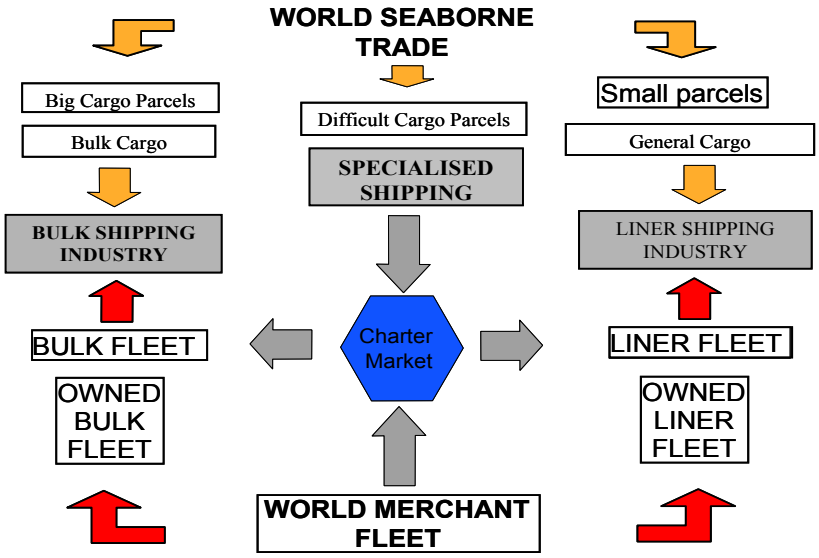
[5] Fayle, Ernest (1932) A Short History of the World's Shipping Industry" George, Allen & Unwin, London page 254

market there is price competition between market segments as well as between owners within a particular segment.

The shape of the PSD for each commodity is determined by the characteristics of demand, including such factors as cargo value, inventory, plant production/consumption levels, port facilities and ship availability and competitive pricing. Since different sizes of cargo parcel require different types of shipping operation, we frequently find the same commodity travelling in different systems. For example forest products travel in bulk carriers, specialised forest products carriers, Ro Ro / PCTC carriers and containers. Or 500 tons of steel products might travel in containers, but 5,000 tons in a bulk carrier. For example when the container rates are low there is increased competition from container operators in various specialised segments.

### *3.4 Parcel size characteristics of commodities shipped by sea*

The parcel size distribution provides the basis for explaining the micro-economic organization of the shipping market, the main elements of which are summarized in Figure 3[6]. Starting at the top of this diagram, world trade splits into large parcels and small parcels, depending on the PSD function of each commodity. Large parcels are carried by the bulk shipping industry and small parcels by the liner shipping industry; these represent the two major segments within the shipping industry, whilst difficult cargoes travel in specialised vessels. Bulk, liner and specialised cargoes are defined as follows.




Source: Martin Stopford, Maritime Economics: 3rd edition 1997

**Figure 3 Shipping market segmentation model**

#### *3.4.1 Bulk shipping*

There are three main categories of bulk cargo. *Liquid bulk* includes crude oil, oil products, and "easy" chemicals such as caustic soda and naptha. The size of individual consignments varies from a few thousand tons to half a million tons the case of crude oil. *The major bulks* cover iron ore, grain, coal, phosphates and bauxite which can be transported satisfactorily in a

[6] This is a simplified model.

conventional dry bulk carriers. *Minor bulks*[7] covers the many other commodities that travel in shiploads. The most important are steel products, cement, gypsum, non-ferrous metal ores, sugar, salt, sulphur, forest products, wood chips and chemicals. In 2003 the bulk fleet of crude oil tankers, bulk carriers and products tankers consisted of 9,600 ships of 612 m dwt. It accounted for 76% of the total cargo fleet of 802 million dwt. Bulk shipping companies handle few transactions (roughly six to twelve voyages a year per ship), so there are minimal administrative overheads and in competitive terms the business unit is the ship rather than the company. Ownership of the fleet is split between industrial concerns who carry their own cargo (the "shippers") and independent operators (the "shipowners") who trade on the "freight market" or charter their ships for long periods to the shippers. The freight rates are very volatile (see graphs on page 33, 37, 41).

### *3.4.2 Specialised Shipping*

Specialised shipping (sometimes called "industrial shipping") carries cargoes in the centre of Figure 3, which are shipped in volume, but where transport efficiency can be improved by investment in specially designed ships, terminals and cargo handling systems. The main cargoes are :

1. Refrigerated cargo (frozen meat, chilled produce, fish etc)

   Refrigerated cargo is an obvious candidate for specialisation, since it can only be carried in holds with refrigeration. This cargo has traditionally been the subject of intense competition between the liner business and specialised "reefer" ships. Specialised reefer ships have fully insulated cargo holds and refrigeration equipment, trading with a full cargo of chilled or frozen commodities. When necessary they will, however, load other cargoes such as motor vehicles, General Cargo or palletized cargo. The other major source of refrigerated capacity is the containership fleet, which now has a greater cubic available than the specialised reefers. The result has been intense competition between these two sectors for the cargo, and a period of very low rates for reefer ships

2. Forest products (timber, pulp, paper.)

   Forest products consist of logs, packaged timber (often in standard sizes), wood pulp bales, paper and wood chips. All of these cargoes can be carried in conventional bulk carriers, but as the trade developed in the 1960s shipowners started to build bulk carriers with special features designed for the efficient handling and stowage of forest products. The special features included "open" hatches which allowed packaged timber to be dropped directly into all parts of the hold (normal bulk carriers have only a smaller hatch opening) and sophisticated cargo handling gear up to speed up the loading and discharge process. These fleets are included in the specialized sector, though the ships can trade in the bulk market, and are especially useful for carrying non-homogeneous commodities such as empty containers, or steel products. However the high first cost of the ships make them more economically effective when used intensively as forest products carriers within a specialized training system.

3. Motor vehicles (new and used), trucks, earth moving equipment, farm implements

[7] "Minor" bulks is a "mixed" bag requiring generally smaller consignments than major bulks... but considerably larger than per an individual container unit. Many "minor bulks" may also be carried by "specialised" forest product carriers.

Motor vehicles can be carried in a wide range of different ship types, including multi-deck liners, multi-purpose vessels with fold-down decks, bulk carriers fitted with collapsible decks (no longer used), deep sea ro-ro vessels, in containers on containerships and purpose built vehicle carriers. As the volume of trade increased specially designed pure car carriers (PCC's) were built but subsequent designs have been for more flexible RoRos and pure car and truck carriers (PCTC). These vessels have multiple decks designed for the carriage of cars, and a high cubic in order to maximize the number of vehicles which can be loaded. In order to add flexibility, the vessels are also have adjustable decks which can be adjusted to allow the transport of large vehicles such as earth-moving equipment and project cargoes. They are generally designed with a fast speed and efficient loading and discharge of the cargo. The fleet is currently 504 ships and details are shown in appendix 2. The vessels operate on regular and frequent transport routes to a multitude of loading/discharging ports/areas. In addition carriers are involved in through transport of vehicles.

4. Gases transported as liquids, including LNG, LPG, ammonia

In order to transport gases by sea they must be liquefied, by pressure or refrigeration and a fleet of specialized Tankers has been constructed for this purpose. There are two main categories of ship. Liquid petroleum gas (LPG) tankers carry propane, butane, ammonia and the number of other chemical gases either under pressure or pressure and refrigeration, or both. The coldest temperatures handled by these vessels is ethylene at -103 degrees centigrade. Liquefied natural gas (LNG) is carried in purpose-built LNG tankers at -163 degrees centigrade. These ships are heavily insulated. Although Gas Tankers are highly specialized, some can trade in oil product's and liquid chemical trades when freight rates make doing so viable. However not all Gas Tankers are designed with this capability. Currently there is a fleet of it 161 LNG tankers and 990 LPG carriers.

5. Chemicals.

Chemicals are shipped by sea in many small parcels, typically 3-30,000 tons in size. Many require special storage and handling systems. traditionally liquid chemicals were carried in drums or special tanks in cargo liners, but this was very inefficient. In the 1950s, as trade volume increased, the industry started to develop special tankers designed to carry up to 40 parcels of different chemicals within a single ship. These "parcel tankers" have separate tanks with independent pumping systems and special coatings such as stainless steel. As the system developed over at the following 30 years, to improve efficiency, liner type services were introduced on some long routes. However liquid chemical transportation is still spread across several different segments of the shipping industry, including smaller tankers (for example a 3,000 deadweight ship carrying a single parcel); tramp ships of 15-25,000 deadweight carrying mixed cargoes on a voyage by Voyage basis; containerships carrying chemicals in tank containers; and Parcel Tankers operating within pools, often on liner services. The specialized tanker fleet is difficult to define accurately, with around 2000 vessels carrying chemicals of some description, but only about half of these carrying the more sophisticated chemical cargoes.

### *3.4.3 Liner Shipping*

The liner business constitutes the provision of scheduled services at a fixed frequency over a pre-determined route, making sea transport available to cargo lots of all sizes. Liner

companies have extensive organisations, often in many countries, and the cost of ship operation is a relatively small part of total expenses. The governing freight document is the Bill of Lading or seaway bill, with the number of Bs/L issued per ship and even per container varying very substantially, depending on parcel size. Containerisation and the dissemination of the just in time approach have subordinated liner shipping within a door to door context of which the sea leg is only part, and not necessarily the most expensive part. Liner shipping caters for cargo of all kinds and, despite the high cost of ships and containers, participation in bulk cargoes is not inconsiderable and rising. Waste paper, is for example, perhaps the biggest single cargo carried in containerships, because of the need to return empty containers to loading areas generating better revenues. A healthy general cargo sector coexists within the liner sector, but, apart from specialist liner services (heavy lift, forest products, cars, refrigerated cargoes), non-cellular general cargo ships tend to operate over routes with small cargo constituencies or in countries with poor port infrastructures, increasingly in short sea trades. In addition cargo liners are involved in through transport of containers.

# 4 Differentiation of sea transport demand

## *4.1 Price and service aspects of sea transport demand*

There are four aspects to the service offered by the shipping services discussed in the previous paragraphs which allow a degree of service differentiation:

1. *Price*: The freight cost is always important, but the greater the proportion of freight in the overall cost equation, the more emphasis shippers are likely to place on it. For many primary commodities shown on the left of Figure 1 price is the major consideration, but for semi manufactures and manufactures the service elements discussed in 2-4 below are also very significant
2. *Speed*: Time in transit incurs an inventory cost, so shippers of high-value commodities value speed. The cost of holding high-value commodities in stock may make it cheaper to ship small quantities frequently even if the freight cost is greater. On a three-month journey a cargo worth $100,000 incurs an inventory cost of $2,500 if interest rates are 10 per cent per annum. If the journey time can be halved it is worth paying up to $1,250 extra in freight. Speed may also be important for commercial reasons. Although liner ships are faster than trampers, since liner ships make more port calls, the time in transit is not necessarily longer.
3. *Reliability*: With the growing importance of `just in time' stock control systems, transport reliability has taken on a new significance. Some shippers may be prepared to pay more for a service which is guaranteed to operate to time and provide cargo capacity at all times.
4. *Security*: Loss or damage in transit is an insurable risk, but raises many difficulties for the shipper, who may well be prepared to pay more for secure transportation of his product without risk of damage.

### *4.2 The cost of freight by region*

**The value of freight in 2000 was $380 billion, representing about five per cent of the total value of world trade. The table opposite shows the growth of freight costs and total trade since 1980, split by region. Its is important to remember these statistics cover both bulk and liner cargoes, and include inland distribution, which may be a considerable proportion of the total cost. During the period 1980 to 1999 the value of trade grew at 12 per cent per annum, whilst the freight costs increased by only seven per cent, showing the productivity improvement by the shipping industry during this period. In effect the unit cost was falling steadily over this period.**

**Figure 4 Transport Cost of Coal 1950-2002**

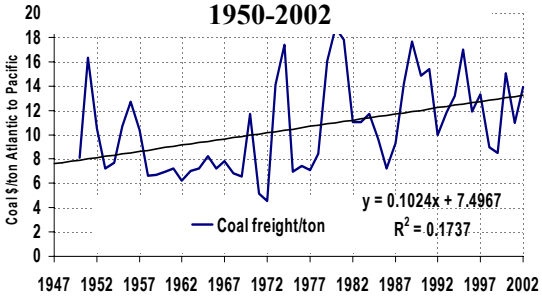



**Table 2 Freight Costs 1980-99 ($bn)**

| | 1980 | 1990 | 1999 | % |
|---|---|---|---|---|
| Developed economies | 78 | 117 | 181 | 7% |
| Africa | 10 | 9 | 13 | 1% |
| Americas | 11 | 10 | 28 | 9% |
| Asia | 22 | 35 | 61 | 10% |
| Europe | 1 | 2 | 2 | 2% |
| Oceania | 0 | 0 | 1 | 5% |
| Total Developing | 45 | 56 | 104 | 7% |
| World total | 123 | 173 | 285 | 7% |

Value of Imports $bn

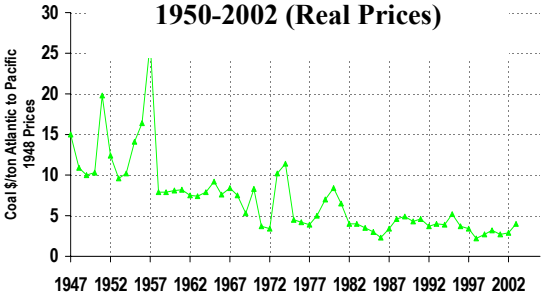
| | 1980 | 1990 | 1999 | |
|---|---|---|---|---|
| Developed economies | 1,426 | 2,662 | 4,010 | 10% |
| Africa | 78 | 82 | 105 | 2% |
| Americas | 123 | 118 | 358 | 11% |
| Asia | 211 | 428 | 780 | 15% |
| Europe | 16 | 21 | 23 | 2% |
| Oceania | 2 | 4 | 5 | 6% |
| Total Developing | 431 | 653 | 1,270 | 11% |
| World total | 1,857 | 3,134 | 5,821 | 12% |

Sources: CRS, UNCTAD Review of Maritime Transport, Martin Stopford (Maritime Economics: 3rd edition 1997)

### *4.3 Long term trends in the cost of bulk transport*

Long term trends in the cost of bulk transport provide an indication of the economic performance of the business. In 1950 it cost about $8 to transport coal from East Coast North America to Japan. In 2002 the trend, which is linear, had increased to $13/ton. Along the way there were seven market cycles, peaking in 1952, 1956, 1970, 1974, 1980, 1989 and 1995, but the average transport cost was $10.9 per ton. The cheapest year for shipping coal was 1972 when it cost $4.5/ton, while the most expensive was 1980 when it cost $24/ton. (The oil trade shows the same long-term trend, with transport costs fluctuating between fifty cents and one dollar per barrel. The highest cost was during the 1956 Suez crisis when the cost went up to $2.1 per barrel. **In four years, 1949, 1961, 1977 and 1994 it fell to $0.5 per barrel**).

**Figure 5 Transport Cost of Coal 1950-2002 (Real Prices)**




**Compared with other sectors of the economy, the transport industry's achievement is exceptional.** Between 1960 and 1990 the trend price of freight only increased from $9/ton to $13/ton as shown in Figure 4 (in Figure 5 we show the development in real price terms). Over the same period average dollar prices increased sixfold. A basic Ford motor car had increased in price from $1,385 to $13,000; the UK rail fare from London to Glasgow from $23.4 to $106; the price of a ton of domestic coal from $12 in the UK to $200; and the price of a barrel of crude oil increased from $1.5 to $30. Another feature over this period has been the increase in the average cargo size- for example the average coal cargo in 1960 was 12,000t, now it is closer to 80,000t.

# 5 The Supply of Sea Transport

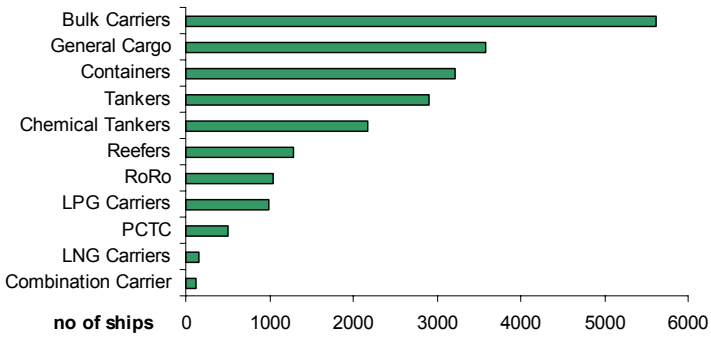
## 5.1 The world merchant fleet

In March 2004, Clarkson Research had records of 26,280 deep sea merchant ships (bulk, specialised & liner), covering all ships down to around 2,000 gross tonnes. However, there is a far larger world fleet of self propelled sea-going merchant ships over 100 gross tons: approximately 80,000 vessels with a capacity of 490 mgt. Half of this 80,000 total though are non-cargo-carrying vessels including 24,000 fishing boats, 3,000 offshore support vessels, 8,000 tugs, 800 research vessels, 1,100 dredgers and 2,650 other non-cargo vessels. The balance is made up of small ships trading generally on short sea, non international routes.

## 5.2 National registration of the world merchant fleet

One of the major commercial issues in the shipping business is the ownership of vessels. In order to trade any merchant ship must be registered under a maritime flag, and in making this registration the shipowner chooses the court jurisdiction under which the ship will operate. Because trading on the high seas is less subject to national affiliations than most other businesses, there is a long tradition of registering ships in countries that are not necessarily the owners commercial base, so the fleets registered in a particular country will not necessarily give a true indication of the fleet controlled by nationals of that country.

**Figure 6 World Cargo Fleet**




Source: Clarkson Research Studies, 1st March 2004

In January 2002 the 35 most important maritime countries controlled 95% of the world fleet[8]. Out of 759 million Dwt, 279 million Dwt was registered under the national flag of the owner, and 479 million Dwt was registered under a foreign flag. The world's biggest shipowning nation is Greece, which controls 146 million Dwt of ships, with 46 million Dwt registered under the national flag. For Japan the ratio is even greater, with 103 m dwt controlled, but only 15 million Dwt registered under the Japanese flag.

## 5.3 Competition between types of ship in the cargo fleet

Although some ship types are well defined, it is difficult to divide the fleet into clear categories which provide a sound starting point for analysing market segmentation. Merchant ships are not mass-produced like cars or trucks and few ships in the fleet are precisely the same. Many are designed to meet a specific owner's needs, so classifying ships into types relies on selecting distinctive physical characteristics which serve to identify the `type' of ship when it is built.

In practice there is often considerable scope for competition between different ship types. For example containerships can carry reefer cargo (or reefer ships can carry containers) or in some instances chemical tankers and gas tankers can carry oil products in bulk. The statistical breakdown of the ship segments under discussion is shown in Figure (6 ) and in more detail in Annex 2.

[8] The tramp shipping market is a global business with the international fleet registered in over 140 countries. Table on page 24 shows the top 35 ship owning countries.

### *5.4 The cargo handling economics & competition*

One of the major areas where shipowners have sought to establish a competitive advantage is by developing improved cargo handling. In some trades this has resulted in a major change in the design of the ships, for example vehicle carriers and forest products carriers. Because these specialised ships are generally designed to meet the needs of a specific group of clients (for example car manufacturers[9] etc) there is more focus on marketing and service levels than is the case with homogeneous bulk vessels.

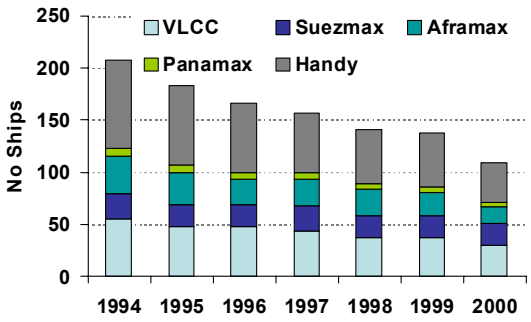
## 6 Sea Transport risk & investment strategy

### *6.1 The risk management system*

Because shipping is a risky business for both shipowners and cargo shippers (shipping markets are unpredictable and highly volatile), they have developed a system which allows shippers with a future commitment to sea transport to spread their risk by developing a portfolio approach to sourcing transport, using four different approaches- ownership, period timechartering, spot chartering and COA.

1. **Ownership**: companies shipping substantial quantities of bulk materials can run their own shipping fleets to handle a proportion of their transport requirements. For example, in 2003 the major oil companies collectively owned approximately 20 m.dwt of oil tankers, representing 7 per cent of the tanker fleet besides having a further 20m dwt (7%) on long term time charter or bareboat charter. Steel companies in Japan and Europe also run fleets of large bulk carriers for the transport of iron ore and coal. This type of bulk shipping operation suits shippers running a stable and predictable through transport operation.

**Figure 7 Oil Major Owned Fleets 1994-2000**




Source: Clarkson Research Studies

2. **Period Timecharter (TC)**: he may charter tonnage on a long-term basis from a shipowner. Some companies place charters for ten or fifteen years to provide a base load of shipping capacity to cover long-term material-supply contracts – particularly in the iron ore trade. For example, the Japanese shipping company Mitsui OSK ships iron ore for Sumitomo, Nippon Kokan and Nippon Steel on the basis of long-term cargo guarantees and operates a fleet of ore carriers and combined carriers to provide this service. In the early 1980s the company was carrying about 20 per cent of Japanese iron ore imports. In such cases, the contract is generally placed before the vessel is actually built. Shorter-term time charters for twelve months or three to five years would be obtained on the charter market.

[9] Car transportation began in conventional vessels, then very specialised pure car carriers (PCC) and now to RoRo/PCTC capable of carrying various types of rolling cargo as well as static and project cargo such as generators, windmills, yachts, trains, airplanes, forest products.

3. **Voyage and trip charter** (Spot Charter): shippers with a single cargo or irregular requirements (for example traders) can contract for freight on a cargo by cargo basis. This is often the case in agricultural trades such as grain and sugar where seasonal factors and the volatility of the market make it difficult to plan shipping requirements in advance, or the cargo could be a consignment of prefabricated buildings for the Middle East or some heavy plant. In such cases, bulk or multi-deck tonnage is chartered for a single voyage via some market such as the Baltic Exchange or broker network, where the shipper can hire a ship for a single voyage at a negotiated freight rate per ton of cargo carried. A variation on the voyage charter is the trip charter when a vessel is fixed on a time charter basis for the period of a specific voyage and for the carriage of a specific cargo. The shipowner earns "hire" per day for the period determined by the voyage.
4. **Contract of Affreightment**[10]: the shipper may, normally through an open tendering procedure, enter into a long-term arrangement with a shipowner who specializes in a particular area of bulk shipping, supported by suitable tonnage. For example, Scandinavian shipowners are involved in the carriage of forest products from West Coast North America to Europe and run fleets of specialist ships designed to optimize the bulk transportation of forest products. Similarly, the transportation of motor cars is serviced by companies, which run fleets of pure vehicle carriers and Ro Ros servicing the Japanese car export trade. COAs are also used in other trades such as coal, fertilizer, grain, ore and oil.

An example of the way these sourcing techniques is used is shown in Figure 7 which shows the vessels used by oil companies in 2003 and the source from which they were obtained.

# 7 The companies involved in the shipping business

## *7.1 Shipping Companies and support services*

There are five categories[11] of company involved in the transport chain, two directly and three indirectly. The relevant companies are

1. Cargo owners
2. Traders
3. Shipowners (shipping companies/operators),
4. Ship managers
5. Ship brokers

Each has a different perspective on the business.

An important group of the past twenty years, *cargo owners* have cargo to be moved by sea. They may be primary producers such as oil companies or iron ore mines. Or they may be manufacturers or wholesalers importing raw materials or equipment. A third important group in last 20 years has been traders who purchase commodities on a speculative basis with a view to reselling them, often in a different location, so they become involved in the transport process. Some cargo owners have a very short term approach to the business, and just want to purchase

[10] COAs, in line with contracts in other industries, are becoming shorter. COAs have increasingly developed into "service contracts" typically with duration of 1-2 years. Given the discussions in UNCITRAL and implications of the *US Ocean Shipping Reform Act*, be careful to avoid any confusion between chartering arrangements and liner trade Ocean Shipping Liner Agreements (OLSAs).

[11] Some companies will combine two or more of the listed functions.

transport when they need it. Others take a more long term perspective, and may become deeply involved in the transport process. For example oil companies often run their own fleet of tankers, or offer long term time charters.

**Table 3 - Merchant fleet by company size**

| Company Size | World Fleet | | | | European Union Owners | | | |
|---|---|---|---|---|---|---|---|---|
| | # Companies | # Ships | m. Dwt | Avg. Ships | # Companies | # Ships | m. Dwt | Avg. Ships |
| (# owned vessels) | | | | | | | | |
| 300+ | 4 | 2,099 | 59.54 | 525 | | | | |
| 200-299 | 3 | 794 | 40.29 | 265 | 1 | 261 | 12.71 | 261 |
| 100-199 | 9 | 1,201 | 61.41 | 133 | | | | |
| 50-99 | 45 | 3,010 | 123.98 | 67 | 14 | 912 | 30.42 | 65 |
| 10-49 | 469 | 8,898 | 321.79 | 19 | 193 | 3,772 | 136.52 | 20 |
| 5-9 | 584 | 3,856 | 107.20 | 7 | 245 | 1,612 | 52.20 | 7 |
| 2-4 | 1,404 | 3,731 | 73.33 | 3 | 460 | 1,246 | 32.56 | 3 |
| 0-1 | 2,277 | 2,194 | 23.28 | 1 | 538 | 503 | 8.00 | 1 |
| Unknown | | 497 | 7.10 | | | 17 | 0.51 | |
| **Total** | **4,795** | **26,280** | **817.92** | **5** | **1,451** | **8,323** | **272.91** | **6** |

Source: Clarkson Research Studies

*Shipping companies*[12] are equally diverse. In 2003 around 5,000 companies owned the 26,000 ships (bulk, specialized & liner) carrying the world's deep-sea trade, an average of five ships per company (see table 3). There are some very big companies, at least when measured by the number of ships owned. One third of the fleet was owned by 61 companies with over 50 ships Another third was owned by 600 companies operating 20 to 50 ships, whilst the remaining third is owned by 4,400 companies with an average of 4 ships each. These companies are often highly focussed, with tight overheads, for example running a fleet of 100 ships with only 30 or 40 employees and sub-contract many main functions to third parties. The ownership characteristics of the individual tramp sectors are shown in appendix 2.

With so many shipping companies, the market share of individual shipowners is very small. This conclusion is illustrated by an analysis carried out of 7000 Dry Bulk fixtures (covering various types of dry bulk commodities) between January 2001 and April 2003. The survey analysed the ownership of each vessel "fixed" and calculated the share of each owner. A total of 750 shipowners were found to be trading during the survey period. Out of this total 712 accounted for less than 0.5 per cent of the total 7000 fixtures; 28 counted for between 0.5 per cent and 1.0 per cent of the total; and five accounted for between one and 1.5 per cent. Of the remainder one shipowner had 2.5 per cent and 13 per cent, which was the highest.

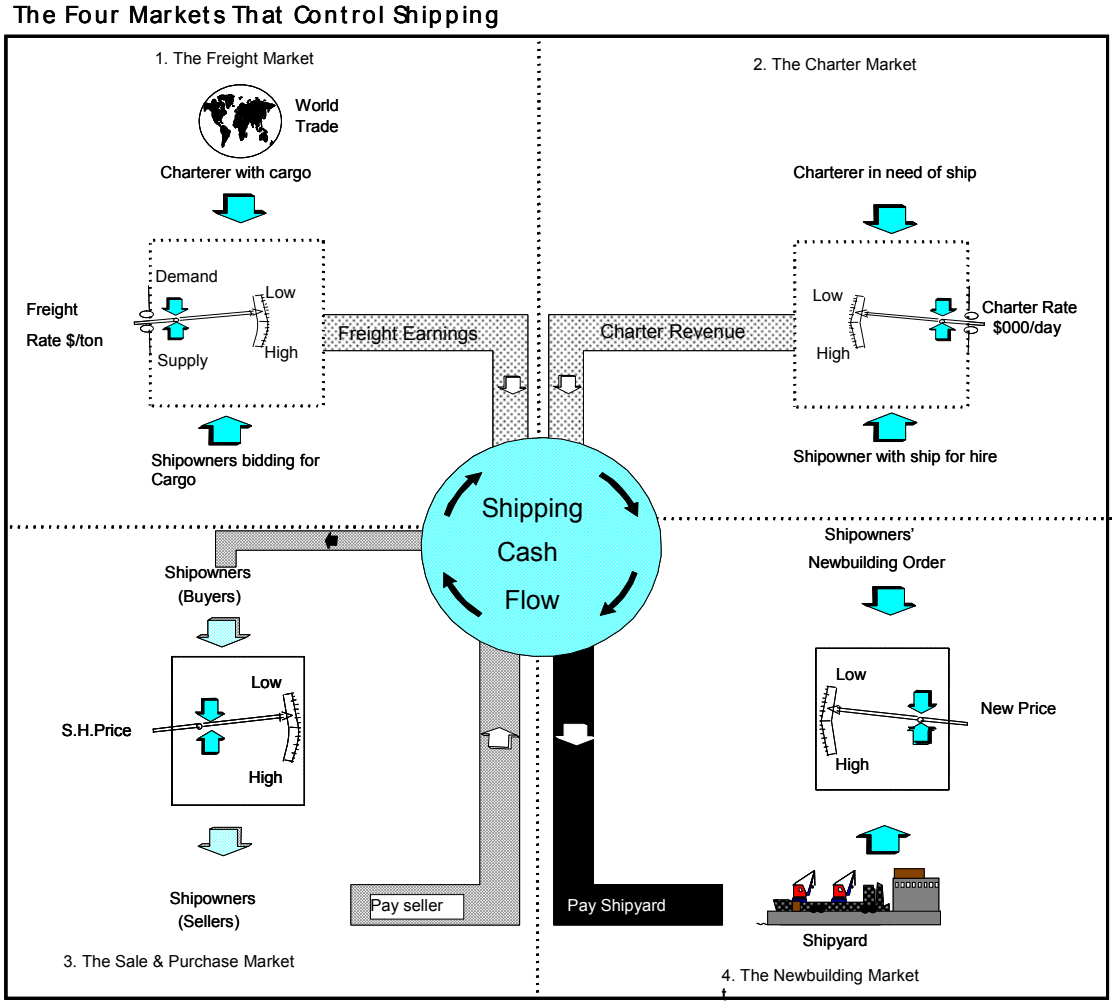
*Ship Managers* undertake the management (both technical and commercial) of ships on behalf of shipowners, often for a fixed fee. There are a significant number[13] of ship management companies who will undertake the management of the ship on behalf of the client. In addition to tankers and bulk carriers, ship management companies will manage specialist ships such as LPG tankers. This makes it very easy for new companies to enter the business the core management tasks can all be outsourced.

[12] The 4,795 owner companies listed in the table are based on "major group" analysis, that shows the highest level of ownership that we are aware of.

[13] The Fairplay Shipping Directory lists over 700 Ship Managers although many of these do not manage internationally trading vessels.

*Shipbrokers:* There is a worldwide network of shipbroking companies[14] which will undertake all the tasks involved with ordering new ships; buying and selling existing ships; and negotiating charters for the vessel. They also undertake the post fixture administration of contracts. This makes it relatively easy for a new shipowner to enter the market.

**Figure 8 The markets where ships and freight are traded**




This diagram shows the cashflow in the shipping market. It involves three markets, the Freight Market, the Sale & Purchase Market and the Newbuilding Market. Note that cash invested in newbuildings flows OUT of the industry.

Source: Martin Stopford *Maritime Economics* 2nd edn 1997

# 8 Definition of the Shipping Markets

## *8.1 The four markets where cargo and ships are traded*

In shipping there are four markets trading in different commodities. The freight market trades in sea transport of commodities; the charter market deals in ships for hire; the sale and purchase

[14] The Fairplay Shipping Directory lists over 1100 Ship brokers. Shipbroking companies are very competitive and revenue is usually based on a commission fee.

market trades second-hand ships; and the newbuilding market trades new ships. Beyond this there is no formal structure.

Because the same companies are trading in all four shipping markets, their activities are closely correlated. When rates rise or fall in the freight market the effect is transmitted into the sale and purchase market and from there into the newbuilding[15] market. The markets are also linked by cash. The relationship is shown graphically in Figure 8. Cash flows back and forth between the industry's bank account (represented by the circle) and the four shipping markets (represented by the squares). The cashflow into the shipping companies' bank account is shown by the light shaded bars, while the black bars show outflows. The hatched bars indicate cash which changes hands from one shipowner to another, but does not change the cash balance of the industry as a whole.

### *8.2 The role of market cycles in the competitive process*

The cash flowing between the four markets drive the shipping investment process. At the beginning of the cycle freight rates rise and cash starts to pour in, allowing shipowners to pay higher prices for second-hand ships. As prices are bid up investors turn to the newbuilding market which now looks better value. But as the ships arrive on the market two years later the whole process goes into reverse. Falling freight rates squeeze the cash inflow just as investors start paying for their newbuildings. Financially weak owners who cannot meet their day-to-day obligations are forced to sell ships on the second-hand market. These sales are often preceded by a, usually prolonged, period of declining rates. As ships are scrapped the supply falls, freight rates are bid up and the whole process starts again.

The cycles create a continuous movement of companies in and out of the market. Market cycles squeeze out the inefficient companies, and allow new and efficient companies to enter the market and gain market share. This is how the shipping industry directs investment and promotes efficiency.

Changes in supply and demand can impact the price paid for freight very quickly.

## 9 "Voyage Charter" Contract

In bulk shipping, a *voyage charter* allows the shipper to buy transport from the shipowner at a negotiated price per ton of cargo. The market contract suits shippers who want to leave the management of the transport to the shipowner, while the time charter is for experienced ship operators who prefer to manage the transport themselves.

### *9.1 Negotiating & concluding a freight contract*

When a ship is chartered or a freight rate is agreed, the ship is said to be `fixed'. Fixtures are arranged in much the same way as any major international hiring or subcontracting operation. Shipowners have vessels for hire, charterers have cargo to transport, and brokers

**Table 4 Type of Charter Arrangement**

| Bareboat | Timecharter | Voyage Charter |
|---|---|---|
| Master appointed & directed by:- Charterer | Master appointed by owner, directed by Charterer | Master appointed and directed by:- Owner |
| Revenue depends on:- Hire rate & duration | Revenue depends on:- Hire rate & duration | Revenue depends on:- Quantity of cargo & rate |
| Costs paid by owner:- Capital<br>Brokerage | Costs paid by owner :- Capital<br>Brokerage<br><br>Wages<br>Provisions<br>Maintenance<br>Repairs<br>Stores & supplies<br>Lube oil<br>Water<br>Insurance<br>Overheads | Costs paid by owner:- Capital<br>Brokerage<br><br>Wages<br>Provisions<br>Maintenance<br>Repairs<br>Stores & supplies<br>Lube oil<br>Water<br>Insurance<br>Overheads<br><br>Port charges<br>Stevadoring charges<br>Cleaning holds<br>Cargo claims<br>Light dues<br><br>Canal dues<br>Bunker fuel |
| **Contract of Afreightmen**t (COA): cost profile same as voyage charter | | |

Source: Clarkson Research Studies

[15] There is strong competition between shipbuilding nations and yards within each nation.

puts the deal together. Let us briefly consider the part played by each of these:

The shipowner comes to the market with a ship available, free of cargo. For example, it may be a Panamax bulk carrier currently on a voyage from the US Gulf to deliver grain to Japan, so it will be `open' (available for hire) in Japan from the anticipated date at which the grain has been discharged, say 12 May.

The shipper has a volume of cargo to transport from one location to another. The quantity, timing and physical characteristics of the cargo will determine the type of shipping contract required. For example, the shipper may have a cargo of 50,000 tons of coal to ship from Newcastle, New South Wales, to Rotterdam. Such a cargo might be very attractive to a bulk carrier operator discharging coal in Japan and looking for a cargo to reposition into the North Atlantic, because he has only a short ballast leg from Japan to Australia and then a full cargo back to Europe.

Most often the principal (i.e. the shipowner or charterer) will appoint a shipbroker to act for him. The broker's task is to discover what cargoes or ships are available; what the owners/ charterers want to be paid; and what is reasonable given the state of the market. With this information they negotiate the deal for their client, often in tense competition with other brokers. Brokers provide other services including post fixture processing, dealing with disputes, and providing accounting services in respect of freight, other payments and receipts under the charter, etc. Some owners or shippers carry out these tasks themselves. However, this requires a staff and management structure which only very large companies can justify. Since broking is all about information, brokers tend to gather in shipping centres. London remains the biggest, with other major centres in New York, Tokyo, Hong Kong, Singapore, Piraeus, Oslo, Hamburg, Copenhagen, Bergen etc.

Three types of contractual arrangement are commonly used. Under a *voyage charter*, the shipowner contracts to carry a specific cargo in a specific ship for a negotiated price per ton. Variants on the theme are the *consecutive voyage charter* and the *contract of affreightment*, in which the shipowner contracts to carry regular tonnages of cargo for an agreed price per ton.

### *9.2 The voyage charter*

A voyage charter provides transport for a specific cargo from port A to port B for a fixed price per ton, so in this case the shipowner pays all the costs relating to the ship. For example, a grain trader may have 25,000 tons of grain to transport from Port Cartier in Canada to Tilbury in the UK. So what does he do? He calls his broker and tells him that he needs transport for the cargo. The broker will `fix' (i.e. charter) a ship for the voyage at a negotiated freight rate per ton of cargo, e.g. $5.20. The terms will be set out in a charter-party and, if all goes well, the ship arrives on the due date, loads the cargo, transports it to Tilbury, discharges and the transaction is complete.

If the voyage is not completed within the terms of charter-party then there will be a claim. For example, if laytime (i.e. port time) at Tilbury is specified at seven days and the time counted in port is ten days, the owner submits a claim for three days demurrage to the charterer. Conversely, if the ship spends only five days in port, the charterer will submit a claim for two days despatch to the owner. The rates for demurrage and despatch are stated in dollars per day in the charter-party.

### *9.3 The Consecutive Voyage Charter (CVC)*

A Consecutive Voyage Charter is similar to a Voyage Charter, but the ship is contracted to undertake a series of cargo carrying voyages on a defined route. This is used when the shipper has a well defined schedule of cargoes to transport. To introduce some flexibility and allow for

changing circumstances the charter party may incorporate options in terms of loading and or discharge ports, quantities and other contract terms.

### *9.4 The Contract of Affreightment (COA)*[16]

The Contract of Affreightment (COA) is a little more complicated. It is a negotiated contract under which the shipowner agrees to carry a series of cargo parcels for a fixed price per unit/volume, generally without specifying the precise ship in which the cargo will be carried. However, the shipowner will be under obligation to provide the necessary cargo carrying capacity to serve the agreed cargo volume and destinations

For example, the shipper has a contract to supply ten consignments of 50,000 tons of coal from Colombia to Rotterdam at approximately two-monthly intervals. So he negotiates a Contract of Affreightment with a shipping company which agrees to undertake the transport at an agreed price per ton. Because details of each voyage and the ship used are left to the shipowner, he can increase his efficiency by planning the operating pattern for his fleet in the most efficient manner.

For example by switching cargo between vessels and obtaining backhauls he may be able to reduce his overall cost per ton transported. Because shipowners are aware of the potential value of a guaranteed cargo stream, there is generally intense competition for these contracts, with the result that shippers are able to obtain some of the value added in reduced rates. Companies who specialize in COAs sometimes describe their business as `industrial shipping' because their aim is to provide a service. Since a long-term contract is involved, COAs involve a greater commitment to marketing the service to the shipper and providing an efficient service.

There is COA business in the dry bulk market carrying cargoes of iron ore and coal and the major customers are the steel mills of Europe and the Far East. This system is also used in many of the specialised trades. The problem in negotiating COAs is that the precise volume and timing of cargo shipments is not generally known so cargo volumes may be specified as a range (e.g. `minimum x and maximum y tons[17]') while timing may rely on generalizations such as `The shipments under the contract shall be evenly spread over the contract period.'

### *9.5 Main contract terms (voyage charter party)*

The *freight charters* listed above will all be concluded with a contract drawn up between the shipper and the shipowner, often through the intermediation of a shipbroker. There are various standard contracts in common use. They typically include the following terms:-

- Details of the ship and the contracting parties.
- A description of cargo to be carried, drawing attention to any special features.
- The load and discharge ports.
- The terms on which the cargo is to be carried. This important part of the voyage charter-party defines the commitments of the shipper and shipowner under the contract. This covers:

[16] There has been a considerable development/change in COAs over recent years. COAs have increasingly developed into "service contracts" typically with duration of 1-2 years. According to ECSA members, within specialised shipping, the majority of cargo is transported under COA or service contract which are negotiated through an open tender process whereby the customer send out a tender to all carrier within the relevant segment. There is intensive competition among the carriers and extensive negotiations with the shipper until one carrier has been awarded the contract.

[17] If the charter involved the transport of cars, the units involved would be expressed in numbers of vehicles rather than tones.

- The terms of payment.
- Damages for non-performance .
- Administrative clauses, covering matters that may give rise to difficulties if not clarified in advance. These include the appointment of agents and stevedores, bills of lading, provisions for dealing with strikes, wars, ice, etc.

# 10 "Timecharter" Contracts

## *10.1 Procedures for time chartering a ship*

A *timecharter* gives the charterer the use of the ship, while leaving ownership and management of the vessel in the hands of the shipowner. In this case the shipowner pays the capital and operating costs of the vessel, but not the voyage related costs (see Table 5 ). The length of the charter may be the time taken to complete a single voyage (trip charter) or a period of months or years (period charter). When on charter, the shipowner continues to pay the finance costs and operating costs of the vessel (i.e. the crew, maintenance and repair) but the charterer directs the commercial operations of the vessel and pays all voyage expenses (i.e. bunkers, port charges and canal dues) and cargo handling costs. With a time charter, the shipowner has a clear basis for preparing the ship budget, since he knows the ship operating costs from experience and is in receipt of a fixed daily or monthly charter rate (e.g. $5,000 per day). Often the shipowner will use a long time charter from a major corporation such as a steel mill or an oil company, as security for a loan to purchase the ship needed for the trade. Shipowners themselves may timecharter vessels for a number of reasons, including if they are not able to finance ownership of more vessels, their own tonnage is committed or they want to spread risk by having a mix of owned / chartered vessels.

Although simple in principle, in practice time charters involve risks for both parties. Details of the contractual agreement are set out in the `charter-party'. The shipowner must state the vessel's speed, fuel consumption and cargo capacity. The terms of hire will be adjusted if the ship does not perform to these standards. The charter-party will also set out the conditions under which the vessel is regarded as `off hire', for example during emergency repairs, when the charterer does not pay the charter hire. Long time charters also deal with such matters as the adjustment to the hire charge in the event of the vessel being laid up, and will set out certain conditions under which the charterer is entitled to terminate the arrangement, for example if the owner fails to run the ship efficiently.

There are three reasons why subcontracting/timechartering may be attractive. *First*, the shipper may not wish to become a shipowner, but his business requires the use of a ship under his control. The shipper may not want to be a ship owner for political, technical or financial reasons (avoding tying up capital for example). *Second*, the time charter may work out cheaper than buying, especially if the owner has lower costs, due to lower overheads and larger fleet. This seems to have been one of the reasons that oil companies subcontracted so much of their transport in the 1960s. *Third*, the charterer may be a speculator taking a position in anticipation of a change in the market.

Timechartering to industrial clients is a prime source of revenue for the shipowner. The availability of time charters varies from cargo to cargo (or commodity to commodity) and with business circumstances.

## *10.2 The timecharter trip*

A time charter trip is the simplest form of time charter. A specific vessel is hired to undertake a trip from a specific starting point (for example Cape Hatteras) to the Pacific and back. During the time the vessel is on charter the owner is paid an agreed daily rate, for example $20,000 a day.

During the period that it is on charter the vessel is directed by the shipper, who tells it where to load cargo, and where to discharge it. The advantage of the trip charter is that it allows the shipper to vary his itinerary and provides greater flexibility than a voyage charter under which the contract involves the transport of a specific Cargo Parcel.

### *10.3 The period timecharter*

Under a period charter the ship is a hired out by the "shipowner" to the "charterer" for a period of time specified in the contract ("charter party"). During this period the shipowner provides the crew and maintains the vessel, whilst the charterer directs its operations. Normally the charter party will specify a number of admissible days "off hire" each year for repairs and maintenance, and there will be an agreement in the contract for handling any additional time out of service.
Typically these charters may be three months, six months, twelve months, two years or in a few cases as long as 10 or even 15 years. Time charters have many different uses. The ship may be chartered by a cargo owner, for example an oil company, to carry its own cargo. Or it might be chartered by a shipowner who needs the vessel to meet cargo commitments, for example under a contract of a affreightment. Finally, some shipowner's may period time charter a vessel in the hope of trading it on the voyage charter market at a higher rate.

### *10.4 Main contract terms (timecharter)*

Time charter-parties follow the same general principles as the voyage charter (see paragraph 9.4), but also deal specifically with the ship's performance (i.e. fuel consumption, speed, quantity, trading limits, prohibited cargoes and allocation of voyage costs and prices of bunkers on delivery and redelivery) and equipment, and may exclude the items dealing with the cargo.

## 11 The Bareboat Charter Contracts

Finally, if a company wishes to have full operational/technical control of the ship, but does not wish to own it, a bare boat charter is arranged. Under this arrangement the investor, not necessarily a professional shipowner, purchases the vessel and hands it over to the charterer for a specified period, usually seven to twenty years. The charterer manages the vessel and pays all operating (including crewing, maintenance, dry docking etc.) and voyage costs and the owner, who is often a financial institution, is not active in the operation of a vessel and does not require any specific maritime skills. At the end of the charter the ship is returned to the owner, although some bareboat charters include an option to purchase the vessel on termination of the charter.

## 12 Market Reporting & Information Flow

The rates at which charters are fixed depend on market conditions and the free flow of information reporting latest developments plays a vital part in the market. Shipping has one of the most extensive market reporting systems of any capital industry and the network of brokers and information providers ensure a high degree of transparency in all the contract negotiations discussed above.

## 13 The Sale and Purchase Market

### *13.1 Procedure for buying and selling a ship*

About 1,300 deep sea merchant ships are sold each year, representing an investment of $16.7 billion in 2003. The market is very open, with ship prices freely reported and subject to open competition.

The participants in the sale and purchase market are the same mix of shippers, shipping companies and speculators who trade in the freight market.

Most sale and purchase transactions are carried out through shipbrokers.

### *13.2 How ship prices are determined*

The sale and purchase market thrives on price volatility. Profits earned from well-timed buying and selling activity are an important source of income for shipping investors. Prices are generally determined by supply and demand, which in turn depend on the cashflow pressures discussed in previous sections.

## 14 Comments on Cooperation in Bulk & Specialized Sectors

### *14.1 The principles of cooperation in shipping*

One of the methods used by shipping companies to improve their efficiency is to form an alliance with other companies. These alliances may take the form of pools, joint ventures, or space charter agreement.

**Table 5 Key issues in building shipping alliances**

| | Joint Venture / Consortia | Pool | Space Charter Arrangements |
|---|---|---|---|
| Capital Investment | Yes | | |
| Marketing & Customer awareness | Yes | Yes | |
| Chartering Efficiency | Yes | Yes | Yes |
| Arranging Cargo contracts (COA) | Yes | Yes | |
| Logistics & vessel productivity | Yes | Yes | Yes |
| Operating Cost Efficiency | Yes | Yes | Yes |
| Administrative cost efficiency | Yes | Yes | |
| Training | Yes | | |

Source: Clarkson Research Studies

### *14.2 Types of alliances:*

Table 5 shows three different types of alliance, joint ventures, pools and space charter agreements. Eight areas of potential cooperation are shown on the vertical axis - capital investment; marketing; chartering; cargo contracts; logistics and productivity; operating cost efficiency; administration and training.

The table illustrates in a very approximate sense the range of the activities which may be undertaken in each of the four types of alliance. A joint venture generally covers every business aspect. It is to all intents and purposes a separate company set up for a specific cooperative venture. In contrast "Pools" are usually concerned with marketing and the associated activities of delivering cargo and collecting revenue.

### *14.3 Joint venture agreements:*

A joint venture is a business arrangement in which two or more parties undertake a specific economic activity together. They are often bilateral in their nature. Whereas a pool is set up to accept a number of different members, a joint venture is usually restricted to a small number of partners who agree to work together on a specific project, or towards a specific goal. Joint ventures vary considerably in the amount of co-operation undertaken by the two parties.

### *14.4 Pool arrangements:*

One of the most common arrangements for working together in the shipping industry is the "Pool". Shipping pools are currently used in almost all segments of the tramp/non-liner shipping market including products tanker business, the chemical tanker business, the LPG business, the bulk carrier business and the crude tanker business.

A shipping pool can be defined as "a collection of similar vessel types under various ownerships placed in the care of a central administration"[18]. Areas of potential co-operation are shown in table 5. Pools are generally developed for 2 reasons. Firstly to allow participants to provide the service levels required by their major customers. Secondly, to improve transport efficiency by special investment and increased ship utilisation e.g. by arranging backhaul cargoes more effectively than a small group of ships could do.

### *14.5 Space Charter Agreements*

In the breakbulk era liner companies operated freight pools, particularly in thin trades, in order to spread operational costs. Containerisation saw the introduction of consortia (sharing administrative and operating costs and revenue) and alliances (sharing vessel operating costs) as carriers sought to drive down operating costs and increase vessel size to access scale. Vessel sharing agreements, today's most common format, operate on the basis of slot swaps between participating carriers with inequalities of provision and usage settled by cash cross-payments at pre-determined prices. In addition, carriers sell slots to third parties, to competing lines without sufficient market support to start their own services, and to lines seeking to supplement their own service capacity as well as to container leasing companies seeking to reposition empty containers. Slot charters are generally on the basis of long term inter-line contractual arrangements, with slot prices set for a fixed duration, but the slot prices for spot arrangements are fixed ad hoc. Needless to say, carriers prefer to restrict slot sales to capacity that they cannot themselves make profitable use of. Instances in which space is subcontracted to cargo interests are extremely rare or non-existent.

Space charter arrangements also exist in some of the specialised sectors. Considering the customer structure and the service requirements they place on the carriers it is a need to optimise capacity utilisation, sailing frequencies and port coverage to the benefit of the customers. Carriers use both irregular ad hoc space charter arrangements mainly to cover short term fluctuations as well as more regular fixed positioning space charters.



[18] William V. Packard 1989 Shipping Pools, Lloyds of London Press Ltd, London p 5

# *Appendix 1—Summary Tables*

## A1.1 Total Fleet Ownership Profile

**Merchant fleet by company size**

| Company Size | World Fleet | | | | European Union Owners | | | |
|---|---|---|---|---|---|---|---|---|
| | #Companies | # Ships | m. Dwt | Avg. Ships | #Companies | # Ships | m. Dwt | Avg. Ships |
| **(# owned vessels)** | | | | | | | | |
| **300+** | 4 | 2,099 | 59.5 | 525 | | | | |
| **200-299** | 3 | 794 | 40.3 | 265 | 1 | 261 | 12.7 | 261 |
| **100-199** | 9 | 1,201 | 61.4 | 133 | | | | |
| **50-99** | 45 | 3,010 | 124.0 | 67 | 14 | 912 | 30.4 | 65 |
| **10-49** | 469 | 8,898 | 321.8 | 19 | 193 | 3,772 | 136.5 | 20 |
| **5-9** | 584 | 3,856 | 107.2 | 7 | 245 | 1,612 | 52.2 | 7 |
| **2-4** | 1,404 | 3,731 | 73.3 | 3 | 460 | 1,246 | 32.6 | 3 |
| **0-1** | 2,277 | 2,194 | 23.3 | 1 | 538 | 503 | 8.0 | 1 |
| **Unknown** | | 497 | 7.1 | | | 17 | 0.5 | |
| **Total** | **4,795** | **26,280** | **817.9** | **5** | **1,451** | **8,323** | **272.9** | **6** |

Includes deep sea vessel, including bulk, specialised and liner

**Orderbook**

| Company Size | World Orderbook | | | | European Union Owners | | | |
|---|---|---|---|---|---|---|---|---|
| | # Companies | # Ships | m. Dwt | Avg. Ships | # Companies | # Ships | m. Dwt | Avg. Ships |
| **(# owned vessels)** | | | | | | | | |
| **300+** | 4 | 139 | 11.33 | 35 | | | | |
| **200-299** | 3 | 154 | 13.51 | 51 | 1 | 53 | 3.80 | 53 |
| **100-199** | 9 | 107 | 10.60 | 12 | | | | |
| **50-99** | 45 | 420 | 21.61 | 9 | 14 | 160 | 8.25 | 11 |
| **10-49** | 469 | 1,196 | 70.17 | 3 | 193 | 693 | 39.12 | 4 |
| **5-9** | 584 | 364 | 20.59 | 1 | 245 | 176 | 9.06 | 1 |
| **2-4** | 1,404 | 183 | 8.04 | 0 | 460 | 101 | 5.45 | 0 |
| **0-1** | 2,277 | 279 | 9.10 | 0 | 538 | 137 | 5.33 | 0 |
| **Unknown** | | 288 | 14.27 | | | 12 | 0.17 | |
| **Total** | **4,795** | **3,130** | **179.21** | **1** | **1,451** | **1,332** | **71.18** | **1** |

Source: Clarkson Research Studies

Fleet figures in this section relate to vessels operating in bulk, specialised and liner trades. Deep Sea fleet (generally over 2,000 dwt).
"European Union" refers to EU-15.

## A1.2 Fleet Summary

***Fleet Summary***

| | Fleet Size | Ownership | | | Vessel Acquisition | | | |
|---|---|---|---|---|---|---|---|---|
| | #ships | Owned by Top 20 | Company Size (ave.) | S&P Volume | 2003 sales as % fleet | N/B Volume | Orderbook as % of fleet | Asset Value, NB Price $m |
| **Bulk Carriers**[1] | 5,621 | 28.6% | 5 | High | 7.2% | High | 16.7% | 50.0 |
| **Forest Products Carriers** | 825 | 47.3% | 3 | Medium | 5.9% | Low | 5.9% | |
| **Crude Oil Tankers**[2] | 1,314 | 48.9% | 6 | High | 8.9% | High | 24.1% | 84.0 |
| **Oil Products Tankers**[3] | 1,599 | 33.2% | 3 | High | 11.3% | High | 37.4% | 35.0 |
| **Vegoil Tankers** | | | | Low | | Low | | |
| **Chemical Tankers** | 2,179 | 33.7% | 3 | Medium | 2.9% | Medium | 24.9% | |
| **LPG Carriers**[4] | 991 | 71.1% | 3 | Low | 2.7% | Medium | 12.0% | 66.0 |
| **LNG Carriers**[5] | 158 | 88.2% | 4 | Very Low | 0.0% | High | 41.9% | 165.0 |
| **Reefers** | 1,281 | 46.2% | 3 | High | 6.3% | Low | 0.0% | |
| **RoRo** | 1,035 | 42.2% | 2 | Medium | 3.0% | Low | 4.8% | |
| **PCTC**[6] | 504 | 79.7% | 5 | Low | 0.0% | High | 22.3% | 50.0 |

NB Price Sizes: [1] 170k dwt, [2] 300k dwt, [3] 47k dwt, [4] 78k cbm, [5] 138k cbm [6] 6,500 cars.

**Source: Clarkson Research Studies**

## A1.3 Total World Fleet

**million dwt**

| Year Start | Bulkers | Tankers All* | Tankers Spec.* | Combos | Total Bulk | Cellular | Multi-Purpose | Reefer | General Cargo | Pure Car Carriers | Ro-Ro | Total Gen.Cargo | Gas Tankers LPG | Gas Tankers LNG | Grand Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1980** | 140.7 | 332.3 | 7.0 | 47.4 | **520.4** | 9.9 | 8.5 | 5.8 | 61.1 | 1.9 | 3.7 | **90.9** | 5.1 | 2.9 | **619.2** |
| **1981** | 144.5 | 329.3 | 7.7 | 44.4 | **518.2** | 11.7 | 9.8 | 5.9 | 55.2 | 2.1 | 4.2 | **88.9** | 5.4 | 3.2 | **615.8** |
| **1982** | 158.4 | 324.5 | 8.6 | 42.7 | **525.6** | 12.3 | 10.8 | 6.0 | 51.0 | 2.4 | 4.6 | **87.2** | 5.9 | 3.4 | **622.1** |
| **1983** | 171.9 | 305.3 | 9.2 | 39.0 | **516.2** | 13.3 | 11.7 | 6.2 | 46.8 | 2.7 | 4.9 | **85.5** | 6.2 | 3.6 | **611.5** |
| **1984** | 181.0 | 286.2 | 9.5 | 37.3 | **504.5** | 15.0 | 12.9 | 6.5 | 38.4 | 3.0 | 5.3 | **81.1** | 6.1 | 3.7 | **595.3** |
| **1985** | 191.9 | 268.6 | 9.6 | 33.6 | **494.2** | 17.0 | 13.9 | 6.7 | 34.2 | 3.2 | 5.8 | **80.8** | 6.1 | 3.8 | **584.8** |
| **1986** | 197.0 | 245.4 | 10.2 | 32.4 | **474.8** | 19.1 | 15.0 | 6.6 | 30.2 | 3.7 | 6.2 | **80.8** | 6.0 | 3.7 | **565.3** |
| **1987** | 196.4 | 241.1 | 10.1 | 31.8 | **469.3** | 21.3 | 15.6 | 6.9 | 29.3 | 3.7 | 6.2 | **83.0** | 6.2 | 3.7 | **562.1** |
| **1988** | 195.7 | 239.9 | 10.1 | 31.4 | **467.0** | 22.8 | 16.0 | 6.9 | 28.3 | 3.9 | 6.4 | **84.3** | 6.2 | 3.6 | **561.1** |
| **1989** | 197.3 | 245.0 | 10.1 | 30.9 | **473.2** | 24.7 | 16.4 | 7.2 | 27.9 | 4.0 | 6.5 | **86.7** | 6.4 | 3.8 | **570.1** |
| **1990** | 203.4 | 252.8 | 10.1 | 30.3 | **486.6** | 26.3 | 16.8 | 7.4 | 27.0 | 4.0 | 6.6 | **88.1** | 6.9 | 3.9 | **585.5** |
| **1991** | 211.0 | 259.2 | 10.4 | 31.4 | **501.5** | 28.3 | 17.2 | 7.8 | 25.9 | 4.1 | 6.7 | **90.1** | 7.6 | 4.0 | **603.2** |
| **1992** | 214.2 | 266.3 | 10.7 | 30.8 | **511.3** | 30.7 | 17.7 | 8.1 | 24.5 | 4.1 | 6.8 | **92.0** | 8.3 | 4.1 | **615.7** |
| **1993** | 214.7 | 272.3 | 11.6 | 29.4 | **516.4** | 33.2 | 18.2 | 8.4 | 23.1 | 4.2 | 7.0 | **94.2** | 8.7 | 4.3 | **623.6** |
| **1994** | 219.0 | 277.1 | 11.7 | 25.9 | **521.9** | 36.0 | 18.5 | 8.7 | 21.1 | 4.3 | 7.1 | **95.7** | 8.8 | 4.9 | **631.4** |
| **1995** | 227.4 | 273.4 | 12.0 | 22.1 | **523.0** | 40.0 | 18.1 | 8.6 | 18.3 | 4.4 | 7.1 | **96.5** | 9.1 | 5.2 | **633.8** |
| **1996** | 243.1 | 273.5 | 12.4 | 19.8 | **536.4** | 45.1 | 18.2 | 8.3 | 15.6 | 4.5 | 7.3 | **98.9** | 9.5 | 5.8 | **650.6** |
| **1997** | 253.1 | 277.1 | 13.6 | 18.3 | **548.5** | 50.2 | 18.1 | 8.2 | 13.0 | 4.5 | 7.5 | **101.5** | 9.8 | 6.1 | **665.8** |
| **1998** | 263.8 | 279.0 | 15.5 | 16.1 | **558.9** | 56.7 | 18.7 | 8.2 | 14.1 | 4.7 | 7.6 | **110.0** | 9.9 | 6.3 | **685.1** |
| **1999** | 263.5 | 284.3 | 18.3 | 15.3 | **563.2** | 62.3 | 19.3 | 8.2 | 13.7 | 5.2 | 7.9 | **116.5** | 10.0 | 6.6 | **696.2** |
| **2000** | 266.8 | 287.2 | 20.0 | 14.9 | **568.8** | 64.7 | 19.0 | 8.0 | 14.3 | 5.7 | 8.1 | **119.8** | 10.2 | 7.1 | **706.0** |
| **2001** | 274.9 | 294.7 | 21.2 | 13.8 | **583.4** | 70.0 | 19.3 | 8.0 | 11.6 | 6.2 | 8.4 | **123.4** | 10.6 | 7.9 | **725.4** |
| **2002** | 286.6 | 289.9 | 13.9 | 13.6 | **590.2** | 77.5 | 20.4 | 7.9 | 12.3 | 6.4 | 8.5 | **132.9** | 11.1 | 8.0 | **742.1** |
| **2003** | 294.7 | 295.2 | 23.2 | 12.0 | **601.9** | 84.4 | 21.0 | 7.8 | 12.3 | 6.5 | 8.7 | **140.7** | 10.9 | 8.7 | **762.2** |
| **Average Growth** | | | | | | | | | | | | | | | |
| **2003/02** | 2.8% | 1.8% | 66.9% | -11.7% | **2.0%** | 8.9% | 3.0% | -1.3% | 0.4% | 2.5% | 1.9% | **5.9%** | -1.7% | 8.5% | **2.7%** |
| **1980-03** | 3.1% | -0.5% | 5.1% | -5.6% | **0.6%** | 9.4% | 3.8% | 1.3% | -6.5% | 5.2% | 3.6% | **1.8%** | 3.2% | 4.7% | **0.9%** |

** over 10,000 dwt. Source: Clarkson Research Studies

## A1.4 *World Seaborne Trade*

***million tonnes***

| Year | Iron Ore | Coal Coking | Coal Steam | Grain* | Baux./ Alum | Phos. Rock | Minor Bulk | Cont-ainer | Other Dry | Total Dry | Crude Oil | Oil Products | Total Oil | Gas Trade LPG | Gas Trade LNG | Grand Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1986** | 311 | 141 | 134 | 187 | 42 | 45 | 555 | 173 | 555 | **2,143** | 1,030 | 400 | **1,430** | 22 | 35 | **3,630** |
| **1987** | 319 | 145 | 148 | 211 | 46 | 45 | 575 | 192 | 532 | **2,213** | 977 | 378 | **1,355** | 24 | 37 | **3,629** |
| **1988** | 346 | 155 | 158 | 216 | 49 | 47 | 603 | 211 | 550 | **2,335** | 1,086 | 415 | **1,501** | 23 | 41 | **3,900** |
| **1989** | 362 | 153 | 161 | 220 | 55 | 44 | 614 | 231 | 578 | **2,419** | 1,198 | 479 | **1,677** | 26 | 44 | **4,166** |
| **1990** | 347 | 155 | 182 | 215 | 55 | 37 | 607 | 246 | 626 | **2,469** | 1,155 | 446 | **1,601** | 28 | 53 | **4,151** |
| **1991** | 358 | 155 | 205 | 218 | 53 | 31 | 606 | 268 | 652 | **2,546** | 1,161 | 401 | **1,563** | 30 | 52 | **4,190** |
| **1992** | 337 | 154 | 214 | 224 | 48 | 30 | 618 | 292 | 673 | **2,589** | 1,245 | 406 | **1,650** | 32 | 53 | **4,325** |
| **1993** | 352 | 156 | 206 | 223 | 51 | 27 | 626 | 322 | 687 | **2,649** | 1,354 | 436 | **1,790** | 34 | 55 | **4,528** |
| **1994** | 380 | 157 | 217 | 207 | 49 | 29 | 659 | 357 | 689 | **2,744** | 1,375 | 430 | **1,805** | 33 | 58 | **4,641** |
| **1995** | 402 | 160 | 242 | 216 | 52 | 30 | 699 | 389 | 696 | **2,886** | 1,400 | 446 | **1,846** | 34 | 33 | **4,800** |
| **1996** | 392 | 165 | 260 | 219 | 54 | 31 | 698 | 430 | 753 | **3,002** | 1,469 | 475 | **1,944** | 36 | 66 | **5,048** |
| **1997** | 428 | 169 | 281 | 229 | 55 | 32 | 707 | 470 | 789 | **3,160** | 1,554 | 494 | **2,048** | 37 | 74 | **5,318** |
| **1998** | 428 | 167 | 284 | 226 | 55 | 31 | 686 | 503 | 810 | **3,190** | 1,545 | 476 | **2,021** | 35 | 75 | **5,321** |
| **1999** | 405 | 161 | 303 | 247 | 54 | 31 | 683 | 559 | 799 | **3,241** | 1,584 | 502 | **2,086** | 37 | 82 | **5,446** |
| **2000** | 449 | 169 | 337 | 264 | 54 | 28 | 697 | 622 | 807 | **3,427** | 1,651 | 496 | **2,147** | 39 | 92 | **5,705** |
| **2001** | 454 | 166 | 369 | 260 | 54 | 27 | 698 | 640 | 852 | **3,520** | 1,643 | 546 | **2,190** | 36 | 94 | **5,840** |
| **2002** | 474 | 167 | 380 | 268 | 54 | 26 | 705 | 709 | 814 | **3,597** | 1,603 | 558 | **2,161** | 36 | 100 | **5,894** |
| **2003 (f)** | 516 | 172 | 416 | 269 | 54 | 26 | 719 | 787 | 782 | **3,741** | 1,688 | 577 | **2,265** | 37 | 106 | **6,149** |
| **2004 (f)** | 558 | 176 | 430 | 266 | 54 | 26 | 738 | 860 | 756 | **3,865** | 1,725 | 561 | **2,286** | 38 | 112 | **6,301** |
| **Average Growth** | | | | | | | | | | | | | | | | |
| **2003-02** | 9.0% | 2.9% | 9.5% | 0.1% | 0.0% | 3.5% | 2.0% | 11.0% | -3.9% | 4.0% | 5.3% | 3.4% | 4.8% | 2.3% | 5.9% | 4.3% |
| **1986-04** | 3.1% | 1.2% | 6.3% | 1.9% | 1.3% | -2.8% | 1.5% | 8.8% | 1.6% | 3.2% | 2.7% | 1.8% | 2.5% | 2.8% | 6.4% | 2.9% |

Bulk and oil trades as per "Dry Bulk Trade Outlook" and "Oil & Tanker Trade Outlook", respectively. LPG trade covers OECD only.

* Includes soyabean

Source: Clarkson Research Studies

## A1.5 *Shipping Market Volatility - Last 7 Years*

| Spot Market Rate Volatility - Last 7 Years | | | | | |
|---|---|---|---|---|---|
| | Crude Tankers | CPP Tankers | Bulk-carriers | VLGCs | Chemical Tankers* |
| | $/day | $/day | $/day | $/day | $/t |
| **Mean Average** | 29,709 | 17,179 | 9,396 | 25,144 | 55.6 |
| **St. Dev.** | 14,669 | 7,606 | 5,549 | 8,703 | 8.7 |
| **St. Dev / Mean** | 0.49 | 0.44 | 0.59 | 0.35 | 0.16 |
| **Max** | 75,589 | 44,091 | 34,790 | 49,145 | 95.0 |
| **Min** | 11,025 | 7,080 | 5,116 | 7,561 | 40.0 |
| **Range** | 64,564 | 37,011 | 29,674 | 41,584 | 55.0 |

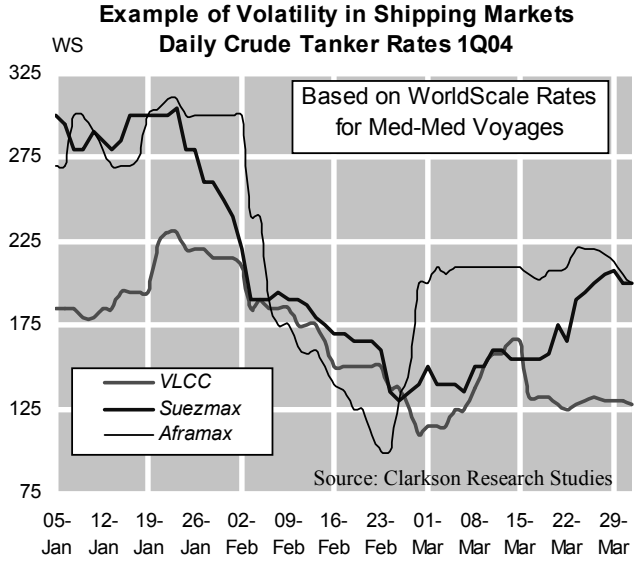
* All units $/day, apart from chemical tankers - based on Rott-F.East 3,000t $/t

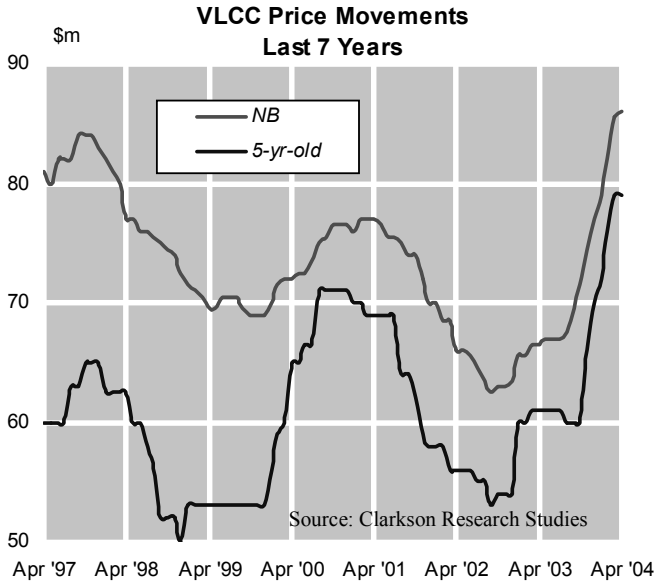
| 5-yr old Secondhand Price Volatility - Last 7 Years | | | | |
|---|---|---|---|---|
| | VLCC Tanker | Product Tanker | Panamax Bulker | VLGC* |
| | $m | $m | $m | $m |
| **Mean Average** | 61.0 | 23.0 | 18.1 | 55.4 |
| **St. Dev.** | 6.8 | 2.4 | 4.8 | 3.3 |
| **St. Dev / Mean** | 0.11 | 0.10 | 0.26 | 0.06 |
| **Max** | 79.0 | 27.0 | 36.0 | 63.0 |
| **Min** | 50.0 | 19.5 | 13.5 | 52.0 |
| **Range** | 29.0 | 7.5 | 22.5 | 11.0 |

* 3-year old

| Newbuilding Price Volatility - Last 7 Years | | | | |
|---|---|---|---|---|
| | VLCC Tanker | Product Tanker | Panamax Bulker | VLGC |
| | $m | $m | $m | $m |
| **Mean Average** | 73.3 | 28.7 | 23.2 | 60.1 |
| **St. Dev.** | 5.9 | 2.4 | 3.0 | 3.5 |
| **St. Dev / Mean** | 0.08 | 0.08 | 0.13 | 0.06 |
| **Max** | 86.0 | 36.0 | 34.5 | 69.0 |
| **Min** | 62.5 | 25.5 | 19.0 | 56.0 |
| **Range** | 23.5 | 10.5 | 15.5 | 13.0 |

Source: Clarkson Research Studies



## A1.6 Glossary of Chartering Terms

**BOX 3.1** Glossary of chartering terms

**Shipper** Individual or company with cargo to transport.

**Charterer** Individual or company who hires a ship.

**Charter-party** Contract setting out the terms on which the shipper contracts for the transportation of his cargo or the charterer contracts for the hire of a ship.

**Voyage charter** Ship earns freight per ton of cargo transported on terms set out in the charter-party which specifies the precise nature and volume of cargo, the port(s) of loading and discharge and the laytime and demurrage. All costs paid by the shipowner.

**Consecutive voyage charter** Vessel hired to perform a series of consecutive voyages between A and B.

**Contract of Affreightment (COA)** Shipowner undertakes to carry quantities of a specific cargo on a particular route or routes over a given period of time using ships of his choice within specified restrictions.

**Period charter** The vessels is hired for a specified period of time for payment of a daily, monthly or annual fee. There are three types, time charter, trip charter and consecutive voyage charter.

**Time charter** Ship earns hire, monthly or semi-monthly. The shipowner retains possession and mans and operates ship under instructions from charterer who pays voyage costs (see chapter 3 for definition).

**Trip charter** Fixed on a time charter basis for the period of a specific voyage and for the carriage of a specific cargo. Shipowner earns `hire' per day for the period determined by the voyage.

**Bare boat charter** The owner of the ship contracts (for a fee, usually long-term) to another party for its operation. The ship is then operated by the second party as if he owned it.

**Laytime** The period of time agreed between the party to a voyage charter during which the owner will make ship available for loading/discharging of cargo.

**Demurrage** The money payable to the shipowner for delay for which he is not responsible in loading and/or discharging beyond the laytime.

**Despatch** Means the money which the owner agreed to repay if the ship is loaded or discharged in less than the laytime allowed in the charter-party (customarily demurrage).

*Common abbreviations*

**c.i.f.** The purchase price of the goods (by importer) include payment of insurance and freight which is arranged by the exporter.

## A1.7 World Fleet by Owner Country

| | | Number of vessels by flag | | | Deadweight Tonnage by flag | | | Foreign % | Total % |
|---|---|---|---|---|---|---|---|---|---|
| Country | Region | National | Foreign | Total | National | Foreign | Total | Total | World |
| Greece | | 789 | 2,374 | 3,163 | 45,707,599 | 100,084,762 | 145,792,361 | 68.7 | 19.2 |
| Japan | | 793 | 2,201 | 2,994 | 14,243,067 | 88,505,212 | 102,748,279 | 86.1 | 13.5 |
| Norway | | 904 | 815 | 1,719 | 27,983,264 | 34,638,082 | 62,621,346 | 55.3 | 8.3 |
| United States | | 542 | 886 | 1,428 | 10,198,991 | 31,971,894 | 42,170,885 | 75.8 | 5.6 |
| China | | 1,584 | 652 | 2,236 | 21,673,882 | 20,250,807 | 41,924,489 | 48.3 | 5.5 |
| Germany | | 422 | 1,798 | 2,220 | 7,172,889 | 30,746,578 | 37,919,467 | 81.1 | 5.0 |
| Hong Kong (China) | | 197 | 360 | 557 | 11,305,895 | 25,055,845 | 36,361,340 | 68.9 | 4.8 |
| Republic of Korea | | 467 | 405 | 872 | 7,760,866 | 17,928,141 | 25,689,007 | 69.8 | 3.4 |
| Taiwan | | 144 | 398 | 542 | 6,697,751 | 14,995,465 | 21,693,216 | 69.1 | 2.9 |
| United Kingdom | | 424 | 420 | 844 | 8,330,039 | 10,857,257 | 19,187,296 | 56.6 | 2.5 |
| Singapore | | 455 | 262 | 717 | 11,828,401 | 6,131,682 | 17,960,083 | 34.1 | 2.4 |
| Denmark | | 386 | 343 | 729 | 8,048,977 | 8,993,460 | 17,042,437 | 52.8 | 2.2 |
| Russian Federation | | 2,156 | 369 | 2,525 | 8,323,528 | 7,106,943 | 15,430,471 | 46.1 | 2.0 |
| Italy | | 518 | 128 | 646 | 8,601,392 | 4,432,127 | 13,033,519 | 34.0 | 1.7 |
| India | | 363 | 48 | 411 | 10,202,571 | 1,577,447 | 11,780,018 | 13.4 | 1.6 |
| SaudiArabia | | 58 | 67 | 125 | 994,200 | 9,150,583 | 10,144,783 | 90.2 | 1.3 |
| Turkey | | 447 | 116 | 563 | 7,762,415 | 1,516,449 | 9,278,864 | 16.3 | 1.2 |
| Brazil | | 153 | 28 | 181 | 5,384,908 | 2,684,919 | 8,069,827 | 33.3 | 1.1 |
| Sweden | | 186 | 160 | 346 | 1,376,337 | 6,620,120 | 7,996,457 | 82.8 | 1.1 |
| Belgium | | 26 | 145 | 171 | 155,155 | 7,397,224 | 7,552,379 | 98.0 | 1.0 |
| Netherlands | | 604 | 220 | 824 | 3,995,888 | 2,804,334 | 6,800,222 | 41.2 | 0.9 |
| Malaysia | | 234 | 78 | 312 | 5,169,704 | 1,529,591 | 6,699,295 | 22.8 | 0.9 |
| Iran, Islamic | | 161 | 2 | 163 | 6,219,557 | 82,087 | 6,301,644 | 1.3 | 0.8 |
| Switzerland | | 12 | 223 | 235 | 576,192 | 5,629,968 | 6,206,160 | 90.7 | 0.8 |
| France | | 176 | 102 | 278 | 2,986,225 | 3,122,524 | 6,108,749 | 51.1 | 0.8 |
| Philippines | | 307 | 27 | 334 | 4,189,994 | 657,895 | 4,827,889 | 13.6 | 0.6 |
| Indonesia | | 513 | 93 | 606 | 3,251,026 | 1,167,330 | 4,418,356 | 26.4 | 0.6 |
| Canada | | 159 | 76 | 235 | 1,052,475 | 2,940,937 | 3,993,412 | 73.6 | 0.5 |
| Spain | | 67 | 255 | 322 | 118,049 | 3,776,299 | 3,894,348 | 97.0 | 0.5 |
| Kuwait | | 32 | 3 | 35 | 3,384,404 | 275,446 | 3,659,850 | 7.5 | 0.5 |
| United Arab Emirates | | 40 | 148 | 188 | 455,107 | 2,638,330 | 3,093,437 | 85.3 | 0.4 |
| Australia | | 54 | 36 | 90 | 1,618,721 | 1,337,051 | 1,337,051 | 100.0 | 0.0 |
| Monaco | | 0 | 104 | 104 | 0 | 2,672,083 | 2,672,083 | 100.0 | 0.0 |
| Cyprus | | 39 | 36 | 75 | 770,399 | 1,863,877 | 1,863,877 | 100.0 | 0.0 |
| Croatia | | 65 | 44 | 109 | | 1,324,544 | 1,324,544 | 100.0 | 0.0 |
| Subtotal | | 13,457 | 13,442 | 26,899 | 0 | 462,466,793 | 717,597,241 | 64 | |
| World | | 16,044 | 14,421 | 30,465 | 279,375,866 | 479,928,099 | 759,298,765 | 63 | |

Source: UNCTAD Yearbook 2002 Table 16, page 31

These statistics are from Lloyds Register and relate to ships over 100 Gross Tons. The precise number of ships in the merchant fleet depends on the lower limit

# *Appendix 2*

# *Overview of the Tramp Shipping Market Segments*

***Notes to data***

1. ***The following data covers the world deep sea fleet, as per Clarksons Shipping Intelligence Weekly.***
2. ***It is a difficult exercise to accurately report ownership information for the c.40,000 vessels on the Clarkson Fleet Database. In the following data we have used Clarksons Major Group indicator that groups ships under the highest level of ownership that we are aware of. Owner type is based on analysts estimates.***
3. ***Some industry data included in this discussion is based on estimates or subjective judgments in circumstances where data for actual market transactions either does not exist or is not publicly available; the published information of other maritime data collection experts may differ from this data; while we have taken reasonable care in the compilation of the industry statistical data, graphs and tables and believe them to be correct, data compilation is subject to limited audit and validation procedures; Clarkson Research, its agents, officers and employees cannot accept liability for any loss suffered in consequence of reliance on such information or in any other manner; and the provision of such data, graphs and tables does not obviate the need to make appropriate further inquiries.***
4. ***Where reference is made to "European Union", this incorporates the existing EU-15 countries. It does not include Norway.***

## A2.1 Bulk carrier Market Profile

| | World | | | European Union | | |
|---|---|---|---|---|---|---|
| | **ships** | **m.dwt** | **# owners** | **ships** | **m.dwt** | **# owners** |
| **Fleet, Mar-04** | **5,621** | **304.3** | **1122** | **1,700** | **96.8** | **443** |
| **Orderbook, Mar-04** | **674** | **50.8** | **141** | **163** | **11.5** | **51** |
| O'book as % of fleet | 12.0% | 16.7% | | 9.6% | 11.9% | |
| **Top 20 Owners' Fleet, m.dwt, Mar-04** | **1,308** | **87.0** | | | | |
| % of fleet | 23.3% | 28.6% | | | | |
| **Ownership Type** | | | | | | |
| Industrial & Utilities | 56 | 6.7 | 12 | 4 | 0.2 | 2 |
| 7 Oil Majors | | | | | | |
| Other Oil Companies | | | | | | |
| State Owned Commercial | 738 | 28.9 | 32 | 1 | 0.1 | 1 |
| State Owned Non-Commercial | | | | | | |
| Independent Public | 603 | 43.5 | 37 | 45 | 3.4 | 7 |
| Independent Private | 4,172 | 222.8 | 1,051 | 1,633 | 92.5 | 431 |
| Independent Manager | 52 | 2.4 | 16 | 17 | 0.6 | 4 |
| **NB Contracts, m.dwt, 2003** | **384** | **29.4** | | | | |
| % of fleet | 6.8% | 9.7% | | | | |
| **S/H Sales, m.dwt, 2003** | **374** | **21.8** | | | | |
| % of fleet | 6.7% | 7.2% | | | | |

**Entry Conditions.** Relatively easy. Vary between the major commodities. Pooling arrangements and high asset costs in the large vessel sectors exist.

**Type of Cargo, Charters.** COAs, period charters and spot chartering all widely used.

| **Cargo Volumes (Dry Bulks)** | | **2002** | **2003** | **2004** |
|---|---|---|---|---|
| World Imports, m.tonnes | | **2,073** | **2,172** | **2,249** |
| | growth | 2% | 5% | 4% |
| EU Major Bulk Imports, m.tonnes | | **293** | **308** | **309** |
| | growth | 2% | 5% | 0% |

Source: Clarkson Research Studies

### Bulk carrier Sector Overview

The major bulk cargoes include raw materials (e.g. iron ore & coal), cereal in general, minor ores and phosphates. At an owner level the sector is not highly concentrated, with the top 20 owners responsible for 29% of the fleet (though this does not mean that they have 29% of any particular bulk trade). However, the level of concentration might be seen to be greater looking at the operator level, noting that many ship operators are chartering vessels from across the spectrum of ownership.

Demand for bulkcarriers is spread among utilities companies, commodity producers and traders. The number of charterers responsible for more than 10mt of seaborne cargo per annum is likely to be more than 25, but maybe not by many. The picture is different across cargoes; in the iron ore market the 3 major players (CVRD, BHP Billiton, Rio Tinto) are responsible for 75% of the cargo, whilst the coal and grain markets are much more fragmented. Consolidation does take place (a good example being the merger of major mineral interests BHP and Billiton), but the sector as a whole could not be said to be characterized by high levels of concentration. Our fixture data shows that around 400 charterers were active in the dry bulk market in 2003, with the top 20 responsible for around 48% of tonnage.

There are a number of 'pooling' type arrangements. Although these are more numerous, but possibly more 'niche' in the Handymax and Handysize sectors, there are also prevalent in the Panamax and Capesize sectors whereby a major shipper can call on a 'pool' of ships taken from a group of shipowners.

## Bulk carrier Fleet Ownership Profile

**Fleet**

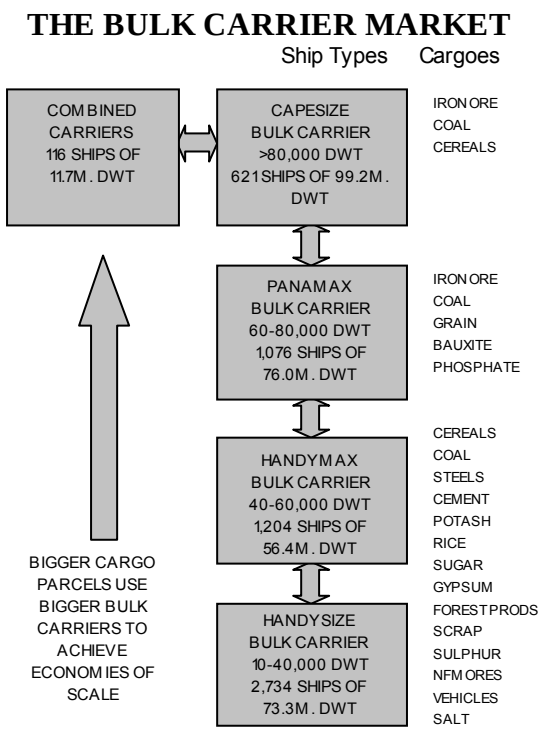
| Company Size | World Fleet | | | | European Union Owners | | | |
|---|---|---|---|---|---|---|---|---|
| | # Companies | # Ships | m.Dwt | Avg. Ships | # Companies | # Ships | m.Dwt | Avg. Ships |
| **(# owned vessels)** | | | | | | | | |
| **300+** | | | | | | | | |
| **200-299** | 1 | 297 | 15.91 | 297 | | | | |
| **100-199** | 4 | 508 | 26.60 | 127 | | | | |
| **50-99** | 7 | 374 | 22.82 | 53 | 1 | 52 | 1.86 | 52 |
| **10-49** | 92 | 1,534 | 95.48 | 17 | 27 | 420 | 32.04 | 16 |
| **5-9** | 193 | 1,251 | 70.63 | 6 | 94 | 592 | 32.74 | 6 |
| **2-4** | 416 | 1,127 | 52.79 | 3 | 168 | 471 | 23.27 | 3 |
| **0-1** | 424 | 408 | 15.80 | 1 | 158 | 152 | 6.38 | 1 |
| **Unknown** | | 122 | 4.28 | | | 13 | 0.51 | |
| **Total** | **1,137** | **5,621** | **304.31** | **5** | **448** | **1,700** | **96.79** | **4** |

Source: Clarkson Research Studies

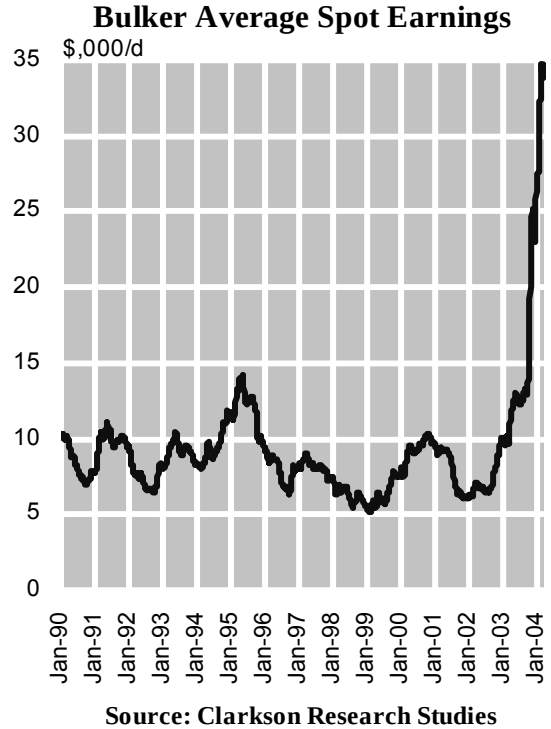
**Orderbook**

| Company Size | World Orderbook | | | | European Union Owners | | | |
|---|---|---|---|---|---|---|---|---|
| | # Companies | # Ships | m.Dwt | Avg.Ships | # Companies | # Ships | m.Dwt | Avg. Ships |
| **(# owned vessels)** | | | | | | | | |
| **300+** | | | | | | | | |
| **200-299** | 1 | 25 | 2.06 | 25 | | | | |
| **100-199** | 4 | 45 | 4.75 | 11 | | | | |
| **50-99** | 7 | 20 | 1.83 | 3 | 1 | 4 | 0.17 | 4 |
| **10-49** | 92 | 167 | 12.55 | 2 | 27 | 30 | 2.88 | 1 |
| **5-9** | 193 | 107 | 8.50 | 1 | 94 | 62 | 4.63 | 1 |
| **2-4** | 416 | 95 | 7.19 | 0 | 168 | 20 | 1.61 | 0 |
| **0-1** | 424 | 55 | 2.71 | 0 | 158 | 47 | 2.21 | 0 |
| **Unknown** | | 160 | 11.18 | | | | | |
| **Total** | **1,137** | **674** | **50.78** | **1** | **448** | **163** | **11.50** | **0** |

Source: Clarkson Research Studies




Source: Clarkson Research Studies




**Source: Clarkson Research Studies**

## A2.2 Forest Products Carrier Market Profile

| | World | | | European Union | | |
|---|---|---|---|---|---|---|
| | **ships** | **m.dwt** | **# owners** | **ships** | **m.dwt** | **# owners** |
| **Fleet, Mar-04** | **825** | **27.6** | **307** | **183** | **5.6** | **96** |
| **Orderbook, Mar-04** | **44** | **1.6** | **17** | **14** | **0.5** | **5** |
| O'book as % of fleet | 5.3% | 5.9% | | 7.7% | 8.6% | |
| **Top 20 Owners' Fleet, m.dwt, Mar-04** | **337** | **13.0** | | | | |
| % of fleet | 40.8% | 47.3% | | | | |
| **Ownership Type** | | | | | | |
| Industrial & Utilities | | | | | | |
| 7 Oil Majors | | | | | | |
| Other Oil Companies | | | | | | |
| State Owned Commercial | | | | | | |
| State Owned Non-Commercial | 56 | 1.6 | 15 | | | |
| Independent Public | 122 | 4.8 | 18 | 4 | 0.1 | 2 |
| Independent Private | 633 | 20.6 | 278 | 171 | 5.2 | 92 |
| Independent Manager | 14 | 0.4 | 4 | 8 | 0.3 | 2 |
| **NB Contracts, m.dwt, 2003** | **15** | **0.57** | | | | |
| % of fleet | 1.8% | 2.1% | | | | |
| **S/H Sales, m.dwt, 2003** | **53** | **1.61** | | | | |
| % of fleet | 6.4% | 5.9% | | | | |

**Entry Conditions.** There are a large range of vessels that can operate in this sector, but relatively few major operators choose to specialise in the forest product trades.

**Type of Cargo, Charters.** Timber, Wood Pulp, Rolled Paper. Most business is organised on a contractual basis between ship owners and customers.

| **Cargo Values** | **2000** | **2001** |
|---|---|---|
| World Imports, $m | **141,886** | **126,079** |
| growth | | -11% |
| EU Imports, $m | **56,558** | **48,581** |
| growth | | -14% |

Source: Clarkson Research Studies, UN/FAO

### Forest Products Carrier Sector Overview

This is a sub-segment of the "Bulk" markets with an orientation towards large unitised parcels. According to our database the forest products carrier fleet stands at 825 vessels of 27.6m.dwt. This covers open hatch carriers, chip carriers, log carriers, lumber carriers and forest product carriers (there are other vessel types (semi-open box vessels/ro-ros) which also operate in this sector but are not included). Cargoes range from logs to battens & bundles, as well as wood pulp and rolled paper. Vessels in this sector are "mixed" product in as much as they are also involved in the carriage of unitized cargoes, project cargoes and containers, and the range of cargoes that such a vessel will carry on an annual basis outside just forestry can be diverse (say 40% forestry, 35% other parcel, 25% bulk).

This diversity of forest product cargo sizes means that the shipper will use whatever type of shipping operation is most economic for that particular cargo; in some cases this may involve the use of a bulk carrier, but in others pulp, paper and logs continue to travel on liner/ro ro services. A large proportion of open-hatch business is based on long-term contracts of affreightment with customers.

Although there is a "desire" for specialisation in forestry products transport, the reality is that there is no such vessel that is "purely" a forest products carrier. The choices of owners dictate the degree of cargo care specialisation he chooses to provide to find the "right" customer at the right price. The ownership of the fleet as defined above is fairly narrow with the top 20 owners responsible for almost half the fleet. In the newbuilding market only 15 new contracts were reported last year. The secondhand market is more active, with 53 sales in 2003.

## Forest Products Carrier Fleet Ownership Profile

**Fleet**

| Company Size | World Fleet | | | | European Union Owners | | | |
|---|---|---|---|---|---|---|---|---|
| | # Companies | # Ships | 000 Dwt | Avg. Ships | # Companies | # Ships | 000 Dwt | Avg. Ships |
| **(# owned vessels)** | | | | | | | | |
| **200+** | | | | | | | | |
| **100-199** | | | | | | | | |
| **50-99** | | | | | | | | |
| **25-49** | 3 | 132 | 5,539.42 | 44 | | | | |
| **10-24** | 7 | 125 | 4,450.13 | 18 | 2 | 32 | 1,178.18 | 16 |
| **5-9** | 19 | 134 | 4,705.89 | 7 | 5 | 28 | 926.62 | 6 |
| **2-4** | 88 | 221 | 6,718.79 | 3 | 25 | 59 | 1,680.66 | 2 |
| **0-1** | 189 | 189 | 5,450.42 | 1 | 63 | 63 | 1,762.01 | 1 |
| **Unknown** | | 24 | 702.72 | | | 1 | 23.51 | |
| **Total** | **306** | **825** | **27,567.36** | **3** | **95** | **183** | **5,570.98** | **2** |

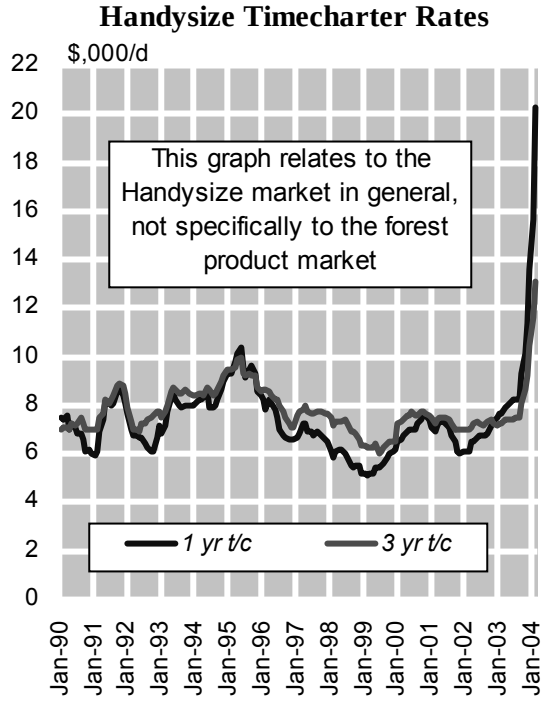
Source: Clarkson Research Studies

**Orderbook**

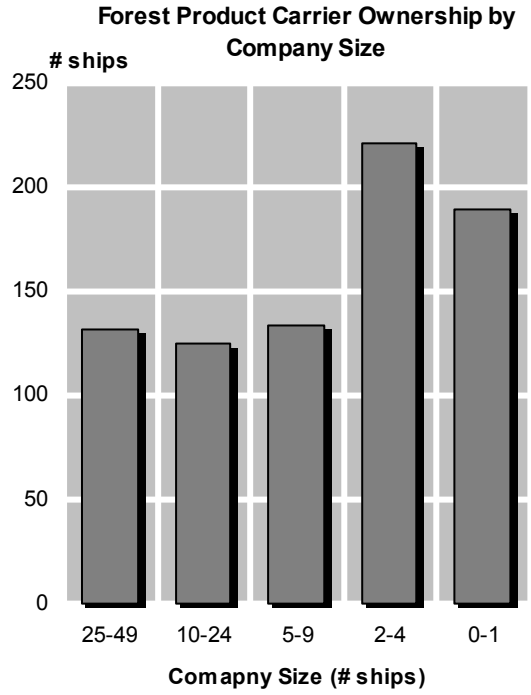
| Company Size | World Orderbook | | | | European Union Owners | | | |
|---|---|---|---|---|---|---|---|---|
| | # Companies | # Ships | 000 Dwt | Avg. Ships | # Companies | # Ships | 000 Dwt | Avg. Ships |
| **(# owned vessels)** | | | | | | | | |
| **200+** | | | | | | | | |
| **100-199** | | | | | | | | |
| **50-99** | | | | | | | | |
| **25-49** | 3 | 7 | 329.00 | 2 | | | | |
| **10-24** | 7 | 8 | 324.05 | 1 | 2 | 7 | 286.55 | 4 |
| **5-9** | 19 | 11 | 359.40 | 1 | 5 | 5 | 160.00 | 1 |
| **2-4** | 88 | 9 | 323.60 | 0 | 25 | 1 | 17.60 | 0 |
| **0-1** | 189 | 4 | 101.40 | 0 | 63 | 1 | 16.50 | 0 |
| **Unknown** | | 5 | 181.50 | | | | | |
| **Total** | **306** | **44** | **1,618.95** | **0** | **95** | **14** | **480.65** | **0** |

Source: Clarkson Research Studies

Please note other vessel types (semi-open box vessels/ro-ros) can also be employed in forest product trades.




**Source: Clarkson Research Studies**



## A2.3 Crude Oil Tanker Market Profile

| | World | | | European Union | | |
|---|---|---|---|---|---|---|
| | **ships** | **m.dwt** | **# owners** | **ships** | **m.dwt** | **# owners** |
| **Fleet, Mar-04** | **1,314** | **222.4** | **219** | **429** | **68.2** | **88** |
| **Orderbook, Mar-04** | **324** | **53.5** | **93** | **142** | **20.4** | **44** |
| O'book as % of fleet | 24.7% | 24.1% | | 33.1% | 29.9% | |
| **Top 20 Owners' Fleet, m.dwt, Mar-04** | **569** | **108.8** | | | | |
| % of fleet | 43.3% | 48.9% | | | | |
| **Ownership Type** | | | | | | |
| Industrial & Utilities | 5 | 1.4 | 1 | | | |
| 7 Oil Majors | 38 | 7.0 | 4 | 16 | 3.6 | 3 |
| Other Oil Companies | 117 | 22.7 | 20 | 11 | 1.3 | 3 |
| State Owned Commercial | 90 | 9.6 | 11 | | | |
| State Owned Non-Commercial | | | | | | |
| Independent Public | 289 | 54.9 | 24 | 28 | 5.5 | 4 |
| Independent Private | 773 | 126.6 | 167 | 374 | 57.7 | 79 |
| Independent Manager | 2 | 0.2 | 2 | | | |
| **NB Contracts, m.dwt, 2003** | **214** | **34.3** | | | | |
| % of fleet | 16.3% | 15.4% | | | | |
| **S/H Sales, m.dwt, 2003** | **144** | **19.8** | | | | |
| % of fleet | 11.0% | 8.9% | | | | |

**Entry Conditions.** Relatively easy. Asset costs depend on size of vessel (current VLCC price = $84m).

**Type of Cargo, Charters.** Homogeneous cargo encourages competition between vessels of different sizes. Long-term contracts, period charters and spot chartering all widely used. Main charterers are oil majors/traders.

| **Cargo Volumes** | | **2000** | **2001** | **2002** | **2003** |
|---|---|---|---|---|---|
| World Imports, m.bpd | | **33.1** | **33.0** | **32.2** | **33.9** |
| | growth | 23% | 0% | -2% | 5% |
| EU Imports, m.bpd | | **9.7** | **9.3** | **8.7** | **9.1** |
| | growth | -32% | -4% | -6% | 5% |

Source: Clarkson Research Studies

### Crude Oil Tanker Sector Overview

The crude oil tanker fleet incorporates 1,314 vessels ranging from 60,000-450,000 dwt. It covers four major sectors: Panamax (uncoated, 60-80,000 dwt), Aframax (uncoated, 80-120,000 dwt), Suezmax (120-200,000 dwt) and VL/ULCC (200,000 dwt+). The size of vessels used on a particular route is usually determined by cargo size and port facilities, but since these vessels carry only one type of cargo (crude oil), there can be significant competition between the size ranges, with, for example, VLCCs switched into Suezmax trades as long as port facilities can handle bigger vessels.

Demand for crude oil tankers is centred on the major oil companies. The oil industry has witnessed a significant degree of consolidation in the past decade, and this has been reflected in the chartering patterns. Our fixture database recorded 220 charterers in the crude oil market in 2003, with the top 20 accounting for 55% of tonnage. In the past the oil majors have also played a significant role in the ownership of the fleet, although this has diminished and they now only account for just 38 vessels. The majority of the fleet is currently owned by independent owners. The top 20 owners account for almost half of the fleet by dwt, though ownership in the larger sectors is more concentrated. Owning and operating the largest tankers requires considerable capital investment.

The sale & purchase market is relatively active, with 9% of the fleet by dwt changing hands in 2003. Over the past few years this market has been characterised by several large en-bloc deals, with the major players adding to their fleets.

## Crude Oil Tanker Fleet Ownership Profile

**Fleet**

| Company Size | World Fleet | | | | European Union Owners | | | |
|---|---|---|---|---|---|---|---|---|
| | # Companies | # Ships | m. Dwt | Avg. Ships | # Companies | # Ships | m. Dwt | Avg. Ships |
| **(# owned vessels)** | | | | | | | | |
| **300+** | | | | | | | | |
| **200-299** | | | | | | | | |
| **100-199** | | | | | | | | |
| **50-99** | 2 | 118 | 21.94 | 59 | | | | |
| **10-49** | 35 | 667 | 112.60 | 19 | 13 | 195 | 29.05 | 15 |
| **5-9** | 39 | 258 | 48.10 | 7 | 18 | 117 | 21.25 | 7 |
| **2-4** | 69 | 196 | 31.06 | 3 | 31 | 91 | 14.87 | 3 |
| **0-1** | 84 | 73 | 8.47 | 1 | 32 | 26 | 2.99 | 1 |
| **Unknown** | | 2 | 0.18 | | | | | |
| **Total** | **229** | **1,314** | **222.35** | **6** | **94** | **429** | **68.17** | **5** |

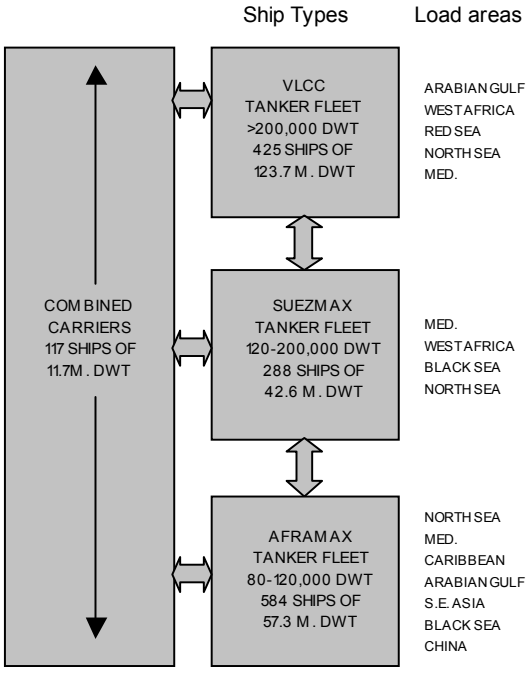
Source: Clarkson Research Studies

**Orderbook**

| Company Size | World Orderbook | | | | European Union Owners | | | |
|---|---|---|---|---|---|---|---|---|
| | # Companies | # Ships | m. Dwt | Avg. Ships | # Companies | # Ships | m. Dwt | Avg. Ships |
| **(# owned vessels)** | | | | | | | | |
| **300+** | | | | | | | | |
| **200-299** | | | | | | | | |
| **100-199** | | | | | | | | |
| **50-99** | 2 | 16 | 1.86 | 8 | | | | |
| **10-49** | 35 | 139 | 25.11 | 4 | 13 | 62 | 9.18 | 5 |
| **5-9** | 39 | 61 | 10.51 | 2 | 18 | 31 | 4.61 | 2 |
| **2-4** | 69 | 56 | 8.56 | 1 | 31 | 32 | 4.66 | 1 |
| **0-1** | 84 | 45 | 6.36 | 1 | 32 | 17 | 1.90 | 1 |
| **Unknown** | | 7 | 1.14 | | | | | |
| **Total** | **229** | **324** | **53.54** | **1** | **94** | **142** | **20.36** | **2** |

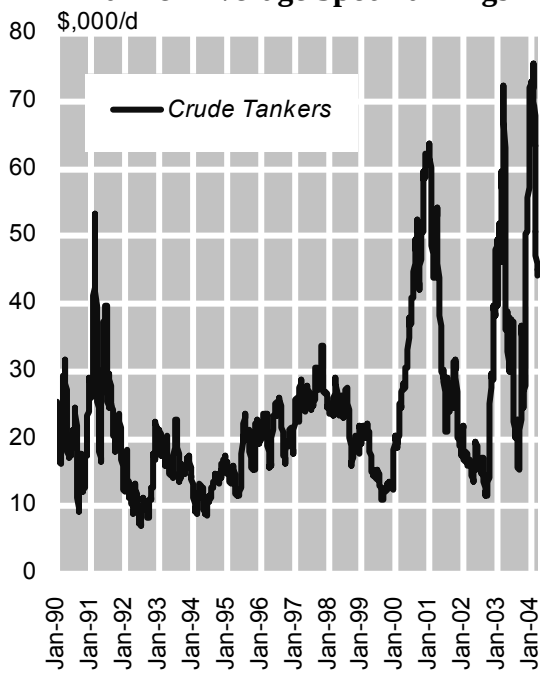
Source: Clarkson Research Studies

### THE CRUDE TANKER MARKET




Source: Clarkson Research Studies

### Tanker Average Spot Earnings




**Source: Clarkson Research Studies**

## A2.4 Oil Products Tanker Market Profile

| | World | | | European Union | | |
|---|---|---|---|---|---|---|
| | **ships** | **m.dwt** | **# owners** | **ships** | **m.dwt** | **# owners** |
| **Fleet, Mar-04** | **1,599** | **50.9** | **473** | **444** | **18.3** | **135** |
| **Orderbook, Mar-04** | **372** | **19.0** | **93** | **182** | **9.6** | **40** |
| O'book as % of fleet | 23.3% | 37.4% | | 41.0% | 52.5% | |
| **Top 20 Owners' Fleet, m.dwt, Mar-04** | **419** | **16.9** | | | | |
| % of fleet | 26.2% | 33.2% | | | | |
| **Ownership Type** | | | | | | |
| Industrial & Utilities | | | | | | |
| 7 Oil Majors | 22 | 1.1 | 5 | 14 | 0.8 | 2 |
| Other Oil Companies | 91 | 2.9 | 20 | 7 | 0.2 | 3 |
| State Owned Commercial | 322 | 7.7 | 28 | | | |
| State Owned Non-Commercial | 3 | 0.1 | 1 | | | |
| Independent Public | 163 | 7.5 | 29 | 53 | 2.4 | 8 |
| Independent Private | 990 | 31.4 | 397 | 368 | 14.9 | 121 |
| Independent Manager | 8 | 0.3 | 3 | 2 | 0.1 | 2 |
| **NB Contracts, m.dwt, 2003** | **244** | **13.0** | | | | |
| % of fleet | 15.3% | 25.5% | | | | |
| **S/H Sales, m.dwt, 2003** | **108** | **5.7** | | | | |
| % of fleet | 6.8% | 11.3% | | | | |

**Entry Conditions.** Capital costs are relatively low compared with larger crude oil sectors. Several major pooling arrangements are in operation.

**Type of Cargo, Charters.** A wide range of cargoes (fuel oil, gas oil, gasolene, jet, naphtha, mtbe).
Long-term contracts, period charters and spot chartering all widely used. Main charterers are oil majors/traders.

| **Cargo Volumes** | | **2000** | **2001** | **2002** | **2003** |
|---|---|---|---|---|---|
| World Imports, m.bpd | | **10.0** | **11.0** | **11.2** | **11.6** |
| | growth | -63% | 10% | 2% | 4% |
| EU Imports, m.bpd | | **3.7** | **4.2** | **4.0** | **3.5** |
| | growth | -74% | 14% | -5% | -13% |

Source: Clarkson Research Studies

### Oil Products Tanker Sector Overview

For the purposes of this review the oil products tanker fleet is defined as all non-specialised tankers below 60,000 dwt, as well as coated tankers above this size. These ships carry a spectrum of cargoes, ranging from relatively unsophisticated dirty products such as fuel oil through to clean products such as naphtha. Vessels that trade at one end of this spectrum are unlikely to be able to switch easily to the other end, and "last cargo" regulations ensure that dedicated fleets become established for some cargo types. At the most sophisticated end of the fleet there is an overlap with the chemical sector, with a significant volume of "swing tonnage" that can operate in either CPP or easychems depending on market conditions.

The ownership structure is relatively diverse. According to our database 509 companies own a total of 1,575 product tankers, with 269 vessels owned by 1-ship companies. There are 26 companies who own 10 or more vessels. This sector has received a massive amount of investment in the past few years and the orderbook for delivery over the next couple of years stands at 37% of the fleet. In the wake of the *Erika* and *Prestige* there has been a growing focus on modern, quality ships.

Demand is typically short-haul, matching refinery production with intra-regional demand. However, some longer-haul routes serve major refining regions such as the Middle East and the Caribbean. The biggest charterers are the major oil companies and oil traders. In 2003 our fixture database recorded 264 charterers of oil products tonnage, with the top 20 responsible for 59% of trade.

## Oil Products Tanker Fleet Ownership Profile

**Fleet**

| Company Size | World Fleet | | | | European Union Owners | | | |
|---|---|---|---|---|---|---|---|---|
| | # Companies | # Ships | m.Dwt | Avg. Ships | # Companies | # Ships | m.Dwt | Avg. Ships |
| (# owned vessels) | | | | | | | | |
| 300+ | | | | | | | | |
| 200-299 | | | | | | | | |
| 100-199 | | | | | | | | |
| 50-99 | 1 | 79 | 1.66 | 79 | | | | |
| 10-49 | 25 | 478 | 15.39 | 19 | 7 | 103 | 4.56 | 15 |
| 5-9 | 57 | 364 | 14.14 | 6 | 20 | 128 | 5.61 | 6 |
| 2-4 | 157 | 422 | 14.27 | 3 | 62 | 167 | 6.65 | 3 |
| 0-1 | 269 | 232 | 5.06 | 1 | 59 | 46 | 1.50 | 1 |
| Unknown | | 24 | 0.41 | | | | | |
| **Total** | **509** | **1,575** | **50.52** | **3** | **148** | **444** | **18.32** | **3** |

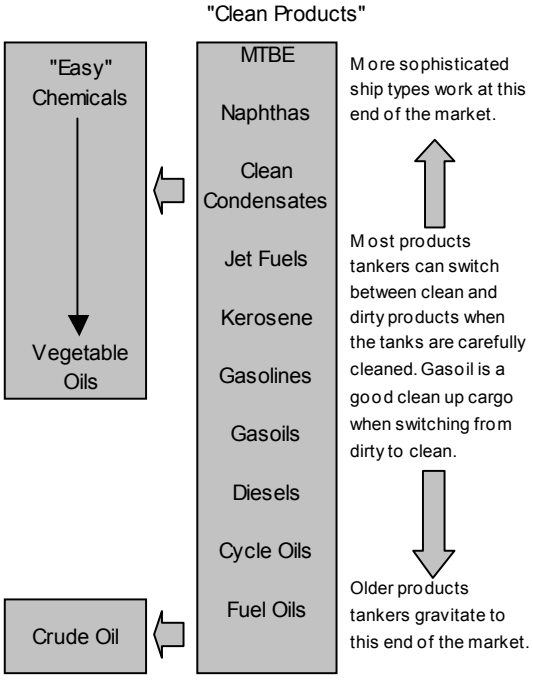
Source: Clarkson Research Studies

**Orderbook**

| Company Size | World Orderbook | | | | European Union Owners | | | |
|---|---|---|---|---|---|---|---|---|
| | # Companies | # Ships | m.Dwt | Avg. Ships | # Companies | # Ships | m.Dwt | Avg. Ships |
| (# owned vessels) | | | | | | | | |
| 300+ | | | | | | | | |
| 200-299 | | | | | | | | |
| 100-199 | | | | | | | | |
| 50-99 | 1 | 9 | 0.50 | 9 | | | | |
| 10-49 | 25 | 77 | 4.06 | 3 | 7 | 16 | 1.03 | 2 |
| 5-9 | 57 | 34 | 2.02 | 1 | 20 | 28 | 1.74 | 1 |
| 2-4 | 157 | 97 | 5.12 | 1 | 62 | 71 | 3.71 | 1 |
| 0-1 | 269 | 138 | 6.54 | 1 | 59 | 67 | 3.14 | 1 |
| Unknown | | 17 | 0.80 | | | | | |
| **Total** | **509** | **372** | **19.05** | **1** | **148** | **182** | **9.62** | **1** |

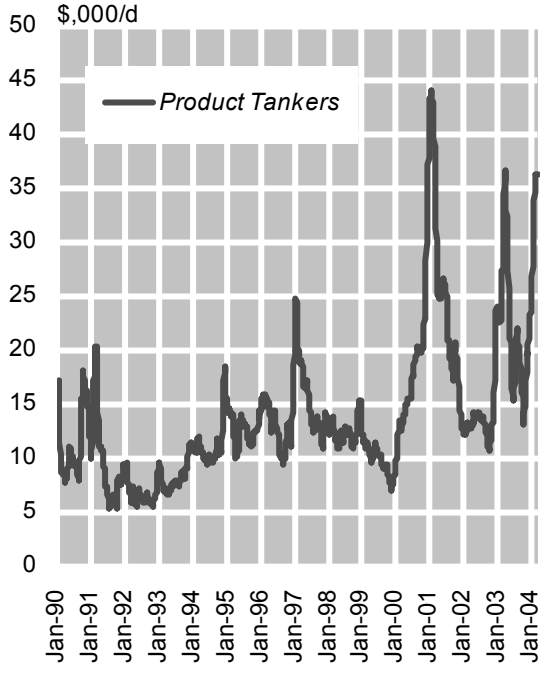
Source: Clarkson Research Studies

## PRODUCTS TANKER MARKET




Source: Clarkson Research Studies

## Tanker Average Spot Earnings




**Source: Clarkson Research Studies**

## A2.5 Chemical Tanker Market Profile

| | World | | | European Union | | |
|---|---|---|---|---|---|---|
| | **ships** | **m.dwt** | **# owners** | **ships** | **m.dwt** | **# owners** |
| **Fleet, Mar-04** | **2,179** | **32.9** | **703** | **644** | **11.1** | **180** |
| **Orderbook, Mar-04** | **329** | **8.2** | **118** | **148** | **4.0** | **56** |
| O'book as % of fleet | 15.1% | 24.9% | | 23.0% | 35.9% | |
| O'book as % of fleet (exc. IMO 3 Only) | 9.8% | 14.2% | | | | |
| **Top 20 Owners' Fleet, m.dwt, Mar-04** | **383** | **11.1** | | | | |
| % of fleet | 17.6% | 33.7% | | | | |
| % of fleet (excluding IMO 3 Only vessels) | 22.0% | 42.6% | | | | |
| **Ownership Type** | | | | | | |
| Industrial & Utilities | 12 | 0.4 | 2 | | | |
| 7 Oil Majors | 5 | 0.2 | 2 | | | |
| Other Oil Companies | 43 | 0.8 | 14 | 17 | 0.2 | 2 |
| State Owned Commercial | 73 | 1.1 | 20 | | | |
| State Owned Non-Commercial | | | | | | |
| Independent Public | 250 | 7.2 | 24 | 47 | 1.4 | 8 |
| Independent Private | 1,786 | 23.1 | 670 | 574 | 9.4 | 178 |
| Independent Manager | 10 | 0.2 | 5 | 6 | 0.1 | 3 |
| **NB Contracts, m.dwt, 2003** | **125** | **2.2** | | | | |
| % of fleet | 5.7% | 6.8% | | | | |
| **S/H Sales, m.dwt, 2003** | **56** | **0.96** | | | | |
| % of fleet | 2.6% | 2.9% | | | | |

**Entry Conditions.** The small number of owners and charterers present higher barriers to entry. The ownership structure is highly concentrated with pooling arrangements in place.

**Type of Cargo, Charters.** Owners operate liner-type parcel services based on COAs with a small number of major industrial charterers. There is a larger proportion of spot trade in the smaller sectors.

| **Cargo Volumes** | **2000** | **2001** | **2002 (e)** | **2003 (e)** |
|---|---|---|---|---|
| World Imports, m.tonnes | **108.5** | **110.7** | **116.2** | **118.4** |
| growth | 3% | 2% | 5% | 2% |

Source: Clarkson Research Studies, Drewry.

### Chemical Tanker Sector Overview

The chemical tanker fleet includes: 1. Modern parcel tankers with either full or partial stainless steel tanks that cover the sophisticated end of the chemicals market, for which IMO Grade I/II is required, and 2. Newer parcel tankers with the flexibility to carry many cargoes, from easy chemicals through caustic soda to methanol, requiring IMO Grade III (last cargo requirements are also enforced).

Owners operate liner-type parcel services based on Contracts of Affreightment with a small number of major industrial charterers. The sophisticated end of the chemical tanker market can be characterised as an "industrial shipping" sector. The operation of chemical parcel services, with many different cargoes loaded into a single vessel with as many as 30-40 tanks with separate pumping arrangements, is highly complex and requires a high degree of skill / experience to ensure high utilisation levels are achieved. The strong degree of control exerted by the major owners through long-term contracts has produced less volatility in earnings and vessel prices than in standard, commoditised bulk shipping.

The main fleet figures in our table above refer to all chemical tankers with IMO grade tanks. Also shown are the orderbook and top 20 owner %age figures for just the IMO 1 and 2 grade fleet. These indicate a greater degree of consolidation within the specialised chemical fleet, with the top 20 owners responsible for over 42%. It also shows an orderbook that in relative terms is smaller, equivalent to 14% of the fleet to be delivered between now and 2007.

## Chemical Tanker Fleet Ownership Profile

**Fleet** (includes all IMO grade tankers)

| Company Size | World Fleet | | | | European Union Owners | | | |
|---|---|---|---|---|---|---|---|---|
| | # Companies | # Ships | m.Dwt | Avg. Ships | # Companies | # Ships | m.Dwt | Avg. Ships |
| (# owned vessels) | | | | | | | | |
| 300+ | | | | | | | | |
| 200-299 | | | | | | | | |
| 100-199 | | | | | | | | |
| 50-99 | 1 | 61 | 1.51 | 61 | | | | |
| 10-49 | 43 | 667 | 12.56 | 16 | 13 | 181 | 3.20 | 14 |
| 5-9 | 73 | 488 | 7.57 | 7 | 34 | 222 | 3.99 | 7 |
| 2-4 | 198 | 532 | 8.19 | 3 | 60 | 168 | 3.04 | 3 |
| 0-1 | 416 | 387 | 2.79 | 1 | 83 | 73 | 0.91 | 1 |
| Unknown | | 44 | 0.31 | | | | | |
| **Total** | **731** | **2179** | **32.94** | **3** | **190** | **644** | **11.13** | **3** |

Source: Clarkson Research Studies, includes all IMO grade tankers

**Orderbook**

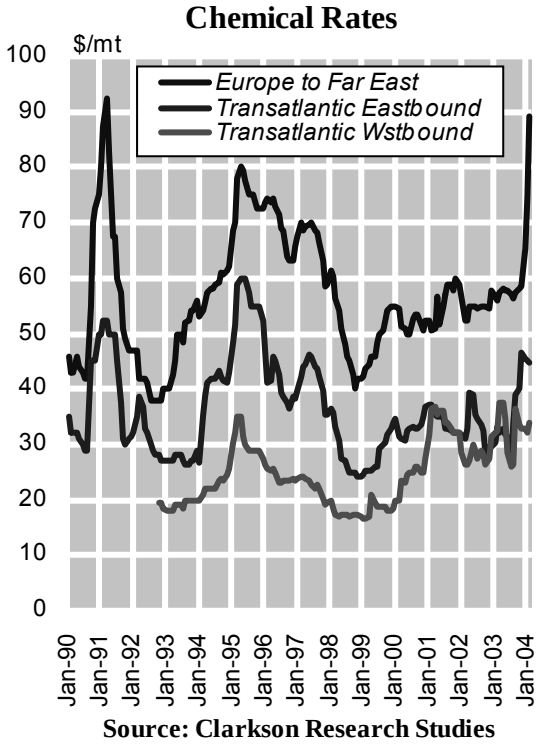
| Company Size | World Orderbook | | | | European Union Owners | | | |
|---|---|---|---|---|---|---|---|---|
| | # Companies | # Ships | m.Dwt | Avg. Ships | # Companies | # Ships | m.Dwt | Avg. Ships |
| (# owned vessels) | | | | | | | | |
| 300+ | | | | | | | | |
| 200-299 | | | | | | | | |
| 100-199 | | | | | | | | |
| 50-99 | 1 | | | | | | | |
| 10-49 | 43 | 87 | 2.45 | 2 | 13 | 23 | 0.57 | 2 |
| 5-9 | 73 | 63 | 1.59 | 1 | 34 | 37 | 0.93 | 1 |
| 2-4 | 198 | 53 | 1.35 | 0 | 60 | 30 | 0.72 | 1 |
| 0-1 | 416 | 102 | 2.44 | 0 | 83 | 58 | 1.78 | 1 |
| Unknown | | 24 | 0.37 | | | | | |
| **Total** | **731** | **329** | **8.20** | **0** | **190** | **148** | **4.00** | **1** |

Source: Clarkson Research Studies, includes all IMO grade tankers

### CHEMICAL TANKER MARKET

| IMO GRADE | CARGO TYPE | DESCRIPTION |
|---|---|---|
| *IMO I / II* | Sophisticated Chemicals | Modern Parcel Tankers: either full stainless steel or stainless steel centre (IMO II) and coated wing tank (IMO III) |
| | Easy Chemicals | Newer Parcel Tankers: have the flexibiility to cover most trades, but are often too expensive for less sophisticated cargoes. With all these trades the last cargo requirements are essential if they have to be FOSFA acceptable. Stainles steel tanks and lines are the easiest to clean. |
| *IMO III* | Caustic Soda Solution | |
| | Methanol | |
| *No IMO Grade required* | Luboils Vegoils MTBE (CPP) | Older Parcel Tankers: coayted vessels and general product carriers that have to be fitted with stainless steel lines. |

Source: Clarkson Research Studies




**Source: Clarkson Research Studies**

## A2.6 LPG Market Profile

| | World | | | European Union | | |
|---|---|---|---|---|---|---|
| | **ships** | **000.cu.m** | **# owners** | **ships** | **000.cu.m** | **# owners** |
| **Fleet, Mar-04** | **991** | **14,280** | **308** | **253** | **3,805** | **42** |
| **Orderbook, Mar-04** | **37** | **1,713** | **19** | **11** | **537** | **5** |
| O'book as % of fleet | 3.7% | 12.0% | | 4.3% | 14.1% | |
| **Top 20 Owners' Fleet, m.cu.m, Mar-04** | **234** | **10,150** | | | | |
| % of fleet | 23.6% | 71.1% | | | | |
| **Ownership Type** | | | | | | |
| Industrial & Utilities | 5 | 178.4 | 2 | | | |
| 7 Oil Majors | 3 | 224.1 | 2 | 1 | 59.7 | 1 |
| Other Oil Companies | 38 | 896.5 | 15 | 2 | 12.4 | 2 |
| State Owned Commercial | 67 | 253.8 | 12 | 2 | 41.5 | 1 |
| State Owned Non-Commercial | | | | | | |
| Independent Public | 154 | 2837.1 | 17 | 57 | 882.9 | 3 |
| Independent Private | 719 | 9841.3 | 267 | 189 | 2797.1 | 36 |
| Independent Manager | 5 | 48.6 | 1 | 2 | 11.3 | 1 |
| **NB Contracts, 000cu.m, 2003** | **23** | **963.0** | | | | |
| % of fleet | 2.3% | 6.7% | | | | |
| **S/H Sales, 000cu.m, 2003** | **25** | **390.8** | | | | |
| % of fleet | 2.5% | 2.7% | | | | |

**Entry Conditions.** Quality and operational standards required by the industry present a barrier to entry. Generally barriers to entry are perceived to allow relatively easy entry to the market place.

**Type of Cargo, Charters.** Propane & Butane (LPG), Ammonia, Ethylene, Chemical Gases, VCM. Charterers include Oil Majors, Chemical Companies such as SABIC & Dow, Traders.

| **Cargo Volumes** | | **2000** | **2001** | **2002** | **2003** |
|---|---|---|---|---|---|
| OECD Imports, m.tonnes | | **38.8** | **36.2** | **36.3** | **37.1** |
| | growth | 4% | -7% | 0% | 2% |
| EU Imports, m.tonnes | | **15.0** | **14.2** | **13.6** | **13.3** |
| | growth | 4% | -5% | -4% | -2% |

Source: Clarkson Research Studies, IEA

### LPG Sector Overview

Four major groups of liquefied gases are traded by sea: LPG, ammonia, petrochemicals and LNG. LPG is co-produced with crude in most oilfields. Small volumes are also produced in the refining process. In 2003 seaborne LPG trade was approx. 45 million tonnes. LPG trade grew at an annual compound growth rate of 5% between 1990 and 2000. Europe and Japan were the largest importers with 14.8m tonnes and 14.5m tonnes respectively in 2000. Other Asian markets, notably China, are also growing rapidly as LPG's properties as a "clean" alternative to traditional fossil fuels is increasingly exploited.

The strongest drive behind recent trade growth has been the expansion of LPG production capacity, notably in the Middle East and Algeria. Middle East LPG dominates the business and this means that the demand for LPG tankers, especially the larger ones, is strongly linked to Middle East and OPEC oil production.

The gas market is mainly cargo-driven. Trade patterns change not only due to product swings, caused by seasonal supply and / or price fluctuations, but also due to increasing consolidation from the industrial client base. The gas market constraints are mainly set by throughtput and storage limitations, not transportation limitations. The worst case scenarios for the industry are tank top situations and / or plant closures due to ullage problems. It is a.o. in such situations that the flexibility and efficiency generated by pools add substantial value to the industry.

## LPG Fleet Ownership Profile

**Fleet**

| Company Size | World Fleet | | | | European Union Owners | | | |
|---|---|---|---|---|---|---|---|---|
| | # Companies | # Ships | 000 cum | Avg. Ships | # Companies | # Ships | 000 cum | Avg. Ships |
| **(# owned vessels)** | | | | | | | | |
| **200+** | | | | | | | | |
| **100-199** | | | | | | | | |
| **50-99** | | | | | | | | |
| **25-49** | 5 | 169 | 4,265 | 34 | 2 | 53 | 1,264 | 27 |
| **10-24** | 14 | 192 | 2,751 | 14 | 7 | 99 | 1,183 | 14 |
| **5-9** | 33 | 222 | 4,213 | 7 | 8 | 58 | 794 | 7 |
| **2-4** | 90 | 234 | 2,220 | 3 | 11 | 29 | 401 | 3 |
| **0-1** | 167 | 165 | 816 | 1 | 15 | 14 | 162 | 1 |
| **Unknown** | | 9 | 14 | | | | | |
| **Total** | **309** | **991** | **14,279.8** | **3** | **43** | **253** | **3,805** | **6** |

Source: Clarkson Research Studies

**Orderbook**

| Company Size | World Orderbook | | | | European Union Owners | | | |
|---|---|---|---|---|---|---|---|---|
| | # Companies | # Ships | 000 cum | Avg. Ships | # Companies | # Ships | 000 Dwt | Avg. Ships |
| **(# owned vessels)** | | | | | | | | |
| **200+** | | | | | | | | |
| **100-199** | | | | | | | | |
| **50-99** | | | | | | | | |
| **25-49** | 5 | 2 | 76.0 | 0 | 2 | | | |
| **10-24** | 14 | 11 | 346.2 | 1 | 7 | 6 | 123.0 | 1 |
| **5-9** | 33 | 8 | 531.6 | 0 | 8 | | | |
| **2-4** | 90 | 5 | 126.0 | 0 | 11 | 1 | 82.0 | 0 |
| **0-1** | 167 | 10 | 625.7 | 0 | 15 | 4 | 332.0 | 0 |
| **Unknown** | | 1 | 7.2 | | | | | |
| **Total** | **309** | **37** | **1,712.7** | **0** | **43** | **11** | **537.0** | **0** |

Source: Clarkson Research Studies

*(Continued from page 46)*

Since 1990 the fleet has grown from 682 vessels to the current number of 991, of which 499 are pressurised, 294 are semi refrigerated and 192 are fully refrigerated. Gas traffics are complex and market swings create continuous uncertainty for owners. In order to cope with the latter, pools have naturally developed in order to create a more efficient capacity utilization platform, which at the same time generates added value to the shippers. It basically allows owners to provide quality / flexibility / reliability / stability and economies of scale to the industry despite uncertain market conditions and increasingly higher operational standards set by their client base. Although pools tend to be composed of tonnage with similar capacity profiles, it needs to be stressed that there is still a high degree of competition not only within but also between the respective segments.

Term deals are becoming increasingly rare for the very reason that the flexibility and the availability on the shipping market allows customers to benefit from tailor-made logistics. This development makes shipping investments more risk-bearing.

Different sizes of LPG tankers are used in different trades. The largest vessels, which typically are around 80,000 cubic meters, are used in the deep-sea trade, for example from the Arabian Gulf to Japan. There are just over a 100 of the large vessels, some of which can also be used to transport clean petroleum product (CPP) cargoes. Medium sized vessels are used in the shorter haul trades, whilst the very smallest trades are used to distribute LPG and other petrochemical gases within the regions, especially Asia and Northwest Europe.

## A2.7 LNG Market Profile

| | World | | | European Union | | |
|---|---|---|---|---|---|---|
| | **ships** | **m.cu.m** | **# owners** | **ships** | **m.cu.m** | **# owners** |
| **Fleet, Mar-04** | **158** | **18.1** | **38** | **26** | **2.7** | **9** |
| **Orderbook, Mar-04** | **54** | **7.6** | **22** | **17** | **2.4** | **7** |
| O'book as % of fleet | 34.2% | 41.9% | | 65.4% | 88.1% | |
| **Top 20 Owners' Fleet, m.cu.m, Mar-04** | **131** | **16.0** | | | | |
| % of fleet | 82.9% | 88.2% | | | | |
| **Ownership Type** | | | | | | |
| Industrial & Utilities | 15 | 1.7 | 6 | 2 | 0.1 | 1 |
| 7 Oil Majors | 14 | 1.8 | 2 | 5 | 0.7 | 2 |
| Other Oil Companies | 15 | 1.6 | 3 | 4 | 0.2 | 1 |
| State Owned Commercial | 6 | 0.7 | 1 | | | |
| State Owned Non-Commercial | | | | | | |
| Independent Public | 63 | 7.8 | 9 | 9 | 1.2 | 2 |
| Independent Private | 45 | 4.5 | 18 | 6 | 0.5 | 3 |
| Independent Manager | | | | | | |
| **NB Contracts, m.cu.m, 2003** | **15** | **2.2** | | | | |
| % of fleet | 9.5% | 12.0% | | | | |
| **S/H Sales, m.cu.m, 2003** | **0** | **0.0** | | | | |
| % of fleet | 0.0% | 0.0% | | | | |

**Entry Conditions*.** Asset costs are extremely high - current NB prices are $165m. LNG transport by sea also requires substantial investment in liquefaction and cargo handling facilities. More specialised technical knowledge to operate.

**Type of Cargo, Charters.** LNG (Methane). Typically newbuildings built against long term contracts but a small spot market has developed representing 4.6% of trade in 2002. Also some shorter charters are reported.

| **Cargo Volumes** | | **2000** | **2001** | **2002** | **2003** |
|---|---|---|---|---|---|
| World Imports, $m.m^3$ | | **226.2** | **232.9** | **246.6** | **282.5** |
| | growth | 12% | 3% | 6% | 15% |
| EU Imports, $m.m^3$ | | **55.0** | **55.2** | **65.9** | **70.0** |
| | growth | -96% | 0% | 19% | 6% |

Source: Clarkson Research Studies

### LNG Sector Overview

Sea transportation of natural gas requires liquefaction at $-160^0$C and containment in insulated tanks. The first small LNG tankers were built in the mid 1960s. LNG tankers are typically 850 feet in length (about the size of a Suezmax Tanker) and capable of carrying 120,000 cbms of liquefied gas. The gas is generally liquefied in a shore based plant and transferred to the ship which is a "floating thermos flask" with heavy insulation. There are two main types of insulation system: the Moss and the membrane type. The spherical Moss tank is employed on 53% of active LNG carriers. The ships are expected to have an operating life of 30-40 years, though this is not known precisely because the large scale building of large LNG tankers did not start until the 1970s.

Due to the high infrastructure costs and requirement for stable supplies, LNG tankers have in the past been built against long contracts (e.g. 20 years) to service specific projects. LNG is a green fuel and demand has been growing very rapidly. World LNG imports trebled between 1984 and 2000.

Japan has traditionally been by far the largest importer, receiving $118m.m^3$ in 2002. Recently imports into Western Europe ($66m.m^3$) and South Korea ($39m.m^3$) have also grown very rapidly. The leading LNG exporters are Indonesia with 23% of 2002 exports, Algeria (18%) and Malaysia (13%). Middle Eastern producers have vast reserves but they only accounted for a total of 22% of world exports in 2002. Qatar is the largest exporter in the Middle East, accounting for $30m.m^3$ (12% of the world total). Trinidad, Nigeria and Australia are other important LNG exporters.

Massive expansion in LNG production and export capacity is planned, which has switched the focus

## LNG Fleet Ownership Profile

**Fleet**

| Company Size | World Fleet | | | | European Union Owners | | | |
|---|---|---|---|---|---|---|---|---|
| | # Companies | # Ships | m cum | Avg. Ships | # Companies | # Ships | m cum | Avg. Ships |
| (# owned vessels) | | | | | | | | |
| 200+ | | | | | | | | |
| 100-199 | | | | | | | | |
| 50-99 | | | | | | | | |
| 25-49 | | | | | | | | |
| 10-24 | 4 | 55 | 6.4 | 14 | | | | |
| 5-9 | 7 | 49 | 6.3 | 7 | 1 | 7 | 0.9 | 7 |
| 2-4 | 15 | 42 | 4.1 | 3 | 7 | 18 | 0.1 | 3 |
| 0-1 | 17 | 12 | 1.3 | 1 | 4 | 1 | 1.6 | 0 |
| Unknown | | | | | | | | |
| **Total** | **43** | **158** | **18.1** | **4** | **12** | **26** | **2.7** | **2** |

Source: Clarkson Research Studies

**Orderbook**

| Company Size | World Orderbook | | | | European Union Owners | | | |
|---|---|---|---|---|---|---|---|---|
| | # Companies | # Ships | m cum | Avg. Ships | # Companies | # Ships | m cum | Avg. Ships |
| (# owned vessels) | | | | | | | | |
| 200+ | | | | | | | | |
| 100-199 | | | | | | | | |
| 50-99 | | | | | | | | |
| 25-49 | | | | | | | | |
| 10-24 | 4 | 11 | 1.5 | 3 | | | | |
| 5-9 | 7 | 10 | 1.4 | 1 | 1 | 5 | 0.7 | 5 |
| 2-4 | 15 | 20 | 2.8 | 1 | 7 | 5 | 1.0 | 1 |
| 0-1 | 17 | 13 | 1.9 | 1 | 4 | 7 | 0.6 | 2 |
| Unknown | | | | | | | | |
| **Total** | **43** | **54** | **7.6** | **1** | **12** | **17** | **2.4** | **1** |

Source: Clarkson Research Studies

*(Continued from page 48)*

onto the LNG carrier newbuilding market. The LNG fleet currently consists of 158 vessels , with another 54 vessels on order. Unlike LPG, which has many small vessels, the majority of vessels are over 130,000 cubic meters in size. 2002 and 2003 saw heavy ordering of LNG carriers with a total of 34 firm contracts. Another 11 have been placed in the first 3 months of 2004. Almost all of the vessels on order are in the 135,000 cbm to 145,000 cbm size range. This compares to the average vessel size of 96,500 cbm in the 1970s. Although there is no technical reason why vessels up to 200,000 cbm cannot be built, they are inhibited by port and storage limitations.

Currently a 138,000 cubic meter LNG newbuilding costs around $165 million. For comparison, in 1990 a 125,000 cubic meter vessel cost $225-250 million. The fall reflects the greater competitiveness of the ship building industry and improvements in engineering. Because LNG ships have generally been built for specific projects, the second hand market is very limited and the only entry vehicle is a company purchase or newbuilding. Recently as ships have come off long leases, we have seen the first indication of a second hand market, but prices are very difficult to establish. For this reason we are not able to quote specific second hand prices.

* *Entry Barriers.* It has earlier been a common assumption that entry barriers have been moderate or high due to the fact that the transportation has been considered as an integrated part of value chain – organised by the exporter or the importer. These have been significantly reduced over recent years through "outsourcing" of the maritime transport-element, with the entry of new players/investors thanks to the lower shipbuilding prices and the speculations of a growing market for the coming years. Therefore we will not only have project-related vessels, but also LNG carriers operating on a spot market and the emergence of independent LNG-shipowners.

## A2.8 Reefer Market Profile

| | World | | | European Union | | |
|---|---|---|---|---|---|---|
| | **ships** | **m.cu.ft** | **# owners** | **ships** | **m.cu.ft** | **# owners** |
| **Fleet, Mar-04** | **1,281** | **344.3** | **429** | **421** | **148.9** | **77** |
| **Orderbook, Mar-04** | **5** | **0.1** | **2** | **5** | **0.1** | **2** |
| O'book as % of fleet | 0.4% | 0.0% | | 1.2% | 0.0% | |
| **Top 20 Owners' Fleet, m.dwt, Mar-04** | **434** | **159.1** | | | | |
| % of fleet | 33.9% | 46.2% | | | | |
| **Ownership Type** | | | | | | |
| Industrial & Utilities | | | | | | |
| 7 Oil Majors | | | | | | |
| Other Oil Companies | | | | | | |
| State Owned Commercial | 140 | 24.2 | 29 | | | |
| State Owned Non-Commercial | | | | | | |
| Independent Public | 27 | 8.3 | 4 | | | |
| Independent Private | 1111 | 310.2 | 397 | 421 | 148.9 | 77 |
| Independent Manager | 3 | 1.6 | 2 | | | |
| **NB Contracts, m.dwt, 2003** | **0** | **0.0** | | | | |
| % of fleet | 0.0% | 0.0% | | | | |
| **S/H Sales, m.dwt, 2003** | **69** | **476.3** | | | | |
| % of fleet | 5.4% | 6.3% | | | | |

**Entry Conditions.** Consolidation has been taking place. Access to pools. Technical requirements and relatively high quality control. Entry conditions for reefer containers are limited.

**Type of Cargo, Charters.** A growing percentage of this trade is carried in reefer containers on liner services. Fruit, frozen meat & fish. Part of the fleet services the fishing industry.

| **Cargo Volumes* (Fruit, Dairy Products, Meat, Fish)** | **2000** | **2001** | **2002** | **2003** |
|---|---|---|---|---|
| World Imports, m.tonnes | **229.2** | **236.1** | **240.4** | **245.0** |
| growth | 3% | 3% | 2% | 2% |

*These data are total world trade, and therefore combine land based and seaborne trade. Plesae note that only around 20% of world imports/exports are seaborne, of which max 50% is now carried by specialised reefers.

Source: Clarkson Research Studies, UN/FAO

### Reefer Sector Overview

The reefer sector consists of 1,281 specialised reefer vessels of 344m.cu.ft split between 428 owners as well as an additional 2,894 containerships with reefer slots. Total reefer capacity on containerships (782 m.cu.ft) is now substantially greater than that of the conventional reefer fleet. The conventional reefer fleet has now declined in 8 of the last 10 years; even when it did grow it was at meagre rates of less than one percentage point. Since 1994 the fleet has declined by 50m.cu.ft, 12.6%. At the same time the cellular reefer fleet has expanded by a factor of three or a little over 400,000 m. cu.ft. This has presented strong competition for reefer capacity and despite a moderate increase in 2003/04, freight rates have been very low in recent years.

Secondhand activity in the conventional reefer fleet is relatively high, with 5.4% of the fleet sold in 2003 in deals totalling $260m, although we have seen very little newbuilding activity in recent years, mainly due to the depressed nature of owner cash flow.

A number of the major fruit exporters own vessels directly through subsidiaries while also time chartering in modern ships on 1-3 year charters. There are a number of pools operating that arrange COAs with fruit and meat exporters. Reefer services are increasingly run as liner services (at least in season), especially on the backhaul routes. Older tonnage tends to be utilised on a spot basis, often during the peak three month season, and put into lay up for long periods. Besides the competition from containerships, there is competition between reefer ships of different size and age.

## Reefer Fleet Ownership Profile

**Fleet**

| Company Size | World Fleet | | | | European Union Owners | | | |
|---|---|---|---|---|---|---|---|---|
| | # Companies | # Ships | m cuft | Avg. Ships | # Companies | # Ships | m cuft | Avg. Ships |
| (# owned vessels) | | | | | | | | |
| 200+ | | | | | | | | |
| 100-199 | | | | | | | | |
| 50-99 | 2 | 128 | 40.4 | 64 | 2 | 126 | 40.0 | 63 |
| 25-49 | 3 | 92 | 25.1 | 31 | | | | |
| 10-24 | 21 | 286 | 100.1 | 14 | 11 | 142 | 57.0 | 13 |
| 5-9 | 28 | 187 | 60.6 | 7 | 8 | 57 | 24.3 | 7 |
| 2-4 | 106 | 268 | 69.5 | 3 | 23 | 63 | 20.3 | 3 |
| 0-1 | 268 | 268 | 41.0 | 1 | 33 | 33 | 7.3 | 1 |
| Unknown | | 52 | 7.7 | | | | | |
| **Total** | **428** | **1,281** | **344.3** | **3** | **77** | **421** | **148.9** | **5** |

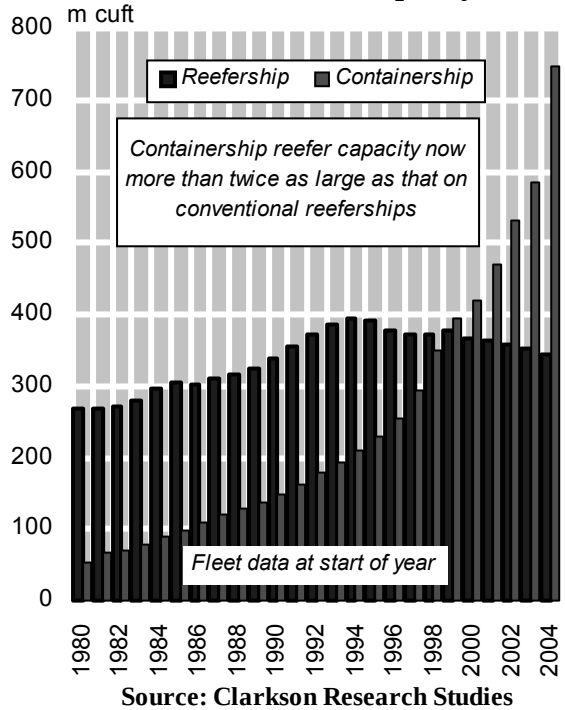
Source: Clarkson Research Studies

**Orderbook**

| Company Size | World Orderbook | | | | European Union Owners | | | |
|---|---|---|---|---|---|---|---|---|
| | # Companies | # Ships | m cuft | Avg. Ships | # Companies | # Ships | m cuft | Avg. Ships |
| (# owned vessels) | | | | | | | | |
| 200+ | | | | | | | | |
| 100-199 | | | | | | | | |
| 50-99 | 2 | 4 | | 2 | 2 | 4 | | 2 |
| 25-49 | 3 | | | | | | | |
| 10-24 | 21 | | | | 11 | | | |
| 5-9 | 28 | 1 | | 0 | 8 | 1 | | 0 |
| 2-4 | 106 | | | | 23 | | | |
| 0-1 | 268 | | | | 33 | | | |
| Unknown | | | | | | | | |
| **Total** | **428** | **5** | **0.0** | **0** | **77** | **5** | **0.0** | **0** |

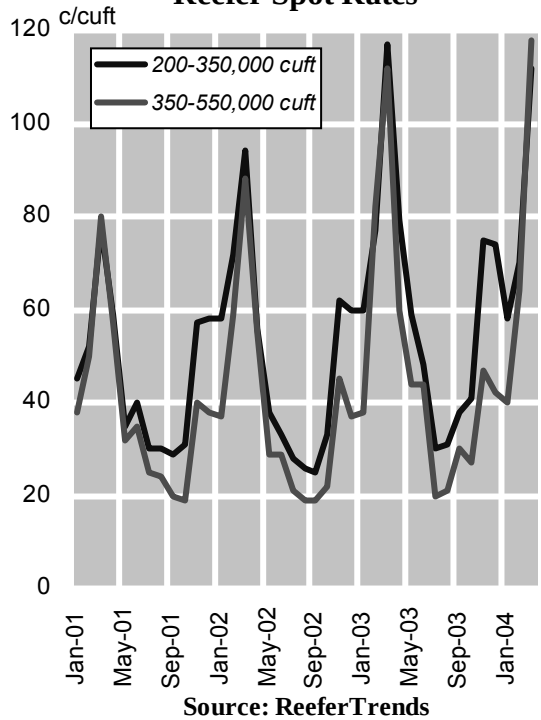
Source: Clarkson Research Studies

**Historical Reefer Capacity**




**Source: Clarkson Research Studies**

**Reefer Spot Rates**




**Source: ReeferTrends**

## A2.9 Ro Ro Market Profile

| | World | | | European Union | | |
|---|---|---|---|---|---|---|
| | **ships** | **m.dwt** | **# owners** | **ships** | **m.dwt** | **# owners** |
| **Fleet, Mar-04** | **1,035** | **9.0** | **431** | **480** | **4.0** | **166** |
| **Orderbook, Mar-04** | **45** | **0.4** | **23** | **30** | **0.3** | **15** |
| O'book as % of fleet | 4.3% | 4.8% | | 6.3% | 8.0% | |
| **Top 20 Owners' Fleet, m.dwt, Mar-04** | **190** | **3.8** | | | | |
| % of fleet | 18.4% | 42.2% | | | | |
| **Ownership Type** | | | | | | |
| Industrial & Utilities | 1 | 0.0 | 1 | | | |
| 7 Oil Majors | | | | | | |
| Other Oil Companies | | | | | | |
| State Owned Commercial | 73 | 0.4 | 21 | 3 | 0.0 | 3 |
| State Owned Non-Commercial | 15 | 0.5 | 1 | | | |
| Independent Public | 83 | 1.3 | 14 | 55 | 0.6 | 7 |
| Independent Private | 860 | 6.7 | 397 | 422 | 3.3 | 158 |
| Independent Manager | 3 | 0.0 | 3 | | | |
| **NB Contracts, m.dwt, 2003** | **20** | **200.0** | | | | |
| % of fleet | 1.9% | 2.2% | | | | |
| **S/H Sales, m.dwt, 2003** | **28** | **272.3** | | | | |
| % of fleet | 2.7% | 3.0% | | | | |

**Entry Conditions.**

**Type of Cargo, Charters.** Type of cargo very varied including HGVs, containers, wheeled traffic, OOG, awkward loads. Deep sea and short sea trades are very different in nature.

Source: Clarkson Research Studies

### Ro-Ro Sector Overview

Diverse and somewhat elderly in some sectors, the RoRo fleet offers unconventional flexibility which allows it to carry whatever type of cargo is offered, and to serve ports where access might otherwise prove a problem. However, there is still a surplus of ships in service built in the mid/late 1970s (422 RoRos built before 1980 are still in operation).

Ownership is very fragmented, with 439 owners and an average company size of only two vessels. Newbuilding activity has been low in recent years, due to fairly depressed cash flow conditions for owners and a lack of fleet renewal. Liquidity in the sale and purchase market is low.

Analysis of the RoRo fleet is complex due to the diversity of the fleet and as a result it is a difficult sector to define. There are 1,035 ships in the RoRo sector, averaging 8,501 dwt, and 19 years of age. One sector is the deep sea Ro Ro sector, serviced by specialist players on long haul routes operating liner like services. We generally class these as Ro Ro container of which there are around 100, with a dwt above 20,000 dwt, lane metre capacity of around 2,500 and container capacity over 1,000 teu. A second sector consists of smaller vessels operating on ferry / liner type services on short haul routes such as Baltic, Mediterranean, US Gulf and Japan. It is difficult to make a clear distinction between Ro Ro passenger ships (not included in statistics above) and the Ro Ros operating in these trades. A third sector is more spot or short term charter orientated. In this sector, military demand demand can have a certain impact for some owners.

## Ro Ro Fleet Ownership Profile

**Fleet**

| Company Size | World Fleet | | | | European Union Owners | | | |
|---|---|---|---|---|---|---|---|---|
| | # Companies | # Ships | 000 Dwt | Avg. Ships | # Companies | # Ships | 000 Dwt | Avg. Ships |
| **(# owned vessels)** | | | | | | | | |
| **200+** | | | | | | | | |
| **100-199** | | | | | | | | |
| **50-99** | | | | | | | | |
| **25-49** | | | | | | | | |
| **10-24** | 13 | 172 | 2,780.8 | 13 | 9 | 115 | 1,379.7 | 13 |
| **5-9** | 38 | 247 | 2,342.4 | 7 | 20 | 130 | 1,161.6 | 7 |
| **2-4** | 143 | 364 | 2,550.6 | 3 | 58 | 156 | 994.1 | 3 |
| **0-1** | 245 | 236 | 1,250.0 | 1 | 83 | 79 | 416.1 | 1 |
| **Unknown** | | 16 | 57.2 | | | | | |
| **Total** | **439** | **1,035** | **8,981.0** | **2** | **170** | **480** | **3,951.4** | **3** |

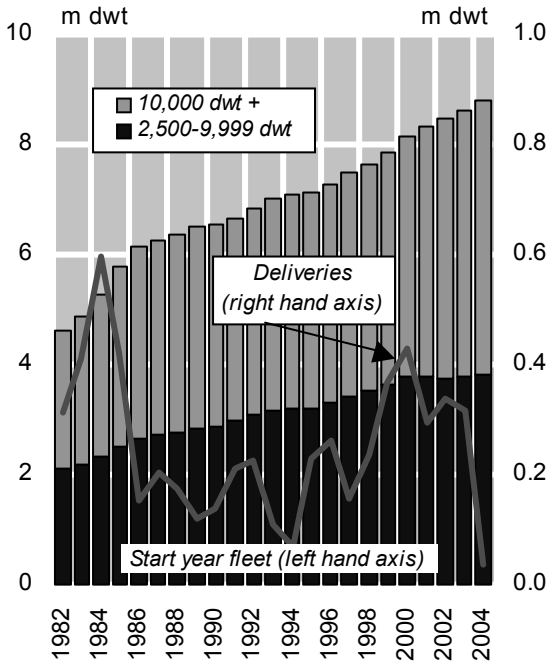
Source: Clarkson Research Studies

**Orderbook**

| Company Size | World Orderbook | | | | European Union Owners | | | |
|---|---|---|---|---|---|---|---|---|
| | # Companies | # Ships | 000 Dwt | Avg. Ships | # Companies | # Ships | 000 Dwt | Avg. Ships |
| **(# owned vessels)** | | | | | | | | |
| **200+** | | | | | | | | |
| **100-199** | | | | | | | | |
| **50-99** | | | | | | | | |
| **25-49** | | | | | | | | |
| **10-24** | 13 | 8 | 77.6 | 1 | 9 | 8 | 77.6 | 1 |
| **5-9** | 38 | 4 | 42.6 | 0 | 20 | 2 | 20.0 | 0 |
| **2-4** | 143 | 13 | 115.2 | 0 | 58 | 8 | 75.0 | 0 |
| **0-1** | 245 | 19 | 187.8 | 0 | 83 | 12 | 142.8 | 0 |
| **Unknown** | | 1 | 10.5 | | | | | |
| **Total** | **439** | **45** | **433.7** | **0** | **170** | **30** | **315.4** | **0** |

Source: Clarkson Research Studies

**Historical Ro-Ro Fleet (excl. PCCs)**




**Source: Clarkson Research Studies**

## A2.10 PCTC Market Profile

| | World | | | European Union | | |
|---|---|---|---|---|---|---|
| | **ships** | **m.dwt** | **# owners** | **ships** | **m.dwt** | **# owners** |
| **Fleet, Mar-04** | **504** | **6.8** | **99** | **100** | **1.3** | **15** |
| **Orderbook, Mar-04** | **95** | **1.5** | **14** | **8** | **0.1** | **2** |
| O'book as % of fleet | 18.8% | 22.3% | | | | |
| **Top 20 Owners' Fleet, m.dwt, Mar-04** | **341** | **5.4** | | | | |
| % of fleet | 67.7% | 79.7% | | | | |
| **Ownership Type** | | | | | | |
| Industrial & Utilities | 7 | 0.1 | 1 | | | |
| 7 Oil Majors | | | | | | |
| Other Oil Companies | | | | | | |
| State Owned Commercial | 2 | 0.0 | 2 | | | |
| State Owned Non-Commercial | | | | | | |
| Independent Public | 154 | 2.4 | 9 | 10 | 0.1 | 1 |
| Independent Private | 333 | 4.2 | 87 | 90 | 1.2 | 14 |
| Independent Manager | 8 | 0.1 | 4 | | | |
| **NB Contracts, m.dwt, 2003** | **49** | **804.2** | | | | |
| % of fleet | 9.7% | 11.8% | | | | |
| **S/H Sales, m.dwt, 2003** | **0** | **0.0** | | | | |
| % of fleet | 0.0% | 0.0% | | | | |

**Entry Conditions.** Only a few major operators and few major global customers.

**Type of Cargo, Charters.** Major car carrier operators typically enter into long term COAs with vehicle manufacturers, agriculture, construction equipment, and owners of project and static cargo.

| **Deep Sea Cargo Volumes (000 Vehicles)** | **2000** | **2001** | **2002** | **2003 (e)** |
|---|---|---|---|---|
| World Imports | **8,000** | **7,700** | **8,300** | **8,700** |
| growth | 4% | -4% | 8% | 5% |

Source: Clarkson Research Studies, Mitsui OSK Lines.

### PCTC Sector Overview

Purpose built vehicle carriers have multiple decks (4-10+), high speed, roll on roll off discharging / loading facilities and internal decks and ramps carefully designed to reduce damage and speed up loading / discharge. At the end of 2003, the number of vessels directly related to deep-sea shipments was 430 (1.95m CEU). The newbuilding market has been very active over the past year, and there are 95 new vessels for delivery through 2007. The average size of vessels on order, at just below 6,000 ceu, shows an emphasis on new larger ships. The biggest ships on order will have a capacity in excess of 7,000 ceu.

The major technical development since the 70s besides larger ships has been a move towards more flexible deck arrangements to allow industrial plant, MPVs and SUVs to be carried. There has also been a growing trade in the movement of secondhand vehicles. There were approximately 8.7 million vehicles shipped globally in 2003.

In terms of market structure, there are few major multinational global customers with high demands on service product, trading pattern, sailing frequencies etc., especially with the "just in time" concept established in the vehicle industry as well as "ordered to be built". The carriers are building reliable transportation and logistic systems for the industry.

Major car carrier operators typically enter into long term COAs with vehicle manufacturers. If they run into capacity constraints, the major operators will typically time charter additional tonnage. Re-

## PCTC Fleet Ownership Profile

**Fleet**

| Company Size | World Fleet | | | | European Union Owners | | | |
|---|---|---|---|---|---|---|---|---|
| | # Companies | # Ships | 000 Dwt | Avg. Ships | # Companies | # Ships | 000 Dwt | Avg. Ships |
| **(# owned vessels)** | | | | | | | | |
| **200+** | | | | | | | | |
| **100-199** | | | | | | | | |
| **50-99** | | | | | | | | |
| **25-49** | 6 | 215 | 3,479.5 | 36 | 1 | 31 | 649.5 | 31 |
| **10-24** | 5 | 79 | 1,083.1 | 16 | 2 | 28 | 454.1 | 14 |
| **5-9** | 12 | 74 | 958.5 | 6 | 3 | 16 | 89.3 | 5 |
| **2-4** | 33 | 93 | 925.1 | 3 | 7 | 23 | 130.7 | 3 |
| **0-1** | 46 | 43 | 386.9 | 1 | 2 | 2 | 17.1 | 1 |
| **Unknown** | | | | | | | | |
| **Total** | **102** | **504** | **6,833.0** | **5** | **15** | **100** | **1,340.8** | **7** |

Source: Clarkson Research Studies

**Orderbook**

| Company Size | World Orderbook | | | | European Union Owners | | | |
|---|---|---|---|---|---|---|---|---|
| | # Companies | # Ships | 000 Dwt | Avg. Ships | # Companies | # Ships | 000 Dwt | Avg. Ships |
| **(# owned vessels)** | | | | | | | | |
| **200+** | | | | | | | | |
| **100-199** | | | | | | | | |
| **50-99** | | | | | | | | |
| **25-49** | 6 | 46 | 785.7 | 8 | 1 | | | |
| **10-24** | 5 | 18 | 294.1 | 4 | 2 | 8 | 104.1 | 4 |
| **5-9** | 12 | 22 | 320.0 | 2 | 3 | | | |
| **2-4** | 33 | | | 0 | 7 | | | |
| **0-1** | 46 | 9 | 122.0 | 0 | 2 | | | |
| **Unknown** | | | | | | | | |
| **Total** | **102** | **95** | **1,521.8** | **1** | **15** | **8** | **104.1** | **1** |

Source: Clarkson Research Studies

*(Continued from page 54)*

cently market conditions have been very tight, and this has contributed to an absence of vessels becoming available on the secondhand market. Unlike other segments, these vessels have never been a trading commodity as they are often used by the owner during their full economical and technical life time.

Vehicles can also moved on board conventional RoRos, Reefers (often as backhaul cargoes) and innovators are constantly looking to develop racking systems in containers to make container transport a more cost effective option.