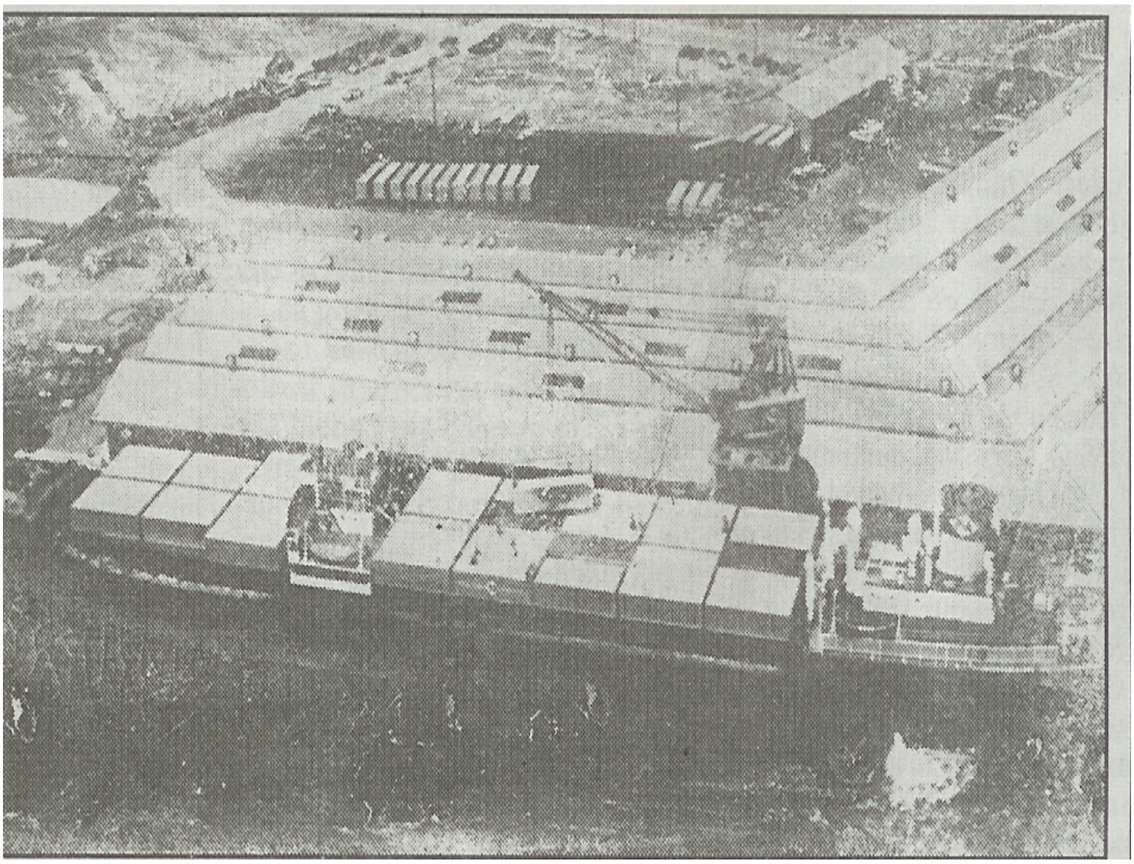
Update of

Study on the Next Generation of Large Containerships

and

Its Potential Implications for the Port of Hong Kong



Marine Department
Hong Kong SAR Government
September 2006

C O N T E N T S

1. INTRODUCTION

Exactly 50 years ago on 27 April 1956, the sailing of Malcom Mclean's Ideal X (front cover), a modified tanker carrying its usual liquid cargo as well as 58 steel containers, was the very first container ship in the world that sail from Port Newark to Houston, which marked a quiet revolution in the history of sea transportation. Mclean had started the containerization revolution, which alters forever the economics of the physical movement of manufactured goods and semi-bulk cargoes. The transportation cost is now such a small portion of the total costs of goods which enables factories to be located at places with the cheapest available pool of labour, rather than the source of raw materials or the consumer base for the particular product.

Containerships are now measured in thousands of TEUs; they spend only a few hours in port, and are loaded and discharged at high rates with the aid of computers and purposely built machines. Starting in the early 1990s, the first post-panamax container carriers with a 40 metre beam were rated with a 4,800 TEU capacity. Since then, vessel carrying capacity has increased rapidly to nearing 10,000 TEUs. The Marine Department had conducted a study on the next generation of large containerships in 2001 and carried out a review in 2003. Since ships of 13,500 TEUs are being built, and designs up to 15,000 TEUs are on the drawing board, it is timely to conduct an update.

1.1 Objectives

The objectives of this update are:

- To identify and evaluate the existing and possible future trends of containership development;
- To review its impact on the operation of the Hong Kong Port.

1.2 Methodology

The Review involves extensive literature reviews, supplemented by interviews with major shipping lines, container terminal operators and classification societies.

2. CONTAINERSHIP DEVELOPMENT

2.1 Growth of the World Container Fleet

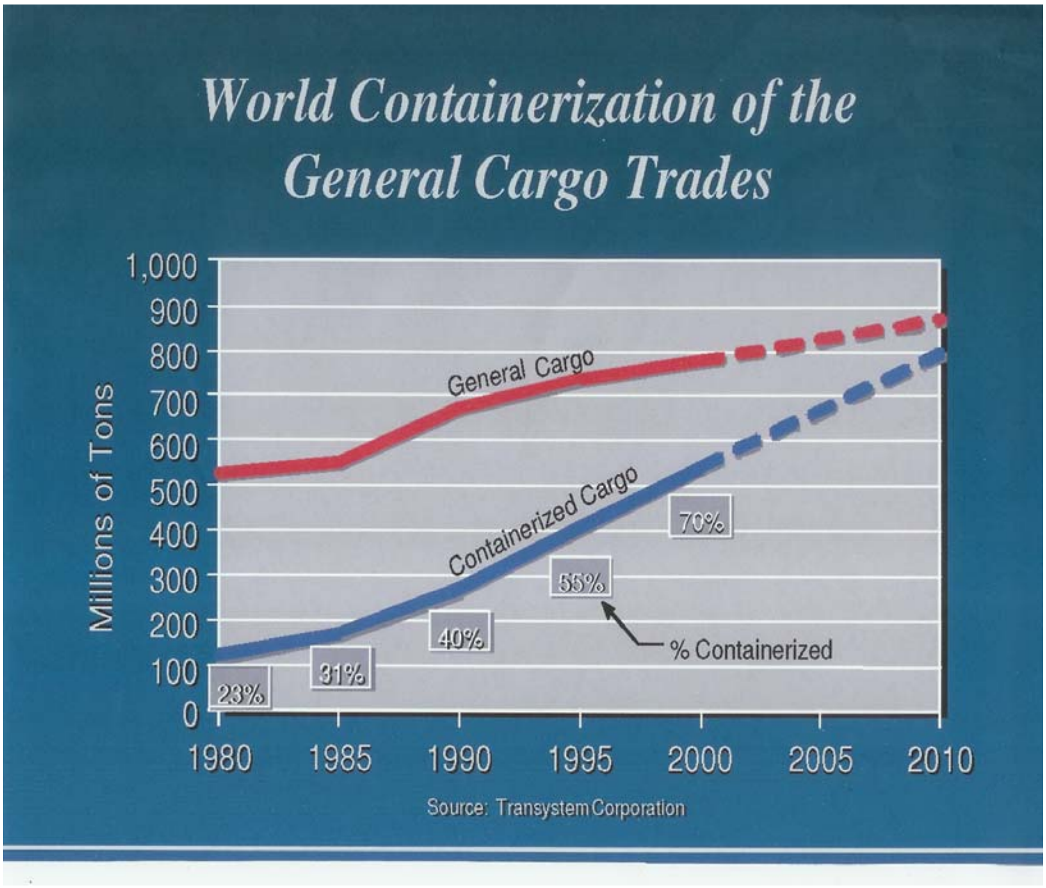
The Containerisation Trend

By the late 1970s, the role of containers was firmly established on the major long-haul trades to and from OECD economies, but the penetration of containerization remained limited on secondary trade routes. During the 1980s and 1990s, container volumes were boosted by the conversion of conventional break bulk liner trade from secondary ports in developing economies in addition to the expansion of global trade. The last five years has seen containerization of new low value products, such as paper and some bulk cargoes contributed to the resilience of container trade growth.

Today, total container trade volumes are increasingly related to the supply and demand for manufactured and semi-manufactured goods. Notably, trades to/from particular geographical regions, such as China, Southeast Asia and the Indian Sub-continent, continue to offer scope for additional growth in box volumes.

It can be seen from Figure 2.1, that the tonnage of containerized cargo trade have been growing at a very fast pace, and is already on a par with the general cargo trade.

Figure 2.1 : Past and Future Development Trend of Container Shipping



The Development Trend of the Containerships

As of 1st January 2006, the container fleet has reached 3,547 ships with a capacity of 8,022,890 TEUs. Table 2.1 records the growth of the container fleet from 2003 to 2006, in terms of total carrying capacity and number of vessels. It shows the container fleet has increased by 22.1% over the last three years and the carrying capacity by 32.2%.

Table 2.1: Growth of Containerships between 2003 to 2006

Vessels	2003	2006	Total Growth (%)	Annual Average
Total TEUs	6,068,427	8,022,890	32.2%	10.7%
No. of Ships	2,905	3,547	22.1%	7.4%
TEU/Ship	2,089	2,262	8.3%	2.77%

Source : Containerisation International 2003 and 2006

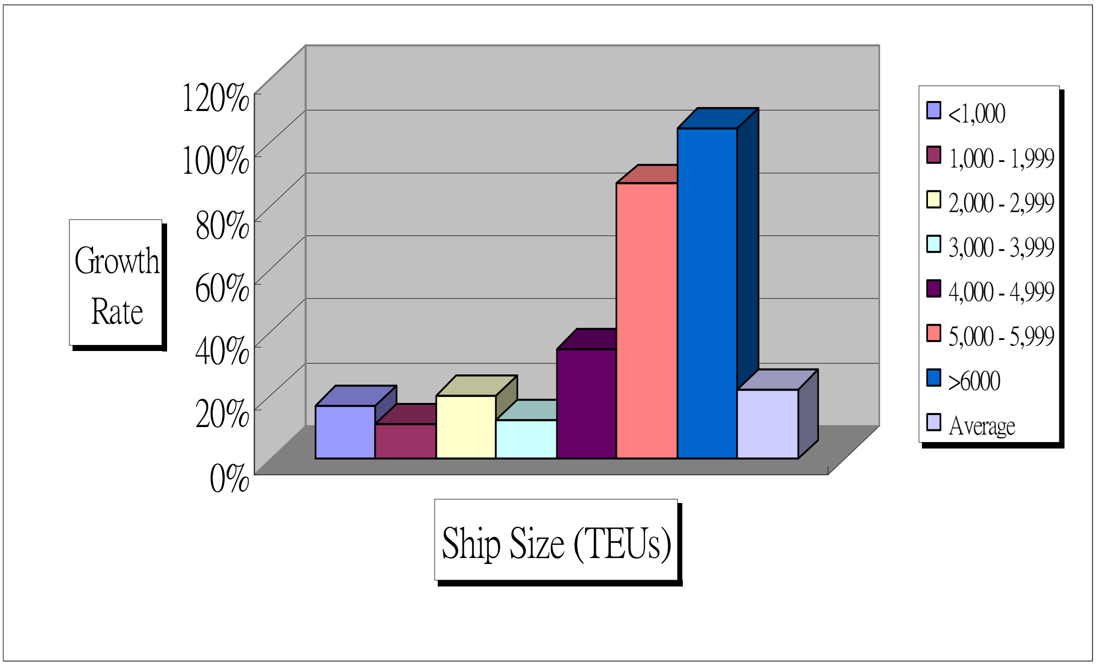
Table 2.2 shows the number of ships in 2003 and 2006, categorized according to carrying capacity. It is obvious that the increase in post-panamax ships (5,000 TEU plus) has been a key feature of recent expansion in the world container fleet, as shown in Figure 2.2.

Table 2.2 : Breakdown of Number of Ships (in ’000 TEUs) in the World Container Fleet (As of 1st January 2003 and 1st January 2006)

Ship size (TEUs)	Number of Vessels		Growth Rate (%)
	2003	2006	
< 1,000	884	1,036	17.2%
1,000 – 1,999	874	972	11.2%
2,000 – 2,999	481	579	20.4%
3,000 – 3,999	256	288	12.5%
4,000 – 4, 999	211	285	35.1%
5,000 – 5,999	116	217	87.1%
> 6,000	83	170	104.8%
Total/Average	2,905	3,547	22.1%

Source : Containerisation International 2003 and 2006

Figure 2.2 Growth Rate of World Container Fleet in terms of TEU Carrying Capacity (Between 2003 and 2006)



The Order Books

Recently, Containerisation International has reviewed that, 430 ships were ordered in 2005, with a combined slot capacity of 1.33 million TEUs, indicating reduction in the growth of new capacity, compared to 465 ships ordered in 2004 offering a total capacity of 1.65 million TEUs. Moreover, new orders for Ultra Large Containerships (ULCSs) tonnage have begun to slow down, with no orders for such ships in the 10-month period since July 2005. This phenomenon suggests that ship owners and ship operators are now more cautious regarding building ULCSs, given the overhang in supply for the next few years.

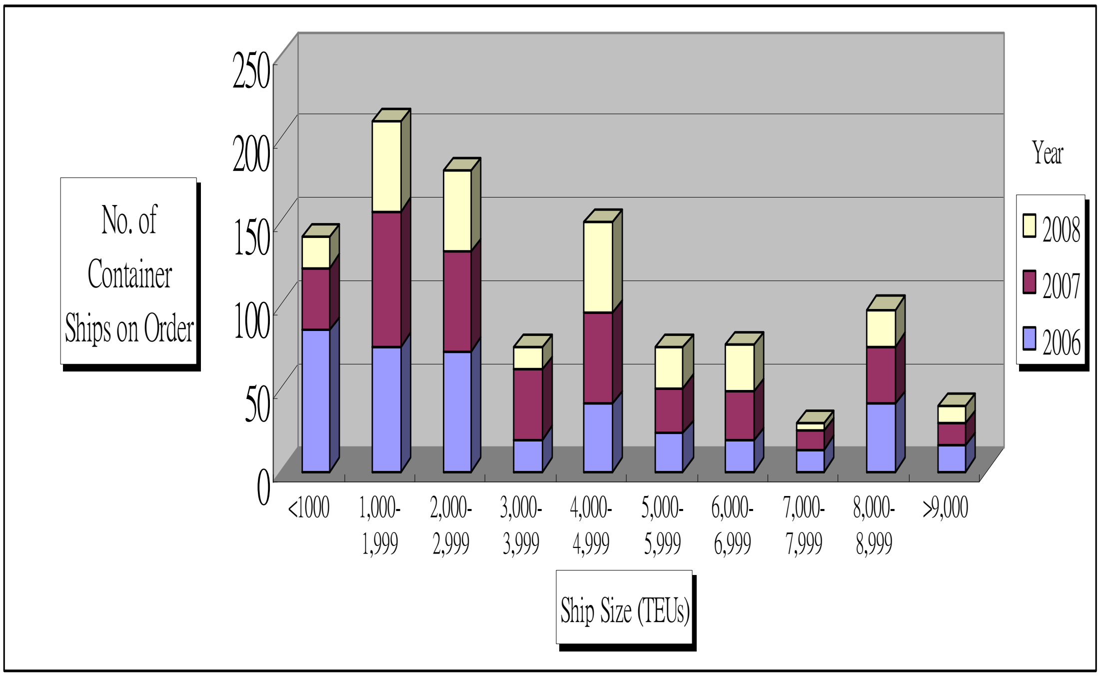
Table 2.3 and Figure 2.3 illustrate the number of new buildings between 2006 and 2008. Container fleet expansion for 2006 is expected to be within the region of 11%, with 399 new boxships offering a capacity of 1.36 million TEUs. A similar outlook is anticipated for 2007, with 393 vessels at 1.43 million TEUs, generating a fleet growth of 10.6%

Table 2.3 : World Containerships on Order, 2006 – 2008 (No. of Vessels)

Ships' Size	2006	2007	2008	Total
< 1,000	84	38	18	140
1,000 – 1,999	75	81	54	210
2,000 – 2,999	72	60	48	180
3,000 – 3,999	19	42	13	74
4,000 – 4,999	40	55	54	149
5,000 – 5,999	23	27	24	74
6,000 – 6,999	18	30	28	76
7,000 – 7,999	13	11	5	29
8,000 – 8,999	40	35	22	97
> 9,000	15	14	10	39
TOTAL	399	393	276	1068

Source : World Shipbuilding and Fairplay Solutions/Newbuildings 2005-2006

Figure 2.3 : Containerships on order, in terms of TEU carrying capacity (2006 – 2008)



The industry has shifted to build more handysize and panamax ships to support the expanded fleet of ULCSs. Another factor affecting the composition of the container fleet is scrapping of old tonnage. In the last two years, ship supply has been very tight and even older vessels have commanded high charter rates, leaving little incentive to scrap.

The Asia-Europe freight rate declined significantly in the first few months of 2006, making it more difficult to charter out old and small boxships and causing a few owners to scrap their vessels. If the trend of scraping old tonnage continues, together with the new orders, the container fleet will gradually become younger and larger in the next decade.

2.2 Emergence of the Ultra Large Containerships

Since the panamax barrier was broken in 1988, there has been a continuous increase in containership sizes. After the Maersk Line brought in the 6,000 plus TEU post-panamax ships in 1996, within six years, the number of this class of vessels has already exceeded 60. With the first 'super-post-panamax' vessel or ULCS coming into operation in the last quarter of 2003, many more 9,600/10,000 TEU ships are coming into service.

Table 2.4 : Representative Containerships Delivered (1970 – 2006)

Ship Name	Year	TEUs	LOA (m)	Beam (m)	Draft (m)
Sealand Navigator	1970	2,361	247.6	27.5	11.1
Nedlloyd Houtman	1977	3,005	258.7	32.3	13.0
Maersk Tokyo	1981	3,734	269.8	32.3	13.0
Nedlloyd Holland	1984	4,534	289.5	32.3	12.7
OOCL California	1995	4,960	276.0	40.0	14.0
Regina Maersk	1996	6,418	318.2	42.8	14.0
Sovereign Maersk	1997	7,060	346.7	42.0	14.5
Sven Maersk	1999	7,500	332.0	42.8	14.5
OOCL Shenzhen	2003	8,063	323.0	42.8	14.5
CMA CGM Hugo	2004	8,238	334.1	42.8	14.5
MSC Pamela	2005	9,178	336.7	45.6	14.5
Cosco Guangzhou	2006	9,500	350.6	42.8	14.5

Source: Marine Department of the HKSAR Government

Table 2.4 shows the representative containerships delivered between 1970 to 2006, illustrating the increase in principal dimensions of large containerships constructed in the intervening eras.

It is well known that, most large shipping lines have been geared to introducing a significant number of 8,000 TEU plus ships into their Asia/Europe and TransPacific routes in 2006 and 2007. As a result, by the end of this year, 250 ships at 6,000 TEUs and above will provide nearly 20% of overall global capacity, and this figure will rise to about 22% by the end of 2007.

Table 2.5 : Average TEUs per Boxship on order (2005 – 2007)

Year	Total Capacity (Million TEUs)	No. of Ships	Average (TEUs/ship)
2005	1.33	430	3,093
2006	1.36	399	3,408
2007	1.43	393	3,638

Source : World Shipbuilding, Fairplay Solution/Newbuildings & Containerisation International

Figure 2.4 : Growth of Average Newbuilding Sizes (2005 – 2007)

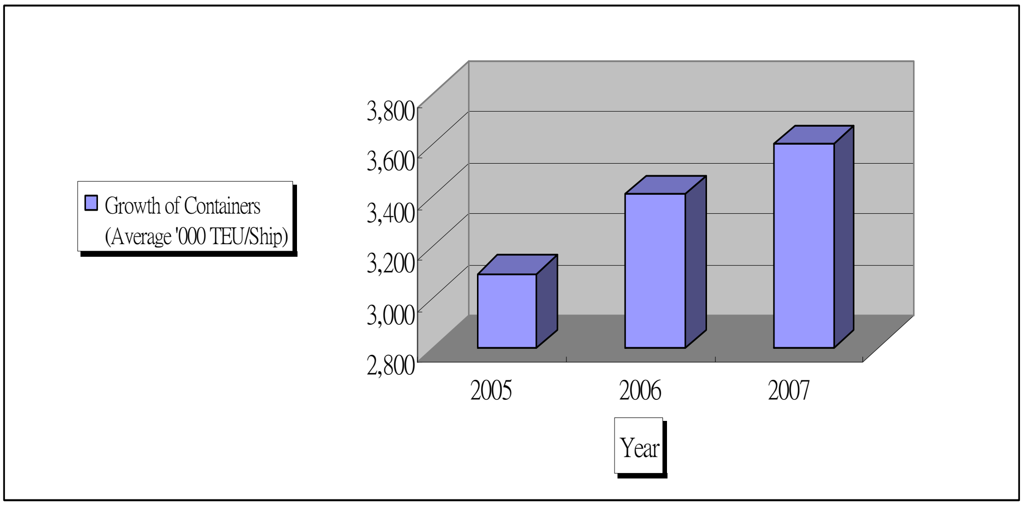


Table 2.5 and Figure 2.4 list the growth of containership sizes based on construction orders in the most recent years, in terms of average TEU carrying capacity underlining the trend towards larger containerships entering service in the next few years.

2.3 Feeder Services

The ULCSs on trans-continental trade are restricted by their draft and beam, and to a lesser extent, length and air draft, such that they are mainly restricted to calling at deep draft hub ports.

Feeder Network

Analysis of regional trading activities predicts the trade volume served by feeders and intra-regional shipping operations will be doubled during the period 2002-2012. With more new ULCSs coming into service, the feeder network in Asia will likely be developed into multi-tier services. In order to transship the large volume of containers, relatively larger feeders of up to 5,000 TEUs carrying capacity could be used. At the secondary ports, a significant number of containers may be carried by smaller feeders to their final port destinations.

Feeder Vessels

Feeder vessels connect the secondary ports with the hub ports. The deployment of these vessels helps to optimize their intended services, since they are smaller in size, with lesser draft but better manoevuring capabilities in order to be able to approach and access small ports. A very small number may continue to have cranes to serve ports without the necessary container handling equipment.

Shipping lines are aware that an efficient feeder service is an integral part of the container transportation chain. They realize that a lack of feeder tonnage in recent years is becoming a threat to the efficient movements of containers. As evident by the latest order books in Table 2.3, shipping lines are addressing this issue by building more vessels with smaller carrying capacity. The demand for feeder tonnage will also be met by decanting some panamax ships from the trans-continental routes when more capacity is taken up by the new ULCSs.

2.4 The Next Generation of Ultra Large Containerships (ULCSs)

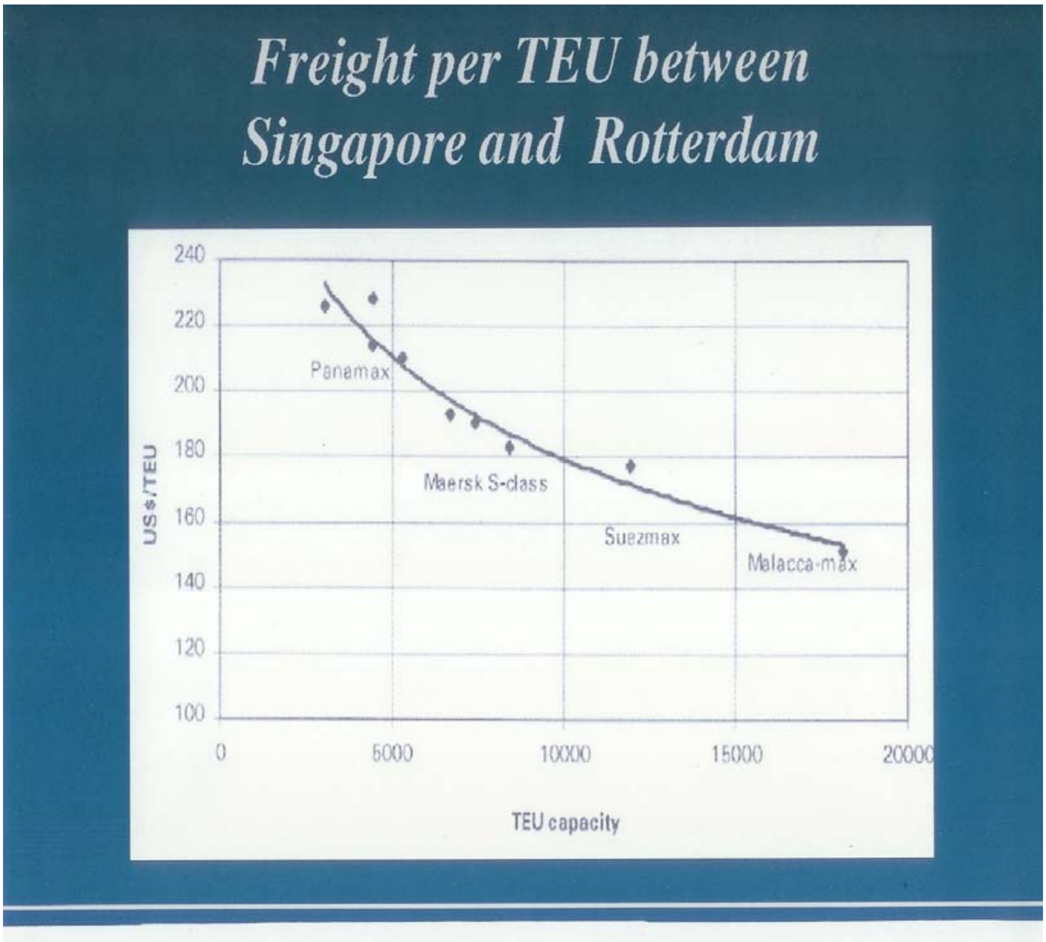
Considerations for the ULCSs

Economies of scale have been, amongst others, the driving force behind the ever larger containerships. On a slot-mile basis, the savings from larger ships are significant. It is also one of the few factors that are directly controlled by the shipping lines. Figure 2.5 presents this phenomenon.

The total running cost including interest repayments, depreciation, fuel, crewing and maintenance, of a 7,500 TEU post-panamax vessel is considered to be 13% cheaper than a panamax ship of 4,500 TEUs. Some shipbuilders capable of building the future ULCSs with a capacity exceeding 10,000 TEUs have nonetheless estimated that, its total running cost will be 29% cheaper than a 7,500 TEU post-panamax vessel.

Furthermore, once a major line advances to the next size echelon, the competitive nature of the shipping industry compels other companies to follow suit. The net effect has been a continuous rise in the size of the largest vessels.

Figure 2.5 illustrates the relationship of the Containerships sizes, in terms of freight per TEU



Source: Germanischer Lloyd

The Largest Known ULCS

In recent months, there have been discussions in the marine industry that ULCSs exceeding 10,000 TEUs are under construction or on order. It was given to understand that a series of containerships of the following configuration are now under construction in the Danish Odense Steel Shipyard, with the first ship Emma Maersk recently delivered to the Maersk Group:-

- Carrying capacity estimated of 13,500 TEUs;
- Length Overall (LOA) of 397m;
- Breadth of 56m (22 boxes across);
- Gross Tonnage (GT) of 170,794 tons;
- Design draft of 16.0m;[1]
- Design speed of 25 knots; and
- Single engine and propeller.

(M.V. Emma Maersk)

1 Advised by the operator that sailing draft would not exceed 15.0m

It was also given to understand that the above-mentioned class of ULCSs, through extending their design length by about 20m, their carrying capacity could be increased to over 15,000 TEUs.

The Lloyd's Register recently revealed that, the actual maximum size of containerships will be determined by the interplay between what can be constructed and propelled at the required speed, and what can be handled effectively by container terminals. That is to say, the actual containership's size to be built and operate will be constrained by:

- Ability of container terminals to physically berth the ships;
- Capacity of the terminals to load and discharge these ships within an acceptable timeframe; and
- Capabilities of the terminals to deliver and dispatch large consignments of containers within a short time frame, i.e. effectiveness of the hinterland linkages.

Indeed, economically meaningful operation of ULCSs depends on many factors. This includes the availability of a large volume of container cargo at the calling ports, hub ports with deep water port facilities, and high-speed cargo handling equipment. The lack of infrastructure and insufficient water depth at certain ports are certainly hindering the development of the giant vessels.

Design and construction of the future ULCSs must be executed with great care to ensure reliable and flexible services. Firstly, there is currently a clear trend towards the use of high cube containers (9 feet 6 inches high). Recent records have shown that about 30% of all containers handled today are high cube and it is expected on a continuous upward trend for the next decade.

Secondly, there is a similar trend towards the use of 45 foot containers in the industry. Currently, 45 foot boxes must be carried on deck with only a few exceptions. As the proportion of 45 foot boxes increases, it will be necessary also to accommodate these in the cargo holds.

Another major issue is the trading draft. Between the end of 1990s and early 2000s, it was common for ships to sail close to their design draft, which was typically at 14.5m. However, containerships are seldom found fully laden by weight and the design draft is not always utilized. Indeed, a recent review has identified a significant change in trading drafts between Asia and Europe. It observed that the large post-panamax containerships on the Asia and Europe trade are becoming lighter in their loaded drafts, from an average of nearly 90% five years ago to only around 85% recently. This structural imbalance is expected to continue in the next several years, resulting in actual drafts being significantly lighter than the design drafts.

Two effects have also become apparent. There are insufficient empty containers in Asia, but conversely, there is insufficient low value cargo in Europe to fill the ever-increasing number of empty containers being returned to Asia.

Views amongst the Industry

There are doubts among the industry on whether the benefits of economies of scale under such circumstances can be reached. Feedback from the industry, both publicized and through interviews/questionnaires, has shown that many key players view the recent spate of orders for ULCSs is a high risk strategy. Operation of these vessels must be at or near full capacity otherwise they become hideously expensive to run.

In order to fill the bigger ships, additional loading ports are necessary. Though transhipment services may be provided by the large shipping lines, past market surveys revealed that shippers have become skeptical about the reliability of indirect services. Polarised views against 'hubbing' and 'point-to-point' services still exist amongst leaders of the shipping industry.

The Chairman of a large French Container Line, in last spring openly warned his fellow container line operators to be 'very careful'[2], before allowing themselves to be tempted by proposals from the shipbuilders to place order for the ULCSs. He claimed that his company had no plans to order such ULCSs, but that some owners might do so as a means of reducing slot costs.

2 Lloyd's List, 1 April 2006

This may be supported by the order books that, the world's container fleet is already set to expand by 50% over the next two and a half years, but cargo growth is forecasted to fall well short of this. The Chairman's warning may be supplemented by the Chief Executive of another major container line, who noted that while in public a sense of optimism is being maintained, the shipping executives privately are painting a gloomy picture of falling rates[3].

On the other hand, the President of a large Chinese Container Line[4], claimed that the second half of 2006 will be a good time for new orders of shipbuildings, and his company will order different types of ships to cater for all service routes. As a matter of fact, the company will start deploying their Samsung-built 9,600 TEU ULCSs from this August, and a further of five 8,500 TEU vessels will follow in 2007/08.

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[3] Lloyd's List Maritime Asia, Spring 2006
[4] Containerization International 2006

The Marine Underwriters

Considering it from a different aspect, the rising TEU carrying capacity is also a known factor for marine risks. The value of cargo container will vary hugely from box to box, cargo to cargo. A 20-foot container and its cargo is, according to the marine underwriters, typically valued at around US$25,000 for low valued goods, and for high valued hi-tech items, it can easily reach two million US dollars.

Marine underwriters' greatest difficulty is assessing exposure in areas where accumulation occurs, whether on conveyance or at distribution/ collection points during the voyage in aggregation across a portfolio. The recent incident of the 'Hyundai Fortune', which went ablaze off the coast of Yemen, aroused serious attention of the marine insurance business.

The incident resulted in nearing 500 containers having been damaged, cargo to an estimated value of US$8 million being destroyed, and the ship declared a total loss. The 'Hyundai Fortune' was built in 1996 and is classed as post-panamax size with a carrying capacity of 5,550 TEUs. Taking into account the above estimates, it makes the ship's overall value nearing US$300 million. Another example is the 'Hanjin Pennsylvania'. The ship caught fire and exploded off the coast of Sri Lanka in November 2002, with only 3,000 TEUs on board and had a reported value of US$175 million.

Furthermore, there are many hazardous and toxic chemicals that are currently being carried on board containerships. It is a sector of business that is increasing. Together with the large amount of heavy-duty fuel oil carried on board these ships, in cases of grounding, fire and/or sinking, the environmental consequences and liabilities further aggravate the total exposure faced by the underwriters. To cover the risk, the premium for the future ULCSs may be raised to a much higher level.

In light of the fact that many contributing factors to achieving the economies of scale of operating the future ULCSs are uncertain at present, the industry believes that other than a few vessels of 13,500 TEUs to be built to test the market, a mass ordering of these vessels is unlikely in the next few years. This also explains the phenomenon that, even the South Korean shipbuilder Samsung Heavy Industries has very recently said that while they are planning to target the 13,500 TEU containerships, it is still a long way for the next generation of ULCSs at 18,000 TEUs to become a reality.

3. IMPACT OF ULTRA LARGE CONTAINERSHIPS ON HONG KONG'S PORT OPERATIONS

3.1 Ultra Large Containerships Visiting Hong Kong

Observations made in the last three years have proven that, all of the largest post-panamax vessels (6,000 TEU plus) in the world's container fleet have regularly visited Hong Kong. It is also considered reasonable that the ULCSs would continue to call at Hong Kong in future. Table 3.1 recorded the rising number of the post-pananmax containerships and ULCSs visited Hong Kong, including the number of trips they made, between 2003 and the first half of 2006.

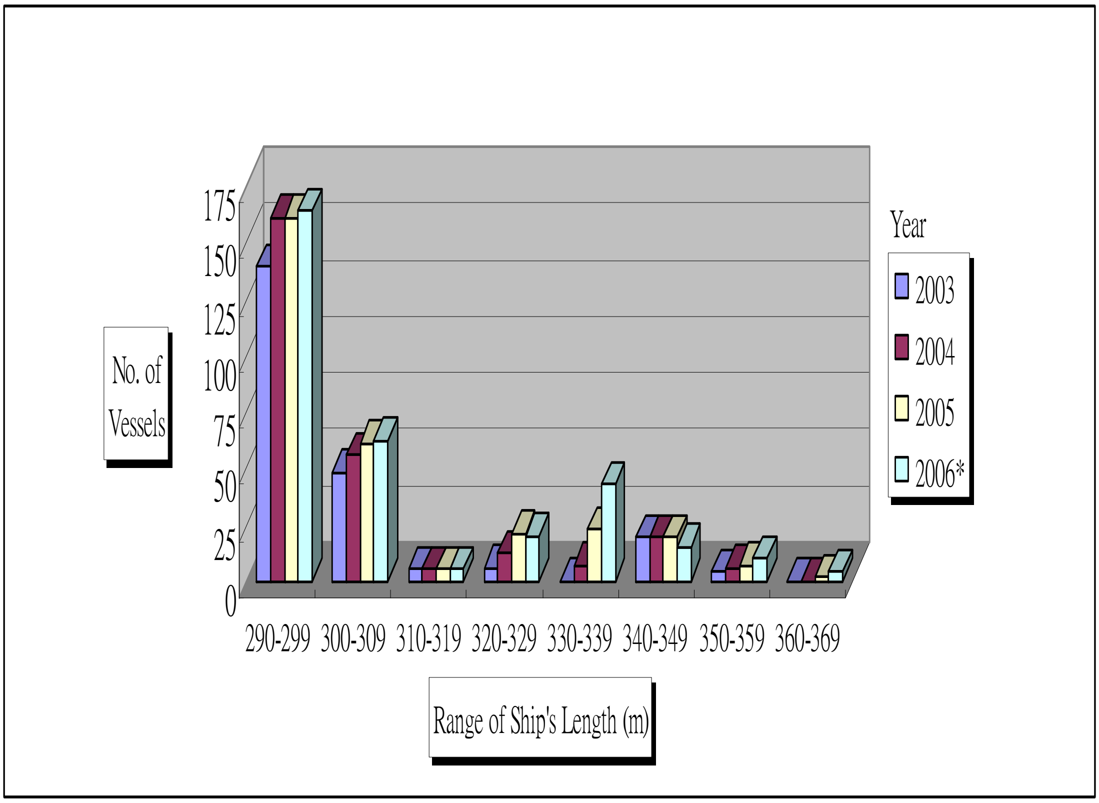
Table 3.1 : Number and Trips of Containerships of over 6,000 TEU Carrying Capacity visited Hong Kong (2003-2006)

Number/Year	2003	2004	2005	2006*
Ships	221	266	299	323
Trips	1,775	2,043	2,209	1,216

Source : Marine Department of the HKSAR Government
* (January – June 2006)

Figure 3.1 presents the breakdown of the length overall (LOA) of the post-panamax containerships visited Hong Kong during the period. It can be seen that these vessels mainly ranged between 290-309m, and the longer vessels made more calls in 2005.

Figure 3.1 : Containerships of over 6,000 TEU carrying capacity, in terms of LOA, visited Hong Kong between 2003 – 2006



* (January – June 2006)

Table 3.2 shows typical post-panamax and Ultra Large Containerships visited Hong Kong during 2003 to the first half of 2006. It is noteworthy that in the first half of 2006, about 30% belongs to ULCSs (i.e. over 8,000 TEU carrying capacity). It also illustrates that difference exists between a containership's 'official' TEU carrying capacity and her dimensions/Gross Tonnage amongst other similarly classed ships.

Table 3.2 : Typical post-panamax and ultra large containerships visited Hong Kong (2003 – 2006)

Ship Name	TEUs	LOA(m)	Beam(m)	Draft(m)	GRT
Hyundai Kingdom	5,900	304.0	40.0	14.0	74,373
CMA CGM Berlioz	6,000	300.0	40.3	14.2	73,157
MOL Promise	6,400	293.2	40.0	14.0	71,902
Regina Maersk	6,418	318.2	42.8	14.0	81,488
P&O Nedlloyd Shackleton	6,673	300.0	42.8	14.0	80,654
MSC Barbara	6,736	304.0	40.0	14.5	73,819
Sovereign Maersk	7,060	346.7	42.8	14.5	91,560
Hanjin Miami	7,471	300.0	42.8	14.5	82,794
Hamburg Express	7,500	320.0	42.8	14.5	88,493
Axel Maersk	7,960	352.0	42.8	15.0	93,496
Cosco Shenzhen	8,000	300.0	42.8	14.5	83,133
OOCL Shenzhen	8,063	323.0	42.8	14.5	89,097
Houston Express	8,500	332.4	43.2	14.5	94,483
Gjertrud Maersk	9,100	367.0	42.8	14.5	97,933
MSC Pamela	9,178	336.7	45.6	14.5	107,849
Cosco Guangzhou	9,500	350.6	42.8	14.5	109,149

Source : Marine Department of the HKSAR Government

3.2 Possible Constraints

In the last chapter we have discussed the design of the ULCS, namely the 13,500 TEU class, which will soon enter the market. In terms of both the design and construction aspects, it is possible to create a new class of 2nd generation ULCS able to carry 18,000 TEUs. However, the views of the shipping industry and shipbuilders believe that such a further step would unlikely be seen in the next five years. We would therefore, for the purpose of this study, focus on the possible challenges resulting from the 13,500 TEU class ULCSs.

<u>Ship's length – 'Quay length'</u>

Existing berths at Kwai Tsing container terminals were designed to accommodate vessels up to 350m in length, whilst we can anticipate future ULCSs ranged between 380-420m. However, the continuous quay provided by the newer terminals at the Kwai Tsing Container Basin would not impose any constraints on the length of future ULCSs. Furthermore, the terminal operators have a mechanism in place to share quay lengths when receiving a ship exceeding the available quay length.

Ship's length – 'Turning Basin'

Completion of Container Terminal No. 9 has provided the Kwai Tsing Container Basin with a width of 800m. According to the International Navigation Association (PIANC), the unassisted swinging area of vessels requires a diameter of between 1.8 and 2 times of the ship's length.

Recent studies revealed that, bow and stern thrusters equipped on the new mega cruise vessels provide them with excellent maneuverability. Indeed, these new ships, even without tug assistance, may maneuver in turning basins with a diameter of between 1.2 to 1.5 times the ship's length. As ULCSs are equipped with bow and/or stern thrusters, the turning circle becomes smaller.

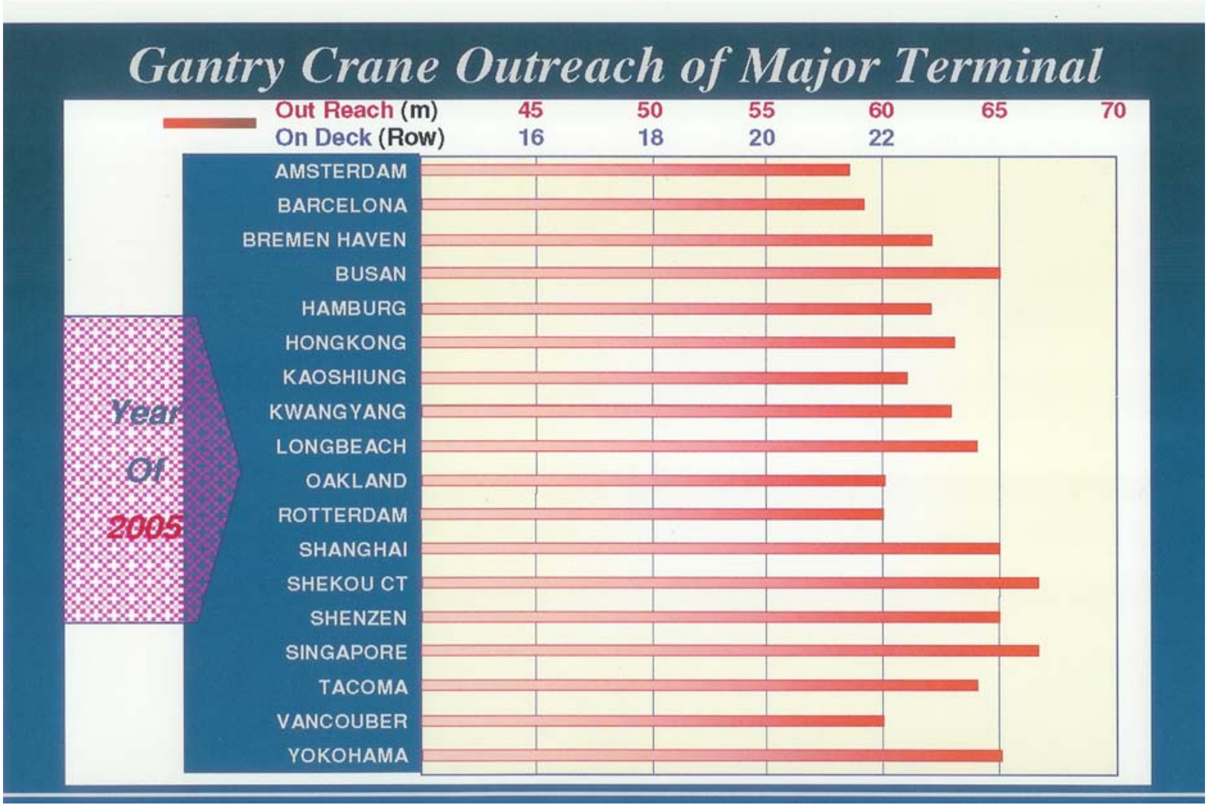
With the future ULCS's length at 400m and with bow/stern thrusters and tugs, the basin is adequate to turn these ships. The Hong Kong Pilots Association has also commented that, under normal weather condition, six tugs would be able to handle a ULCS under dead tow. However, turning these ships will require proper marine traffic coordination and planning to ensure navigational safety and efficiency.

Ship's Breadth – Quay Crane Outreach

The beam of the future ULCSs are of 56m, i.e. a maximum of 22 rows across. All terminal operators now in Hong Kong are equipped with quay cranes having sufficient outreach to serve ships with 22 rows of containers.

Figure 3.2 presents the crane outreach of the world's major container terminals, including Hong Kong, in the year 2005. As seen from the figure, the world's major terminals are well-prepared for reception of the future ULCSs in this aspect.

Figure 3.2 : Quay Crane Outreach of the World's Major Container Terminals



Source: Germanischer Lloyd

Ship's Draft – Quay Depth

Comparing with the design draft of the Maersk's ULCSs, Table 2.4 provides clear indications that, the sailing/operation draft of the future ULCSs is likely to remain in the region of 14m to 15m.

In the light of a number of factors, such as the use of tidal windows, reduction of speed, tug assistance and the sheltered condition of the Kwai Tsing Container Basin, together with the fact that actual drafts are always lighter than the design drafts. While the draft of Emma Maersk approaches the limit of the Basin depth, there should not be any insurmountable constraints to berth these ULCSs. However, it is now opportune that Hong Kong should consider the development of the future ULCSs, and to provide sufficient water depth to serve these vessels, in order to maintain the port's competitiveness as a regional hub.

Ship's Air Draft – The Stonecutters Bridge

It has also been revealed that, the maximum air draft for the next generation of ULCSs is expected to be 64.5m. This is counter verified by the air draft of Emma Maersk, 64.5m under light ship condition. Taking safety factors into consideration, the minimum navigational clearance requirement would be 73.5m. In other words, bridges with a soffit height of 73.5m or below may limit such vessels to navigate underneath.

This review has studied whether larger air draft would be required by the future ULCSs. For containerships, its air draft will be determined by the hull's depth plus the height of her superstructure. The hull depth is fixed by the height of container stacks in the cargo holds. This has already been maximized because, without intermediate supports for the container stacks, the collapse strength of individual containers has been reached. As the height of the superstructure is mainly determined upon the height of container stacks on deck, taking into account of the hull depth development, this is likely to remain static.

In other words, maximum air draft for the next generation of ULCSs is expected to remain at 64.5m. Considering that the future Stonecutters Bridge provides a navigation clearance of 73.5m, air draft should not be a significant factor for accessing the Kwai Tsing Container Basin.

3.3 Views of the Industry

Various representatives of the container shipping industry were either interviewed or had returned their responses to our questionnaires, providing their views on the possible impacts resulting from the existing and near future ULCSs visiting Hong Kong.

In general, the industry considered that, the requirements for a hub port to receive the future 13,500 TEU containerships should be: -

- Ability to berth vessels up to 400m LOA
- Depth of water be available for vessels at least of 15m draft
- Crane reach for vessels having 24 rows across
- Container handling speed of 250 – 350 moves per hour

Most believed that the next generation of ULCSs is not likely to join the market in the coming five years. The 15.5m water depth now in the Kwai Tsing Container Basin and its approaches, should be sufficient to cater for the ULCSs coming into service. Nevertheless, they considered that deeper water depth of at least 17m may be required in future, and a tighter traffic control should be exercised within the Basin, particularly when berths on both sides are being occupied.

4 CONCLUSIONS

4.1 Post-panamax containerships and feeder vessels will retain an important position and, ULCSs of estimated carrying capacity at 13,500 TEUs will soon come into operation. Albeit ship designers/builders have the confidence and enthusiasm to construct containerships reaching 18,000 TEUs carrying capacity, the industry generally believe that it would not come on stream within the next five years.

4.2 The Order Books for the next three years has seen a lesser supply in the range of sub-panamax (3,000 – 3,999 TEU) and post-panamax (5,000 – 7,999 TEU) sizes of containerships. A good supply is however going to be made in the smaller size (1,000 – 2,999 TEU) vessels, since there are strong requirements for the feeder services.

4.3 As the length, breadth and depth, including air-draft for the ULCSs to come on stream in the next few years, are expected to fall within the range of the previous findings, the Port of Hong Kong will be able to receive these ships without major constraints. However, the general consensus of major hub ports is to prepare to accommodate the next generation of ULCSs, and dredge to 16m - 17m is necessary to welcome these ships.

4.4 Given continued technological development, it is possible that the next generation of ULCSs of up to 18,000 TEUs may be developed within the next decade. This should be closely monitored and future reviews on its development should be conducted at a suitable time.

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Annex 1

Categories of Containerships

Category	TEU Carrying Capacity
Small Handysize	< 1,000
Handysize	1,000 – 2,999
Sub-panamax	3,000 – 3,999
Panamax	4,000 – 4,999
Post-panamax	5,000 – 7,999
Ultra Large Containership	**8,000 and above**
Super-post-panamax	8,000 – 9,999
Suezmax	10,000 – 12,999
Malaccamax	> 13,000

Annex 2

Depth of Water for Major Container Ports

Ports	Water Depth (m)
Antwerp	17.0
Barcelona	16.0
Bremerhaven	12.8 (14.5)
Busan	16.0
Dubai	16.0
Felixstowe	15.0
Hamburg	16.7
Hong Kong	15.5
Kaohsiung	15.0
Le Harve	15.5
Long Beach/Los Angeles	16.8
New York	15.8
Oakland	15.2
Osaka	15.0
Rotterdam	23.0 (16.6)
Seattle	15.0
Shanghai	14.2 (YS-17.0)
Singapore	16.0
Tokyo	15.0
Yantian	16.0