

PORT OF ROTTERDAM: CONTAINER SHIPPING - BACKGROUND INFORMATION

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Ongoing increase in ship size

The introduction of the container has brought about a revolution in goods transport. Originally, some forty years ago, it involved only a few dozen or hundreds of containers per ship.

In the mid-1970s the maximum capacity was increased to a little more than 2000 TEU. The gradual increase to 4500 TEU took about ten years. With a few exceptions, this size of ship cannot pass through the Panama Canal (maximum width 32 metres) and we refer to such vessels as 'post Panamax'. For this type, a cargo capacity of about 5000 TEU became a kind of standard and the vessels became branded as the 'workhorses of the sea'. This proved to be premature, because in 1996 the Danish shipping company Maersk generated shock waves through the container world by unexpectedly putting a vessel of 6600 TEU into operation. This *Regina Maersk* was the first in a long line of ships that had two things in common: the ships became gradually larger and the shipping company did not disclose how many containers the ships could carry.

Container experts believe that the Danes are now using ships in excess of 9000 TEU. This corresponds with the capacity of the officially largest ship, that of the Chinese shipping company Cosco (see below) which was put into service at the start of the year. This size of 8500-9000 TEU is developing to become a type of new standard, the 'workhorses' for the two major routes: Asia –Europe and Asia – North America.

The first ship with a capacity of more than 10,000 TEU, expected to be about 12,000 TEU, will probably be launched from the Maersk shipyard in Odense this year. The next 'step' is 15,000 TEU. The upper limit for Europe, apart from the ports, is firstly the Suez Canal, which is being gradually deepened. For the Panama Canal, which is more important to America, plans have been developed to increase the maximum capacity of a little over 4000 TEU to 12,000 TEU. The upper limit for container ships would seem to be 18,000 TEU. This is the maximum size, according to the calculations, for passage through the Straits of Malacca.

'12,000 plus'

The 12,000-TEU ships will become wider: increasing from 17 containers wide on the deck at present to 22 containers in the near future. The cranes that can handle these are already in use in the large ports such as Rotterdam.

With a capacity approaching 15,000 TEU, the ships' draft increases still further. The maximum length of the ships is probably 400 metres. In the same way that access to a port is critical, ships also have critical length-beam-draft ratios. A ship that is 'too long' can lose rigidity and be difficult to keep on a straight course, one with insufficient draft will become unstable and could capsize, while one that is too broad in the beam will have a detrimental effect on sailing performance and fuel consumption.

The Korean shipyards in particular are devoting all their creativity to designs with a large capacity but still a limited draft (about 14.50 metres for the ship). Commercial arguments in favour of such ships are cost benefits of 29% for ships of 13,000 TEU compared to 7,500 TEU (according to Hyundai Heavy Industry). The limited draft must still make it possible for the ships to call in at ports such as Hamburg.

Ship size and capacity, then and now

A = traditional general cargo ship up to the 1970s

B = current 8500 TEU ship (*)

	A	B
Length (m)	160	330
Beam (m)	23	43
Draft (m)	10	14.5
Capacity (dwt)	13,000	100,000
Speed (knots)	21	25
Engine capacity (hp)	18,000	94,000

Source: Hapag-Lloyd Container Line

The traditional cargo ships could make a round trip between Europe and Asia four times a year, carrying a total of 80,000 tonnes of cargo. The modern ship shuttles back and forth six times and transports one million tons.

(*) The officially largest container ships at present are the *Cosco Guangzhou* and the *Cosco Ningbo* of 9500 TEU. These are slightly longer (350 m.), just as broad, have a capacity of 107,000 dwt and an engine capacity of 102,000 hp.

Investment

Rotterdam is one of the few ports in Europe where the extremely large ships can still enter the port fully loaded, i.e. with a deep draft, without any restrictions caused by the tide. It is therefore often the first port of call for vessels from Asia. With a depth of 23 metres, the Rotterdam port is easily accessible for ships carrying 15,000 EU and with a draft of 17 metres (plus two metres extra below the keel). However, deeper quays have to be built, something that is currently happening at the EuroMax terminal which will come into operation in 2008 and be almost 20 metres deep along the quaysides.

There must also be enough horizontal space to allow a ship to turn around (400 metres for the ship plus 300 metres to manoeuvre) and to reach the quayside. The accessibility of the dock is calculated using a formula incorporating the length of the ship, speed of current and the width of the opening to the port basins.

In an unfavourable situation, this may mean that a dock is only safely accessible for a limited number of hours in a day. This loses time and therefore entails extra costs. The Maasvlakte, with low current speeds and large dimensions, is easy to reach. For the Second Maasvlakte, only the proverbial sky is the technical limit.

Incidentally, it is in Rotterdam's interests for there still to be a limited number of easily accessible ports. Shipping companies only build larger and larger ships if they do not need to place all their eggs in one basket, and it is inefficient from a socio-economic point of view to have too much handled by just one port.

The Port of Rotterdam Authority must invest heavily to retain its advantage. For example, the 1900-metre quay currently under construction for the EuroMax terminal is costing 60 million euro. Shipping companies, however, will have to dig even deeper into their pockets for their vessels. Until recently it cost about \$ 15 million per 1,000 TEU to build the large container ships, which works out at \$ 120 million for our example ship. Containers totalling 24,000 TEU are needed for each ship, costing \$ 48 million. For a weekly service between Europe and the Far East, eight ships are needed. The investment for such a service therefore totals about \$ 1.4 billion.

For two services, which will in principle start up within one year, shipping companies are investing an amount equivalent to what it is costing to construct the Second Maasvlakte over several years (about € 2.9 billion).

The Asian shipyards have a huge number of ships on their order books. These ships will steadily come into service until 2008. Between now and 2009 the capacity of the worldwide fleet will grow by 50%. Shipping companies believe that the demand for ship capacity will be sufficient to fill the supply. Cargo prices will then remain at a reasonable level. However, cargo prices have fallen over the past few months due to an alleged growth in (over)capacity.

Routes

Most containers are transported along three main routes and within Asia. (2004 figures, approximate and in millions of TEU)

Asia – North America	16
Asia – Europe	12
Europe – North America	7
Intra Asia	12

According to Ocean Shipping Consultants, container shipping will continue to grow by at least 10% per annum for the coming decade. The demand for terminal capacity will therefore double to almost 650 million TEU in 2015. The growing market will demand substantial investment in infrastructure in the coming years. This increase will create severe pressure on the capacity and quality of terminals. OSC also emphasises the importance of generating maximum returns from the huge investments.

Lower transport costs

In 1970, ocean shipping costs accounted for about 10% of the sale price of a product. Thirty years on, this has fallen to an average of 3%. A motorbike represents the average, while products such as a TV (2%) and a can of beer (1%) are below the average. In just one container you could easily pack 70,000 cans of beer, or 14,000 bottles of wine, 1600 car tyres, 1500 coats on racks, 100 washing machines or 27 motorbikes. (For more products, go to www.ect.nl)

Shipping companies

Apart from the increase in the scale of ships, the consolidation of shipping companies is a second constant factor in the development of the container sector. Dozens of shipping companies, often familiar and illustrious names, have already disappeared through mergers, a couple of bankruptcies and above all through takeovers. Only about twenty large companies remain, but the market can still be regarded as fragmented. For example, the market leader, Maersk Line, still has a market share of less than 20%. It is only logical to expect further consolidation. Among the current top five shipping companies there are four European companies. Furthermore, a large part of them is still family-owned.

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| 1. Maersk Line | Denmark |
| 2. Mediterranean Shipping Company | Switzerland |
| 3. CMA CGM | France |
| 4. Hapag-Lloyd | Germany |
| 5. Evergreen | Taiwan |

See also www.portofrotterdam.com for information on the Rotterdam container port. For an up-to-date overview of the ocean vessels, feeder vessels, inland vessels and trains handled at the ECT terminals, see www.ect.nl. This latter site also has many photos available, also in high resolution.