

UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT
Geneva

REVIEW OF MARITIME TRANSPORT 2000

Chapter V Port Development



UNITED NATIONS
New York and Geneva, 2000

Chapter V

PORT DEVELOPMENT

This chapter covers container port throughput for developing countries, improving port performance, institutional changes in ports and special needs of small ports.

A. CONTAINER PORT TRAFFIC

103. Table 42 gives the latest available figures on reported world container port traffic in developing countries and territories for 1997 and 1998. The world growth rate for container port throughput (number of movements measured in TEUs) increased to 6.7 per cent in 1998 from 2.6 per cent in 1997, which is closer to the annual containerized throughput growth rate of 9 per cent experienced during the first half of the decade. The throughput for 1998 (1997) was over 165.0 (as against 154.6) million TEUs, which is an annual increase of slightly over 10.4 (3.9) million TEUs.

104. The rate of growth for developing countries and territories was 12.6 per cent in 1998 with a total throughput of 88.5 million TEUs (accounting for slightly more than 53 per cent of total throughput), which was an increase compared to the 3.1 per cent growth rate in 1997. Countries with double digit growth in both 1997 and 1998 were the Republic of Korea, Panama, Malta, Venezuela, Argentina, Honduras, Bangladesh, Trinidad and Tobago and Mauritius. The growth in developing countries is uneven from year to year, owing sometimes to strong fluctuations in trade and sometimes to improved data or lack of data.

105. Initial figures for 1999 are available for the main ports, including those of developing countries and of the socialist countries of Asia, with seven ports from these countries ranking among the top 20 container ports. Their throughput is shown in table 43, together with the annual percentage increase for each of the past two years. In 1999, Hong Kong (China) bounced back with double digit growth to become the world leader in total number of movements, overtaking Singapore which had its growth rate fall to 5.3 per cent. This is a good result for Hong Kong, reflecting

the economic recovery in Asia and paralleled with strong growth through other Chinese ports on the mainland. The port of Shanghai had a percentage change of 37.3 per cent or an increase of 1,144,000 TEUs and the ports of Yantian and Qingdao were also in the top 30 ports for the first time. This reflects the continued growth of Chinese exports, especially to North America and Europe.

B. IMPROVING PORT PERFORMANCE

106. Changing trade flows and the competitive strategies of the vessel operators are impinging on the way in which port authorities and terminal operators must adapt. Pressure is being exerted to cut costs and to provide services for a new fleet of mega-vessels now being brought on stream. At the same time port investment requirements have skyrocketed. The expansion is being driven by two pressures. First, the overall container volume continues to grow and outlook for trade expansion appears favourable. Secondly, the arrival of the mega-vessels, 5,000 TEUs and greater, is driving the need for transshipment hubs and for feeder ports. To be considered as a hub, ports must have post-Panamax cranes, deep water, a large amount of back-up land, and direct intermodal connections, often via on-dock rail. However few ports have meaningful guarantees that their investment in facilities will be recaptured. Ports choosing to become hubs are extremely vulnerable to the changing fortunes and desires of both large shipping lines and alliances.

107. One means of cutting costs that is appropriate for terminals with high labour costs and with proven ability to maintain hi-tech equipment is through automation. ECT's Rotterdam operation is roughly 50 per cent automated and PSA Corp has invested in this type of technology for its Pasir Panjang terminal. Thamesport in England, as a relatively new terminal, has

Table 42
Container port traffic of 41 developing countries and territories in 1998 and 1997
(in TEUs)

Country or territory	Container traffic 1998	Container traffic 1997	Percentage change 1998/1997	Percentage change 1997/1996
China	24 729 085	19 929 241	24.1	5.5
Singapore	15 100 000	14 135 300	6.8	9.2
Republic of Korea	6 331 416	5 636 876	12.3	11.0
Taiwan Province of China	6 271 053	5 693 339	10.1	27.6
United Arab Emirates	4 475 789	4 133 578	8.3	10.2
Philippines	3 166 716	2 491 990	27.1	6.6
Malaysia	3 014 564	2 843 248	6.0	11.5
Thailand	2 638 906	2 123 671	24.3	3.5
Indonesia	2 233 394	2 478 674	-9.9	40.5
Panama	1 997 372	1 580 933	26.3	156.2
India	1 828 836	1 738 406	5.2	15.2
Sri Lanka	1 714 077	1 687 184	1.6	24.4
South Africa	1 560 272	1 467 153	6.3	2.5
Saudi Arabia	1 380 804	1 286 806	7.3	12.1
Brazil	1 345 395	1 376 537	-2.3	-3.4
Malta	1 118 741	704 427	58.8	11.5
Venezuela	830 109	606 036	37.0	147.1
Argentina	806 674	720 247	12.0	35.8
Egypt	802 071	993 554	-19.3	9.1
Chile	774 343	711 112	8.9	12.3
Mexico	665 721	832 475	-20.0	21.9
Jamaica	573 114	496 682	15.4	3.9
Honduras	446 613	365 864	22.1	15.6
Ecuador	407 434	375 894	8.4	16.2
Peru	378 013	321 568	17.6	-4.2
Bangladesh	345 327	300 476	14.9	13.9
Iran, Islamic Republic of	325 904	260 095	25.3	6.4
Lebanon	289 562	309 719	-6.5	19.5
Trinidad and Tobago	270 204	239 952	12.6	19.7
Morocco	245 382	210 688	16.5	-1.1
Cyprus	214 030	402 700	-46.9	-28.6
Guam	169 571	164 470	3.1	5.9
Papua New Guinea	152 845	149 870	2.0	14.5
Mauritius	136 417	116 956	16.6	10.7
Martinique	135 700	141 650	-4.2	5.6
Cameroon	118 238	116 578	1.4	9.8
Senegal	115 039	110 836	3.8	12.0
United Republic of Tanzania	108 363	103 433	4.8	4.6
Guadeloupe	103 473	99 643	3.8	-0.3
Haiti	96 612	60 186	60.5	-6.4
Reunion	95 122	122 600	-22.4	-1.6
Total	87 512 301	77 640 647	-	-
Other reported ^a	981 919	959 059	-	-
Total reported ^b	88 494 220	78 599 706	12.6	3.1
World total	165 006 036	154 629 432	6.7	2.6

Sources: Derived from information contained in *Containerisation International Yearbook, 2000* and from information obtained by the secretariat directly from terminal operators or port authorities.

^a Comprising developing countries and territories where less than 95,000 TEU per year were reported or where a substantial lack of data was noted.

^b Certain ports did not respond to the background survey. While they were not amongst the largest ports, total omissions may be estimated at 5 to 10 per cent.

Table 43
Top 20 container terminals and their throughput, 1999 and 1998
(in TEUs)

Ranking 1999	Ranking 1998	Port	1999 TEU	1998 TEU	Change 1999	Change 1998
1	2	Hong Kong, China	16 100 000	14 582 000	10.4	0.6
2	1	Singapore	15 900 000	15 100 000	5.3	9.1
3	3	Kaohsiung	6 985 360	6 271 050	11.4	10.1
4	5	Busan	6 439 590	5 945 610	8.3	1.6
5	4	Rotterdam	6 400 000	6 010 500	6.5	10.7
6	6	Long Beach	4 408 480	4 097 690	7.6	17.0
7	10	Shanghai	4 210 000	3 066 000	37.3	20.6
8	8	Los Angeles	3 828 850	3 378 220	13.3	14.3
9	7	Hamburg	3 750 000	3 550 000	5.6	6.7
10	9	Antwerp	3 614 260	3 265 750	10.7	10.4
11	13	New York	2 863 340	2 465 990	16.1	2.5
12	11	Dubai	2 844 630	2 804 104	1.4	7.8
13	12	Felixstowe	2 700 000	2 523 640	7.0	4.8
14	21	Port Klang	2 550 419	1 820 020	40.1	8.0
15	13	Tokyo	2 399 000	2 198 690	9.1	2.8
16	19	Tanjung Priok	2 273 300	1 898 070	19.8	-0.6
17	16	Gioia Tauro	2 253 400	2 125 640	6.0	46.4
18	22	Bremenhaven	2 180 960	1 812 441	20.3	8.6
19	17	Kobe	2 176 000	2 100 880	3.6	-5.5
20	15	Yokohama	2 172 920	2 091 420	3.9	-12.1

Source: *Containerisation International*, March 2000 and *Port Development International*, April 2000.

invested considerably in this technology. In 1998, the terminal handled over 500,000 TEU with 360 staff, of which 150 are traditional dock workers. All operations at the terminal are regulated by a central computer system. Six post-Panamax ship-to-shore cranes work the vessels. For the discharge operation, the crane driver inputs the container serial number into the central computer. The computer then informs the tractor driver to which of the nine stacks in the container yard he has to deliver the container. There are 18 rail-mounted gantries (RMG), which are fully automated without drivers. The RMG picks up the container and the central computer informs the crane where to stack it. Lorry drivers coming to pick up imports or drop off exports are given smart cards. These allow the control centre to place drivers in queues

and regulate loading and unloading to maximize efficiency. Lorry drivers go to the stack entrances where their containers are taken from or into the stack by the RMG. The next step in automation is the planned installation of automatic guided vehicles for the transfer operation between stack and ship.

108. Increasing terminal productivity and performance will increase terminal capacity without capital investment. To achieve this, efficient and cost effective connections to the hinterland of a port are required. On-dock rail systems are one method of providing freight transport efficiency. This is a system where the rail-heads end as near to the quayside as possible, so that the boxes can be transferred from the ship into the yard and then on to rail.

This lessens the need for sizable terminal yards and separate intermodal exchange facilities. An added advantage of the system is the use of the more environmentally-friendly transport mode of rail rather than road.

109. An example of this system is in the US port of Tacoma at Hyundai Merchant Marine Terminal. The terminal has a quay length of 600 meters, a container yard area of 24.3 hectares and a rail yard of 8.1 hectares. The handling equipment consists of four post-Panamax ship-to-shore gantries, a fleet of reach stackers and terminal tractors. The direct ship to rail transfer works with the tractor-trailers taking the containers from the cranes and hauling them 300 meters to the rail yard where the reach stackers transfer them on to the rail wagons. Container dwell time in the terminal has been reduced to 8 to 12 hours versus the normal dwell time of 6 to 7 days with road trucks.

110. In October 1999, Ceres Terminals Incorporated, through their Dutch company, and Amsterdam Port Authority, started work on a new container terminal concept for the mega-ships. The first phase of the terminal will have three berths, two marginal ones and one 'indented' berth - totalling 1,050 meters of berthing capacity. The indented berth will allow a minimum of 300 moves per hour with up to ten cranes working both sides of the ship. The indented berth is 64 metres wide and 400 metres long and can accommodate ships with a maximum beam of 50 metres. The cranes have an outreach of 22 containers and will be serviced by a fleet of 39 of the latest straddle carriers. The straddle carriers have a lifting capacity of 50 tons, lift one-over-three and use a Global Positioning System (GPS) linked to a yard management computer system. Two-thirds of the costs are being financed by the Amsterdam Port Authority and the remainder by Ceres. The area of the first phase is 50.6 hectares and is scheduled to be completed in 2001, and a second phase of 68.8 hectares with a second indented berth will be operational in 2003.

C. INSTITUTIONAL CHANGE

111. Large multi-port operating companies continued to seek new operating concessions, thus consolidating the trend towards public/private partnerships in the container terminal sector. The major international firms are Hutchinson Port Holdings (HPH), PSA Corp, P&O Ports, International Container Terminals Incorporated.

112. HPH operates at present in 18 ports in the Bahamas, China, Indonesia, Myanmar and Panama, and in 1999 estimated that it handled about 10 per cent of global port container throughput. Other major terminal operators are P&O Ports with 21 container terminals in 19 countries and interests in a further 30 ports. Their terminals are found in the following developing countries with the approximate volumes in thousands of TEUs shown in brackets (Argentina (500), China (750), India (470), Indonesia (1,100), Mozambique (25), Pakistan (190), the Philippines (540), Sri Lanka (310), and Thailand (340)). PSA Corp, in addition to four terminals in Singapore, operates eight others in Brunei, China (Dalian and Fuzhou), India (Tuticorin and Pipavav), Italy, Portugal and Yemen and has entered into an agreement to manage a terminal in Inchon, Republic of Korea. International Container Terminal Services, Inc. (ICTSI), in addition to Manila, operates one terminal in Argentina, two in Mexico, and one each in Pakistan, Saudi Arabia and the United Republic of Tanzania. Stevedoring Services of America (SSA) and Ceres Terminals operate mostly in the United States. SSA operates seven terminals in the United States and one terminal in Panama. Ceres provides stevedoring and terminal operations in 20 locations throughout North America as well as in Amsterdam, Odessa and Moscow.

113. South America's privatization of ports is continuing, especially in the Mercosur countries, with the exception of Uruguay, where several attempts to privatize the container terminal in Montevideo have failed. In Chile, the container terminals in Valparaiso and San Antonio, plus the multi-purpose terminal at San Vicente have been leased to private companies as operating concessions. In each case the prices paid were well above initial expectations.

114. In Brazil, the privatized terminals in Santos, Rio de Janeiro, Rio Grande and Paranagua have all achieved better traffic performances. The terminal operators in Santos have made big improvements in productivity rates and efficiency levels. This has resulted from the programme to upgrade equipment, from the improved balance in trade and from fewer ships with more cargo. In Rio de Janeiro, since privatization, the waiting time for a berth of from 24 to 30 hours has been eliminated, and crane productivity has improved from six moves per hour up to 20. There is still need for reform in the high manning levels for working container vessels and that will allow the lowering of cargo handling charges. There are a number of smaller Brazilian ports that are

in the process of asking for tenders from private companies to operate their container facilities.

115. In Argentina, the various private terminal operators in Buenos Aires have continued to invest in new equipment, although cargo flows are expected to decline by at least 10 per cent in 1999 as a result of the Brazilian currency devaluation. A consortium led by Manila-based ICTSI won a concession to operate the container terminal in the port of Rosario and a programme to upgrade the facilities was started. However, the operator faced heavy losses and the consortium has subsequently withdrawn from the lease.

D. SPECIAL NEEDS OF SMALL PORTS

116. To better understand the needs of the least developed countries in their port sector the following extract has been made from a study on port development for an island least developed country. The Republic of Kiribati consists of 33 islands scattered over 4,500 km east-west and 1,800 km north-south of a wide expanse of the Central Pacific Ocean and has at present a population of about 80,000. Tarawa atoll, where Betio Port is located, is isolated at a distance of about 4,500 km from a major trade partner Australia, about 4,300 km from New Zealand, and 5,200 km from Japan. Almost all the islands of the country consist of coral atolls with poor soil for agricultural activities and hence depend on imports for most foods and other necessities. Major export commodities are copra and fish. However, the trade balance has shown a heavy deficit since the exhaustion of phosphate reserves in 1979. Due to these peculiar geographical and social conditions, sea transport constitutes a lifeline supporting Kiribati's economic activities, while port facilities are indispensable infrastructure connecting sea and land transport for foreign and domestic cargoes.

117. The major port of the country, Betio, the most important port of the Line Islands Group, London Wharf in Christmas Island and all the other outer island ports are suffering from a serious deterioration of their services because of a long absence of investment to improve facilities. Betio Port is the sole gateway for foreign trade and the centre of domestic sea transport. However, no significant work has been done on improving the port since the development works for port facilities for small boats

that were undertaken about 30 years ago. In consequence, Betio Port experiences problems of inefficient and unsafe port operations due to the deterioration of its facilities that lack the necessary capacity for the present trade.

118. The current situation of the deteriorated port is such that the port is unable to perform the functions required for modern trade without urgent rehabilitation and improvement. Betio Port further lacks the capacity to deal with containerization. Since large container ships cannot berth alongside the quay wall in the port, containers are transferred from ship to shore, or vice-versa, by using barges and a tug. This handling system reduces cargo handling efficiency. Full containers are handled only with a fixed tower crane in the container yard and are stacked 5 high within the reach of the crane. Average handling time for these containers stacked at random is about twice that of containers normally handled in other international ports. The extremely small area for stacking containers makes handling efficiency worse. Better management information systems could assist the port operator to improve performance in the port.

119. In Betio and the other outer island ports, maintenance dredging has been neglected resulting in difficult and inefficient entry and berthing operations for small vessels. In terms of containerized imports, container traffic is expected to increase from 1,600 TEU in 1993, to 2,500 in 2000 and 3,200 in 2005. Total tonnage will rise from about 62,000 tons in 1993 to 86,000 tons in 2000 and to 109,000 tons in 2005. A development plan to construct a new wharf allowing alongside berthing of 90 per cent of the ships calling at Betio Port has been drawn up. However, an economic analysis of the project shows a low internal rate of return because of the small volume of cargo and the large capital investment required to bring the facilities up to an international standard.

120. While this is an extreme case, it illustrates the problem that ports in the least developing countries are facing. There are 32 LDCs that border the ocean, of which 11 are island countries. The improvements required are essential for the sound growth of the countries' economies, but the low rate of return deters the private sector from either lending or investing funds. Consequently governments must often depend on ODA or loans on concessionary terms to make the required improvements, although the amount of these funds continues to decline.