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18

Container Terminal Development and Management: The Sri Lanka Experience (1980–2002)

by

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NOTE

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INTRODUCTION TO THE SERIES

UNCTAD has been cooperating with the International Association of Ports and Harbors (IAPH) for some years in fields that include the production, translation and distribution throughout the world of technical studies in the form of monographs. Through these, it helps to develop the management skills needed for efficient port operation in developing countries.

The UNCTAD Division for Services Infrastructure for Development and Trade Efficiency is pleased to continue to cooperate with IAPH, presenting the practical experience gained by a specific port or professionals for the benefit of the international port community.

This cooperation supplements other research, training and technical cooperation activities carried out by the UNCTAD Division for Services Infrastructure for Development and Trade Efficiency that seek in particular to encourage the development of competitive international maritime transport services, reinforce trade structures and promote international cooperation and exchanges of expertise. We would like to thank the authors for their contributions to these monographs, all of which have been made on a voluntary basis.

John Burley
Director
Division for Services Infrastructure
for Development and Trade Efficiency

FOREWORD

When UNCTAD first decided to seek the cooperation of the International Association of Ports and Harbors (IAPH) in producing monographs on port management, the idea was enthusiastically welcomed as a further step forward in the provision of information to managers from ports in developing countries. The preparation of monographs through the IAPH Committee on International Port Development has drawn on the resources of IAPH member ports to record, for the benefit of others, the experience and lessons learned in reaching current levels of port technology and management. In addition, valuable assistance has been given by senior management in ports of developing countries in assessing the value of the monographs at the drafting stage.

I am confident that the UNCTAD monograph series will be of value to managers from ports in developing countries in providing indicators towards decision-making for improvements, technological advance and optimum use of existing resources.

The International Association of Ports and Harbors looks forward to continued cooperation with UNCTAD in the dissemination of information to port managers in developing countries.

Eddy Bruyninckx
Chairman
Human Resources Development Committee
IAPH

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Abstract

This monograph presents the evolution of containerization in the port of Colombo from 1998 to 2002. It describes the way in which the authorities took advantage of the “window of opportunity” open to them for this traffic and the successful conversion of the port into an important trans-shipment centre. The present challenges facing the port are also outlined.

1. Introduction

1.1 Location and history of the port

The Port of Colombo (Colombo) is the principal seaport of Sri Lanka and is located on the West Coast at a latitude of $6^{\circ}57'$ N and a longitude of $79^{\circ}51'$ E. A unique feature of the port is its strategic geographical location on the main East-West shipping lanes running from Europe to the East and the Far East, Europe to Australasia through Singapore and from India's West Coast to East Coast. The deviation for a vessel is only eight hours from the main sea routes. Therefore, the Colombo seaport could be considered as the South Asian Gateway to Europe, the Far East, the Middle East, Africa, Australia and Pacific Rim countries.

The Port of Colombo had been a main trading centre of seafaring Arab and Indian traders from ancient times. After the Portuguese invasion in 1505, Colombo became known to maritime nations of the West. During the rule of the Dutch and the British, the port structure was developed and gradually Colombo became a popular port of call in the Indian Ocean. During this time, Sri Lanka (then Ceylon) exported its traditional products such as tea, rubber and coconut and thus became a major world port.

Since 1918, the Colombo Port Commission (a government department) has administered and managed the Port of Colombo. In 1958 the Port Cargo Corporation was set up to take over the activities performed by the private sector operators. The Port Tally and Protective Services Corporation was formed in 1967 to perform on-board tallying and watchman services on behalf of agents.

1.2 Strategies adopted for the trans-shipment business

In the late 1970s the authorities realized that with containerization there was a "*window of opportunity*" available to Sri Lanka because of the strategic location of the Port of Colombo in the Indian Ocean. Successful strategies were formulated to exploit the trans-shipment opportunities that were available. In the early 1990s, owing to various developments that took place in the industry, competition increased. The authorities then adopted the "*Shipping/ Maritime Centre*" strategy to sustain the container trans-shipment business and to attract further trans-shipment volumes moving to the Indian subcontinent.

2. Background of container terminal development

2.1 Conceiving the idea of container terminals

In the early 1970s, the Queen Elizabeth Quay (QEY) was to be extended for bulk handling of cargo. By the time actual work commenced, the pattern of the world shipping industry and trade was undergoing rapid changes owing to the introduction of containers. Colombo was experiencing steady growth in this mode of traffic during that time. Therefore, the authorities decided to divert the funds for an extension that would be used to handle containers.

Colombo began container operations in 1973 on a very small scale with American President Lines (APL). The first vessel *President Tyler* was berthed at QEY in December 1973 and

brought nine laden import containers that were discharged using ship's gear. Because of lack of shore equipment for container handling, de-stuffing was arranged on the pier and cargo was warehoused. The empties were stuffed with export cargo in the same manner and were loaded on board. Some of the people concerned were not aware of the impending developments in the industry at this time and expressed doubts about the future of this traffic. Nevertheless, the Port Manager's strong determination overcame the hurdles and APL container operation became a regular feature in the shipping industry in Sri Lanka. The volumes subsequently increased to about 200 TEUs a month.

The container revolution received the attention of all other administrative authorities such as the Department of Customs. The necessary changes were introduced and inserted into the tariffs and documentation, greatly facilitating containerized operations in Colombo.

In 1974, Gold Star Lines (GSL) also began transporting containers on conventional vessels and handling them with ship's gear. After some time, APL brought in container handling equipment that paved the way to increasing volumes. Other shipping lines, such as Hoegh Lines and Ceylon Shipping Corporation (CSC), also started bringing in containers on break-bulk vessels. Then, Compagnie Générale Maritime (CGM), a French shipping line, brought in a 40-ton Kalmar top-lift truck for shore handling. In addition to this, some abandoned equipment such as 10-ton Hyster forklifts were repaired and included in the equipment inventory. The rapid progress of the operation demanded more yard space and warehouse facilities. Innovative solutions using various types of equipment were adopted to handle the increasing volumes that also included trans-shipment traffic.

As the first port in South Asia to embrace containerization, Colombo created an important milestone in maritime history. India, despite its leading position in the region, had many constraints on developing container terminals in its ports. In the initial stages, many in South Asia did not see a bright future for containerization because the main player, India, had most of its exports and imports in bulk or break-bulk form. Most of those in the industry in the 1970s believed that these cargoes could not be containerized for various reasons, including the heavy financial requirements for infrastructure developments.

But the CSC and relevant government authorities foresaw the potential and decided to meet the challenge. As a result of this decision, Colombo was successful in using the "window of opportunity" to overshadow the other ports in the region, especially the main ports in India. The shallow drafts of the Indian ports, their highly bureaucratic structures, the labour problems of the Port Trusts, and the geographical disadvantage vis-à-vis Colombo were the main contributory factors for the lack of development of major Indian container facilities. Figure 1 illustrates Colombo's position on the main East-West route.

Figure 1. Position of the Port of Colombo



2.2 Creation of the Sri Lanka Ports Authority

In 1978, the system of Executive Presidency was introduced. The stagnant "closed market" economic structure was converted to a more pragmatic "open market" regime in order to keep pace with emerging world trends. The private sector was entrusted with a great many economic responsibilities as the engine of growth. To support the changes and face the emerging challenges the public sector also needed reforms. A number of structural changes were therefore introduced.

As a result, an Act of Parliament formed the Sri Lanka Ports Authority (SLPA) in 1979, incorporating all three establishments (the Colombo Port Commission, the Port Cargo Corporation and the Port Tally and Protective Services Corporation) that were operational in the port sector and entrusted with the promotion of the use, improvement and development of ports. This project received the highest political priority and work was expedited on a policy directive from the Government with the aim of exploiting the geographical advantage of the port and transforming it into a modern container port to attract trans-shipment traffic in the region. This was the first important decision made towards commercialization of the port sector in Sri Lanka.

2.3 Setting up the first terminal: Queen Elizabeth Container Terminal (QCT)

Extension of the QEQ into Berth No. 5 provided the facility for the container terminal (QCT). The project featured a tied-back concrete cylinder quay wall 300 m x 120 m with a back-up area of newly reclaimed land. The entire project was executed by the engineering and technical personnel of the SLPA from its inception, without any foreign funds or foreign consultancy services. This 500-metre-long container terminal with a depth of 9-10.5 metres was officially opened on 1 August 1980.

This terminal had a marshalling area of only 10 acres (3.94 hectares) adjacent to the berth. The marshalling area was laid out according to a carefully designed yard plan with designated areas demarcated for imports, exports and trans-shipment containers allocating different areas for each shipping line. However, there was no shore equipment for container handling. Moreover, the problem of empty container handling had become a major constraint due to lack of yard space. Therefore, the port arranged with the private sector to open up off-dock container yards and Container Freight Stations (CFS). This caused a number of disputes with the labour unions, which were opposed to containers being transferred outside the port to be worked by non-union labour.

The next task was to equip this terminal. The basic equipment, such as shifters for stacking containers, 25-ton and 40-ton forklift trucks for container handling and smaller forklifts for stuffing/de-stuffing operations, were ordered. Also, orders were placed for four-yard gantry cranes (capable of stacking 20 and 40 ft. laden containers, three high in three rows with one lane for trailers) and for a large number of prime movers and trailers (to move containers from the quay to the marshalling area). There were 32 points for servicing of reefer containers. Soon afterwards, a quayside gantry crane, "Tango 80", was leased, as the gantry cranes on order had a considerable delivery time. In October 1982, gearless container vessels began calling at Colombo.

In the meantime, new shipping services started calling at Colombo. Ceylon Shipping Lines (CSL) started a regular feeder service with self-sustained first-generation vessels covering the east coast of India and connecting with mother vessels at Colombo. CSC entered into a joint venture with Neptune Orient Lines (NOL) of Singapore for services to South-East Asia. CSC also brought in additional container handling equipment. During this time, permission was finally granted to operate private off-dock container yards and CFSs for easing congestion. As a result, Colombo was fast becoming a regional centre for trans-shipment business to the Indian subcontinent, the Middle East Gulf and even East Africa, with an increased number of callings of self-sustained vessels.

The SLPA decided to equip the port for gearless containerships. Two new "Liebherr" gantry cranes were commissioned at QCT in September 1983 to provide a speedy service and improve vessel turn-around. Crane operators were sent for training in Manila and Singapore. Average crane productivity reached around 14 moves/hour and this was almost on a par with the other hubs in the region. Still more equipment was brought in – one "Mitsui Paceco" gantry crane that replaced the leased "Tango 80" (reinstalled at berth 4 of QEQ), and four 35-ton yard gantry cranes with telescopic spreaders.

The SLPA evolved operational systems and drew up plans to suit handling requirements and practices. A number of supervisors and staff officers were also sent on crash courses to Singapore to learn container terminal operation and documentation. In order to ensure proper control over containers in the yard and for accounting and billing, the "T Card" system was introduced. Each shipping line was allocated separate areas in the yard according to their volume of traffic. The CSC was given a large area and even an office in the port for their staff on account of their volume and their position as the national carrier.

With these equipment additions and other operational improvements, the theoretical capacity of QCT rose to about 230,000 TEU/year.

2.4 Gradual build-up of container traffic

Table 1 shows the annual growth rates of container traffic in Colombo for the period 1980-1984 when QCT was in operation. It was a remarkable total throughput increase – more than fourfold – that justified the vision of the authorities in giving priority to this new traffic.

Table 1. Increase in container handling at QCT 1980–1984

Year	Discharged (TEUs)	Loaded (TEUs)	Total (TEUs)	% growth
1980	21 384	20 238	41 622	-
1981	30 917	28 554	59 471	43
1982	55 165	50 955	106 120	78
1983	74 434	72 156	146 590	38
1984	92 718	95 009	187 727	28

Source: SLPA statistical data.

With this strong growth, arrangements were made to expand facilities to further develop this container business. At this stage, facilities were hard pressed to cope with the mounting traffic. Accordingly, plans were prepared to develop infrastructure for container handling, as authorities knew that having facilities ahead of demand was the key to success.

2.5 The second terminal: Stages 1 and 2 of Jaye Container Terminal (JCT)

It was decided to provide additional container berths by constructing a deep-water quay in the northern sector of the port. A consortium of Japanese contractors took charge of Stage 1 of the expansion project in 1983 to provide a fully equipped container berth to handle third-generation vessels. Work started soon afterwards in May 1984 on Stage 2 to provide a second berth, but designs were upgraded when United States Lines (USL) proposed to deploy fourth-generation container vessel on the round-the-world service. Table 2 describe these berths, including their equipment. This facility was designated the “Jaye Container Terminal” and enabled Colombo to cater to the fast-growing demand for container imports and function as a "hub port" handling trans-shipment cargo for the Indian subcontinent.

Table 2. Facilities at JCT 1 and 2

Facility	Berth 1	Berth 2
In-service date	August 1985	December 1986
Berth length	300 m	332 m
Depth alongside	12 m	13 m
Storage area	8.6 hectares	8.4 hectares
Number of container cranes	3	3
Features:		
Max. load under spreader	35.5 tonnes	35.5 tonnes
Max. load under hook	50 tonnes	49 tonnes
Spreader	Telescopic rotating	Telescopic rotating
Outreach	38.1 m (125')	38.1 m (125')
Backreach	16 m	16 m
Total lift	42.26 m	42.26 m
Number of transfer cranes	5	5
Features:		
Capacity	35.5 tonnes	35.5 tonnes
Lifting height above ground	12.5 m	12.5 m
Prime movers	12	15
20' trailers	18	20
40' trailers	22	21
Total no. of slots	5 040 max.	5 940 max.
Reefer slots	72 x 2	72 x 2

Source: Various SLPA publications and Internet website.

JCT had a considerable number of prime movers and trailers for internal container movement. It was fully computerized and the system kept track of all the movement of containers from the point of entry. Ship planning and yard planning were computerized using the technology available at that time.

An upgraded roadway linked JCT with QCT terminal and other operational areas of the port for ensuring smooth and coordinated movement of containers. The port offered adequate facilities for stuffing and de-stuffing of containers. A modern CFS was built at that time with an area of 5,400 sq. metres, equipped with a fleet of 2.5-ton forklift trucks provided for this facility. This enabled the port to handle a large volume of cargo for stuffing and de-stuffing.

To ease the pressure on the area available within the port owing to the increased volumes of traffic, the private sector was encouraged to provide container freight stations in reasonable proximity to the port. They made arrangements with the Customs for the handling of FCL containers with export cargo outside the port, at these CFSs. There were 12 private CFS at that time. These measures contributed immensely to the smooth flow of container traffic without causing congestion within the port.

The port provided facilities for pre-warehousing, unitization and palletizing of export cargo. A concessionaire grace period of seven days free storage was granted and fast-track documentation systems were introduced to facilitate and encourage the export trade.

Towards the end of the 1980s, Colombo became one of the finest and most efficient container ports in Asia. In 1987 the port ranked 38th among 337 container ports in the world. This was a significant improvement compared with its 139th position in 1980. Colombo was maintaining good productivity levels, was competing with the other regional hubs and was providing a service to the international shipping industry and the trade that was second to none in terms of efficiency and quality of service. This had been the result of a clear vision, innovative and commercial orientation in management policies, streamlined and flexible operations, and long-range planning which included timely investments in infrastructure according to realistic forecasts.

At that time, unlike other regional ports handicapped by intractable operational and natural problems, Colombo had no berthing problems, no breakdowns of equipment and no labour unrest. Therefore, the port customers were satisfied as they could consistently control the cost of the operation and they were happy with vessel turn-around. Also, Colombo was recognized as one of the most economical ports in this region with competitive and attractive port and stevedoring charges. Pilotage services were available without any restrictions around the clock and the tidal difference was negligible.

Its geographical advantage was one of the main reasons that allowed Colombo to develop into a major trans-shipment centre and a gateway for other countries in the region. The facilities, efficiency, productivity and safety were other contributory factors in this achievement. The port offered excellent facilities to operate feeder services and this rapidly developed into a systematic and popular "hub and spoke operation" for serving a multitude of Indian ports that generated rather a small number of containers individually. The trans-shipment business was encouraged and promoted by offering 28 days rent-free storage to the lines and an attractive scheme of volume rebates. It grew rapidly with the installation of additional back-up facilities.

In order to facilitate the business, JCT had two IBM computers with a network of terminals connected locally and via telecommunication lines. The systems were used in the following application areas:

- Comprehensive inventory control of in-yard containers;
- Generation of ship loading and discharging plans and computer-aided ship-planning services;
- Determination of yard stack locations for receipts and deliveries with re-handling instructions;
- Generation of on-line/printed information for terminal use and for customers;
- Generation of invoices based on the port tariff;
- Revenue analysis; and
- Operational information (i.e. vessel schedules and traffic).

While looking into all the aspects of developing a reliable and efficient container port, Colombo provided all other main ancillary services such as bunkers, water and ship repairs and construction facilities. All these factors contributed immensely to the success story of container terminal development in Colombo.

Colombo always took great pains in maintaining an up-to-date workforce by providing training to ensure workers and managers were well qualified. The SLPA Training Institute was affiliated to the UNCTAD/TRAINMAR network and the main areas of concentration of the institute are as follows:

- Port operations;
- Engineering and navigation;
- Port management and administration;
- Equipment operation training;
- Vocational and skill development.

2.6 Colombo gaining trans-shipment hub status

During the 1980s the share of trans-shipment in the total container throughput increased steadily. When Colombo began its regular container operation in 1980, the trans-shipment volume amounted to almost 29 per cent of the total throughput. Every year the trans-shipment component increased on account of the forward-looking policies of the authorities and in 1985 it rose to 51 per cent and in 1988 reached a record of 77.2 per cent. In the period 1985-1990, trans-shipment traffic averaged 66.3 per cent of total traffic, with the port briefly taking some traffic from regional hubs such as Singapore and Dubai. Because of open market economic policies, Sri Lanka exports and imports were also on the rise, but there were certain restrictions in lifting exports on foreign shipping lines. Table 3 shows the annual percentage of increase in trans-shipment volumes from 1980 to 2002.

During the decade Colombo managed to build up a captive market for trans-shipment business and the Indian ports provided the lion's share – between 40 and 45 per cent of the total trans-shipment volume. As mentioned earlier, the Indian ports were underdeveloped and most of their exports and imports were in break-bulk form during this time. Ports such as Bombay (Mumbai), Madras (Chennai), Calcutta and Tuticorin were the main ports where containerized cargo was handled. A sizeable amount of trans-shipment cargo to/from Pakistan (Karachi) and Bangladesh (Chittagong) was handled in Colombo. In addition to this, Colombo handled a certain volume to/from the Middle East, East Africa and Australasia.

In the early stages there were no feeder lines, but an American company started a regional feeder network in the early 1980s under the name of West Asia Kontena Line (WAKL). WAKL operated the services as a so-called common carrier feeder operator. Then other feeder operators moved into Colombo to cater to the increasing demand of trans-shipment volumes, which was a lucrative business. During most of the decade, APL was one of the main contributors to the success of the port, having relocated its trans-shipment hub in Colombo for strategic reasons. However, APL shifted its hub operation to Fujairah in 1989.

The secret of this success was to provide capacity in time as an en-route port on the main international shipping lanes. The productivity and quality of service offered in Colombo attracted almost all the major container carriers. Nevertheless, by the end of the 1990s the total throughput came down because of the adverse political and social conditions that prevailed in the country,

such as insurgency and certain lapses in economic activities. Trans-shipment volumes were about 70 per cent of the total throughput.

Table 3. Increase in trans-shipment throughput, 1980-2002

Year	Local (TEU)	Trans-shipment (TEU)	Restows (TEU)	Total in TEU	Trans-shipment % of total
1980	29 570	12 052	-	41 622	29.0
1981	49 987	7 820	1 664	59 471	13.2
1982	70 983	32 261	2 876	106 120	30.4
1983	77 009	65 801	3 780	146 590	44.9
1984	93 379	88 105	6 243	187 727	47.0
1985	103 313	112 563	4 331	220 207	51.1
1986	120 950	220 456	6 736	348 142	63.3
1987	129 076	300 222	6 320	435 618	69.0
1988	135 439	485 501	7 545	628 485	77.2
1989	158 980	385 217	7 613	551 810	69.8
1990	173 039	410 772	11 545	595 356	69.0
1991	188 183	469 519	11 786	669 488	70.1
1992	211 931	451 213	12 632	675 776	66.8
1993	251 899	590 654	15 845	858 398	68.8
1994	289 475	665 840	17 327	972 642	68.5
1995	328 254	700 492	20 298	1 049 044	66.8
1996	349 800	979 882	26 619	1 356 301	72.2
1997	416 797	1 232 685	37 702	1 687 184	73.1
1998	478 698	1 191 157	44 222	1 714 077	69.5
1999	511 618	1 152 928	39 843	1 704 389	67.6
2000	551 922	1 129 892	51 041	1 732 855	65.2
2001	531 559	1 157 893	37 164	1 726 616	67.1
2002	546 195	1 147 781	70 741	1 764 717	65.0

Source: SLPA statistical data.

3. Development of container operations

3.1 Liberalization of the industry

At the beginning of 1990, Sri Lanka dropped its long-standing policy of cargo reservation in favour of the national carrier. The Central Freight Bureau (CFB), which was in charge of freight allocation and filing freight rates, came to a virtual standstill. CSC, having lost government protection for lifting cargo to Asian destinations, had to operate at a competitive level. The UK/Continent trade was liberalized in 1991.

The change came about because of deteriorating CSC operations in contrast to the international carriers and the strong lobbying by mammoth lines such as Evergreen. This paved the way for all lines to call at Colombo and market their services without any restrictions. Foreign lines were also allowed to invest in the local shipping lines up to a maximum share of 40 per cent.

With the liberalization, the services of almost all the main lines at that time were available in the port, including the "round-the-world" services. Some of the lines servicing the port were:

Maersk Line;
 Evergreen Marine Corporation;
 American President Lines (APL);
 Sealand Shipping;
 Seven Star Lines (ZIM);
 Gold Star Lines (GSL);
 Nippon Yusen Kaisa Line (NYK);
 United Arab Shipping Company (UASC);
 Hapag-Lloyd;
 Pacific International Lines (PIL);
 Hanjin Line;
 Shipping Corporation of India (SCI);
 Orient Overseas Container Lines (OOCL).

Some of the common feeder operators were as follows:

X-press Container Lines (Sea Consortium);
 Bengal Tiger Line (BTL);
 Orient Express Lines (OEL);
 Integrated Container Feeder Services;
 Ceylon Shipping Corporation.

3.2 Development of Stages 3 and 4 of Jaye Container Terminal

The steady increase in the size of containerships and port traffic required the planning of new facilities. Accordingly, berths 3 and 4 for JCT were designed for Post-Panamax container vessels. Japanese funding was secured for the construction, which started in 1991 and 1993 respectively. These two berths were built adjacent to JCT 2 and their basic data are given in table 4. JCT therefore ended up with a quay length of 1,292 metres and an annual capacity of about 1.35 million TEU.

During this time two other projects were completed to keep pace with the escalating demand:

- The construction in 1994 of a new Port Access Road connecting the port to the main container hinterland to bypass the congested city road. The new road linked the QEQ and JCT in the port with the inland container depots, so that they could operate as a single complex.
- Shifting of Oil Berth to island breakwater and refurbishing Guide Pier and North Pier back-up area as an overflow stacking area for the JCT.

During the period 1982-1995, an investment of 62 billion Yen (about \$525 million) was made in the development of container terminals and other associated infrastructure facilities. These Japanese loans were provided on concessionaire terms at 2.5 per cent interest with a 10-year grace period. SLPA has to repay the loans over a period of 30 years.

Table 4. Facilities at JCT 3 and 4

Facility	Berth 3	Berth 4
In-service year	1995	1996
Berth length	330 m	330 m
Depth alongside	13.5 m	14 m
Storage area	14 hectares	14 hectares
Number of container cranes	3	3
Features: Max. load under spreader	41 tonnes	41 tonnes
Max. load under hook	50 tonnes	50 tonnes
Outreach	38.1 & 44.5 m	38.1 & 44.5 m
Lifting height above ground	15.5	19
Prime movers	a large number	
Total no. of slots	6 552 max.	9 504 max.
Reefer slots	108 x 3	312 x 3
Container stacking area — 37,910 TEUs (approx)		

Source: Various SLPA publications and Internet website.

3.3 The pressures from container carriers

With the introduction of the Post-Panamax containerships to take advantage of the economies of scale, shipping lines started to form alliances and consortia in various regions. In the East-West routes, larger vessels of up to 4,000 TEU were deployed in multiple strings and forced terminal operators to invest in infrastructure, new equipment and expand the facilities accordingly. Towards the middle of the 1990s mergers and acquisitions were frequent in the shipping industry.

Carriers deployed these larger vessels on the main routes and increased speed from 18 to 24 knots to shorten transit times. Soon all major lines achieved roughly the same transit times and owing to lack of service differentiation, freight rates deteriorated to extremely low levels.

The alliances exercised considerable bargaining power over the terminal operators because they controlled a sizeable portion of the throughput. In most of the main ports such as Singapore, Hong Kong (China) and Dubai, alliances were able to negotiate preferential tariffs (Terminal/Port Service Agreements), priority berthing and other advantages based on an annual guaranteed throughput. This was very important as the carriers had very low profit margins because of depressed freight rates. Colombo did not introduce Port Service Agreements, but offered volume rebates to attract business. Thanks to its geographical advantage, comparative productivity levels and expansion projects, Colombo's throughput continued to increase. During this period Maersk Line, Zim and Evergreen were patronizing their Colombo hub heavily.

After the inauguration of JCT 4 in 1996, SLPA did not have any major infrastructure development programmes planned to meet the next revolution of containerization and to handle additional trans-shipment traffic, as the capacity was progressively becoming saturated. SLPA proposed five 17-metre draft berths in order to accommodate 8,000-12,000 TEU vessels, which were being envisaged for the near future. But they could not get the green light for this project

with the change of Government in 1994, as the new government intended to formulate a new National Policy for the Port and Shipping Industry.

During this time, international terminal operators began various projects in strategic locations. The Port of Singapore Authority (PSA) decided to develop the Port of Aden in South Yemen and also develop container facilities in Tuticorin. Maersk/Sealand opted to develop Port Raysut in Salalah. Other international port operators, such as P&O Ports and International Container Terminal Services Inc. (ICTSI), received the concessions in Navah Sheva Container International Terminal (NSICT) at Jawaharlal Nehru Port (JNP) and Karachi Port Trust (KPT) respectively.

PSA, the main player in the region, was continually expanding its capacity to cater to future demand. It had infrastructure that could be used at any time to cope with the demand and maintained a superior product that could be marketed together with an unmatched service quality. Although Colombo managed to capture a small portion of the market, in the long run it could not compete for a sizeable portion of trans-shipment volumes relayed via Singapore. There was also tremendous pressure from ports in the Middle East, such as Fujairah and Dubai, and indirect competition from Westport in Malaysia.

In the middle of the 1990s, Maersk-Sealand invested in Salalah (Oman), in spite of patronizing Colombo and enjoying most favoured treatment over the rest of the carriers. It had always stressed the necessity to improve productivity and cut berthing delays. At the end of 1997, it moved about 65 per cent of its Colombo trans-shipment operation to Salalah. This was a heavy blow and a permanent loss to Colombo. However, other lines such as Zim Line, GSL and Evergreen continued to use Colombo as a trans-shipment hub. Trans-shipment reached 73 per cent of the total throughput in 1997 but dropped to 65 per cent in 2002 (see table 3).

During this period the Indian authorities were very concerned about their 12 major ports, which were handicapped by geography, lack of finance and unreliability. It was decided to introduce reforms gradually and corporatize the main ports in order to change their work and management culture. Also, the acceleration of containerization and the economic restructuring of the country largely contributed to an upsurge in containerized traffic. This benefited Colombo as most of the Indian West Coast trans-shipment cargo was relayed through it. For the East Coast a rebate was introduced to attract cargo.

Although capacity augmentation at the main Indian ports was needed, there were limits to expansion and in some ports the capacity had already been reached. Indian ports made considerable investments in port equipment modernization projects. Traffic at main ports is forecast to rise fourfold to reach 1,275 million tonnes by the year 2010, and in the next five years the Government of India expects the private sector to contribute about 20 per cent of the total capacity corresponding to about \$2 billion.

3.4 Effectiveness and efficiency of container operations

Since the inception of container operations in Sri Lanka and up to the early 1990s, operations were effective and efficient and competitive with the other players in the region. However, because of the complacency of the authorities a number of problems, described below, started

creeping in towards the middle of the 1990s and the quality of the product deteriorated drastically.

There were crane and berth productivity problems due to equipment breakdown, loss of time between shift changes, unofficially extended meal breaks and management lethargy. Table 5 compares productivities with other main ports in the region.

Owing to the heavy congestion, vessels bypassed Colombo and cancelled port calls. The main line vessels had to wait for more than 20 hours and feeder vessels about two to three days on average.

Because of inferior quality of service, customers found that they did not get value for money and the real cost of operation was more expensive, as the port tariff was complicated.

This was partially a reflection of the fact that Colombo could not make any investment without the prior approval of the Treasury. This slowed down the development programmes as approval procedures of the central government were very cumbersome and projects took a long time to go through the bureaucratic channels and red tape. This hindered progress and Colombo's development lagged behind that of other hub ports. Ports such as Singapore and Dubai, however, always invested large sums in infrastructure developments, the latest equipment and various computer systems for fast receipt/delivery of containers as they had the autonomy to use their own funds for these purposes.

Table 5. Average port productivity (small & large vessels)*
(Moves per hour)

Port	Crane productivity for small vessel	Berth productivity for small vessels	Crane productivity for large vessel	Berth productivity for large vessels
Singapore PSA	23	45	36	140
United Arab Emirates Port Rashid and Jebel Ali	22	40	30	110
Khor-Fakkan	20	32	28	100
Salalah	N/A	N/A	29	90
Aden	N/A	N/A	28	70
India				
Nhava Sheva	18	30	22	40
Jawaharlal Nehru	16	24	20	36
Tuticorin	14	14	-	-
Colombo - SLPA	14	23	18	45
Colombo - SAGT	13	25	-	-

Source: Various/primary research.

Notes: No large vessels calling at SAGT (P&O Ports terminal) before 2002.

* Small vessels: 400-800 TEU vessels. Large vessels: 1,800 TEU upwards. N/A – not available.

As a result of a number of improvements, the congestion eased towards the end of 1990s. Table 6 gives an idea of the revenues accruing to the Port of Colombo from container trans-shipment operations for the period 1980-2002.

Table 6. Variation of revenues in the Port of Colombo due to the trans-shipment business for period 1980-2002

Year	Annual percentage change	Index revenue (1980 = 100)
1980	+ 410	100
1981	- 40	60
1982	+ 330	258
1983	+ 110	542
1984	+ 30	704
1985	+ 30	915
1986	+ 90	1 739
1987	+ 40	2 434
1988	+ 60	3 895
1989	- 20	3 116
1990	+ 10	3 428
1991	+ 10	3 770
1992	- 4	3 619
1993	+ 30	4 706
1994	+ 10	5 176
1995	+ 10	5 693
1996	+ 40	7 971
1997	+ 30	10 362
1998	- 5	9 844
1999	- 3	9 545
2000	- 3	9 258
2001	+ 2	9 443
2002	-1	9 349

4. The situation at the beginning of 2000

4.1 The National Ports and Shipping Policy of 1997 and its impact on container operations

Sri Lanka's long-term vision is to consolidate and further develop its position as a competitive shipping centre in South Asia to generate economic activity, employment and income. The concept of a shipping centre mainly envisages the following objectives in respect of the container operation:

- Efficient ports that would facilitate the movement of domestic and trans-shipment trade;
- Development of one of the ports as a free port and promotion of multimodal transport;
- Exporters and importers having unimpeded access to reliable and competitive shipping services;

- Ancillary services and shipbuilding and ship repair facilities, and supply of trained seafarers;
- Development of the Port of Galle as a multipurpose port.

To achieve those objectives it was deemed crucial to develop and expand Colombo as a hub port – to exploit the full potential of its unique geographical location and use it as a relay port more than a consolidation hub. The key factors to consider in this respect are as follows:

- Development of container handling facilities;
- Growth in Sri Lanka's external trade;
- Regional economic growth and demand for trans-shipment facilities;
- Port development in South Asia;
- Technological and structural changes in liner shipping.

The Colombo development programme broadly follows the master plan prepared in the 1980s by the Japanese International Corporation Agency (JICA). This included construction of container terminals and facilities, road access to the port and dredging of the main entrance channel and harbour basin to 15 m.

JICA envisaged refurbishing the QEQ to increase the annual volumes from 230,000 to 500,000 TEUs. Since this was the only facility that could be developed in the short term, the Government concentrated on a plan to deepen the draft and make it a terminal that could handle 1 million TEUs per annum. Moreover, it was recommended that the North Pier be converted into a container terminal.

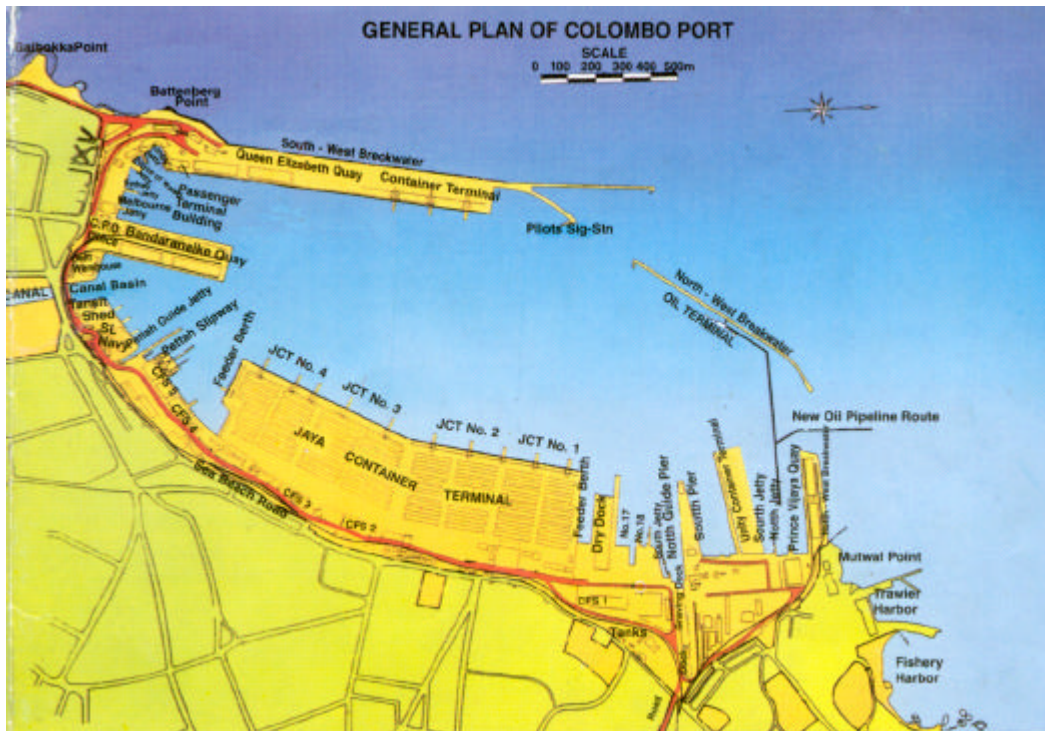
With this development the capacity of the port would reach a ceiling of 3.2 million TEU per year. As the present throughput is 1.76 million a year, it may take another five to seven years to reach that ceiling. However, facilities need to be planned for additional domestic and international demand beyond 2010.

Two sites have been identified for developing container terminals that cater for this future demand (see figure 2):

- The South Port of Colombo, adjacent to the Queen Elizabeth Quay (QEQ);
- The North Port of Colombo.

In the short term the policy of the Government is to encourage the private sector to participate in the financing and operating of ports and port-related infrastructure using the build-operate-transfer (BOT) scheme with some public sector financing wherever necessary and feasible.

Figure 2. Plan of the Port of Colombo



Also, the policy is to encourage feeder operations from non-traditional areas. SLPA would formulate a promotional package for encouraging feeder operators to increase the volume of containers brought to Colombo and expand the scope and frequency of feeder services. For the main shipping line operators, the productivity of the container berths would have to be improved. Additional gantry cranes, transfer cranes and other support equipment will be installed. The port staff will be encouraged to evolve new work norms (the work culture is currently incentive-based and speed-money-based at JCT) and will be educated to make them aware of the nature of business and the requirements of the carriers.

The marketing and promotional plans, simplification of the tariff, promotional packages with the shipping alliances and fixed day berthing schemes will be implemented.

SLPA management and operational systems are to be reorganised to improve efficiency and to be consistent with international standards. The reorganization will draw upon the expertise of academics and the private sector and will result in a human resources development programme that will ensure professionalism at all levels.

4.2 Privatization of container terminals

Concerning the new policy and the financial difficulties encountered in developing the port facilities, the Government decided to privatize the QCT on a 30-year concession on a BOT basis. In September 1999, the concession was awarded to a consortium led by P&O Ports and the terminal was renamed the South Asia Gateway Terminal (SAGT). The QCT container facility, with a capacity of about 250,000 TEU/year, was handed over to the consortium for a three-phase

expansion into a 1-million TEU/year modern container terminal with an investment of \$240 million. The new facility will be fully operational in 2003. The SLPA, which secured a 15 per cent equity in SAGT, will be paid a rental and a royalty for the containers handled in this terminal.

The privatization of this terminal immediately brought intra-port competition to the Port of Colombo. The government-controlled JCT had to compete with SAGT. This company with private sector management has been able to operate the terminal with about 475 employees versus 2,000 people when it was managed and operated by SLPA. At the time of the handover almost all the workers opted to revert to SLPA. However, the workforce is expected to increase in the future on the basis of the expected growth in traffic.

Up to January 2002 SAGT managed its operation with three relatively old gantry cranes (two Liebherr and one Mitsui Paceco) plus one Gottwald mobile crane installed at the berth. Owing to draft restrictions, only smaller vessels could be handled at this berth. The storage area was restricted because of the ongoing construction work. However, SAGT managed to handle a record throughput of over 300,000 TEUs in 2000, about 50 per cent more than in the previous year. Table 7 indicates SAGT throughput up to 2002.

Table 7. SAGT Performance (2000–2002)

Year	Port of Colombo throughput (TEUs)	SAGT throughput (TEUs)	SAGT market share %
2000	1 732 855	300 602	17.3
2001	1 726 616	329 670	19.1
2002	1 764 717	558 023	31.6

Source: Port statistical data.

SAGT commissioned its first and second state-of-the-art berths in February and June 2002 respectively. When the SAGT is fully operational, there will be three berths (340 m, 310 m and 290m), 20 hectares of container yard and a new administrative complex. Also, the terminal will be equipped with six Super Post-Panamax and three Post-Panamax quay cranes, 28 RTGs and other required equipment. The draft of the berths will be 14 metres and there will be 5,600 ground slots together with 540 reefer points.

SAGT will have the following software systems and hardware platforms:

- (a) Software systems: NAVIS SPARCS for vessel and yard planning and NAVIS EXPRESS for terminal management and billing, MainPac CMMS for maintenance and stores management, and Oracle Financials for finance purposes;
- (b) Hardware platforms: IBM RS/6000 running AIX 4.3 and Oracle 8i, IBM LAN Server running Windows 2000, IBM personal computers on an Ethernet 10/100 Local Area Network and CISCO Router based Wide Area Network.

4.3 New trends emerging in the region and potential threats

In 1997 Jawarhalal Nehru Port (JNP) awarded a 30-year concession to P&O Ports for operating Nhava Sheva International Container Terminal on a BOT basis. Today, JNP is capable of handling larger vessels with 14-metre draft berths. This development managed to attract main lines such as APL, which has deployed various services via this port. JNP is now evolving to be a hub on the West Coast of India and by mid-2001 it had surpassed the 1-million TEU/year mark. With its deeper draft, state-of-the-art technology and new management styles this port is becoming a threat to Colombo, with the potential danger of losing the trans-shipment volumes of Cochin and Tuticorin now being fed via Colombo.

In addition to JNP, India has managed to overcome opposition to developing another private sector hub in Chennai (formerly Madras) on the East Coast. In August 2002, the Chennai container terminal was handed over to P&O Ports. Also, Karachi is becoming an efficient port with private sector involvement.

PSA involvement in developing container facilities in Tuticorin is also a significant development for Colombo. In addition to its Singapore stronghold, PSA is trying to develop a string of ports towards the West. In this strategy, it has managed to capture the opportunities that were available in Aden. However, at present Aden has not been able to enter into direct competition with Colombo. But it is developing fast and attracting main lines, and competes with the ports in the Middle East Gulf.

The wider competitive scenario in which Colombo plays a role is to the East. The two Malaysian ports of Tanjung Pelapas and Westport are competing fiercely with Singapore and, to a much lesser extent, with Hong Kong (China).

5. The future

5.1. Containerized shipping and future opportunities for Sri Lanka

In the near future we will witness container vessels with capacities of 8,000 TEU or more, as orders for these vessels were placed during the first half of 2003. According to the industry, the 14-metre draft berths of Colombo could accommodate these vessels. Some are of the opinion that the next generation Suezmax vessels, which would have a capacity of 12,000 TEU, will not be a reality because they will be uneconomical.

However, there is more optimism about Malacca-Max vessels, which are expected in the second decade of this century. These vessels will have a capacity ranging from 15,000 to 18,000 TEU and a draft between 17 and 22 metres. They will call in about seven pure trans-shipment mega-hubs, and it is expected that by that time the Suez Canal will be dredged to 21 metres.

Also, the industry envisages that only one mega-hub will be enough to serve the entire region of the Middle East and Indian subcontinent. The proposed Colombo South Port, which is planned for 12 berths, would be capable of bidding for mega-hub status and attracting those vessels if they

become a reality. If no development takes place, Colombo would automatically be relegated to the position of a secondary hub.

So far the Government has not been able to secure funds from lending agencies for construction of the breakwater of the South Port and the basic infrastructure on which the private sector will be encouraged to develop the superstructure. P&O Ports has already expressed its willingness to develop four berths in this port, which will be adjacent to their existing operation. According to industry sources, other main lines also are interested in investing.

The concept of forming port alliances to counter the pressure of shipping alliances may surface in the industry. P&O Ports, as a multiport operator with presence in Colombo, might contribute to forming alliances with ports in the region. If Colombo could form strategic port alliances they might be more successful in negotiating with the global shipping alliances.

5.2. Colombo's response to future demand

For the period 1998–2002, total throughput at Colombo has been stagnant (see table 2). Actually, domestic cargo has shown a certain improvement, but the trans-shipment cargo growth rate has been negative. The main reasons for this are as follows:

- Capacity limitations;
- Low productivity levels;
- Relatively inferior service quality;
- Relocation of the trans-shipment hub operations of some shipping lines;
- Absence of marketing efforts;
- No encouragement for cargo consolidation and entrepot trade;
- Adverse global economic trends.

In this period, the addition of capacity being created at SAGT is being replicated to a lesser extent by SLPA with the rehabilitation of the North Pier (called Unity Container Terminal), where new equipment (three gantry cranes and eight rubber-tyred gantry cranes) are to be installed. Together, this will add about 0.4 million TEU to the capacity available at SAGT and JCT. In addition, the port of Galle is being developed to handle about 0.1 million TEU/year.

Recent estimates¹ of capacity being made available by SAGT and SLPA are 1.2 and 3.0 million TEU per year, respectively. This will be the maximum throughput within the existing breakwaters unless the authorities convert the other port facilities to handle containerized cargo.

The industry will demand deeper draft and longer-length berths to accommodate the new-generation vessels. The authorities should plan and be prepared to make state-of-the-art new container terminals available ahead of demand in order to capture the increasing container volumes of the region. As a developing nation Sri Lanka does not possess adequate finances and other resources for mammoth projects such as development of container ports. The only option for financing these projects is to solicit funds/loans from international lending agencies and other

¹ A Lloyd's List Special Report, 22 May 2003.

sources. Approaching these institutions and convincing authorities will take a considerable amount of time and must be given a high priority in order to achieve the required facilities in the planned timeframe.

A feasibility study has been already carried out on the proposed South Port development. Two alternative schemes for the breakwater will cost between \$195 and 230 million, for which the Government has not yet been successful in securing funds. Arrangements have been made to engage a team of consultants to prepare a detailed design of the breakwater and berths and to carry out a study on increasing efficiency at the existing government-controlled terminal.

The latter entails preparing a corporatization plan for JCT. The Asian Development Bank and SLPA are jointly funding this \$14 million project. However, the payment of incentives and some other auxiliary responsibilities, such as lashing/unlashing and refer container monitoring, were taken over by SLPA/JCT in 2002 and a consolidated stevedoring charge higher than the previous one was introduced. SAGT has not introduced any incentive/speed money schemes.

5.3 Strategies for future sustainable development

There is no alternative to having the required capacity ahead of demand if the port wishes to attract new trans-shipment volumes. Achieving an acceptable level of crane/berth productivity and maintaining the required quality of service are key factors for the success of a container hub port. To address the operational shortcomings, the following might be adapted as strategies and tactics to replicate Colombo's past success:

- Make rapid decisions on the new container development projects and embark on them immediately. This entails working on proper and realistic time frames and making the capacity available ahead of demand;
- Do a thorough study (in SLPA-controlled terminals) to find out the causes of low productivity and inefficiencies, and address those issues on an urgent basis to ensure improved vessel turn-around. Demotivation and unionization of workers, lack of vision and focus of the top management, lack of commercialization, bureaucracy, red tape and politicization are some of the factors contributing to these problems. Arrangements are already made to improve operating conditions by effecting necessary technical improvements such as gantry crane boom extensions to some cranes from 16 to 18 boxes across and dredging the harbour entrance channel, basin etc.
- Market the facilities effectively at the right price when the port is ready to offer a quality product in all aspects. Also Colombo, should continue to establish Terminal Services Agreements² with the main customers, offer them suitable rebates and develop a captive clientele.
- Be vigilant about developments in the industry and make suitable arrangements to seize new opportunities and counter new threats.

² The SLPA Chairman reported five agreements in May 2003, including one with Evergreen.

5.4 Total quality management (TQM) of container operations

A superior quality of service second to none is becoming a commercial must, especially for the container hub ports. All the regional hubs are trying to attract greater volumes, and quality of service has become the only area in which a port could make a real difference apart from its geographical advantage. Colombo has used its location and exploited it to its fullest at the beginning in order to penetrate the container business. Most of the ports in South Asia will compete in terms of productivity and quality of service vis-à-vis Colombo. As the industry is so dynamic, container ports cannot be complacent about their performance. Continuous improvement, maintaining required industry norms, reliability and consistency are imperative at all times.

In order to secure its hub port status in the next decade and beyond, the Port of Colombo must ensure an efficient and quality service for which the elements described below are recommended.

The port should keep the shipping lines informed about the facilities available and the tariffs for the facilities and services. Also, the terminals should maintain a constant and amicable dialogue with the customers in order to attend to their requirements and sort out their difficulties. Colombo's tariff is found to be somewhat complicated owing to certain hidden costs, and this should be rectified without delay.

Harbour pilots should board the vessels on arrival (outside the harbour) and bring the vessel safely onto the berth. Currently, in Colombo vessels are experiencing berthing delays due to delays of pilots and other related services for various reasons and because of port congestion. Likewise, the port should ensure immediate sailing on completion of vessel operation.

When the vessel is berthed, the terminal operation should commence immediately without wasting time and conclude loading/discharging as soon as possible to ensure a quick vessel turn-around. At JCT, vessels lose time owing to meal intervals, shift changes and so forth, but at SAGT the "hot seat" handover system is in operation, which ensures a 24-hour working day. JCT was trying to introduce a system of three shifts instead of the two-shift system to achieve better results. However, this was not implemented because of labour union action. Also, the terminals should make sure that the equipment is properly serviced and maintained in order to minimize equipment breakdowns.

In order to implement the systems, ports need good managers who would understand the dynamics of the industry and its environment. They should be capable of thinking ahead and having a proactive approach. Hence, the necessary staff development programmes should be introduced, with present-day requirements and future challenges in mind.

Finally, a system of performance monitoring and benchmarking to ensure continuous improvement of all aspects at all times should be implemented.



PORT OF COLOMBO – QCT THE BIRTHPLACE OF CONTAINERIZATION





PORT OF COLOMBO – JAYE CONTAINER TERMINAL

