Port Benchmarking for Assessing Hong Kong's Maritime Services and Associated Costs with other Major International Ports

Marine Department
Planning, Development and Port Security Branch
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Executive Summary

1. Introduction

1.1 In order to assess the relative position of the port of Hong Kong in relation to other leading container ports, a comparative study of port costs and port facilities was conducted in 2001. The current study is an update of the 2001 study.

1.2 Hong Kong is a mature port with different types of cargo handling facilities. These facilities handle containers, general cargoes, petroleum, other liquid bulk, dry bulk, and vehicles. Although these facilities are integral parts of the port, with the exception of the container terminals, the majority of the cargo handled are for domestic consumption. From the 2005 shipping and cargo statistical data, containerized cargoes handled in Hong Kong represented about 74% by weight of the total cargo throughput of Hong Kong. Thus, for the purpose of this study, the focus is to benchmark the related port charges incurred by container ships at container handling facilities in Hong Kong, and against other leading container ports of the world.

1.3 Since the 2001 study, Hong Kong has faced growing competition from other container ports in the region, in particular, the south China ports where container terminal capacity has increased by approximately 150 %. In the past five years, the growth of our container throughput has been marginal. The growth in 2005 was 2%, compared year-on-year, bringing the total container throughput to 22.43 million Twenty-foot Equivalent Units (TEU). The latest growth rate is well below our competitor port Shenzhen (+18.6% to 16.19 million TEU) where direct cargo access by road from the manufacturing areas in the Pearl River Delta is easier and by sea from the western delta areas is comparatively similar.

1.4 Hong Kong is a free market economy with the container terminals owned and operated by private enterprises. The various charges and tariffs related to terminal

and shipping operations are set by terminal operators and shipping lines. Given these charges are confidential commercial decisions outside the realms of the Government, this study would not compare these charges with other ports, however empirical evidence indicates these charges have been reducing over the past decade but remain higher than those in Shenzhen.

2. Objectives of the Study

2.1 The objectives of this study are :

- To conduct a benchmarking exercise focusing on comparative port costs and characteristics of container terminals at leading container ports around the world;
- To evaluate the productivity of our container terminals and compare it with other major container ports;
- To conduct an analysis on services provided to visiting ships, port formality procedures and application of information technology in Hong Kong;
- To position the port of Hong Kong amongst major ports worldwide taking into account the cost and performance of the port; and
- to formulate recommendations, as far as possible, on matters related to port charges and services provided by the Government.

3. Scope and Methodology

3.1 For quantitative comparison purpose, the top 20 container ports in 2005 are chosen for benchmarking on the following indicators:-

- Individual port cost items including harbour and light dues, pilotage, towage, mooring/unmorring and other ancillary charges;
- Total port charges;

- Container throughput growth; and
- Terminal characteristics including number of berths, total quay length, maximum alongside depth, total terminal area, total storage capacity, productivity per metre quay length and ratio of storage capacity over terminal area.

3.2 While quantitative comparisons are not practicable on services provided to ships, port formality procedures, and application of information technology, these areas are covered by empirical analysis.

3.3 This study involves an extensive survey of literatures with a view to collating the latest data, available at the time of the data collection phase of this study, on port charges, container throughput (TEUs), characteristics of container terminals, and port formalities. In parallel, interviews with international shipping lines and shipping agencies have been conducted so as to obtain their views on the performance of the Hong Kong port.

4. Findings

4.1 The key findings are summarised below :-

i. The position on total port charges is similar to the findings in 2001. Hong Kong remains as one of the ports with the lowest cost in the world with total port charges only slightly higher than Singapore and Port Klang in the region.

ii. The growth of container throughputs in Hong Kong from 2001 to 2005 was generally lower than other top container ports. The less encouraging achievement in throughput growth indicates that Hong Kong is unable to get an even share of the strong growth in

Mainland's container volume. Though Hong Kong is expected to benefit from Mainland's economic growth, appropriate measures need to be taken, if better throughput increase is to be achieved.

iii. In terms of number of berths and total quay length, Hong Kong is average in the global context and second to Singapore in terms of regional context. The available alongside water depth of Hong Kong's container terminals is 15 metres which is average for leading ports. The Kwai Tsing container port handled 1,745 TEU per metre quay length in 2004 which was average amongst leading container ports. The physical size of Hong Kong's container terminals is considered average yet our terminals have the highest container storage capacity in the world. The ratio of container storage to total terminal area in 2004 at 74 TEU per thousand square metres ranks the fifth behind Kaohsiung.

iv. Worldwide crane productivity ranges from 23 to 40 moves per hour (MPH) with many advanced ports able to achieve a rate of at least 30 MPH. For Hong Kong's container terminals, the average crane rate is 36 MPH with peak rate at 40 MPH. This makes Hong Kong one of the most efficient container port in the world.

v. The analysis on services reveals that Hong Kong is providing world class port services to visiting ships and port formality procedures are considered very satisfactory. Hong Kong may be considered a little lagging in terms of IT application amongst leading container ports worldwide, but it is more advanced than other ports in this region.

5. Recommendations

5.1 From the analysis and findings of this study, it is recommended that :-

- Low and simple port charge strategy should be continued.

- Efficient and simple port formalities should be maintained.

- The two suggestions made by the shipping industry on providing port formality service at Kwai Chung and reducing physical inspection of the trading certificates of Hong Kong registered ship will be addressed by the MD eBS Phase 2, the effectiveness of this system on alleviating these issues should be taken into account in system development.

- Continuous effort should be given to further promote and develop IT applications with a view to providing more user friendly automated port and shipping services to our customers.

- Action should be taken to improve cargo access to/from the port from the hinterland areas.

- Given competitive demands, terminal tariff and shipping charges should continue to ease towards the prevailing levels at competitive facilities in Shenzhen.

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1.3 Since the 2001 study, Hong Kong has faced growing competition from other container ports in the region, in particular, the south China ports where container terminal capacity has increased by approximately 150 %. In the past five years, the growth of our container throughput has been marginal. The growth in 2005 was 2%, compared year-on-year, bringing the total container throughput to 22.43 million Twenty-foot Equivalent Units (TEU). The latest growth rate is well below our competitor port Shenzhen (+18.6% to 16.19 million TEU) where direct cargo access by road from the manufacturing areas in the eastern Pearl River Delta is easier and by sea from the western delta areas is comparatively similar.

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- Total port charges;
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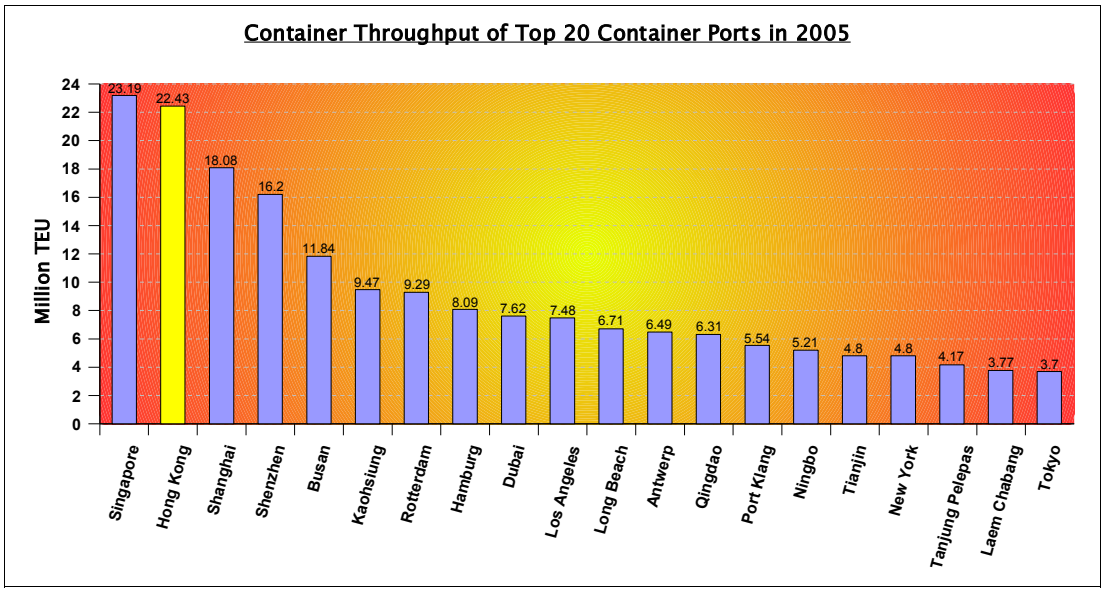


(Figure 3.1)

4. Methodology

4.1 This study involves an extensive survey of literatures with a view to collating the latest data, available at the time of the data collection phase of this study, on port charges, container throughput (TEUs), characteristics of container terminals, and port formalities. In parallel, interviews with international shipping lines and shipping agencies have been conducted so as to obtain their views on the performance of the Hong Kong port.

4.2 To facilitate comparisons with different ports, all port costs are denominated in US currency.

5. Assumptions

5.1 In the calculation of port charges, two popular cost elements have been excluded, namely berthage/wharfage and agency fees. The main reasons being:

(i) In a modern container terminal, berthage/wharfage fees are normally incorporated in the box-handling rate. As such, the berthage/wharfage fees are considered as a cargo handling charge; and

(ii) According to the liner shipping industry, there has been a growing trend towards bringing the agency functions in-house by liner operators and many shipping lines no longer require the employment of local shipping agencies to service their container ships during each port call. This means that agency fees can be taken out of the port charges equation as agency functions are taken up by carrier-owned agency offices.

5.2 Other assumptions are:

(i) Despite the trend that container ships are getting larger in size in recent years, the size of the model ship only relates to absolute port disbursement but it would not cause significant difference in benchmarking type comparisons. To facilitate comparison with the results obtained in the 2001 study, the same panamax size model ship is used for the calculation of port disbursement data. The particulars of this model container ship are as follows:

- GRT: 50,350 tonnes
- NRT: 28,369 tonnes
- Capacity: 4,200 TEUs
- Length: 270 m
- Draft: in/out 12.0 m
- Towage: 2 mooring / unmooring tugs

(ii) no overtime and holiday expenses are involved. All port cost calculations are based on standard rates to facilitate like-for-like comparisons.

6. Benchmarking for Port Charges

6.1 When a ship calls at a port, the following costs are normally incurred: port charges, cargo expenses and operating costs. In addition, bunker costs may also be incurred. In this study, the focus will be centred around port charges which are the costs levied on the carriers for using the port and its associated facilities based on 2005 prices.

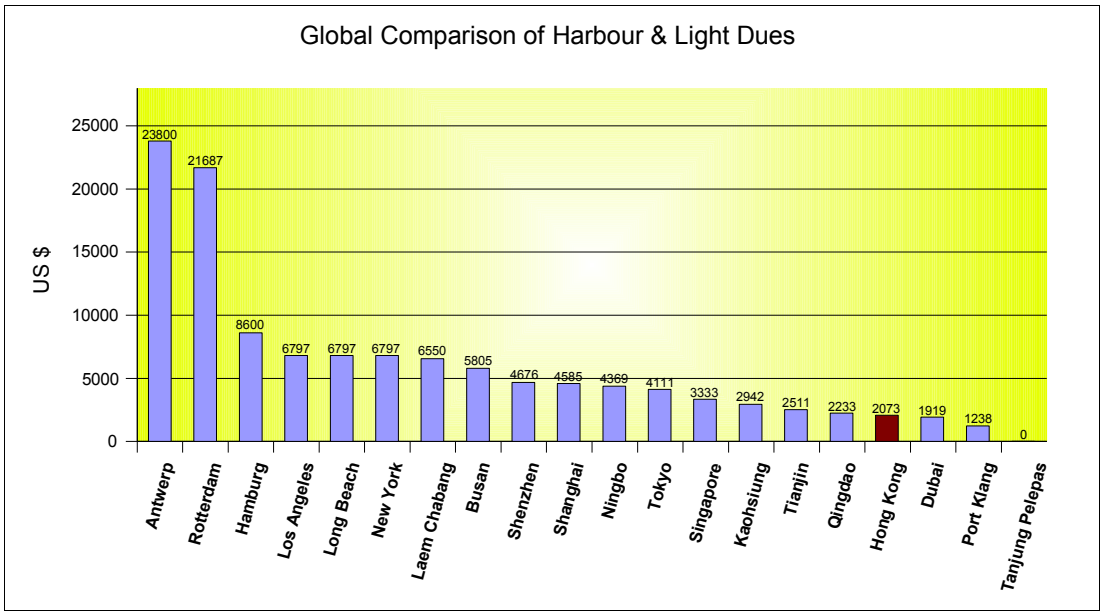
6.2 Broadly speaking, port charges are made up of the sum of various tariffs which are based on the ship's dimensions (e.g. Gross Registered Tonnage (GRT), Net Registered Tonnage (NRT), length, draft and etc.). It should be noted that this practice may vary from port to port, and in certain cases other non-conventional bases may be used for calculation of tariffs. For the purpose of making comparisons in this study, port charges include harbour and light dues; pilotage; towage; mooring/unmooring; and ancillary charges. Total port charges is the sum of the above charges a ship incurred at a port. It should be noted that in the case of Tanjung Pelepas all port charges are consolidated into a single charge which will be shown in the total port charges comparison.

Harbour and Light Dues (Figures 6.1 - 6.2)

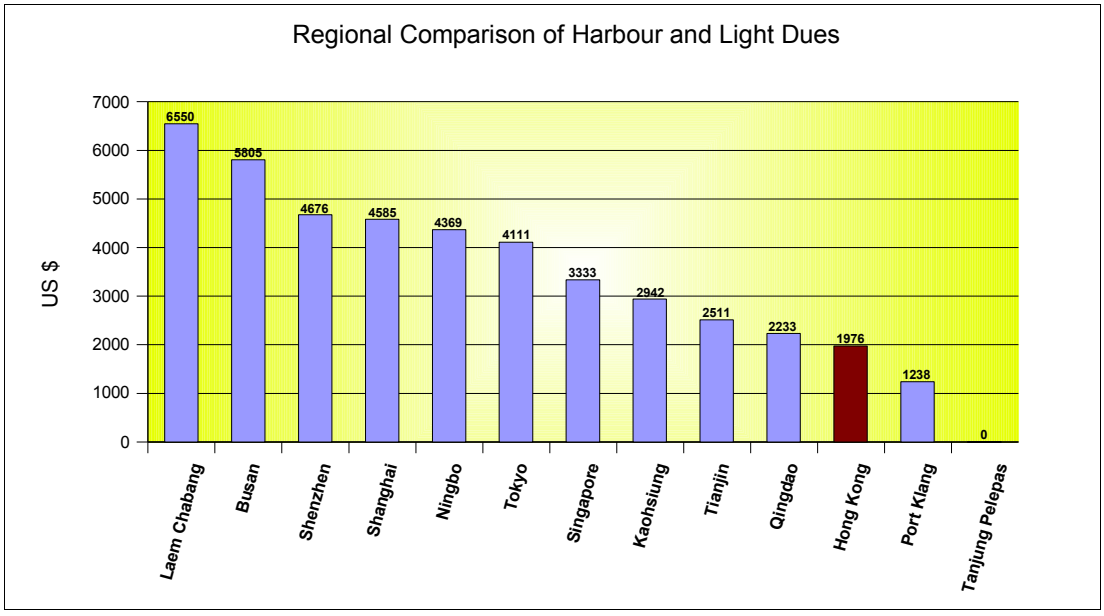
6.3 Harbour and light dues are charges that do not affixed with a specific port service. They are in general charged by port authorities for using a port according to the tonnages of vessels. Some ports may name this type of charges simply as port dues, harbour dues, light dues or tonnage dues.

6.4 From the global comparison in Figure 6.1, we can see that European ports are the most costly followed by US ports and Asian ports.

6.5 As can be seen in Figures 6.1 and 6.2, Hong Kong's harbour and light dues is found to be very low in both global and regional context. Although Hong Kong is no longer the least expensive port as in the last study, Hong Kong is now slightly higher than Dubai and Port Klang. The global average and regional average of harbour and light dues are US$ 6,354 and US$ 3,694 and Hong Kong's dues is US$ 2,073 which is 33% and 56% of the global and regional average respectively.



(Figure 6.1)

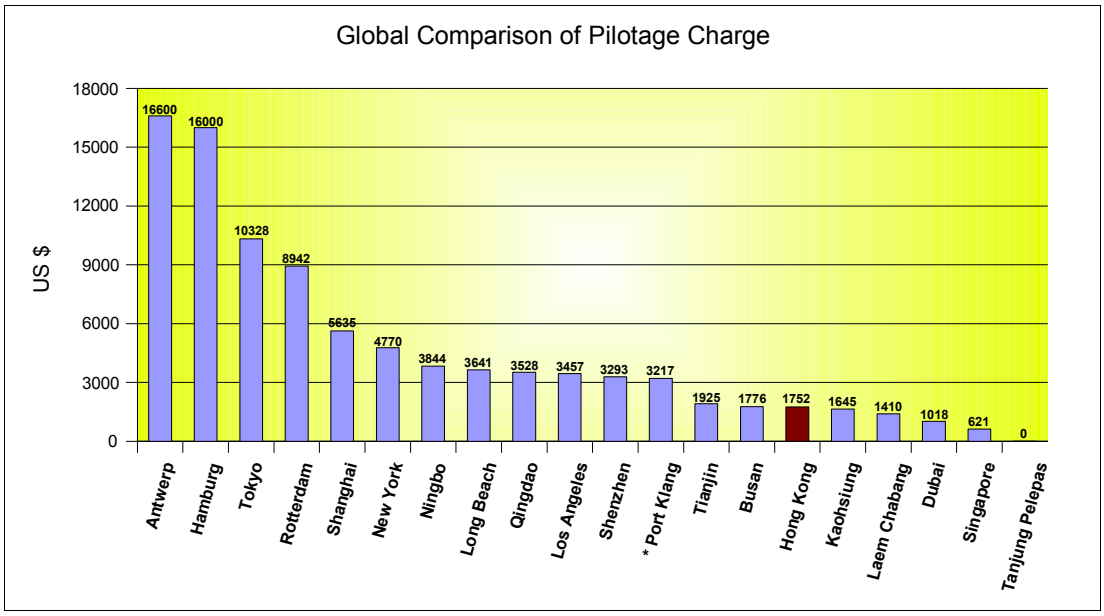


(Figure 6.2)

Pilotage Charge (Figures 6.3 - 6.4)

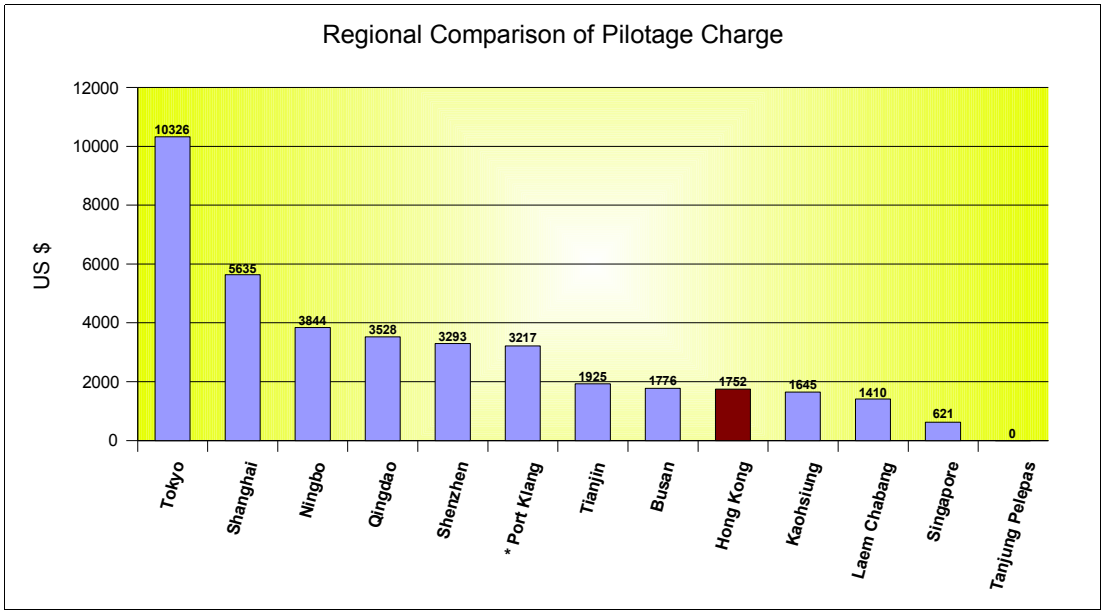
6.6 Pilotage service is provided either by the port authorites or private companies. pilotage charge is usually calculated on the size of a vessel and/or the distance under pilotage. The cost for providing pilotage services to river and inland ports are therefore usually higher. This is reflected in the global comparison of pilotage charge (Figure 6.3) that Antwerp, Hamburg, Tokyo (require a bay pilot), Rotterdam and Shanghai appear as the top five ports.

6.7 Given our geographical benefit, Hong Kong's pilotage cost, named as pilotage dues, is comparatively lower. Our pilotage dues ranks the fifth lowest globally and the fourth regionally (Figure 6.4). Hong Kong's pilotage dues has been revised twice since the last study. In 2003 part of the additional dues were reduced. While in 2005, the basic due has been increased together with increases in majority of the additional dues. Despite the price revision in 2005, the position of Hong Kong's pilotage cost is still lower than that in Shenzhen.



* Also includes towage and mooring/unmooring charges

(Figure 6.3)

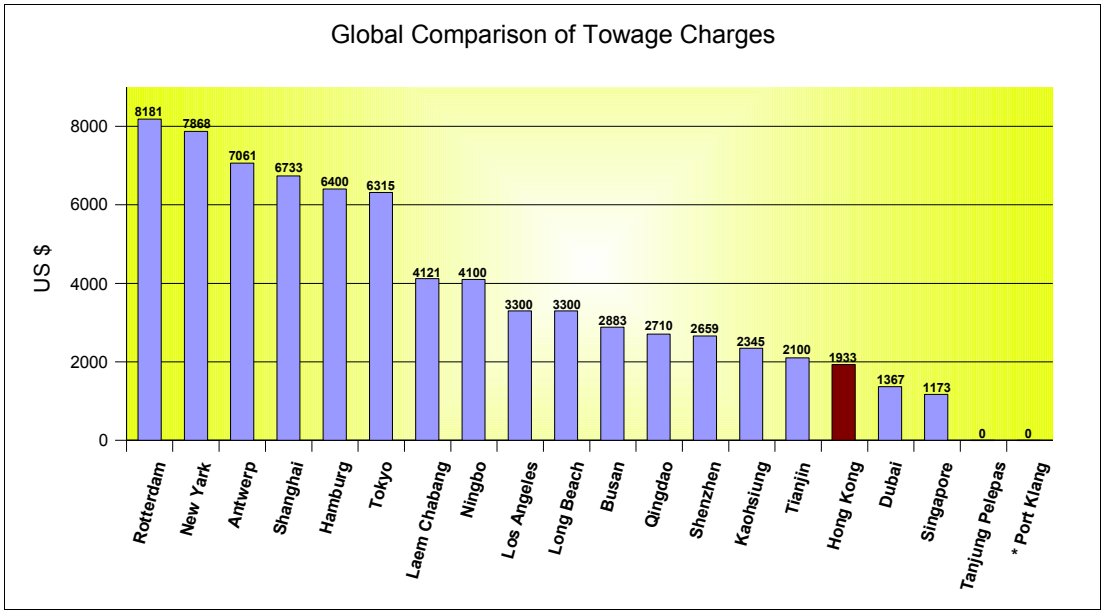


* Also includes towage and mooring/unmooring charges

(Figure 6.4)

Towage Charge (Figures 6.5 - 6.6)

6.8 Comparisons of towage cost indicate that there are wide variations between ports. The highest towage cost is found at Rotterdam which is over US$ 8,000, about 7 times of the lowest port - Singapore at US$ 1,173. Similar to pilotage, towage costs are in general higher in river and inland ports. New York seems to be the exception as it is located at the river mouth yet it has a rather expensive towage cost. Comparatively Hong Kong's towage cost is at the low side of both the global and regional comparisons, as found in the previous study.



* The towage charge of Port Klang is included in the pilotage charge

(Figure 6.5)

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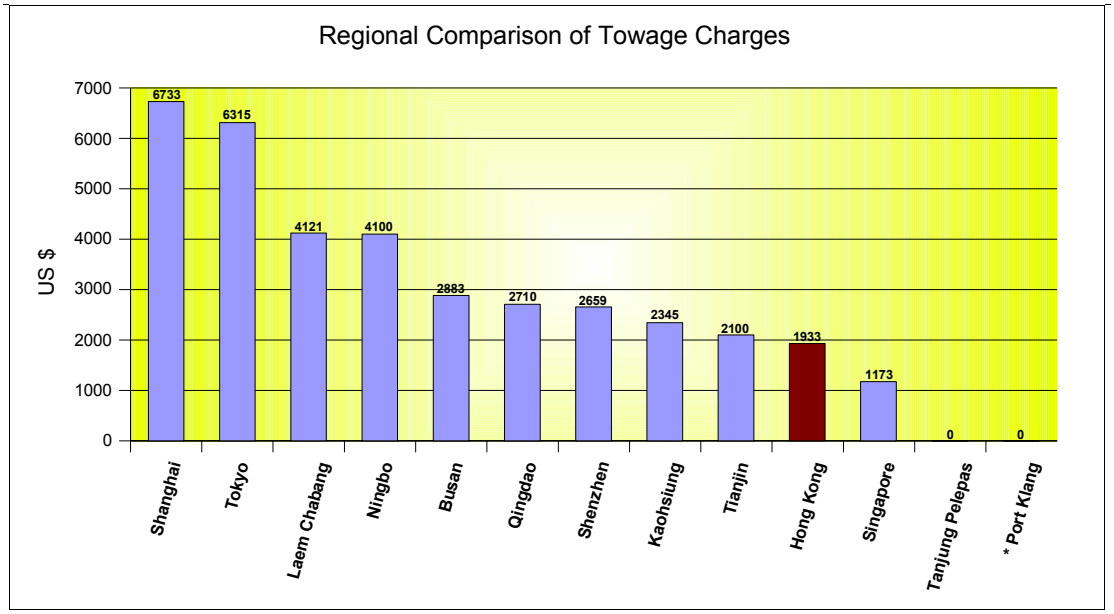
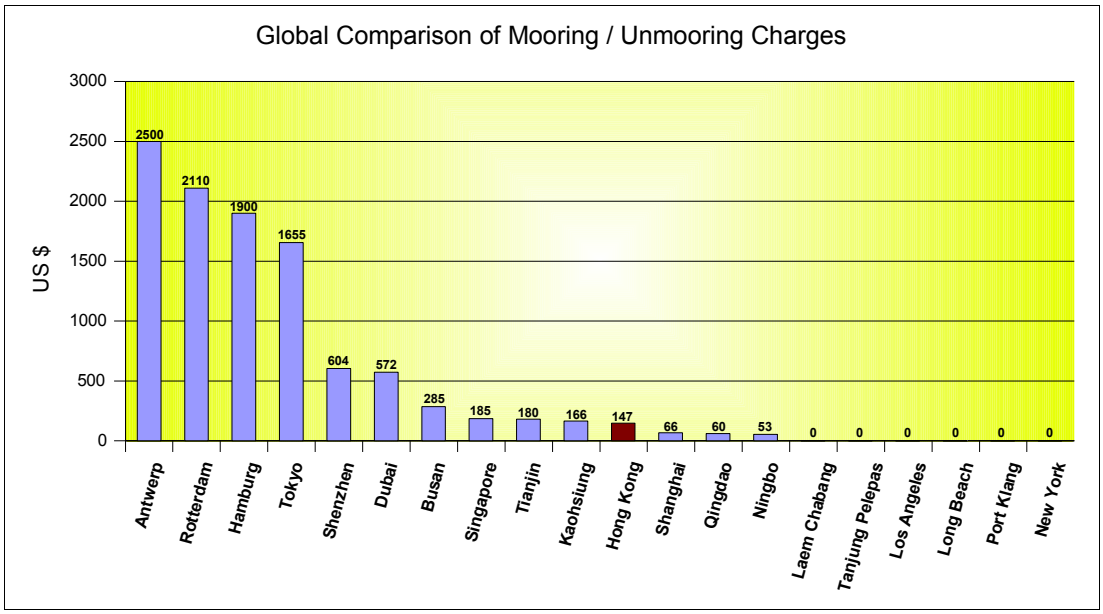


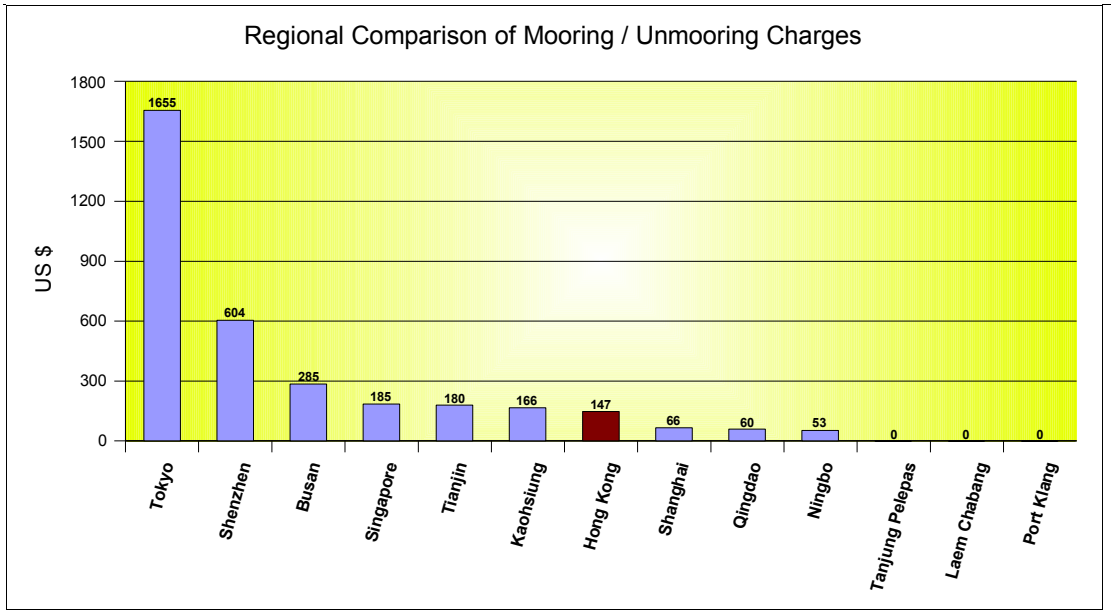
(Figure 6.6)

Mooring/Unmooring Charge (Figures 6.7 - 6.8)

6.9 The differentiation of this labour intensive charge between ports is quite significant. The highest charge is at Antwerp where US$ 2,500 will be levied on the model vessel which is 47 times higher than the lowest port Ningbo at US$ 53. Similar to that found in the 2001 study, Hong Kong's mooring / unmooring charge is comparatively low in both global and regional context.



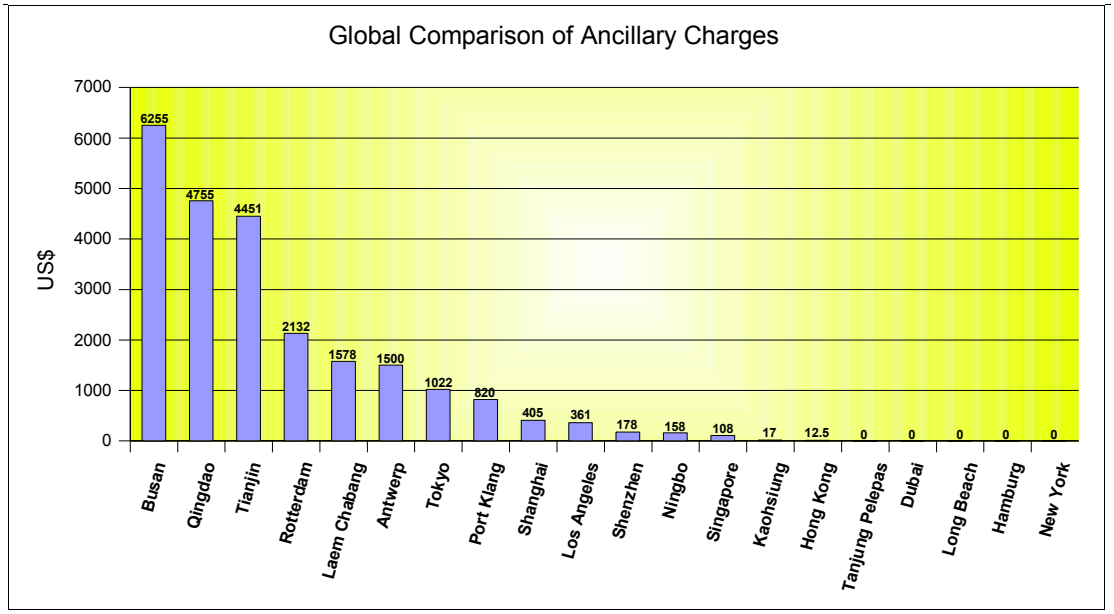
(Figure 6.7)



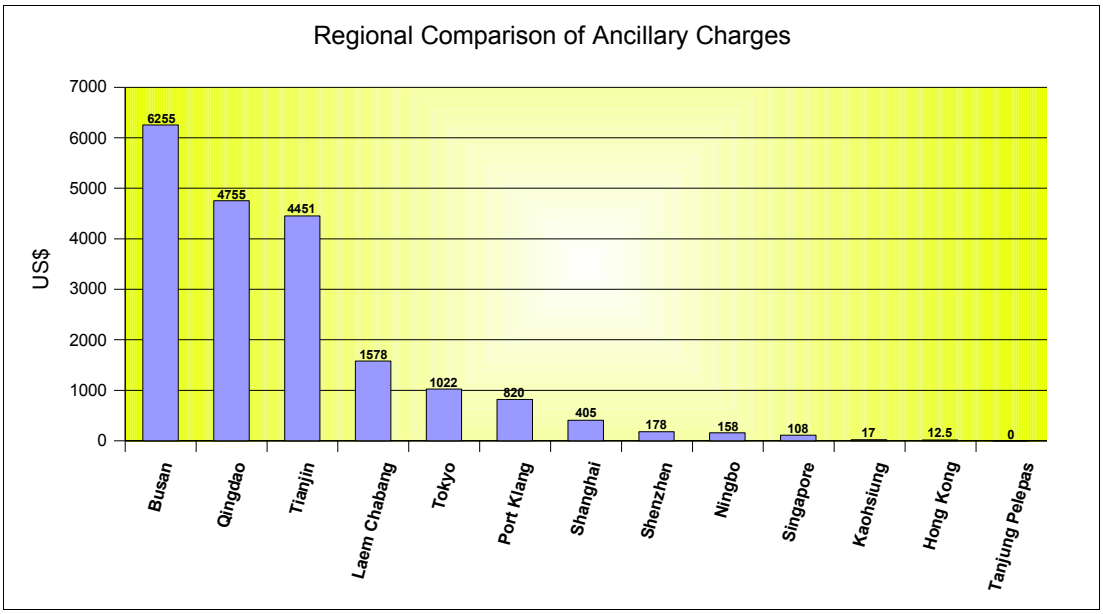
(Figure 6.8)

Ancillary Charges (Figures 6.9 - 6.10)

6.10 Other than the above four items, other charges imposed to ships by port authorities are grouped as ancillary charges. These charges come under many different hats, examples are port clearance charge; port entry fee; maritime welfare charge; harbour cleaning and maintenance fee; VTS user fee and etc. It should be noted that different ports levy different charges and a few ports do not have any charge of this category. For this reason only the total of the ancillary charges are compared. From Figures 6.9 and 6.10, it can be seen that Hong Kong's total ancillary charges is the lowest amongst the ports that charge some form of ancillary charges. The conclusion made in the last report that Hong Kong's ancillary charges was minimal remains valid.



(Figure 6.9)

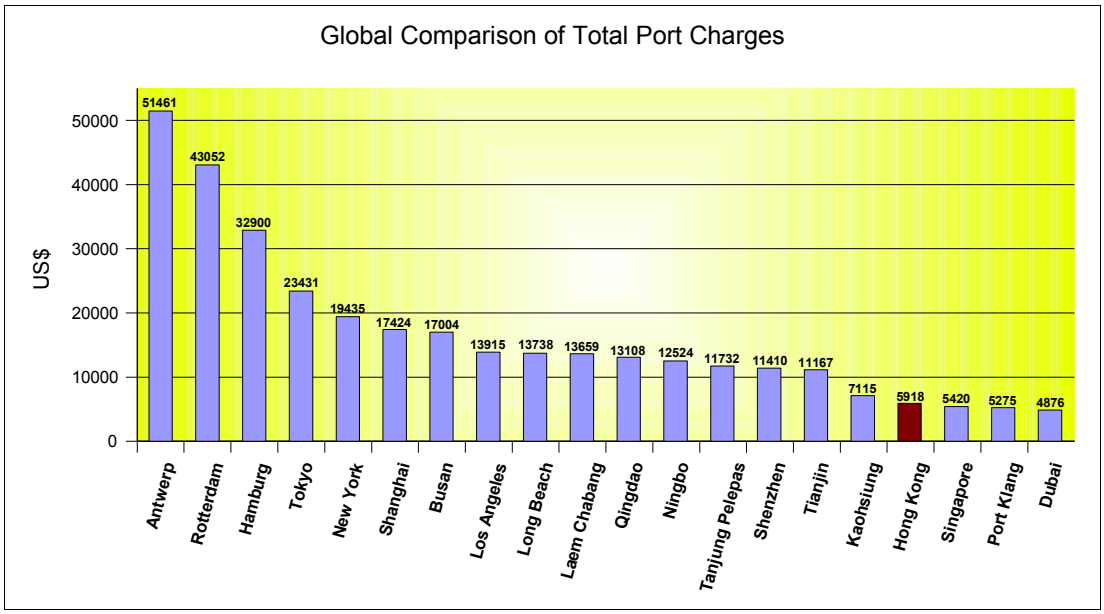


(Figure 6.10)

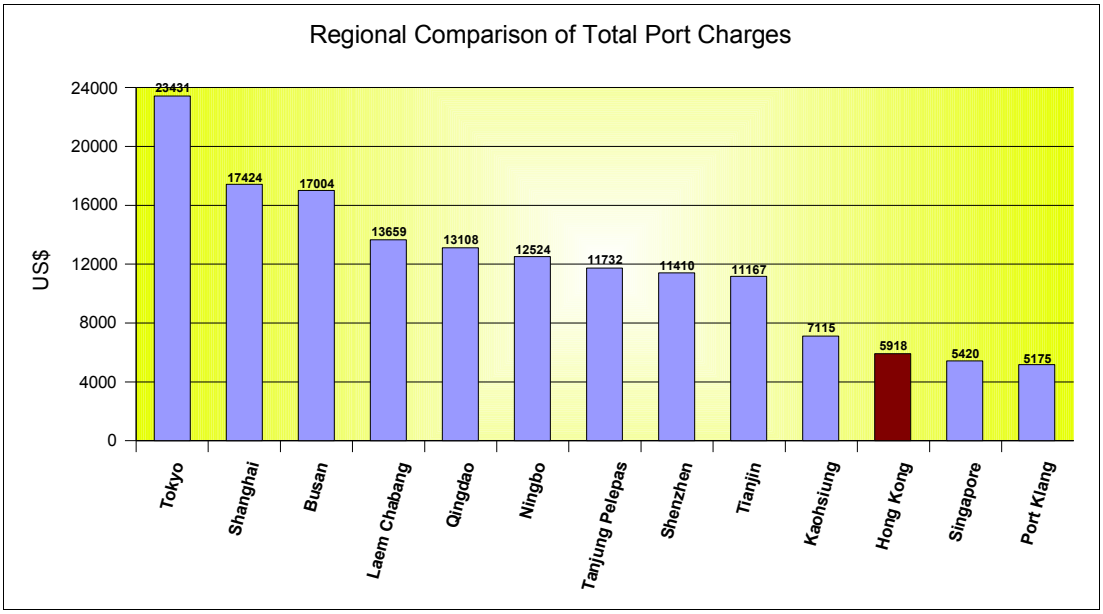
Total Port Charges (Figures 6.11 - 6.12)

6.11 The collected data, listed in Figure 6.11, indicate that the price range of total port charges per call by the model ship varies between US$ 51,461 at Antwerp to US$ 4,876 at Dubai. Amongst the 20 leading container ports, Hong Kong lies at the lower end at US$ 5,918 per call which only slightly higher than Singapore (US$ 5,420) and Port Klang (US$ 5,275) in the region, and Dubai (US$ 4,876) in the global context. The ranking on total port charge is the same as in the last study.

6.12 As shown in Figure 6.12, Hong Kong maintains its position as one of the lowest cost ports in Asia.



(Figure 6.11)

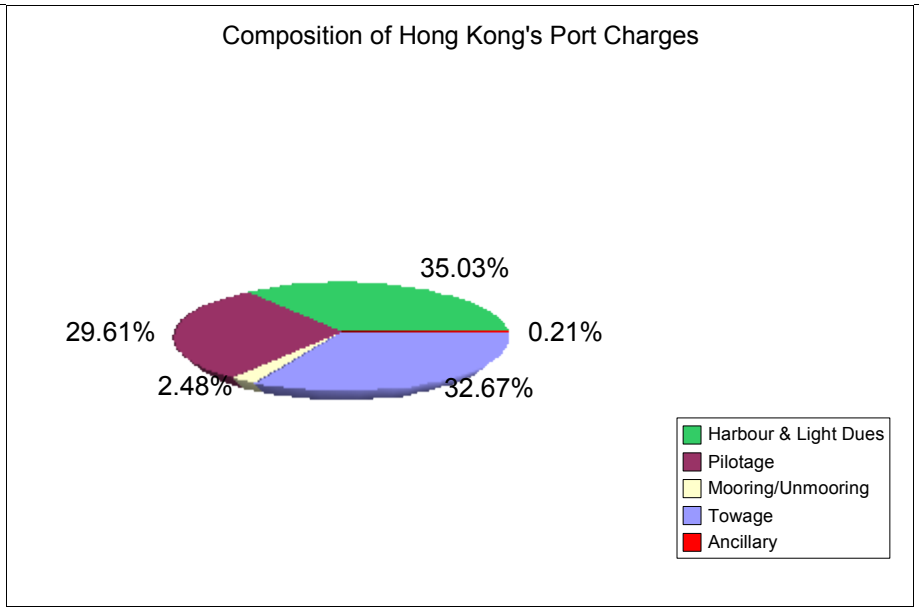


(Figure 6.12)

Hong Kong Port Charges

6.13 Figure 6.13 below shows the composition of Hong Kong's port charges. It is mainly composed of three almost equal parts of about one third of the total cost. The harbour and light dues are set and collected by the Government. The pilotage dues are set by the Government on the advice of the pilotage Advisory Committee. The towage charges are set by the tug companies based on commercial decisions.

6.14 In February 2006 the Government has reduced harbour and light dues from HK$57 to HK$54 per 100 NRT to make the port more attractive to shipping lines. Although not benchmarked in this study, the Government has also reduced the anchorages dues at the same time.


Composition of Hong Kong's Port Charges
35.03%
29.61%
0.21%
2.48%
32.67%
Harbour & Light Dues
Pilotage
Mooring/Unmooring
Towage
Ancillary

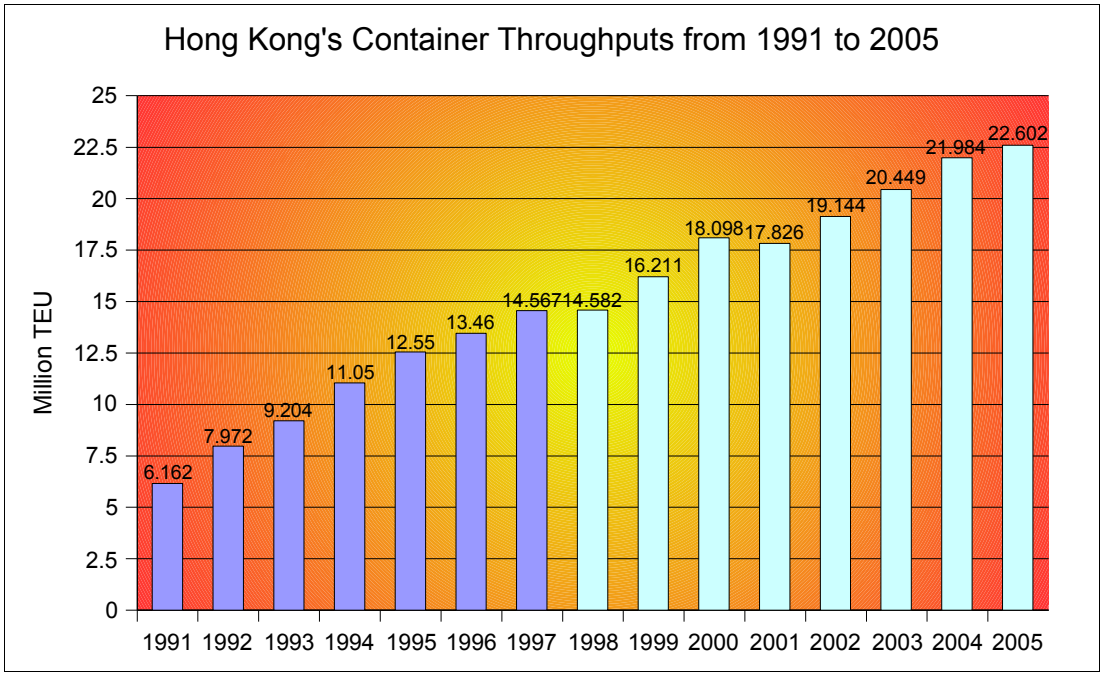
(Figure 6.13)

7. Benchmarking the Container Ports

7.1 Container Throughput

7.1.1 Figure 7.1 is a graphical representation of Hong Kong's container throughputs from 1991 to 2005.

7.1.2 It should be noted that started from 1998 the Marine Department has used a new series of container throughput statistics. For comparison purpose, Hong Kong's container throughput in 1997 under the old and new series were 14.567 million TEU and 14.386 million TEU respectively. In other words, the new series has offset the throughput figure of 1997 by -0.181 million TEU.



(Figure 7.1)

7.1.3 In terms of annual container throughput, Hong Kong was still at the top of the world list in 2004 but has been replaced by Singapore in 2005.

Growth of Container Throughput

7.1.4 The growth rate of container throughput is considered over a designated period by comparing the throughput of the end year to that of the base year. In this study, a ten year period of 1996 to 2005 and the latest five year period of 2001 to 2005 are used. From Tables 7.2, it can be seen that over the 10 year period, the growth rate of Hong Kong's container throughput are the lowest amongst the top 20 container ports. While in the last study, Hong Kong's 10 year growth rate (1991 to 2000) were ranked fourth and second in global and regional comparisons respectively. In the period 2001 to 2005, Hong Kong's throughput growth rate rises slightly to the second lowest as shown in Table 7.3. However, Shenzhen, Shanghai, Qingdao and Tianjin occupy the top four places in growth rate, indicating China's blooming economy.

7.1.5 Using Hong Kong's growth rate as the reference point, the other ports growth rate is indexed against Hong Kong. It shows Shenzhen has a growth rate of nearly 23 times that of Hong Kong in 1996 to 2005 and 8.5 times in 2001 to 2005. The relative growth rate indexes are shown in Figures 7.5 to 7.8.

7.1.6 Due to the smaller bases, newly developed ports tend to achieve a higher relative growth. In order to determine the position of Hong Kong's actual growth in volume, Table 7.4 is developed based on the actual increase in throughput in 2001 to 2005. Hong Kong climbs up to the upper part of the list with 4.6 million TEU growth over the five-year period, however Hong Kong's growth still falls behind Shanghai (11.75 million TEU), Shenzhen (11.12 million TEU) and Singapore (7.62 million TEU). The global and regional comparisons are shown in Figures 7.9 and 7.10.

7.1.7 Although, Hong Kong's throughput still benefits from China's strong economy, the low achievement in growth indicates that Hong Kong is unable to get an even share of the strong growth in trade volume in south China.

7.1.8 According to the "Regional Shipping and Port Development Strategies (Container Traffic Forecast)" published by UN ESCAPE in 2005, Asian port's share of the world container volumes will continue to grow from 55% in 2002 to 61% in 2015. China is expected to be the main driving force to push up the throughput. In

order to handle the anticipated port container traffic in 2015, around 570 new container berths will be required in the region. The study forecasts that the largest number, a total of 270 new berths will be needed in China including Hong Kong and Taiwan. It is important that Hong Kong is prepared to meet the opportunity and challenge of the future container market.

(Table 7.2)

Growth Rate of Container Throughputs at Top 20 Container Ports from 1996 to 2005 (Million TEU)

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	Growth Rate (%) #	Index*
Shenzhen	0.11	0.35	0.64	1.58	2.14	5.08	7.61	10.65	13.66	16.2	15226.4	22842.14
Shanghai	1.97	2.52	3.05	4.22	5.61	6.33	8.62	11.37	14.55	18.08	817.77	1226.79
Port Klang	1.41	1.69	1.75	2.55	3.21	3.76	4.53	4.84	5.2	5.54	293.02	439.58
Dubai	2.25	2.6	2.8	2.84	3.06	3.5	4.19	5.15	6.43	7.62	239.12	358.72
Los Angeles	2.68	2.96	3.38	3.28	4.88	5.18	6.11	7.15	7.4	7.48	178.79	268.22
Hamburg	3.05	3.34	3.56	3.74	4.25	4.69	5.37	6.14	7	8.09	164.9	247.38
Busan	4.73	5.23	5.51	6.44	7.54	8.07	9.44	10.37	11.43	11.84	150.58	225.9
Antwerp	2.65	2.97	3.28	3.61	4.08	4.22	4.78	5.45	6.06	6.49	144.63	216.97
Long Beach	3.07	3.51	4.1	4.41	4.6	4.46	4.52	4.66	5.78	6.71	118.78	178.19
New York	2.27	2.46	2.78	2.83	3.05	3.32	3.75	4.07	4.48	4.8	111.45	167.2
Rotterdam	4.81	5.45	6.01	6.34	6.27	6.1	6.52	7.12	8.22	9.29	93.1	139.66
Kaohsiung	5.06	5.69	6.27	6.99	7.43	7.54	8.49	8.84	9.71	9.47	87.04	130.58
Tokyo	2.01	2.09	2.2	2.7	2.9	2.54	2.71	3.31	3.58	3.7	84.45	126.68
Singapore	12.95	14.14	15.1	15.94	17.09	15.57	16.94	18.1	21.33	23.19	79.14	118.73
Hong Kong	13.46	14.54	14.69	16.21	18.1	17.83	19.14	20.45	21.93	22.43	66.66	100
Ningbo	0	0	0	0	0	0	1.86	2.77	4	5.21	-	-
Tianjin	0	0	0	1.3	1.71	2.01	2.41	3.02	3.81	4.8	-	-
Tanjung Pelepas	0	0	0	0	0	2.05	2.66	3.49	3.48	4.17	-	-
Qingdao	0	0	0	1.54	2.12	2.64	3.41	4.23	5.14	6.31	-	-
Laem Chabang	0	0	0	1.76	2.11	2.31	2.66	3.18	3.62	3.77	-	-

Growth Rate from 1996 to 2005 (%)

* This index shows the relative growth rate from 1996 to 2005 on a percentage scale, using Hong Kong as a reference (100%)

(Table 7.3)

Growth Rate of Container Throughputs at Top 20 Container Ports from 2001 to 2005 (Million TEU)

	2001	2002	2003	2004	2005	Growth Rate (%)*	Index#
Shenzhen	5.08	7.61	10.65	13.66	16.2	219.12	848.41
Shanghai	6.33	8.62	11.37	14.55	18.08	185.43	717.94
Qingdao	2.64	3.41	4.23	5.14	6.31	139.15	538.77
Tianjin	2.01	2.41	3.02	3.81	4.8	138.81	537.44
Dubai	3.5	4.19	5.15	6.43	7.62	117.6	455.33
Tanjung Pelepas	2.05	2.66	3.49	3.48	4.17	103.51	400.79
Hamburg	4.69	5.37	6.14	7	8.09	72.54	280.88
Laem Chabang	2.31	2.66	3.18	3.62	3.77	63.03	244.05
Antwerp	4.22	4.78	5.45	6.06	6.49	53.86	208.53
Rotterdam	6.1	6.52	7.12	8.22	9.29	52.39	202.85
Long Beach	4.46	4.52	4.66	5.78	6.71	50.35	194.94
Singapore	15.57	16.94	18.1	21.33	23.19	48.93	189.45
Port Klang	3.76	4.53	4.84	5.2	5.54	47.36	183.37
Busan	8.07	9.44	10.37	11.43	11.84	46.67	180.68
Tokyo	2.54	2.71	3.31	3.58	3.7	45.91	177.75
New York	3.32	3.75	4.07	4.48	4.8	44.74	173.23
Los Angeles	5.18	6.11	7.15	7.4	7.48	44.3	171.54
Hong Kong	17.83	19.14	20.45	21.93	22.43	25.83	100
Kaohsiung	7.54	8.49	8.84	9.71	9.47	25.59	99.07
Ningbo	0	1.86	2.77	4	5.21	-	-

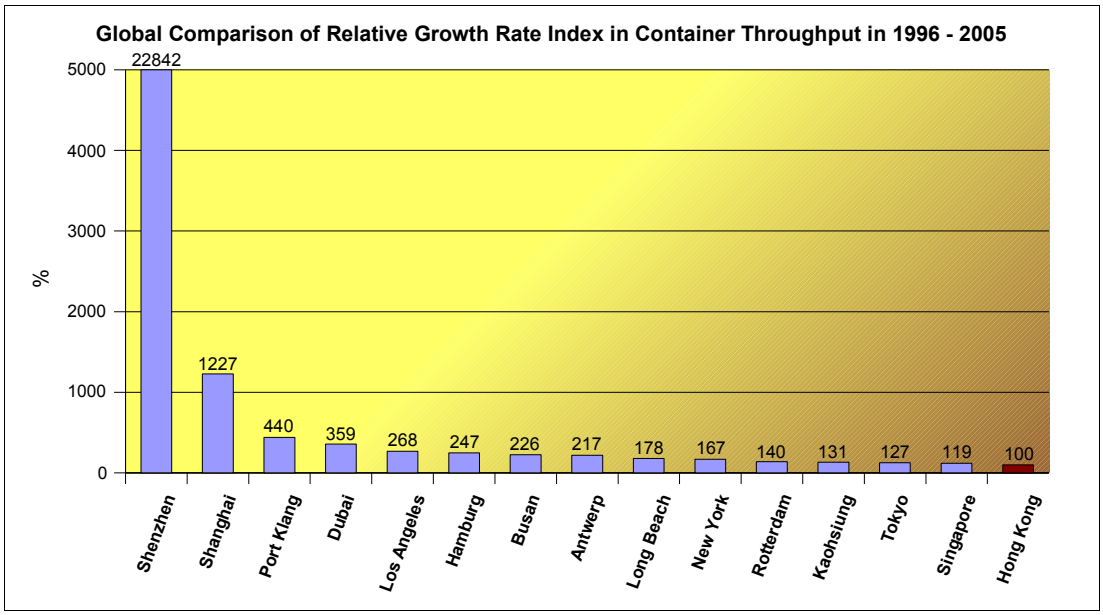
Growth Rate from 2001 to 2005 (%)

* This index shows the relative growth rate from 2001 to 2005 on a percentage scale, using Hong Kong as a reference (100%)

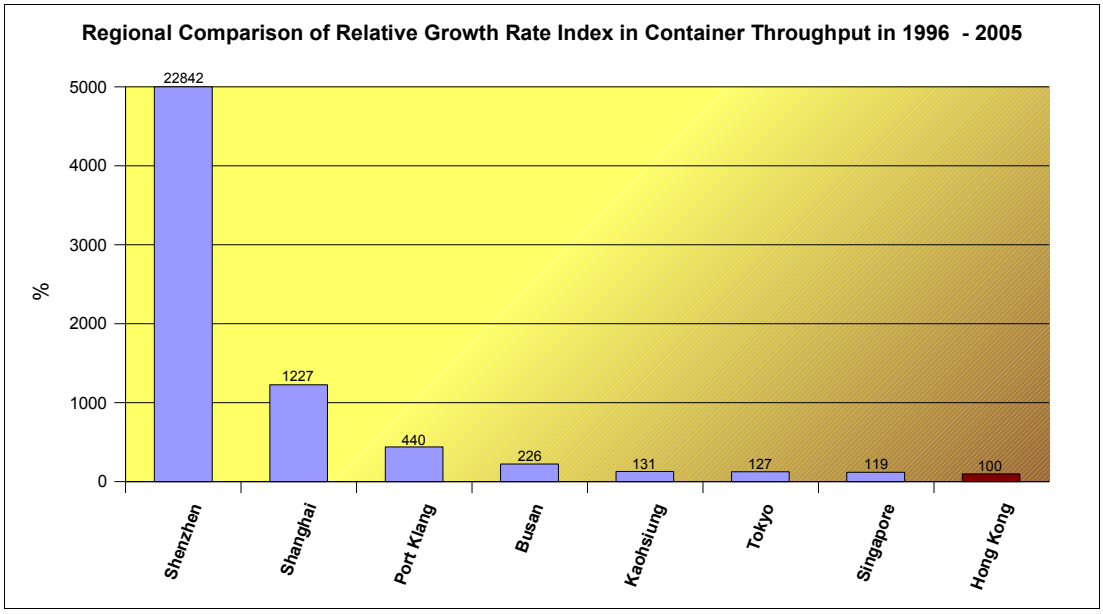
(Table 7.4)

Actual Growth of Container Throughputs at Top 20 Container Ports from 2001 to 2005 (Million TEU)

	2001	2002	2003	2004	2005	Actual TEU Growth
Shanghai	6.33	8.62	11.37	14.55	18.08	11.75
Shenzhen	5.08	7.61	10.65	13.66	16.2	11.12
Singapore	15.57	16.94	18.1	21.33	23.19	7.62
Hong Kong	17.83	19.14	20.45	21.93	22.43	4.6
Dubai	3.5	4.19	5.15	6.43	7.62	4.12
Busan	8.07	9.44	10.37	11.43	11.84	3.77
Qingdao	2.64	3.41	4.23	5.14	6.31	3.67
Hamburg	4.69	5.37	6.14	7	8.09	3.4
Rotterdam	6.1	6.52	7.12	8.22	9.29	3.19
Tianjin	2.01	2.41	3.02	3.81	4.8	2.79
Los Angeles	5.18	6.11	7.15	7.4	7.48	2.3
Antwerp	4.22	4.78	5.45	6.06	6.49	2.27
Long Beach	4.46	4.52	4.66	5.78	6.71	2.25
Tanjung Pelepas	2.05	2.66	3.49	3.48	4.17	2.12
Kaohsiung	7.54	8.49	8.84	9.71	9.47	1.93
Port Klang	3.76	4.53	4.84	5.2	5.54	1.78
New York	3.32	3.75	4.07	4.48	4.8	1.48
Laem Chabang	2.31	2.66	3.18	3.62	3.77	1.46
Tokyo	2.54	2.71	3.31	3.58	3.7	1.16
Ningbo	0	1.86	2.77	4	5.21	0



(Figure 7.5)



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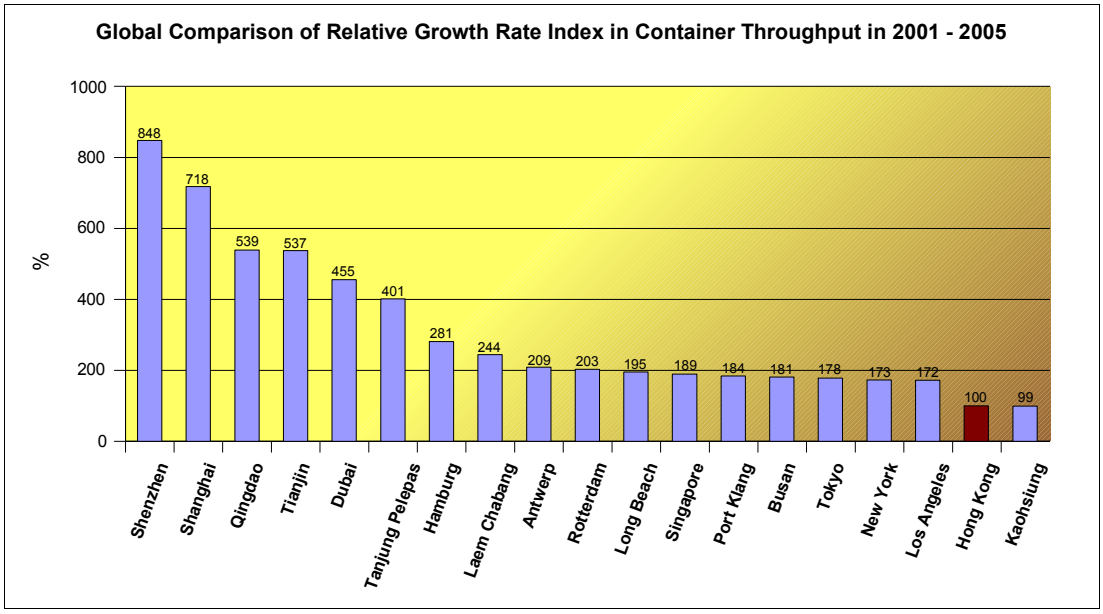
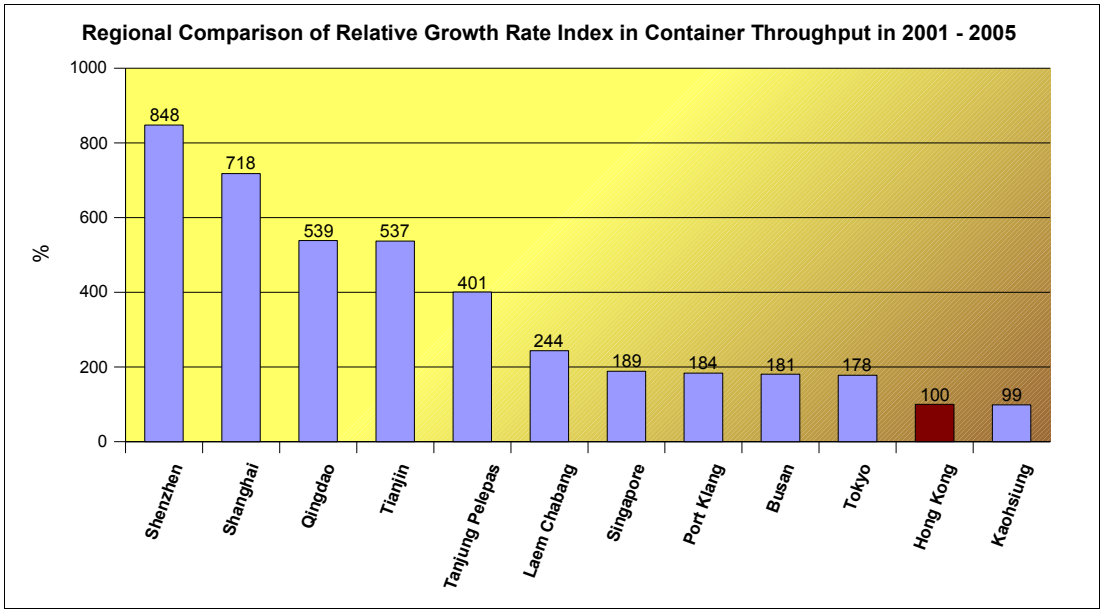
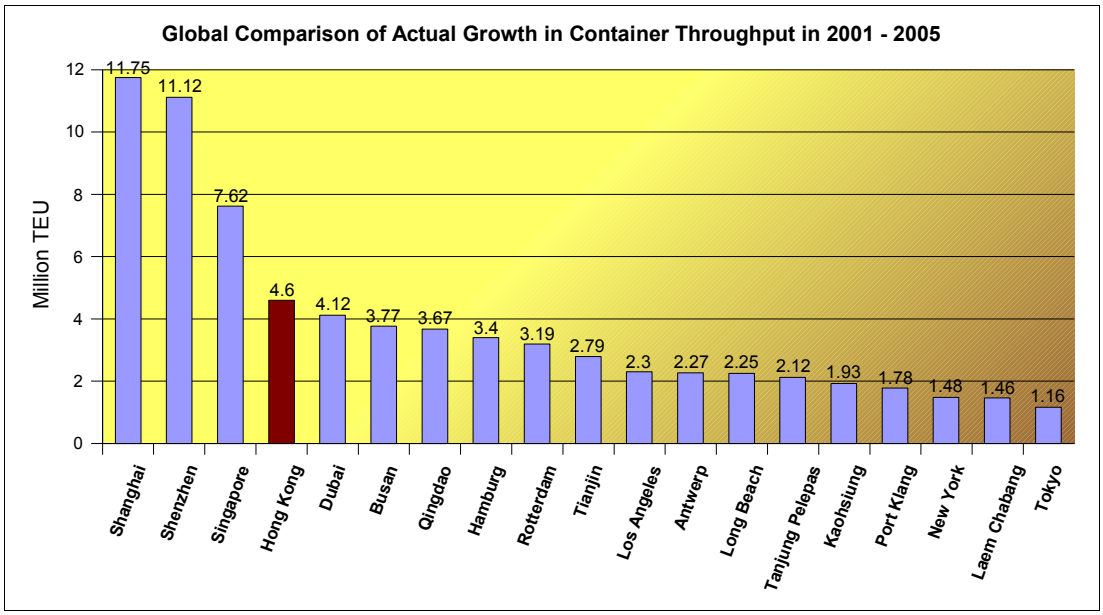


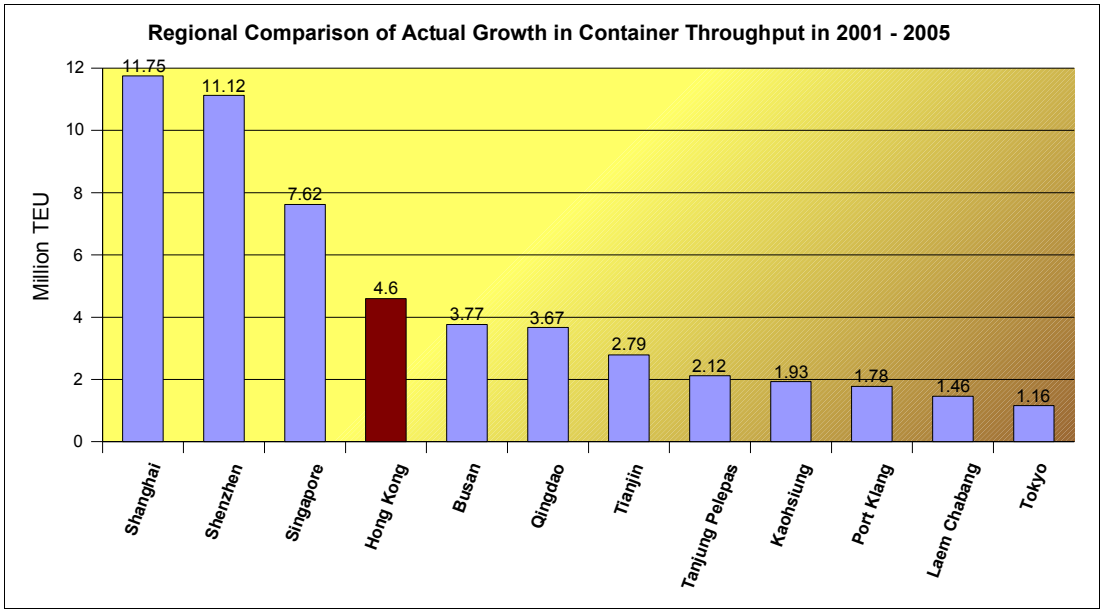
(Figure 7.7)



(Figure 7.8)



(Figure 7.9)



(Figure 7.10)

7.2 Container Terminals

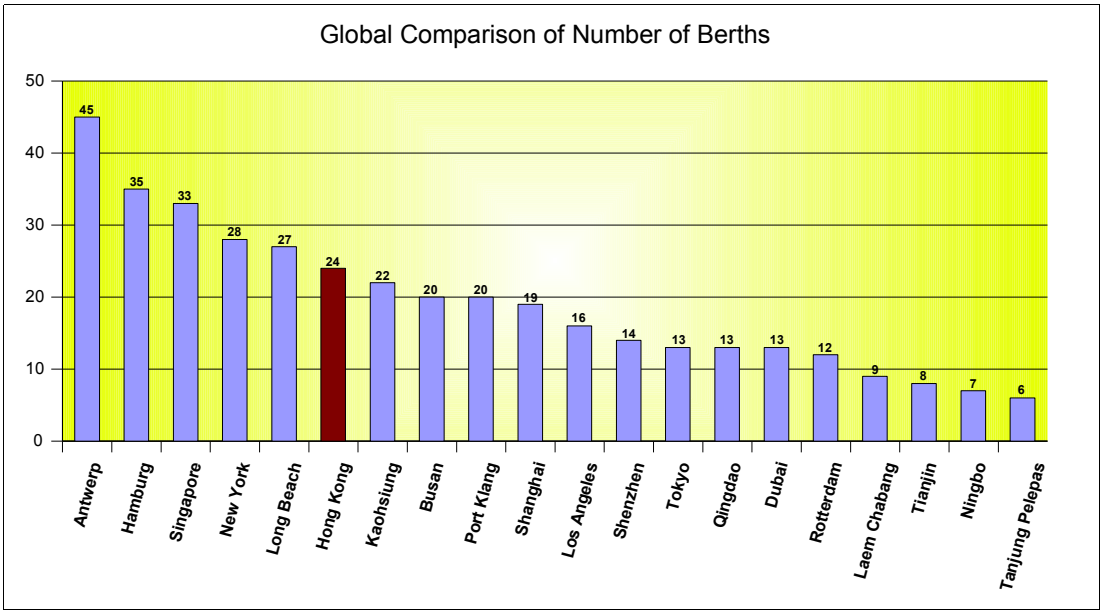
7.2.1 Hong Kong has been a container port for more than three decades. Containerized cargoes handled in Hong Kong represent about 74 per cent by weight of Hong Kong's total cargo throughput which is one of the key factors in the prosperity and economic growth of Hong Kong. The container port is also vital for Southern

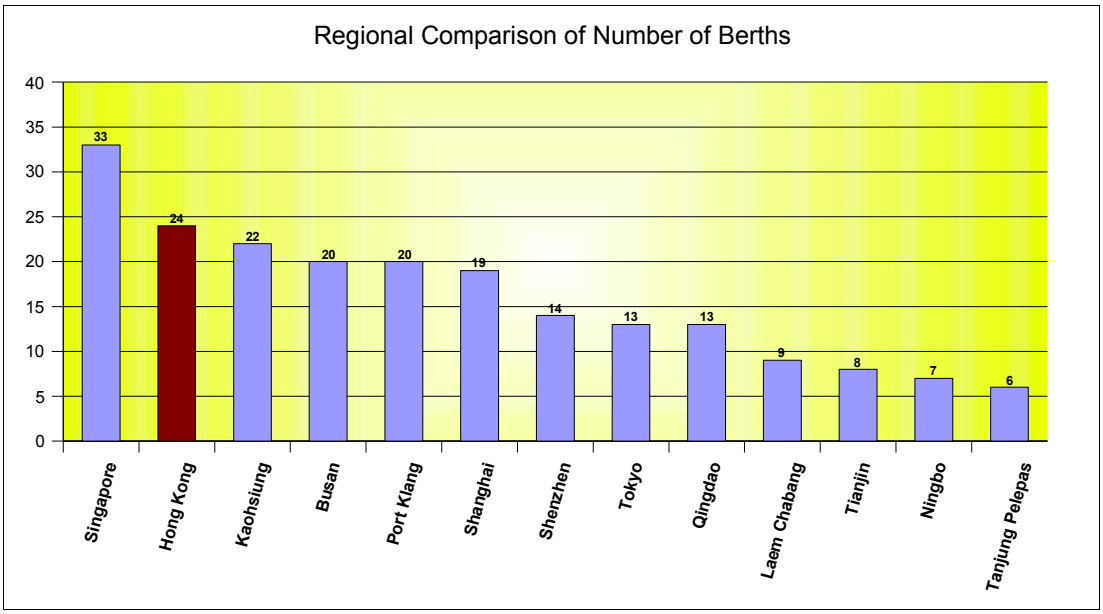
China as some 78 per cent of the throughput is related to the area. The port of Hong Kong is a major hub port in the global supply chain and is served by some 80 international shipping lines with over 450 container liner services per week to over 500 destinations worldwide. Hence, it would be useful to know the relative position of Hong Kong's container terminals in terms of hardware and efficiencies.

7.2.2 The physical characteristics : number of berths, total quay length, maximum alongside depth, total terminal area and total container storage capacity will be benchmarked against the top 20 ports. By comparing the annual throughput per metre quay length and container storage capacity over total terminal area, it can give an indication on how the efficiencies of the terminals are fare. The following comparisons are based on 2004 container terminal data obtained from the "Containerization International Yearbook 2005". It should be noted that the total quay length and total terminal area data of 2004 are obtained from the "Port of Hong Kong in Figures 2005". These figures assumed full operation of Terminal 9 but in fact, only four berths of Terminal 9 were in operation in 2004 and the remaining two berths commenced operation only in 2005.

Number of Berths (Figures 7.11 to 7.12)

7.2.3 In terms of number of berths Hong Kong is average in global context and second to Singapore in regional context. The result is similar to that of the last study.

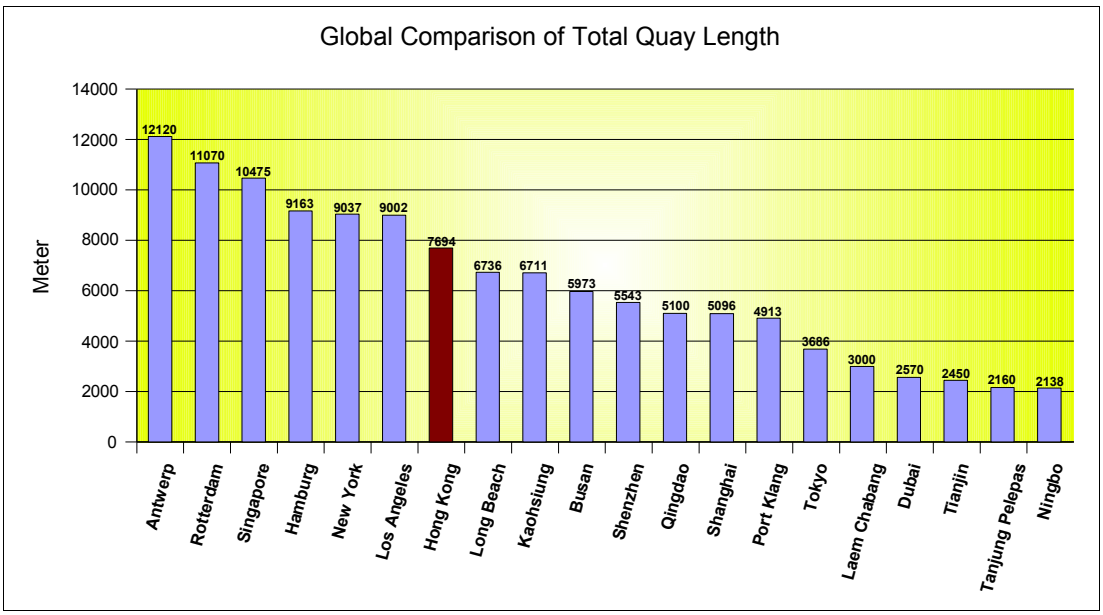




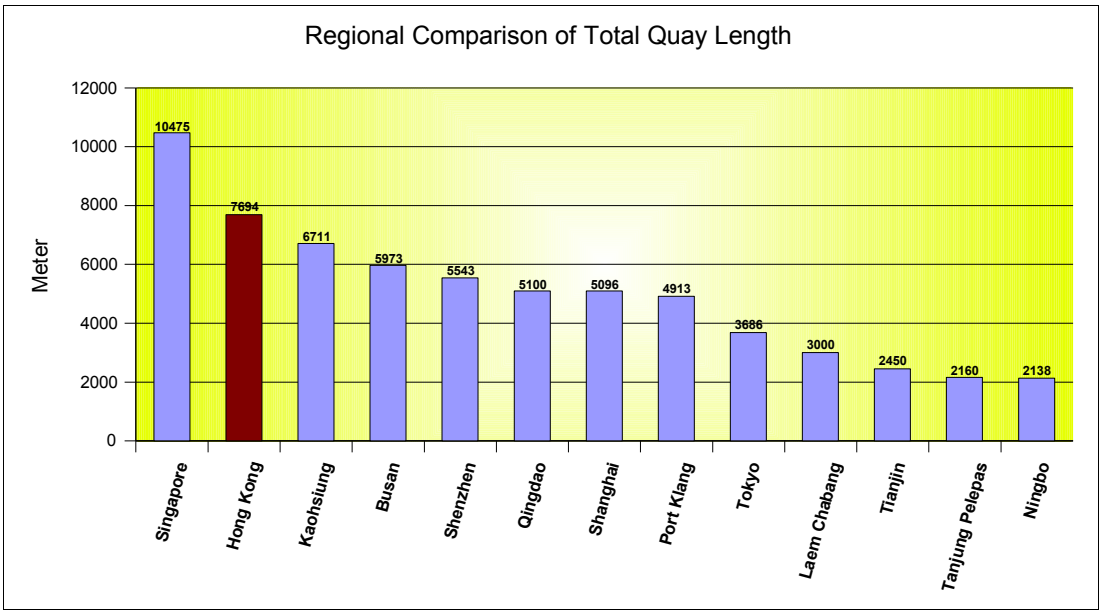
(Figure 7.12)

Total Quay Length (Figures 7.13 - 7.14)

7.2.4 In this aspect, Hong Kong is also found to be on par with the global trend and is only having shorter total quay length than Singapore in Asian region. The result is similar to that of the last study. However, this position may change in the next few years as Shenzhen is continuously expanding Yantian and is building a new port at Dachan.



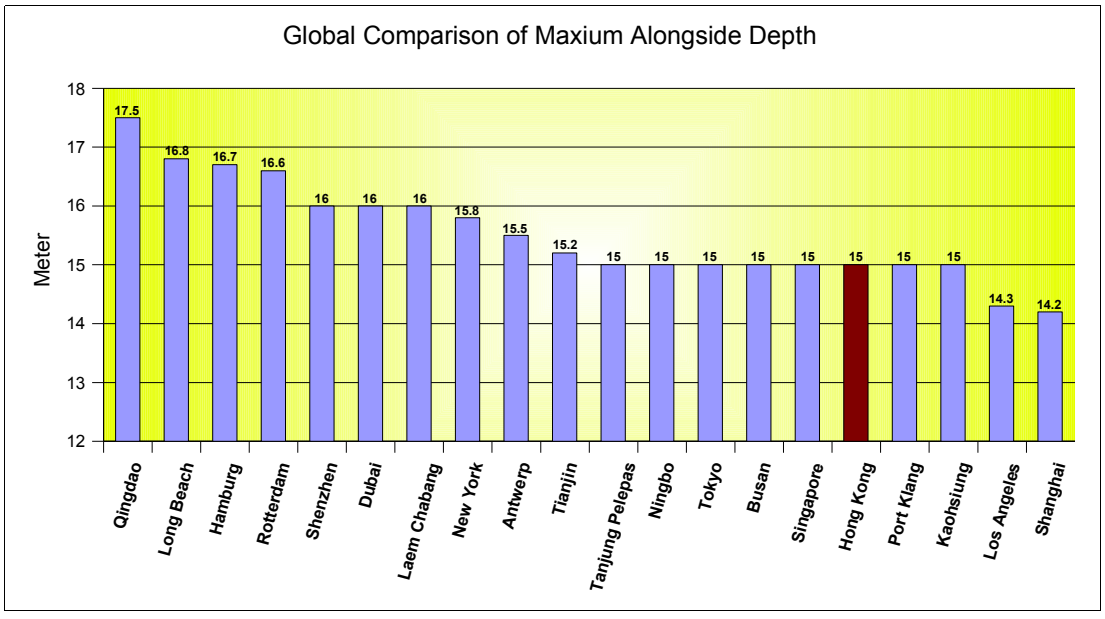
(Figure 7.13)

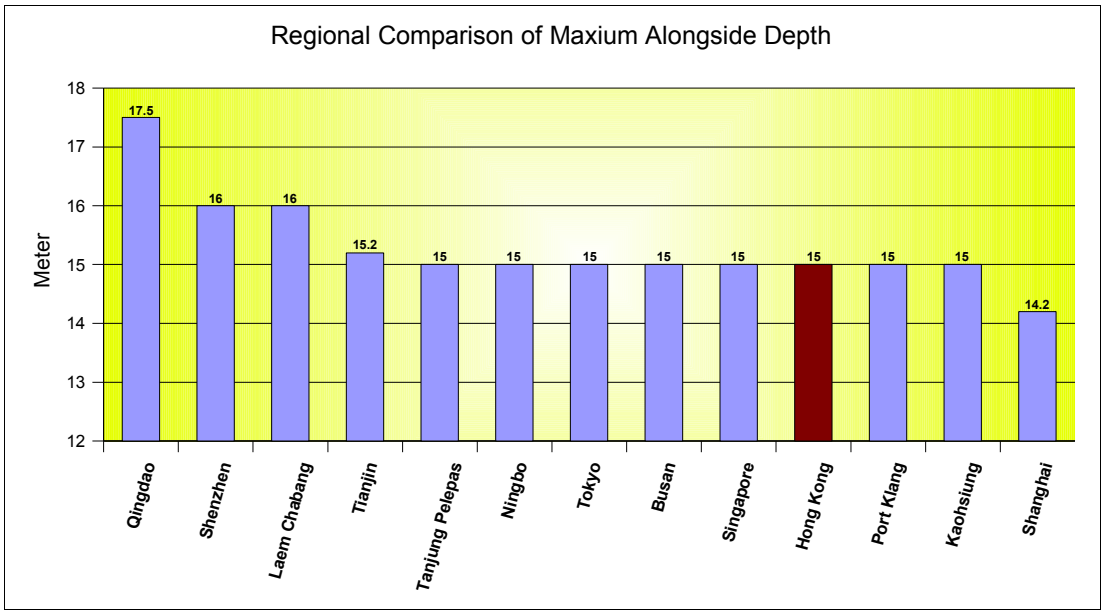


(Figure 7.14)

Maximum Alongside Depth (Figures 7.15 - 7.16)

7.2.5 The maximum alongside water depth of Hong Kong's container terminals is 15 metres which is within the average band but behind our neighboring port - Shenzhen. On comparison with the last study, it can be seen that the number of ports having over 15 metres alongside depth berths has increased from 4 to 10. Although majority of the ports in the region are still having a maximum of 15 metres alongside depth, it can be expected that more and more ports would seek to provide deeper berths.

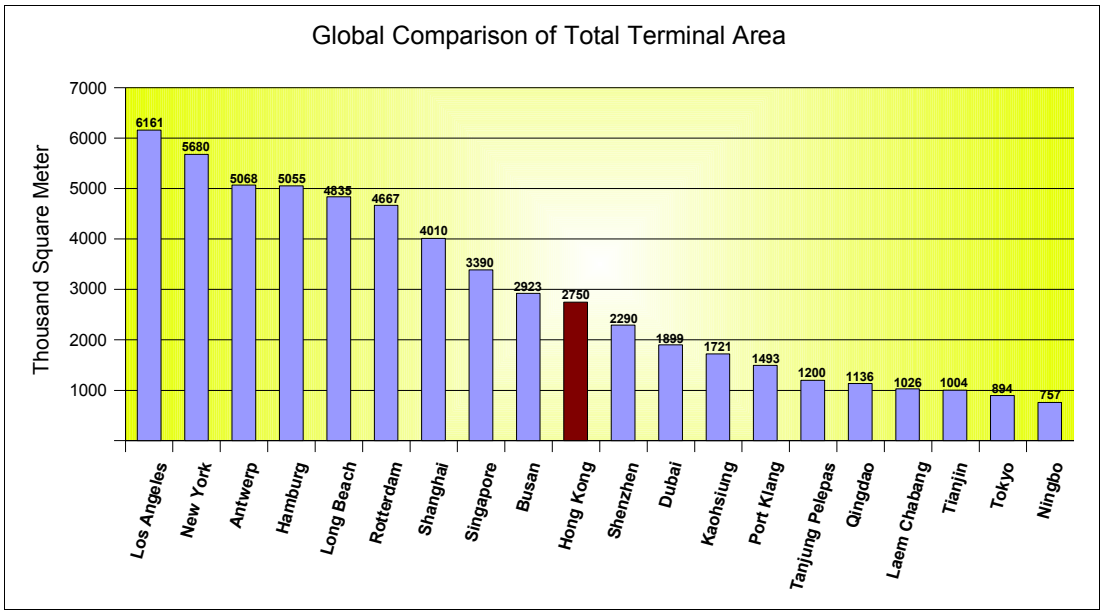




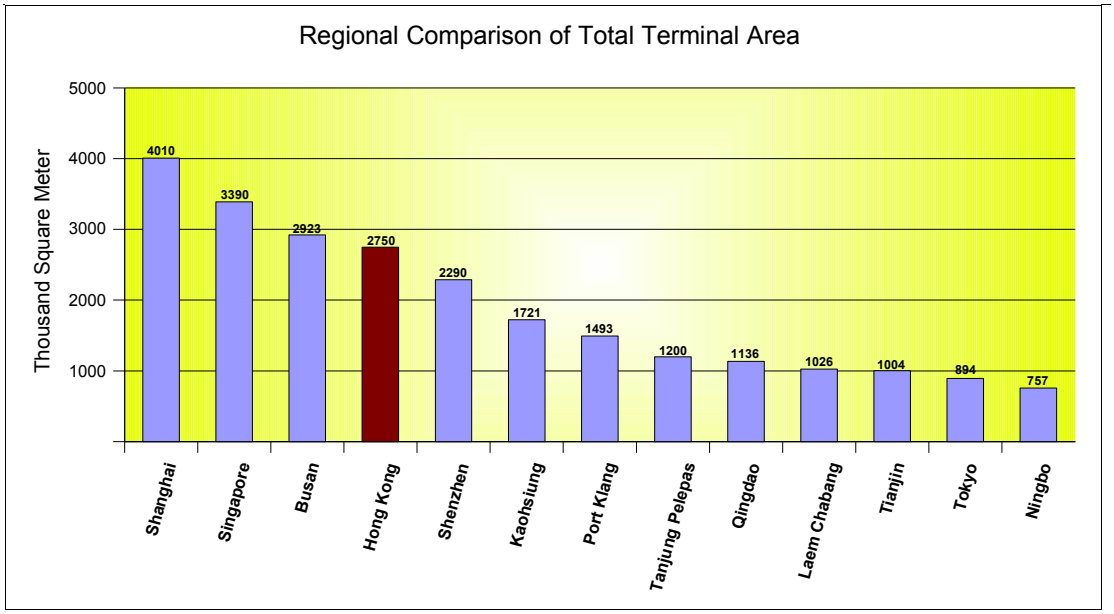
(Figure 7.16)

Total Terminal Area (Figures 7.17 - 7.18)

7.2.6 The physical size of Hong Kong's container terminals is considered as medium. The finding is similar to that of the last study.



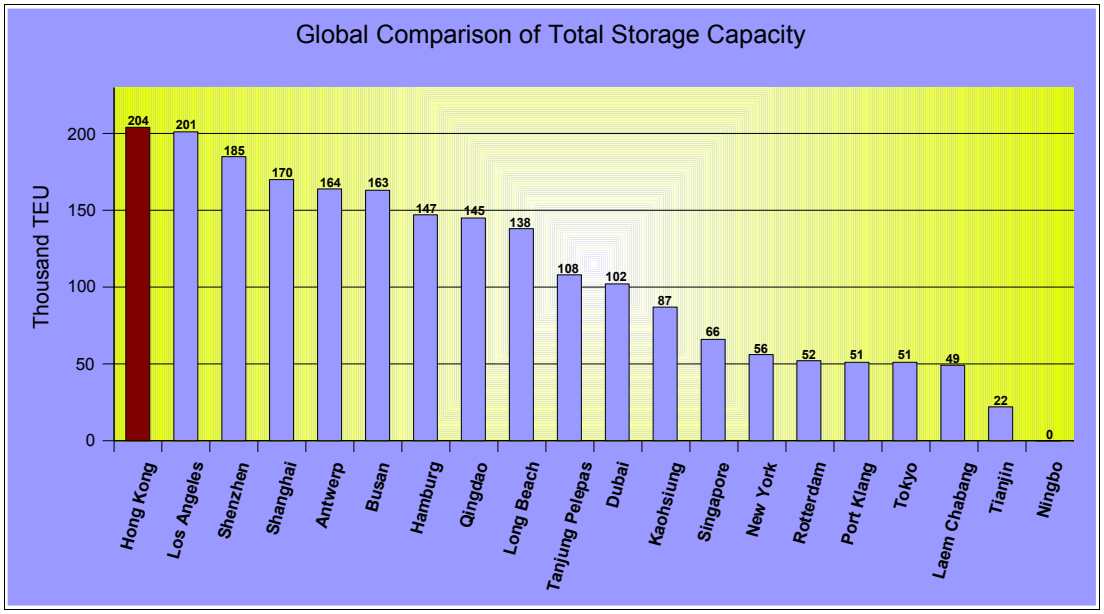
(Figure 7.17)



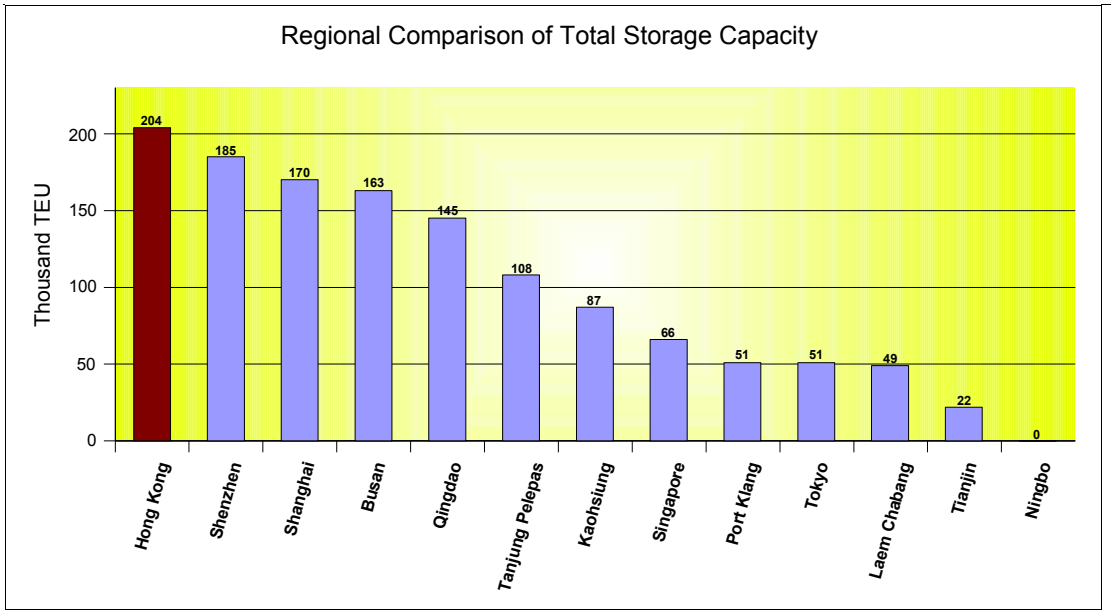
(Figure 7.18)

Total Storage Capacity (Figures 7.19 - 7.20)

7.2.7 Hong Kong's container terminal is medium in size, its storage capacity is found to having the highest storage capacity in the world in this study.



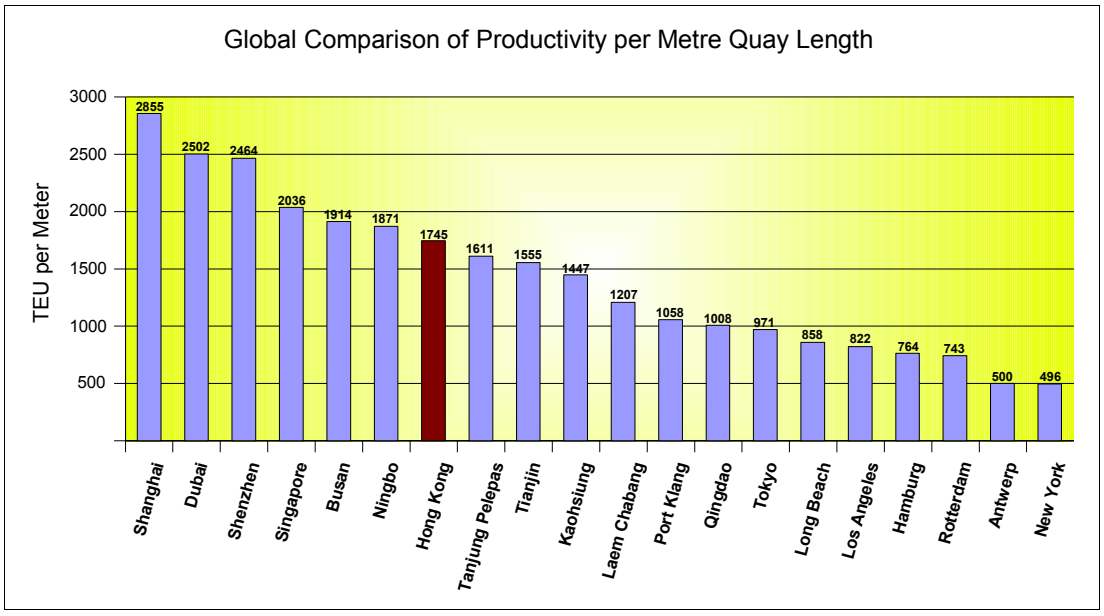
(Figure 7.19)



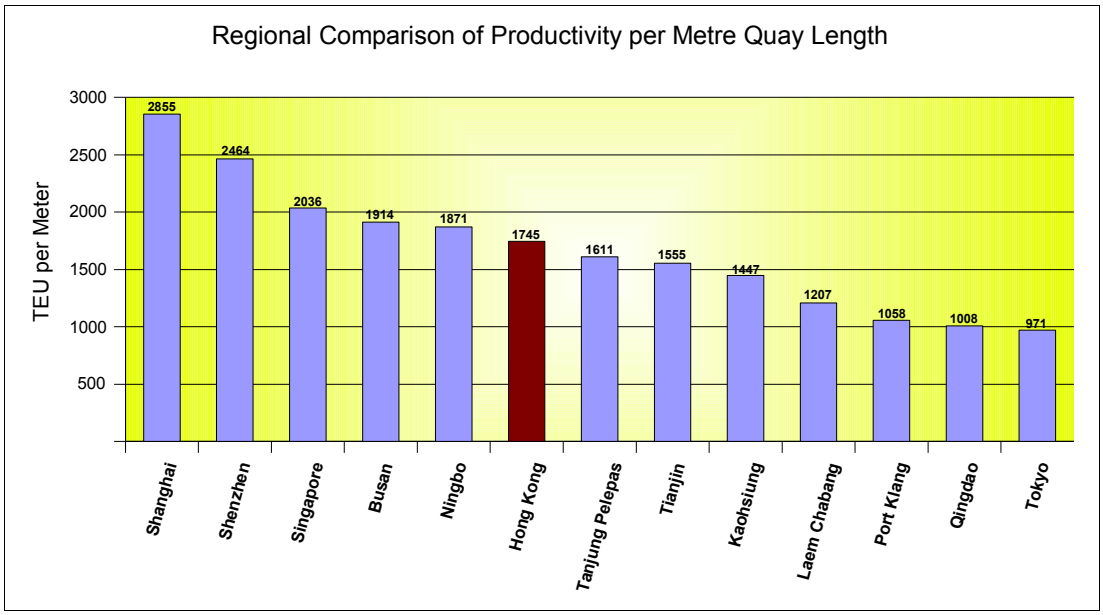
(Figure 7.20)

Productivity per metre Quay Length (Figures 7.21 - 7.22)

7.2.8 The Kwai Tsing container port handled 13.425 million TEU of containers in 2004 which gives a yearly productivity of 1,745 TEU per metre quay length. The productivity is of average amongst leading container ports, recorded a downward movement since the last study (2003 TEU). The decrease in productivity may be related to the additional quay length after the opening of container terminal 9.



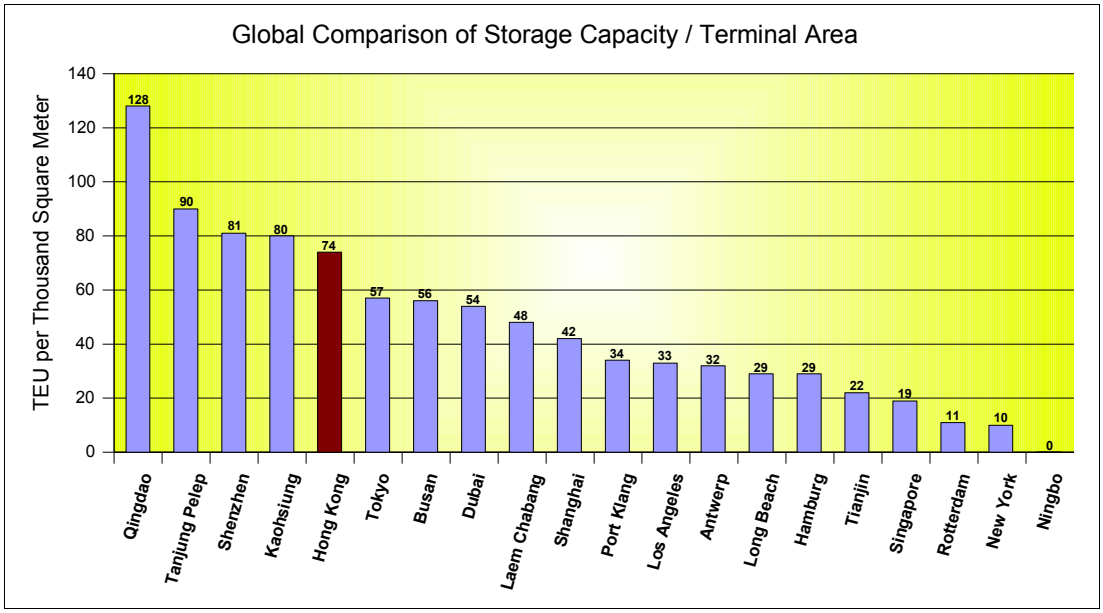
(Figure 7.21)



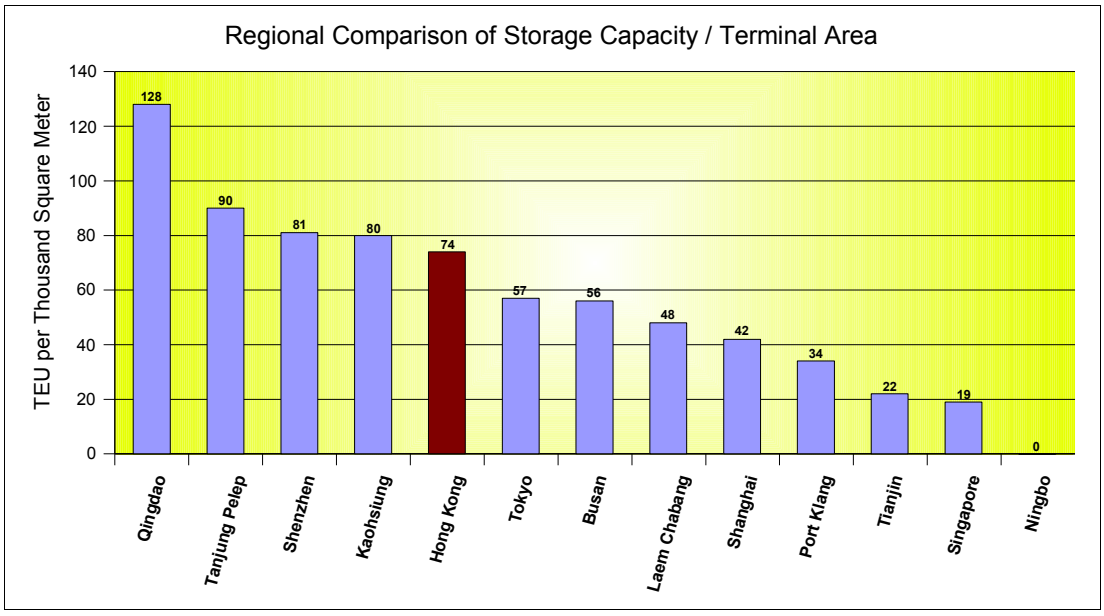
(Figure 7.22)

Storge Capacity / Terminal Area (Figures 7.23 - 7.24)

7.2.9 The ratio of container storage capacity over total terminal area in 2004 was 74 TEU per thousand square metre that ranks the fifth behind Kaohsiung with a ratio of 80 TEU per thousand square metre.



(Figure 7.23)



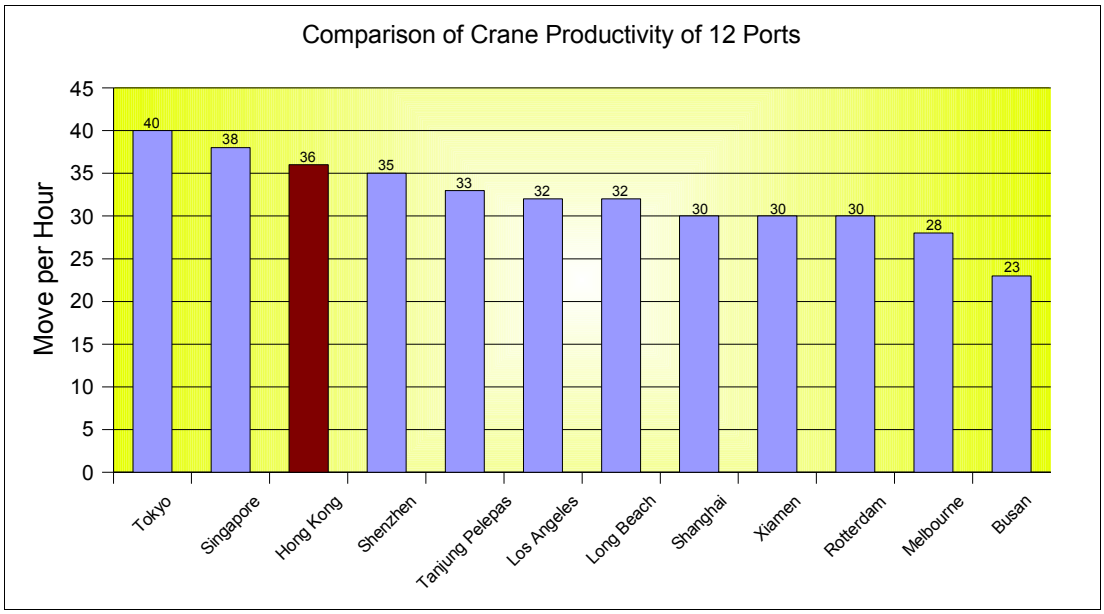
(Figure 7.24)

Terminal Productivity (Figure 7.25)

7.2.10 The container port is an important link in the overall supply chain, the level of terminal productivity is an important indicator to a port's efficiency. While there could be other indicators to represent terminal productivity, crane rate is the most frequently used indicator for gauging container terminals.

7.2.11 Crane productivity is not well documented for many ports. In this study, a data set of 12 container ports has been collected, the comparison is graphically presented as in Figure 7.25.

7.2.12 From the collected data, worldwide crane productivity ranges from 23 to 40 moves per hour (MPH) with many advanced ports able to achieve a rate of at least 30 MPH. Crane rate depends on many factors including layout of the terminal, its facilities, type of ships handled, interfacing with yard gantries/tractors, proximity and stacking of the containers and loading/unloading sequence planning. For Hong Kong's container terminals, the average crane rate is 36 MPH with peak rate at 40 MPH. This makes Hong Kong one of the most efficient container port in the world.


Comparison of Crane Productivity of 12 Ports
Move per Hour
45
40
35
30
25
20
15
10
5
0
40
38
36
35
33
32
32
30
30
30
28
23
Tokyo
Singapore
Hong Kong
Shenzhen
Tanjung Pelepas
Los Angeles
Long Beach
Shanghai
Xiamen
Rotterdam
Melbourne
Busan

(Figure 7.25)

8 Analysis on Port Services, Port Formality Procedures and Application of Information Technology in Hong Kong

8.1 Port Services

8.1.1 In supporting safe and efficient port operations and protecting the environment, seaports provide a number of port services to visiting ships. Apart from basic services such as navigation aids, bunkering, fresh water and garbage collection, modern ports also provide vessel traffic services (VTS), Differential Global Positioning System (DGPS) broadcasting and waste reception services.

8.1.2 The purpose of VTS is to actively monitor and tending navigational advice to vessels particularly within confined and busy waterways. For automation in vessel identification, more and more VTS centres are integrating the Automatic Identification System (AIS) transponder signals into their surveillance systems.

8.1.3 To improve the accuracy of the position obtained from the "degraded" civilian GPS signal by shipboard receivers, many ports use a network of fixed ground based reference stations to broadcast the difference between the positions indicated by the satellited systems and the known fixed positions. This system is commonly known as DGPS.

8.1.4 Shore-base waste reception facilities allow ships to discharge the chemical wastes accumulated on board thus protecting the environment from shipboard discharges.

8.1.5 From the results of literature research and data collection, these services are provided by the majority of the top 20 ports with only a few exceptions in one or two services. Table 8.1 below shows the services provided by the top 20 container ports. It confirms that Hong Kong has provided comprehensive services to visiting ships.

Port	VTS	AIS Integration	DGPS Reference Station	Waste Reception Facility
Hong Kong	Yes	Yes	Yes	Yes
Singapore	Yes	Yes	Yes	Yes
Shanghai	Yes	Yes	Yes	Yes
Shenzhen	Yes	Yes	-	-
Busan	Yes	Yes	Yes	Yes
Kaohsiung	Yes	-	-	-
Rotterdam	Yes	Yes	Yes	Yes
Los Angeles	Yes	Yes	Yes	Yes
Hamburg	Yes	Yes	Yes	Yes
Dubai	Yes	Yes	-	-
Antwerp	Yes	Yes	Yes	Yes
Long Beach	Yes	Yes	Yes	-
Port Klang	Yes	Yes	Yes	Yes
Qingdao	Yes	Yes	Yes	Yes
New York	Yes	Yes	Yes	-
Ningbo	Yes	-	Yes	Yes
Tianjin	Yes	Yes	Yes	Yes
Laem Chabang	-	-	-	-
Tokyo	Yes	Yes	Yes	Yes
Tanjung Pelepas	Yes	-	-	Yes

(Table 8.1)

8.2 Port Formality Procedures

8.2.1 Long processing time, inappropriate formalities and unclear rules/regulations can become serious obstacles to visiting ships. In comparing the inward and outward clearance, information on activities, pre-arrival notification requirements, number of documents required by ports and port formality processing time are collected from shipping companies.

8.2.2 Majority of the ports, including Hong Kong, require notification to be given 24 hours in advance of the arrival of a ship. The exceptions are Singapore and US ports. Singapore only requires a 12 hour advance pre-arrival notification while the US dictates all vessels to give a 96 hour advance notification due to security considerations.

8.2.3 The number of documents required for port formalities ranging from 4 to 17, amongst a total of 12 ports that we are able to collect the relevant information. Hong Kong asks for 10 different documents for completing the port formalities : The crew list, passenger list, maritime declaration of health, vaccination list, deratting exemption certificate, bonded store/personnel effects/arms/drugs/narcotics list, port of call list, arrival declaration of dutiable stores, cargo manifest and general declaration (MO 618).

8.2.4 The port formality time of the ports reported by shipping companies ranges from 1 to 7 hours. Two thirds of these ports require less than 2 hours to complete the formalities. In Hong Kong our performance pledge for processing port formalities with Marine Department is 20 minutes and this is being met in 90% of cases.

8.2.5 Although Hong Kong has very satisfactory port formality performance, there are still areas that shipping lines and shipping agencies would like to see improvements in. These areas are :-

i. At present, registered agents can submit the arrival and departure declarations of ships under their management by facsimile to Marine Department. However, they still need to visit the Central Marine Office to collect the port clearance. Nowadays, majority of shipping activities are being conducted in the Kwai Tsing container port area, shipping agents consider that travelling between Kwai Chung and Central for clearing a ship is time consuming.

ii. The existing port formality process requires the submission and examination of the ship's original trading certificates on her first visit and the renewed certificates upon the expiry of such documents. This formality applies to all visiting ships including Hong Kong registered vessels. The industry feels that, for vessels registered in Hong Kong, the Marine Department should posses all information related to the validity of their trading certificates. If Hong Kong ships could be exempted from this requirement, it can save their time spent on visiting the Central Marine Office.

8.2.6 The two suggestions are relating to port formality processes that need to be conducted in person at the Central Marine Office. In this regard, some shipping agencies suggest Marine Department to establish a port formality office at Kwai Chung to minimise the commuting time. It should be noted that the two port formality processes have been reviewed among other procedures under the Business Process Re-engineering Study on Electronic Business System for Port Formalities and Related

Shipping Activities in Marine Department conducted by the Efficiency Unit in 2004. The two processes have been included for automation in Phase 2 of the Marine Department Electronic Business System, the details of which will be discussed in the following Section 8.3.3.

8.3 Application of Information Technology

8.3.1 Effective use of information technology (IT) enhances service efficiency and level of facilitation to port users. Nowadays, use of IT systems already becomes an indispensable element of a port given the needed efficiency and complexity of various operations. Applications of IT are found in areas like port facilitation, port management, cargo/shipping management, communication and information dissemination.

8.3.2 The port of Hong Kong has a long history in making use of the world wide web technology in disseminating information and providing services to customers. The Marine Department maintains a number of IT systems for port management and facilitation such as the Vessel Traffic Management System, the Dangerous Goods Information System and the Marine Department Electronic Business System (MD eBS) Phase 1 with Phase 2 of the System being developed.

8.3.3 The MD eBS Phase 1 was implemented in April 2004. The system is an online document submission system for port formality and other shipping related documents including : pre-arrival notification; tanker arrival notification; general declaration, applications for various permits; booking of Government mooring buoys; dangerous goods manifest and etc. On completion of the Phase 2 development, the MD eBS will provide a one-stop electronic submission solution to all port formality procedures in Hong Kong via the internet, including those required by Port Health and Immigration Department. As a result of the re-engineered business process to be implemented together with the Phase 2 system, registered shipping companies/agencies will have the flexibility of using e-printing to produce the approved permits and port clearance at their offices. Furthermore, ship's certificates would also be submitted electronically via MD eBS to the Marine Department instead of producing them physically for examination. Thus, shipping agents, including those

managing Hong Kong registered vessels, will not need to visit the Central Marine Office for collecting clearances or submitting ship's certificates.

8.3.4 To facilitate trade and enhance the efficiency and productivity of the logistics sector, Hong Kong has implemented the Digital Trade and Transportation Network (DTTN) in 2006. DTTN is an information infrastructure and multi-compatible platform for data exchange along the supply chain. Paper-based documents can be prepared and transmitted electronically to raise efficiency and lower expenses. The concept of the DTTN is about providing infrastructure for communication, especially for the small and medium enterprises (SMEs) in Hong Kong and Southern China. These SMEs cannot compete with the bigger companies in the area of in-house technology development. The DTTN assists the SMEs in bridging the technology gap.

8.3.5 To promote electronic commerce, improve efficiency and reduce the use of paper, the Government has, since 1997, introduced electronic services for the submission of a number of trade documents. The electronic submission of cargo manifests in the air, rail, river and ocean modes of transport (EMAN) was launched in April, 2003. After constructive dialogues with industry representatives and having ascertained the state of readiness of ocean and river carriers, electronic submission of cargo manifests for river and ocean carriers has been made mandatory on 16 June 2006.

8.3.6 Although Hong Kong may be considered a little lagging in terms of IT application amongst leading container ports worldwide, but it is more advanced than other ports in this region. Both the port industry and the Government have exerted continuous effort in improving their IT systems in meeting customers' expectations.

9. Findings

9.1 The key findings are summarised below :-

i. The position on total port charges is similar to the findings in 2001. Hong Kong remains as one of the ports with the lowest cost in the world with total port charges only slightly higher than Singapore and Port Klang in the region.

ii. The growth of container throughputs in Hong Kong from 2001 to 2005 was generally lower than other top container ports. The less encouraging achievement in throughput growth indicates that Hong Kong is unable to get an even share of the strong growth in Mainland's container volume. Though Hong Kong is expected to benefit from Mainland's economic growth, appropriate measures need to be taken, if better throughput increase is to be achieved.

iii. In terms of number of berths and total quay length, Hong Kong is average in the global context and second to Singapore in terms of regional context. The available alongside water depth of Hong Kong's container terminals is 15 metres which is average for leading ports. The Kwai Tsing container port handled 1,745 TEU per metre quay length in 2004 which was average amongst leading container ports. The physical size of Hong Kong's container terminals is considered average yet our terminals have the highest container storage capacity in the world. The ratio of container storage to total terminal area in 2004 at 74 TEU per thousand square metres ranks the fifth behind Kaohsiung.

iv. Worldwide crane productivity ranges from 23 to 40 moves per hour (MPH) with many advanced ports able to achieve a rate of at least 30 MPH. For Hong Kong's container terminals, the average crane rate is 36 MPH with peak rate at 40 MPH. This makes Hong Kong one of the most efficient container port in the world.

v. The analysis on services reveals that Hong Kong is providing world class port services to visiting ships and port formality procedures are considered very satisfactory. Hong Kong may be considered a little lagging in terms of IT application amongst leading container ports worldwide, but it is more advanced than other ports in this region.

10. Recommendations

10.1 From the analysis and findings of this study, it is recommended that :-

- Low and simple port charge strategy should be continued.

- Efficient and simple port formalities should be maintained.

- The two suggestions made by the shipping industry on providing port formality service at Kwai Chung and reducing physical inspection of the trading certificates of Hong Kong registered ship will be addressed by the MD eBS Phase 2, the effectiveness of this system on alleviating these issues should be taken into account in system development.

- Continuous effort should be given to further promote and develop IT applications with a view to providing more user friendly automated port and shipping services to our customers.

- Action should be taken to improve cargo access to/from the port from the hinterland areas.

- Given competitive demands, terminal tariff and shipping charges should continue to ease towards prevailing levels at competitive facilities in Shenzhen.

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