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Containing

A Market Report on the European Seaport Industry

Prepared by the Institute of Transport and Maritime Management Antwerp (ITMMA)

and

An Overview of EU Policy Developments and ESPO Activities

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on the occasion of the ESPO 2007 Conference held in Algeciras, Spain

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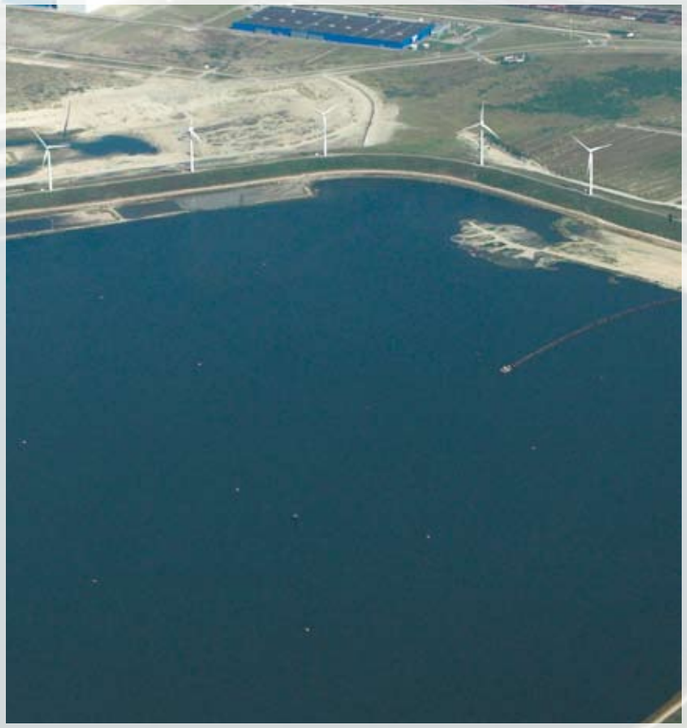

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Foreword by Giuliano Gallanti, Chairman of ESPO

It is my pleasure to introduce this Annual Report which covers the period mid-2006 to mid-2007.

This is the first Annual Report ESPO produces in co-operation with the Institute of Transport and Maritime Management Antwerp (ITMMA). I am particularly grateful to Theo Notteboom and Bert Vernimmen of the Institute who have meticulously prepared the market analysis section of this document. You will find it contains a comprehensive and practical overview of the major developments and trends in the different market segments of European ports. It furthermore provides clear insight in the policy implications for European port authorities and thus makes the link with the work of ESPO which is described in the second part of the report.

The co-operation with ITMMA, which took effect in May 2006, was inspired by the need to ensure that policy-makers have the essential insights in the complex mechanics of our sector. At a time when the European Commission is planning to map out a comprehensive policy for seaports, this cannot be overestimated.

I believe ESPO should generally make better use of the wealth of European know-how on port-related matters to complement its lobby work. At the same time ESPO could also develop a catalyst role in the field of port knowledge and expertise, which today is very much scattered around Europe. We are currently exploring ways to give this concrete shape and you will no doubt hear more about our plans during the coming year.

The changes that drive seaports progress at such a speed that well-intentioned policy initiatives can be totally outdated by the time they are implemented. The port services' Directive, which was the direct result of the 1997 Green Paper of Commissioner Kinnock, is a case in point. During the 10 years that elapsed between the publication of the Green Paper and the withdrawal of the Directive, the sector has changed so much that it would be difficult to fit it in some of the proposals developed years ago.

We want to prevent a similar scenario happening with the EU ports policy that is currently taking shape. This is why we are advocating a flexible approach. By limiting legislative intervention, we believe it will be easier for Europe to find an appropriate and adaptable policy framework for our diverse and dynamic port industry. As you will read further in the policy section of this report, we believe the essential way forward consists of a mixture of instruments that provide guidance and clarification (so-called "soft law"), stimulate best practice and review legislation where necessary.

Finally, I am very pleased that over the past year we managed to close a partnership with our colleagues of the European Federation of Inland Ports. Given that the interests of inland and maritime port authorities increasingly coincide, I am convinced it will strengthen the overall representation of European ports in Brussels.

ANNUAL REPORT 2006-2007

Foreword by Theo Notteboom, President of ITMMA – University of Antwerp

It is important that policy initiatives are based on a sound knowledge of market processes. This is especially relevant in the context of the preparations for a European seaport policy which the European Commission has embarked upon. European ports find themselves embedded in ever-changing economic and logistics systems. The environment creates a high degree of uncertainty and leaves European port managers puzzled with the question how to respond effectively to market dynamics.

In order to shed light on the market environment of seaports, the ESPO Annual Report 2006-2007 contains a large section on market developments in European seaports. This part of the Annual Report analyses five markets: the container market, the RoRo market, the market for conventional general cargo, the liquid bulk market and the dry bulk market. Detailed statistics on cargo handling in European seaports for 2005-2006 are provided as well as an overview of main developments and trends in each of the market segments. The report aims for a balanced approach covering all port regions in Europe and large as well as mid-sized and small ports.

The market report, which was written by my colleague Bert Vernimmen and myself, has been realized within the framework of the existing service agreement between the European Sea Ports Organisation and the Institute of Transport and Maritime Management Antwerp (ITMMA), an institute of the University of Antwerp. Over the years, ITMMA has acquired a leading position in the fields of transport economics, including maritime economics, port economics and logistics. The activities of ITMMA include research and consultancy, master and postgraduate programs, short-term specialized courses, tailor-made courses and events and conferences. ITMMA is determined to continue developing activities fostering the European seaport industry. We therefore greatly value the partnership with ESPO.

I am confident the market report will be of some practical value to your professional activities and I hope it will advance our shared understanding and knowledge of European ports.

I. EXECUTIVE SUMMARY

Introduction

It is important that policy initiatives are based on a sound knowledge of market processes. This is especially relevant in the context of the preparations for a European seaport policy which the European Commission has embarked upon in 2006 and which is expected to lead to a concrete action plan in Autumn 2007.

The first main section of this report aims to provide input to this process by analysing the following five markets: the container market, the RoRo market, the market for conventional cargo, the liquid bulk market and the dry bulk market. Detailed statistics on cargo handling in European seaports are provided as well as an overview of main developments and trends in each of the market segments. The report aims for a balanced approach covering all port regions in Europe and large as well as mid-sized and small ports.

The second section provides an overview of relevant European policy initiatives and ESPO activities in the period 2006/2007. It concentrates on the above-mentioned European port policy review but also on the parallel maritime policy consultation. In addition, developments in the field of transport policy, environment as well as safety and security are highlighted.

The market environment of ports in 2005/2006

Economic growth and seaborne trade

The global economy has been transformed in recent years by the fall of international barriers to the flow of goods, services, capital and labour, and a marked acceleration in the pace of technological and scientific progress. Technological advances have created new opportunities for businesses against the background of an increasingly complex global economy, while reductions in the cost of transport and communication are spurring companies to move operations to lower cost environments. This has resulted in new growth markets such as China (real GDP growth of 10.2% in 2005 and 10.5% in 2006), India (8.5% both in 2005 and 2006), Turkey (7.4% and 6% respectively) and parts of Central and Eastern Europe. After a year of frail economic growth in 2005, GDP growth in Europe rebound in 2006 to around 3%. The strongest growers in 2006 were Latvia (11.9%), Estonia (10.9%), Slovakia (8%) and Romania (6%). Over the 2007-2012 period, GDP in the Euro Zone is expected to rise on average by 2% per annum.

The growth of the economy is reflected on maritime transportation. International seaborne trade increased by an estimated 3.8% in 2005 to reach a total volume of 7.11 billion tons. Total demand for shipping services reached about 29 billion ton-miles in 2005, representing an increase of 5.1% compared to the year before. Europe remains a massive importer of crude oil and petroleum products with more than half a billion tons in 2005. Europe also remained the largest dry cargo market with more than a billion tons of exports (22.7% of world total) and over 1.5 billion tons of imports (32.3%).

The container market

Container shipping has been the fastest growing sector of the maritime industries during the last two decades. Both the Far East-Europe and Transpacific trade have enjoyed healthy 8-9% growth in 2006, and this is expected to continue throughout 2007-2008 as well. The Transatlantic market is significantly smaller (albeit still very important) and also has much lower annual growth rates. Container trade

between Europe and Latin America (including Central America, the Caribbean and South America) saw an increase of nearly 16% in two years time. Intra-European containerized trade saw an increase of 19% between 2004 and 2006. Many of the trades continue to be characterized by major imbalances, thereby putting a lot of pressure on box logistics and equipment management.

Total throughput handled by the world's container ports grew at an average rate of 11% per year in the last five years. Major drivers are increased transhipment traffic and the high growth rates in Asian/Chinese container ports. But also quite a number of European container ports are recording double digit growth figures. Total container throughput in Europe accounts for some 18% of the world total. The top fifteen ports in Europe saw a container throughput of around 54 million teu in 2006, the top three 25.6 million teu. The Le Havre – Hamburg range remains the leading port range in Europe, but a significant number of ports in the West-Mediterranean (in particular Spanish ports), the Black Sea and the Baltic have witnessed healthy growth rates as well. The highest growth rates in 2006 have been realized by Amsterdam, Sines, Zeebrugge, Bremerhaven, Constanza, Gdynia, Tallinn, Kotka and Rauma. The top five strongest growers in TEU terms were Hamburg, Bremerhaven, Antwerp, Rotterdam and Constanza, together adding some 2.7 million TEU to total European port throughput in 2006.

Road transport is still by far the dominant transport mode in most of Europe's seaports. Modal shift policies are implemented throughout Europe and these policies are starting to pay off on some multimodal inland corridors. However, rail and inland navigation still have not reached their maximum potential. The prospects for rail and barge in smaller ports and new load centers in a start-up phase remain rather precarious.

The period 2005-2006 will be remembered as the era of major consolidation in the container market. Substantial take-over activity took place both on the shipping lines' side (where mergers have created a handful of gigantic companies controlling several hundred ships, and where a handful of European shortsea operators turned out to be in a very acquisitive mood) as well as on the side of the container terminal operators (with the take-over of P&O Ports by DP World and PSA's acquisition of a 20% stake in Hutchison Port Holding's global terminal portfolio as the most cited events). The top-20 container shipping lines carried an estimated 88 million full teu during 2006 or 80% of the world total. Some industry observers argue that we could be on the verge of further consolidation in the liner shipping industry in the years to come. The top-10 terminal operators handle some 55% of the world container throughput. The current situation in the terminal operating sector is somewhat comparable to that of the liner shipping industry, where the four largest shipping lines also control some 40% of the market.

Both major shipping lines and global terminal operators have been very active in securing terminal capacity. The trend towards more carrier involvement in terminals has not escaped the European port scene. Nowadays a substantial number of container terminals in North and South Europe feature a shipping line among their shareholders (in most cases as a minority shareholder).

Finally, the coming years will bring a massive influx of new container tonnage, and the introduction of ever larger post-panamax ships on the arterial trade routes.

The RoRo market

RoRo volumes handled in European seaports

Combined European RoRo throughput amounted to 415 million tons in 2005, of which ports in the United Kingdom handled about one quarter. Other major RoRo countries include Italy, Sweden, Germany, Belgium, Denmark, France, Greece, Spain, the Netherlands and Finland. Dover remains the largest European RoRo port followed by Calais, Zeebrugge, Lübeck, Immingham, Rotterdam, Trelleborg and Göteborg.

Seaborne vehicle trade and port volumes

The vehicle manufacturing industry has been characterized by an ever-increasing degree of concentration and globalisation over the last few decades. Emerging markets in Asia, the Middle East, South Africa, Eastern Europe, Russia or South America have rapidly gained in importance in recent years. In Europe the main axes of car assembly and supplier activities are increasingly being complemented by strong developments in Eastern and Central Europe. Seaborne trades are nowadays increasingly focusing on the developing economies and emerging markets mentioned above. About 20-25% of the world car production was exported by ship from their country of manufacture. Europe produces about 20 million new cars on an annual basis with only a relatively small amount of their output exported overseas. Japan and South Korea are the main drivers of maritime export flows.

The main vehicle ports in Europe are Zeebrugge, Bremerhaven, Emden, Antwerp, Barcelona and Southampton. In some of these ports, car carrier operators have invested in dedicated hub terminals from which other destinations are feedered, although a typical roundtrip for a large PCTC nowadays still counts five or six ports in Europe. As far as the European market is concerned, maritime transport of cars is expected to increase steadily over the years to come driven by strong growth in Russia, Eastern Europe and Turkey. The leading deepsea car carrier operators are also heavily involved in the intra-European shortsea trades. This combination of deepsea and regional service provision is part of the general trend towards the 'one stop shop/total service logistics package' which operators now have to provide to vehicle manufacturers to retain their business.

Shortsea – Ferries

The markets are being characterized by an increasing focus on freight transport (and thus a reduced focus on passenger transport), less duty-free sales and the deployment of faster and more modern ships. The Mediterranean has witnessed a tonnage rejuvenation in recent years. Important ferry links are Germany/Sweden, Denmark/Sweden, England-Wales/Ireland, England/Scandinavia, Calais/Dover, Valencia/Barcelona to the islands and North Africa, Marseille/Corsica and North Africa, Sicily/Sardinia, Greece, the Adriatic Sea and Tunisia/Algeria/Morocco.

Shortsea – Unaccompanied freight transport

The market for unaccompanied freight transport is booming and for most geographical regions is being characterized by scale increases (larger vessels), a shortage of vessels and a rather old age profile of the fleet. In Scandinavia substantial volumes of paper and forest products from local manufacturers are exported via this way. Another major market for unaccompanied RoRo freight transport is the North Sea. Containers are expected to increase their penetration on the shortsea trade routes. The market between North Europe and the Mediterranean remains a very difficult market for unaccompanied RoRo-transport, due to fierce competition from road transport.

Deepsea – Liner trades with RoRo-facilities

In the past, the deployment of ConRo vessels was very popular on certain liner trades to the Middle East, West Africa, South America and Russia, where facilities to handle ships were rather limited in certain ports. As for today, the ConRo concept has almost completely faded away on the deepsea routes. It does, however, still survive on certain Western African and South American trades.

The market for conventional general cargo

The container has been able to swiftly conquer a substantial share of the total general cargo market as demonstrated by an increasing container penetration rate. However, despite the container boom, breakbulk shipping has started flourishing again in recent years due to growing economies in the Far East as well as Brazil, Russia and Southern Africa and the rising demand for oil and gas equipment and building materials. The volume of breakbulk cargo shipped overseas is estimated to be in the region of 400-450 million tons per year. The submarkets in breakbulk shipping include conventional liner-type concepts, barge carriers, container ships, forest products carriers, heavy lift and project carriers, conventional reeferships and RoRo ships.

General cargo ships represented just 10% of the total dwt capacity of the world merchant fleet at mid-2006, whereas this was 12% at the beginning of 2002. The general cargo ship fleet is also of relatively high age.

European seaports handled a total throughput of 253 million tons of conventional general cargo in 2005. The lion's share of conventional general cargo was handled in ports in Italy, the United Kingdom, Spain, Belgium, the Netherlands, Sweden, Germany, Norway, Finland and France. Antwerp is the market leader with a volume of 17.4 million tons in 2005. Other major conventional general cargo ports include Rotterdam, Taranto, Dunkirk and Valencia. More than 200 ports in Europe handled less than half a million ton of conventional general

cargo traffic in 2005. Generally speaking, the handling of conventional general cargo is confronted with ever-tighter handling space in many seaports in Europe (as more and more square metres are consumed by containers) and, given the strong labour intensity, it is also very sensitive to labour-related issues.

The liquid bulk market

The seaborne liquid bulk trade amounted to 2.42 billion tons in 2005, of which 77% crude oil and 23% oil products. Loadings and unloadings in Europe amounted to half a billion tons of crude oil and 146 million tons of oil products. The liquid bulk ships represent 40.9% in the world fleet (in dwt), mainly oil tankers. The fleet of liquid gas tankers (LNG and LPG) is swiftly gaining market share.

European seaports handled a total throughput of 1.58 billion tons of liquid bulk traffic in 2005. The lion's share of this volume was handled in ports in the United Kingdom, Italy, the Netherlands, France and Spain. These five countries accounted for around 1 billion tons of liquid bulk traffic. On an individual port basis, by far the biggest liquid bulk port in Europe is Rotterdam, handling nearly 170 million tons in 2005, mainly thanks to a favourable nautical accessibility and the presence of major petrochemical clusters in Rotterdam and Antwerp. Other major liquid bulk ports include Bergen Ports (Norway), Marseille and Le Havre (France), Wilhelmshaven (Germany), Tees & Hartlepool, Milford Haven, Forth and Southampton (UK), Antwerp (Belgium), and Trieste and Augusta (Italy). No less than 185 ports handled less than 1 million ton of liquid bulk cargo in 2005.

The dry bulk market

A world total volume 4.69 billion tons of dry cargo was shipped in 2005. The five major bulks (iron ore, coal, grains, bauxite/alumina and rock phosphate) accounted for 37% of this volume, while minor dry bulks and other dry cargoes (containerized cargo and other general cargo, including RoRo) had a share of 20% and 43% respectively. European seaports handled a total throughput of about 2.6 billion tons of dry bulk traffic. The share of dry bulk ships in the world fleet slightly decreased from 41.4% at the beginning of 2002 to 40.9% at mid-2006. Vessels above 100,000 dwt provide some 33% of the dwt capacity.

European ports handled a total throughput of 977 million tons of dry bulk in 2005. The lion's share of this volume was handled in ports in the Netherlands, the United Kingdom, Spain, Italy and France. Also here, by far the biggest dry bulk port is Rotterdam, handling nearly 88 million tons of dry bulk traffic in 2005. Other major dry bulk ports include Hamburg (Germany), Antwerp (Belgium), Dunkirk (France), Taranto (Italy) and Amsterdam (Netherlands).

Key implications of market developments for European ports

There is no lack of port competition in Europe. Battles are fought on many fronts: maritime and hinterland access, terminal capacity, but above all the accommodation of supply chains. The European port scene is becoming more diverse in terms of number of ports involved and the scope of port functions and services, leading to more routing options to shippers.

Growing concerns on capacity shortages in ports have made supply chain managers base their port choice decisions increasingly on reliability and capacity considerations next to pure cost considerations. To be successful, ports have to think along with the customer, to try to figure out what his needs are, not only in the port, but throughout the supply chains and networks. Port authorities can be a catalyst in this process, even though their direct impact on the routing of cargo flows is limited. Such a catalyst role requires a supply chain focus and an institutional and governance framework that encourages collective actions in the port community.

The growing mismatch between the demand for container shipping services and the supply of terminal capacity continues to be the main reason for observed schedule unreliability in liner services. Port congestion and associated decreasing schedule integrity affect the integrity of entire supply chains. It is therefore a joint responsibility of port managers, policy makers and other stakeholders to foster seaports and the broader networks of which they are part, to look after their well-being and to safeguard their future development potential. It has become crucial to have an institutional and procedural framework in place that is conducive to potential investors.

Against the background of supply chains, competitive forces are shifted to groups of spatially-dispersed but functionally-integrated terminals in different ports. New entrants in the terminal market typically meet the requirements for maritime accessibility and terminal layout. However, they often have to tackle major issues such as securing hinterland services, dealing with stakeholder-related procedures linked to large terminal projects and improving their cargo-generating and cargo-binding potential.

European seaports are competing fiercely to extend their hinterlands across frontiers. This has opened new routing options to shippers and shipping lines and has intensified the battle for contestable cargo. Even regions close to a port are often not captive to that specific port. Container port competition has broadened and altered spatial hierarchy, in the sense that ports in the traditionally dominant Hamburg-Le Havre range are increasingly facing competition from container ports in other European port ranges, primarily for serving hinterland regions in the periphery of the core of the EU. The rise of economic centres in Eastern and Central Europe creates opportunities for all ports to develop short sea shipping services and water- and land-based hub-feeder networks to these areas.

Most ports have achieved a considerable modal shift in hinterland transport, but rail and inland navigation still have not reached their maximum potential. Modal shift policies are implemented throughout Europe and these policies are starting to pay off on some multimodal inland corridors. Hinterland connections of smaller ports and terminals in a start-up phase however remain rather precarious. For the time being, the absence of critical mass complicates a further modal shift in many ports around Europe and impedes the development of new multimodal corridors.

The changing logistics environment poses new challenges in the relations between seaports and inland ports. The development of multimodal corridors enhances the interaction between seaports and inland locations and as such leads to the development of large logistics poles consisting of several logistics zones. This trend towards geographical concentration of distribution platforms in many cases occurs spontaneously as the result of a slow, market-driven process. Supranational, national, regional and/or local authorities have a role to play in facilitating the process towards a further adaptation of the port system to the imperatives of distribution systems.

Finally, port authorities and port companies must demonstrate a high level of environmental performance in order to ensure community support and to attract trading partners and potential investors. A number of ports are lading the way. Their experiences can also help other ports in learning to cope with the present avalanche of environmental challenges.

EU policy developments and ESPO activities in 2006/2007

A year of consultation

The period 2006-2007 will no doubt be remembered as one of intensive consultation on the future of both Europe's policy for ports and for the maritime sector as a whole.

The partial approach of the late port services' Directive did not only ignore the overall added value of ports for Europe's trade, economy and welfare, but also overlooked fundamental market developments such as the scale increase of shipping and the growing influence of intermodal carriers and global terminal operators. Not in the least, problems partially created by European legislation itself, such as in the field of the environment, were for a long time considered taboo.

The Commission's new approach, both in the context of the port policy review and the maritime policy Green Paper, is refreshingly different. It not only provides room for genuine consultation and debate, it also takes a much broader perspective, doing justice to the significant and multifaceted role seaports play in European society.

A port policy for all seasons – Ten years after the Kinnock Green Paper

It is in a sense remarkable that ten years after the Green Paper on Sea Ports and Maritime Infrastructure, initiated in 1997 by the then Transport Commissioner Neil Kinnock, a policy for seaports has not materialised yet.

ESPO however believes that seaports cannot do without a sector-specific EU framework. The sector is in many aspects too important for the European Union to leave it governed by the current unclear patchwork of measures or subject to case-by-case initiatives without an overall and coherent policy vision.

Relevant themes for such a policy framework include market access to port services, the role of port authorities, port financing and charging, sustainable port development and the environment, port labour and technical-nautical services, ports and the supply chain, competition with non-EU ports and the public perception of seaports.

Policy however does not automatically mean producing new legislation. A combination of providing guidance, stimulating best practice and reviewing existing law where necessary is the overall course that ESPO has taken in preparing its input for the Commission's port policy consultation which will be concluded at the ESPO Annual Conference in Algeciras on 31 May–1 June 2007. ESPO hopes that the Commission Communication and Action Plan which are expected to result from the exercise in autumn 2007, will adopt a similar approach.

Integrating ports in the supply chain

ESPO very much welcomes the realistic course set by the mid-term review of the Transport Policy White Paper. The mid-term review implicitly recognises that growth in transport is here to stay. It abandons previous theoretical thinking that transport growth can be decoupled from economic growth. ESPO also supports the sensible "co-modality" concept which judges each transport mode upon its own merits and introduces measures to improve the environmental performance of all.

It is most doubtful whether theoretical solutions such as infrastructure "smart" charging can achieve modal shift objectives. The priority is to ensure that existing EU measures in the field of railway transport, inland navigation and Trans-European Transport Networks are enforced so that service levels and infrastructure capacity are improved.

The changing logistics environment introduces new challenges for the relations between seaports and inland ports. ESPO and the European Federation of Inland Ports (EFIP) have underlined the importance of such networks by formalising their co-operation at EU level through a "Platform of European Sea and Inland Ports" which took effect in May 2007.

The Commission's proposal to establish a Common Maritime Space for Europe is a welcome initiative, provided its sole purpose is to give intra-European shipping the same flexibility in administrative terms as land-based transport modes.

The concept of the Common Maritime Space is closely linked to the development of Motorways of the Sea. Artificially setting up Motorways of the Sea services with European funding however entails the risk that cargo is simply shifted from existing services and ports rather than from roads.

Sustainable development of ports – Maritime Green Paper brings new élan

The development of Motorways of the Sea implicitly begs the controversial question whether traffic in Europe should be concentrated on a number of hub ports or should be distributed over a wider set of smaller ports. This question is also raised by the European Commission's Maritime Policy Green Paper.

ESPO's answer is very clear: it is not for EU decision-makers to indicate where port development should take place. The bottom-up principle should be fostered whereby project proposals are based on market needs. Local port management is best placed to assess these needs. The

present European port system moreover shows a healthy balance between large, medium-sized and small ports, which all have their specific role to play.

ESPO has nevertheless warmly welcomed the Commission's Green Paper as it is one of the first EU documents that recognises the legal uncertainties that exist with regard to the application of nature conservation legislation, as for instance outlined in ESPO's new Code of Practice on the Birds and Habitats Directives. Despite pro-active behaviour of port managers, seeking win-win solutions with NGOs and other stakeholders, these uncertainties continue to cause substantial delays for many projects, thus contributing to the growing mismatch between demand and supply of port and port-related capacity in European seaports.

The Green Paper introduces maritime spatial planning as a tool to create greater legal certainty for both nature and economic development. ESPO believes there may be added value in this concept for ports provided it is not only based on ecological criteria, refrains from port planning at EU level, avoids overlap with existing planning instruments and simplifies current consent procedures for port development projects and port operations such as dredging.

Another merit of the Green Paper is that it has brought the theme of maritime identity to the forefront. Creating a positive image of the port sector and improving the public acceptance of ports is also one of the prime objectives of ESPO.

Maritime safety and security

Pro-active behaviour of port authorities in the field of the environment goes hand in hand with a similar attitude regarding safety of navigation and port operations as well as port security. These are typical public responsibilities of port authorities, regardless of their ownership or management structures.

ESPO has therefore adopted a constructive approach throughout the political discussions on the series of maritime safety packages that have seen the light of day since the Erika and Prestige accidents. ESPO has in particular supported proposals to install an adequate response system to deal with ships in distress seeking a place of refuge. Such a system should however ensure adequate compensation for port authorities in case a ship in distress were to cause local damage, be it of human, environmental or economic nature.

In the field of port security, things have moved from the terminal level to that of the port area as such. By June 2007, Member States have to implement the port security Directive, which introduces ISPS-type measures for the overall port area. Key principle for ESPO is that measures, be they applied to the port perimeter or to specific equipment and installations within a port, should be risk-based. This implies that ports should – at low risk level – remain generally accessible.

With the ISPS Code and the port security Directive firmly in place, ESPO believes that Europe should now fully concentrate its security efforts on other parts of the supply chain.

II. MARKET REPORT ON THE EUROPEAN SEAPORT INDUSTRY(*)

1. General developments

1.1 Economic background: world output and world merchandise trades

According to the International Monetary Fund (2006), world output increased by a very healthy 4.9% in 2005, slightly down from the growth rate of 5.3% recorded the year before. As Table 1 indicates, all major regions of the world experienced positive output growth in 2005, albeit to a different extent. With a growth rate of 2.6%, the economic performance of the advanced economies clearly lagged behind the world average. While the United States performed well, growth in the Euro Area was rather modest, due to low growth rates of Germany and France, its two biggest economies. Output in Japan increased 2.6%, while the United Kingdom witnessed real GDP growth of just 1.9%, well-below the 3.3% growth of the year before. Significantly better growth rates were obtained by economies in Africa (5.4%), Central and Eastern Europe (5.4%) and the Commonwealth of Independent States (CIS) (6.5%). The star performers, however, were China and India with real GDP increases of 10.2% and 8.5%, respectively. In 2006, China's GDP increased by another 10.5% while India remained at 8.5%. Registering a growth rate of 5.7%, countries in the Middle East scored slightly better than the world average. After a year of frail economic growth in 2005, GDP growth in Europe rebound in 2006 to around 3%. The strongest growers in 2006 were Latvia (11.9%), Estonia (10.9%), Slovakia (8%) and Romania (6%). Over the 2007-2012 period, GDP in the Euro Area is expected to rise on average by 2% per annum.

Table1: World output growth for selected regions (annual percentage changes)

	2004	2005	2006(*)	2007(*)
World output	5.3	4.9	5.1	4.9
Advanced economies	3.2	2.6	3.1	2.7
United States	3.9	3.2	3.4	2.9
Euro Area	2.1	1.3	2.4	2.0
Germany	1.2	0.9	2.0	1.3
France	2.0	1.2	2.4	2.3
Italy	1.1	—	1.5	1.3
Spain	3.1	3.4	3.4	3.0
Japan	2.3	2.6	2.7	2.1
United Kingdom	3.3	1.9	2.7	2.7
Canada	3.3	2.9	3.1	3.0
Other advanced economies	4.6	3.7	4.1	3.7
Newly industrialized Asian economies	5.9	4.5	4.9	4.4
Other emerging market and developing countries	7.7	7.4	7.3	7.2
Africa	5.5	5.4	5.4	5.9
Central and Eastern Europe	6.5	5.4	5.3	5.0
Commonwealth of Independent States	8.4	6.5	6.8	6.5
Developing Asia	8.8	9.0	8.7	8.6
China	10.1	10.2	10.0	10.0
India	8.0	8.5	8.3	7.3
ASEAN-4	5.8	5.1	5.0	5.6
Middle East	5.5	5.7	5.8	5.4

Source: IMF (2006) (*) projections

(*) Authored by Bert Vernimmen and Theo Notteboom, ITMMA – University of Antwerp

In view of the above, it comes as no surprise that merchandise trade expanded strongly in recent years (see Table 2). After a very remarkable growth of 9.5% in 2004 (largely due to double-digit growth in Asia, the CIS and Latin America), the volume of world exports increased by another 6% in 2005. The slowdown in 2005 was particularly pronounced during the first months of the year, but a recovery was apparent by late June onwards, in spite of high oil and commodity prices and doubts about the persistence of strong demand in the Chinese market (UNCTAD, 2006:2).

Table 2: Growth in the volume of merchandise trade by geographical region (annual percentage changes)

	Exports			Imports		
Region/Country	**2003**	**2004**	**2005**	**2003**	**2004**	**2005**
World	5.0	9.5	6.0	-	-	-
North America	3.0	8.0	6.0	5.5	10.5	6.5
European Union (25)	0.9	7.0	3.5	1.8	6.0	2.5
Africa and Middle East	-	7.0	7.5	-	13.5	12.0
Latin America	4.5	12.5	10.0	1.6	18.5	14.0
Asia	-	14.0	9.5	11.1	14.0	7.5
CIS	-	13.0	4.5	10.9	16.0	16.5
Japan	-	10.5	1.0	-	7.0	2.5
China	-	24.0	25.0	-	21.5	11.5

Source: UNCTAD (2006)

Among the developed economies, the EU-25 and Japan experienced a significant deceleration of export growth during 2005 (with the Japanese export growth being decimated), while growth in North American exports decreased by a modest 2 percentage points to 6%. Export growth for Africa and the Middle East (7.5%) was above the world average, while Latin American countries enjoyed a very healthy 10% growth. The star performer in 2005 was (again) China, registering a staggering increase of 25% in export volume, following an already remarkable 24% growth in 2004. Hence, Chinese exports increased by no less than 55% in just two years time.

The preliminary figures available for growth in import volumes indicate double-digit growth for countries in the CIS (16.5%), developing countries in Central and South America (14%) and developing countries in Africa and the Middle East (12%). China followed closely behind with 11.5% growth in imports. These growth percentages are well-above those of developed countries, where the performance of North America (6.5%) was significantly better than that of the EU-25 and Japan.

Figures for 2006 are not yet available, but according to the UNCTAD, "prospects for export growth [in 2006] are based on the acceleration of the economic activity of European Union economies, as the potential for further acceleration of the US economy and the main economies of the Far East is deemed to be limited. In spite of uncertainties concerning the prices of commodities and their supply, it is expected that exports could increase by about 7% in 2006" (UNCTAD, 2006:3).

1.2 Development of world seaborne trade

As indicated by Table 3, international seaborne trade increased by an estimated 3.8% in 2005 to reach a total volume of 7.11 billion tons. This followed strong expansions of 6.2% and 5.3%, respectively, in 2003 and 2004. The figure of 7.11 billion tons of international seaborne trade in 2005 comprised 2.42 billion tons of tanker cargo (34.1%) and 4.69 billion tons of dry cargo (65.9%). The first category, in turn, consisted of about 1.86 billion tons (76.7%) of crude oil and 565 million tons (23.3%) of petroleum products.

Just like the previous years, major crude oil loading areas in 2005 included the developing countries in Western Asia (934.5 million tons), the Caribbean (247.6 million tons), West Africa (196.3 million tons) and North Africa (130.2 million tons). The main discharging areas were located in developed market-economy countries in North America (537.7 million tons), Europe (438.4 million tons) and Japan (215 million tons). Apart from these, a substantial volume of crude oil was also discharged in developing countries in South and East Asia.

The volume of 565 million tons of petroleum products represented an increase of 5.8% compared to 2004. The pattern and volume of shipments were similar to those of past years, with shipments of Russian petroleum products from Baltic ports in small tankers continuing to have an impact in other countries. The last quarter of the year witnessed an increase in the shipments of products to North America because of the damage done to refineries in the Gulf of Mexico during the hurricane season (UNCTAD, 2006:11). Finally, it is worthwhile to note that shipments of liquefied natural gas (LNG) increased by 5.4% in 2004 to reach a total volume of 178 billion cubic metres. Supplies mainly came from Indonesia, Malaysia, Qatar, Algeria, Trinidad, Nigeria and Australia, while the largest importing area was located in the Far East (in particular Japan and Republic of Korea).

Table 3: Development of international seaborne trade (loaded goods) for selected years

Year	**Tanker cargo**		**Dry cargo**		**Total cargo**	
	m tonnes	**% change**	**m tonnes**	**% change**	**m tonnes**	**% change**
1990	1,755		2,253		4,008	
2000	2,163		3,821		5,984	
2001	2,177	0.6%	3,844	0.6%	6,021	0.6%
2002	2,139	-1.7%	3,981	3.6%	6,120	1.6%
2003	2,226	4.1%	4,274	7.4%	6,500	6.2%
2004	2,318	4.1%	4,528	5.9%	6,846	5.3%
2005(*)	2,422	4.5%	4,687	3.5%	7,109	3.8%

Source: UNCTAD (2006)
(*) estimate

Table 3 reveals that it is especially the dry cargo sector which expanded strongly in recent years, although the 3.5% growth rate in 2005 was rather modest compared to the years before. The total volume of 4.69 billion tons in 2005 consisted of 1.70 billion tons of the five traditional dry bulk types (iron ore, coal, grains, bauxite/alumina and rock phosphate), which represented a healthy 7.2% increase compared to the year before. The booming production of steel[1] was reflected in a 9.3% increase in iron ore shipments in 2005. Australia and Brazil (accounting for about 70% of world iron ore exports) recorded export growth rates of 14.5% (to 237 million tons) and 8.3% (to 222 million tons), respectively, while India recorded a 10% increase in iron ore exports to 75 million tons. Exports from South Africa, however, remained stable at 27 million tons while smaller iron ore exporters such as Canada, Sweden, Mauretania and Peru recorded single-digit increases (UNCTAD, 2006:13). On the import side, China absorbed 263 million tons of iron ore, representing a massive increase of 50 million tons compared to the year before. Japan and the EU-15 imported 135.7 million tons and 117.6 million tons of iron ore, respectively, representing marginal volume increases over the previous year. Between them, China, the EU-15 and Japan accounted for more than three quarters of world iron ore imports. Imports by the Republic of Korea were steady at about 40 million tons, while imports into the Americas, the Middle East and Africa reached a total of nearly 37 million tons.

Coal shipments in 2005 increased by 4.9% to reach an all-time high of 682 million tons. Thermal coal represented 72% of this volume, with coaking coal representing the remaining 28%. The main coal exporters in 2005 included Australia (234 million tons), Indonesia (120 million tons), China (73 million tons), South Africa (66 million tons) and Colombia (57 million tons). On the import side, the EU and Japan represented 27% and 26%, respectively, while the Republic of Korea and Taiwan each represented about 10% of world coal imports. Imports of coking coal into Brazil expanded by a remarkable 25% to 11 million tons in 2005.

World shipments of grain, the third traditional dry bulk flow, are estimated to have increased by a modest 3.4% in 2005 to reach a volume of 274 million tons. In 2004 the main loading areas included North America (46%) and the East Coast of South America (15%). Well-established importers such as Japan, the Republic of Korea and EU Member States kept imports steady, while a number of other countries (for example countries in the Middle East, Central America and Africa) recorded substantial import increases.

Next, shipments of bauxite and alumina (the primary inputs for the aluminium industry) are estimated to have increased by 4.5% to 70 million tons in 2005. West African countries accounted for about half the world's bauxite export volume, with the EU and Eastern

1 World crude steel production surpassed the 1 billion tons mark for the second year in a row during 2005, mainly due to a very remarkable 24.6% increase in Chinese steel production. This was followed by another 18.5% increase in 2006. As a result, China had a market share of 34% in worldwide crude steel production in 2006 (cf. infra).

European countries being the most important destinations. Finally, shipments of rock phosphate reached about 30 million tons in 2005, with Morocco (12 million tons) being the main exporter, next to other African countries (e.g. Togo) and countries in the Middle East (e.g. Jordan). On the import side, countries in the Far East (e.g. China) imported about 10 million tons of rock phosphate in 2005.

Somewhat surprisingly, minor dry bulks (950 million tons) and other dry cargoes (2.04 billion tons) expanded by a very modest 1.5% to reach 2.99 billion tons in 2005. Since these latter cargoes are increasingly being carried in containers, this low growth rate is surprising indeed.

Table 4: World seaborne trade by country groups, 2005 (million tons)

	Exports			Imports		
	Liquid	**Dry**	**Total**	**Liquid**	**Dry**	**Total**
Developed market-economy countries						
North America	95.1	502.8	597.9	681.9	442.2	1,124.1
Europe	105.3	1,065.1	1,170.4	542.9	1,514.9	2,057.8
Japan	4.3	185.5	189.8	247.5	584.7	832.2
Australia/New Zealand	14.0	604.4	618.4	39.9	47.9	87.8
Other	0.0	171.6	171.6	16.2	23.5	39.7
Total DMEC	218.7	2,529.4	2,748.1	1,528.4	2,613.2	4,141.6
Countries of Central and Eastern Europe	177.2	181.0	358.2	13.7	67.4	81.1
Socialist Countries of Asia	38.6	478.4	517.0	153.0	583.9	736.9
Developing Countries	1,987.4	1,498.1	3,485.5	731.0	1,431.4	2,162.4
World total	**2,421.9**	**4,686.9**	**7,108.8**	**2,426.1**	**4,695.9**	**7,122.0**

Source: UNCTAD (2006)

An analysis of world seaborne trade by country groups also yields some interesting insights (Table 4). Firstly, developed market-economy countries (DMECs) accounted for 2.75 billion tons of seaborne exports and 4.14 billion tons of seaborne imports in 2005. This gave them a market share of 38.7% of total world exports and 58.2% of total world imports, respectively. Within this country group, Europe remains the most important exporter of crude oil and petroleum products with a total of 105.3 million tons (this, however, represents just 4.3% of the world total). North America, on the other hand, is a massive importer of crude oil and petroleum products with 681.9 million tons (28.1% of the world total), followed by Europe (22.4%) and Japan (10.2%). In the dry bulk segment, Europe remains the largest dry cargo market for exports and imports with 1,065.1 million tons (22.7% of world exports) and 1,514.9 million tons (32.3%) respectively. The United States, Canada, Australia and New Zealand were also large exporters of dry shipments. This underlines their important shares in shipping the three major dry bulk commodities iron ore, coal and grain. On the import side, Japan alone represented 10.2% of seaborne imports of liquid cargo and about 12.5% of seaborne imports of dry cargo.

Secondly, developing countries (across all continents) represented about half the volume of world seaborne exports (with a whopping market share of 82% for liquid cargo, reflecting the importance of Middle East oil producers) and about 30% of world seaborne imports. These percentages have been fairly stable over the last couple of years. Table 4 indicates clearly that the trade structure of developing countries contrasts sharply with that of DMECs. The developing countries' combined share in crude oil and petroleum products exports represented 86.5% and 67.6% respectively. For imports, these shares were 26.3% and 42.4%. In the dry cargo sector, the share of developing countries' exports reached 32% of world exports, while their share of world imports increased marginally to 30.5%. It should also be noted that, because of differences in GDP growth, substantial regional variations exist among groups of developing countries. It is, however, beyond the scope of the present Report to go into this matter in detail.

Finally, socialist countries of Asia accounted for about 7% of total seaborne exports and 10% of total seaborne imports, while corresponding figures for countries of Central and Eastern Europe are 5% and 1%, respectively (UNCTAD, 2006:4). Preliminary figures for 2006 indicate that annual growth rates will probably be slightly lower than those of 2005, while the distribution of world tonnage by continent is expected to fluctuate only marginally.

More detailed statistics on the seaborne trade of liquid bulk cargo and dry bulk cargo are provided in Chapters 5 and 6, respectively, of this Market Report.

Table 5: Demand for shipping services for selected years (billion ton-miles)

Year	Tanker cargo		Five main dry bulks		Other dry cargoes		Total	
	bn t-miles	**% change**	**bn t-miles**	**% change**	**bn t-miles**	**% change**	**bn t-miles**	**% change**
2000	1,0265		6,638		6,790		23,693	
2001	1,0179	-0.8%	6,782	2.2%	6,930	2.1%	23,891	0.8%
2002	9,898	-2.8%	6,879	1.4%	7,395	6.7%	24,172	1.2%
2003	10,580	6.9%	7,454	8.4%	7,810	5.6%	25,844	6.9%
2004	11,235	6.2%	8,065	8.2%	8,335	6.7%	27,635	6.9%
2005	11,705	4.2%	8,610	6.8%	8,730	4.7%	29,045	5.1%

Source: Fearnleys, Review 2004 and Review 2005

To conclude, Table 5 provides data on total demand for shipping services in terms of ton-miles. World seaborne trade for 2005 reached 29.05 billion ton-miles, representing an increase of 5.1% compared to the year before. This increase is about 1.3 percentage points higher than the increase in transported volume (see Table 3), implying that the average transport distance increased slightly during 2005. Increased demand for haulage of crude oil and oil products resulted in ton-mileage for these commodities increasing by 4.2%, somewhat less than the 6.2% increase of the previous year. For the five main dry bulks, ton-miles increased by 6.8% in 2005, against a 7.2% increase in cargo volume, which indicates increased vessel utilization. The remaining dry cargoes, minor bulks and liner cargo, were characterized by increasing length of supply lines, as their ton-miles increased by 4.7% to 8,730 billion ton-miles while cargo increased by a very modest 1.5%. This reflects longer distances between cargo origins and destinations and the lasting effect of relocated industries in the Far East (UNCTAD, 2006:17).

The remainder of this Market Report provides an overview of the main trends and developments for the following five markets: the container market (Chapter 2), the RoRo market (Chapter 3), the market for conventional general cargo (Chapter 4), the liquid bulk market (Chapter 5) and the dry bulk market (Chapter 6). After a general overview of each of these markets, detailed statistics on cargo handling in European seaports are presented. In doing so, we aim to provide a 'balanced' analysis in two respects. First of all, the statistics cover both Northern European and Southern European seaports. Secondly, we include not only the large and well-known mainports, but also mid-sized and small ports. Each chapter ends with an overview of key developments during 2005/2006.

2. The container market

2.1 Volumes shipped and world container port throughput

Container shipping has been the fastest growing sector of the maritime industries during the last two decades. As outlined by Drewry Shipping Consultants (2006) a number of fundamental drivers underlie demand growth in container shipping. First of all, organic growth is spurred by increasing economic activity, trade liberalisation, reduced import tariffs, globalisation and outsourcing. This organic growth is compounded by the fact that breakbulk cargo is increasingly being carried in containers (substitution effect), by changes in carriers' scheduling strategies (for example an increased focus on transhipment) and by port development. Finally, "incidental" demand growth can be triggered by regional variations in import and export activity (for example related to exchange rate swings) causing imbalances in directional containerised trade flows.

According to Dynamar (2007) the total number of full containers shipped on worldwide trade routes reached an estimated 110.2 million teu in 2006. This is nearly twice as high as the 60.5 million teu in 2000, corresponding to an average annual growth rate of 10.5%. For 2007 a further double-digit increase to 121.5 million teu is forecasted. Similarly, UNESCAP (2005) forecasts a figure of 177.6 million teu

for 2015 (excluding transhipment). More specifically, container volumes shipped on worldwide trade routes are expected to develop as follows (see also Global Insight et al., 2005):

- Volumes on the *east-west trades* (i.e. Transpacific, Transatlantic and Asia/Europe) are expected to increase from 34 million teu in 2002 to 70 million teu in 2015, representing an average annual growth rate of nearly 6%;
- Volumes on the *north-south trades* (linking the major production and consumption centres of Asia, North America and Europe with developing countries in the Southern Hemisphere) are expected to show a similar average growth rate, increasing from about 17 million teu in 2002 to about 36 million teu in 2015;
- *Intra-regional trades*, however, are expected to show significantly higher growth during the same period. Mainly as a result of booming intra-Asian trades, they are expected to surge from 28 million teu in 2002 to no less than 72 million teu in 2015, corresponding to an average annual growth rate of 7.5%.

Table 6 gives an overview of the estimated 2006 and forecast 2007-2008 full container trade on the three arterial East-West trades. As this table indicates, both the Far East-Europe and Transpacific trade have enjoyed healthy 8-9% growth in 2006, and this is expected to continue throughout 2007-2008 as well. Compared to these two trade routes, the Transatlantic market is significantly smaller (albeit still very important) and also has much lower annual growth rates.

Apart from the arterial East-West trades, the container trade between Europe and Latin America (including Central America, the Caribbean and South America) also involves significant volumes. According to Global Insight, volumes on this trade route increased from about 2.85 million teu in 2004 to 3.30 million teu in 2006, representing an increase of nearly 16% in two years time. Just like the Far East-Europe and Transpacific trade, the trade between Europe and Latin America is characterized by a major imbalance: the northbound volumes (2.32 million teu) were more than double the southbound volumes (0.98 million teu) in 2006[2]. In addition, the Europe-Africa trade is estimated at 2.98 million teu in 2006 (some 17% higher than in 2004), of which 1.71 million teu southbound and 1.27 million teu northbound. Similarly, trade between Europe and the Middle East increased from 2.30 million teu in 2004 to 2.65 million teu in 2006 (+15%), of which 1.83 million teu eastbound and 0.82 million teu westbound. Hence, contrary to the Far East-Europe trade, the eastbound leg is the dominant leg on the trade between Europe and the Middle East.

Finally, the intra-European containerized trade (including shortsea and feedering) is estimated at some 7.72 million teu in 2006, some 19% higher than in 2004. Volumes between North Europe and the Mediterranean reached 2.44 million teu in 2006, of which 1.33 million teu southbound and 1.12 million teu northbound (Dynamar, 2007).

Table 6: Overview of main East-West container trades (full teu)

	2006	2007	2008
Far East/Europe			
westbound	12,240,000	13,916,000	15,347,000
eastbound	5,747,000	5,995,000	6,235,000
total	17,987,000	19,911,000	21,582,000
growth	9%	11%	8%
Transatlantic			
westbound	4,250,000	4,240,000	4,260,000
eastbound	2,670,000	2,870,000	3,030,000
total	6,920,000	7,110,000	7,290,000
growth	5%	3%	3%
Transpacific			
westbound	4,720,000	5,040,000	5,330,000
eastbound	15,340,000	16,900,000	18,510,000
total	20,060,000	21,940,000	23,840,000
growth	8%	9%	9%

Source: Global Insight

2 A large part of the Europe-Latin America trade involves trade with Brazil. As an example, the North Europe-Brazil trade is estimated at 712,000 full teu in 2006 (some 17% higher than in 2004), of which 447,000 teu northbound and 265,000 teu southbound.

In view of the above, it is hardly surprising that container traffic has been the driving force behind the growth in cargo handling in many seaports around the world. Drewry Shipping Consultants (2006) estimates that the total throughput handled by the world's container ports (not to be confounded with the trade route volumes mentioned above) increased from about 236 million teu in 2000 to an estimated 399 million teu in 2005 (including empties and transhipment), representing an average annual growth rate of 11%. As Table 7 indicates, transhipment traffic has clearly been the driving force behind growth in container handling in the last decade. As far as the near future is concerned, worldwide container handling is expected to increase further to 627.7 million teu in 2010 (nearly 60% above the 2005 level), of which 356.7 million teu port-to-port full containers, 91.2 million teu port-to-port empty containers and 179.8 million teu transhipment.

Table 7: World container port traffic and its components for selected years (teu)

	Total Port Handling	Port-to-port Full	Port-to-port Empty	Trans-shipment
1990	87.9	57.4	14.6	16.0
1995	145.1	92.1	20.8	32.3
2000	235.6	136.7	36.8	62.1
2005 (e)*	399.2	231.3	59.7	108.2
2010 (f)*	627.7	356.7	91.2	179.8
2005 vs 1995	+175%	+151%	+187%	+235%
2010 vs 2005	+57%	+54%	+53%	+66%

Source: Drewry Shipping Consultants (2006)
** (e) estimated (f) forecasted*

2.2 Container traffic handled in European seaports

Table 8 provides an overview of container traffic handled in selected geographical areas in Europe. The total sample consists of 132 individual seaports[3] which together handled 73.73 million teu in 2005 (transhipment included). At an estimated average weight of 11 tons per teu, this boils down to some 800 million tons. The figure of 73.73 million teu represents about 18% of the estimated world container port traffic of 399.2 million teu for 2005, as mentioned above. Table 8 is divided into two parts. The first part covers Northern Range ports (including Northern Europe and Scandinavia/Baltic) while the second part focuses on Southern Range ports (covering the Western Mediterranean, Iberian Peninsular and Eastern Mediterranean/ Black Sea).

2.2.1 Northern Range ports

About 56% of the total European container traffic was handled by ports in Northern Europe (37 ports in total), registering a combined throughput of 41.70 million teu in 2005. Rotterdam, Hamburg and Antwerp handled a staggering 23.86 million teu in 2005 or 32% of the European total and nearly 60% of the Northern European container throughput. In 2006 their combined throughput increased further to 25.57 million teu (+7.2%). The main volume drivers were intra-European flows and Chinese traffic, mainly in Rotterdam and Hamburg. Chinese cargo (including Hong Kong) in Hamburg far exceeded 2 million TEU in 2005 with Rotterdam also approaching the 2 million TEU mark. Hamburg continues to develop its hub role for the Baltic and Central and Eastern Europe, while Rotterdam and Antwerp strongly capitalize on strong cargo generating centres in the extending 'blue banana' of Western Europe combined with a high density of European distribution centres in the Benelux, Northern France and parts of Germany.

Besides these three mainports, Northern Europe also counted five other "teu millionaires" (of which two in the UK). The 29 remaining (small and mid-sized) ports handled a combined throughput of 6.3 million teu in 2005. Most of them handled less than half a million teu.

3 Table 8 only includes ports with an annual throughput of at least 3000 teu, but does not take into account ports along inland waterways. Some of these latter ports, however, handled substantial volumes of container traffic in 2005. The inland port of Duisburg (Germany) is a prime example of this. With a throughput of 712,000 teu it outperformed most seaports listed in Table 8. In addition, the inland ports of Vienna, Germersheim, Mannheim and Dortmund each handled (well) in excess of 100,000 teu in 2005.

Although the Scandinavia/Baltic region includes no less than 45 container ports, volumes handled are far less than in Northern Europe. The total throughput in 2005 reached 6.44 million teu, more than half of which was handled by the top-5 ports St-Petersburg, Aarhus, Gothenburg, Helsinki and Gdynia. However, expressed in percentage terms, many ports in the Scandinavia/Baltic region have grown considerably faster than their big counterparts in Northern Europe in recent years. A prime example is St-Petersburg, which handled only 0.58 million teu in 2002 (i.e. about half its throughput of 2005). A similar picture applies to Aarhus (0.40 million teu in 2002), Gdynia (0.25 million teu) and Klaipeda (0.07 million teu).

Hence, the total Northern Range (82 ports) accounted for 48.14 million teu in 2005, i.e. about 65% of the total port sample included in Table 8.

2.2.2 Southern Range ports

The second biggest container port region in Europe is the West-Mediterranean (27 ports) which, consisting predominantly of Spanish and Italian ports, accounted for 19.32 million teu in 2005. Three Spanish, three Italian and one Maltese port handled in excess of 1 million teu, with Marseilles (Southern France) following closely behind. The 19 remaining (small and mid-sized) ports together handled about 3.6 million teu. Most of them handled less than half a million teu.

Next, the 15 ports in the East-Mediterranean/Black Sea region (excluding ports in Egypt, Israel, Turkey or Lebanon) handled a combined throughput of 4.62 million teu in 2005. Only Piraeus handled in excess of 1 million teu. Finally, the 8 ports on the Atlantic Coast of the Iberian Peninsular accounted for only 1.66 million teu in 2005. The biggest of them (Lisbon and Bilbao) handled about half a million teu each.

Hence, the total Southern Range (50 ports) accounted for 25.59 million teu in 2005, i.e. about 35% of the total port sample included in Table 8.

The West-Mediterranean has witnessed a remarkable development since the mid 1990s. From that moment on, transhipment hubs emerged in the region (e.g. Algeciras, Gioia Tauro, Marsaxlokk, Taranto, Cagliari) which gave impetus to shipping lines to reconfigure their service networks and to have more services calling in Mediterranean ports. Although most transhipment hubs still record healthy growth, growing Mediterranean volumes have generated a mounting interest of shipping lines to have direct calls in mainland Med ports, supported by dedicated Asia/China-Med liner services. An example is the successful development of the Spanish ports of Valencia and Barcelona. This development has made some transhipment hubs to reorient their focus towards feeder flows to the East Mediterranean.

Table 8: Container port throughput for Northern Range ports (2005)

Region	Port	Total TEU
Northern Europe	Rotterdam	9,288,349
	Hamburg	8,087,545
	Antwerp	6,482,029
	Bremen/Bremerhaven	3,735,574
	Felixstowe *	2,730,000
	Le Havre	2,118,509
	Zeebrugge	1,407,933
	Southampton	1,375,000
	Tilbury	677,902
	Thamesport *	650,000
	Liverpool	626,000
	Dublin	590,250
	Dartford *	495,000
	Immingham	433,547
	Hull	361,240
	Teesport	318,077
	Belfast	270,000
	Reykjavik	269,359
	Grangemouth	224,000
	Dunkirk	204,563
	Rouen	202,429
	Waterford	181,419
	Cork	164,336
	Nantes St-Nazaire *	125,000
	Goole	116,000
	Bristol	114,390
	Ipswich	74,670
	Amsterdam	65,844
	Harwich *	61,500
	Cardiff	54,663
	Bordeaux *	49,500
	Drogheda	48,490
	Warrenpoint	40,510
	Ghent	30,529
	Limerick	9,288
	Ostend	8,890
	Dover *	6,000
Total Northern Europe (37)		**41,698,335**
Scandinavia/Baltic	St Petersburg	1,119,346
	Aarhus	803,000
	Gothenburg	771,679
	Helsinki	459,744
	Gdynia	400,165
Scandinavia / Baltic (continued)	Kotka	366,667
	Esbjerg *	295,000
	Klaipeda	214,307
	Oslo	170,506
	Riga	168,978
	Helsingborg	162,000
	Hamina	159,783
	Copenhagen Malmo	155,000
	Tallinn	127,585
	Rauma	118,776
	Kaliningrad	112,528
	Gavle	84,555
	Bergen	72,489
	Gdansk	70,014
	Pori	61,048
	Aalborg	55,960
	Hanko	52,351
	Norrkoping	43,349
	Fredrikstad	41,944
	Kristiansand	38,942
	Stockholm	38,122
	Szczecin-Swinoujscie	36,453
	Kemi	29,127
	Halmstad	21,864
	Oulu	19,744
	Kiel	19,029
	Ahus	18,715
	Wallhamn	18,449
	Sodertalje	18,261
	Turku	16,717
	Varberg	14,051
	Fredericia	12,000
	Umea	11,213
	Tornio	10,151
	Raahe	7,640
	Lysekil	7,221
	Lappeenranta	5,708
	Skelleftea	4,949
	Kokkola	3,698
	Liepaja	3,144
Total Scandinavia/Baltic (45)		**6,441,972**
NORTHERN RANGE PORTS (82)		**48,140,307**

Source: Containerisation International and respective port authorities
** Estimate*

Container port throughput for Southern Range ports (2005)

Region	Port	Total TEU
West-Mediterranean	Algeciras	3,179,614
	Gioia Tauro	3,160,981
	Valencia	2,409,821
	Barcelona	2,071,481
	Genoa	1,624,964
	Marsaxlokk	1,321,000
	La Spezia	1,024,455
	Marseilles	908,000
	Leghorn	658,506
	Cagliari	631,435
	Salerno	418,205
	Naples	373,706
	Malaga	247,451
	Vado Ligure *	223,000
	Savona	219,876
	Alicante	159,501
	Palma de Mallorca	155,582
	Cadiz	138,441
	Seville	115,669
	Valletta	61,410
	Civitavecchia	44,615
	Castellon de la Plana	43,773
	Cartagena	37,406
	Palermo	27,984
	Mahon	22,725
	Ibiza	13,025
	Tarragona	9,857
Total West Mediterranean (27)		**19,302,483**

Region	Port	Total TEU
East-Mediterranean/Black Sea	Piraeus	1,394,512
	Constantza	771,126
	Taranto	716,856
	Thessaloniki	365,925
	Limassol	320,130
	Venice	289,860
	Trieste	198,319
	Koper	179,745
	Ravenna	168,588
	Varna	84,400
	Rijeka	76,258
	Bourgas	25,685
	Heraklion	18,593
	Bari	10,008
	Larnaca	4,732
Total East-Med/Black Sea (15)		**4,624,737**
Iberian Peninsular (Atlantic Coast)	Lisbon	513,061
	Bilbao	503,804
	Leixoes	340,641
	Vigo	205,057
	Sines	50,994
	Marin	32,128
	Aviles	10,851
	Gijon	5,048
Total Iberian Peninsular (Atl,) (8)		**1,661,584**
SOUTHERN RANGE PORTS (50)		**25,588,804**
TOTAL EUROPEAN PORTS (132)		**73,729,111**

Source: Containerisation International and respective port authorities
** Estimate*

At the time of writing (March 2007), final traffic figures for 2006 were not yet available for all seaports listed in Table 8. Those seaports for which this was the case are included in Table 9. This table again includes only those seaports handling more than 3000 teu on an annual basis. This resulted in a (provisional) sample of 56 different ports, handling a combined throughput of 66.12 million teu. This represents an increase of 8.6% compared to the year before. However, as Table 9 indicates, growth rates varied considerably between ports and geographical regions.

Table 9: Comparison of 2006 and 2005 container traffic for selected ports (teu)

Port	2006	2005	Growth
Rotterdam	9,690,052	9,288,349	4.3%
Hamburg	8,861,545	8,087,545	9.6%
Antwerp	7,018,799	6,482,029	8.3%
Bremen/Bremer-haven	4,449,624	3,735,574	19.1%
Algeciras	3,244,640	3,179,614	2.0%
Felixstowe	3,000,000	2,730,000	9.9%
Gioia Tauro	2,938,176	3,160,981	-7.0%
Valencia	2,612,139	2,409,821	8.4%
Barcelona	2,317,368	2,071,481	11.9%
Le Havre	2,130,000	2,118,509	0.5%
Genoa	1,657,000	1,624,964	2.0%
Zeebrugge	1,653,493	1,407,933	17.4%
Marsaxlokk	1,450,000	1,309,000	10.8%
Southampton	1,516,000	1,375,000	10.3%
St-Petersburg	1,449,958	1,119,346	29.5%
Piraeus	1,400,000	1,394,512	0.4%
La Spezia	1,137,000	1,024,455	11.0%
Constantza	1,075,000	768,099	40.0%
Marseilles	941,400	908,000	3.7%
Gothenburg	820,000	771,679	6.3%
Cagliari	690,392	631,435	9.3%
Kotka	461,876	366,667	26.0%
Gdynia	461,170	400,165	15.2%
Helsinki	416,667	459,744	-9.4%
Thessaloniki	376,940	365,925	3.0%
Leixoes	372,611	340,641	9.4%
Hull	360,000	361,240	-0.3%
Limassol	356,723	320,130	11.4%
Amsterdam	305,722	65,844	355.6%
Malaga	300,000	247,451	21.2%
Vado Ligure	250,000	223,000	12.1%

Port	2006	2005	Growth
Klaipeda	231,548	214,307	8.0%
Trieste	220,661	198,319	11.3%
Dunkirk	204,853	204,563	0.1%
Helsingborg	200,000	162,000	23.5%
Rauma	168,952	120,234	40.5%
Hamina	168,192	159,783	5.3%
Copenhagen Malmo	164,300	155,000	6.0%
Palma de Mallorca	156,000	155,582	0.3%
Tallinn	152,399	127,585	19.4%
Sines	121,956	50,994	139.2%
Bristol	115,000	114,390	0.5%
Rijeka	96,000	76,258	25.9%
Ipswich	75,000	74,670	0.4%
Aalborg	59,000	55,960	5.4%
Hanko	54,256	52,351	3.6%
Valletta	47,920	61,410	-22.0%
Pori	42,137	61,048	-31.0%
Oulu	30,338	19,744	53.7%
Kemi	23,645	29,127	-18.8%
Heraklion	21,963	18,593	18.1%
Turku	20,257	16,717	21.2%
Ventspils	16,077	900	1686.3%
Tornio	11,976	10,151	18.0%
Raahe	6,975	7,640	-8.7%
Liepaja	6,054	3,144	92.6%
Northern Europe	39,374,366	36,045,646	9.3%
West Mediterranean	17,742,035	17,007,194	4.3%
East Med/Black Sea	3,547,287	3,141,836	12.9%
Scandinavia/Baltic	4,965,777	4,313,292	15.1%
Iberian Peninsular	494,567	391,635	26.3%
Total port sample	**66,129,754**	**60,899,603**	**8.6%**

Source: Containerisation International and respective port authorities

The Northern European seaports included in Table 9 handled a combined throughput of 39.38 million teu in 2006. Compared to the 36.05 million teu of the year before, this represents a healthy 9.3% increase. The biggest percentage increases were registered by Amsterdam, Bremen/Bremerhaven and Zeebrugge. The ports of Felixstowe, Hamburg, Southampton and Antwerp also performed well, while Rotterdam scored below average. Finally, volumes at Le Havre, Dunkirk, Bristol, Ipswich and Hull were quasi-stagnant.

Secondly, the Western Mediterranean seaports included in Table 9 saw their combined traffic increase by a mere 4.3% to 17.74 million teu in 2006. Star performers with double-digit increases in traffic levels included Malaga, Vado Ligure, Barcelona and La Spezia. The ports of Marsaxlokk, Cagliari and to a lesser extent Marseilles, Genoa and Algeciras also performed well, while Gioia Tauro and Valetta saw a significant drop in volumes. Traffic at Palma de Mallorca remained quasi-stagnant.

Thirdly, ports in the Eastern Mediterranean/Black Sea region handled a combined throughput of 3.55 million teu. This is a healthy 12.9% increase compared to the year before. Constantza enjoyed a whopping 40% increase and breached the 1 million teu barrier. Rijeka and Heraklion also registered double digit growth of 25.9% and 18.1%, respectively. Trieste and Limassol each notched a nice 11% increase in volumes, while traffic at Thessaloniki increased by a mere 3% and volumes Piraeus remained quasi-stagnant.

Finally, the Scandinavian/Baltic seaports included in Table 9 notched a nice 15.1% increase to 4.97 million teu in 2006. This nice result is largely due to St-Petersburg's 30% increase to nearly 1.5 million teu. The port of Ventspils registered a massive 1686% increase, albeit from a very low cargo base in 2005. Liepaja, Oulu, Rauma, Helsingborg, Kotka and Turku each witnessed a growth rate of (well-)above 20%. Most other Scandinavian/Baltic ports also performed well, with the exception of Helsinki, Pori, Kemi and Raahe which each saw a (significant) drop in volumes.

An overview of the Top-15 European container ports for selected years is given in Table 10. As this table indicates, Rotterdam, Hamburg and Antwerp have assumed the top-3 positions in Europe since 1995, while Felixstowe dropped from fourth position in 2000 to sixth position in 2006. Expressed in percentage terms, by far the biggest growth between 1995 and 2006 was enjoyed by the port of Gioia Tauro. In 1995 this port handled a mere 16,000 teu as port operations just started up. Other ports with substantial increases in volumes include the Spanish ports of Valencia, Algeciras and Barcelona as well as Zeebrugge, Hamburg, Antwerp and Bremerhaven. On the other hand, ports with below-average growth over the period considered include Rotterdam, Felixstowe, Le Havre and La Spezia.

Table 10: Top-15 European container ports for selected years (teu)

1995		2000		2005		2006	2006 vs 1995
Rotterdam	4,786,577	Rotterdam	6,280,000	Rotterdam	9,288,349	Rotterdam	9,690,052	+102%
Hamburg	2,890,181	Hamburg	4,248,247	Hamburg	8,087,545	Hamburg	8,861,545	+207%
Antwerp	2,329,135	Antwerp	4,082,334	Antwerp	6,482,061	Antwerp	7,018,799	+201%
Felixstowe	1,898,201	Felixstowe	2,853,074	Bremerhaven	3,735,574	Bremerhaven	4,449,624	+192%
Bremerhaven	1,526,421	Bremerhaven	2,712,420	Algeciras	3,179,614	Algeciras	3,244,640	+234%
Le Havre	1,154,714	Gioia Tauro	2,652,701	Gioia Tauro	3,160,981	Felixstowe *	3,000,000	+58%
Algeciras	970,426	Algeciras	2,009,122	Felixstowe *	2,730,000	Gioia Tauro	2,938,176	+18461%
La Spezia	965,483	Genoa	1,500,632	Valencia	2,409,821	Valencia	2,612,139	+284%
Barcelona	703,807	Le Havre	1,464,901	Le Havre	2,118,509	Barcelona	2,317,368	+229%
Leghorn	689,324	Barcelona	1,387,570	Barcelona	2,071,481	Le Havre *	2,130,000	+84%
Valencia	681,080	Valencia	1,308,010	Genoa	1,624,964	Genoa	1,657,000	+169%
Tilbury	671,827	Piraeus	1,161,099	Zeebrugge	1,407,933	Zeebrugge	1,653,493	+213%
Genoa	615,242	Southampton	1,060,708	Piraeus	1,394,512	Marsaxlokk *	1,450,000	+182%
Southampton	600,137	Marsaxlokk	1,033,052	Southampton	1,375,000	Southampton	1,516,000	+153%
Zeebrugge	528,478	Zeebrugge	965,345	Marsaxlokk	1,309,000	Piraeus *	1,400,000	+45%
Top-3	10,005,893	Top-3	14,610,581	Top-3	23,857,955	Top-3	25,570,396	+156%
Top-10	17,914,269	Top-10	29,191,001	Top-10	43,263,935	Top-10	46,262,343	+158%
Top-15	21,011,033	Top-15	34,719,215	Top-15	50,375,344	Top-15	53,938,836	+157%

Source: ITMMA based on figures CI Online and respective port authorities
** Estimate*

Table 11 lists some of the strongest growers in Europe in 2006, both in percentage terms and absolute volume terms. In relative terms, Amsterdam was the star performer with a nearly five-fold increase in 2006. The Dutch port started to see the full impact of the Grand Alliance loops calling at the Ceres Paragon Terminal (owned by NYK). Similarly, the PSA-operated container terminal in the port of Sines (Portugal), which opened in May 2004, got a significant traffic boost through MSC. Constanza is rapidly becoming a major gateway to Eastern Europe and Black Sea states, while volumes in Gdynia and Tallinn are also witnessing high growth rates. The Finnish ports of Kotka and Rauma saw a sharp increase in 2006, but total container throughput in the Finnish ports saw a more moderate increase of 7.7%, mainly due to a 9.4% traffic decline in Helsinki (figures Finnish Ports Association). In Northern Europe, Zeebrugge witnessed healthy growth, although the new APM Terminals facility (opened in the Summer of 2006) will only have its full effect on traffic volumes in 2007. Finally, Bremerhaven marked one of the highest growth rates both in teu and percentage terms, mainly as a result of Maersk Line shifting cargo to Bremerhaven and increased traffic from MSC. In absolute volume terms, the ports of Hamburg and Bremerhaven added a remarkable 1.5 million teu in 2006, significantly more than the combined 930,000 teu throughput increase of their large Benelux competitors.

Table 11: European container ports characterized by strong growth in 2006

	2005	2006	TEU growth	% growth
Amsterdam	65,844	305,722	239,878	364.3%
Sines	50,994	121,956	70,962	139.2%
Rauma	120,234	168,952	48,718	40.5%
Constanza	768,099	1,075,000	306,901	40.0%
Kotka	366,667	461,876	95,209	26.0%
Tallinn	127,585	152,399	24,814	19.4%
Bremerhaven	3,735,574	4,449,624	714,050	19.1%
Zeebrugge	1,407,933	1,653,493	245,560	17.4%
Gdynia	400,165	461,170	61,005	15.2%

	2005	2006	TEU growth	% growth
Hamburg	8,087,545	8,861,804	774,259	9.6%
Bremerhaven	3,735,574	4,449,624	714,050	19.1%
Antwerp	6,482,029	7,018,799	530,770	8.2%
Rotterdam	9,288,349	9,690,052	403,295	4.3%
Constanza	768,099	1,075,000	306,901	40.0%
Felixstowe (*)	2,730,000	3,000,000	270,000	9.9%
Barcelona	2,071,481	2,317,368	245,887	11.9%
Zeebrugge	1,407,933	1,653,493	245,560	17.4%
Amsterdam	65,844	305,722	239,878	364.3%
Valencia	2,409,821	2,612,139	202,318	8.4%
Marsaxlokk (*)	1,309,000	1,450,000	141,000	10.8%
Southampton	1,375,000	1,516,000	141,000	10.3%

(*) estimate for 2006
Source: ITMMA based on figures of the respective port authorities

Northern ports, in particular Hamburg, are benefiting the most from the last round of EU enlargement, whereas new development opportunities are arising for secondary port systems in the Baltic Sea and the Black Sea. An increasing number of ports gain direct hinterland access to the 'blue banana' area. On the one hand, this development has broadened container port competition and altered spatial hierarchy, in the sense that the load centres in the Hamburg-Le Havre range are increasingly facing competition from container ports in other European port ranges (Baltic and Med), primarily for serving hinterland regions in the periphery of the core of the EU. On the other hand, the rise of economic centres in Eastern and Central Europe creates opportunities for the Hamburg-Le Havre range to develop shortsea shipping services and water- and land-based hub-feeder networks to these areas.

Finally, as far as the hinterland traffic of containers is concerned, road transport is still by far the dominant transport mode in most of Europe's seaports. In this respect, Table 12 provides an overview of the modal split for a selection of 10 large seaports in Northern Europe. In all ports except for Amsterdam, Dunkirk and Bremerhaven road transport has a market share of at least 50% (and even 80% in the large UK ports). Rail transport has a (very) important market share in Bremerhaven, Dunkirk, Zeebrugge, Hamburg and Felixstowe, while barge transport enjoys a strong position in Rotterdam, Antwerp and Amsterdam (although the latter port has a much smaller cargo base than its three Benelux counterparts).

Table 12: Modal split for container transport in selected Northern European ports

	Road	Rail	Barge
Rotterdam	51%	13%	36%
Hamburg	70%	29%	1%
Antwerp	59%	8%	33%
Bremerhaven	15%	70%	15%
Felixstowe	79%	21%	0%
Le Havre	86%	8%	6%
Zeebrugge	62%	36%	2%
Thamesport	83%	17%	0%
Dunkirk	33%	55%	12%
Amsterdam	44%	12%	44%

Source: Dynamar (2007)

While most ports have achieved a considerable modal shift in hinterland container transport, rail and inland navigation still have not reached their maximum potential. Modal shift policies are implemented throughout Europe and these policies are starting to pay off on some multimodal inland corridors. Antwerp and Rotterdam have always had a strong position in container transport by barge in Europe. In the last ten years, their barge volumes have seen strong growth by the development of numerous inland terminals in the Benelux and Northern France, sustained growth in the Rhine basin and massive container exchanges between the two mainports. However, container transport by barge is also becoming more important in other navigation areas (e.g. Seine axis, Elbe, Rhône) and this has led to significant growth in barge transport in ports such as Hamburg, Le Havre and Marseilles.

Container transport by rail has seen a spectacular development in German ports (in particular Hamburg), while other both small and large ports are implementing strategies (backed up by infrastructure and rail liberalisation) to significantly increase the market share of rail in the modal split in the medium term. The organizational focus on rail implied the spatial development of extensive hinterland corridors, at first instance with a North-South orientation, but the last ten years also with a West-East orientation.

Hinterland connections of smaller seaports and new load centres in a start-up phase remain rather precarious. Smaller ports and new terminals often find themselves confronted with a vicious circle in the organization of hinterland transportation. The small-scale container volumes do not allow to install frequent block and shuttle trains to the more distant hinterlands. Because of the inability to serve a substantial hinterland, the major shipping lines do not include these ports in their liner services.

2.3 Consolidation in the container industry

In many respects, the period 2005-2006 has been truly eventful for the container industry. Above all, it will undoubtedly be remembered as the era of major consolidation. Indeed, substantial take-over activity took place both on the shipping lines' side (where mergers have created a handful of gigantic companies controlling several hundred ships, and where a handful of European shortsea operators turned out to be in a very acquisitive mood) as on the side of the container terminal operators. This is illustrated with some key facts and figures in the sections below.

2.3.1 Shipping lines

As far as the shipping lines are concerned, AP Moller-Maersk started the wave of consolidation with a successful 2.3 billion euro takeover bid for P&O Nedlloyd in August 2005, adding nearly half a million teu slots to its fleet. A couple of months later, TUI AG (Hapag-Lloyd's parent company) responded with a USD 2.1 billion purchase of CP Ships, while French line CMA CGM acquired the shipping interests of compatriot industrial group Bolloré (including Delmas, OTAL, Setramar and Sudcargos) for a reported USD 600 million. Finally, Hamburg-Süd took full control of Ybarra y Compania Sudamericana S.A. of Barcelona in early 2006, by acquiring the 50% stake previously held by CMA CGM. This was followed by an announcement in March 2006 that Hamburg-Süd had reached agreement with Fesco Ocean Management Limited (FOML), a subsidiary of the Far Eastern Shipping Company (FESCO), to acquire the assets of FOML and its affiliates that relate to FOML's cross trades between Australia/New Zealand and Asia as well as North America. The deal was finalized in early July 2006. These two acquisitions follow the 15 or so takeovers by Hamburg-Süd during 1990-2005.

As Table 13 indicates, the acquisition of P&O Nedlloyd enabled Maersk to substantially increase its market share (based on the number of teu slots deployed) from about 12.4% at the beginning of 2005 to more than 18% at the beginning of 2006. Its cellular fleet capacity of nearly 1.7 million teu was more than double the fleet size of runner-up MSC and more than three times the fleet size of CMA CGM. Between them, these three carriers controlled about 20% of the cellular ships in service and more than 30% of the cellular teu-capacity at the beginning of 2006. Similarly, the take-over of CP Ships more than doubled the size of the Hapag-Lloyd cellular fleet and catapulted the German shipping line from 17th to 5th position in the global league table. Finally, given the relatively small size of the Delmas/OTAL cellular fleet at the time of the acquisition by CMA CGM, the impact on the latter's market share was rather limited[4].

Table 13 also shows that during 2006 and the first couple of months of 2007 the cellular fleet of Maersk Line has grown considerably slower than that of its nearest rivals. Between January 2006 and mid-March 2007 Maersk Line added less than 100,000 teu slots to its cellular fleet, representing an increase of just 5.6%. This is significantly less than the fleet increases of MSC (+297,000 teu or +37.8%) and CMA CGM (+238.000 teu or +46.9%). In fact, with the exception of Hanjin/Senator (+4.9%), APL (+3.5%), Wan Hai Lines (+1.8%) and RCL (-4.4%), Maersk Line witnessed the lowest percentage increase of the entire top-25 during the period considered. As a result, its market share decreased to 16.4% in Mid-March 2007.

4 Fluctuations in market shares between 2005 and 2006 are obviously not only related to take-overs, but also reflect endogenous fleet growth through the addition of new vessels in the course of 2005.

Table 13: Top-25 container shipping lines for selected dates

Situation as at 01/01/2005					Situation as at 01/01/2006					Situation as at 15/03/2007				
		ships	teu	share			ships	teu	share			ships	teu	share
1	Maersk-Sealand	377	1,015,908	12.4%	1	Maersk Line	586	1,665,272	18.2%	1	Maersk Line	539	1,758,857	16.4%
2	MSC	245	637,358	7.8%	2	MSC	276	784,248	8.6%	2	MSC	332	1,081,005	10.1%
3	Evergreen Group	153	443,938	5.4%	3	CMA CGM Group	242	507,954	5.6%	3	CMA CGM Group	310	746,185	6.9%
4	P&O Nedlloyd	155	428,666	5.2%	4	Evergreen Group	155	477,911	5.2%	4	Evergreen Group	166	566,271	5.3%
5	CMA CGM Group	182	408,131	5.0%	5	Hapag-Lloyd	131	412,344	4.5%	5	Hapag-Lloyd Group	138	467,030	4.3%
6	APL	99	310,745	3.8%	6	CSCL	123	346,493	3.8%	6	CSCL	135	417,337	3.9%
7	Hanjin/Senator	77	283,664	3.5%	7	COSCO	104	331,437	3.6%	7	COSCO	131	391,527	3.6%
8	NYK	103	278,893	3.4%	8	NYK	84	328,794	3.6%	8	NYK	127	353,832	3.3%
9	COSCO	115	276,506	3.4%	9	Hanjin/Senator	126	322,326	3.5%	9	Hanjin/Senator	87	345,037	3.2%
10	CSCL	105	253,999	3.1%	10	APL	118	302,213	3.3%	10	APL	107	342,899	3.2%
11	OOCL	65	218,140	2.7%	11	OOCL	80	241,282	2.6%	11	OOCL	75	303,864	2.8%
12	K-Line	73	207,584	2.5%	12	K-Line	65	234,141	2.6%	12	K-Line	88	283,076	2.6%
13	ZIM	89	202,472	2.5%	13	MOL	86	234,002	2.6%	13	MOL	93	281,447	2.6%
14	MOL	64	199,558	2.4%	14	Yang Ming Line	75	227,872	2.5%	14	Yang Ming Line	82	253,104	2.4%
15	CSAV Group	77	199,118	2.4%	15	CSAV Group	85	201,432	2.2%	15	CSAV Group	85	250,436	2.3%
16	CP Ships Group	78		0.0%	16	ZIM	69	188,206	2.1%	16	ZIM	103	248,922	2.3%
17	Hapag-Lloyd	50	190,000	2.3%	17	Hapag-Lloyd	87	184,438	2.0%	17	Hamburg-Süd Group	96	222,907	2.1%
18	Yang Ming Line	62	181,594	2.2%	18	Yang Ming Line	39		0.0%	18	HMM	39	168,966	1.6%
19	Hamburg-Süd Group	79	152,991	1.9%	19	Hamburg-Süd Group	101	134,362	1.5%	19	P1L	104	146,174	1.4%
20	HMM	39	148,681	1.8%	20	HMM	68	114,346	1.3%	20	Wan Hai Lines	71	116,439	1.1%
21	P1L	100	128,313	1.6%	21	P1L	32	74,004	0.8%	21	UASC	35	86,608	0.8%
22	Wan Hai Lines	64	94,066	1.2%	22	Wan Hai Lines	58	53,512	0.6%	22	MISC	25	68,257	0.6%
23	UASC	33	73,764	0.9%	23	UASC	41	48,604	0.5%	23	IRIS Lines	58	62,753	0.6%
24	Delmas Group	51	61,066	0.7%	24	Delmas Group	36	44,363	0.5%	24	Grimaldi (Napoli)	66	58,859	0.5%
25	IRIS Lines	56	53,532	0.7%	25	IRIS Lines	18	40,543	0.4%	25	RCL	39	46,466	0.4%
	Top-5	**1,112**	**2,934,001**	**35.9%**		**Top-5**	**1,390**	**3,847,729**	**42.1%**		**Top-5**	**1,485**	**4,619,348**	**43.0%**
	Top-10	**1,611**	**4,337,808**	**53.1%**		**Top-10**	**1,945**	**5,478,992**	**60.0%**		**Top-10**	**2,072**	**6,469,980**	**60.2%**
	Top-25	**2,591**	**6,448,687**	**78.9%**		**Top-25**	**2,885**	**7,500,099**	**82.1%**		**Top-25**	**3,131**	**9,068,258**	**84.4%**
	TOTAL	**5,107**	**8,168,396**	**100%**		**TOTAL**	**5,380**	**9,136,632**	**100%**		**TOTAL**	**5,768**	**10,747,128**	**100%**

Source: ASS-alphaliner website (consulted on 15/03/2007)

The consolidation trend on the shipping line's side continued in 2007, albeit on a much smaller scale than the two years before. At the end of February 2007 it was announced that CMA CGM had made its (much-anticipated) offer for Taiwanese owner Cheng Lie Navigation Co (CNC Line) for a reported USD 159 million. At the beginning of March the French line had already secured agreement for over 80% of the shares. The acquisition was primarily aimed at giving CMA CGM a stronghold in the fast-growing intra-Asia feeder and shortsea trades[5]. At the beginning of March 2007, the CNC Line fleet counted 9 ships (of which 2 owned and 7 chartered) for a total capacity of some 11,000 teu slots.

Some industry observers argue that we could be on the verge of further consolidation in the liner shipping industry in the years to come. For example, an in-depth assessment of AP Moller-Maersk's prospects by Dansk Equities during 2006 stated that the Danish company could well be targeting a 25% market share in container shipping by 2010, through a massive USD 15 billion fleet expansion programme[6]. It suggests this ambition could embrace the takeover of another major rival. However, as the integration costs related to the takeover of P&O Nedlloyd turned out to be higher than expected (forcing Maersk to significantly lower its profit expectations for 2006[7]), one could question whether the Danish carrier is ready for a next big move in the short term. Moreover, a single carrier with a market share of 25% would be unlikely to escape the scrutiny of regulatory bodies such as the European Commission. Last but not least, it also remains to be seen what the reaction of customers would be when being faced with such a dominant market player.

Table 13 also reveals that, following the consolidation activity in 2005 and massive organic growth during 2006, the top-5 container shipping lines (four of which are European) controlled 43% of the total teu-capacity deployed on worldwide trade routes at mid-March 2007. This obviously gives them enormous bargaining power *vis-à-vis* terminal operators and port authorities.

As a matter of fact, in an effort better to control costs and operational performance and as a measure to remedy against the effects of ever-decreasing schedule integrity (cf. infra), container shipping lines have been very active in securing (semi-)dedicated terminal capacity in strategic locations in recent years. As Table 14 indicates, this trend towards more carrier involvement in terminals has not escaped the European port scene, quite to the contrary. Nowadays a substantial number of container terminals in North and South Europe feature a shipping line among their shareholders (in most cases as a minority shareholder). In particular MSC and CMA CGM, the world's second and third biggest container shipping lines, are very active in this field, with involvements in 15 and 10 container terminals, respectively. This is a significantly bigger portfolio than the one of Maersk Line, which has a stake in only 1 terminal in Europe. However, it has to be noted that Maersk Line's parent company, AP Moller-Maersk, operates a large number of container terminals in Europe (and abroad) through its subsidiary APM Terminals. Although this Netherlands-headquartered company advertises itself as "an independent company within the A.P. Moller-Maersk Group, with an independent board and operating common user terminals for all container ship lines in Europe", it currently still mainly handles traffic of sister company Maersk Line. In fact, it does so in an ever-increasing number of European ports: APM Terminals is currently involved in the management of container terminals in the ports of Aarhus, Bremerhaven, Rotterdam, Zeebrugge, Dunkirk, Gioia Tauro, Algeciras and Constantza. It has also been awarded a new terminal in Le Havre's Port 2000 complex (to be opened in early 2008), as well as a new terminal on the future Maasvlakte-2 in Rotterdam and in the future JadeWeserPort in Wilhelmshaven (the latter one in 30/70 joint-venture with Eurogate).

5 In fact, CMA CGM was originally thought to be eyeing a takeover of Taiwanese Wan Hai Lines. With a fleet of 71 vessels for a combined capacity of some 116,000 teu slots, Wan Hai Lines ranked number 20 in the worldwide league table at the beginning of March 2007 (see Table 13). Being one of the largest intra-Asian carriers with also an (albeit relatively small-scaled) presence on the Asia/Europe and Transpacific trades, Wan Hai Lines carried an estimated 2.5 million teu during 2006. However, the takeover rumours were quickly quashed by Wan Hai Lines.

6 Dansk Equities also foresees a USD 15 billion investment programme in sister company APM Terminals over the next couple of years, which could well catapult the company to the position of the world's largest container terminal operator by 2010. In 2006 APM Terminals (43m teu) ranked third among the global terminal operators, behind Hutchison Port Holdings (58m teu) and PSA International (51.3m teu).

7 In fact, the AP Moller-Maersk Group net profit from container shipping and related activities (including Maersk Line, Safmarine, APM Terminals and Maersk Logistics) dropped from USD 1.3 billion in 2005 to a loss of USD 568 million in 2006. Many other container shipping lines also saw a significant drop in financial results in 2006, due to spiraling fuel costs coupled with a decline in freight rates on major trade routes (despite strongly growing volumes and ships sailing nearly full).

Table 14: Container terminals in Europe where shipping lines currently hold, or will hold, a (minority) share

Shipping Line	Terminal	Port	Country
MSC	MSC Home Terminal	Antwerp	Belgium
	Terminal de l'Océan, Bougainville Quay	Le Havre	France
	Port 2000	Le Havre	France
	Fos 2XL	Marseille	France
	MSC Gate Bremerhaven	Bremerhaven	Germany
	Callata Bettolo	Genoa	Italy
	La Spezia Container Terminal	La Spezia	Italy
	TDT Livorno	Livorno	Italy
	Molo Bausan Container Terminal	Naples	Italy
	Nuova Darsena di Levante	Naples	Italy
	Terminal Contenitori Ravenna	Ravenna	Italy
	Terminal Intermodale Veneziana	Venice	Italy
	OPCSA, Leon y Castillo	Las Palmas	Las Palmas
	Abra Terminales Maritimas	Bilbao	Spain
	MSC Terminal (Muelle de Fangos)	Valencia	Spain
CMA CGM	Antwerp Gateway	Antwerp	Belgium
	Container Handling Zeebrugge	Zeebrugge	Belgium
	Nord France Terminal International	Dunkirk	France
	Terminal de France	Le Havre	France
	Europe Terminal	Le Havre	France
	Americas Terminal	Le Havre	France
	Eurofos Terminal	Marseille	France
	Fos 2XL	Marseille	France
	Mourepiane Container Terminal	Marseille	France
	Malta Freeport Terminals	Marsaxlokk	Malta
Maersk Line	Cagliari International Container Terminal	Cagliari	Italy
Hapag-Lloyd	Container Terminal Altenwerder	Hamburg	Germany
Evergreen	Taranto Container Terminal	Taranto	Italy
Cosco	Molo Bausan Container Terminal	Naples	Italy
	Nuova Darsena di Levante	Naples	Italy
NYK	Ceres Paragon Terminal	Amsterdam	Netherlands

Source: Dynamar (2005), Ocean Shipping Consultants (2006), Drewry Shipping Consultants (2006)

As Table 15 indicates, the top-20 container shipping lines carried an estimated 87.77 million full teu during 2006, some 8% more than the year before. This represents about 80% of the estimated world total of 110.20 million full teu that year. In view of the above, it comes as no surprise that Maersk Line, MSC and CMA CGM took the number 1, 2 and 3 spots, respectively, with combined carryings of nearly 30 million full teu in 2006. It is, however, surprising to see that Maersk Line actually carried slightly less containers than in 2005 while MSC and CMA CGM both registered a massive 16-17% increase in carryings. In fact, their percentage increase in 2006 was only exceeded by China Shipping Container Lines', which saw volumes jump nearly 20%. This enabled them to leapfrog Evergreen, which only enjoyed a modest 7% growth in volumes carried. The same situation applies to COSCO and Hapag-Lloyd, although the difference in carryings between these two shipping lines is very small. Between them, the top-7 shipping lines carried more than 50 million teu in 2006, i.e. some 45% of the world total. This once again illustrates the dominance of the top liner shipping companies.

Table 15: Carryings of the top-20 container shipping lines in 2005 and estimated volumes for 2006 (full teu)

	2005	2006 (est)	growth		2005	2006 (est)	growth
Maersk Line	16.000.000	15.800.000	-1.25%	K-Line	2.650.000	2.900.000	9.43%
MSC	6,500,000	7,600,000	16.92%	MOL	2,351,000	2,733,000	16.25%
CMA CGM	5,200,000	6,050,000	16.35%	Yang Ming	2,416,000	2,650,000	9.69%
CSCL	4,597,000	5,500,000	19.64%	Wan Hai	2,400,000	2,500,000	4.17%
Evergreen	5,000,000	5,350,000	7.00%	RCL	2,291,000	2,400,000	4.76%
COSCO	4,535,000	5,100,000	12.46%	CSAV	2,087,000	2,200,000	5.41%
Hapag-Lloyd	4,876,000	5,005,000	2.65%	PIL	2,100,000	2,200,000	4.76%
APL	3,891,000	4,193,000	7.76%	Hyundai	2,138,000	2,160,000	1.03%
OOCL	3,523,000	3,894,000	10.53%	ZIM	1,934,000	2,100,000	8.58%
Hanjin	3,629,000	3,880,000	6.92%	**Total top-20**	**81,378,000**	**87,765,000**	**7.85%**
NYK	3,260,000	3,550,000	8.90%	**World total (est)**	**102.000.000**	**110.200.000**	**8.04%**

Source: Dynamar (2007)

Apart from the deepsea segment, the period 2005-2006 has also been a very remarkable one for the intra-European (shortsea) container trades, as indicated in the overview below. In fact, 2006 witnessed an acceleration of the consolidation momentum which took off in 2005, with two Icelandic (Eimskip and Samskip) and one Belgian company (Delphis) leading the game for door-to-door container services. In addition, Grimaldi Lines became a leader on the pan-European trade running from the upper Baltic to the Eastern Mediterranean with its successful bid on Finnlines. Finally, North Sea RoRo-operators DFDS Tor Line and Cobelfret were also in an acquisitive mood, while AP Moller-Maersk offloaded its intra-Europe door-to-door container businesses Portlink and Norfolkline Containers. Table 16 provides an overview of the five largest intra-European container operators as at early March 2007.

Table 16: Top-five intra-European container operators (March 2007)

Company	Brands	Vessels	TEU cap,
Unifeeder	Unifeeder	39	26,129
Delphis	Delphis, Team Lines	32	22,123
Eimskip	Eimskip, CoNor, Euro Container Line, Faeroe Ship, Kursiu Linija	22	14,556
Samskip	Samskip, GNSL, Seawheel, TECO, Van Dieren Maritime	25	12,251
ICG	Eucon, Eurofeeder, Feederlink	18	8,491

Source: AXS Alphaliner (2007)

Overview of main deals and developments in the intra-European container trades during 2005-2006

Samskip (Iceland)

- Bought Dutch intermodal operator Geest North Sea Line (GNSL) in March 2005.
- Bought UK-based shortsea shipping operator Seawheel Ltd. in July 2005.
- Established its own organization in Spain in September 2006, taking over all shortsea activities from its existing partner Odiel Bilbao SA.
- Dropped the GNSL brand in September 2006 and applied the Samskip brand to its entire European shipping network, covering all of North-West Europe (including the UK and Baltic).

Eimskip (Iceland)

- Bought a 50% equity stake in Kursiu Linija (Lithuania) in May 2006 and took control of the whole company in September 2006. Eimskip reportedly paid around USD 13 million for the deal. Kursiu Linija offers door-to-door services in the Baltic States, Poland, Russia, the United Kingdom and Northern Europe.
- Took control of Finnish carrier Containerships OY in September 2006, through a joint venture under the name Containerships Group (CS). CS is headquartered in Helsinki and covers trades between Finland, Germany and the UK. Kursiu Linija has since been integrated within CS operations.

Delphis (Belgium)

- Bought Germany-based Team Lines in July 2006 from Finnlines. Team Lines, the second largest intra-Europe feeder operator after Denmark's UniFeeder, provides transportation and feedering services between North Sea ports and the Scandinavia and Baltic area.
- Bought Portlink NV in August 2006 from Safmarine Container Lines NV, itself a division of the A.P. Møller-Maersk Group. Portlink operated regional door-to-door services between the Benelux-UK-Le Havre area and Iberia, a sector already covered by Delphis.
- Delphis has since extended the 'Team Lines' brand to its other intra Europe operations, i.e. the former Portlink services and the Delphis original services.

DFDS

- Took full-control of Lys-Line (offering liner services between Scandinavia and the Netherlands, Belgium, Germany, the United Kingdom, Spain and Ireland) in December 2005.
- Bought Norfolk Line Containers B.V. (operating container shipping activities between the Continent and Ireland) from Norfolk Holdings B.V., a division of the A.P. Møller-Maersk Group, in August 2006. The entity has been renamed DFDS Container Line BV and allows DFDS Tor Line to strengthen its market position within the lo-lo container shipping segment, thereby obtaining synergies between the existing DFDS Tor Line container activities in DFDS Lys Line and DFDS Suardiaz Line, connecting the North Sea, the Irish Sea and Spain.

Other significant deals and developments (non-exhaustive)

- In November 2005 Spliethoff (the Netherlands) took full control of multi-purpose RoRo operator Transfennica.
- In January 2006 Cobelfret (Belgium) bought the cross-Channel ferry business Dart Line from South Africa-based Bidvest Group for a reported USD 105 million. Dart Line offers container services between Flushing, Zeebrugge and Dartford. The sale reportedly includes the four Dart Line ships and the RoRo terminal in Dartford. Cobelfret operates some 10 RoRo crossings per day on the North Sea/Baltic. Ports of call include Zeebrugge, Rotterdam, Flushing, Purfleet, Killingholme and Gothenburg.
- In April 2006 Tallink took over the intra-Baltic services of Superfast Ferries from Attica. Next, in June 2006, Tallink took over Silja Line from Sea Containers for a reported USD 570 million plus five million shares.

Source: AXS-Alphaliner (2007), Dynamar (2006, 2007) and various trade press articles

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Overview of main deals and developments in the intra-European container trades during 2005-2006 (continued)

Other significant deals and developments (continued)

- In September 2006 Tschudi Shipping Company AS (Norway) acquired full ownership of the shortsea liner company TECO Lines AS, through its fully owned subsidiary Estonian Shipping Company AS (ESCO). ESCO purchased the remaining 50% shares in TECO Lines AS from Samskip. TECO Lines offers door to door services between the UK-Continent and the Baltic Sea.
- At the end of December 2006 Grimaldi Lines, the Naples-based RoRo and container vessel operator, became the majority shareholder in Finnlines when it acquired 1.5m shares. The move gave Grimaldi 50.1% of the Finnish company, a stake that is divided among its subsidiaries Grimaldi Compagnia di Navigazione (37.44%), Industria Armamento Meridionale (7.35%) and Atlantic Container Line (5.32%). The acquisition also gave Grimaldi control of Finnsteve (the leading port operator in the Finnish ports of Helsinki, Turku and Kotka) and Norsteve.
- During 2006 UK-based 3A Marine Holdings (founded in 2004) purchased Contaz Line (NW Europe-Greece-Turkey) and set up Europe Line (Rotterdam-Ireland – together with Johnson Stevens Agencies UK) and Balticon Line (Antwerp-Baltic).
- In 2006 DFDS Lys Line and Vapores Suardiaz set up DFDS Suardiaz Line. The joint venture line operates a shortsea box service connecting Bilbao (Spain) with Avonmouth (England), Dublin (Ireland) and Greenock (Scotland) with 2 x 750 teu vessels.
- Through its acquisitions of Clydeport and Mersey Docks and Harbour Company in 2006, the Peel Ports Group took control of the intra-European feeder and regional cargo services of those two companies. As from early 2007, the Peel Ports shipping division will include BG Freight Line (9 ships operating between Antwerp, Rotterdam, Felixstowe, Southampton, Belfast, Cork, Dublin and Greenock), BG Freight Line East Coast Service (formerly known as Concorde Container Line) (3 ships operating between Antwerp, Rotterdam, Teesport and Grangemouth), Clydeport Feeder Service (managed by BG Freight Line) (2 vessels operating between Southampton, Liverpool, Manchester, Greenock, Belfast and Dublin) and Coastal Container Line (3 ships operating between Cardiff, Liverpool, Dublin and Belfast).
- As from 1 January 2007, German ports and forwarding concern Rhenus assumed full control of compatriot intra-Europe shortsea operator Rhein-, Maas- und See Schiffahrtskontor (RMS) of Duisburg. RMS mainly offers services between Duisburg and seaports in Germany, the Netherlands, Belgium, the Baltic, Scandinavia, UK, France, Portugal and Spain. Its fleet consists of 75 vessels (of which 42 river-sea going units) and transports more than 7 millions tons of cargo per year.

Source: AXS-Alphaliner (2007), Dynamar (2006, 2007) and various trade press articles

2.3.2 Terminal Operators

Not only the liner shipping industry, but also the container terminal operating industry has witnessed an increased amount of consolidation during 2005-2006. A front-runner in this respect was DP World, through the acquisition of the terminal portfolios of CSX World Terminals (2005) and P&O Ports (2006) for a total amount of more than 8 billion US Dollars. These two acquisitions have given DP World a significant presence on the container handling scene in China, Hong Kong, South (East) Asia, Australia, the Americas and Europe. In fact, DP World now has a very balanced terminal portfolio covering most of the world's trading regions, which should protect it against the risk of a downturn in any one particular region (Drewry Shipping Consultants, 2006).

Apart from DP World's acquisitions, another major deal was PSA's acquisition of a 20% stake in Hutchison Port Holding's global terminal portfolio for a reported USD 4.93 billion, following its earlier purchase of strategic shareholdings in a number of other Hong Kong operations (HIT, Cosco-HIT, Container Terminal 3 and Container Terminal 8) in 2005. In addition, quite a number of terminal operators took shareholdings or increased their existing stakes in individual terminal businesses during 2005 and 2006. It is beyond the scope of this Report to list all these transactions in detail. For an overview, the reader is referred to Drewry Shipping Consultants (2006).

Hence, whereas a few years ago the container handling sector was still rather fragmented and characterized by about 10 big players, the picture looks drastically different today. Table 17 provides an overview of the top-10 global terminal operators for the years 2001 and 2005

(the latest year for which detailed statistics are available). Whereas the volume handled by the top-10 players amounted to 103 million teu in 2001, for a market share of 42%, these figures had risen to about 220 million teu and 55%, respectively, in 2005.

Table 17: Throughput of the top-10 global container terminal operators for selected years

2001			2005		
Operator	**m teu**	**share**	**Operator**	**m teu**	**share**
Hutchison	29.3	11.8%	Hutchison	51.8	13.0%
PSA	19.5	7.9%	APM Terminals	40.4	10.1%
APM Terminals	13.5	5.5%	PSA	40.3	10.1%
P&O Ports	10.0	4.0%	P&O Ports	23.8	6.0%
Eurogate	8.6	3.5%	Cosco	14.7	3.7%
DPA	4.7	1.9%	DP World	12.9	3.2%
Evergreen	4.5	1.8%	Eurogate	12.1	3.0%
Cosco	4.4	1.8%	Evergreen	8.7	2.2%
Hanjin	4.2	1.7%	MSC	7.8	2.0%
SSA Marine	4.0	1.6%	SSA Marine	7.3	1.8%
Top-10	**102.7**	**41.5%**	**Top-10**	**219.8**	**55.1%**

Source: Drewry Shipping Consultants (2003. 2006)

As Table 17 indicates, a significant throughput gap existed between the top-3 players and the rest of the league in 2005. As stated before, this situation was compounded by the take-over of P&O Ports by DP World in early 2006, such that the container handling industry is nowadays dominated by four worldwide operating companies with an enormous lead over their rivals in terms of throughput and market share. When the P&O Ports portfolio is added to DP World's, the combined throughput of the top-4 operators amounted to nearly 170 million teu in 2005, representing some 42% of total worldwide container handling. To put this in perspective, in 2001 the market share of the top-4 operators was still below 30%. Hence, as far as the concentration of market power is concerned, the current situation in the terminal operating sector[8] is somewhat comparable to that of the liner shipping industry, where the four largest shipping lines also control some 40% of the market (expressed in the number of teu slots deployed). The current European portfolio of leading container terminal operators is presented in Figure 1. The financial involvement varies between full ownership to minority shareholdings.

Figure 1: Terminal portfolio of some major terminal operators

Source: © Notteboom – ITMMA

8 Dynamar (2007) estimates the combined throughput of the top-4 operators at more than 192 million teu in 2006. This represents some 43% of the estimated 441.8 million teu world container port throughput that year.

Given the fact that there are no really "big" companies left to acquire nowadays, it can be expected that the top-4 players will maintain their lead over the other operators for quite a number of years to come. As a matter of fact, some industry observers even predict that, spurred by the shortage of port capacity to handle the ever-growing volumes of container traffic (making existing terminals very attractive for investors), as well as high profitability levels enjoyed by terminal operators[9], M&A activity in the container handling sector is likely to continue in the years to come, albeit on a smaller scale than witnessed recently. In this respect, one should not forget that building or extending container terminal capacity nowadays requires huge capital investments, which only very few players can afford. Moreover, while their business had thus far grown mainly organically, APM Terminals announced in mid-2006 that they were also looking at the acquisition of existing facilities, in order to reduce dependency on Maersk Line and strengthen their common-user business. It is believed that Maersk Line traffic nowadays accounts for about 65% of APMT business worldwide, down from 90% some five years ago.

However, in early 2007 the prospect of further consolidation among the major players was somewhat put on hold by the decision of the City of Hamburg concerning the sale of a stake in local terminal operator HHLA. At the end of 2006 the City of Hamburg requested Expressions of Interest for a stake of up to 49.9% in HHLA, mainly aimed at funding the €1.2 billion investment programme (amongst other things to increase box handling capacity to over 12 million teu in 2015). At the beginning of 2007 six companies were shortlisted by the Hamburg Municipality, one of which was DP World. However, in a surprise move, the Hamburg Senate announced in early March 2007 that the shortlist was reduced to two bidders, namely Hochtief and Macquarie. This, in turn, was followed by rallying protests from HHLA staff fearing a negative impact on working conditions when a 49.9% stake would be sold to either of the two companies. As a result, the Hamburg Senate decided to stop the bidding process for HHLA altogether and agreed to a part-floatation of the terminal operator for 30% of the shares.

In fact, the interest being shown by players such as Macquarie for investments in port operations is something that has only been witnessed in recent months. Indeed, as mentioned by Dynamar (2007:21), "when it comes to takeovers of ports, terminals or terminal operators, more and more financial suitors (banks, hedge funds, private equity groups, investors) are directly taking part in the bidding, a completely new development also seen in other lines of business". Examples of recent deals involving such players are listed in Table 18. The total value of the 10 deals listed exceeds USD 13 billion.

Table 18: Takeovers of port operations involving financial suitors

Company	**Took over**	**Price**
American International Group	Activities of P&O USA, including 6 container terminals (Dec. 2006)	USD 1.01 bn
Ontario Teachers Pension Plan Board	4 OOIL Terminals in North America (Nov. 2006)	USD 2.35 bn
RREEF Infrastructure (Deutsche Bank)	49% share of Peel Ports UK (Nov. 2006)	USD 1.43 bn
Macquarie Infrastructure	Halterm Halifax (Nov. 2006)	USD 0.15 bn
Macquarie Infrastructure	40% share of 6 Hanjin terminals in Japan and the USA (Sept. 2006)	USD 0.85 bn
Admiral (Goldman Sachs, GIC)	Associated British Ports UK (Aug. 2006)	USD 5.30 bn
Montauban (Cobelfret)	Remaining 53% of Simon Group UK (Jul. 2006)	USD 0.18 bn
Babcock & Brown	PD Ports UK (Dec. 2005)	USD 0.46 bn
Peel Ports	Clyde Ports UK (Nov. 2005)	USD 0.29 bn
Peel Ports	Mersey Dock and Harbour Company UK (MDHC) (Jun. 2005)	USD 1.38 bn

Source: Dynamar (2007)

2.4 Container terminal capacity in Europe: a growing mismatch between supply and demand

As a result of strong growth on the arterial container trade routes in recent years, and in order to anticipate on future volume increases, many shipping lines have embarked upon ambitious expansion plans to upgrade the capacity of their ship fleets. According to AXS-Alphaliner (2007), 2622 cellular containerships were deployed on worldwide trade routes at the beginning of 2000, providing a total slot capacity of about 4.51 million teu (see Table 19). By the beginning of 2007 these figures had increased to 3950 ships and 9.58 million teu, respectively. Hence, the total capacity provided by cellular containerships more than doubled in just seven years time, representing an average annual increase of 11.3%. Moreover, based on shipping lines' orderbooks as at 01/03/2007, the number of cellular containerships deployed on worldwide trade routes is expected to further increase to about 5200 units by 01/01/2010, providing a total slot capacity of 14.07 million teu. This equals a massive increase of nearly 50% in just three years time, or 13.5% per year. To put this in perspective, the

9 According to industry pundits, "terminal operators can enjoy a 15% or more internal rate of return on any project (depending on the risk), with typical profit margin targets of about 20%. This is dramatically different from the liner shipping industry, which has more downs than ups" (American Shipper, 2006: 22).

capacity increase of 4.50 million teu during 2007-2009 means that a stunning 125,000 teu slots will be added to the worldwide cellular fleet *every month*.

Given the relentless search for cost savings at sea (cf. economies of scale), it is hardly surprising to see that many shipping lines' expansion plans are heavily focused towards large post-panamax (i.e. 5000+ teu) containerships. Whereas 78 of such ships provided a total slot capacity of just 464,000 teu at the beginning of 2000, these numbers already amounted to 504 units and 3.3 million teu, respectively, at the beginning of 2007 and are expected to further increase to 820 units and nearly 5.7 million teu by the beginning of 2010. This equals a more than 12-fold increase of the teu-capacity in a time span of ten years, or an average increase of nearly 30% per year. Whereas 5000+ teu ships provided just 10% of the total cellular fleet capacity at the beginning of 2000, their share will have increased to 40% at the beginning of 2010.

Table 19: Composition of the cellular containership fleet for selected dates

	01/01/2010*		01/01/2007		01/01/2000		01/01/1995	
size range	no,	teu	no,	teu	no,	teu	no,	teu
> 7500 teu	293	2,631,348	147	1,250,003	10	80,822	0	0
5000 / 7499 teu	527	3,085,113	357	2,070,373	68	383,415	0	0
4000 / 4999 teu	518	2,284,181	346	1,529,854	156	682,428	79	345,351
3000 / 3999 teu	362	1,230,169	282	956,165	227	770,410	164	541,516
2000 / 2999 teu	810	2,055,784	648	1,630,850	389	960,443	255	637,502
1500 / 1999 teu	618	1,051,374	466	786,591	327	552,003	198	339,511
1000 / 1499 teu	776	924,068	595	705,600	484	565,073	367	433,533
500 / 999 teu	924	689,004	722	525,853	539	381,630	336	239,439
100 / 499 teu	386	122,792	387	122,944	422	132,484	343	107,046
TOTAL	5.214	14,073,833	3,950	9,578,233	2,622	4,508,708	1,742	2,643,898
Average vessel size		2,699 teu		2,425 teu		1,720 teu		1,518 teu

Source: AXS-Alphaliner (2007)
** Figures for 2010 are based on the orderbook as at 01/03/2007. They should be treated with care. On the one hand, many shipyards can still accept orders for (small) ships to be delivered during 2009. On the other hand, the figures assume that no ships are scrapped between 01/03/2007 and 01/01/2010. Taking into account the age profile of the current containership fleet (with many ships built prior to 1975), this is not very realistic.*

The massive influx of new tonnage in the coming years, and the cascading-down effect triggered by the introduction of large post-panamax ships on the arterial trade routes, will obviously invoke a significant increase in average vessel sizes on the main trade routes. For example, Ocean Shipping Consultants (2006) expects the size of a *typical* container vessel deployed on the Far East - Europe trade to increase from 4500-5500 teu in 2000 to 8000-9000 teu in 2010 (i.e. +70%) and no less than 10,500 teu in 2015 (i.e. +110%). The increases in average vessel sizes for the other deepsea trades and the feeder trades are somewhat lower, albeit still remarkable[10] (see Table 20).

Table 20: Average vessels sizes (in teu) on major container trade routes for selected years

	2000	2005	2010	2015	2010 vs 2000	2015 vs 2000
Deepsea east/west						
Far East - Europe	4,500-5,500	5,500-7,000	8,000-9,000	10,500	+70%	+110%
Transpacific	4,500-5,000	5,500-6,500	7,000	8,500	+47%	+79%
Transatlantic	3,500	4,000	5,000	6,500	+43%	+86%
Deepsea north/south	2,500	3,000	3,000	3,500	+20%	+40%
Feeder	550	650	700	850	+27%	+55%

Source: Ocean Shipping Consultants (2006)

10 According to APL Logistics, the average vessel size for the Far East – Europe trade will even reach 12,000 teu in 2015.

Whereas shipping lines, through massive expansion plans for their ship fleets, have clearly prepared themselves to handle the expected increase in container volumes in the short term, the development of additional container handling capacity to meet this demand has clearly lagged behind in some parts of the world. Specifically with respect to North Europe, Drewry Shipping Consultants (2005) found significant delays in many expansion projects related to container handling. In France, for example, the originally proposed date for the opening of the "Le Havre Port 2000" complex was delayed for three years (from 2003 until 2006). Analogously, operations at the Deurganckdok in the port of Antwerp (Belgium) only started in late 2005, while this date was originally intended to be 2001. A similar four-year delay is experienced by the Euromax terminal in the port of Rotterdam (from 2004 to 2008) and the JadeWeserPort in Wilhelmshaven (from 2006 to 2010), while yet even bigger delays are being faced by the Westerschelde Container Terminal in Flushing (at least five years delay, if the terminal will be built at all) and the Maasvlakte II project in Rotterdam (start date of operations postponed from 2002 to 2013 at the earliest). In the UK, Hutchison Port Holdings' 'Felixstowe South Reconfiguration' obtained government approval in early 2006 and is expected to be taken into operation in 2008, i.e. two years behind schedule. Hutchison was also recently given the formal go-ahead for the development of a new container terminal at Bathside Bay in the port of Harwich. Construction work on the first phase of the project is expected to start in 2009 at the earliest, implying a significant delay to the proposed start date of operations of 2004. Finally, DP World's plans for the London Gateway terminal (originally scheduled to open in 2006) were still awaiting final approval in early 2007, while Associated British Ports' plans to develop a new container terminal at Dibden Bay in Southampton (scheduled to open in 2000) have even been cancelled altogether.

The delays or cancellations of the above-mentioned projects have a number of different causes, ranging from internal politics within the port, environmental objections, legal technicalities and objections, investigations by the European Commission into market share implications, to political wrangling over funding, court cases, or to public enquiries and subsequent government considerations of their findings. Overall, the estimated total cost of the approval processes of the different terminal projects listed above is well in excess of half a billion euro. If all these proposed projects had been realised in accordance with the original time schedule, an extra capacity of no less than 11.4 million teu would have been available in North European ports in 2005. To put this in perspective, this is nearly one third of the total capacity offered by these ports in 2004 (34.8 million teu).

In view of the above, it should come as no surprise that terminal operators active in major European container ports have been witnessing increasing utilization levels of their facilities in recent years. According to estimates by Ocean Shipping Consultants (2006), 'North Continent East' (=German) and 'North Continent West' (=Benelux and Northern French) container ports experienced utilization levels of +90% and +80% respectively in 2004, obviously resulting in severe congestion problems during peak periods[11]. This is confirmed by HVB Group/Drewry Shipping Consultants (2005), who state that "arguably, 2004 was the worst year on record for congestion at the world's container ports" and who indicated in particular the major Benelux ports and some UK ports as European 'congestion hotspots' during 2004. Appleton (2005) argues that, as 90% utilization levels are exceeded, carriers experience a significant loss in terminal flexibility. In this respect it is important to note that, without the planning delays of the above-mentioned projects, average utilization levels at European deepsea terminals in 2004 would have hovered around 68%, significantly lower than the 86.6% experienced in reality.

Although many new container terminal projects in European seaports have faced significant delays, stevedores have not been sitting on their laurels. Indeed, in recent months and years substantial investments have been made to increase the capacity of existing container terminals. According to Cargo Systems Magazine, 69 ship-to-shore (STS) gantry cranes were delivered to European container terminals in 2006, i.e. nearly one fifth of all STS gantry crane deliveries that year (Table 21). Moreover, the orderbook for delivery at European terminals during 2007-2008 counted 91 units at the end of 2006, from a total of 368 units worldwide.

As Table 21 indicates, terminal operators around the world are clearly anticipating the arrival of massive 10,000+ teu containerships in great numbers in the not too distant future. Of the 363 STS gantry cranes delivered to worldwide terminals in 2006, no less than 231 (64%) had an outreach of at least 60m, enabling them to handle ships of 20-22 containers wide. A similar picture applies to the STS gantry crane orderbook. Many of the cranes listed in Table 21 have a lift capacity of 60 tons or more (with a few cranes even breaking through the 100 ton lifting capacity barrier) and are equipped with twin-lift (2 teu) or tandem-lift (4 teu) spreaders.

Table 21 also illustrates the overwhelming dominance of Chinese manufacturer ZPMC, accounting for 67% of STS gantry crane deliveries in 2006 and 60% of the orderbook. Their 244 deliveries in 2006, the lion's share of which was destined for the Chinese market, is equivalent to one crane leaving the factory gates every 1.5 days. Finally, as far as the geographic spread is concerned, the single biggest market for STS gantry crane deliveries is China, followed by Europe and Other Asia. Between them, these three regions accounted for some 73% of worldwide STS gantry crane deliveries in 2006 and 71% of the orderbook. While North American terminals only received 15 new STS gantry cranes in 2006, their combined orderbook for delivery in 2007-2008 stands at 43 units.

11 Similar figures characterized the situation in Western Mediterranean (83%), Central Mediterranean (78%) and Eastern Mediterranean/Black Sea (89%) ports in 2004.

Table 21: Overview of ship-to-shore gantry crane deliveries and orderbook

Ship-to-shore gantry crane deliveries during 2006 (worldwide)								
Deliveries by manufacturer			**Geographic spread of deliveries**			**Deliveries by crane outreach**		
ZPMC	244	67.2%	China	135	37.2%	Below 35m	5	1.4%
SPMP	22	6.1%	Europe	69	19.0%	35m - 44.99m	21	5.8%
Liebherr	18	5.0%	Other Asia	60	16.5%	45m - 59.99m	106	29.2%
Fantuzzi/Reggiane/Noell	15	4.1%	Mid East/Red Sea	47	12.9%	At least 60m	231	63.6%
DHI/DCW	11	3.0%	Cent/S.Am/Carib.	21	5.8%			
IMPSA	10	2.8%	North America	15	4.1%			
Other manufacturers (7)	43	11.8%	Australasia	11	3.0%			
			Africa	4	1.1%			
Total (all manufacturers)	**363**	**100%**	**Total (all regions)**	**363**	**100%**	**Total**	**363**	**100%**

Ship-to-shore gantry cranes on order for delivery in 2007-2008 (worldwide)								
Orders by manufacturer			**Geographic spread of orders**			**Orders by crane outreach**		
ZPMC	221	60.1%	China	126	34.2%	Below 35m	0	0%
SPMP	34	9.2%	Europe	91	24.7%	35m - 44.99m	33	9.0%
Liebherr	24	6.5%	Other Asia	44	12.0%	45m - 59.99m	121	32.9%
Fantuzzi/Reggiane/Noell	19	5.2%	North America	43	11.7%	At least 60m	214	58.2%
IMPSA	18	4.9%	Mid East/Red Sea	20	5.4%			
Mitsui	12	3.3%	Africa	19	5.2%			
Other manufacturers (7)	40	10.9%	Cent/S.Am/Carib.	17	4.6%			
			Australasia	8	2.2%			
Total (all manufacturers)	**368**	**100%**	**Total (all regions)**	**368**	**100%**	**Total**	**368**	**100%**

Source: Cargo Systems Magazine (December 2006 and March 2007) and own calculations

2.5 Unreliability in liner schedules and its impact on ports and their actors

As argued by IBM Business Consulting Services (2005), container shipping lines are facing several challenges in today's highly competitive environment, one of which is an increasing demand by customers for greater reliability of container shipments at lower total costs. This is acknowledged by Psaraftis (2004), former CEO of the Piraeus Port Authority, stating that "the name of the game of all major container lines is their ability to meet their schedules, as they incur enormous costs, both real and intangible, in case they do not". However, an in-depth schedule reliability survey performed by leading maritime analyst Drewry Shipping Consultants (2006) and based on the monitoring of no less than 5410 vessel arrivals on 23 different east/west and north/south trade routes between April and September 2006 (i.e. about 200 vessel calls per week) revealed that more than 40% of vessels deployed on worldwide liner services arrived one or more days behind schedule. To be more precise, the percentage of on-time vessel calls was about 52%, with 21% of vessels arriving one day late, 8% arriving two days behind schedule and no less than 14% of vessels calling their port of arrival three or more days late (the remaining 4% actually arrived two or three days *before* their scheduled ETA). These observations are obviously in stark contrast with claims of shipping lines that most of their containerships operate on fixed-day weekly schedules.

Although the Drewry survey found low reliability levels overall across the industry, strong variations were observed between the schedules of different liner carriers. Of the 65 international shipping lines whose vessel schedule reliability was monitored, 15 enjoyed on-time arrivals of 60% or more, while 12 carriers scored between 50% and 60%. No less than 38 carriers had on-time arrivals of less than 50% (of which 21 carriers even scored below 40%). Individual schedule reliability percentages ranged between 4% for the least reliable shipping lines and above 90% for the best performing carriers over the period of the survey. Of the main east/west carriers, Hatsu Marine, Italia Marittima (both belonging to the Evergreen Group), Safmarine and Maersk Line enjoyed high schedule reliability levels, whereas K-Line, China Shipping Container Lines and Mediterranean Shipping Company were some of the carriers with below-average schedule integrity. For the worst performing carriers, average deviation from the ETA easily amounted to 3 days or more.

Unsurprisingly, the survey also revealed significant differences between reliability levels on the different liner trade routes. Routes with on-time arrivals of 70% or more included North America/Indian Subcontinent/Mideast/Red Sea and North America/Hawaii/Guam/mid-Pacific. On the other hand, the Asia/East Coast South America, Asia/West Coast South America, Europe/Med/Australia/New-Zealand/South Pacific, Europe/Med/West Coast South America, North America/Caribbean/Central America and North America/East Coast South America trades each experienced reliability levels of (well-)below 40%. On some trade routes transit time delays of 3 days or more were found to be the rule rather than the exception[12].

Low reliability of liner schedules can be explained by a number of factors. Common reasons for vessel delays include bad weather at sea, congestion or labour strikes at the different ports of call, as well as knock-on effects of delays suffered at previous ports. More serious delays, leading to significant time-losses for the cargoes involved or even the loss of the cargo altogether, can be caused by fire incidents (cf. the serious fire incident onboard the HYUNDAI FORTUNE in the Gulf of Aden in late March 2006), ship collisions or ship groundings (cf. the incident with the MSC NAPOLI off the English Coast in early 2007).

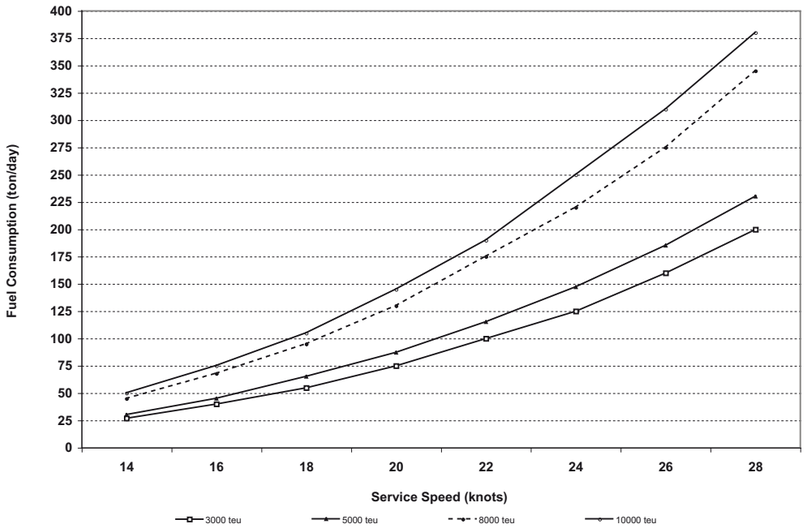
Obviously, another major factor hampering liner schedule integrity is the growing mismatch between the demand for container shipping services and the supply of terminal capacity, as outlined above. It is obvious that decreasing schedule integrity can have profound implications for players throughout the entire supply chain (for an excellent overview, see HVB/Drewry Shipping Consultants, 2005):

(1) Shipping lines are faced with increasing operating costs. According to industry experts, an 8500 teu container vessel ordered in 2003 at USD 80m (well-below the USD 130m level observed during the second quarter of 2005) and nowadays being deployed on an eight-week Far East-Europe run, gives rise to fixed costs of about USD 30,000 per day (including capital + interest on loans + crewing and maintenance) and variable costs of about USD 95,000 per day (including bunker costs + canal costs + port costs + insurance + miscellaneous). Hence, an increase in the total round-trip time of, for example, 3 days due to increased congestion/waiting times in the different ports of call increases its operating costs with several tens of thousands of dollars per round-trip.

In order to make up for time lost in port and restore schedule integrity, shipping lines can follow a number of strategies (see also Notteboom, 2006). Firstly, they might have their ships sail at full service speed when steaming from one port to the next. However, such a practice can be extremely costly. Figure 2 depicts the relation between service speed and fuel consumption for four types of container vessels and eight different service speeds. This figure indicates that an increase in service speed with just a couple of knots already results in a dramatic increase of fuel consumption. For example, increasing service speed from 22 to 24 knots for an 8000 teu container vessel increases its fuel consumption by as much as 45 tons per day. With current bunker prices[13] of about USD 270 per ton, this translates into a daily cost increase of USD 12,150 for each of the vessels deployed. For a 10,000 teu ship, which will most probably become the workhorse on the Far East-Europe trade route by 2010, the daily cost increase per vessel would even amount to USD 16,200.

12 It should be noted, however, that for some trade routes the results are based on very small sample sizes.
13 See the text box at the end of this chapter for the evolution of bunker prices in selected ports during 2006.

Figure 2: Daily fuel consumption for four types of container ships at different service speeds



Source: own representation based on AXS-Alphaliner data

Table 22 gives an indication of the daily fuel costs at sea (at mid-2006 bunker prices) for three types of container ships and seven different service speeds, as estimated by leading containership classification society Germanischer Lloyd.

Table 22: Fuel costs at sea for three types of container vessels and different service speeds (USD per day) at end-July 2006 bunker prices

Speed (kt)	5000 teu	8000 teu	12,000 teu
14	12,200	16,000	20,700
16	16,800	21,600	27,500
18	23,100	29,000	36,500
20	31,800	39,400	48,700
22	43,700	52,200	64,400
24	59,300	69,400	83,600
26	82,800	96,100	114,700

Source: Germanischer Lloyd

As a matter of fact, bunker prices have nowadays reached such a level that, at least for certain trade routes, it might be justified to add an extra vessel to an existing loop in order to slow down the sailing speed of all vessels plying it, while still maintaining the service frequency (usually weekly). Indeed, if the addition of an extra 8000 teu vessel to an existing loop would reduce the required service speed for all vessels plying it from 22 to 20 knots, this would result in fuel savings of some 45 tons per day for each of the vessels deployed. At a USD 280 per ton bunker price, this translates into a daily saving of some USD 12,800 per vessel. In this respect, it comes as no surprise that both the Grand Alliance and CMA CGM each decided to add a ninth vessel to one of their respective Far East-Europe loops during the Summer of 2006. The resulting fuel cost savings generated by each of the existing eight vessels more than compensated for the cost of hiring and operating the ninth vessel.

Secondly, rising port congestion levels might incite shipping lines to reshuffle the order of ports of call on a certain loop (possibly resulting in peak volumes in the 'new' first port of call) or, in extreme cases, leave them with no other option than to omit certain port calls altogether to get vessels back on schedule (cf. the diversions of container ships from Rotterdam to Antwerp and Amsterdam following IT-problems at the ECT Delta terminal on the Maasvlakte in May 2006). As discussed by Notteboom (2006), yet another option to keep deteriorating schedule reliability under control is the so-called "cut and run" principle, implying that crane operations on a vessel are abruptly stopped even if there are still some containers on the stack waiting to be loaded.

Thirdly, liner carriers could relax buffer time in their service schedules for contingencies such as bad weather and port delays. But increasing buffer time comes at a high cost, even an additional vessel on a loop.

Finally, as noted by Dynamar (2005), the prospect of ever-decreasing schedule reliability constitutes an important reason why shipping lines increasingly seek control of container terminals in strategic locations. Indeed, by investing in (semi-)dedicated facilities, shipping lines can reduce waiting times (cf. berthing on arrival) and are guaranteed of high vessel productivity. Moreover, terminal agreements typically lead to lower handling rates, enabling shipping lines to operate below the normal THC levels. As discussed previously, the trend towards more carrier involvement in terminals has not escaped the European port scene, quite to the contrary (see Table 14 above).

(2) Terminal operators, especially in those ports which are non-first port of call, are confronted with rising uncertainty with respect to estimated times of arrival (ETA) of container vessels. A container ship missing its contractually negotiated berthing window affects both berth planning and yard planning at seaport terminals. Moreover, as stated above, unexpected delays might force shipping lines to make last-minute changes to their shipping schedules (e.g. an inversion of port calls or the omission of a certain port call altogether). As a result, terminal operators can face sudden and unplanned peaks in volumes (forcing them to hire extra manpower), possibly leading to domino effects for ships berthing at the same terminal, aggravating problems even more. By way of illustration, average reliability of vessel arrivals for the container terminals operated by PSA HNN in the port of Antwerp was around 30% in 2005 (based on the monitoring of 30 loops, with somewhat higher reliability levels for deepsea vessels than for feeder vessels). This figure is well-below the schedule reliability needed for efficient terminal planning, which can be estimated at 90% (Notteboom, 2006), although this should be considered a theoretical figure.

(3) Inland transport operators are confronted with increasing unreliability of sailing schedules. Inland barge operators, for example, have to take into account the fact that most terminal operators treat deepsea traffic with priority over barge traffic. As a result, securing berthing space becomes ever-more difficult for inland barge operators when the reliability of deepsea services decreases. As an example, in the 2004 peak season, barge and feeder operators experienced delays of up to 60 hours at deepsea terminals in Rotterdam and Antwerp, causing havoc in their sailing schedules and forcing them to impose congestion surcharges on their clients to recover costs. In general, inland transport operators (be it truck, rail or barge operators) being faced with increasing delays can see their productivity levels significantly reduced. Since nowadays competition is no longer a question of "port versus port" but rather "supply chain versus supply chain", this can obviously have a profound impact on the competitive position of a seaport *vis-à-vis* its nearest rivals. In this respect, it comes as no surprise to see that terminal operators are showing an increasing interest to cooperate on a strategic basis with other players in the supply chain in order to safeguard the integrity of goods flows.

(4) Shippers/consignees, finally, are confronted with an increase in logistical costs because (1) they are faced with decreasing reliability of lead times, obliging them to invest in higher inventory levels in order to avoid disruptions to their production processes and meet service level agreements, and (2) they are faced with so-called 'congestion surcharges' imposed by deepsea shipping lines or inland transport operators aiming to recover costs associated with rising congestion levels (for a detailed overview of rate and surcharge developments imposed by deepsea shipping lines during 2004-2006, see Drewry Shipping Consultants, 2006 or Dynamar, 2006). It has to be noted, however, that congestion surcharges have only very rarely been imposed in European seaports in recent years. For a detailed case study on the impact of liner schedule unreliability on shippers/consignees the reader is referred to Vernimmen et al. (2006)

Overview of main developments in the European container market during 2006

Development of the world cellular fleet in 2006

- According to AXS-Alphaliner, 357 cellular ships were added to the world fleet in 2006 (i.e. on average about one ship every day), representing 1.36 million teu and 16.76 million dwt. The same year hardly 19 cellular ships, totaling 28,576 teu (489,000 dwt), were deleted. As a result, at 01/01/2007 the world cellular fleet reached 3,949 ships for a total capacity of 9.57 million teu. This implies an increase of more than 16% of the teu-capacity during 2006.
- Also during 2006, 401 cellular ships totaling 1.60 million teu (19.3 million dwt) were ordered, for a total contract value estimated at USD 24.2 billion (which boils down to roughly USD 15,000 per teu-slot). This followed already hefty ordering in 2005, when 522 vessels were ordered for a total capacity of 1.62 million teu and a total contract value of around USD 27.2 billion.
- The cellular fleet is expected to continue growing strongly in 2007. No less than 503 cellular ships with a total capacity of 1.50 million teu should be added to the fleet, representing nearly 16% of the cellular fleet capacity at 01/01/2007. The net effect, however, will obviously be lower: given the age profile of the current cellular fleet (a lot of ships were built prior to 1975, including many ships in the 1000-3000 teu segment) it can be expected that (many) ships will be scrapped in the course of 2007.

Port/terminal development in Europe (non-exhaustive)

- Although container volumes in European seaports increased rapidly during the last few years, 2006 did not witness the commissioning of many new container terminals. The only new terminals that were opened during the year included APM Terminals Zeebrugge (Belgium), Terminal de France (Port 2000, Le Havre), Astakos port (Greece), Gdynia Container Terminal (HPH-operated) (Poland), Gävle Container Terminal (Sweden), a second terminal in Klaipeda (Lithuania) and the first berth of CT-IV in Bremerhaven. However, apart from these new projects, a substantial amount of existing container terminals throughout Europe were either upgraded or expanded during 2006 in order to cope with the expected increase in cargo volumes. Examples (non-exhaustive) include ECT's Delta Terminal in Rotterdam, the MSC Home Terminal in Antwerp, Eurogate's Container Terminal Hamburg, Darsena Levante (Naples), Klaipeda Container Terminal, Baltic Container Terminal (Gdynia), East/Chita Docks (Valencia), Bristol Container Terminal and Southampton Container Terminal.
- In February 2006 the Port of Felixstowe obtained government approval for its 'Felixstowe South Reconfiguration' project. This comprises the conversion of existing facilities into a 1350m quay length container terminal with a capacity of some 1.5m teu per year. Some months before, Hutchison Port Holdings had also obtained approval for its Bathside Bay project in the port of Harwich. These two expansion projects are a much-needed development for the UK East Coast, where existing terminals are characterized by high utilization levels.
- In August 2006 the Port of Thessaloniki signed a deal with the European Investment Bank for the financing of the expansion plans for its container terminal. The expansion, taking a start in 2007, comprises the construction of 500m quay length and corresponding superstructure.
- In October 2006, the Port of Rotterdam received the go-ahead from the Dutch government for its massive Maasvlakte-2 expansion project. Maasvlakte-2 encompasses some 1000 hectares (net) of industrial sites, located directly on deep water. It will mainly be reserved for the container, chemical and distribution industry. Construction works are expected to start in 2008, with the first terminals being operational by 2012-2014. In June 2006 the Port of Rotterdam Authority and APM Terminals concluded an agreement, under certain conditions to be satisfied, for the lease of a container terminal on Maasvlakte 2. The terminal will cover about 167 hectares with a potential handling capacity of 4.5 million TEU per year. The first part of the terminal should be operational in 2014 at the latest. Next, the granting of another container terminal at Maasvlakte 2 (to be taken into operation in 2012-2013), for which a number of candidates were still in the running at the beginning of 2007, is expected to take place in the Summer of 2007.
- In the port of Algeciras (south Spain) construction works started on the 'Isla Verda Exterior' expansion project in 2006. The first two phases of the project have meanwhile been finalized and comprise a container terminal with 1265m quay length and 50ha stacking yard. The third phase comprises an additional 995m quay length and 55ha stacking yard.

Source: Dynamar (2006, 2007), AXS-Alphaliner and various trade press articles

Overview of main developments in the European container market during 2006 (continued)

Port/terminal development in Europe (continued)

- In late 2006 the Port of Southampton commissioned a new berth for feeder vessels up to 150m in length. The berth is used to handle extra feeder volumes following the Grand Alliance's decision in June 2006 to consolidate calls at Southampton (implying traffic shifts from Thamesport). The feeder berth will also be used in a bid to attract more intra-European business.
- In the port of Barcelona construction works started on the new Prat Terminal (Muelle Prat). When finished, the terminal boasts a 1500m quay length and 93ha stacking yard, sufficient to handle 2.5m teu per year. The Prat Terminal will be operated by Hutchison Port Holdings together with Spanish partner Grupo Mestre (TerCat). The terminal should be taken into operation in 2008.
- In March 2007 formal planning approval was granted for the deepsea JadeWeserPort container terminal at Wilhelmshaven in North Germany. JadeWeserPort comprises a 120ha container terminal (capacity: some 3 million teu per year) and an adjacent 170ha zone for logistics activities. Construction of the terminal should take a start in the Summer of 2007. JadeWeserPort will be operated by Eurogate (70%) in joint venture with APM Terminals (30%) and its first phase should be operational by 2010, providing Northern Germany with much-needed extra handling space for the world's largest container vessels.
- In Gdansk the construction works on the DCT-Gdansk container terminal progressed well during 2006. The first operations should take a start in mid-2007, with the total terminal being finished around October.

Other significant developments (non-exhaustive)

- In August 2006, the Odense Steel Shipyard delivered the long-awaited EMMA MAERSK to Maersk Line. With an LOA of 397m, a width of 56.4m (22 rows across) and an estimated nominal capacity of 14,000+ teu when carrying 9 tiers above deck, the EMMA MAERSK is the largest container vessel in the world. In fact, as at March 2007 she was about 50% bigger than the second-largest container vessels afloat (CSCL's 350m long and 18-wide XIN LOS ANGELES of 9580 teu). Hence, just as was the case with the 7000 teu REGINA MAERSK in 1996, Maersk Line again took a very important lead over its nearest competitors as far as the deployment of large vessels is concerned. Together with seven identical sister ships (of which the ESTELLE MAERSK, ELEONORA MAERSK and EVELYN MAERSK have already been delivered) the EMMA MAERSK will be deployed on the Far East-Europe trade. In fact, as from April 2007, these giant ships will only call at a handful of ports, namely Rotterdam, Bremerhaven, Algeciras, Tanjung Pelepas, Yantian (Shenzhen), Hong Kong, Ningbo, Xiamen, Hong Kong, Yantian (Shenzhen), Tanjung Pelepas, Algeciras, and back to Rotterdam. Given their 28,000+ teu nominal two-way capacity, these ships should generate massive import/export call sizes for the ports involved.
- In October 2006, Panamanians have answered an overwhelming (almost 80% of the 43% of Panamanians that showed up) "Yes" to the plans for the construction of a third set of Panama Canal locks. If all goes as planned, this new set of locks will be operational in 2015 and will boost the "panamax" gauge to ships able to carry 12,000 teu. The total cost is estimated at some USD 5.25 billion, including a safety margin to face unplanned expenses. The new locks, which will measure 427 x 55 x 18.3m, imply that ports on the US East Coast as well as some US Gulf Coast ports and Caribbean ports will have to prepare the arrival of giant containerships in about 10 years from now (AXS-Alphaliner, 2006).
- During 2006 a total of 17 new container services were launched on the East-West trades, involving 105 ships with an average capacity of 4500 teu. Similarly, the North-South trades welcomed no less than 38 new container services involving 187 ships with an average capacity of 2200 teu. In addition, 9 new container services were introduced in the intra-Europe container trade and the intra-Mediterranean container trade in 2006 (Dynamar, 2007). Apart from these new services, many existing services on the East-West, North-South and regional trades witnessed a (significant) capacity of the vessels deployed. It is beyond the scope of the present Report to discuss this in detail.

Source: Dynamar (2006, 2007), AXS-Alphaliner and various trade press articles

Overview of main developments in the European container market during 2006 (continued)

Other significant developments (continued)

- The year 2006 saw the birth of "Emirates Shipping Line FZE", formed by former Norasia Line executive Vikas Khan. Emirates Shipping Line is registered in Dubai Maritime City (United Arab Emirates) and is owned by private interests. The company is commercially headquartered in both Dubai and Hong Kong. Between May and November 2006, Emirates Shipping Line launched no less than 6 services, of which three as vessel provider and three as slot buyer.

- The port of Amsterdam initiated AMSbarge, a 200 teu box barge fitted with a 35-ton gear including the required spreaders. The AMSbarge has been developed to collect containers at companies with an inland water connection, hence avoiding road transport. It will serve all container-handling facilities in Amsterdam, including NYK's Ceres Terminal. The AMSbarge can also serve as a floating container terminal, consolidating boxes from various barge operators.

- During the first half of 2006 the price for 380 CST bunker fuel climbed to a very high level. In Rotterdam, for example, bunker prices steadily increased from USD 273 per ton at the beginning of January to reach their peak level of USD 338 per ton in early May. Afterwards, prices fell to USD 287 per ton at the end of June, only to climb back to USD 326 per ton in Mid-August. The second half of 2006 saw a significant decrease of the price level to USD 254 per ton at the end of December. On average, bunker prices in Rotterdam attained USD 292 per ton in 2006, some 25% higher than the average USD 234 per ton during 2005. A similar picture applied to bunker prices in Singapore (from an average USD 264 per ton in 2005 to an average USD 314 per ton in 2006), Houston (from USD 250 per ton to USD 302 per ton), Fujairah (from USD 259 per ton to USD 311 per ton), Tokyo (from USD 296 per ton to USD 345 per ton) and Long Beach (from USD 267 per ton to USD 319 per ton). This obviously had an enormous impact on the bottom line of many container shipping lines.

Source: Dynamar (2006, 2007), AXS-Alphaliner and various trade press articles

3. The RoRo market

3.1 Overview of four RoRo submarkets

Broadly speaking, the RoRo market encompasses four main sub-markets. Firstly, there is the deepsea segment which can be divided into car carrying trades and regular liner trades with RoRo-facilities. Secondly, we have the shortsea segment which can be divided into ferry transport for both passengers (with cars) and rolling freight on the one hand, and freight-only RoRo transport (including containers on mafis) on the other. These four sub-markets will be dealt with in this chapter.

3.1.1 Deepsea – Car carrying trades

3.1.1.1 Vehicle manufacturing and worldwide seaborne vehicle trade

The vehicle manufacturing industry nowadays produces about 65 million units per year and is characterized by chronic overcapacity (plant utilisation is estimated at some 73% of capacity on a global level, whereas according to industry specialists a level of 80% is needed in order to earn a decent profit) and chronically poor return on investment[14]. Moreover, just like many other industries, the vehicle manufacturing industry has witnessed an ever-increasing degree of concentration and globalisation over the last few decades. As a result, the industry nowadays counts just 15 (global) players. The top-seven manufacturers, many of which feature a whole myriad of different car brands in their portfolio[15], accounted for 46.7 million vehicles in 2005 or nearly 75% of worldwide production (Table 23). It is assumed that by 2010-2012 the number of global vehicle manufacturers will have further reduced to 9 or 10.

Table 23: Leading automobile manufacturers in 2005

	Output (m)	%		Output (m)	%
General Motors	10.9	17.2%	Fiat	2.4	3.8%
Toyota	7.6	12.0%	Mitsubishi	1.9	3.0%
Ford	7.4	11.7%	Suzuki Motor	1.8	2.8%
Daimler-Chrysler	6.3	9.9%	BMW Group	1.4	2.2%
VW-Audi	5.4	8.5%	AutoVaz	1.3	2.1%
Renault-Nissan	5.3	8.4%	Mazda Motor	1.0	1.6%
PSA Group	3.8	6.0%	Fuji Heavy Ind.	0.9	1.4%
Hyundai Motor	3.0	4.7%			
Honda	3.0	4.7%	**Total**	**63.4**	**100%**

Source: Drewry Shipping Consultants (2006)

Over the years the car manufacturing industry has witnessed important geographical shifts. While established production markets such as Europe, North America and Japan are nowadays indeed still dominant as far as output is concerned, emerging markets in Asia (China, India and Thailand), the Middle-East, South-Africa[16], Eastern Europe, Russia or South-America have rapidly gained in importance in recent years. Many of these latter regions have welcomed substantial investments in large car assembly factories. As a result their importance for the worldwide car manufacturing market has increased significantly, and is expected to continue to do so in the years to come. As an example, production in South Asia is expected to more than quadruple from 1.3 million units in 2004 to 5.4 million units in 2020.

China is a very special case in point: its light vehicle production (including commercial vehicles) is expected to increase from about 5.2 million units in 2004 to no less than 12 million units by 2015 and 15 million units by 2020. As far as selling strategies are concerned, there exists a big difference between the local car manufacturers: on the one hand, Chinese manufacturers that are developing production

14 According to Drewry Shipping Consultants, average profit margins in car manufacturing have declined from 20% in the early 1920s to around 10% in the 1960s and less than 5% today.

15 General Motors, for example, includes brands such as Cadillac, Oldsmobile, Saab, Chevrolet, Saturn, Holden, Pontiac, Opel, Isuzu, Buick and Vauxhall cars. Similarly, Ford Motor Company marques include Ford, Volvo, Lincoln-Mercury, Aston-Martin, Jaguar, Land Rover and Mazda. Next, Daimler-Chrysler covers Mercedes-Benz, Jeep, Chrysler, Smart Car, Plymouth, Maybach and Dodge, while Volkswagen-Audi encompasses Volkswagen, Audi, Skoda, Seat, Bugatti, Bentley and Lamborghini. On the other hand, Toyota only includes the Toyota and Lexus (luxury) brand, and the PSA Group only encompasses Peugeot and Citroën.

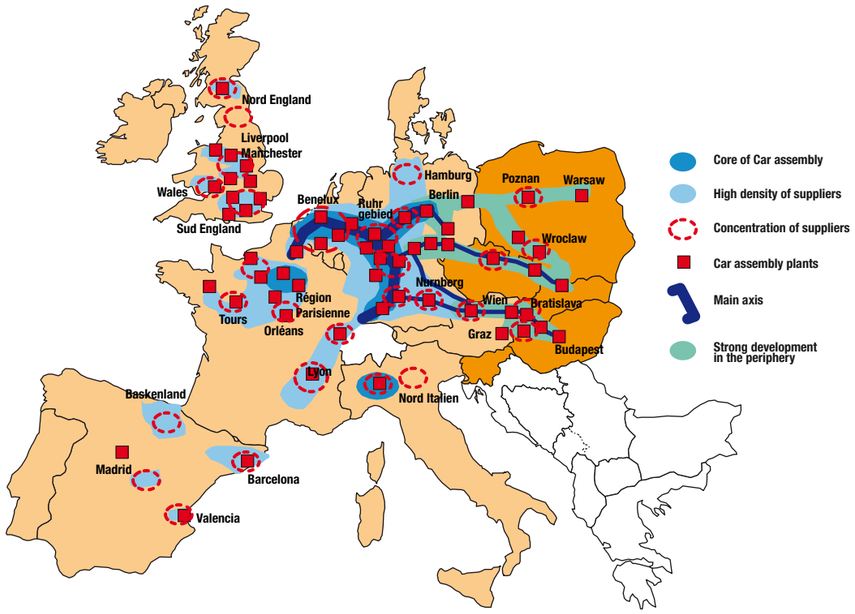
16 In 2006 eight of the world's largest car manufacturers had a facility in South Africa.

lines are doing so independently, with the aim of exporting their products[17]. On the other hand, global manufacturers that have set up joint-ventures with Chinese manufacturers are (mainly) producing for the domestic market (Nightingale, 2006:37).

In view of the above, it is hardly surprising that the seaborne vehicle trade has over the years undergone a fundamental geographical shift as well. Whereas today the major seaborne car trades still are Japan-North America, Japan-Europe, Japan-Middle East, South Korea-North America, South Korea-Europe and West Europe-North America, seaborne trades are nowadays increasingly focusing on the developing economies and emerging markets mentioned above. Unsurprisingly, the increasing globalisation trend has also been accompanied by a significant increase in the seaborne shipments of new cars[18]. It is estimated that, from the total production volume of nearly 65 million new cars in 2005, about 20-25% (i.e. some 15 million units)[19] were exported by ship from their country of manufacture, with the remaining 75-80% sold locally or exported overland. Forecasts for 2015 indicate a worldwide production volume of some 80 million units with overseas exports accounting for nearly 20 million units (excluding transhipment). This figure includes about 16.4 million deepsea units and 3.2 million shortsea units.

The European automotive network, as depicted in Figure 3, demonstrates how the main axes of car assembly and supplier activities are increasingly being complemented by strong developments in the periphery[20]. Figure 4 depicts a typical production process for CBU (Completely Built Up) cars.

Figure 3: The European automotive network



Source: Podvin; to-Consulting

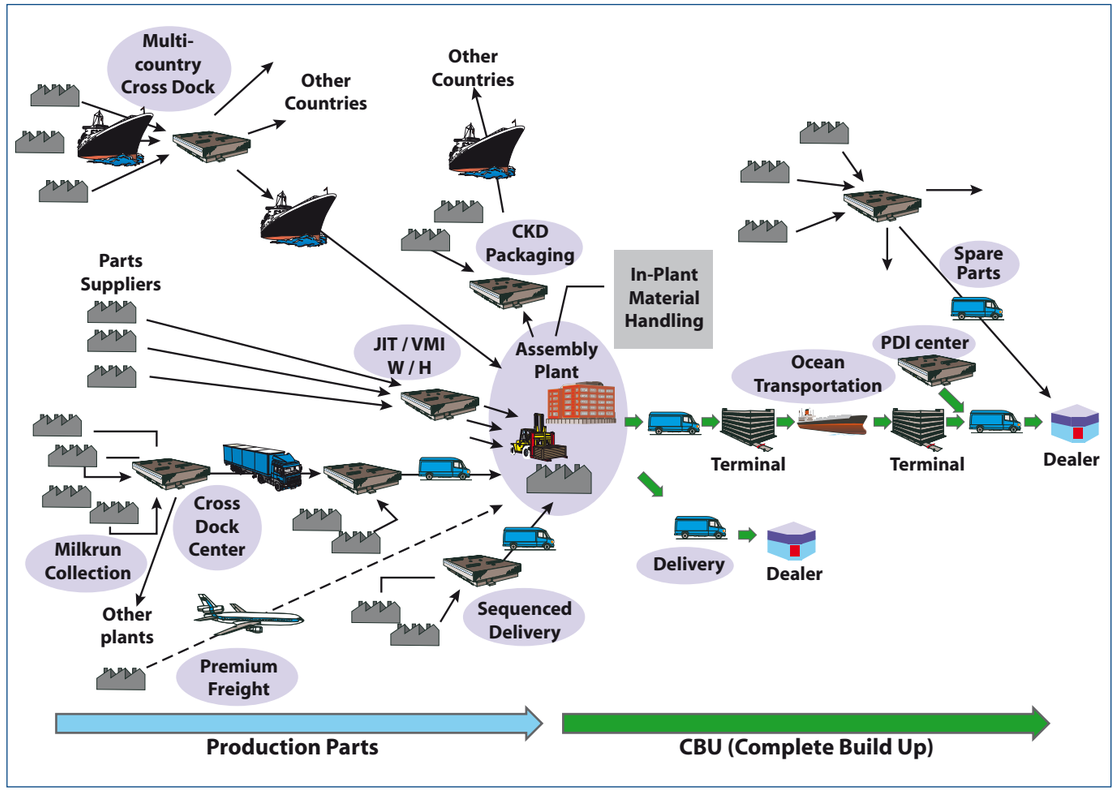
17 Due to fierce price undercutting among domestic producers, the average price of China's exported cars has dropped from USD 16,100 per unit in 1999 to USD 9,100 per unit in 2005. Nowadays Chinese car exports mainly consist of low-end models that are sold to emerging markets such as South East Asia, the Middle East, Latin America, South Africa and Russia (Nightingale, 2007).

18 Although deepsea transport of vehicles has already been in existence since the end of the 1950s (with Volkswagen and Renault taking the lead for shipments to the US), the deepsea car carrying market did not fully take off until the 1970s with worldwide trading of Japanese cars (Isemar, 2007:01).

19 This represents a 66% increase over the 9m units transported overseas in 1995.

20 Figure 3 does not include the Scandinavia/Baltic region. This region, however, is also of major importance to the European automotive industry, with large assembly factories (e.g. Volvo and Saab in Sweden) and substantial import/export car traffic shipped through Scandinavian/Baltic ports.

Figure 4: The production process for CBU



Source: NYK Logistics

To conclude, Table 24 provides an overview of the production and overseas exports of new cars for four selected regions in 2005. As this table indicates, both Europe[21] and North America took the lead with a production of about 20 million new cars each that year. However, only a relatively small amount of their output was exported overseas. The opposite applies to Japan and South Korea, which produced (far) less new vehicles than Europe and North America but generated much bigger maritime export flows.

Table 24: Production and overseas exports of new cars for selected regions (million units in 2005)

	Europe	Japan	Korea	N America
Production	20.7	10.6	4.2	20.0
Exports	1.8	5.0	4.0	0.4
% N America	64%	35%	30%	-
% Europe	-	25%	40%	45%
% Asia	21%	10%	17%	9%
% S America	3%	7%	-	22%

Source: Isemar (2007)

21 European car exports mainly originate from such countries as France, Germany, Spain, the United Kingdom and Belgium.

3.1.1.2 The Pure Car and Truck Carrier (PCTC) fleet

Nowadays new and second-hand cars are transported mostly by Pure Car and Truck Carriers or PCTCs, the first of which entered service in 1977 (some ten years later than the first Pure Car Carrier or PCC)[22]. By mid-February 2007 the total fleet consisted of 580 vessels with a combined capacity of 2.64m CEU. Just like in many other shipping sectors, the average size of the PCTC fleet is getting bigger and bigger, as indicated by Table 25. Whereas the average PCTC had a capacity of just 4035 CEU in mid-1990, this figure had increased to 4552 CEU (+13%) by mid-February 2007. The lion's share of the PCTC fleet is currently being deployed on liner-type services, i.e. involving fixed routes with a predetermined schedule. Moreover, there is nowadays an increased emphasis on logistics and supply chain management, so that car carrier operators are now required to do more than simply move vehicles between ports (Drewry Shipping Consultants, 2006:45).

At the end of 2006 the largest PCTCs in service had a capacity of 7200 CEU, only to attain the 8000 CEU barrier about half a year later. And the increase in size will probably not stop there: shipyards have reportedly been asked to consider building PCTCs of up to 11000 CEU capacity. While such giant ships would obviously result in significant cost savings on the sea leg (economies of scale), they could well pose serious problems for car terminals designed to handle ships with a maximum LOA of 200m[23]. In fact, the growing shortfall in the number of ports that have the infrastructure for car capacity, including in Europe, constitutes an important problem for car carrier operators. As a result, some of them have taken control of their own destiny by taking a (significant) stake in RoRo terminals in strategic ports (Nightingale, 2007). The takeover of PSA HNN's RoRo terminals by NYK in early 2007 constitutes a prime example of this. Hence, the parallel with the liner shipping industry, which has also seen increasing investments by shipping lines in (semi-) dedicated facilities in recent years (cf. supra), is striking.

Table 25: Composition of the car carrier fleet for selected years

Year	1-1999 CEU		2000-2999 CEU		3000-3999 CEU		4000-4999 CEU		5000-5999 CEU		6000+ CEU		Total fleet		
	ships	cap	ships	cap	ships	cap	ships	cap	ships	cap	ships	cap	ships	cap	avg size
1990	24	33,800	42	105,800	78	260,400	87	394,900	64	347,600	22	136,500	317	1,279,000	4,035
1995	20	28,900	41	103,600	76	252,300	88	395,300	78	418,100	26	160,300	329	1,358,500	4,129
2000	37	51,089	35	87,675	87	289,535	113	512,147	117	639,617	34	206,810	423	1,786,873	4,224
2005	46	62,842	33	81,490	93	313,686	140	631,706	117	640,215	88	551,200	517	2,281,139	4,412
2006	47	67,338	36	87,890	94	316,979	144	648,683	114	619,875	118	747,040	553	2,487,805	4,499
2007	47	67,338	37	90,090	95	320,879	153	689,223	135	745,275	113	727,140	580	2,639,945	4,552

Source: Fearnleys, All figures refer to the first of July each year, while the 2007 figure refers to mid-February 2007,

As its name implies, the cargo of PCTCs is not limited to new or second-hand cars alone. Broadly speaking, the cargo carried by PCTCs on deepsea routes nowadays typically includes about 50% new or second-hand cars and 50% (better-paying) "high and heavy" or "out of gauge" cargo. The latter is mainly being carried on ballast legs (i.e. on their way back to the car loading areas) and can include a whole myriad of different cargoes such as agricultural machines, construction equipment, wind mills, helicopters, etc. On some trades (e.g. to the Eastern Mediterranean or West-Africa) vast volumes of second-hand cars are shipped.

From a technical point of view the PCTC with 10-14 cargo decks, of which 4 or 5 hoistable ones, is nowadays the true workhorse in the industry. Many of the recently built PCTCs have a ramp capacity of 150 tons or more, clearly reflecting the increasing importance of "high and heavy" cargoes. In contrast to PCTCs, the Pure Car Carrier (PCC) concept is slowly fading away, due to a number of reasons. Firstly, the clear height of their car decks is not high enough to accommodate mono-volume cars or SUVs, which are becoming increasingly popular among consumers. Moreover, PCCs are far less suited than PCTCs to carry the mix of cargo types mentioned above.

In order to keep up with an expected annual 2% growth in vehicle manufacturing in the coming decade (to reach an estimated 80 million units by 2015), many operators have invested heavily in the expansion of their ship fleets[24]. At the end of 2006 about 570 car carriers with a capacity of at least 1000 car equivalent units (CEU) were being deployed on worldwide trade routes (never before was the fleet so big) for a combined capacity of about 2.6 million CEU. At that time, a further 160-180 units were on order for delivery during 2007-2010, for a total capacity of nearly 1 million CEU. In recent years prices for PCTC newbuildings have increased steadily: the typical price tag for a 6500 CEU unit ordered at established Japanese or South Korean yards nowadays reaches about USD 75-80 million, while this was just USD 55 million a few years ago. However, shipyards in emerging markets such as Vietnam (Vinashin) or India (Pipavav) nowadays offer more attractive prices.

Although representing some 35% of the current fleet capacity in CEU terms, it is generally assumed that the 1 million CEU order backlog, which is heavily focused towards 6000+ CEU vessels, will easily be absorbed by the market. Indeed, according to some industry observers the market is nowadays (i.e. early 2007) characterized by a shortage of car carrier tonnage of about 10%. This corresponds with roughly 50 ships in the 2000+ CEU segment[25]. This tight supply situation has a number of important implications. Firstly, according to some industry observers, shipments of new cars from Japan or South Korea are nowadays being delayed by about 1 month on average. Secondly, the lack of capacity has resulted in the fact that many older vessels, which have reached an age at which they could be scrapped, are actually still trading. In fact, just one single car carrier went to the scrapping yard in 2005, while in 2006 no such ship was scrapped at all.

Because of this extremely low scrapping activity in recent years, the car carrier fleet nowadays counts more than 100 vessels of over 25 years old[26]. Unsurprisingly, these ships are mainly used to transport second-hand cars, as they do not boast the necessary deck configuration or ramp capacity to carry a mix of vehicles and "high and heavy" cargo. Other important markets for older car carriers are the trades between Japan and New Zealand, between the Mediterranean/North Europe and West Africa, and between the Far East and Middle East. It is generally assumed that the older vessels will gradually be phased out as from 2010 onwards, i.e. after the large newbuildings slated for 2007-2010 delivery have poured into the market.

A final implication of the tight supply situation is the fact that charter rates for car carriers have increased significantly in recent years. Current 12-month charter rates for 5000-6000 CEU units are estimated to be in the USD 30,000-40,000 per day region, i.e. about double the rate level of three years ago. In fact, the increases in newbuild prices and charter rates have been much more pronounced than the increase in freight rates obtained from shippers/manufacturers who, following consolidation in the car manufacturing industry, nowadays have substantial bargaining power *vis-à-vis* operators[27]. This fact, combined with spiralling fuel costs, has obviously put PCTC operators under significant pressure in recent times. Yet, as manufacturers are well aware of the current tight supply situation and high fuel costs, they are prepared to put freight rates and bunker clauses back up for discussion at the negotiation table. After all, for many of them ocean transport constitutes a vital part of their global supply chains. In fact, as a result of the tight supply situation at the end of 2006, some car manufacturers have signed longer-term contracts than usual with car carrier operators, in order to safeguard required space (Nightingale, 2007).

3.1.1.3 Leading car carrier operators

On the shipping lines side, the industry is dominated by about six major operators based in the Far East and Europe, the largest of them being Japanese NYK (Table 26). This carrier currently has an (owned or controlled) car carrier fleet of some 90 vessels for a combined capacity of some 400,000 CEU and shipped an estimated 3.2 million CEU during 2006, an increase of about 15% compared to 2005[28]. Driving forces behind the growth in NYK cargo volumes were (and still are) the increasing interest from the North American market for fuel-efficient Japanese cars, as well as good sales in Europe and the Middle East. Apart from NYK, other big deepsea players are Mitsui OSK Lines, K-Line, Eukor, Wallenius Wilhelmsen Logistics and Höegh Autoliners (including Maersk tonnage). These six carriers nowadays directly own about half of the specialist car carrier capacity and operate more than 80% of global fleet capacity (when chartered tonnage is included). Moreover, each of these six companies is also heavily involved in the European shortsea trades (cf. infra). Table 26 also clearly illustrates the dominance of the Japanese "Big Three" (NYK, K-Line and MOL) on the car carrying market. The "Others" line in

22 Before the emergence of PCCs, cars used to be transported by conventional ships, often on top of other (heavier) cargoes, and later on by bulk carriers fitted with car decks that could be folded. However, car carrying capacity was low, the loading/unloading process slow and the risk of damage high (Dynamar, 2006:68).

23 Moreover, in many ports around the world port dues rise significantly when the 200m LOA is exceeded.

24 Of course not all of the 80 million manufactured vehicles will have to be transported overseas. Nevertheless, some industry pundits estimate that the car carrying trades could involve as much as 20 million units by 2010, when China and other emerging markets in Asia are expected to generate substantial regional and global export flows.

25 This is the minimum size considered competitive for long-haul trades.

26 The oldest car carriers in the current world fleet are two units built in 1973. One of them is still used to carry second-hand vehicles from Europe to the Middle East and Africa, while the other is being circulated for sale by its Maltese owners. Car carriers can nowadays indeed continue trading to an age of 30 years or more, because rolling cargo on rubber tyres does not cause much hull damage, coupled with the fact that ballast tanks and engines onboard ships can be renewed. The improved quality of coatings also plays a role in this respect.

27 Out of the 50 or so major car manufacturers worldwide, only five have their own vessels to handle export cargoes, namely Nissan Motor (Nissan Motor Car Carrier), Volkswagen (Volkswagen Logistics), Toyota (Toyofugi), Honda (Act Marine) and Hyundai Motor (Eukor). The size of their ship fleets is, however, not sufficient to meet 100% of their shipment needs, implying that they have to rely on other operators as well. In fact, many car manufacturers have long-standing relationships with PCTC operators.

28 The total export volume of Japanese new cars reached an estimated 5.6 million units in 2006, a substantial 19% increase over 2005. For China, the total export volume of new cars reached about 340,000 units in 2006, a massive 96% increase over 2005. On the import side, China accounted for 229,000 units in 2005, about 40% more than the year before. Contrary to their Japanese or South Korean counterparts, Chinese manufacturers have to rely on foreign car carrier operators for the shipment of vehicles, because local shipping companies only own RoRo vessels that are deployed on coastal routes. This constitutes an important reason behind the plans of China to establish its own car carrier fleet, although this will take a number of years to materialize.

Table 26 mainly refers to tonnage suppliers. The main players in this segment are Cido Shipping, Ray Car Carriers, Gram Car Carriers, Zodiac Maritime, Vroon and Dyvi. Just like the big operators, these tonnage providers have invested heavily in newbuilding orders in recent years.

In order to supply their global networks, the large vehicle manufacturers are nowadays increasingly obliged to use the services of all these six independent companies, rather than appointing one or two single carriers to carry all their business. In fact, "established relationships from the past have given way to contracts based on the need to supply different trade flows with different carriers. These contracts often imply cargo sharing agreements between carriers" (Drewry Shipping Consultants, 2006:45).

Table 26: Leading car carrier operators as at July 2006

Operator	Vessels owned	Capacity (CEU)	Vessels operated	Capacity (CEU)
NYK	54	264,000	85	393,000
Eukor	24	124,000	> 85	> 350,000
K-Line	30	145,000	77	344,000
MOL	51	235,000	> 70	> 320,000
WWL	37	195,000	50	264,000
Hoegh	27	142,000	50	220,000
Others	354	1,212,000	-	-
Total	**577**	**2,359,000**	**577**	**2,359,000**

Source: Drewry Shipping Consultants (2006)

Another major player in the car carrier industry is Italy-based Grimaldi, which is both an operator and tonnage provider. From a geographical point of view, Grimaldi is a special case in point in that it currently mainly focuses on the Mediterranean-North Europe, intra-Mediterranean, Europe-West Africa and Europe-East Coast South America trade routes. As such, it has not (yet) ventured outside the Atlantic for vehicle transport. Secondly, United European Car Carriers (UECC) and K-Line European Sea Highway Service (KESS) are peculiar cases as they are heavily involved in the shorter-haul feedering business for the main deepsea operators (see below). So also here a parallel with the container liner industry can be drawn.

From an operational point of view, in the mid-nineties a fleet of 25-30 ships was regarded as the threshold needed to have the scale and flexibility to serve the car manufactures. The general expectation is that this figure will have tripled to around 80 units by 2010. This probably constitutes an important reason behind the recent team-up between Höegh Autoliners and AP Moller Maersk, which involves a joint commercial management of their respective fleets. The combined Höegh and Maersk fleet consists of 55 + 12 vessels (including chartered tonnage), with a further 15 units to be delivered during the next couple of years. Höegh Autoliners carried about 1.8 million CEU in 2006, of which some 65% consisted of new cars. While the AP Moller Maersk Line fleet (consisting of small 2500 CEU and mid-sized 4800 CEU units) is currently chartered out to Wallenius Wilhelmsen Logistics, NYK and Mitsui OSK Lines, it is expected that most of the vessels will join the Höegh fleet once their charter commitments expire.

3.1.1.4 Vehicle trades in Europe

As far as the European market is concerned, maritime transport of cars is expected to increase steadily over the years to come, following stable or slightly increasing demand for cars in the mature Northwest European market coupled with strong growth in Russia[29], Eastern Europe and Turkey. This latter aspect is expected to boost the import flow of cars in ports in the Baltic and the Black Sea. It will also be to the benefit of intra-European shortsea carriers, because many ports in the Baltic or the Black Sea currently dispose of insufficient draught to handle the large PCTCs, such that they have to be served by transhipment via large ports in the Mediterranean such as, for example, Gioia Tauro. Similarly, Russian volumes[30] could be transshipped via Bremerhaven in Germany to, e.g., Kotka in Finland. Of course, this picture would change drastically when car manufacturers would decide to establish factories in Eastern Europe and Russia.

29 The Russian vehicle market is expected to reach 2 million units by 2010. The port of Kotka in Finland is increasingly being used as the gateway to Russia, with vehicles being transported to St-Petersburg and Moscow. In fact, Kotka is one of the seven strategic ports where Wallenius Wilhelmsen Logistics operates its own terminals, next to Zeebrugge, Southampton, Liverpool, Baltimore, Brunswick and Port Hueneme (the latter three being located in the United States of America).

30 As a matter of fact, demand for new cars in Russia is so high that in the course of 2006 a number of modern RoRo vessels of Transfennica were grabbed by UECC. They are now being converted to shortsea car carriers.

As outlined above, the leading deepsea car carrier operators are also heavily involved in the intra-European shortsea trades. Examples include United European Car Carriers (UECC) which is jointly owned by Wallenius and NYK; K-Line European Sea Highway Service (KESS); Autoliners SAS (a subsidiary of Höegh Autoliners); Euro Marine Carriers (in which Höegh has a minority share); and the European shortsea operations by MOL. This combination of deepsea and regional service provision is part of the general trend towards the "one stop shop/total service logistics package" which operators now have to provide to vehicle manufacturers to retain their business (Drewry Shipping Consultants, 2006).

In more mature European markets, for example the English Channel traffic, car carriers are nowadays facing very strong competition from traditional RoRo operators (such as Cobelfret from Belgium), although the RoRo operators' main business still remains the transport of trucks, trailers and mafis so their ships have relatively limited car capacities. Cobelfret is a particular case in point. Following the commissioning of the massive 4600 lanem PAULINE in 2006, coupled with a consolidation of its terminal interests (Cobelfret owns terminals in Purfleet, Killingholme, Rotterdam, Zeebrugge and Vlissingen), the company can remain ahead of competition from other RoRo operators, as well as feeder lines and shortsea car carriers (ShipPax Information, 2007).

Table 27 provides an overview of the main European ports handling new and second-hand cars. In some of these ports, car carrier operators have invested in dedicated hub terminals from which other destinations are feederised, although a typical roundtrip for a large PCTC nowadays still counts five or six ports in Europe. Apart from the ports listed in Table 27, other important car handling ports which receive regular PCTC calls are Livorno (Leghorn), Flushing (Vlissingen), Vigo, Valencia, Piraeus, Koper, Santander, Göteborg, Copenhagen/Malmö[31], Marseilles, Pasajes, Almeria, Rotterdam, Ghent and Cuxhaven. Some of these ports are situated in close proximity to car assembly factories of leading manufacturers[32].

Table 27: Main European vehicle ports in 2005

Port	units (m)	Port	units (m)
Zeebrugge	1.73	Sheerness*	0.67
Bremerhaven	1.65	London*	0.67
Emden	0.86	Grimsby/Immingham	0.62
Antwerp	0.81	Bristol/Portbury	0.60
Barcelona	0.78	Le Havre	0.58
Southampton	0.71	Tyne Ports	0.48

Source: Port Authorities. various
** 2004 figure*

3.1.2 Deepsea – Liner trades with RoRo-facilities

From an operational point of view, the ConRo concept (which refers to the carriage of containers and RoRo cargo on one single ship) bears a big resemblance with container liner shipping. Cargoes transported include new and second-hand cars, trucks, "high and heavy" cargo and containers. Important shipping lines in the ConRo market segment are Grimaldi Lines, Delmas/OTAL and Nile Dutch Shipping (NDS).

In the past, the deployment of ConRo vessels was very popular on certain liner trades to the Middle East, West Africa, South America and Russia, where facilities to handle ships were rather limited in certain ports. As for today, the ConRo concept has almost completely faded away on the deepsea routes (e.g. to/from the Middle East). It does, however, still survive on certain Western African and South-American trades (e.g. Grimaldi), as well as in the Levant (Beirut/Tripoli). ConRo vessels are nowadays also being deployed on some shortsea routes, by such carriers as Transfennica (Spliethoff Group) or Cobelfret.

Most of today's ConRo vessels were built in the seventies and eighties, so the fleet has reached a relatively high average age. Construction of new vessels has come to an almost complete standstill as, with the exception of Grimaldi Lines (Naples) (which also owns transatlantic ConRo line ACL), nobody seems willing to invest in new tonnage[33]. This has led to a decreased presence of ConRo tonnage on liner trades.

31 The port of Copenhagen/Malmö (CMP) is rapidly developing as a Nordic hub for cars. The volume of new cars handled at CMP terminals increased from 160,000 units in 2003 to no less than 350,000 units in 2005. This represents an average annual increase of nearly 50%.

32 In North America, the main ports of call for new and second-hand vehicle trades include New York (1 million units in 2005), Fraserport (Canada), Baltimore, Portland, Jacksonville, Brunswick, Los Angeles, Port Hueneme and Long Beach. In the Far East, the principal hub ports are Hong Kong, Laem Chabang (Thailand), Sriracha (Thailand), Singapore, Shanghai, Tianjin, Yokohama and Toyohashi.

33 Grimaldi Lines ordered five ConRo vessels (25,000 dwt, 800 teu, 2000 cars and 250 trucks) at Hyundai Mipo for a reported USD 430 million in early 2007. The vessels will be delivered in 2010-2011 and come on top of five similar units ordered earlier in Croatia.

Grimaldi Lines also has a number of dedicated terminals around Europe suited to handle ConRo cargoes, e.g. in Naples, Antwerp and Hamburg. To conclude, it should be mentioned that the United States (for their Naval Reserve Fleet) have absorbed quite a number of ConRo vessels from the market, to deploy them in times of international conflict.

3.1.3 Shortsea – Ferries

Whereas in the past the main income of ferry operators was related to the transport of passengers (income could typically be broken down into 35-40% "passengers", 35-40% "duty free" and 25-30% "freight"), this picture has undergone a fundamental change in recent years. First of all, ferry operators have been and are still faced with increasing competition from low-cost airlines (which nowadays offer cheap flights throughout entire Europe) and passenger and freight services between the Continent and the UK via the Channel Tunnel. This was compounded by the abolishment of duty-free sales onboard ferries in Europe on 1 July 1999, which resulted in a substantial loss of passenger traffic. On the other hand, freight transport in Europe has enjoyed very high growth rates in recent years.

In view of the above, it is not surprising to see that many ferry operators have felt the need to substitute passenger space for freight space onboard their vessels. As a case in point, SeaFrance's latest ferries nowadays carry about 120 trucks per voyage between Calais and Dover, compared to 40-50 for vessels of a previous generation. Another example is the Travemünde-Trelleborg service operated by TT-Line. After the abolishment of duty-free sales, TT-Line decided to order new ships with a higher focus on freight and with only very basic passenger facilities (in the past passenger facilities onboard TT-Line ships were much more developed). In addition, Stena Line decided to have its cruise-ferries on the Kiel-Göteborg link rebuilt, to allow for an increase in the freight capacity and a more flexible exploitation of passenger facilities (e.g. less crew in the Winter season and more crew in the Summer holiday season). Another case in point is ferry operator Finnlines, who is introducing ferries with a freight capacity of about 4200 lanemetre and several hundred passengers on the link between Travemünde (North Germany) and Finland. These ferries will temporarily be the largest ferries deployed on European trade routes.

Hence, the general tendency in today's ferry market is clear – an increasing focus on freight (which has indeed now become the main revenue for most ferry operators in Europe) rather than passengers. Having said this, however, passenger transport still remains a very important business for certain ferry operators on certain markets. A prime example of this is the Sweden-Finland link. Another exception to the increasing focus on freight is formed by the "cruise-ferries" which only carry about 1300-1500 lanemetre of freight. As an example we can mention the cruise ferries of Color Line deployed between Kiel (Germany) and Oslo.

In addition to the traditional services in Northern and Western Europe, another market worth mentioning is the Mediterranean, which has witnessed a tonnage rejuvenation in recent years. The traffic is very much "North-South" oriented rather than "East-West", with large ferries being deployed on services linking e.g. Northern Italy with Sicily, Italy with Greece, and France with Corsica or North Africa. Service speed is a crucial issue in these markets, and several ferry operators are nowadays deploying conventional RoPax vessels with speeds of up to 30 knots. To some extent, this phenomenon of fast conventional RoPax ferries is being copied in Northern Europe. As a case in point, Color Line will soon be introducing fast conventional vessels replacing ageing passenger RoRo vessels on services linking Denmark with Norway.

Finally, other important ferry links are Germany/Sweden, Denmark/Sweden, England-Wales/Ireland, England/Scandinavia, Calais/Dover, Valencia/Barcelona to the islands and North Africa, Marseilles/Corsica and North Africa, Sicily/Sardinia, Greece, the Adriatic Sea and Tunisia/Algeria/Morocco. Generally speaking, all these markets are being characterized by an increasing focus on freight transport (and thus a reduced focus on passenger transport), less duty-free sales and the deployment of faster and more modern ships.

Table 28 provides an overview of world ferry traffic in 2005 for passengers and three types of cargo. As this table indicates, Europe accounts for about one third of global passenger traffic by ferries, but its share of commercial ferry cargoes is much higher. The Baltic is a very important market for car and bus traffic, while the North Sea area is the dominant geographical region for trailer traffic.

Table 28: World ferry traffic in 2005

Area	Passengers	Cars	Buses	Trailers	Trips
Baltic	187,182,008	67,816,381	305,106	6,926,465	3,569,383
Mediterranean	192,195,725	26,551,362	85,131	6,578,501	351,432
North Sea	131,772,903	18,786,155	275,265	10,100,708	315,830
Subtotal Europe	511,150,636	113,153,898	665,502	23,605,674	4,236,645
Rest of world	883,964,931	43,295,710	86,015	4,878,016	1,404,400
World total	**1,395,115,567**	**156,449,608**	**751,517**	**28,483,690**	**5,641,045**
Share of Europe	**36.6%**	**72.3%**	**88.6%**	**82.9%**	**75.1%**

Source: ShipPax Statistics & Outlook 2006

At 01/01/2006, the total number of ferries amounted to 1,162 units, with a combined capacity of 1.16 million passengers (of which some 320,000 accommodated in cabins), 266,210 cars or 769,210 lanemetres of commercial vehicles. The fleet had a combined Gross Tonnage (GT) of 12,816,377 GT and an average age of 21 years. As Table 29 indicates, the top-15 European ferry operators accounted for just over half the GT of the total ferry fleet.

Table 29: Top-15 European ferry operators at 01/01/2006

Company	Total GT	Company	Total GT
DFDS Group	925,167	Scandlines	349,274
Stena	834,359	Tallink	347,914
P&O	572,082	ANEK Lines	328,243
Tirrenia di Navigazione	549,565	Silja Line	317,313
Grandi Navi Veloci	443,181	SNCM Ferryterranee	264,645
Color Line	424,613	**Viking Line**	**246,032**
Superfast Ferries	388,184	**Total top-15**	**6,740,270**
Trasmediterranea	381,405	**Total ferry fleet**	**12,816,377**
Minoan Lines	368,293	**Share of top-15**	**52.6%**

Source: ShipPax Statistics & Outlook 2006

3.1.4 Shortsea – Unaccompanied freight transport

The market for unaccompanied freight transport, the fourth of the RoRo markets discussed here, is "booming business" for all players involved in it, and for most geographical regions is being characterized by scale increases (larger vessels), a shortage of vessels and a rather old age profile of the fleet. Vessels active in these trades are only allowed to carry a maximum of 12 drivers.

The market for unaccompanied freight transport is of crucial importance to many ports in Scandinavia, through which substantial volumes of paper and forest products from local manufacturers (such as Stora Enso, UPM Kymmene, SCA or Norske Skog) are exported. Many of these export cargoes are loaded on mafis and then transported via RoRo vessels to destinations all across Europe. However, in order to reduce their dependency on pure RoRo freight, many shipping lines also increasingly reserve space for containers, for example for northbound cargoes going back to Scandinavia (e.g. 600-700 teu on the new Transfennica vessels). Important shipping lines in the Scandinavian RoRo market include DFDS Tor Line, Transfennica (Spliethoff Group) and Finnlines.

Another major market for unaccompanied RoRo freight transport is the North Sea, for example from Benelux ports (Rotterdam (Europoort and Hoek van Holland), Flushing, Zeebrugge and Ostend) to ports along the Humber and Thames (Hull, Killingholme, Dartford, Purfleet, Dagenham and Immingham). Other important UK ports are the so-called "Haven Ports" of Felixstowe (Norfolkline), Harwich (Stena Line) and Ipswich (Ferryways). On the North Sea market, containerized cargo is playing an increasingly important role (e.g. Cobelfret already carries more containers than trailers on some of its North Sea services). Without a doubt, the container will increase its penetration on other trade routes than the North Sea as well.

In contrast to the two above-mentioned markets (i.e. Scandinavia and North Sea), the market between North Europe and the Mediterranean is a very difficult market for unaccompanied RoRo transport, due to the very heavy competition from road transport. As a matter of fact, volumes on the North Europe to Mediterranean trade are nowadays not yet sufficient for a cost-effective exploitation of services with a high

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frequency (which is a crucial aspect if one wants to compete head-on with road transport). As a result, services on this trade route are only viable if they enjoy financial support such as under the "Motorways of the Seas" programme of the European Commission.

Finally we have the intra-Mediterranean market, but this market is nowadays more focussed towards RoPax vessels, while trailer transport is only of secondary importance. In the intra-Mediterranean market, UN RORO offers very specific concepts between Italy and Turkey (2 RoRo sailings per day between Trieste and Istanbul).

3.2 RoRo traffic handled in European seaports

Table 30 provides an overview of RoRo traffic handled in a selection of European seaports. The table was drawn from a large Eurostat database containing about 260 ports handling RoRo traffic, for a total throughput of 415 million tons in 2005. However, for the present Report we have limited ourselves to those seaports which handled at least 200,000 tons of RoRo traffic. This resulted in a total ports sample of about 160 individual ports spread across 22 different countries, as shown in Table 30. Their combined RoRo throughput amounted to 407 million tons in 2005, effectively representing 98% of the total RoRo throughput of the 260 ports in the Eurostat database.

As can be seen from Table 30, ports in the United Kingdom handled nearly 100 million tons of RoRo traffic in 2005, i.e. about one quarter of the total RoRo traffic handled in European seaports. Next, with a total traffic of more than 50 million tons, Italy is also a major import/export country for RoRo cargo in Europe, although none of its ports handled more than 8 million tons of RoRo traffic in 2005. Other important players on the European RoRo handling scene are Sweden, Germany, Belgium, Denmark, France, Greece, Spain, the Netherlands, Finland and Ireland, each handling more than 10 million tons in 2005. Between them, these 12 countries handled about 391 million tons of RoRo traffic in 2005, giving them a combined market share of nearly 95%.

On an individual port basis, the biggest RoRo port in Europe is Dover, with a total traffic of more than 20 million tons in 2005. This represents about 5% of the combined RoRo throughput of the 260 ports in the Eurostat database. Other major RoRo ports, handling more than 10 million tons per year, include Calais (France), Zeebrugge (Belgium), Lübeck (Germany), Immingham (UK), Rotterdam (the Netherlands), Trelleborg and Göteborg (Sweden). At the other end of the spectrum, more than 160 European seaports handled less than 1 million tons of RoRo traffic in 2005.

As Table 30 indicates, the Eurostat database makes a distinction between two kinds of RoRo cargo, namely mobile self-propelled units on the one hand and other (non-self-propelled) RoRo cargo on the other. These two categories correspond to Codes 5 and 6, respectively, as defined in Annex II of Council Directive 95/64/EC of 8 December 1995 on statistical returns in respect of carriage of goods and passenger by sea, as modified by Commission Decision 2005/366/EC of March 2005 (see OJ L123 of 17/5/2005 page 5).

The first RoRo category (mobile self-propelled units) includes (1) road goods vehicles and accompanying trailers, (2) passenger cars, motorcycles and accompanying trailers/caravans, (3), passenger buses, (4) trade vehicles (including import/export motor vehicles), (5) live animals on the hoof, and (6) other mobile self-propelled units. The total throughput in the selected European ports amounted to some 243 million tons in 2005. The United Kingdom was by far the market leader with a cargo volume exceeding 50 million tons, followed by Sweden (26.8 million tons), France (22.5 million tons) and Germany (21.4 million tons). On an individual port basis, Dover was by far the biggest port, followed by Calais, Rotterdam, Trelleborg, Lübeck, Rostock and Rodby.

The second RoRo category (non self-propelled cargo) includes (1) unaccompanied road goods trailers and semi-trailers, (2) unaccompanied caravans and other road, agricultural and industrial vehicles, (3) rail wagons, shipborne port-to-port trailers, and shipborne barges engaged in goods transport, and (4) other mobile non-self-propelled units. Here, the total throughput reached about 172 million tons in 2005. The United Kingdom was again by far the market leader with a cargo volume of nearly 50 million tons, followed by Italy (32 million tons), Belgium (20.4 million tons), Germany (15.3 million tons) and Sweden (13.9 million tons). On an individual port basis, Zeebrugge was the biggest port for this type of RoRo cargo, followed by Immingham, Lübeck, London, Göteborg and Genova.

Table 30: Overview of RoRo traffic handled in European seaports (2005)

Port	Self-prop,	Other	RoRo total
Zeebrugge	2,426,461	13,579,949	16,006,410
Oostende	3,827,212	2,360,556	6,187,768
Antwerp	1,893,961	3,484,103	5,378,064
Ghent	75,955	1,007,948	1,083,903
Belgium	**8,223,589**	**20,432,556**	**28,656,145**
Varna	456,369		456,369
Other Bulgarian ports	85,114		85,114
Bulgaria	**541,483**	**0**	**541,483**
Rødby (Færgehavn)	5,240,900		5,240,900
Helsingør (Elsinore)	4,282,510		4,282,510
Århus	1,818,656	1,551,328	3,369,984
Kalundborg	1,859,567	1,131,520	2,991,087
Frederikshavn	2,401,566	243,780	2,645,346
Esbjerg	93,527	1,667,608	1,761,135
Gedser	1,447,100		1,447,100
Hirtshals	1,177,068		1,177,068
Rønne	174,830	208,427	383,257
Københavns Havn	216,939	150,564	367,503
Køge	119,506	182,710	302,216
Aabenraa	:	263,873	263,873
Fredericia (Og Shell)	29,088	181,958	211,046
Denmark	**18,861,257**	**5,581,768**	**24,443,025**
Lübeck	6,062,021	9,650,269	15,712,290
Rostock	5,287,150	1,894,134	7,181,284
Puttgarden	3,734,777		3,734,777
Sassnitz	461,167	2,010,181	2,471,348
Bremerhaven	2,328,577	77,959	2,406,536
Kiel	778,573	761,365	1,539,938
Emden	1,422,066		1,422,066
Cuxhaven	289,484	799,050	1,088,534
Hamburg	371,069	11,373	382,442
Other German ports	644,939	73,516	718,455
Germany	**21,379,823**	**15,277,847**	**36,657,670**
Tallinn	3,099,223	1,637,419	4,736,642
Kunda		828,149	828,149
Pärnu		1,350,663	1,350,663
Vene-Balti		218,778	218,778
Estonia	**3,099,223**	**4,035,009**	**7,134,232**
Dublin	4,255,551	4,107,980	8,363,531
Other Irish ports	2,478,816	974,125	3,452,941
Ireland	**6,734,367**	**5,082,105**	**11,816,472**
Pireus	3,247,269	1,525,330	4,772,599
Patras	2,947,729	612,731	3,560,460
Igoumenitsa	2,745,158	24,339	2,769,497
Antirio	2,242,389		2,242,389
Rio	2,242,389		2,242,389
Heraklio	934,180	962,944	1,897,124
Paloukia Salaminas	1,867,352		1,867,352
Perama	1,867,352		1,867,352
Corfu	630,891	574	631,465
Megara	382,925		382,925
Rhodes	254,573	23,236	277,809
Other Greek ports	260,910	75,785	336,695
Greece	**19,623,117**	**3,224,939**	**22,848,056**
Palma Mallorca	4,601,149	2,603,848	7,204,997
Barcelona	2,707,849	1,145,977	3,853,826
Santa Cruz de Tenerife	376,503	1,291,282	1,667,785
Las Palmas	137,621	1,494,515	1,632,136
Cádiz	83,642	1,411,754	1,495,396
Algeciras	976,474	49,978	1,026,452
Ceuta	307,380	472,876	780,256
Tarragona	593,212	102,218	695,430
Santander	498,525	33,074	531,599
Melilla	133,963	385,235	519,198
Vigo	471,248		471,248
Málaga	79,193	302,274	381,467
Almería	114,927	260,628	375,555
Pasajes	311,016	19,072	330,088
Alicante	12,363	239,348	251,711
Other Spanish ports	129,340	88,304	217,644
Spain	**11,534,405**	**9,900,383**	**21,434,788**
Calais	16,555,458		16,555,458
Marseille	491,717	1,475,319	1,967,036
Cherbourg	1,456,821	759	1,457,580
Caen	1,398,724		1,398,724
Le Havre	1,312,903	174	1,313,077
Dieppe	661,098		661,098
Nantes Saint-Nazaire	203,747	94,144	297,891
Rouen	239,665	754	240,419
Other French ports	149,477	206,265	355,742
France	**22,469,610**	**1,777,415**	**24,247,025**
Genova	753,985	6,582,507	7,336,492
Livorno	1,822,881	4,944,340	6,767,221
Olbia	1,056,584	3,849,479	4,906,063
Trieste	1,372,991	1,832,042	3,205,033
Cagliari	270,085	2,757,512	3,027,597
Palermo	1,065,643	1,689,242	2,754,885
Napoli	1,275,415	1,171,894	2,447,309
Taranto	1,879	2,293,199	2,295,078
Ancona	2,057,855	146,509	2,204,364
Civitavecchia	583,360	1,460,334	2,043,694
Salerno	1,563,162	294,628	1,857,790
Piombino	1,151,119	650,149	1,801,268
Venezia	927,165	583,648	1,510,813
Messina	1,209,373	239,705	1,449,078
Catania	325,149	760,184	1,085,333
Trapani	765,069	176,481	941,550
Bari	858,241	43,611	901,852
Brindisi	773,036	35,752	808,788
Porto Torres	144,013	660,624	804,637
Termini Imerese	43,842	755,599	799,441
Ravenna	9,134	529,494	538,628
Monfalcone	74,294	395,180	469,474
Other Italian ports	740,273	125,640	865,913
Italy	**18,844,548**	**31,977,753**	**50,822,301**

Source: Eurostat

Table 30 (continued)

Port	Self-prop,	Other	RoRo total
Limassol (Lemesos)	118,666	92,044	210,710
Other Cypriotic ports	12,574	281	12,855
Cyprus	**131,240**	**92,325**	**223,565**
Liepaja	437,076	82,762	519,838
Ventspils	512,073	3,345	515,418
Other Latvian ports	57		57
Latvia	**949,206**	**86,107**	**1,035,313**
Klaipeda	847,660	851,567	1,699,227
Lithuania	**847,660**	**851,567**	**1,699,227**
Malta (Valetta)	22,552	181,999	204,551
Other Maltese ports		698	698
Malta	**22,552**	**182,697**	**205,249**
Rotterdam	9,599,793	1,380,999	10,980,792
Scheveningen	3,328,675		3,328,675
Vlissingen	1,735,405		1,735,405
Amsterdam	309,873	14,411	324,284
Other Dutch ports	191,908		191,908
Netherlands	**15,165,654**	**1,395,410**	**16,561,064**
Swinoujscie	2,239,819	489,760	2,729,579
Gdynia	1,022,976	530,024	1,553,000
Other Polish ports	124,916	70,548	195,464
Poland	**3,387,711**	**1,090,332**	**4,478,043**
Setúbal	368,442	3,678	372,120
Other Portuguese ports	71,240	2,794	74,034
Portugal	**439,682**	**6,472**	**446,154**
Romanian ports	22,579	188,683	211,262
Romania	**22,579**	**188,683**	**211,262**
Slovenian ports	20,266	8,380	28,646
Slovenia	**20,266**	**8,380**	**28,646**
Helsinki	2,129,028	2,905,656	5,034,684
Turku	1,388,132	1,456,548	2,844,680
Hanko	949,024	1,342,313	2,291,337
Naantali	1,996,235	80,542	2,076,777
Hamina	22,555	331,616	354,171
Kotka	82,621	188,496	271,117
Uusikaupunki	23,734	210,994	234,728
Vaasa	153,533	66,592	220,125
Other Finnish ports	7,178	90,960	98,138
Finland	**6,752,040**	**6,673,717**	**13,425,757**
Trelleborg	7,554,054	3,003,534	10,557,588
Göteborg	3,248,685	6,948,616	10,197,301
Helsingborg	3,824,864	616,098	4,440,962
Malmö	2,806,163	1,077,756	3,883,919
Stockholm	1,660,304	1,033,197	2,693,501
Kappelskär	2,481,841	101,380	2,583,221
Ystad	1,957,836	501,204	2,459,040
Karlshamn	881,551	279,631	1,161,182
Karlskrona	931,836	32,551	964,387
Nynäshamn (ports)	442,177	252,658	694,835
Varberg	658,788	6,136	664,924
Umeå	217,515	11,375	228,890
Other Swedish ports	105,166	64,013	169,179
Sweden	**26,770,780**	**13,928,149**	**40,698,929**
Dover	20,124,272	540,898	20,665,170
Immingham	1,782,985	10,897,124	12,680,109
London	998,436	7,991,937	8,990,373
Liverpool	2,595,607	3,627,928	6,223,535
Larne	2,830,000	2,599,160	5,429,160
Belfast	1,971,851	2,730,667	4,702,518
Hull	1,151,303	2,751,417	3,902,720
Holyhead	3,088,472	693,987	3,782,459
Portsmouth	2,812,491	910,104	3,722,595
Harwich	1,510,771	2,117,632	3,628,403
Heysham	466,859	2,841,742	3,308,601
Cairnryan	2,186,882	1,087,051	3,273,933
Felixstowe	236,439	2,633,963	2,870,402
Tees & Hartlepool	172,427	2,468,084	2,640,511
Ramsgate	1,618,105	224,371	1,842,476
Fleetwood	563,524	1,071,611	1,635,135
Southampton	1,451,730	99,576	1,551,306
Stranraer	1,046,564	118,538	1,165,102
Milford Haven	535,679	541,047	1,076,726
Ipswich	98,593	968,885	1,067,478
Poole	813,492	226,405	1,039,897
Warrenpoint	87,253	766,250	853,503
Bristol	718,955	123,253	842,208
Tyne	649,766	165,726	815,492
Fishguard	380,015	133,310	513,325
Forth	256,109	217,830	473,939
Medway	396,840		396,840
Aberdeen	24,265	232,018	256,283
Other UK ports	331,979	127,988	459,967
United Kingdom	**50,901,664**	**48,908,502**	**99,810,166**
Split	628,705	534	629,239
Other Croatian ports	49,225	928	50,153
Croatia	**677,930**	**1,462**	**679,392**
Stavanger Ports *	2,039,775	253,661	2,293,436
Haugesund Ports *	1,314,947	37,607	1,352,554
Oslo	534,271	678,690	1,212,961
Porsgrunn Ports *	208,048	352,526	560,574
Larvik	455,376		455,376
Kristiansand S	283,679	105,300	388,979
Sandefjord	298,279		298,279
Other Norwegian ports	287,443	300,908	588,351
Norway	**5,421,818**	**1,728,692**	**7,150,510**
Total all ports	**242,822,204**	**172,432,270**	**415,254,474**

Source: Eurostat

Overview of main developments in the European RoRo market during 2006

Development of the RoRo fleet in 2006

- According to Clarkson Research Services Ltd, the total RoRo fleet (including RoRo/Freight/Passenger vessels, RoRo/LoLo vessels, full-RoRo vessels, ConRo vessels and PC(T)Cs) reached 1673 units at the end of 2006 for a combined capacity of 18.13 million dwt. This represents a 4.8% increase compared to the beginning of the year (1618 vessels for 17.3 million dwt). The combined orderbook for all above-mentioned vessel types at the end of 2006 counted 226 vessels for a combined capacity of some 3.5 million dwt. Only a handful of RoRo vessels were sent to the scrapyards during 2006.

Port/terminal development in Europe (non-exhaustive)

- Despite declaring that its core interests when acquiring Hesse-Noord Natie (HNN) in 2002 were Containers and RoRo traffic, PSA reached an agreement with NYK at the end of 2006 regarding the transfer of the RoRo activities of PSA HNN to NYK. The agreement concerns both the terminal operations (one terminal in Antwerp and two in Zeebrugge) and the PDI activities. The take-over fits in NYK's strategy to develop existing port infrastructure and thus ensure the continuity of maritime vehicle transport. The deal was officially concluded in mid-February 2007 and the new company will operate under the name International Car Operators (ICO). The terminals in Zeebrugge and Antwerp handled a combined volume 1.3 million units in 2006.
- Grimaldi Naples is reportedly looking to strengthen its RoRo terminal activities in the Mediterranean. Existing terminals in Civitavecchia, Monfalcone, Salerno and Valencia are involved, as well as a new facility in Barcelona. Apart from these Mediterreanean terminals, Grimaldi also has stakes in RoRo/multipurpose terminals in Antwerp (Antwerp Euro Terminal, its North European hub) and Hamburg (through an early-2007 acquired 49% stake in HHLA's Unikai terminal).
- DFDS Tor Line switched most of its operations in Immingham (UK) to the Nordic Riverside Terminal at the Immingham Outer Port, for which they have a 25-year exclusive use. Vanuden RoRo reportedly intends to use this terminal as its hub for Scandinavia/Baltic cargo on its RoRo/multipurpose service between Europe and the Eastern Mediterranean.
- Hafen-Entwicklungsgesellschaft Rostock developed the berth 60 on the Warnow quay into a RoRo berth by removing the old container bridges at the site (January-August 2006).
- In April, 2006, CCI Boulogne announced a €20m investment in a new RoRo berth, due into service in June 2007, dedicated to fast jet cargo carriers.
- In early 2006 the ports of Dover and Calais announced plans to cater for major increases in RoPax ferry traffic, estimated at around £200m and €300-400m respectively. Dover handled a record ≥ 2m freight vehicles in 2005. Calais, which accounted for 1.6m heavy-goods vehicles that year, plans to create a new outer port. Apart from catering for more Dover-Calais traffic, the port authority (CCI Calais) wants to diversify and attract new (unaccompanied) RoRo services from Spain, the Baltic, etc. The new development will be directly rail-linked. In 2006 the port of Calais invested effectively in the new facilities and improved the security and safety measures to meet the demands of the ferry operators and their customers. The port achieved a record throughput of 1,847,197 trucks in 2006.
- In the port of Bilbao, vehicle handling company Termicar Bilbao moved to a new site in the Bilbao Outer Abra zone. The new terminal boasts a 900m quay length and two ramps for RoRo vessels. It comprises a 27ha yard and has rail and road connections.
- The Port of Warnemunde commissioned a new passenger terminal in May 2006, complementing the existing Warnemunde Cruise Center.
- Similarly, the port of Sillamae (Estonia) commissioned a new passenger terminal in August 2006.

Other significant developments (non-exhaustive)

- Generally speaking, trailer traffic is expected to increase by some 4-5% per year in the established markets, with even higher growth rates in the emerging markets. According to some observers, this might well lead to orders for 7500+ lanem vessels in the not too distant future. This will obviously have massive implications for port facilities handling them.

Source: Dynamar (2006, 2007), ShipPax Information (2007) and various trade press articles

Overview of main developments in the European RoRo market during 2006 (continued)

Other significant developments (continued)

- Although 2006 saw the contracting of the world's biggest RoPax (2 x 5500 lanem vessels for Stena Line) and cruise vessels (Royal Caribbean's "Genesis" class), shipyards in the Far East currently have such huge order backlogs for other types of tonnage (notably container vessels and dry and liquid bulk carriers) that their interest in building RoPax and cruise vessels has vanished. Moreover, the number of manufacturing locations for large and medium-speed engines (which are crucial to the ferry market) have been reduced to just three, creating a capacity bottleneck. As a result, there is currently a 36-month lead-time between contract signing and vessel delivery in the RoRo segment.
- SeaContainers, the once giant passenger shipping company, was dissolved in 2006. Another victim was Fjord Line, which sold off its UK line to DFDS Seaways. On the other hand, Tallink swallowed Silja Line and Superfast's Baltic activities while Grimaldi took control of Finnlines in late 2006. Similarly, LD Lines tendered successfully for the operation hitherto provided by Transmanche Ferries while the service of the already defunct DANE Sea Lines was acquired by Blue Star Ferries.
- Just like the container industry, the ferry sector aroused an increased interest of risk capitalists and equity funds, casting their eyes on Scandlines, SNCM, Moby Lines and Grandi Navi Veloci. This marks an important change in the history of ferry shipping, where merger and acquisition activity used to take place within the established shipping businesses.
- Norfolkline (at the time still owned by AP Moller-Maersk) and Flota Suardiaz set up the joint venture Norfolkline-Suardiaz BV in early 2006, with the intention to start a Dunkirk-Northern Spain service with 200-trailer capacity RoRo vessels. For this project the European Commission reserved USD 5.1 million of Marco Polo support. Norfolkline already offers RoRo ferry services between the North Continent and the UK, while Flota Suardiaz started a two-vessel RoRo link between Le Havre, Setubal, Casablanca and Santa Cruz de Tenerife.
- Cido Car Carriers commenced a monthly southbound RoRo service from Antwerp and Sheerness to East Africa in July 2006, deploying 3000 CEU vessels.
- Cosco Shipping Company (Coscol) concluded a 15-year contract with no less than 17 Chinese car makers for the carriage of their vehicles worldwide (starting with domestic, Russia, Middle East and Latin America flows). Coscol will substantially invest in a PCC and PCTC fleet expansion.
- At the RoRo 2006 conference in Ghent (May 2006) Stena Line announced that they would soon commission ConRoPax vessels, i.e. a combination of container feeder vessel (250 TEU) and a 2100 lanem RoRo ship with accommodation for 300 passengers.
- The AS Tallink Group acquired from Attica (Greece) the 3 x 30 knot RoPax Ferries SUPERFAST VIII, SUPERFAST IX and SUPERFAST X in early 2006, for a total amount of USD 383 million. The route on which the ships are deployed (Hanko-Paldiski-Rostock) is part of the deal.
- A new Italian domestic RoRo service has been set up between the Port of Augusta, in the south east of Sicily, and the north Adriatic Port of Ravenna in early 2006. Departures will be every four days in each direction. The line has been launched by BMMS Motorway Mediterranean Sea. A chartered vessel, the 193m LOA MAERSK VOYAGER is deployed in the service. The ship has a capacity for approximately 185 unaccompanied trailers and accommodation for up to 12 drivers. Complete vehicles and containers will be accepted, as well as dangerous goods and oversized project cargoes.
- During 2006 the first steps were undertaken to privatise German/Danish Scandlines AG (at that time still 50% Danish Ministry of Transport / 50% Deutsche Bahn owned). In early 2007 two take-over candidates were still in the running, i.e. venture capitalist 3i and Baltic Freight Ferry Development (comprising Allianz Capital and Deutsche Seereederei). It is unclear when the final decision will be taken. Scandlines AG operates 24 ferries on 12 Baltic RoRo services (in the Denmark-Germany-Sweden triangle and to the Baltic countries) and carried just over 1 million lorry units in 2006, a 3.3% increase compared to the year before. The number of rail wagons decreased 12% to 88,000 units. Scandlines also carried about 20 million passengers and 4.2 million cars in 2006.

Source: Dynamar (2006, 2007), ShipPax Information (2007) and various trade press articles

4. The market for conventional general cargo

4.1 Definitions and overview of conventional general cargo commodities

In contrast to the bulk cargo market, where parcel sizes are usually big enough to fill an entire ship (e.g. crude oil, iron ore, coal, grain, etc), the general cargo market deals with the shipment of consignments which are smaller than a ship or hold size. Broadly speaking, the general cargo market can be divided into three subcategories, namely containers, RoRo and conventional general cargo. This latter subcategory, also known as breakbulk, refers to cargo that is normally packed, bundled or unitized but which is not stowed in containers. Examples of breakbulk packaging techniques include (big)bags, bales, cardboard boxes, cases, casks, crates, drums or barrels which can be stowed on pallets or skids. The term "bundled", for its part, is sometimes used to refer to unpacked goods (usually iron and steel items or sawn timber) which are strapped together. Finally, the term "neobulk cargo" is often used for specific kinds of general cargo that is mostly shipped in larger parcels (Dynamar, 2006).

As such, conventional general cargo encompasses a myriad of different commodities. Dynamar (2006) lists no less than 150 of them, divided into a number of larger categories, for example:

- Project cargo: e.g. power generation plants, steel mills, wood pulp factories, gas power plants, roadbuilding equipment, …
- Powerplant equipment: e.g. gas turbines, power generators, transformers, turbines, heavy machinery, industrial equipment, …
- Iron and steel products: e.g. bars, coils, plates, wires, …
- Forest products: i.e. all kinds of wood and paper products
- Parcels: e.g. malt, fertilizer, sugar, rice, …
- Breakbulk shipments of smaller lots

4.2 General overview of the breakbulk market

As observed by Dynamar (2006:8), the first Transatlantic container sailing in 1966 "quickly made it clear that the conventional way of shipping general cargo (or breakbulk) was to become a sunset industry sooner rather than later". Indeed, because of the many logistical advantages it can offer (e.g. fast loading and unloading of vessels, coupled with an easy transfer between vessels and various inland transport modes, enabling door-to-door transport with a low risk of damage to the cargo), the container has been able to swiftly conquer a substantial share of the total general cargo market. This is clearly reflected in the traffic statistics of seaports around the world, which show an increasing container penetration rate (cf. infra). As a result, containerization "has been the death knell for many breakbulk ships and traditional shipping lines" (Dynamar, 2006:14).

However, it has to be admitted that breakbulk shipping has started flourishing again in recent years. In this respect, Dynamar (2006) outlines a number of recent demand drivers behind breakbulk shipping. Firstly, booming economies in the Far East (especially China and India) as well as Brazil, Russia and Southern Africa require huge investments in infrastructure, factories and equipment. Indeed, the unprecedented industrial development of China, following its accession to the WTO in December 2001, has resulted in a massive demand for the construction of power plants and infrastructure projects, including entire seaports. This obviously constitutes a massive driver behind the demand for the shipment of project cargo. The same goes for developing economies which are showing a strong demand for the construction of bridges and roads, hospitals and schools, as well as water and power plants. Emerging East-Asian economies such as Indonesia, the Philippines and Vietnam constitute prime examples of this phenomenon.

A third important factor driving the demand for breakbulk shipping is formed by the worldwide gas and oil exploration/exploitation industries and the development of related petrochemical industries (cf. investments in pipes and drilling/refining equipment), the worldwide mining industry (cf. maintenance/renovation of existing fields or construction of new fields) as well as energy-related equipment and the alternative energy segment (e.g. wind power generating equipment). In this respect, the demand for oil and gas equipment and building materials has been particularly strong in countries in the Middle East in recent years, which is obviously not surprising. However, with certain economies aiming to reduce their oil dependency from the Middle East, rapid developments might be taking place in West Africa in the years to come.

Besides the above-mentioned factors, sudden peaks in breakbulk shipments can also be triggered by natural disasters such as the December 2004 Tsunami in the Bay of Bengal or Hurricane Katrina in New Orleans (August 2005), which both resulted in the requirement to repair or reconstruct a massive amount of infrastructure.

Finally, a major factor affecting the demand for breakbulk shipments is formed by the state of the container market. In periods of low demand, container freight rates might drop to such low levels that it becomes economical to put certain breakbulk commodities (think for example of rice, sugar, forest products, iron or steel items, liquid chemicals, etc.) in bags and put them in containers. In such circumstances, any contribution to the costs of repositioning empty boxes is indeed highly welcomed by shipping lines. As a matter of fact, breakbulk cargoes on the backhaul leg of imbalanced trade routes will always attract the interest of container shipping lines. Indeed, by offering a regular, standardized service at low cost, container shipping lines can attract shippers with backhaul cargo who would normally use tramp shipping (Isemar, 2006). This obviously helps to solve the huge problem originating from the massive trade imbalance on the arterial container trade routes, in particular the Transpacific.

On the other hand, in periods of high demand for container shipments, space on the headhaul trade routes (e.g. Far East-Europe westbound or Far East-US eastbound) is so tight and rates are at such a high level that shipping lines often prefer to return their empty boxes to the loading areas as quickly as possible, where they can immediately be filled with well-paying cargoes for export. As an illustration, Dynamar (2006:18) points out that "in the 2004 peak period, one conventional reefership operator reported an unusual increase of breakbulk cargo offerings for the positioning trips of its vessels".

Although the general cargo market has witnessed an increased container penetration rate in recent years (cf. infra), the volume of breakbulk cargo shipped overseas is still very significant. It is estimated to be in the region of 400-450 million tons per year and could well reach the 500 million ton mark in the not too distant future.

4.3 Ways of shipping breakbulk cargoes

Given the enormous variety of different cargoes involved, it comes as no surprise that there exist several ways in which breakbulk cargoes can be shipped. Broadly speaking, the following ways can be distinguished: conventional liner-type concepts, barge carriers, container ships, forest products carriers, heavy lift and project carriers, conventional reefers hips and RoRo ships. These will be briefly discussed in the following paragraphs. For a more extensive discussion, the reader is referred to Dynamar (2006).

4.3.1 Conventional liner-type concepts

Although the industry certainly needs reliable maritime services for the shipment of breakbulk cargoes, the concept of "weekly fixed-day services", which characterizes today's liner shipping industry[34], is something the deepsea trade of conventional cargo has never really been able to achieve. Instead, the following service/schedule options can be distinguished in the case of breakbulk shipping (Dynamar, 2006:31):

- Services of a certain frequency operated with dedicated ships;
- Services offering sailings within a certain period, deploying trip charters;
- Services operated on inducement, but still within a more or less defined trade lane;
- A mixture of two or three of the above options;
- "Parcelling" (also referred to as "shipping opportunities"), i.e. tramping whereby a vessel is chartered (usually on a trip-out basis) once a specific cargo volume is available.

This segment of breakbulk shipping is dominated by Europe-based carriers such as Rickmers Linie, Chipolbrok, Conti Lines, Cargo Levant, Spliethoff Group, CEC or Beluga Chartering and Shipping. Major non-European players include Arab Lines, IRISL and Bonyad Shipping in the Middle East; Indotrans, Eastern Car Liners, Kyowa Shipping, NYK and Thoresen Thai Agencies Public Company in the Far East; Austral Asia Line and Tasman Orient Lines in Australia/New-Zealand; MUR Shipping in Africa; TBS Shipping Services, Seabord Marine, Intermarine and Associated Transport Line in North America; CCNI, CSAV and Aliança in South America. It is beyond the scope of the present Report to discuss the ship fleet and trading profiles of all these operators in detail. For an excellent overview, the reader is referred to Dynamar (2006).

4.3.2 Barge Carriers

This type of breakbulk shipping basically refers to the situation where a mothership (mostly a propelled floating dock) carries barges loaded with cargo over (long) deepsea distances. When reaching the mothership's port of call, the barges are "launched" from the mothership for the remaining part of their journey, i.e. from anchorage to final destination or vice versa (Dynamar, 2006:39). The barge carrier concept can broadly be divided in two categories, i.e. "Lighter Aboard Ship" (LASH) and "Barge Container Carrier" (BACO).

One of the main reasons for the development of this type of breakbulk shipping was the need to lessen vessels' dependency from port infrastructure and avoid port congestion. Other advantages include fast loading/discharging operations, the possibility of door-to-door shipment and the avoidance of risk associated with cargo handling in the port (Dynamar, 2006:42). Other barge carrier types include Heavy Lift vessels and Naval Auxiliary vessels. Yet two other designs, i.e. the "Barge Catamaran" (BACAT) and "Sea Barge" (SEABEE) are currently no longer in use.

The following breakbulk/neobulk cargoes are often transported in barge carriers: forest products (various types); project, oversized and other cargo (e.g. plant equipment); steel products (various types); and bulk commodities. Nowadays there are only three deepsea trades being served by the barge carrier concept, i.e. North Europe-West Africa, North Europe-US Gulf and US East Coast/Gulf-Middle East. Compared to the other ways of shipping breakbulk commodities, the barge carrier option remains a relatively small activity, although substantial investments are required from the operators involved. Examples of such operators include Forest Lines, Seereederei Baco-Liner, Waterman Steamship Corporation and Murmansk Shipping Company.

4.3.3 Container ships

Some kinds of breakbulk cargoes are carried by cellular container ships, although this is the exception rather than the rule, especially on the headhaul East-West trades and during peak seasons. Breakbulk cargoes carried by container ships usually concern oversized cargo or heavy lift items that do not fit into standard containers. Instead they are secured on special container equipment such as flats and platforms and then lifted onto the ship by a container gantry crane. Another solution includes specially constructed loading platforms on or under deck in combination with platforms or flat racks onto which the cargo is lifted by floating cranes[35]. Finally, breakbulk cargoes can also be lifted on the hatch cover or in the hold on the tank top – a method which is only possible on container ships which are equipped with special 'stoppers' in the cells to that the lowest tier is left free (Dynamar, 2006:44).

4.3.4 Forest product carriers

The forest products cargo segment encompasses a wide variety of wood and paper products, both in raw-material, semi-finished product and finished-product form. Examples include wood chips, wood panels, pulp, sawn timber, plywood, newsprint, paper reels, paper rolls, paperboard, etc. Forest products are nowadays shipped in specialized vessels such as "Open Hatch Gantry Crane" vessels (OHGCs) or "Totally Enclosed Forest Carriers" (TEFCs) which provide protection against harsh weather conditions.

34 However, many container vessels nowadays have troubles meeting their expected times of arrival and respecting their fixed sailing schedules, as discussed in Chapter 2 of this Report.

35 This kind of handling is not very practical on today's large container vessels of 7500+ teu. In fact, handling breakbulk to/from container ships generally hinders the regular container operations and risks extending the vessel's port stay. In addition, out-of-gauge items might lead to the loss of a significant number of teu slots. The trimaran "B&Q" of Dame Ellen MacArthur, for example, consumed no less than 84 teu slots on the CMA CGM BIZET on its voyage from Southampton to China in February 2006 (Dynamar, 2006:44).

The forest products shipping industry is characterized by a limited number of players, such as Gearbulk, Star Shipping, Saga Forest Carriers, Westwood Shipping, Rederi AB Transatlantic, Kent Line or Seaboard International Shipping (Dynamar, 2006:46-47). As far as trade lanes are concerned, well-established exporters of forest products are located in the Pacific-Northwest, Eastern Canada and Scandinavia, although competition is heating up from suppliers in South America (Brazil and Chile), Russia and even China. Major importers of forest products include China and Europe.

Finally, it should be noted that forest products are nowadays increasingly being carried in containers, which is clearly reflected in throughput figures for ports such as Rotterdam, Antwerp, Bristol, Liverpool or Tees (Dynamar, 2006:48). One of the main reasons for the increasing container penetration rate in the forest products sector lies in the fact that, whereas parcel sizes used to be too big to fit into a container in the past, nowadays a first "transformation" of the cargo takes place at the origin location, such that it increasingly loses weight but gains value. This makes it perfectly suitable for supply chains involving regular shipments in containers (Isemar, 2006).

4.3.5 Heavy-lift and project carriers

Operators in this market (e.g. BigLift Shipping, Dockwise, Jumbo Shipping, etc.) generally employ purpose-built ships able to carry very heavy and/or very large cargoes such as (power)plants or factories, powerplant equipment or offshore oil and gas facilities. Loading and discharging of the vessels is done through various methods, including lift on-lift off (LoLo) and roll on-roll off (RoRo). As mentioned in the introduction of this chapter, the greatest demand for specialist heavy lift shipping nowadays arises from the wide range of offshore and petrochemical industry projects (for example in Canada, India, Far Eastern Russia and West Africa) as well as mining activities, factories and power plants in countries such as Australia, China and India. It is again beyond the scope of the present Report to discuss ship fleets and trade routes in detail. The reader is referred to Dynamar (2006) for an extensive overview. Finally it is worth mentioning that, because of increased demand for heavy lift ships able to carry rigs and large offshore constructions, many owners of tanker tonnage are considering the conversion of some of their single-hull vessels into heavy lift ships. This will provide a new life for some tankers which would otherwise have to be phased out due to international double-hull requirements. Frontline, having set aside six 1989-1993 built single-hull vessels for conversion at China's COSCO shipyard group, is a case in point. The vessel conversions consist of the replacement of the existing mid-sized section by a new heavy-lift section (Nightingale, 2007).

Heavy-lift vessels obviously do not operate on fixed routes, but they are attracted to those areas where large investments in the oil and gas industry are made. Nowadays, the main discharge areas are the Middle East, West Africa, Southeast Asia, Australia and the North Sea while loading areas are situated in the Mediterranean, Far East and Australia (Nightingale, 2007).

4.3.6 Conventional reeferships

Conventional reeferships mainly carry high-value foodstuffs that require refrigeration and/or atmosphere control in order to avoid spoilage. Examples of reefer cargoes include fresh and frozen fruit (e.g. bananas, deciduous and other citrus fruits), vegetables, fish, meat, poultry and dairy products. Reefer shipping is a prime example of a one-way (and for some products seasonal) business, i.e. cargoes are mainly exported from the Southern Hemisphere to industrialized countries in the Northern Hemisphere (Dynamar, 2006:52).

Just as is the case for the forest product industry, the reefer shipping sector is increasingly being put under pressure from container shipping. It is estimated that about 50-60% of all reefer trade is nowadays being carried in containers, and this percentage is expected to grow (quickly) in the years to come[36]. Compared to conventional reeferships, reefer containers have the additional advantage that they can also be used to transport non-food cargoes which are temperature-sensitive, such as electronic equipment, photographic film, pharmaceuticals or computer chips (Dynamar, 2006:52).

As far as the operators are concerned, major players in the conventional reefership market include independent operators such as Eastwind Transport, Lavinia Group, NYKLauritzenCool, Seatrade Reefer Group and Star Reefers. Besides these, large fruit companies such as Chiquita (Great White Fleet), Del Monte (Horn Linie), Dole (Dole Fresh Fruit International, Dole Ocean Cargo Express) and Fyffes Plc. of Ireland also play a very important role. For a detailed analysis of these operators and the trade routes in which they are active, the reader is referred to Dynamar (2006).

36 According to Dynamar (2006) the capacity provided by the conventional reefership fleet dropped by an average 1.04% per year between 1998 and early 2006, to arrive at a total figure of 334 million cubic feet. In contrast, the cellular integral reefer capacity of containerships increased by 6.15% per year over the period considered.

4.3.7 RoRo ships

Although mainly aimed at the transport of wheeled cargo, certain RoRo ships are also used to transport breakbulk cargoes on deepsea trade lanes. As far as the ship fleet is concerned, a distinction can be made between four RoRo vessel types (Dynamar, 2006:57): Full RoRo cargo vessels; General cargo ships with (auxiliary) RoRo access; Container vessels with RoRo capacity (so-called ConRos); and Pure Car Carriers (PCCs) and Pure Car and Truck Carriers (PCTCs). As discussed in the previous chapter of this Market Report, RoRo cargo can be either wheeled by itself (i.e. cars, trucks or rolling equipment) or 'mobilised' (i.e. placed on a trailer-type unit and then towed on board). As a matter of fact, RoRo provides the ability to carry a very wide range of cargo, such as cars (of all kinds), trucks and trailers, (agricultural) machinery, mining equipment, roadbuilding equipment, project cargo, forest products, iron and steel, coils, cables, oversized cargo, etc. Advantages of RoRo vessels are the fact that there is no need for dockside cargo handling equipment, and the fact that it enables fast turnaround times for certain cargo types. On the other hand, stowage productivity for RoRo ships is rather low, extensive lashing and securing can be needed (in order to avoid sudden movement of cargo). Last but not least, RoRo vessels are rather expensive.

4.3.8 Other ways of shipping breakbulk cargo

Apart from the 'classic' vessel types listed above, other vessels used to transport breakbulk cargo include small Handysize (up to 32,000 dwt) or Handymax (up to 47,000 dwt) bulk ships.

4.4 Some figures on the general cargo ship fleet

Table 31 provides an overview of the general cargo ship fleet for selected dates. At the first of July 2006 the total fleet reached 98.4m dwt, a 2.4% increase compared to the beginning of 2002. This is significantly lower than the 22.4% increase in the dwt capacity of the world merchant fleet over the period considered. As a result, general cargo ships represented just 10% of the total dwt capacity of the world merchant fleet at mid-2006, whereas this was 12% at the beginning of 2002.

As Table 31 indicates, the dwt capacity of single-deck ships increased significantly since the beginning of 2002, resulting in an increased market share among general cargo ships. At mid-2006 nearly half the dwt capacity of the general cargo ship fleet concerned single-deck ships. On the other hand, the dwt capacity of multi-deck ships decreased significantly over the period considered, obviously resulting in a lower market share. Whereas multi-deck ships accounted for more than 30% of the total general cargo ship fleet at the beginning of 2002, their share decreased to some 26% by mid-2006. The same picture applies to reefer ships and RoRo cargo ships, albeit to a somewhat lesser extent. The biggest fleet growth was registered by Special ships, which enjoyed a 28% increase in dwt capacity, resulting in a 2.5 percentage points increase in market share.

Table 31: Overview of the general cargo ship fleet for selected dates

	01-01-2002 ('000 dwt)	%	01/07/2006 ('000 dwt)	%	Growth
Single-deck ships	42.137	43.8%	47.018	47.8%	11.6%
Multi-deck ships	29,852	31.1%	25,676	26.1%	-14.0%
Reefer ships	7,220	7.5%	6,608	6.7%	-8.5%
Special ships	9,554	9.9%	12,228	12.4%	28.0%
RoRo cargo ships	7,365	7.7%	6,865	7.0%	-6.8%
General cargo ships	**96,128**	**100%**	**98,395**	**100%**	**2.4%**
World merchant fleet	**799,763**		**978.522**		**22.4%**

Source: Institute of Shipping Economics and Logistics (2006)

In view of the above, it is hardly surprising that the general cargo ship fleet is of relatively high age compared to the total world fleet (Table 32). At the beginning of 2006 more than 57% of the general cargo ship fleet (measured in dwt terms) was over 20 years old, while for the total world fleet this was just 27.1%. On the other hand, hardly 22.5% of general cargo ships was under 10 years old at that time, while the corresponding percentage for the world fleet was 45.4%. The average age of the general cargo ship fleet at the beginning of 2006 was 17.5 years, some 5 years older than the average for the total merchant fleet. This is a direct result of the fact that shipping lines have been very reluctant to invest in newbuildings during the last decade, a couple of exceptions notwithstanding. In fact, despite some recent newbuilding projects coupled with delayed scrapping of vessels, the general cargo fleet runs the risk of being faced with an acute capacity

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shortage in the short term. This will obviously translate into higher prices on the charter market. This is not unimportant since, in contrast to container shipping, charter rates make up a large share of the total cost for general cargo ships.

Table 32: Age profile of the general cargo ship fleet versus other ship fleets as at 01/01/2006 (percentage of total dwt)

Vessel type	0-4 years	5-9 years	10-14 years	15-19 years	20+ years	Average age
Oil tankers	31.6%	22.0%	19.7%	12.4%	14.3%	10.0 years
Bulk carriers	19.7%	21.6%	16.6%	10.2%	32.0%	13.1 years
General cargo ships	8.6%	13.9%	10.6%	9.6%	57.4%	17.5 years
Containerships	32.1%	28.3%	17.3%	8.2%	14.0%	9.4 years
Other ships	18.2%	14.5%	11.2%	8.8%	47.3%	15.3 years
World fleet	**24.2%**	**21.2%**	**16.8%**	**10.6%**	**27.1%**	**12.2 years**

Source: UNCTAD (2006)

4.5 Conventional general cargo traffic handled in European seaports

Table 33 provides an overview of conventional general cargo traffic handled in a selection of European seaports. The table was drawn from a large Eurostat database containing about 340 ports, handling a total throughput of 253 million tons of conventional general cargo[37] in 2005. However, just like was the case in the previous chapter, we have limited ourselves to those seaports which handled at least 200,000 tons. This resulted in a total ports sample of about 200 individual ports spread across 23 different countries. Their combined conventional general cargo throughput amounted to 238 million tons in 2005, effectively representing 94% of the total throughput of the 340 ports in the Eurostat database.

Although the total throughput of 253 million tons implies that conventional general cargo is by far the smallest (in tonnage terms) of the five traffic categories discussed in this Market Report, its importance for the port sector should not be underestimated. Compared to the handling of, say, crude oil or the major dry bulks, conventional general cargo is much more labour-intensive and generates a substantially higher value-added per ton.

As can be seen from Table 33, the lion's share of conventional general cargo was handled in ports in Italy, the United Kingdom, Spain, Belgium, the Netherlands, Sweden, Germany, Norway, Finland and France. Between them, these ten countries accounted for 212 million tons of conventional general cargo traffic in 2005. On an individual port basis, Antwerp is by far the market leader with a volume of 17.4 million tons in 2005. This represents about 7% of the combined throughput of the 340 ports in the Eurostat database. Other major conventional general cargo ports, handling more than 5 million tons per year, include Rotterdam, Taranto, Dunkirk and Valencia. Apart from these ports, 24 other ports handled between 2 and 5 million tons of conventional general cargo in 2005. At the other end of the spectrum, more than 200 ports handled less than half a million ton of general cargo traffic.

Generally speaking, the handling of conventional general cargo is confronted with ever-tighter handling space in many seaports in Europe (as more and more square metres are consumed by containers) and, given the strong labour intensity, it is also very sensitive to labour-related issues.

37 Actually, the figures in Table 33 refer to the "Other cargo, not elsewhere specified" figures of the Eurostat database. Hence, the figures exclude dry bulk, liquid bulk, containers and RoRo cargo.

Table 33: Overview of conventional general cargo traffic handled in European seaports (2005)

Port	tons	Port	tons	Port	tons	Port	tons
Antwerp	17,384,429	Marín-Pontevedra	559,441	Szczecin	2,200,674	Karlskrona	223,684
Ghent	4,618,722	Huelva	464,585	Gdynia	1,578,535	Other Swedish ports	409,888
Zeebrugge	1,039,630	Cartagena	444,169	Gdansk	863,555	**Sweden**	**21,536,619**
Oostende	343,385	Gijón	421,401	Swinoujscie	661,783	London	3,308,409
Belgium	**23,386,166**	Cádiz	398,537	Other Polish ports	100	Tees & Hartlepool	2,619,797
Frederiskværk Havn	740,413	Tarragona	389,708	**Poland**	**5,304,647**	Medway	2,493,405
Fredericia (Og Shell-Havnen)	463,310	Alicante	322,164	Aveiro	1,374,830	Newport, Gwent	1,896,850
Vejle	388,316	Santa Cruz de Tenerife	253,452	Vila do Porto	1,371,303	Immingham	1,880,218
Randers	333,948	Villagarcía (de Arosa)	240,407	Setúbal	1,212,411	Aberdeen	1,842,951
Avedøreværkets Havn	283,782	Palma Mallorca	223,127	Leixões	488,559	Hull	1,585,088
Esbjerg	276,772	Other Spanish ports	385,620	Lisboa	439,070	Goole	1,262,576
Århus	252,228	**Spain**	**24,391,237**	Other Portuguese ports	76,826	Forth	1,183,464
Odense	236,725	Dunkerque	5,779,941	**Portugal**	**4,962,999**	Trent River	1,058,294
Aalborg	210,587	Marseille	2,998,569	Constanta	5,012,843	Portsmouth	782,693
Other Danish ports	664,416	Rouen	1,479,753	Galati	966,595	Liverpool	777,031
Denmark	**3,850,497**	La Rochelle	880,221	Other Romanian ports	170,093	Belfast	602,452
Bremen, Blumenthal	4,508,065	Bayonne	627,588	**Romania**	**6,149,531**	Clydeport	590,224
Brake	2,645,544	Nantes Saint-Nazaire	584,943	Koper	992,883	Cardiff	587,191
Hamburg	2,353,475	Boulogne-sur-Mer	407,295	Slovenia	992,883	Warrenpoint	382,419
Wismar	1,977,317	Sète	269,631	Rauma	2,982,065	Boston	375,275
Duisburg, Homberg, Walsum	1,339,339	Other French ports	1,001,819	Kotka	2,280,157	Felixstowe	358,044
Rostock	1,240,499	**France**	**14,029,760**	Hamina	1,764,947	Bristol	349,958
Bremerhaven	1,185,088	Taranto	7,230,846	Kemi	994,052	Tyne	312,595
Emden	884,293	Ravenna	3,741,117	Raahe	795,131	Peterhead	288,631
Nordenham	680,351	Venezia	2,377,480	Helsinki	785,921	Shoreham	266,359
Lübeck	417,388	Livorno	2,326,550	Pori	781,698	Heysham	257,953
Wilhelmshaven	411,384	Monfalcone	2,293,394	Oulu	695,117	Londonderry	231,330
Kiel	328,796	Genova	1,807,931	Hanko	635,659	Poole	227,983
Cuxhaven	226,655	Marina Di Carrara	1,723,434	Loviisa	615,534	Dundee	225,850
Other German ports	157,748	Piombino	1,383,221	Pietarsaari	492,041	Ipswich	222,172
Germany	**18,355,942**	Chioggia	1,026,824	Kokkola	425,028	River Hull & Humber	221,644
Estonian ports	6,853	Porto Nogaro	738,583	Naantali	340,074	Swansea	208,085
Estonia	**6,853**	La Spezia	620,667	Turku	306,808	Other UK ports	1,107,379
Drogheda	362,677	Savona - Vado	447,379	Koverhar	233,890	**United Kingdom**	**27,506,320**
Limerick	326,330	Trieste	275,135	Other Finnish ports	979,172	Rijeka	990,930
Cork	306,210	Brindisi	213,359	**Finland**	**15,107,294**	Other Croatian ports	378,762
Dublin	294,195	Civitavecchia	212,050	Husum	2,100,436	**Croatia**	**1,369,692**
Other Irish ports	148,250	Other Italian ports	2,078,486	Jättersön	1,664,134	Bergen Ports	2,020,096
Ireland	**1,437,662**	**Italy**	**28,496,456**	Halmstad	1,625,532	Drammen Ports	1,791,929
Eleusina	1,447,344	Limassol (Lemesos)	447,652	Piteå	1,587,246	Mo i Rana/Rana	1,636,999
Thessaloniki	1,296,921	Larnaca (Larnaka)	200,685	Norrköping	1,497,537	Kristiansund N/Grip	1,180,196
Volos	1,105,335	Other Cypriotic ports	38,157	Gävle	1,396,624	Haugesund Ports	841,982
Chalkida	771,920	**Cyprus**	**686,494**	Oxelösund (ports)	1,391,800	Verdal/Levanger	838,292
Almyros (Amaliapoli) Volou	326,692	Riga	4,373,132	Sundsvall	1,202,705	Porsgrunn Ports	490,250
Kavala	262,090	Liepaja	1,636,867	Varberg	1,191,034	Måløy	439,596
Larymna	202,720	Ventspils	735,252	Karlshamn	1,139,886	Fredrikstad/Sarpsborg	428,400
Other Greek ports	1,146,449	**Latvia**	**6,745,251**	Norrsundet	1,109,250	Oslo	419,536
Greece	**6,559,471**	Klaipeda	2,262,325	Iggesund	1,098,359	Stavanger Ports	406,699
Valencia	5,664,944	**Lithuania**	**2,262,325**	Skutskär	1,037,740	Larvik	400,122
Bilbao	3,779,335	Maltese ports	175,232	Umeå	998,605	Trondheim/Flakk	305,952
Barcelona	1,760,090	**Malta**	**175,232**	Skellefteå	355,202	Ålesund	291,596
Pasajes	1,750,527	Rotterdam	8,275,914	Uddevalla	347,219	Moss	261,177
Algeciras	1,200,899	Vlissingen	4,140,100	Malmö	343,752	Other Norwegian ports	4,887,255
Avilés	1,033,596	Velsen/Ijmuiden	2,827,924	Köping	288,734	**Norway**	**16,640,077**
La Coruña	1,015,262	Terneuzen	2,263,332	Helsingborg	272,506		
Vigo	909,626	Amsterdam	2,171,216	Västerås	254,746	**Total all ports**	**252,571,216**
Sevilla	709,305	Moerdijk	1,060,248				
Santander	686,534	Delfzijl/Eemshaven	849,692				
Las Palmas	643,249	Dordrecht	419,889				
Castellón	569,462	Other Dutch ports	609,493				
Ferrol	565,797	**Netherlands**	**22,617,808**				

Source: Eurostat

Overview of main developments in the European conventional general cargo market during 2006

Development of the general cargo fleet in 2006

- Despite the fact that many breakbulk cargoes are increasingly being carried by containerships, the multipurpose ship fleet continues to grow. According to Clarkson Research Services Ltd, the total multipurpose ship fleet counted 2583 ships for a combined capacity of 23.57 million dwt at the end of 2006, representing a 3.0% increase compared to the year before. The combined 'container capable capacity' of these vessels reached 1.08 million teu (most vessels can carry less than 500 teu). This is hardly 10% of the overall capacity of the container capable fleet (i.e. including fully cellular boxships). At the end of 2006 the orderbook for multipurpose vessels included 470 ships for a combined 4.59 million dwt, i.e. some 20% of the fleet capacity at that time.
- As far as the reefership fleet is concerned, the total fleet comprised 1237 vessels at the end of 2006 for a combined capacity of 331.24 million cubic feet (7.29 million dwt), a slight contraction compared to the 334.12 million cubic feet (7.35 million dwt) at the end of 2005. The orderbook for reeferships comprised just 15 vessels for 6.63 million cubic feet at the end of 2006.

Port/terminal development in Europe (non-exhaustive)

- DP World will concentrate the vast majority of its breakbulk handling activities in the port of Antwerp at the Churchill dock as from the end of 2007. Its 1800m quay length and 45 hectare facility will be upgraded accordingly, making it one of the largest breakbulk facilities in Europe. Antwerp is the largest port in Europe for conventional general cargo.
- Following increasing demand for breakbulk shipments, Bremen-based BLG Logistics considers expanding its conventional terminal in the Northern German port. Similarly, Rickmers Linie and Conti Lines reportedly consider a move into stevedoring to secure handling capacity.
- Rotterdam-based Broekman Group acquired a 50% share in compatriot multipurpose stevedore Gevelco in 2006. The latter is developing a second covered all weather steel terminal in the Dutch port. At the first facility, Finnish steel producer Ruukki is the largest customer.
- Similarly, Wijngaard Natie is developing a covered all weather terminal in the port of Antwerp. Just like the Gevelco terminals in Rotterdam and the Waterlandse terminal in Amsterdam, the Wijngaard Natie facility will mainly be used for the handling of iron and steel products in intra-Europe shortsea trades.
- Hamburg-based Buss Ports & Logistics Group has announced plans to invest € 2m in a new multipurpose terminal in Stade-Büzfleth on the river Elbe (outside Hamburg) to expand their port handling activities and have capacity for additional bulk and breakbulk business.

Other significant developments (non-exhaustive)

- ESAN Lines (registered in the Netherlands Antilles) started a multipurpose service between North Europe and the Caribbean with chartered-in tonnage of around 5000 dwt in April 2006.
- SolNiver Lines, a joint subsidiary of Swedish Orient Line and Niver Line, exchanged RoRo ships for four multipurpose units for its mainly forest products-oriented service between the Baltic, Northern Europe and the Eastern Mediterranean in May 2006. For wheeled cargo, space is provided by POL-Levant's RoRo service between Scandinavia/Baltic and the Mediterranean.
- IRIS Lines is reportedly considering the expansion of its breakbulk activities, while UASC is mulling to do just the opposite.
- The sale of Forest Lines' HICKORY in late 2006 (reportedly for breaking) apparently indicated the end of the LASH concept. The vessel was deployed on the Transatlantic where she carried agricultural products (e.g. rice), but volumes had dropped significantly following the EU ban on genetically modified agricultural products.
- In the heavy-lift sector, venture capitalist 3i acquired Dutch-based specialist Dockwise Transport BV from previous owners Heerema Group and Wilh. Wilhelmsen for a reported USD 700m in 2006.
- Spurred by increasing demand for heavy-lift shipping, Norway's Frontline decided to convert two single-hull tankers of 140,000-150,000 dwt into heavy-lift ships during 2006. Another four ships might have reportedly been involved as well.

Source: Dynamar (2006, 2007) and various trade press articles

Overview of main developments in the European conventional general cargo market during 2006 (continued)

Other significant developments (continued)

- In the reefer sector, the intended sale of Fresh Delmonte was put on hold in 2006. Reportedly no interested parties could be found with sufficient indemnification for outstanding lawsuits.
- Seatrade Groningen sold 14 of its reefer vessels (with a combined 4.3 million cubic feet capacity) to German KG company Münchmeyer Petersen Capital (MPC) in early 2006. Another eight vessels followed later on. The total estimated price is USD 150 million, including a charter-back of at least four vessels. Seatrade also reportedly acquired four ships (1 million cf capacity) in April/May.
- In August 2006 Star Reefers took delivery of the first of series of four 620,000 cubic feet, 550 teu capacity conventional reefership newbuildings. This was the first order of substance in deepsea reeferships in many years. The vessels will be chartered out to Fyffes International for an initial period of five years.
- In late 2006 Norway's Green Reefers acquired from various owners no less than 20 second-hand mid-sized reefer vessels for a reported USD 180 million.
- In December 2006 J. Lauritzen surprisingly withdrew from owning conventional reeferships altogether. The impact on NYKLauritzenCool, a 50/50 joint venture with NYK, remains unclear.
- In the Caribbean-North Europe fruit trade, established conventional reefership operators such as Dole, Fyffes, Great White Fleet, NYKLauritzenCool and Seatrade have been facing head-on competition from Maersk Line since the beginning of 2007. The Danish carrier deploys 2600 teu boxships with 600 reefer plugs each in a new weekly "CRX" service. The maximum reefer capacity of each ship stands at 1.4 million cubic feet, equivalent to four 350,000 cf conventional reeferships. Ports of call on the CRX include San Juan, Rio Haina, Kingston, Puerto Moin, Manzanillo, Caucedo, Southampton, Zeebrugge, Rotterdam and Algeciras.
- During 2006, Hyundai Merchant Marine's breakbulk division secured monthly shipments of an average 30,000 tons of iron and steel from Antwerp to Changshu in China.
- Universal Africa Line added a 15th multipurpose vessel to its fleet serving the African oil and gas trade from (mainly) North Europe and the US Gulf in late 2006.
- H. Stinnes Linien from Rostock (Germany) started increasing vessel capacity on its SanMex service between North Europe and the Caribbean/Mexico East Coast. When fully upgraded, the service will offer fortnightly sailings between Antwerp, Bremen, Bilbao and Rio Haina, Vera Cruz, Altamira, San Juan and Balboa. The SanMex is probably the only scheduled multipurpose service in this trade.
- Rickmers Reederei reportedly ordered 8 x 24,000 dwt multipurpose ships (dubbed "Superflex Mumbai-max") from an undisclosed Chinese shipyard in early 2007, for delivery as from 2009 onwards. The contract includes an option for four similar ships.
- Greek non-operating owner Restis Group reportedly exited the reefer sector in 2006.

Source: Dynamar (2006, 2007) and various trade press articles

5. The liquid bulk market

5.1 Crude oil production and seaborne liquid bulk trades

As mentioned in the first chapter of this Market Report, the seaborne liquid bulk trade amounted to 2.42 billion tons in 2005, of which 1.86 billion tons crude oil and 0.57 billion tons oil products. Table 34 provides an overview of the world crude oil production for selected years. As this table indicates, OPEC member countries accounted for about 43% of world crude oil production in 2005. This is roughly the same share as in 2000 but significantly up on the 37% market share in 1990. Among the non-OPEC member countries, the most important crude oil producers are the Former USSR (10.94 million barrels per day in 2005), the United States (5.12m barrels), China (3.62m barrels), Norway (2.55m barrels) and the United Kingdom (1.64m barrels). Between them, these five non-OPEC countries produced 23.87 million barrels per day in 2005 or exactly one third of worldwide crude oil production.

Table 34: World crude oil production for selected years ('000 barrels per day)

	1980	1990	2000	2005
Algeria	1,020	784	796	1,352
Indonesia	1,576	1,299	1,273	1,059
Iran	1,467	3,135	3,661	4,092
Iraq	2,646	2,113	2,810	1,913
Kuwait	1,664	859	1,996	2,573
Libya	1,832	1,389	1,347	1,693
Nigeria	2,058	1,727	2,054	2,366
Qatar	471	406	648	766
Saudi Arabia	9,901	6,413	8,095	9,353
UAE	1,702	1,763	2,175	2,378
Venezuela	2,165	2,135	2,891	3,128
Total OPEC	**26,502**	**22,021**	**27,745**	**30,673**
World total	**59,696**	**59,116**	**65,880**	**71,763**
OPEC share	**44.4%**	**37.3%**	**42.1%**	**42.7%**

Source: OPEC (2006)

Whereas OPEC member countries accounted for 42.7% of worldwide crude oil production in 2005, their market share in crude oil exports was 50.9% (Table 35). Other major crude oil exporters in 2005 were located in Eastern Europe (more particularly Russia), Africa (in particular Nigeria, Libya and Algeria) and Latin America (in particular Venezuela and Mexico). The most important crude oil exporters in Western Europe are Norway and the United Kingdom.

Table 35: World crude oil production and exports for selected years ('000 barrels per day)

Production	2000	2005	Exports	2000	2005
North America	7,213	6,480	North America	1,227	1,654
Latin America	9,317	10,207	Latin America	5,054	5,572
Eastern Europe	7,625	11,098	Eastern Europe	4,145	7,531
Western Europe	6,288	4,904	Western Europe	4,960	4,406
Middle East	21,415	22,764	Middle East	16,017	17,186
Africa	6,771	8,857	Africa	5,173	6,478
Asia-Pacific	7,252	7,434	Asia-Pacific	2,266	1,905
Total World	**65,880**	**71,763**	**Total World**	**38,842**	**44,730**
OPEC members	**27,745**	**30,673**	**OPEC members**	**20,527**	**22,774**
OPEC share	**42.1%**	**42.7%**	**OPEC share**	**52.8%**	**50.9%**

Source: OPEC (2006)

An overview of the main loading and unloading areas for crude oil in 2005 is given in Table 36. Not surprisingly, this table illustrates the dominance of Middle Eastern countries, which are included under the 'West Asia' heading[38], as far as loading is concerned. Major unloading regions include North America, Europe, South and East Asia, and Japan.

Table 36: Loading and unloading areas for crude oil in 2005 (million tons)

Area	Loaded	Unloaded	Area	Loaded	Unloaded
North America	22.2	537.70	Caribbean. Central and North America	125.2	35.1
Europe	63.5	438.40	South America North and East	122.4	52.7
Japan	0	215.00	South America West	30.2	15.9
Australia/New-Zealand	11.2	33.10	Subtotal developing countries in America	277.8	103.7
South Africa	0	15.30	West Asia	934.5	9.9
Subtotal DMECs	96.9	1,239.5	South and East Asia	62.2	313.9
Central and Eastern Europe	132.3	10.5	Subtotal developing countries in Asia	996.7	323.8
Socialist countries of Asia	22.2	115.3	Developing countries in Europe	0	7
North Africa	130.2	49.3	Developing countries in Oceania	4.2	0
West Africa	196.3	3.7	Subtotal developing countries	1,605.2	488.2
East Africa	0	0.7			
Subtotal developing countries in Africa	326.5	53.7	**World total**	**1,856.6**	**1,853.5**

Source: UNCTAD (2006)

A similar picture is obtained from Table 37, which depicts the export-import matrix for seaborne crude oil in 2004, the most recent year for which this detailed information is available.

Table 37: Export-Import matrix for seaborne crude oil trade in 2004 (million tons)

From/to	NW Eur.	Medit.	N.Amer.	S.Amer.	Japan	Other Asia	Others	Total
Middle East Gulf	65.8	62.9	130.0	10.6	179.9	352.7	30.3	**832.2**
Near East	0.1	11.0	1.1	0.0	0.0	0.0	0.0	**12.2**
North Africa	14.5	67.9	21.8	4.0	0.3	5.0	1.0	**114.5**
West Africa	5.2	21.2	91.7	9.0	7.6	67.4	3.7	**205.8**
Caribbean	5.0	8.5	189.1	12.5	0.1	6.0	0.3	**221.5**
SE Asia	0.0	0.0	5.3	0.0	10.2	25.3	15.4	**56.2**
North Sea	2.3	8.2	46.4	0.6	0.1	4.1	0.2	**61.9**
Others	88.1	67.2	40.3	14.3	2.2	32.0	5.7	**249.8**
Total	**181.0**	**246.9**	**525.7**	**51.0**	**200.4**	**492.5**	**56.6**	**1,754.1**

Source: Institute of Shipping Economics and Logistics (2006)

Secondly, an overview of the main loading and unloading areas for oil products, which include products such as liquefied natural gas (LNG), liquefied petrol gas (LPG), naphta, gasoline, jet fuel, kerosene, light oil and heavy oil, is given in Table 38. In contrast to the crude oil trade, a significant amount of oil products is loaded in developed market-economy countries. On the other hand, developing countries in Africa represent a relatively small market share. As far as unloading of oil products is concerned, developing market-economy countries have a market share of 50%.

38 To be more precise, West Asia includes Bahrain, Cyprus, Iran, Iraq, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syria, United Arab Emirates and Yemen.

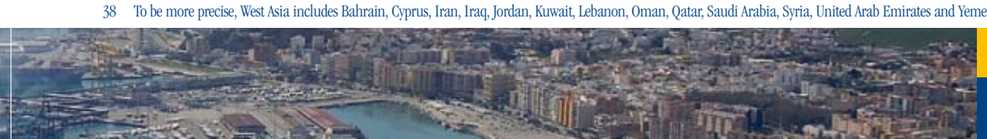


Table 38: Loading and unloading areas for oil products in 2005 (million tons)

Area	Loaded	Unloaded	Area	Loaded	Unloaded
North America	72.9	144.20	Caribbean. Central and North America	43.4	37.8
Europe	41.8	104.50	South America North and East	73	8.6
Japan	4.3	32.50	South America West	2.2	5.9
Australia/New-Zealand	2.8	6.80	Subtotal developing countries in America	118.6	52.3
South Africa	0	0.90	West Asia	113.9	9.3
Subtotal DMECs	121.8	288.9	South and East Asia	109.9	155.5
Central and Eastern Europe	44.9	3.2	Subtotal developing countries in Asia	223.8	164.8
Socialist countries of Asia	16.4	37.7	Developing Countries in Europe	2.3	2.2
North Africa	35.8	7.9	Developing Countries in Oceania	0.1	6.2
West Africa	1.6	4.2	Subtotal developing countries	382.2	242.8
East Africa	0	5.2			
Subtotal developing countries in Africa	37.4	17.3	**World total**	**565.3**	**572.6**

Source: UNCTAD (2006)

5.2 Some key figures on the tanker fleet

Table 39 provides an overview of the tanker fleet for selected dates. At the first of July 2006 the total fleet reached 399.97m dwt, a 20.9% increase compared to the beginning of 2002. This is slightly lower than the 22.4% increase in the dwt capacity of the world merchant fleet over the period considered. As a result, the share of tanker vessel capacity in the world fleet marginally decreased from 41.4% at the beginning of 2002 to 40.9% at mid-2006.

Table 39: Overview of the tanker fleet for selected dates

	01-01-2002		01/07/2006		Growth
	('000 dwt)	%	('000 dwt)	%	
Oil tankers	303,234	91,7%	364,025	91.0%	20.0%
Chemical tankers	8,489	2.6%	10,344	2.6%	21.9%
Liquid gas tankers	18,994	5.7%	25,599	6.4%	34.8%
Total liquid bulk fleet	**330,717**	**100%**	**399,968**	**100%**	**20.9%**
World merchant fleet	**799,763**		**978,522**		**22,4%**

Source: Institute of Shipping Economics and Logistics (2006)

As Table 39 indicates, more than 90% of the dwt capacity of the tanker fleet concerns oil tankers. They registered a 20% increase of their dwt capacity between the beginning of 2002 and mid-2006. A similar percentage increase applies to the chemical tanker fleet. Liquid gas tankers (LNG and LPG), on the other hand, registered a near 35% increase of their dwt capacity over the period considered, resulting in an increasing market share.

Table 40 provides an overview of the tanker fleet divided by dwt range for 01/01/2006. As far as oil tankers are concerned, vessels above 100,000 dwt represent hardly 15% of the total number of ships, but they provide some 65% of the total dwt capacity (the biggest oil tankers afloat measure some 441,000 dwt). On the other hand, all but one chemical tankers are below 50,000 dwt and all liquid gas tankers are in the 0-100,000 dwt range.

Table 40: Breakdown of the tanker fleet by dwt range (as at 01/01/2006)

	Oil tankers			Chemical tankers			Liquid gas tankers		
Dwt range	**ships**	**'000 dwt**	**% dwt**	**ships**	**'000 dwt**	**% dwt**	**ships**	**'000 dwt**	**% dwt**
0 - 9.999	4163	13.324	3.8%	1065	2.831	28.5%	740	2.330	9.6%
10,000 - 19,999	544	8,205	2.3%	136	2,098	21.1%	72	1,066	4.4%
20,000 - 49,999	1323	50,897	14.4%	152	4,911	49.4%	148	5,603	23.1%
50,000 - 69,999	239	14,960	4.2%	0	0	0.0%	104	6,213	25.6%
70,000 - 99,999	404	35,314	10.0%	0	0	0.0%	120	9,016	37.2%
100,000 - 149,999	530	62,041	17.5%	1	103	1.0%	0	0	0.0%
150,000 - 199,999	179	28,353	8.0%	0	0	0.0%	0	0	0.0%
200,000 - 299,999	289	80,784	22.9%	0	0	0.0%	0	0	0.0%
300,000 - 399,999	187	57,487	16.3%	0	0	0.0%	0	0	0.0%
400,000+	5	2,172	0.6%	0	0	0.0%	0	0	0.0%
Total liquid bulk fleet	**7863**	**353,537**	**100%**	**1354**	**9.943**	**100%**	**1184**	**24.228**	**100%**

Source: Institute of Shipping Economics and Logistics (2006)

Finally, Table 41 provides an overview of the total tanker fleet (controlled and registered) by region. As this table indicates, a significant share of the tanker fleet is controlled by European owners. This is especially the case for oil/chemical tankers and product tankers. On the other hand, due to the overwhelming importance of registers like Panama and Liberia in tanker shipping, the regional tonnage distribution shows a stronger concentration on Latin and South America, Asia and Oceania, and Africa when looking at fleet registry.

Table 41: World tanker fleet (controlled and registered) by region as at 01/01/2006 (percentages based on dwt)

		Crude oil tankers	Products tankers	Oil/chemical tankers	Chemical tankers	Liquid gas tankers
Controlled fleet	Europe	40.7%	46.8%	62.0%	34.4%	30.9%
	N.America	9.9%	7.5%	8.1%	11.0%	4.2%
	Lat./S.America	1.4%	5.9%	1.0%	2.8%	1.0%
	Asia/Oceania	43.8%	34.1%	22.8%	43.1%	54.2%
	Africa	0.4%	0.3%	0.8%	2.1%	5.5%
	Unknown	3.7%	5.4%	5.4%	6.6%	4.3%
	Total	**100%**	**100%**	**100%**	**100%**	**100%**
Registered fleet	Europe	22.2%	25.0%	39.4%	21.7%	27.3%
	N.America	1.6%	2.3%	1.3%	2.6%	0.0%
	Lat./S.America	27.6%	22.6%	19.6%	31.5%	31.6%
	Asia/Oceania	34.1%	36.9%	25.3%	26.2%	29.5%
	Africa	14.4%	13.1%	14.4%	18.1%	11.5%
	Total	**100%**	**100%**	**100%**	**100%**	**100%**

Source: Institute of Shipping Economics and Logistics (2006)

5.3 European shipping companies active in the liquid bulk market

Table 42 provides a (non-exhaustive) overview of the main European shipping companies active in the liquid bulk market. As this table indicates, most of these companies are located in Scandinavia, Germany and Greece. Moreover, quite a number of them are also active in the dry bulk (DB) market.

Table 42: Main European shipping companies active in the liquid bulk market

Country	Shipping Company	DB	Country	Shipping Company	DB
Denmark	Torm		France	Fouquet Sacop	
Denmark	Norden	X	France	Green Tankers	
Denmark	Lauritzen	X	France	Broström SAS	
Denmark	Maersk Tankers		Germany	Schulte group	X
Sweden	Fredriksen group	X	Germany	E. Oldendorff	X
Sweden	Broström		Germany	Ernst Jacob	
Sweden	Stena Bulk-Concordia		Germany	Ahrenkiel group	
Norway	Viken		Germany	Chemikalien	
Norway	Eitzen Group	X	Germany	Gaschem	
Norway	KG Jebsen	X	Germany	Essberger-Broere	
Norway	Stolt Nielsen		Germany	Sloman Neptun	
Norway	Odfjell		Germany	Poseidon Schiffahrt	X
Norway	Jo Tankers		Germany	ASP Shipmgt	X
Norway	Knutsen		Greece	GenMar	
Norway	Höegh		Greece	Thenamaris	
UK	Zodiac Maritime	X	Greece	Angelicoussis	X
Italy	Premuda		Greece	Dynacom	
Italy	D'Amico Nav.	X	Greece	Tsakos	
Italy	Bottiglieri	X	Greece	Polembros	X
Italy	Fratelli d'Amato	X	Greece	Gulf Marine	
Italy	Nav. Montanari		Greece	Eastern Med. Mar.	
Belgium	Euronav		Greece	Minerva Marine	
Spain	Elcano	X	Greece	Centrofin Mgt.	
France	Socatra		Greece	Hellespont	
France	Petromarine		Greece	Aeolos	
France	Navale française		Greece	Eletson	

Source: Isemar (2007)

5.4 Liquid bulk cargo handled in European seaports

Table 43 provides an overview of liquid bulk traffic handled in a selection of European seaports. The table was drawn from a large Eurostat database containing about 330 ports, handling a total throughput of 1.58 billion tons of liquid bulk traffic in 2005. However, for the present Report we have limited ourselves to those seaports which handled at least 500,000 tons of liquid bulk traffic. This resulted in a total ports sample of nearly 180 individual ports spread across 24 different countries. Their combined liquid bulk throughput amounted to 1.55 billion tons in 2005, effectively representing 98% of the total liquid bulk throughput of the 330 ports in the Eurostat database.

As can be seen from Table 43, the lion's share of this volume was handled in ports in the United Kingdom, Italy, the Netherlands, France and Spain. Between them, these five countries accounted for 1.03 billion tons of liquid bulk traffic in 2005. On an individual port basis, by far the biggest liquid bulk port in Europe is Rotterdam, handling nearly 170 million tons in 2005. This represents more than 10% of the combined liquid bulk throughput of the 330 ports in the Eurostat database. One of the main reasons for Rotterdam's strong market position is its extremely favourable nautical accessibility for VLCC and ULCC vessels, coupled with its good connections with the major petrochemical clusters in Rotterdam and Antwerp[39]. Other major liquid bulk ports, handling more than 25 million tons per year, include Bergen Ports[40] in Norway, Marseilles and Le Havre (France), Wilhelmshaven (Germany), Tees & Hartlepool, Milford Haven, Forth and Southampton (UK), Antwerp (Belgium), and Trieste and Augusta (Italy). Apart from these ports, 31 other ports handled between 10 and 25 million tons of liquid bulk cargo in 2005. At the other end of the spectrum, no less than 185 ports handled less than 1 million ton of liquid bulk cargo.

39 In 2006 more than 28 million tons of crude oil was transported through the Rotterdam-Antwerp Pipe Line (RAPL).

40 In Tables 43 and 53 of this Market Report, "Bergen Ports" (Norway) includes Bergen, Mongstad, Sture, Ågotnes, Eikefet, Askøy and Modalen. Similarly, "Haugesund Ports" comprises Haugesund, Tysvær, Karmøy/Kårstø, Skudeneshavn and Kopervik. Next, "Porsgrunn Ports" includes Porsgrunn, Rafnes, Herøya, Brevik, Skien, Langesund and Voldsfjorden, while "Stavanger Ports" comprises Stavanger, Sola/Risavik, Forus, Dusavik and Mekjarvik. Finally, "Drammen Ports" includes Drammen, Solumstrand, Tørkopp, Lier, Hurum, Tofte and Svelvik.

Table 43: Overview of liquid bulk traffic handled in European seaports (2005)

Port	tons
Antwerp	36,840,786
Zeebrugge	4,163,457
Ghent	3,339,664
Other Belgian ports	69,735
Belgium	**44,413,642**
Burgas	8,912,930
Varna	788,839
Bulgaria	**9,701,769**
Fredericia (Og Shell-Havnen)	15,188,845
Statoil-Havnen	7,780,532
Københavns Havn	3,137,249
Århus	1,731,271
Aalborg	1,086,053
Esbjerg	552,226
Other Danish Ports	926,044
Denmark	**30,402,220**
Wilhelmshaven	43,644,543
Hamburg	13,067,544
Brunsbüttel	5,476,317
Rostock	2,646,475
Bützfleth	2,317,451
Bremen, Blumenthal	1,643,619
Emden	861,106
Nordenham	685,536
Other German ports	1,260,393
Germany	**71,602,984**
Tallinn	24,413,634
Miiduranna	2,025,245
Vene-Balti	1,021,845
Other Estonian ports	122,444
Estonia	**27,583,168**
Cork	6,546,401
Dublin	4,037,405
Limerick	1,835,645
Bantry Bay	825,458
Other Irish ports	535,095
Ireland	**13,780,004**
Agii Theodori	12,989,894
Megara	8,545,088
Thessaloniki	8,147,900
Eleusina	8,137,036
Perama	841,001
Heraklio	671,206
Rhodes	658,466
Other Greek ports	2,048,436
Greece	**42,039,027**
Algeciras	21,447,343
Cartagena	20,847,760
Bilbao	19,717,492
Tarragona	17,904,143
Huelva	12,936,171
Barcelona	12,202,205
Santa Cruz de Tenerife	9,558,027
Castellón	8,949,177
La Coruña	8,533,773
Las Palmas	4,798,070
Palma Mallorca	2,067,814
Gijón	1,418,468
Valencia	1,380,287
Molina de Segura	1,322,436
Ferrol	822,346
Avilés	740,096
Ceuta	611,011
Other Spanish ports	1,489,563
Spain	**146,746,182**
Marseille	65,688,272
Le Havre	46,824,700
Nantes Saint-Nazaire	23,637,552
Dunkerque	14,849,408
Rouen	10,748,084
Bordeaux	5,361,370
La Rochelle	2,690,687
Bayonne	1,699,189
Sète	1,585,398
Fort-de France (Martinique)	1,432,000
Port-la-Nouvelle	1,421,839
Lorient	1,221,466
Brest	1,121,865
Guadeloupe (Guadeloupe)	764,304
Port Réunion (ex Pointe-des-Galets)	759,608
Other French ports	251,111
France	**180,056,853**
Trieste	35,818,499
Augusta	31,994,840
Santa Panagia	23,254,246
Porto Foxi	22,727,718
Genova	18,287,138
Milazzo	17,480,902
Venezia	13,520,081
Livorno	8,901,205
Gela	7,941,833
Taranto	7,662,316
Savona - Vado	7,646,096
Fiumicino	6,541,600
Napoli	5,833,409
Ravenna	5,303,003
Falconara Marittima	4,893,761
La Spezia	3,575,701
Brindisi	2,814,240
Porto Torres	2,738,915
Civitavecchia	2,441,594
Gaeta	1,944,235
Palermo	1,234,998
Lipari	1,231,125
Portovesme	1,089,976
Vibo Valentia	905,728
Ortona	838,963
Cagliari	603,237
Catania	523,051
Other Italian ports	3,931,391
Italy	**241,679,801**

Source: Eurostat

Table 43: Overview of liquid bulk traffic handled in European seaports (2005) (continued)

Port	tons
Larnaca (Larnaka) Oil Terminal	1,277,913
Vassilico (Vassiliko)	527,630
Other Cypriotic ports	963,082
Cyprus	**2,768,625**
Ventspils	17,660,259
Riga	3,516,307
Liepaja	663,216
Latvia	**21,839,782**
Klaipeda	7,214,523
Butinge	6,126,919
Lithuania	**13,341,442**
Malta (Valetta)	1,090,550
Marsaxlokk	665,123
Malta	**1,755,673**
Rotterdam	167,869,712
Amsterdam	18,846,791
Terneuzen	6,583,085
Vlissingen	3,779,905
Moerdijk	2,093,788
Vlaardingen	1,618,214
Other Dutch ports	1,089,720
Netherlands	**201,881,215**
Gdansk	11,731,621
Gdynia	1,046,743
Szczecin	627,657
Other Polish ports	503,297
Poland	**13,909,318**
Sines	18,552,681
Leixões	7,713,006
Setúbal	1,716,537
Lisboa	1,608,907
Aveiro	536,486
Other Portuguese ports	704,927
Portugal	**30,832,544**
Constanta	13,824,543
Midia	1,314,963
Other Romanian ports	182,591
Romania	**15,322,097**
Koper	2,039,003
Slovenia	**2,039,003**
Sköldvik	17,349,524
Naantali	4,053,655
Hamina	1,703,243
Oulu	1,091,239
Kotka	1,075,660
Kokkola	939,185
Pori	664,298
Kemi	526,055
Other Finnish ports	2,465,252
Finland	**29,868,111**
Göteborg	19,673,855
Brofjorden Preemraff	19,221,261
Stenungsund (Ports)	3,362,723
Malmö	2,943,541
Nynäshamn (ports)	2,302,813
Karlshamn	2,285,702
Norrköping	1,351,987
Gävle	1,320,899
Oxelösund (ports)	1,251,887
Stockholm	1,051,850
Bergs Oljehamn	1,025,949
Helsingborg	740,990
Sundsvall	561,170
Skellefteå	541,849
Västerås	526,032
Other Swedish ports	2,325,563
Sweden	**60,488,071**
Tees & Hartlepool	36,894,324
Milford Haven	36,384,369
Forth	29,100,329
Southampton	28,170,916
Immingham	24,291,746
Sullom Voe	20,492,480
London	20,170,666
Kirkwall	14,372,940
Liverpool	13,148,158
River Hull & Humber	8,637,580
Manchester	5,453,570
Clydeport	3,498,541
Cromarty Firth	3,115,021
Belfast	3,106,938
Medway	2,694,050
Bristol	2,664,831
Hull	2,438,029
Aberdeen	1,995,581
Plymouth	1,314,783
Cardiff	1,263,941
Dundee	662,685
Peterhead	501,369
Other UK ports	2,386,175
United Kingdom	**262,759,022**
Omišalj	7,120,774
Bakar	2,086,893
Split	520,510
Other Croatian ports	720,534
Croatia	**10,448,711**
Bergen Ports	68,981,252
Tønsberg/Slagentangen/Valløy	9,637,771
Haugesund Ports	9,295,468
Porsgrunn Ports	2,856,500
Oslo	1,927,885
Kristiansund N/Grip	1,781,600
Bremanger	1,156,233
Fredrikstad/Sarpsborg	894,089
Stavanger Ports	843,870
Trondheim/Flakk	583,334
Other Norwegian ports	5,603,160
Norway	**103,561,162**
Total all ports	**1,578,820,426**

Source: Eurostat

Overview of main developments in the European liquid bulk market during 2006

Development of the liquid bulk fleet in 2006

- According to Clarkson Research Services Ltd, the world tanker fleet (vessels above 10,000 dwt) comprised 4278 vessels at the end of 2006, for a combined capacity of 363.9 million dwt. This represents an increase of some 6% compared to the end of 2005. At the end of 2006 worldwide tanker orderbooks counted no less than 1662 vessels (of which 511 to be delivered in 2007) for a combined capacity of 141.16 million dwt. This is a massive 39% of the tanker fleet capacity at the end of 2006. Finally, 74 tankers above 10,000 dwt were sent to the scrapyards in 2006, for a combined 2.96 million dwt capacity.
- At the end of 2006, the liquefied petroleum gas (LPG) fleet fleet counted 1034 vessels for 15.30 million cubic metres (11.89 million dwt), a 5.8% increase compared to the end of 2005 (14.66 million cubic metres). At the end of 2006 the LPG orderbook comprised 189 vessels for a combined capacity of 6.90 million cubic metres. This represents some 45% of the fleet capacity at that time.
- At the end of 2006, the liquefied natural gas (LNG) fleet fleet counted 222 vessels for 27.02 million cubic metres (15.03 million dwt), a 16.6% increase compared to the end of 2005 (23.17 million cubic metres). At the end of 2006 the LNG orderbook comprised 138 vessels for a combined capacity of 23.14 million cubic metres. This represents a staggering 86% of the fleet capacity at that time.

Port/terminal development in Europe (non-exhaustive)

- In many European seaports private companies are nowadays investing heavily in an increase of their tank storage capacity. The port of Antwerp is a prime example, with investment projects by such companies as Oiltanking Stolthaven, Vopak, ADPO and LBC. The investments concern both the expansion of existing facilities and the construction of new terminals on both banks of the River Scheldt.
- Similarly, European seaports have also recently witnessed a proliferation of plans and projects for the construction of LNG terminals. Examples include the El Ferrol LNG Terminal in Mugardos (Galicia) and the Sagas Terminal in Sagunto (both with a 300,000 m³ storage capacity), the expansion of the Isle of Grain LNG Terminal in the Medway estuary (comprising an additional 3 x 190,000 m³ storage tanks), a new terminal in Milfordhaven developed by Dragon LNG as well as the South Hook LNG Terminal in the same port, plans for an offshore LNG reception terminal at Teesside ('GasPort'), the offshore regasification Terminal GNL Adriatico in Rovigo, an LNG terminal at Brindisi and plans for an LNG terminal in the port of Gdansk. Moreover, expansion of the Fluxys LNG terminal in Zeebrugge is in the pipeline, as well as new projects for LNG facilities in the port of Rotterdam.

Other significant developments (non-exhaustive)

- In September 2006 Maersk Tankers announced plans to expand its fleet by 14% per year up till 2009 in order to become one of the top-three tanker operators in the world. Its total fleet has grown by close to 9% per year over the last five years. The expansion will include its business both within VLCC crude carriers, product tankers, gas carriers and LNG carriers.
- In December 2006 A.P. Møller-Mærsk A/S and Teekay Shipping Corporation announced an agreement to form Swift Tankers, a pool of Intermediate Product Tankers. The management company, named Swift Tankers Ltd, will provide safe and flexible solutions to customers by offering a large, homogenous fleet of double hull, ice-class Product Tankers of 10,000 to 20,000 dwt. The initial combined fleet comprises more than 20 vessels.

Source: Journal de la Marine Marchande (22/12/2006) and various trade press articles

6. The dry bulk market

6.1 Iron ore and coal production and seaborne dry bulk trades

As mentioned in the first chapter of this Market Report, a total volume 4.69 billion tons of dry cargo was shipped in 2005. This consisted of 1.70 billion tons of the five major bulks (iron ore, coal, grains, bauxite/alumina and rock phosphate), 950 million tons minor dry bulks and 2.04 billion tons other dry cargoes. The latter category mainly refers to containerized cargo and other general cargo, including RoRo.

According to Baffinland Iron Mines Corporation, world production of iron ore reached 1.26 billion tons in 2005, some 4.3% higher than the year before (Table 44). The top-five countries (Brazil, Australia, China, India and Russia) produced nearly 1 billion tons, giving them a combined market share of 79%. A similar picture applies to the export side, where the top-five countries (Australia, Brazil, India, Canada and South Africa) exported 600 million tons of iron ore in 2005, for a combined market share of 84%. Table 44 also illustrates that some 57% of worldwide iron ore production was exported in 2005. Countries such as Canada, Australia, Sweden, Brazil and South Africa put most of their iron ore production on the export market. On the other hand, China, the Ukraine, the United States and Russia used most (if not all) of their iron ore production for domestic purposes. The situation in India was rather balanced, with 55% of iron ore production exported and 45% used for domestic purposes. Baffinland Iron Mines Corporation forecasts a production volume of some 1.65 billion tons of iron ore for 2010.

Table 44: Production and exports of iron ore in 2005 (million tons)

Production	m tons	%	Exports	m tons	%	% of prod.
Brazil	293	23%	Australia	239	34%	91%
Australia	262	21%	Brazil	225	32%	77%
China	198	16%	India	81	11%	55%
India	146	12%	Canada	28	4%	100%
Russia	97	8%	South Africa	27	4%	68%
Ukraine	69	5%	Russia	20	3%	21%
United States	55	4%	Ukraine	20	3%	29%
South Africa	40	3%	Sweden	18	3%	78%
Canada	28	2%	United States	12	2%	22%
Sweden	23	2%	China	0	0%	0%
Others	44	4%	Others	43	6%	
World total	**1,255**	**100%**	**World total**	**713**	**100%**	**57%**

Source: Baffinland Iron Mines Corportation (2006)

The World Coal Institute estimates that global production of hard coal reached 4.97 billion tons in 2005, a 7.4% increase over the year before. The top-10 hard coal producers were China (2.23bn tons), the United States (951m tons), India (398m tons), Australia (301m tons), South Africa (240m tons), Russia (222m tons), Indonesia (140m tons), Poland (98m tons), Kazakhstan (79m tons) and Colombia (61m tons). Hence, these countries accounted for 95% of worldwide hard coal production in 2005. Worldwide consumption of hard coal reached 4.99 billion tons in 2005, of which 63% in the Asia-Pacific region, 19% in North America, 7% in Europe and 6% in the Former Soviet Union. Finally, the total brown coal/lignite production is estimated at 905 million tons in 2005. Major brown coal producers include Germany, the United States, Russia, Greece and Australia.

Tables 45, 46 and 47 depict the import-export matrices for the three main dry bulk categories in 2004, the most recent years for which this detailed information is available.

Table 45: Export-Import matrix for seaborne coal trade in 2004 (million tons)

From/to	UK/Cont.	Mediter.	Other Eur.	S.America	Japan	Other FE	Others	Total
FSU/E.Europe	26.1	18.6	10.2	0.3	9.3	7.1	1.9	73.6
North America	12.9	5.8	4.6	8.2	10.2	9.2	3.5	54.5
Australia	19.3	3.3	6.9	10.3	102.5	59.3	23.4	225.0
South Africa	24.2	7.4	14.4	2.2	0.0	1.3	6.3	56.0
Others	24.2	11.9	10.0	5.1	57.9	107.4	39.5	256.0
Total	**106.7**	**47.1**	**46.1**	**25.7**	**180.0**	**184.5**	**74.6**	**664.7**

Source: Institute of Shipping Economics and Logistics (2006)

Table 46: Export-Import matrix for seaborne iron ore trade in 2004 (million tons)

From/to	UK/Cont.	Mediter.	Other Eur.	US	Japan	China	Other FE	Others	Total
Scandinavia	6.6	0.8	0.9	0.0	0.0	0.7	0.2	6.7	**15.8**
Other Europe	0.5	0.0	0.0	0.0	0.0	0.4	0.9	3.4	**5.2**
West Africa	7.6	0.0	0.7	0.0	0.0	0.0	0.0	2.7	**11.0**
Other Africa	7.2	0.3	3.2	0.0	10.1	17.0	1.6	2.3	**41.7**
North America	12.0	1.3	0.3	0.0	0.9	1.9	2.3	4.5	**23.2**
S.America Atl.	46.2	2.4	8.1	7.5	27.1	54.4	20.9	38.2	**204.8**
S.America Pac.	0.0	0.0	0.0	0.4	4.1	5.7	3.0	0.6	**13.8**
Asia	0.6	0.1	0.0	0.0	21.9	39.8	3.7	2.1	**68.3**
Australia	14.6	1.0	0.5	0.1	76.3	69.6	38.8	5.2	**206.1**
Total	**95.3**	**5.9**	**13.7**	**8.0**	**140.4**	**189.6**	**71.3**	**65.7**	**589.8**

Source: Institute of Shipping Economics and Logistics (2006)

Table 47: Export-Import matrix for seaborne grain trade in 2004 (million tons)

From/to	US	Canada	S.America	Australia	Others	Total
UK/Continent	2.8	0.7	6.0	0.0	0.3	**9.8**
Mediterranean	4.0	1.7	6.1	0.7	3.5	**16.0**
East Europe	0.6	0.0	0.6	0.0	3.5	**4.8**
Other Europe	0.4	0.1	2.2	0.0	0.4	**3.1**
Africa	14.6	2.2	7.4	3.8	12.0	**40.1**
Americas	26.5	3.2	7.8	0.2	0.2	**37.9**
Near East	3.6	0.0	1.0	0.1	2.9	**7.6**
Indian Ocean	2.1	0.8	4.7	6.7	5.0	**19.2**
Japan	22.8	1.7	0.8	2.7	0.7	**28.6**
Other Far East	30.1	5.2	16.4	9.9	6.7	**68.4**
Not specified	0.0	0.0	0.0	0.5	0.0	**0.5**
Total	**107.6**	**15.7**	**53.0**	**24.6**	**35.1**	**236.0**

Source: Institute of Shipping Economics and Logistics (2006)

Table 48 provides an overview of the main dry cargo (all categories combined) loading and unloading areas in 2005. On the loading and unloading side, developed market-economy countries accounted for more than half of total trade.

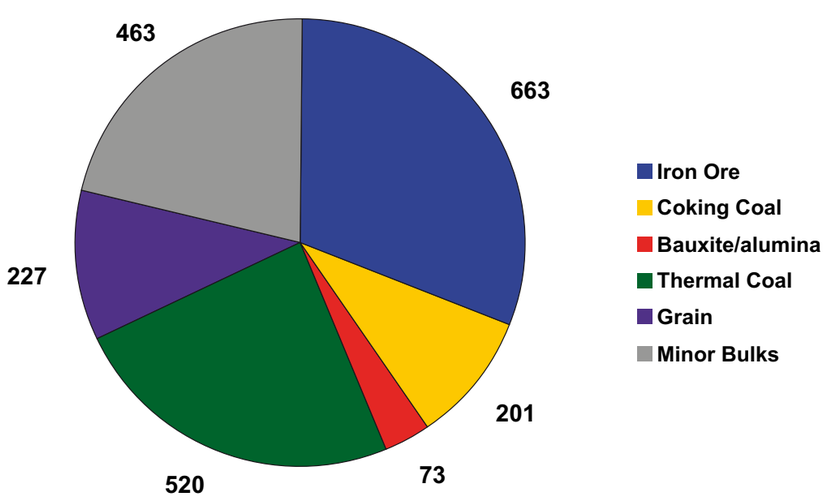
Table 48: Loading and unloading areas for dry cargo in 2005

Area	Loaded	Unloaded	Area	Loaded	Unloaded
North America	502.8	442.20	Caribbean. Central and North America	65.3	86.1
Europe	1,065.1	1,514.90	South America North and East	392.6	91.7
Japan	185.5	584.70	South America West	119.9	34.6
Australia/New-Zealand	604.4	47.90	Subtotal developing countries in America	577.8	212.4
South Africa	171.6	23.50	West Asia	72.7	140.6
Subtotal DMECs	2,529.4	2,613.2	South and East Asia	761.7	914.9
Central and Eastern Europe	181	67.4	Subtotal developing countries in Asia	834.4	1,055.5
Socialist countries of Asia	478.4	583.9	Developing Countries in Europe	16.9	11.1
North Africa	38	84.3	Developing Countries in Oceania	2.1	5.5
West Africa	19.6	42.1	Subtotal developing countries	1,498.1	1,431.4
East Africa	9.3	20.5			
Subtotal developing countries in Africa	66.9	146.9	**World total**	**4,686.9**	**4,695.9**

Source: UNCTAD (2006)

Finally, Figure 5 provides an overview of the dry bulk seaborne trade in 2006. Total trade amounted to some 2.15 billion tons, of which iron ore (31%), thermal coal (24%) and minor bulks (22%) represented the lion's share. Figure 5 also clearly illustrates the importance of the steel industry for dry bulk shipping: iron ore, coking coal and bauxite/alumina represented a combined volume of 937 million tons or nearly 44% of the total dry bulk seaborne trade in 2006. In addition, (semi-) finished steel products (which indeed classify as general cargo rather than dry bulk) represented a total volume of 218 million tons of seaborne trade in 2006.

Figure 5: World dry bulk seaborne trade in 2006 (million tons)



Source: own representation based on Barry Rogliano Salles data

According to the International Iron and Steel Institute, the production of crude steel reached an estimated 1.22 billion tons in 2006, an increase of some 8% compared to the year before. The top-10 crude steel producers were China (421m tons), Japan (116m tons), the United States (99m tons), Russia (71m tons), South Korea (48m tons), Germany (47m tons), India (43m tons), Ukraine (41m tons), Italy (32m tons) and Brazil (31m tons). Hence, these countries accounted for three quarters of worldwide crude steel production in 2006. Baffinland Iron Mines Corporation forecasts a further increase in world crude steel production to some 1.46 billion tons in 2010.

China is a particular case in point as far as crude steel is concerned. Until 2004 the country was a net importer of crude steel, but following massive increases in production in 2005 (+24.6%) and 2006 (+18.5%) the balance has shifted. According to French broker Barry Rogliano Salles, the gap between production and consumption of crude steel in China amounted to some 36 million tons in 2006 and it is expected to widen further to some 140 million tons in 2010. Having said this, however, Chinese consumption of crude steel is still very substantial. Of the estimated total world crude steel consumption of 1.13 billion tons in 2005, China accounted for 350m tons (31%), followed by the United States (113m tons), Japan (83m tons), South Korean (49m tons), India (41m tons) and Germany (39m tons). Hence, these six countries accounted for some 60% of world crude steel consumption in 2005.

6.2 Some key figures on the dry bulk fleet

Table 49 provides an overview of the dry bulk fleet for selected dates. At the first of July 2006 the total fleet reached 353.62m dwt, a 21.4% increase compared to the beginning of 2002. This is slightly lower than the 22.4% increase in the dwt capacity of the world merchant fleet over the period considered. As a result, the share of dry bulk vessel capacity in the world fleet marginally decreased from 36.4% at the beginning of 2002 to 36.1% at mid-2006.

Table 49: Overview of the dry bulk fleet for selected dates

	01-01-2002		01/07/2006		Growth
	('000 dwt)	%	('000 dwt)	%	
Bulk carriers	277,067	95.2%	346,412	98.0%	25.0%
Oil/bulk/ore carriers (OBO)	14,108	4.8%	7,211	2.0%	-48.9%
Total dry bulk fleet	**291,175**	**100%**	**353,623**	**100%**	**21.4%**
World merchant fleet	**799,763**		**978.522**		**22.4%**

Source: Institute of Shipping Economics and Logistics (2006)

Table 50 provides an overview of the dry bulk fleet divided by dwt range for 01/01/2006. As far as bulk carriers are concerned, nearly 65% of dwt capacity is provided by vessels in the 20,000-99,999 dwt range. Vessels above 100,000 dwt represent hardly 10% of the total number of ships, but they provide some 33% of the dwt capacity. Secondly, the oil/bulk/ore vessels are heavily concentrated in the 70,000-149,999 dwt range, with only two vessels being bigger than 200,000 dwt.

Table 50: Breakdown of the dry bulk fleet by dwt range (as at 01/01/2006)

	Bulk carriers			Oil/bulk/ore carriers		
Dwt range	ships	'000 dwt	% dwt	ships	'000 dwt	% dwt
0 - 9.999	877	2.883	0.9%	47	156	1.9%
10,000 - 19,999	499	7,858	2.4%	3	43	0.5%
20,000 - 49,999	2722	93,871	28.1%	8	359	4.4%
50,000 - 69,999	888	52,941	15.9%	12	706	8.7%
70,000 - 99,999	842	63,519	19.0%	43	3,553	43.9%
100,000 - 149,999	153	21,412	6.4%	18	2,021	25.0%
150,000 - 199,999	441	74,833	22.4%	4	638	7.9%
200,000 - 299,999	66	14,360	4.3%	0	0	0.0%
300,000 - 399,999	6	1,954	0.6%	2	612	7.6%
400,000+	0	0	0.0%	0	0	0.0%
Total dry bulk fleet	**6494**	**333,631**	**100%**	**137**	**8.088**	**100%**

Source: Institute of Shipping Economics and Logistics (2006)

Finally, Table 51 provides an overview of the total dry bulk fleet (controlled and registered) by region. As this table indicates, more than 90% of the dry bulk fleet is controlled by owners in Asia/Oceania and Europe. On the other hand, just like was the case for the tanker fleet, the regional tonnage distribution according to the flag of registry shows a strong concentration on Latin and South America.

Table 51: World dry bulk fleet (controlled and registered) by region as at 01/01/2006 (percentages based on dwt)

		million dwt	Share
Controlled fleet	Europe	129.5	37.9%
	North America	7.2	2.1%
	Latin and South America	3.3	1.0%
	Asia and Oceania	180.3	52.8%
	Africa	0.9	0.3%
	Unknown	20.1	5.9%
	Total	**341.3**	**100%**
Registered fleet	Europe	60.2	17.6%
	North America	0.7	0.2%
	Latin and South America	135.7	39.8%
	Asia and Oceania	123.8	36.3%
	Africa	20.8	6.1%
	Total	**341.3**	**100%**

Source: Institute of Shipping Economics and Logistics (2006)

6.3 European shipping companies active in the dry bulk market

Table 52 provides a (non-exhaustive) overview of the main European shipping companies active in the dry bulk market. Just like with the liquid bulk market, the lion's share of these companies are located in Scandinavia, Germany and Greece. Moreover, quite a number of them are also active in the liquid bulk (LB) market.

Table 52: Main European shipping companies active in the dry bulk market

Country	Shipping Company	LB	Country	Shipping Company	LB
Denmark	Norden	X	Spain	Elcano	X
Denmark	Lauritzen	X	France	Louis Dreyfus Arm.	
Sweden	Fredriksen group	X	France	Setaf Saget	
Norway	Western Bulk		Germany	Schulte group	X
Norway	Eitzen Group	X	Germany	E. Oldendorff	X
Norway	KG Jebsen	X	Germany	Orion Bulkers	
Norway	Torvald Klaveness		Germany	Aug. Bolten	
Norway	Grieg-Star Shipping		Germany	Peter Döhle	
Norway	Spar Shipping		Germany	Vogemann	
UK	Zodiac Maritime	X	Germany	Poseidon Schiffahrt	X
UK	Graig group		Germany	ASP Shipmgt	X
UK	Nordbulk		Greece	Angelicoussis	X
Italy	Coeclerici Ceres		Greece	Polembros	X
Italy	Premuda	X	Greece	Enterprises shipping	
Italy	D'Amico Nav.	X	Greece	Marmaras Nav.	
Italy	Bottiglieri	X	Greece	Golden Union	
Italy	Fratelli d'Amato		Greece	Carras Hellas	
Belgium	CMB				

Source: Isemar (2007)

6.4 Dry bulk cargo handled in European seaports

Table 53 provides an overview of dry bulk traffic handled in a selection of European seaports. The table was drawn from a large Eurostat database containing about 350 ports, handling a total throughput of 977 million tons of dry bulk in 2005. However, for the present Report we have limited ourselves to those seaports which handled at least 500,000 tons of dry bulk traffic. This resulted in a total ports sample of about 230 individual ports spread across 24 different countries. Their combined dry bulk throughput amounted to 944 million tons in 2005, effectively representing 97% of the total throughput of the 350 ports in the Eurostat database.

As can be seen from Table 53, the lion's share of this volume was handled in ports in the Netherlands, the United Kingdom, Spain, Italy and France. Between them, these five countries accounted for 564 million tons of dry bulk traffic in 2005. On an individual port basis, by far the biggest dry bulk port is Rotterdam, handling nearly 88 million tons of dry bulk traffic in 2005. This represents 9% of the combined dry bulk throughput of the 350 ports in the Eurostat database. Just as is the case for the liquid bulk market, Rotterdam owes its strong market position to its excellent nautical accessibility (it can receive dry bulk carriers of 300,000 dwt or more), coupled with very good links with major consumption centres in the hinterland (especially the German Ruhr area). Other major dry bulk ports, handling more than 25 million tons per year, include Hamburg (Germany), Antwerp (Belgium), Dunkirk (France), Taranto (Italy) and Amsterdam (Netherlands). Apart from these ports, 15 other ports handled between 10 and 25 million tons of dry bulk cargo in 2005. At the other end of the spectrum, more than 185 ports handled less than 1 million ton of dry bulk cargo.

Table 53: Overview of dry bulk handled in European seaports (2005)

Port	tons
Antwerp	26,684,613
Ghent	13,054,649
Zeebrugge	1,718,655
Oostende	991,903
Belgium	**42,449,820**
Varna	7,373,893
Burgas	3,008,167
Bulgaria	**10,382,060**
Enstedværkets Havn	3,501,770
Aalborg Portland	2,906,083
Århus	2,852,271
Københavns Havn	2,071,110
Odense	2,045,933
Asnæsværkets Havn	1,273,502
Esbjerg	1,081,997
Fredericia (Og Shell-Havnen)	1,031,794
Aalborg	956,893
Aabenraa	917,038
Kolding	899,228
Rønne	886,485
Randers	883,130
Køge	848,680
Studstrupværkets Havn	784,281
Norjyllandsværkets Havn	657,111
Stigsnæsværkets Havn	551,134
Other Danish ports	1,660,021
Denmark	**25,808,461**
Hamburg	27,011,709
Bremen, Blumenthal	6,450,257
Rostock	6,070,366
Bützfleth	2,660,582
Nordenham	2,402,055
Brake	2,169,433
Wilhelmshaven	1,902,812
Wismar	1,715,976
Brunsbüttel	1,100,480
Lübeck	969,895
Kiel	739,202
Flensburg	551,921
Other German ports	1,195,886
Germany	**54,940,574**
Tallinn	6,975,427
Other Estonian ports	660,677
Estonia	**7,636,104**
Limerick	9,140,956
Dublin	1,904,046
Cork	1,572,570
Waterford	804,438
New Ross	603,558
Other Irish ports	678,395
Ireland	**14,703,963**
Volos	7,936,157
Larymna	4,296,759
Thessaloniki	3,395,929
Aliverio	3,291,121
Eleusina	2,969,907
Milos Island	2,889,663
Almyros (Amaliapoli) Volou	2,506,300
Chalkida	1,628,890
Itea	1,405,638
Antikyra	1,296,946
Politika (074)	1,205,320
Rio	1,134,524
Kavala	1,067,136
Heraklio	824,489
Nafplio	657,636
Igoumenitsa	652,925
Other Greek ports	947,947
Greece	**38,107,287**
Gijón	19,663,187
Tarragona	11,915,749
Ferrol	8,289,625
Huelva	7,530,686
Valencia	6,360,690
Almería	6,306,756
Santander	5,139,651
Cartagena	5,027,915
La Coruña	4,437,796
Bilbao	4,261,135
Barcelona	3,532,003
Castellón	3,293,592
Pasajes	3,273,904
Avilés	3,082,737
Sevilla	2,813,380
Algeciras	2,652,267
Cádiz	2,557,444
Palma Mallorca	2,389,763
Málaga	2,100,472
Santa Cruz de Tenerife	1,892,082
Las Palmas	1,785,378
Alicante	1,667,539
Molina de Segura	1,234,823
Marín-Pontevedra	1,016,240
Vigo	692,535
Villagarcía (de Arosa)	578,413
Other Spanish ports	155,656
Spain	**113,651,418**
Dunkerque	26,314,341
Marseille	15,363,075
Nantes Saint-Nazaire	8,348,756
Rouen	8,040,885
Le Havre	4,848,293
La Rochelle	3,266,933
Bordeaux	2,648,341
Sète	1,768,116
Bayonne	1,569,330
Lorient	1,455,032
Port Réunion (ex Pointe-des-Galets)	1,290,686
Brest	1,041,243
Calais	827,004
Port-la-Nouvelle	749,859
Guadeloupe (Guadeloupe)	723,138
Caen	592,521
Other French ports	1,132,204
France	**79,979,757**
Taranto	25,453,936
Ravenna	12,962,076
Venezia	11,224,317
Brindisi	6,339,720
Portovesme	4,514,519
Savona - Vado	4,467,391
Piombino	4,375,254
Genova	3,551,330
Porto Torres	2,179,487
Trieste	2,130,276
La Spezia	1,853,761
Ancona	1,548,162
Chioggia	1,537,450
Oristano	1,502,718
Bari	1,258,013
Livorno	1,235,020
Monfalcone	1,060,197
Napoli	1,036,517
Civitavecchia	1,025,408
Marina Di Carrara	1,015,161
Porto Empedocle	936,783
Augusta	896,868
Pozzallo	853,816
Manfredonia	811,342
Barletta	801,491
Salerno	761,102
Gaeta	604,005
Porto Nogaro	500,279
Other Italian ports	2,885,393
Italy	**99,321,792**

Source: Eurostat

Table 53 (continued)

Port	tons
Vassilico (Vassiliko)	633,108
Other Cypriotic ports	810,226
Cyprus	**1,443,334**
Riga	14,938,364
Ventspils	10,439,641
Liepaja	1,680,318
Latvia	27,058,323
Klaipeda	7,462,926
Lithuania	7,462,926
Malta (Valetta)	677,411
Other Maltese ports	2,262
Malta	**679,673**
Rotterdam	87,694,773
Amsterdam	25,107,777
Velsen/Ijmuiden	18,666,451
Vlissingen	5,294,507
Terneuzen	3,742,709
Delfzijl/Eemshaven	1,602,575
Dordrecht	1,498,989
Moerdijk	917,123
Vlaardingen	801,757
Harlingen	771,703
Other Dutch ports	128,114
Netherlands	**146,226,478**
Gdansk	9,273,949
Swinoujscie	6,666,268
Szczecin	5,042,718
Gdynia	3,416,231
Police	2,086,060
Poland	**26,485,226**
Sines	5,801,572
Lisboa	5,203,093
Setúbal	3,224,270
Leixões	2,301,129
Aveiro	1,416,233
Other Portuguese ports	484,148
Portugal	**18,430,445**
Constanta	18,103,190
Other Romanian ports	661,268
Romania	**18,764,458**
Koper	7,731,876
Slovenia	**7,731,876**
Raahe	4,731,628
Kokkola	2,709,032
Pori	2,241,155
Kotka	1,927,939
Rauma	1,517,683
Inkoo	1,256,830
Koverhar	1,129,189
Helsinki	959,823
Parainen	886,985
Naantali	883,877
Uusikaupunki	811,360
Kemi	772,516
Pietarsaari	730,546
Other Finnish ports	3,124,832
Finland	**23,683,395**
Luleå	7,135,761
Oxelösund (ports)	4,211,861
Karlshamn	2,699,808
Storugns	2,503,999
Slite (ports)	2,317,922
Stockholm	1,022,408
Köping	991,615
Skellefteå	989,047
Norrköping	873,247
Halmstad	812,336
Västerås	721,196
Malmö	597,861
Uddevalla	571,599
Helsingborg	500,756
Other Swedish ports	1,801,779
Sweden	**27,751,195**
Immingham	20,735,227
London	15,002,694
Tees & Hartlepool	12,401,973
Clydeport	11,281,993
Liverpool	8,891,227
Port Talbot	8,569,720
Bristol	6,415,974
Medway	5,471,213
Glensanda	5,438,705
Hull	3,784,965
Belfast	3,444,407
Southampton	2,234,526
Newport, Gwent	2,072,789
Tyne	1,920,976
Ipswich	1,817,462
Manchester	1,658,800
Forth	1,650,822
Shoreham	1,382,108
Fowey	1,270,154
River Hull & Humber	983,447
Ballylumford	976,836
Trent River	861,106
Plymouth	832,969
Newhaven	659,216
Londonderry	655,932
Other UK ports	5,046,796
United Kingdom	**125,462,037**
Bakar	2,242,427
Ploce	2,196,708
Split	1,362,296
Pula	807,247
Rabac	726,424
Rijeka	512,835
Other Croatian ports	1,190
Croatia	7,849,127
Narvik	15,921,615
Porsgrunn Ports	5,589,901
Bergen Ports	2,575,692
Haugesund Ports	2,554,026
Brønnøy	1,931,784
Kristiansund N/Grip	1,852,343
Mo i Rana/Rana	1,798,880
Oslo	1,329,626
Fredrikstad/Sarpsborg	1,281,702
Stavanger Ports	1,248,499
Drammen Ports	1,044,766
Verdal/Levanger	793,962
Trondheim/Flakk	685,347
Kristiansand S	586,807
Moss	571,880
Other Norwegian ports	11,244,799
Norway	**51,011,629**
Total all ports	**977,021,358**

Source: Eurostat

Overview of main developments in the European dry bulk market during 2006

Development of the bulk carrier fleet in 2006

- According to Clarkson Research Services Ltd, the world bulk carrier fleet counted 6369 units at the end of 2006, for a combined capacity of 367.9 million dwt. This represents an increase of some 7% compared to the year before. At the end of 2006 worldwide orderbooks counted no less than 1138 bulk carriers (of which 354 to be delivered in 2007) for a combined capacity of 89.42 million dwt. This is some 24% of the bulk carrier fleet capacity at the end of 2006. Finally, 49 bulk carriers were sent to the scrapyards in 2006, for a combined 1.87 million dwt capacity.

Port/terminal development in Europe (non-exhaustive)

- A new facility at OBA Bulk Terminal Amsterdam, one of Europe's largest bulk terminals, consisting of a 365m quay and a 10 ha storage and handling area, opened in October 2006. This will give the terminal an annual throughput capacity of 4m tons. Further development will include two Capesize quays and an additional 20-25ha of storage area. This year, LBH is going to build an indented berth, 400m long and 80m wide, for barges. When these projects are completed, Amsterdam's coal handling facilities will have been expanded from 85ha to 115ha.
- The Port of Immingham's £59.5 m dedicated coal-handling facility, Humber International Terminal 2 (HIT 2), was officially opened in May 2006. HIT 2 is located close to six of Britain's largest power stations. It was developed to meet the power-generation industry's escalating demand for coal. The terminal can handle an estimated 9.5m tons of coal each year. In August 2006 the facility handled a record-breaking total of 1.095m tons, of which 1.022m tons was coal. HIT 2 extends Humber International Terminal's total quay length by 220m, giving a total of 520m, and can accommodate vessels carrying more than 100,000 tons of cargo.
- In August 2006, Associated British Ports (ABP) announced to invest £3.7m in two new Gottwald cranes for Humber International Terminal 1, the dedicated dry bulk handling terminal at the port of Immingham.
- Following the signing of a new 20-year agreement with Solent Stevedores, ABP is investing £4.1m in upgrading the handling and storage facilities at Southampton's Bulk Terminal. The investment comprises £1.6m earmarked for a new mobile harbour crane, and £2.5m for a new multi-purpose transit shed, which will be completed in 2007. ABP has also invested over £700,000 on upgrading the handling equipment in Ayr.
- In addition to ABP's investment, Solent Stevedores has spent approximately £350,000 on shore-side equipment in the port of Southampton in 2006, with additional investments of £250,000 planned for 2007 and 2008. A new high-capacity screw-type ship unloader has been commissioned at the Seaforth Grain Terminal, which enables bulk carriers of up to 75,000dwt to be discharged at the terminal with unloading capacities of up to 1,800 tons per hour.
- Workington, the largest port in Cumbria, has invested over £8m in the latest phase of developments at Battleship Wharf with new carnage already in place capable of discharging over 10,000 tons of cargo per day. The port opened a new rail link in September in 2006 with a quay extension due for completion by the end of the year. The port is investing approximately £7.8m in the upgrade of its main bulk terminal, Battleship Wharf. It is to construct a 155m quay extension, build a rail link, improve site infrastructure and upgrade support vehicles. This is in addition to the new 100 ton capacity harbour crane that was purchased earlier 2006. This is the biggest investment by the port in decades and has been implemented to cope with the increasing bulk trades being handled at the port.
- ABP's port of Teignmouth took an important step forward when the Western Quays was officially opened during August 2006. The Western Quays is the product of a £5m investment by ABP and represents a huge enhancement of the port's cargo-handling facilities.
- A number of new developments were completed at Dunkirk's multibulk facilities in the central area of the port. The Vracs du Nord cement terminal that exports ground slag produced by the new crushing plant of Ciment des Flandres, and the Dunkerque Multibulk Terminal, which has facilities for handling and storing under cover of powdered bulk products, were both completed in 2006.

Source: International Bulk Journal and various trade press articles

Overview of main developments in the European dry bulk market during 2006 (continued)

Other significant developments (non-exhaustive)

- The containerization of bulks is a rapidly developing sector. As an example, it has now become cheaper to move barley and other grains in containers to Asia than using Panamax Bulk carriers. Port logistics and terminal operator Société Havraise de Gestion et de Transport (SHGT) has recently invested € 2m in developing a system to put sugar in containers in the port of Le Havre.
- Despite being a relative newcomer on the dry bulk market, "K" Line (Europe) already established several contracts, both long and short term, with major European steel mills, trading houses and power companies worldwide. A new Capesize vessel of 185,500 dwt was to be delivered in the first half of 2006.
- In early 2007 Navios Maritime Holdings (Greece) took over Kleimar, the dry bulk shipping company of Belgium's Sea-Invest group, for a reported €128 million. The Kleimar fleet, specialized for the transport of coal and iron ore, comprises 30 vessels of which 20 Capesizes and 10 Panamaxes. In 2005 Kleimar transported some 27 million tons of dry bulk cargo. Sea-Invest is one of the largest (if not the largest) bulk handling companies in Europe, active in the handling and storage of such commodities as iron ore, coal, fertilizers and liquid bulk. It is also a major player on the European fruit handling scene.

Source: International Bulk Journal and various trade press articles

7. Key implications of market developments for European ports

7.1. The changing nature of port competition in Europe

Europe is blessed with a long coastline reaching from the Baltic all the way to the Mediterranean and Black Seas. The European port system cannot be considered as a homogenous set of ports. It features established large gateway ports, hub ports as well as a whole series of medium-sized to smaller ports each with specific characteristics in terms of hinterland markets served, commodities handled and location qualities. This unique blend of different port types and sizes combined with a vast economic hinterland shapes port competition in the region.

Port competition in Europe is highly complex and dynamic. It is clear that the factors determining the underlying competitiveness of ports are as diverse as they are numerous. The institutional environment within which economic actors operate is one of the determining factors. The organizational and institutional environment in which ports operate has changed dramatically in the last decades. WTO's impact on free trade, deregulation and privatization in ports and inland transportation are among the main institutional factors affecting port hierarchy. Logistics integration, scale increases in vessel size, the emergence of global terminal operators and structural changes in logistics and distribution networks are just some of the key organizational trends affecting port operations and spatial characteristics within Europe. These developments have not only made port competition more intense, but have even affected the core object of port competition. The factors that are critical for improving port competitiveness are evolving over time, given the rapid pace of change in the global economy and the increased focus on supply chain management. Today we focus on the growing importance of the latest technologies in enhancing processes and management practices related to port productivity, logistics performance and environmental performance, in contrast to past decades when the expansion of resource endowments seemed to be the main driver.

There is no lack of port competition in Europe. Battles are fought on many fronts: maritime and hinterland access, terminal capacity, but above all the accommodation of supply chains. An increasing number of European ports is present on the competitive scene. This is in

sharp contrast to North America where more and more cargo is being channeled through only a few ports. The European port scene is therefore becoming more diverse in terms of the number of ports involved and the scope of port functions and services, leading to more routing options to shippers.

European ports are increasingly competing not as individual places that handle ships but as crucial links within supply chains. Market consolidation has resulted in large port clients who possess a strong bargaining power *vis-à-vis* terminal operations and inland transport operations. The loyalty to the home port tends to fade as large players are expanding their reach over more than one port. The network focus allows market players to engage in extensive port/terminal benchmarking exercises on issues related to productivity and supply chain compliance. As such, individual terminals are more than ever forced to strive for a high position in the efficiency rankings. The stakes are high as the loss or the acquirement of a large customer can have a significant impact on overall port throughput and associated value-added services.

Ports are engaged in a competitive battle to bind shippers and carriers who control huge cargo flows and who are in a good position to generate value-added for the port region. Vertical integration in the market has complicated the identification of the real supply chain managers. In some cases, the supply chain manager is situated at the end of the chain. For instance, supermarket chains like Carrefour exert strong power on the supply lines of food products. In these high-volume supply chains, a seaport is seen as a bundling point, a buffer within the scope of inventory management and/or a fast transit point. In other supply chains, commodity traders have a large impact on the routing of cargo. Large forwarding agencies negotiate rates with shipping lines and route the cargo they manage according to a combination of determinants such as price, transit time and reliability. Differences may also be observed depending on the type of cargo involved, the cargo generating power of the shipper, the characteristics related to specific trade routes and the terms of trade and terms of sale. Some markets witness a power play between shipping lines and shippers when it comes to cargo routing through ports. The higher the bargaining power of shippers *vis-à-vis* shipping lines the more pressure for direct calls in ports close to the markets as this will shift the 'cargo follows ship' principle to the 'ship follows cargo' principle.

Supply chain managers are facing a market environment in which freight transportation has become the most volatile and costly component of many firms' supply chain and logistics operations. Managers have to deal with delays in the transport system, with rising oil prices, complex security issues, and with labour and equipment shortages and imbalances. Each of these problems adds risk to the supply chain, and the problems are likely to get worse before they improve. Managers in the logistics industry are already spending a growing share of their time handling freight transport missteps and crises. Growing concerns on capacity shortages in ports has made supply chain managers base their port choice decisions increasingly on reliability and capacity considerations next to pure cost considerations. To be successful, ports have to think along with the customer, try to figure out what his needs are, not only in the port but throughout the supply chains and networks. This demands the creation of a platform in which the port is working together with relevant stakeholders to identify and address issues affecting logistics performance. Port authorities can be a catalyst in this process, even though their direct impact on the routing of cargo flows is limited. The adoption of a catalyst role requires a supply chain focus of port authorities and an institutional and governance framework that encourages collective actions in the port community.

7.2. The need for securing port capacity

The development of additional container handling capacity to meet growing demand has clearly lagged behind in some parts of the world, including some parts of Europe. Terminal projects around Europe have witnessed severe delays or were even cancelled. The causes range from internal politics within the port, environmental objections, legal technicalities and objections, investigations by the European Commission into market share implications, to political wrangling over funding, court cases, or to public enquiries and subsequent government considerations of their findings. Terminal operators have been witnessing increasing utilization levels of their facilities in recent years and this has often resulted in port congestion. The growing mismatch between the demand for (container) shipping services and the supply of terminal capacity continues to be the main reason for observed schedule unreliability in liner services. More than 40% of vessels deployed on worldwide container services nowadays arrive one or more days behind schedule. On the Europe – Far East route this figure even amounts to 54%. Port congestion and associated decreasing schedule integrity have profound implications for all players throughout the entire supply chain: increased operating costs for shipping lines, negative effects on terminal planning and inland transport planning and increased logistics costs for shippers due to late arrivals. As such, the integrity of entire supply chains is affected.

Accepting high risks for capacity shortages in ports as the 'new normal' might in the longer term have adverse effects on the whole European logistics system and eventually also on Europe's position in global production and consumption networks. Therefore, it is a joint responsibility of port managers, policy makers and other stakeholders to foster seaports and the broader networks of which they are part, to look after their well-being and to safeguard their future development potential.

As governments are curbing their financial participation in terminal development projects and port authorities are adopting full liability, it has become crucial to have an institutional and procedural framework in place that is conducive to potential investors.

7.3. Terminal networks as driving forces in European port efficiency

More than ever, terminals are not an end in themselves: efficient cargo handling facilities contribute to the industrial and logistics development in the port area and the hinterland. Against the background of supply chains, competitive forces are shifted to groups of spatially-dispersed but functionally-integrated terminals in different ports. Large terminal operators have emerged in container handling, dry bulk handling and segments of the conventional cargo market in order to offer the customers a more differentiated service range. The extensive terminal networks can also be considered as an effective means to counterbalance the power of carrier combinations, to realize economies of scale and to optimize the terminal function within supply chains.

New entrants in the terminal market typically meet the requirements for maritime accessibility and terminal layout. However, they often have to tackle major issues such as securing hinterland services, dealing with stakeholder-related procedures linked to large terminal projects and improving their cargo-generating and cargo-binding potential (typically as a result of a lack of associated forwarders' and agents' networks).

7.4. Serving an expanding European hinterland

Port hinterlands have become a key component for linking more efficiently elements of the supply chain, namely to ensure that the needs of consignees are closely met by the suppliers in terms of costs, availability and time in freight distribution. European seaports are competing fiercely to extend their hinterlands across frontiers. This has opened new routing options to shippers and shipping lines and has intensified the battle for contestable cargo. Major shared hinterlands characterized by intense port rivalry are found in the Rhine-axis, northern France, northern Italy, the east-west corridors from the Benelux ports to the hinterland, the Alpine countries, the central part of Spain, the southeast of the UK and parts of Eastern and Central Europe. Even regions close to a port are often not captive to that specific port.

The Le Havre – Hamburg range remains the dominant port range in Europe. The traditional 'blue banana' is now approaching the shape of a boomerang. As a result of extensions to Central and Eastern Europe and significant growth on the Iberian Peninsula, an increasing number of ports gain direct hinterland access to the 'blue banana' area. On the one hand, this development has broadened container port competition and altered spatial hierarchy, in the sense that the ports in the Hamburg – Le Havre range are increasingly facing competition from container ports in other European port ranges (Baltic, Black Sea and Med), primarily for serving hinterland regions in the periphery of the core of the EU. On the other hand, the rise of economic centers in Eastern and Central Europe creates opportunities for all ports to develop shortsea shipping services and water- and land-based hub-feeder networks to these areas.

Most ports have achieved a considerable modal shift in hinterland transport, but rail and inland navigation still have not reached their maximum potential. Modal shift policies are implemented throughout Europe and these policies are starting to pay off on some multimodal inland corridors. For example, container transport by barge is slowly becoming more important in navigation areas outside the Rhine and the Benelux countries with positive effects on barge traffic in ports such as Hamburg, Le Havre and Marseilles. Container transport by rail has seen a spectacular development in German ports, while other both small and large ports are implementing strategies (backed up by infrastructure and rail liberalisation) to significantly increase the market share of rail in the modal split in the medium term. Hinterland connections of smaller ports and new terminals in a start-up phase remain rather precarious. Smaller ports and new terminals often find themselves confronted with a vicious circle in the organization of hinterland transportation. The small-scale container volumes do not allow to install frequent block and shuttle trains to the more distant hinterlands. Because of the inability to serve a substantial hinterland, major shipping lines do not include these ports in their liner services. For the time being, the absence of critical mass complicates a further modal shift in many ports around Europe and impedes the development of new multimodal corridors.

7.5. Forging ties with inland ports and inland freight centers

The changing logistics environment poses new challenges in the relations between seaports and inland ports. Port authorities and market players are invited to bring the perspective of port development to a higher geographical scale (beyond the port perimeter) through a number of strategies linking the port more closely to inland freight centers. A port regionalization phase[41] is emerging characterized by a strong functional interdependency and even joint development of a specific port and selected multimodal logistics platforms in its hinterland. An increasing number of European ports are embracing the concept of port regionalization, while others stay at the sideline. Private market players have already gone far in setting up cooperative networks involving ports and inland centers. Port authorities are often quite reluctant to engaging in advanced forms of strategic partnerships with inland ports, e.g. through strategic alliances, (cross-)participation, joint-ventures or even mergers and acquisitions. More room has been created for forms of indirect co-operation, for example through joint marketing and promotion, which are less binding and require less financial means. Rotterdam, Marseilles (in relation to Lyon), Le Havre (in relation to Rouen and Paris), Antwerp (in relation to Liège), Hamburg and Barcelona are some examples. Large ports generally have a broad financial base to engage in a well-balanced port networking strategy, although substantial differences exist even among the largest ports. Smaller ports tend to rely more on simple co-ordination actions to substantially improve inland freight distribution, with benefits for all parties involved.

The development of multimodal corridors enhances the interaction between seaports and inland locations and as such leads to the development of large logistics poles consisting of several logistics zones. This trend towards geographical concentration of distribution platforms in many cases occurs spontaneously as the result of a slow, market-driven process. Supranational, national, regional and or local authorities have a role to play in facilitating the process toward a further adaptation of the port system to the imperatives of distribution systems.

7.6. Coping with mounting environmental challenges

Environmental issues are having an ever-larger impact on port development and port operations: dredging and dredge disposal, wetlands preservation, emissions into the air (both from ships and from port facilities), water pollution, congestion, light and noise externalities and potential conflicts with commercial fishing and recreational uses of area waters. Port authorities and port companies must demonstrate a high level of environmental performance in order to ensure community support. However, environmental aspects also play an increasing role in attracting trading partners and potential investors. A port with a strong environmental record and a high level of community support is likely to be favoured.

Observed differences among European ports in the implementation and application of environmental objectives and measures can potentially have an impact on the future port hierarchy in Europe. A number of ports are leading the way and went through 'learning by doing' experiences in developing stakeholders' relations management and in dealing with EU and national environmental regulations and spatial planning restrictions. Their experiences can also help other ports in learning to cope with the present avalanche of environmental challenges.

41 For further information on the concept of port regionalization, we refer to Notteboom and Rodrigue (2005)

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III. OVERVIEW OF EU POLICY DEVELOPMENTS AND ESPO ACTIVITIES

1. A year of consultation

The period 2006-2007 will no doubt be remembered as one of intensive consultation on the future of both Europe's policy for ports and for the maritime sector as a whole. With the organisation of six thematic workshops on port-related issues and a Green Paper on maritime policy, the European Commission has embarked upon a tour of Europe to sound out ideas, proposals and suggestions.

Despite the fact that the European Union celebrates in 2007 the fiftieth anniversary of the Treaty of Rome, seaports have emerged relatively late on the European agenda. The Commission's modal shift policy and promotion campaign for short sea shipping which both emerged in the early 1990s were the catalysts that brought ports to the forefront.

Initially the emphasis was a negative one, inspired by true or alleged complaints of shipowners, which explains why ports were systematically categorised as "bottlenecks". This narrow focus was most often inspired by local problems in particular ports.

This somehow also characterised the discussion on the 1997 Green Paper on Sea Ports and Maritime Infrastructure and especially on the subsequent ports package which culminated in an aggressive debate on self-handling, in itself a very minor issue. This partial approach did not only ignore the overall added value of ports for Europe's trade, economy and welfare, but also overlooked fundamental market developments such as the scale increase of shipping and the growing influence of intermodal carriers and global terminal operators. Not in the least, problems partially created by European legislation itself, such as in the field of the environment, were for a long time considered taboo.

The Commission's new approach, both in the context of the port policy review and the maritime policy Green Paper, is refreshingly different. It not only provides room for genuine consultation and debate, it also takes a much broader perspective, doing justice to the significant and multifaceted role seaports play in European society.

ESPO very much encouraged this new way forward and even inspired the Commission to organise the thematic regional workshops that were held from November 2006 to May 2007 in order to heal the sector from the ports package trauma. At the time of publishing this Annual Report, it is too early to predict what the outcomes of the port policy review and the maritime policy Green Paper will be, but the experience with both consultation processes so far is a broadly positive one, showing a great deal of consensus between different actors in the sector. This is already a significant step in the right direction.

2. A port policy for all seasons – Ten years after the Kinnock Green Paper

In 1997 the then Commissioner for Transport, Neil Kinnock, launched the first substantial European discussion paper on seaports. Before the publication of this *Green Paper on Sea Ports and Maritime Infrastructure*, the Commission had produced mainly factual reports on the organisation of the sector which were prepared by ESPO's predecessor, the Community Port Working Group (CPWG). Only the European Parliament commissioned in 1993 a genuine policy study, covering a broad range of issues. It is still a very readable and topical paper today but one which was not given any concrete follow-up at the time.

The Kinnock Green Paper was narrower in focus and outlined three principal areas on which a European seaport policy could be based: integration of ports in the Trans-European Transport Networks, financing and charging and market access to port services. It was the latter subject which would gain most attention, four years later, with the publication of the ports package and its Directive proposal on market access to port services.

The story of the port services Directive is sufficiently known but still it is in a sense remarkable that ten years after the Green Paper a policy for seaports has not materialised yet. This stands in stark contrast to the airport sector for instance, where over roughly the same period of time a series of measures has been developed starting with a Directive on ground-handling services, followed by a Regulation on air navigation services, State aid guidelines and – early 2007 – a package of measures which contains a Directive proposal on airport charging as well as recommendations on airport capacity.

The implementation of a European policy for seaports got stuck in the first phase, with the port services proposal introduced by the late Transport Commissioner Loyola de Palacio which was – at least in its original edition – very much inspired by the airport ground-handling Directive.

The experience with the ports package has demonstrated that – although at first sight parallels exist – seaports are very different from airports. There is first of all the often underestimated but very influential historical factor. Most seaports have developed over centuries and are much more embedded in local structures and cultures than airports. The scale of market developments and especially of investments is moreover considerably different and, perhaps most significantly, stakeholder interests and attitudes vary.

The reason why airports have an important legislative framework is that there has been a continued strong demand from the users' side to regulate the sector. Whilst this was initially also the case for seaports, the picture has changed considerably during the last years due to vertical integration processes and increased competition, as demonstrated by the market analysis section of this Annual Report. In addition, trade unions in the port sector are traditionally more militant and this has played an important role in rejecting both port services' Directives.

All this does in ESPO's view not mean that seaports can do without a sector-specific EU policy framework. The sector is in many aspects too important for the European Union to leave it governed by the current unclear patchwork of measures or subject to case-by-case initiatives without an overall and coherent policy vision.

This is why after the withdrawal of the port services' Directive last year ESPO proposed a broad-ranging consultation on a future EU port policy. This initiative was welcomed by Transport Commissioner Jacques Barrot at the ESPO annual conference in Stockholm early June 2006 and implemented through a series of regional thematic workshops held in Antwerp, Hamburg, Lisbon, Valencia, Naples and Tallinn from November 2006 to May 2007. Themes included market access to port services, the role of port authorities, port financing and charging, sustainable port development and the environment, port labour and technical-nautical services, ports and the supply chain, competition with non-EU ports and the public perception of seaports.

The experience from these workshops is – from the point of view of ESPO – a broadly positive one. Although perhaps not all issues were discussed as openly as desired, the workshops did show a great deal of consensus among stakeholders, not only on the actual themes, but also on the instruments that should be used to create an adequate European port policy. Leaving aside the field of sustainable development, where implementation problems and policy conflicts created by EU environmental legislation can possibly only be remedied by a review of existing law, most stakeholders seem to agree that hard legislation is generally not the right approach for the very diverse port industry.

The port sector would, however, benefit from clarification of the rules of the game enshrined in the EC Treaty, in terms of competition, market access, freedom to provide services, freedom of employment and the use of public funding, to name but a few areas. This is a task which lies fully within the competence of the European Commission and can be undertaken through the use of so-called "soft law" instruments, which are not legally binding but aim at indirect legal effects and – above all – practical effects. Examples are guidelines and interpretative communications.

In addition, the Commission can act as a catalyst in stimulating best practice, for instance in the field of environmental management, corporate social responsibility and the promotion of a positive interaction with stakeholders and citizens that live close to ports.

A combination of reviewing existing (environmental) legislation, providing guidance and stimulating best practice is the overall course that ESPO has taken in its input for the Commission's consultation which will be concluded at the ESPO Annual Conference in Algeciras on 31 May–1 June 2007, one year after its initiation at the Stockholm conference. It is also the line taken by the European Economic and Social Committee (EESC) in its own-initiative report on European seaport policy that was developed in parallel to the consultation exercise.

ESPO hopes that the Commission Communication and Action Plan which are expected to result from the port policy review and are likely to see the light of day in autumn 2007, exactly ten years after the publication of the first Green Paper on seaports, will adopt a similar approach.

3. Integrating ports in the supply chain

Part of the Commission's port policy consultation focuses on the role of ports in the supply chain. Here a robust European framework exists already, which finds its basis in the 2001 Transport Policy White Paper and, in particular, its mid-term review which was published in June 2006.

ESPO very much welcomes the realistic course of the mid-term review, which implicitly recognises that growth in transport is here to stay and abandons previous theoretical thinking that transport growth can be decoupled from economic growth. ESPO also supports the sensible "co-modality" concept which judges each transport mode upon its own merits and introduces measures to improve the environmental performance of all.

Ports are nodal points par excellence and rely on all transport modes to fully play their role within the supply chain. ESPO recognises that, as explained in the first section of this Annual Report, the potential of inland navigation and rail transport as environmental-friendly alternatives to road transport is still not used to the full extent. Yet it is most doubtful whether theoretical solutions such as infrastructure charging – a Monster of Loch Ness which has recently reappeared under the disguise of "smart charging" – is the answer.

In ESPO's view, it is rather a matter of improving service levels and infrastructure capacity. The European Commission has developed over the years the necessary framework to achieve this aim, in the context of its Trans-European Transport Network programme, its series of railway packages and – last year – its NAIADES programme for inland navigation. The priority is therefore to ensure that these measures are duly implemented. The problems with railway services and infrastructure in many ports demonstrate that a lot of work still needs to be done.

The ITMMA analysis in this report indicates that the changing logistics environment introduces new challenges for the relations between seaports and inland ports. Although seaport authorities – contrary to private terminal operators – still seem somehow reluctant to engage in advanced forms of strategic partnerships with inland ports, ESPO and the European Federation of Inland Ports (EFIP) have underlined the importance of such networks by formalising their co-operation at EU level through a "Platform of European Sea and Inland Ports" which was officially launched on 15 May 2007. The principal aim is to strengthen the European lobby of ports in Brussels as both representative organisations of port authorities have an increasingly common agenda. Under the platform both EFIP and ESPO will keep their own identity but will express joint opinions wherever this is feasible.

The European Commission has recognised the importance of logistic networks in its Communication on freight logistics which was published in October 2006. Yet it remains to be seen whether the Communication will lead to any concrete new measures which were not already introduced by the transport policy mid-term review, short sea shipping policy (on which a review was also published in 2006) and the Maritime Policy Green Paper.

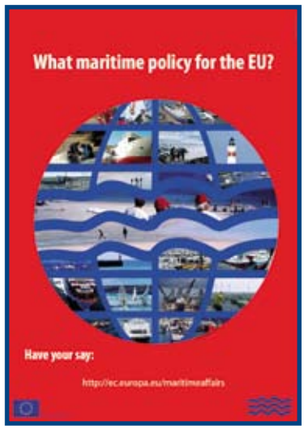
The proposed resurrection of the European Intermodal Loading Unit (EILU) does in any case not seem to bring any added value as long as there is no market demand. What would be of interest to the port sector though would be a measurement standard for ro-ro units, similar to the existing TEU standard for containers. The Port of Gothenburg, the UK Chamber of Shipping and Lloyd's Register have developed a proposal in this sense which is endorsed by ESPO and has been presented to the Commission and Eurostat for support.

The Logistics Communication and the Maritime Policy Green Paper both introduce the concept of the Common Maritime Space. Although this proposal initially created a lot of confusion, the recent clarification by Transport Commissioner Barrot that its sole purpose is to give intra-European shipping the same flexibility in administrative terms as land-based transport modes makes it a very welcome initiative.

The concept of the Common Maritime Space is closely linked to the development of the Motorways of the Sea, the network which intends to reinforce the position of short sea shipping and ports in the Trans-European Transport Networks. With a first call for proposals being scheduled for December 2007, ESPO has set up an internal forum to compare the different initiatives that are being undertaken within the various maritime regions of Europe. Aim is to learn from practical experience, focusing especially on the selection of projects and ports and ways to avoid possible negative implications in terms of distortion of competition.

The market section of this report points at the importance of having critical mass and adequate hinterland connections which evidently does not make every port suitable to become a Motorway of the Sea port. Cost-effective exploitation of services with a high frequency is a must for viable competition with road transport. Artificially setting up such services with European funding however entails the risk that cargo is simply shifted from existing services and ports rather than from roads.

4. Sustainable development of ports – Maritime Green Paper brings new élan



The development of Motorways of the Sea implicitly begs the controversial question whether traffic in Europe should be concentrated on a number of hub ports or should be distributed over a wider set of smaller ports. This question is also posed by the Maritime Policy Green Paper which the European Commission published in June 2006 and on which a consultation runs until June 2007.

ESPO's answer is very clear: it is not for EU decision-makers to indicate where port development should take place, tempting as it may be to move dots on the port map of Europe. Instead, the bottom-up principle should be fostered by which project proposals are based on market needs, taking into account objective economic assessments, and designated by local port management – which is closest to the market – in conjunction with regional or national authorities where this may be applicable. The ITMMA report moreover demonstrates that the present European port system shows a healthy balance between large, medium-sized and small ports, which all have their specific role to play.

Besides this general warning, which equally applies to the port policy consultation, ESPO has given the Green Paper of Fisheries and Maritime Affairs Commissioner Joe Borg a warm welcome. It is not only the first Commission publication with literary ambitions – a relief compared to the usual dry bureaucratic communications – but it also underlines the importance of seaports for European trade and welfare. Most importantly, the Green Paper dares to name some fundamental problems which have for a long time been ignored or considered taboo.

One of the principal fields where this is the case is that of the environment. Ports are frequently located close to valuable nature conservation areas. Harmonising ecological and economic objectives has proved to be a difficult learning exercise for many ports resulting often in conflict situations. European seaports have, however, made considerable progress in achieving high environmental standards and improving environmental management and have over the years succeeded in developing constructive agreements with NGOs and local stakeholders leading to win-win situations for nature and ports.

Ever since its existence, ESPO has taken the lead in stimulating such pro-active behaviour. With the publication in February 2007 of a specific Code of Practice on the Birds and Habitats Directives, ESPO has continued the line started in 1994 with the first general Code of Practice on the environment which was fully revised and updated in 2003. The recent addition in the list of ESPO publications draws from practical experience of port managers on how to work within the existing legal framework.

The Code, however, also lists a number of outstanding issues which can only be solved through policy or legislative initiatives. Legal uncertainties with regard to the application of nature conservation legislation such as the Birds and the Habitats Directives continue to cause substantial delays for many projects, contributing to the growing mismatch between demand and supply of port and port-related capacity in European seaports as outlined in the market section of this report. The Green Paper is one of the first EU documents which recognises this problem.

The need to reinforce the legal status of port development projects is also the main message of a DG TREN-commissioned study on the impact of environmental legislation on ports and waterways, which was carried out by the Antwerp professor Eric Van Hooydonk.

A major opportunity in this respect is the review of the Birds and Habitats Directives scheduled for the second half of 2007. Although indications are that so far these Directives will only be assessed in terms of their ecological merits, ESPO is making a plea to also take into consideration their effect on Europe's economy.

The Maritime Policy Green Paper introduces maritime spatial planning as a tool to create greater legal certainty for port development. ESPO believes there may be added value in this concept for ports provided it is not only based on ecological criteria, refrains from port planning at EU level, avoids overlap with existing planning instruments and simplifies current consent procedures for port development projects and port operations such as dredging.

ESPO however regrets that the environmental pillar of maritime spatial planning has already formed the object of a legislative proposal, in the form of the Marine Strategy Directive, whereas the broader policy context is still to be written. ESPO has presented a number of amendments on this Directive proposal but would essentially prefer to have a time-out on the proposal until the follow-up of the Green Paper is clear. The latter will take shape in autumn 2007.

Other new proposals in the field of the environment have been calling over the period 2006-2007 for action by ESPO, such as the Air Quality Directive and related initiatives on ship emissions, as well as the Waste Framework Directive. Especially on the latter proposal, ESPO has been actively campaigning to obtain recognition that sediments which do not contain hazardous material should not be treated as waste and therefore not undergo costly treatment. This line was followed by the European Parliament which adopted an amendment in this sense during its first reading, but finds considerably more resistance in Council.

Dredging activities in ports, which are vital both for maintenance and development purposes, are equally threatened by the Commission's Directive proposal for Environmental Quality Standards for priority substances and other polluntants, the so-called "Daughter Directive" of the Water Framework Directive.

Although most port authorities these days invest considerably in the environment, a dimension which still tends to be underestimated is that of the overall perception and attractiveness of seaports to the general public. Another merit of the Maritime Policy Green Paper is that it has brought this theme to the forefront by encouraging partnerships with tourism, recreation and heritage sectors in order to make European citizens more familiar with the world of ports and shipping and to foster a genuine maritime identity.

Creating a positive image of the port sector and improving public acceptance of ports is also one of the prime objectives of ESPO, which is why it decided to support – together with EFIP – the international workshop on the restoration of public support for ports organised by the European Institute of Maritime and Transport Law at the Antwerp University on 16 May 2007. During this event, ESPO and EFIP presented a public declaration to representatives of the European Commission, inviting them to facilitate, in consultation with representative sector organisations, initiatives for the restoration of public support for ports within the framework of future port and maritime policies.

5. Maritime safety and security

Pro-active behaviour of port authorities in the field of the environment goes hand in hand with a similar attitude regarding safety of both navigation and port operations. These are typical public responsibilities of port authorities, regardless of their ownership or management structures.

ESPO has therefore adopted a constructive approach throughout the political discussion on the series of maritime safety packages that have seen the light of day since the Erika and Prestige accidents. ESPO has in particular supported proposals to install an adequate response system to deal with ships in distress seeking a place of refuge.

The amendment to the Traffic Monitoring Directive which the Commission introduced through its Third Maritime Safety Package requires Member States to set up an independent competent authority endowed with ultimate decision-making power regarding ships seeking shelter in a place or port of refuge. ESPO agrees that such a neutral entity should be established and have the possibility to overrule decisions of local authorities, including port authorities. The Commission's proposal however omitted to foresee adequate compensation for local authorities and port authorities in case a ship in distress were to cause local damage, be it of human, environmental or economic nature. This fundamental shortcoming has meanwhile been rectified by the European Parliament thanks to a proposal of its Rapporteur Dirk Sterckx. The situation in Council is more complex, particularly because many Member States have difficulties in accepting the proposed independent competent authority.

The Commission's Traffic Monitoring Directive has also led to the establishment of the SafeSeaNet system, a European platform for maritime data exchange between Member States' maritime authorities. Aim of the system, which is managed by the European Maritime Safety Agency (EMSA), is to prevent accidents at sea and marine pollution. It also incorporates data exchange requirements from other EU Directives such as those on port reception facilities for ship's waste and Port State Control inspections in EU ports.

Port authorities contribute to the well-functioning of SafeSeaNet. Still, it seems that a considerable number of seaports experience a clear lack of communication with the national competent authority and are not sufficiently informed about the developments of the system and the points of discussion at EU level by the national competent authority. In some Member States furthermore little consideration is given as to how the required information would have to be delivered by port authorities.

ESPO has therefore urged both the Commission and EMSA to pay more attention to cost-effectiveness, technical feasibility, actual need and end benefit of the system as well as to the detailed input data requirements.

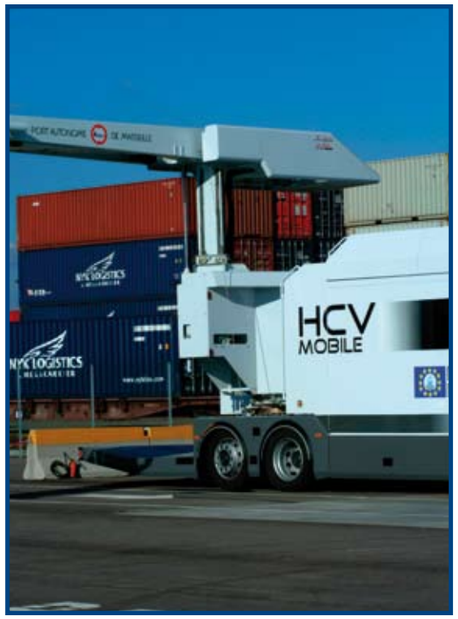
In the related field of port security, things have moved from the terminal level to that of the port area as such. By June 2007, Member States have to implement the port security Directive, which introduces ISPS-type measures for the overall port area. ESPO is closely following the implementation process, which so far does not seem to raise substantial problems. Key principle is that measures, be they applied to the port perimeter or specific equipment and installations within the port area, should be risk-based. This implies that ports should – at low risk level – remain generally accessible. This is also important for the public image of ports as discussed above.

What remains an issue is who pays for security measures. An EU-commissioned study has confirmed that port security measures are typical public authority tasks and that public funding would therefore fall outside the scope of State aid rules. Be that as it may, very few Member States seem prepared to provide the necessary budgets. This is in sharp contrast to the United States, where the Federal Government has been releasing security funds for ports year after year.

With the ISPS Code and the port security Directive firmly in place, ESPO believes that Europe should now fully concentrate its security efforts on other parts of the supply chain. This is why ESPO has for instance resisted that ports would be included under the EU's critical infrastructure initiative, a totally superfluous exercise given the existence of the port security Directive which covers all relevant European ports.

Paradoxically enough, the past year has seen the temporary withdrawal of the Commission's proposed Regulation on supply chain security following pressure from the European Parliament. Although it was a logical complement to the security measures which apply to seaports and maritime transport, the fierce resistance of land-based transport modes have stranded the proposal, leaving the port and shipping industry as the only European transport sectors with an adequate security system.

It remains to be seen whether this was a wise decision. Although the draft Regulation was not perfect, it at least introduced the principle that the only effective security system is one which involves the entire supply chain, from factory to end user. This would be in the interest of ports, allowing more efficient operations and more targeted inspections. ESPO believes that appropriate basic security measures should be applicable to all operators in the supply chain. The main weakness of the draft Regulation was that it introduced a voluntary scheme which does not force weaker parts of the chain to participate.



The Commission will now wait with further measures until the related concept of the Authorised Economic Operator (AEO) developed by DG TAXUD will become reality. The first AEO certificates will be granted to reliable economic operators as of 1 January 2008.

6. Overview of ESPO activities in the period 2006-2007

Events organised, co-organised or supported:

ESPO 2006 Conference – Stockholm – 1-2 June 2006

ITMMAPS Conference "Fostering Seaports and Beyond" – Antwerp – 25-27 October 2006

ESPO Annual Luncheon – Brussels – 22 November 2006

EcoPorts Conference – Genoa – 14-15 December 2006 (with EFIP)

GreenPort 2007 Conference – Lisbon – 13-14 February 2007 (with EFIP)

Launch of the Platform of European Sea and Inland Ports – Brussels – 15 May 2007 (with EFIP)

EIMTL International Workshop on the Restoration of Public Support for Ports – Antwerp – 16 May 2007 (with EFIP)

ESPO 2007 Conference – Algeciras – 31 May-1 June 2007

Publications:

ESPO Code of Practice on the Birds and Habitats Directives – February 2007

ESPO Annual Report 2006-2007 – Including a Market Report on the European Seaport Industry prepared by ITMMA – May 2007

Policy input:

Recommendations for the consultation process on European seaport policy – June 2006

Positions on the Air Quality Directive proposal – July and October 2006

Position Supply Chain Regulation proposal – August 2006

Initial response to the Maritime Policy Green Paper – September 2006

Position on the Waste Framework Directive proposal – September 2006

Positions on the proposed Port State Control Directive – October 2006 and February 2007

Positions on the Traffic Monitoring and Reporting Directive proposal (Places of Refuge) – October 2006 and February 2007

Position on the Marine Strategy Directive proposal – November 2006

Response to the Mid-term review of the Transport Policy White Paper – November 2006

Response to the Communication on Freight Logistics – November 2006

Response to the Mid-term review of the Short Sea Promotion Programme – November 2006

Response to the Commission consultation on a Rail Freight-oriented Network – January 2007

Position on the Environmental Quality Standards Directive proposal (Water Framework Daughter Directive) – February 2007

Position on the implementation of the HNS Convention – February 2007

Statement on SafeSeaNet – February 2007

Declaration on ratification IMO Conventions (with ECSA and other shipping organisations) – March 2007

Contribution to the consultation process on European seaport policy – May 2007

Information on the above events, publications and position papers can be found on the ESPO website: www.espo.be, in particular under the sections "News and Events", "Active Policy Issues" and "Legislative Observer".

7. ESPO membership and structure

ESPO membership consists of the port authorities, port administrations and port associations of the seaports of the European Union. The organisation is furthermore open to observer members from countries neighbouring the EU.

The membership structure is organised on national level and finds its reflection in the General Assembly of the organisation where each EU member country has three official delegates (and in some instance official proxies or alternates) with voting right. Non-EU countries have one observer delegate each.

The General Assembly sets the overall policy of the organisation and meets twice a year. It elects the Chairman and two Vice-Chairmen of ESPO. For the period 2007-2008 ESPO is chaired by Giuliano Gallanti (Italy), assisted by Vice-Chairmen Maria Nygren (Sweden) and Victor Schoenmakers (Netherlands).

The General Assembly mandates the daily policy-making of the organisation to the Executive Committee which consists of one representative per EU member country and a number of observers. It meets about five times a year.

A series of Technical Committees provide technical recommendations to the Executive Committee on specific subjects which fall within their scope of competence. Currently four committees exist, dealing with transport, marine, environment and statistics. In addition, the Marine Committee has a specific expert group on port security under its umbrella.

Finally, the ESPO Secretariat is responsible for the overall coordination of the organisation's activities, including policy advice, communication, representation and administrative management. The Secretariat is based in Brussels and consists of Patrick Verhoeven (Secretary General), Lieselot Marinus and Roel Hoenders (Policy Advisors), Cécile Overlau (Office Manager and PA) and Jeanette Voosen (Consulting Accountant).

OVERVIEW OF ESPO MEMBERSHIP

COUNTRY	NATIONAL PORTS BODY	GENERAL ASSEMBLY REPRESENTATIVES	EXECUTIVE COMMITTEE REPRESENTATIVE
FULL MEMBERS			
Belgium		Eddy Bruyninckx (Port of Antwerp) Pierre Kerckaert (Bruges-Zeebrugge Port Authority) Eugeen Van Craeyvelt (Port of Ghent)	Kate Verslype (Port of Ghent)
Bulgaria	Executive Agency Port Administration / Bulgarian Ports Infrastructure Company	To be confirmed	To be confirmed
Cyprus	Cyprus Ports Authority	Christos Assimenos (Cyprus Ports Authority) Yiannakis Kokkinos (Cyprus Ports Authority) Chrysis Prentzas (Cyprus Ports Authority)	Christos Assimenos (Cyprus Ports Authority)
Denmark	Danish Ports Association	Hans Berthelsen (Danish Ports Association) Bjarne Mathiesen (Port of Aarhus) Peter Jens Peters (Associated Danish Ports)	Tom Elmer Christensen (Danish Ports Association)
Estonia		Allan Kiil (Port of Tallinn) Karin Kiviste (Port of Tallinn) Sven Ratassepp (Port of Tallinn)	Alan Kill (Port of Tallinn)
Finland	Finnish Port Association	Matti Aura (Finnish Port Association) Henry Lindelöf (Finnish Port Association) Heikki Nissinen (Port of Helsinki)	Matti Aura (Finnish Port Association)
France	French Ports Association UPACCIM	Patrick Fourgeaud (CCI de Calais) Antoine Jourde (CCI de Sète-Frontignan-Mèze) Jean-Marc Lacave (Port Autonome du Havre) Jean-Marcel Piétri (C.C.I. de Dieppe) Michel Quimbert (Port de Nantes St-Nazaire) Bruno Vergobbi (UPACCIM)	Bruno Vergobbi (UPACCIM)
Germany		Ernst Jagl (Niedersächsisches Ministerium für Wirtschaft) Bettina Linkogel (Senator für Wirtschaft und Häfen Bremen) K. Richter (Wirtschaftsministerium des Landes Mecklenburg-Vorpommern) Jana Schiedek (Hamburg Port Authority) Wolfgang Zeichner (Ministerium für Wirtschaft, Arbeit und Verkehr Schleswig-Holstein)	Jana Schiedek (Hamburg Port Authority)
Greece		Stavros Hatzakos (Piraeus Port Authority) Apostolos Kamarinakis (Igoumenitsa Port Authority) Yiannis Tsaras (Thessaloniki Port Authority)	Yiannis Tsaras (Thessaloniki Port Authority)
Ireland	Irish Ports Association	Enda Connellan (Dublin Port) Brendan Keating (Port of Cork Company) Pat Keenan (Irish Ports Association)	Pat Keenan (Irish Ports Association)
Italy	Italian Ports Association ASSOPORTI	Francesco Nerli (ASSOPORTI) Luigi Robba (ASSOPORTI)	Francesco Nerli (ASSOPORTI)

Latvia		Irina Gorbatikova (Freeport of Riga Authority) Leonids Loginovs (Freeport of Riga Authority) Vladimirs Makarovs (Freeport of Riga Authority)	Leonids Loginovs (Freeport of Riga Authority)
Lithuania		Sigitas Dobilinskas (Klaipéda State Seaport Authority) Viktoras Lukocevicius (Klaipéda State Seaport Authority)	Sigitas Dobilinskas (Klaipéda State Seaport Authority)
Malta	Malta Maritime Authority	Charles Abela (Malta Maritime Authority) David Bugeja (Malta Maritime Authority) Charles Schembri (Malta Maritime Authority)	Charles Schembri (Malta Maritime Authority)
Netherlands		Hans Gerson (Port of Amsterdam) Peter Mollema (Port of Rotterdam) Victor Schoenmakers (Port of Rotterdam) Hans van der Hart (Zeeland Seaports)	Victor Schoenmakers (Port of Rotterdam)
Poland		Janusz Catewicz (Port of Szczecin-Swinoujscie) Przemyslaw Marchlewicz (Port of Gdynia Authority) Julian Skelnik (Port of Gdansk)	Krzysztof Gromadowski (Port of Gdynia Authority)
Portugal	Association Ports of Portugal	Manuel Frasquilho (Port of Lisbon) Antonio Ricardo de Oliveira Fonseca (APDL - Admin. Portos do Douro e Leixoes) Lidia Sequeira (Association Ports of Portugal)	Manuel Frasquilho (Port of Lisbon)
Spain	Puertos del Estado	Ramon Gomez-Ferrer Boldova (Port Authority of Valencia) Manuel Moron Ledro (Port Authority of Algeciras Bay) Mariano Navas Guttierrez (Puertos del Estado)	Mariano Navas Guttierrez (Puertos del Estado)
Sweden	Ports of Sweden	Lars Karlsson (Copenhagen Malmö Port) Eric Nilsson (Göteborgs Hamn) Maria Nygren (Ports of Sweden)	Maria Nygen (Ports of Sweden)
United Kingdom	British Ports Association / UK Major Ports Group	Paul Davey (Port of Felixstowe) John Dempster (UK Major Ports Group) Martin Putman (Portsmouth Commercial Port) David Whitehead (British Ports Association)	David Whitehead (British Ports Association) and John Dempster (UK Major Ports Group (alternates)
OBSERVER MEMBERS			
Croatia	Croatian Ports Association	Bojan Hlaca (Port of Rijeka Authority)	
Iceland		Gisli Gislason (Associated Icelandic Ports)	
Norway	Norwegian Ports Federation	Odd Gerhard Andreassen (Norwegian Ports Federation) Anne Sigrid Hamran (Oslo Port Authority)	Rune Mjös (Norwegian Ports Federation)
Romania	National Maritime Administration	Mircea Marius Banias (Port of Constantza)	Mircea Marius Banias (Port of Constantza)

Colophon

The European Sea Ports Organisation (ESPO) represents the seaports of the Member States of the European Union and has observer members in several other European countries.

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