Prospects of Tanzanian seaports in view of developments in cargo form and handling technology in shipping

Justus Benezeth Blazi

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WORLD MARITIME UNIVERSITY
MALMO, SWEDEN

PROSPECTS OF TANZANIAN SEAPORTS
IN VIEW OF DEVELOPMENTS IN
CARGO FORM AND HANDLING
TECHNOLOGY IN SHIPPING

by

JUSTUS BENEZETH BLAZI

United Republic of Tanzania

A paper submitted to the faculty of the World
Maritime University in partial fulfilment of the
requirements for the award of a

MASTERS OF SCIENCE DEGREE
IN
GENERAL MARITIME ADMINISTRATION

The contents of this paper reflect my personal views
and are not necessarily endorsed by the World Maritime
University.

Signature
Date 3/11/88

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Co-assessed by: Dr. Hans Ludwing Beth
   Visiting Professor WMU
   Hamburger Hafen-und Lagerhaus
   Federal Republic of Germany
PROSPECTS OF TANZANIAN SEAPORTS
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26th October, 1988
To my wife Lyidia and daughters Justina and Julieta
and
In memory of my father, grandmother and father-in-law who passed away while I am attending this course
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J.B.B.
ABBREVIATIONS

ADB  African Development Bank
CIDA  Canadian International Development Agency
EAC  East African Community
EACHS  East African Cargo Handling Services
EAHC  East African Harbours Corporation
FCL  Full Container Load
ICD  Inland Container Depots
LCL  Less than Container Load
TAZARA  Tanzania Zambia Railway Authority
TEU  Twenty-foot Equivalent Unit
THA  Tanzania Harbours Authority
TRC  Tanzania Railways Corporation
Ro-Ro  Roll on Roll off
SIDA  Swedish International Development Agency
UNCTAD  United Nations Conference on Trade And Development
US  United States
ZBR  Zaire Burundi and Rwanda
CHAPTER 1

A GENERAL INTRODUCTION

Transport is that part of economic activity which is concerned with increasing human satisfaction by changing the geographical position of goods and people. It may bring raw materials to places where they can be manufactured more easily, or finished goods to places where consumers can make best use of them. In this case transport is an essential part of production process, because goods and services are regarded as not fully produced until they are actually reached the final consumer. The demand for transport is derived demand, that is, it is derived from the economic needs of mankind. Transport in any form promotes trade and in return trade induces economic development in one way or another.

Ocean transport plays a key role in the international trade by transporting commodities from one continent to another and from one country to the other, thus stimulating trade among nations, this trade is one of the main generators of economic growth.

A seaport is an essential element in a global transport system, also a servant of international trade linking together several independent transport modes, such as road, rail and inland waterway and integrating efficiently a range of transport networks.

Shipping contributes to economic development, that is, shipping as an industry by itself employs labour and capital, this directly means that it generates incomes,
and the generated incomes are later invested and re-invested to generate more and more incomes and this creates employment and capital. Though different forms of transport have different costs and the levels of costs tend to change quite rapidly over time and space, for the foreseeable future nothing or no form of transport will replace sea transport as the cheapest means of transport per tonne kilometer.

A transport system consists of nodes, links and flows, the port is an important node in the all transport chain because it lies at the interface between the sea link and the land link, at the point where flows of goods and or people are transferred from water borne transport and distributed down into smaller flows for distribution by other transport modes and vice versa. With this idea in mind ports are critical sub-systems within the total transport system. In a simple reasoning as the size of the ship increases the cost per tonne of goods transported by it decreases, but this can increase the cost of ships' time in port unless the necessary capacity in terms of port facilities is made available, this can be possible through good planning utilising the modern techniques.

A seaport is an indispensable link, interface and gateway in the worldwide distribution. It is an interface because it provides the facilities and service required for the transfer of cargoes from ships onto the land conveyance and vice versa. It is a gateway because it is through the ports that countries are able to trade with the rest of the world.

I quote in order to stress the importance of
seaports, "Despite the present depressed conditions in the shipping market due to the recession in the world economy, ports must look to the future with confidence. The day will never come when man can dispense with the ship which opened up the world to him and made civilisation possible. The ports of the world which have served mankind so well over the centuries have a still more important role ahead for them".[1].

Seaports for many years in the world played a passive role in the maritime industry, from the history of port development, ports portlay the role of dependency to the industry they serve, and any changes which occurred in seaports were largely a reflection of and response to what was happening in the shipping industry[2]. Many of the technological and organisational changes that have occurred in the maritime industry grew out of the desire to achieve the economies of scale through larger and faster vessels, efficient cargo handling techniques and proper coordination of the movement of cargo from origin to destination. All the above changes greatly affected the seaport in both developed and developing countries. The basic function of the seaports as a transfer point has not been totally displaced, but ports are now increasingly moving towards a transport function. Other traditional port functions such as the storage function is gradually decreasing its importance, and many others which were formally located at the waterfront have begun moving to inland locations near or in the inland container depots (sometimes known as dry port). Though there are strong indications that seaports are undergoing a period of change in operational methods because they have to adjust themselves to the new technologies, and physical layouts of ports are changing also.
In some cases dock areas have been closed, in other countries the old finger piers have been abandoned in favour of new layouts. The organisational structures of ports have also changed. New activities have emerged in place of those which have been phased out, ports are still taking active part in the wider maritime industry.

Notes.
1. Baudelaire, J.G. (1986), Port Administration and Management, IAPH, Tokyo, Japan
CHAPTER 2

DEVELOPMENT OF SEAPORTS IN TANZANIA

2.1. Brief introduction to Tanzania

The official title of Tanzania is the United Republic of Tanzania (incorporating mainland Tanganyika and the Islands of Zanzibar and Pemba). Tanzania covers an area of 945,087 square kilometers with a population of about 21.4 million (1984 estimates). Tanzania has a long coastline of about 840 kilometers. Tanzania like most of the developing countries, is mainly an exporter of agricultural raw materials and an importer of industrial manufactured products. The agricultural sector is the mainstay of Tanzania's economy, accounting for about 80 percent of export earnings, and providing a livelihood for 90 percent of the economically active population. The leading exports are sisal, coffee, cotton, tea, and many others. Imports include crude oil and petroleum products, but the bulk of imports is made up of intermediate goods, transport equipment and machinery.

Before the breakup of the East African Community (E.A.C) in 1977, which comprised Kenya, Uganda and Tanzania, the railways, inland waterways, harbours, airways, post and telecommunications, civil aviation, and meteorological services were jointly owned and run by the East African Community. After the break up of the EAC each country had to set up independent organisations to run the same. In Tanzania the Tanzania Harbours Authority (T.H.A) was set up to run and manage the maritime ports in the country, this is a public organisation. Now the sea transport, inland waterways, the railways, and airways
are controlled by the public sector through different parastatals. The only transportation system which is still dominated by private operators is the road transport.

2.2. Early Development Of the Seaports

In the early times various trading settlements were developed along the coast by Asiatic traders from the north and east, and later by Europeans approaching from the south. In the pre-twentieth century trading patterns in the west Indian Ocean were essentially related to the monsoon winds. The seasonal winds reversals matched by a reversal of some of the ocean currents were important factors in the trade circulations of the northwestern Indian Ocean in the early days of sailing ships. Between November to March every year with the north east monsoon winds, dhows from ports in south and south west Asia were able to come to the Tanzania coast for trading, and with the aid of the south west monsoon winds from April to December were able to return. This type of trade influenced the development of various trading settlements along the Tanzanian coast.

A long succession of traders came to the shores of Tanzania in those times, like the Arabs, Shirazi, Portuguese, Omanis, Europeans and several others, this lead to the development of the indigenous trading networks. These extended to the interior, first at a low scale and later more expansively. The seaports of Tanzanian coast, which were at first almost exclusively oriented towards the circulations of the Indian Ocean trade, started to perform the classical role of a
Fig. 1 The Medieval trade routes of the Indian Ocean and the Monsoon Winds
seaport, that is, of an intermediary node linking land and sea transport networks, although primitive at that time. As the internal trading systems of the interior developed and extended to include the coastland the Indian Ocean trade also increased its intensity. The coastal ports modified their commercial orientation, some grew bigger and bigger while others decayed and disappeared. Those which survived and prospered are seen to day because by that time they were important maritime points and brought this part of the continent within the world trading system.
2.3. Modern Development of the Tanzanian Seaports

The rise and the present traffic of the modern seaports is the indication of the successful economic development which occurred in Tanzania in the twentieth century.

As far as material port facilities are concerned in the modern ports, the modern development of Tanzanian seaports started to take place in the late twentieth century. The era of dhow traffic which extends from the medieval times to the end of nineteenth century did not produce any substantial development in port facilities, but the introduction of the modern ship, in this part of the Indian Ocean necessitated the port having facilities to handle both those ships and provide special facilities for warehousing and other cargo operations. The increasing ship sizes and traffic lead to the construction of deep-water berths and special facilities to handle the same[1]. The building of the railways inland were important for example, Tanga Port developed the port facilities because it had a railway connection inland also Dar es Salaam Port had the same features. The concentration of traffic in these ports by the simultaneous development of land transport and port facilities rapidly induced an increase in traffic in the early development and this stimulated further the development of these ports.
2.4. The Major Tanzanian Seaports

There are several seaports along the Tanzanian coastline such as; Tanga, Pangani, Bagamoyo, Dar es Salaam, Kilwa, Lindi, Mtwara, Mikindani, Zanzibar and many other small ones.

The major Tanzanian seaports which have international connections are Dar es Salaam Port, Tanga Port, and Mtwara Port. The selection of the above ports is based on the four principal criterion, of which at least one applies to each of the three ports, that is;

(i) - a total volume of traffic per annum is great i.e. hundreds of thousands tonnes of cargo per annum.
(ii) - a port have an extensive connections to the hinterland by rail and roads.
(iii) - a port must have deep-water berths, and
(iv) - deep-sea vessels can anchor there.

(a) TANGA PORT

This was the first of the Tanzanian seaports to be developed into a modern port, but its disadvantageous situation and site conditions seriously curtailed its progress. The first small jetty was built there in 1892 designed to receive imported railway materials for the construction of the railway line from Tanga westwards to the sisal plantations owned by a German company, and to the coffee and rubber plantations. The construction and installation of a lighter quay, sheds, and ancillary equipment was completed in 1914. But, as stated earlier, the disadvantageous situation and site have limited its progress. Up to this moment, Tanga is still a lighterage port. There is only a single jetty serving the Tanzania
Fertilizer Company. The main exports passing through this port are: coffee, sisal, tea, and timber. The main imports through this port are: raw materials such as ammonia gas for the fertilizer company and other industrial inputs. Other features of this port include: sheltered waters of varying depths, the inner harbour provides six anchorages, maximum 8.23 meters depth and length of 182.9 meters. The outer harbour has six anchorages, containers are handled by pontoons only. Ro Ro vessels berth at a new lighterage quay 4 meters maximum depth. In 1986, 153 vessels of 1,706,000 dwt called at this port.

(b) DAR ES SALAAM PORT

Dar es salaam Port is the principal seaport in Tanzania, it is believed that the port was formally opened as a seaport by Seyyid Majid in September, 1867 [2]. The new phase in the development of the port started in 1887 after a small trading station and a mission settlement were established, and it was during this time the beginning of the German activities appeared here. Up to 1956 the port operated as a lighterage. The post-1940s period manifested a considerable advances in tonnage handled at this port, this lead to the construction of three deep-water berths which were completed in 1956, the construction of an oil refinery and the rehabilitation of a small existing jetty to receive crude oil were completed in 1966. The modern facilities today are 11 deep-water berths (berths 9, 10 and 11 are being converted to a container terminal).

The port is served by two railway systems, that is, the Tanzania Railway Corporation (T.R.C) and the Tanzania Zambia Railway Authority (TAZARA). These railway systems
connect the port with the Tanzanian hinterland and those of the landlocked countries of Zambia, Malawi, Burundi, Rwanda and Uganda and also the eastern parts of Zaire. The port is also served by a good road network radiating from the port itself.

Vessels of up to 180 meters (600 ft) long can be accommodated, the maximum draft is 10 meters at a high tide and 9 meters at a low tide. The inner harbour has anchorage berths for up to 9 vessels, ranging from 107 meters to 109 meters in length and from 7 meters to 9 meters in draft. There are also two coaster anchorages. The main quay is about 2,000 meters long, has two transit sheds of 11,706 sq.m. and 16,898 sq.m. respectively, on berths 1, 2, and 3 there are two sheds which cover about 17,000 sq.m. The open storage area covers about 120,000 sq.m., also a tanker terminal for vessels with a maximum length of 183 meters and maximum draft of 9.8 meters.

There is a slip way to handle vessels of up to 30.5 meters and workshops for minor repairs.

The Dar es Salaam port has been handling about 2 million tonnes of general cargo per annum for the past decade and at least half of this cargo is Tanzanian trade and the rest is transit trade belonging to the landlocked countries of Zambia, Burundi, Rwanda, Uganda and Malawi and the eastern part of Zaire, most of the transit traffic is Zambia bound. The rate of containerization in this port has been rising considerably from 10 percent to 30 percent between 1981 and 1986, due to lack of inland terminals most of the containers are port to port. It is estimated that the cargo volumes for this port will increase to reach 3 million tonnes annually in 1992 and
3.8 million tonnes by the year 2000, and more than a half of it will be in containers.

The main exports through this port are copper, cotton, coffee, tea, sisal, tobacco and hides and the main imports are industrial products (miscellaneous), machineries and plants, grains and other food stuffs.
The stimulus for development of this port was provided for by the groundnut scheme soon after the Second World War in 1948 when there was a serious world shortage of edible oils and fats. The Overseas Food Corporation, a United Kingdom company, launched a groundnut scheme in Mtwara Region, which led to the construction of port facilities at Mtwara with an annual rate capacity of around 400,000 tonnes. Mtwara was chosen in preference to the existing port of Lindi which was closer to the proposed scheme area, because of its physical advantage for the development of a major port in the future. With the failure of the groundnut scheme, Mtwara port has attained only a small part of the traffic envisaged for it and further development of this port was curtailed, coupled with the poor hinterland connections, up to now this port handles only a small share of the country's traffic. The main products through this port are cassava and cashew nuts as exports and consumer goods as imports.

2.5. Organisation of Seaports

Before the breakup of the East African Community in 1977, as stated earlier, the ports were under the East African Harbours Corporation (E.A.H.C) and the stevedoring operations were under the East African Cargo Handling Services (E.A.C.H.S). In 1977 the Tanzanian Harbours Authority (T.H.A) was established under the Government Act No.12 to develop, improve, maintain, operate and regulate the Tanzanian seaports, the former functions of E.A.H.C and E.A.C.H.S were amalgamated under one authority T.H.A
Fig. 2 The Tanzania Harbours Authority Organisation Chart
The Tanzania Harbours Authority is responsible for the three major ports of Dar es salaam, Tanga and Mtwara, the minor ports are attached to one of the above major ports nearby for administrative purposes. The headquarters of T.H.A are in Dar es salaam.

Notes.
1. Change from sail to steam propulsion ships
THE TANZANIA SEAPORTS

3.1. Functions of Tanzanian Seaports

The Tanzanian seaport form a very important link in the whole transport chain, as the other seaports in the world they represent the earliest form of transport terminal where passengers and cargo representing traffic pass from land transport to water transport and vice versa, this means that the major functions of the seaport can be taken as they are geared to service the interchange of traffic from land based modes of transport and the water based ones.

The major seaports in Tanzania are all public owned, functions like the provision of aids to navigation, pilotage, stacking areas, warehouses, cargo handling, lighterage, cranage and other handling appliances, towage, fire fighting are all provided by the port authority no independent body is responsible. It is only the cargo clearing and forwarding which is mostly dominated by private companies.

3.2. Cargo Traffic

From the historical development of the Tanzanian seaports, traditionally these ports were constructed and equipped to handle break bulk general cargo, this meant that terminals could accommodate a variety of cargoes shipped in the packaging or unit loads in which they originated from the supplier. Dar es salaam which is a principal port among the other handles a greater
<table>
<thead>
<tr>
<th>Activity:</th>
<th>Loading truck</th>
<th>Check/Tally delivery</th>
<th>Transport to delivery ramp</th>
<th>Storage</th>
<th>Transport to warehouse</th>
<th>Hook off</th>
<th>Check/Tally sorting</th>
<th>Discharge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performers:</td>
<td>Terminal op./ Haulage Co.</td>
<td>Terminal op./ Haulage Co.</td>
<td>Terminal operator</td>
<td>Terminal operator</td>
<td>Stevedore</td>
<td>Tally firm</td>
<td>Stevedore</td>
<td></td>
</tr>
</tbody>
</table>

Fig. 3 Cargo flow through a general cargo terminal.
percentage of both local imports and exports, and more than half of the cargo passing through this port is the transit traffic for the neighbouring landlocked countries of Zambia, Burundi, Rwanda, Uganda, Malawi and the Eastern parts of Zaire.

Table 1: The Dry General Cargo Handled at The Port of Dar es salaam 1979-1985 in '000 Tons [1]

<table>
<thead>
<tr>
<th>Year</th>
<th>Imports</th>
<th>Exports</th>
</tr>
</thead>
<tbody>
<tr>
<td>1979</td>
<td>915</td>
<td>760</td>
</tr>
<tr>
<td>1980</td>
<td>1157</td>
<td>707</td>
</tr>
<tr>
<td>1981</td>
<td>1033</td>
<td>673</td>
</tr>
<tr>
<td>1982</td>
<td>1167</td>
<td>649</td>
</tr>
<tr>
<td>1983</td>
<td>865</td>
<td>605</td>
</tr>
<tr>
<td>1984</td>
<td>1063</td>
<td>703</td>
</tr>
<tr>
<td>1985</td>
<td>1088</td>
<td>708</td>
</tr>
</tbody>
</table>

Source: Tanzania Harbours Authority (T.H.A)

With the development of containerisation in this part of the world, the share of containers in the import and export trade have been rising considerably in recent years, this has a big repercussion on the facilities geared to handle conventional break-bulk cargoes.

The two major ports of Tanga and Mtwara handles mainly the local coastal trade and a small amount of Tanzanian exports and imports passes through these ports. Tanga port is well known for the coffee exports.

The position of Dar es salaam as the principal port in the export and import business is demonstrated by the
The general pattern of cargo traffic is that, there is the imbalance between exports and imports. Tanzania and her neighbours the landlocked states imports more than they export. In the container trade this imbalance is more visible, that is, more import containers than export containers. This imbalance is on both value and quantity imported.

3.2.1. The Export Cargo Traffic

Most of the export cargo traffic through the Tanzanian seaports is composed of agricultural products such as; coffee, sisal, cotton, cloves, cashewnuts, tobacco, animal feeds, beans and related products, and semi finished manufactured raw materials such as; copper, diamonds, zinc and colbat (exports from landlocked countries are included). Between 1975 and 1985 the growth of the gross domestic product and exports in Tanzania and her neighbouring landlocked countries has stagnated. But
from the SATCC and The World Bank forecasts it is envisaged that there will be a moderate growth of national and foreign trade in these countries. The following table shows the forecast for export of these countries through the port of Dar es salaam in 1990 and 2000.

Table 3: Forecast Of Exports Through the Port of Dar es Salaam [2]

<table>
<thead>
<tr>
<th>Country</th>
<th>1990</th>
<th>2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tanzania</td>
<td>432,000</td>
<td>538,000</td>
</tr>
<tr>
<td>Zambia</td>
<td>521,000</td>
<td>529,000</td>
</tr>
<tr>
<td>Malawi</td>
<td>10,000</td>
<td>10,000</td>
</tr>
<tr>
<td>ZBR &amp; U [3]</td>
<td>121,000</td>
<td>197,000</td>
</tr>
<tr>
<td>TOTAL</td>
<td>1,084,000</td>
<td>1,274,000</td>
</tr>
</tbody>
</table>

Source: South African Transport Communications Committee (SATCC)

Table 4: Dry general cargo exports through the Port of Dar es salaam in '000 Tons 1979-1985

<table>
<thead>
<tr>
<th>Year</th>
<th>Tanzanian Cargo</th>
<th>Transit Cargo</th>
</tr>
</thead>
<tbody>
<tr>
<td>1979</td>
<td>259</td>
<td>501</td>
</tr>
<tr>
<td>1980</td>
<td>222</td>
<td>485</td>
</tr>
<tr>
<td>1981</td>
<td>181</td>
<td>492</td>
</tr>
<tr>
<td>1982</td>
<td>135</td>
<td>514</td>
</tr>
<tr>
<td>1983</td>
<td>108</td>
<td>497</td>
</tr>
<tr>
<td>1984</td>
<td>159</td>
<td>544</td>
</tr>
<tr>
<td>1985</td>
<td>207</td>
<td>501</td>
</tr>
</tbody>
</table>

Source: Tanzania Harbours Authority (T.H.A)
3.2.2. Import Cargo Traffic

While exports are dominated by raw agricultural products and few metals, on the other hand imports through the Tanzanian seaports for Tanzania and the landlocked countries are dominated by four elements, that is; fuel and power supplies, industrial products (machinery, transport materials etc.), manufactured goods for the consumer market, and supplementary food stuffs. Petroleum products in bulk represents an important element in the import traffic by weight and volume.

Table 5: Dry General Cargo Imports in '000 Tonnes through the Port of Dar es Salaam (1979-1985)

<table>
<thead>
<tr>
<th>Year</th>
<th>Tanzania Cargo</th>
<th>Transit Cargo</th>
</tr>
</thead>
<tbody>
<tr>
<td>1979</td>
<td>393</td>
<td>522</td>
</tr>
<tr>
<td>1980</td>
<td>655</td>
<td>497</td>
</tr>
<tr>
<td>1981</td>
<td>609</td>
<td>424</td>
</tr>
<tr>
<td>1982</td>
<td>736</td>
<td>431</td>
</tr>
<tr>
<td>1983</td>
<td>516</td>
<td>349</td>
</tr>
<tr>
<td>1984</td>
<td>667</td>
<td>396</td>
</tr>
<tr>
<td>1985</td>
<td>655</td>
<td>433</td>
</tr>
</tbody>
</table>

Source: Tanzania Harbours Authority (T.H.A)
Table 6: Imports Forecast through the Port of Dar es Salaam Year 1990 and 2000 [4]

<table>
<thead>
<tr>
<th>Country</th>
<th>1990</th>
<th>2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tanzania</td>
<td>1,990,000 tons</td>
<td>2,000,000 tons</td>
</tr>
<tr>
<td>Zambia</td>
<td>324,000 tons</td>
<td>470,000 tons</td>
</tr>
<tr>
<td>Malawi</td>
<td>20,000 tons</td>
<td>20,000 tons</td>
</tr>
<tr>
<td>ZBR &amp; U</td>
<td>200,000 tons</td>
<td>372,000 tons</td>
</tr>
<tr>
<td>TOTAL</td>
<td>2,000,000 tons</td>
<td>3,265,000 tons</td>
</tr>
</tbody>
</table>

Source: South African Transport and Communications Commission (SATCC)

3.3. Passenger Traffic

Passenger traffic in the major Tanzanian seaports is of less importance. Most of who would be passengers prefer to use other modes of transport. The only passenger traffic worth mention is between the main land and the islands and the southern parts of Tanzania. Due to the insignificance of the passenger traffic no seaport has actually committed itself to provide full freighted facilities for this traffic.

3.4. The Hinterlands of The Ports

The Tanzanian seaports, especially the Dar es Salaam Port apart from serving local import and export traffic (the immediate hinterland) the port serve the transit traffic for the far hinterlands.

The rail and road transport modes plays crucial roles in linking the port and its immediate and distant hinterlands. 13 of the 18 landlocked developing countries
in the world are in Africa and 8 out of the 13 are situated in the Eastern Africa and 5 out of 8 located in Eastern Africa are served by the Tanzanian seaports, in this case Dar es salaam.

The concept hinterland has a number of definitions, but for this analysis, the hinterland is taken to mean the land area lying behind the port, which is served by it. This analysis is only limited to three hinterlands these are: the immediate hinterland (the environs of the port), the primary hinterland (the area dominated by the port and its associate development), and the secondary hinterland (the area which use the port for part of its imports and exports these taken together they form the land areas lying behind the ports).

Both Tanga and Mtwara ports have limited hinterlands only limited to the local Tanzanian import and export trade. The hinterland of Dar es salaam Port which extends beyond the national borders includes; Uganda, Rwanda, Burundi, Zambia, and Malawi.

Table 7 on the next page demonstrates the importance of the transit traffic to the Tanzanian seaports in the international maritime trade, and table 8, Dar es salaam Port is taken separately.
### Table 7: Total Dry General Cargo through The Tanzanian Ports—Dar es salaam, Tanga and Mtwara in '000 Tons

<table>
<thead>
<tr>
<th>Year</th>
<th>Total</th>
<th>Tanzanian</th>
<th>%</th>
<th>Transit</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1978</td>
<td>2,604</td>
<td>1,402</td>
<td>53.8</td>
<td>1,202</td>
<td>46.2</td>
</tr>
<tr>
<td>1979</td>
<td>2,088</td>
<td>1,064</td>
<td>51.0</td>
<td>1,024</td>
<td>49.0</td>
</tr>
<tr>
<td>1980</td>
<td>2,243</td>
<td>1,261</td>
<td>56.2</td>
<td>982</td>
<td>43.8</td>
</tr>
<tr>
<td>1981</td>
<td>2,046</td>
<td>1,130</td>
<td>55.2</td>
<td>916</td>
<td>44.8</td>
</tr>
<tr>
<td>1982</td>
<td>2,146</td>
<td>1,198</td>
<td>55.8</td>
<td>948</td>
<td>44.2</td>
</tr>
<tr>
<td>1983</td>
<td>1,694.8</td>
<td>844.7</td>
<td>49.8</td>
<td>850.1</td>
<td>50.2</td>
</tr>
<tr>
<td>1984</td>
<td>1,984.4</td>
<td>1,041</td>
<td>52.5</td>
<td>943.4</td>
<td>47.5</td>
</tr>
</tbody>
</table>


### Table 8: Transit Dry General Cargo through Dar es salaam Port 1976 - 1984 in '000 Tonnes

<table>
<thead>
<tr>
<th>Year</th>
<th>Zambia</th>
<th>Zaire</th>
<th>Rwanda</th>
<th>Burundi</th>
<th>Malawi</th>
<th>Uganda</th>
</tr>
</thead>
<tbody>
<tr>
<td>1976</td>
<td>1,259.7</td>
<td>95.6</td>
<td>1.5</td>
<td>75.5</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>1977</td>
<td>1,345.7</td>
<td>147.7</td>
<td>1.9</td>
<td>75.4</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>1978</td>
<td>1,016.5</td>
<td>67.3</td>
<td>1.6</td>
<td>105.8</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>1979</td>
<td>919.2</td>
<td>26.5</td>
<td>2.2</td>
<td>74.0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>1980</td>
<td>861.6</td>
<td>53.2</td>
<td>1.5</td>
<td>64.2</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>1981</td>
<td>774.5</td>
<td>57.1</td>
<td>0.9</td>
<td>81.2</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>1982</td>
<td>834.4</td>
<td>39.9</td>
<td>0.3</td>
<td>69.0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>1983</td>
<td>668.2</td>
<td>61.0</td>
<td>0.2</td>
<td>62.9</td>
<td>28.5</td>
<td>20.7</td>
</tr>
<tr>
<td>1984</td>
<td>770.1</td>
<td>69.3</td>
<td>0.5</td>
<td>50.6</td>
<td>15.4</td>
<td>32.4</td>
</tr>
</tbody>
</table>

A point to note is that, all the present transit traffic through Tanzania goes through the Port of Dar es Salaam, but Tanga Port can assume this role if there is an emergence need or in the future because of the present potential hinterland connections by rail and road networks. As already mentioned earlier the landlocked countries of Burundi, Rwanda, Zambia, and the Eastern part of Zaire are the ones which traditionally used the Tanzanian ports for their imports and exports traffic, in 1983 and 1984 Malawi, Uganda and Zimbabwe began to route some of their trade through the Dar es Salaam Port. Zambian copper exports accounts for about 25 per cent of the total general cargo through the port of Dar es Salaam. The share of the total general cargo (imports and exports) countrywise in the transit traffic can be summarized as follows in 1984

Table 9: The share of Transit Traffic through the Port of Dar es Salaam

<table>
<thead>
<tr>
<th>Country</th>
<th>Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zambia</td>
<td>82%</td>
</tr>
<tr>
<td>Zaire, Burundi and Rwanda</td>
<td>13%</td>
</tr>
<tr>
<td>Malawi, Uganda and Zimbabwe</td>
<td>5%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>

3.5. Port Facilities and Equipment

(a) Dar es Salaam Port

The Port of Dar es Salaam due to the limitation imposed by the entrance channel, only ships with length up to 180 meters and draft of 9 meters can
Fig. 4. Trunk roads network.
Fig. 5 The Railway Networks from the Ports

ZAIRE
SNCZ
Kalemie

UGANDA
UGANDA

Rwanda
Kigali

Burundi
Bujumbura

Tanzania
Kigoma
Tabora
Kalamia
Itigi
Kilosa
Kiwombe
Kiywala
Tunduma
Tunduma

Lake Victoria
Musoma
Kisumu
Nairobi

Lake Nyasa
Mpondwe
Kabale
Mukono

Zambia
Lusaka
Livingstone
Mfuwe
Kafue

Malawi
Zomba
Blantyre
Chichewa

Kenya
Mombasa
Dares Salaam

Tanzania Railway Corporation (TRC)
Railway Ferry Services
Tanzania Zambia Railway Authority (Tazara)
enter this port. This means that ships’ size inside the harbour is limited to 35,000 dwt. At this port there are 11 deep-water berths with a total length of about 2,000 meters, also there are 9 mid-stream anchorages and mooring places for ships with lengths between 150 - 180 meters and draft of between 7 - 9 meters, a lighter wharf of 600 meters in length and a coaster quay. Outside the harbour there is a single point buoy mooring (SPM) for tankers of up to 100,000 dwt, inside the harbour at Kurasini there is an oil jetty for 36,000 dwt tankers. The rated cargo capacity for this port is 2.5 million tonnes per annum.

On the storage side, there are two main quay transit sheds of 11,706 sq m and 16,898 sq m respectively, also there are other two transit sheds at the back of the port of about 16,695 sq m. There are stacking grounds of 93,000 sq m at the main port and 20,539 sq m at the Inland Container Depot (ICD) 10 kilometers away from the port (a former warehouse for Zambia transists which have been face lifted).

The port is served by two railway systems; that is the Tanzania Railways Corporation (TRC) with a railway gauge of 1,000 mm. This railway system connects the port with inland areas of central and northern Tanzania and the neighbouring landlocked countries (Uganda, Rwanda and Burundi) and the eastern parts of Zaire, the Tanzania-Zambia Railway Authority (TAZARA) with a railway gauge of 1067 mm. This connects the port with the inland areas of south-western Tanzania and the landlocked
countries of central and southern Africa. Also there is the Uhuru Highway which provides a direct link to the port the southern parts of Tanzania, and countries like Zambia, Malawi and Zimbabwe.

Cargo handling equipment in the port is composed of conventional forklifts, mobile cranes, floating crane, tractors and trailers of different capacities and makes (usually the availability and serviceability is below 50 per cent). Most of the cargo handling equipment were meant for handling conventional cargo, but this is now changing with the conversion of berths 9 to 11 to a full fledged container terminal, this will be discussed later.

(b) Tanga Port

Tanga being a lighterage port most of the ship shore cargo operations is done by using lighters and pontoons. Imports and exports are lifted to and from barges by the ship's own gear, lifting between pontoon, barges and the berth is done with the port's own cranes. At this port there are two lighterage quays with a total length of 381 meters with 9 lighter handling points. The inner harbour provides anchorages for six ocean going vessels of 213 meters in length and 9.4 meters draft. Six further anchorages are available in the outer harbour for ships exceeding 9.4 meters draft and the minimum depth at these anchorages is 13.7 meters. Also there is a 700 meter multi-purpose jetty able to receive bulk carriers of up to 50,000 dwt for the Tanzania Fertilizer Company.
Cargo handling equipment is composed of pontoons barges, mobile cranes, electric fixed cranes, rail mounted cranes, tractors and several assortment of folk lifts, at this moment it is indeterminable because a great number of these needs repair or are beyond repair.

The port is connected with the hinterland especially the northern part of Tanzania by the TRC railway system, and there is a road radiating from the port itself but not in good condition.

(c) Mtwara Port

This port has a 380 meters deep water quay, this provides two berths for deep-sea ships with minimum depth along side of 9.75 meters. There are four transit sheds and a big stacking areas. At this port ocean going vessels are worked by ship's derriks, the port's mobile cranes are normally used for coastal vessels.

This port is only served by the road, railway services were withdrawn in 1963. Though this port has considerable reserve capacity but due to the low level of throughput this port is underutilised and as far as to my knowledge there are no plans to develop this port in order to handle containers in the near future only some minor rehabilitation. In case the need arouse the intensive use could be made of existing facilities or by introducing the lighterage operations.
3.6. Port Operations and Inland Transportation

The years 1970s of unprecedented congestion of the port of Dar es Salaam which occurred due to the extension of the hinterland of the port to include Zambia, and an increase in demand from the traditional export and import sources and coupled with low labour productivity in the port due to rising of the average working days per ships are over. This can be attributed to several factors, such as the deteriorating / stagnating economic situation in this part of the world which has reduced the amounts of both imports and exports, another point is that, the increasing cargo movement to and from the port because of the opening of the Tanzania - Zambia Railway line in 1975 and some important development programmes which occurred in the port itself.

While the Dar es Salaam port in the early 1970s was facing severe pressures on the facilities the other ports of Tanga and Mtwara there was no marked pressures on their facilities because the total throughput in these ports was comparatively on the low levels, only few commodities and products passed through there.

Sometimes seasonal pressures on port facilities occurs due to the seasonal nature of the export commodities which are mainly agricultural products such as coffee, cotton, sisal and many others but this is not serious. The Tanzanian seaports being conventional ones have long been supplied, designed, constructed and equipped to handle a wide range of goods and commodities and to provide almost all the required port services for the general cargo purpose. This general role is no longer feasible in the current period whereby containers need
Fig. 6 The hinterland of the seaports and the transport system
special handling equipment and special terminal for container operations. Containerisation rates in the Tanzanian seaport especially in the port of Dar es Salaam have increased from 10 to 30 percent from 1981 to 1986 and it is forecasted to be more than 50 percent for the local cargo and up to 90 percent of the transit traffic.

Now the former general cargo berths 9, 10 and 11 are being converted to full fledged container terminal which is expected to be in operation before the end of this 1988.

Inland movement of the containers and other cargoes is carried out by the railway lines as mentioned earlier there are two railway systems in the country and all of them services the port of Dar es Salaam, that is TRC and TAZARA. Tanga port is served by TRC only and at Mtwara port there is no railway connection. These two railway systems are almost facing similar problems of:— shortage of rolling stock and traction power — this is more on TRC though some improvement is expected due to the interest already shown by foreign financiers especially for the TAZARA line; lack of proper maintenance of the rolling stock and the permanent way; shortage of skilled manpower this renders the control, monitoring and the rationarized utilization of the lines difficult. The problem of shortage of skilled manpower is bound to increase with the further deepening of cargo form technologies in this case containerisation and the intermodalism. Poor communication and the lack of spare parts also affects the smooth running of the railway lines. Most of the problems occurring to these railway systems affects also the offtake of cargo from the port(s) especially in the port of Dar es Salaam. There is
also a great need to put more emphasis on unit trains on both lines, this is an essential requirement in the containerisation era in order to reap the benefits associated with this.

The road transport, this is only favourable in short haulages because of poor condition of the road networks both in the country and the neighbouring landlocked countries, shortage of vehicles suitable for transport of containers and other heavy cargoes, and also road regulations in these countries differ very much this affects the free movements of the vehicles between these countries, there is a need to harmonise these regulations in considering the benefits which can be derived by permitting the intermodality.

Inland waterways, in this case I refer to the lakes no navigable rivers in the country on known scales, it is only in Lake Victoria where there is sufficient capacity as to transportation of containers and other cargoes, other lakes of Tanganyika and Nyasa have small capacities for the same.

Handling of break bulk cargo in the hinterland pose no threat in this region, but the handling of containers in the hinterland is a great problem now and it will be a serious problem in the future unless otherwise something is done on it, because there are no container handling equipment at most of the important inland terminals. Important terminals where there are sufficient cargo it is appropriate and justified to be provided with these equipment at least at the minimum.
Notes.
1. including the transit traffic for Zambia, Burundi, Rwanda, Malawi, Uganda and Zaire
2. includes dry bulk, liquid bulk and general cargo
3. Zaire, Rwanda, Burundi, and Uganda
4. includes dry bulk, liquid bulk and general cargo
5. Zaire, Burundi, Rwanda, and Uganda
CHAPTER 4
THE TECHNOLOGICAL CHANGES IN SHIPPING AND
THE CHANGING ROLES OF SEAPORT

4.1 General Introduction

In the nineteen fifties and sixties stevedoring and port costs rose rapidly in the developed countries mainly due to rapid increases in wage costs because of the strong bargaining positions of the trade unions, port congestion resulting from a lack of investment in infrastructure in those countries and higher port dues. Shipowners reacted in the form of higher freight rates or surcharges in some cases and passed these increases to their customers. In the early nineteen sixties increases in freight rates to take account of rising port costs met with resistance from shippers and certain national governments in the same countries forcing shipowner to improve the ships in - port performance in order to increase productivity and stabilise costs.

It is widely supported that, in recent years the technological changes in shipping has been largely initiated by cargo handling and the cargo form technology [1]. The conventional cargo handling required a lot of labour inputs (labour intensive) and was time consuming both in ports and throughout the rest of the transport chain because the transportation of the general cargo involved the handling of a large of small articles packaged in a variety of forms, of different shapes and sizes. In many cases different types of handling equipment were needed to handle the same this lead to delays while equipment is changed during the handling process. The
driving force behind the development of all modern cargo handling and shipping systems lay in the need to escape from the slow rate of cargo handling and the high labour content of the conventional system and its inability to progress. By 1950, ships costs in port plus cargo handling costs accounted for some 80 percent in the U.S.A trades and more than 50 percent in many major European trades. Therefore any system which developed had to cut down the time spent by ship in port by improving the productivity of the ship. The process of unitisation of cargo which involved the packaging of a number of small items of cargo into a standard unit, this has the effect of reducing the labour content and speeding up the handling of goods because these standard units permitted the use of mechanical aids such as the folk lifts.

The ship the central focus of the shipping industry, was also the area where naval architectures in the last three decades took alot of pain to change designs in order to accomodate changes brought about by the cargo form technology developing in the general cargo to prepare grounds for use of mechanical aids in speeding up the loading and discharging operations as well as stowing of goods in ships.

An early advance in the unitisation of cargo was the use of pallets in the early 1940s, this was a natural progression from pre-slung cargo. Pallets see figure 7 are wooden trays with horizontal space into which a folk lift truck can insert its prongs and thus manoeuvre the load much more easily and efficiently than the traditional manhandling of the same.

The technological changes in shipping lead to the
Fig. 7 Different kinds and types of pallets

(a) Two way entry

Two way entry, reversible open boarded decks, wing type

Two way entry, reversible open boarded deck

Two way entry, reversible close boarded decks, wing type

Two way entry, non reversible close boarded deck, wing type

(b) Four way entry

Four way entry, reversible close boarded decks, wing type

Four way entry, non reversible open boarded deck, wing type

Four way entry, reversible open boarded decks, wing type

Four way entry, reversible close boarded decks
development of advanced shipping systems which are divided into the following epochs [2]:

- Period up to 1939: The development of early bulk systems
- Period 1950 to 1965: (a) General unit load and semi-bulk development; (b) Introduction of the cellular container system - chiefly in the U.S trades.
- Period 1965 to 1978: (a) The container revolution, characterised by a rapid takeover of the major routes between developed nations and an increase of some five times in ship TEU capacities to 2,000 TEU and the early development of integrated intermodal networks; (b) Further development in semi-bulk; (c) Early development of flexible systems in the form of large, main line Ro-Ro and Ro-Ro/Containerships that could carry containers in association with other cargoes.
- Period 1978 to 1985: (a) Further technological evolution of container systems, now particularly in terminals and in the development of intermodal networks; (b) Further development in the flexible systems, that is, larger Ro-Ro ships, semi-container ships and the 5th generation container vessels; (c) The beginning of container penetration into developing countries.

As mentioned earlier, the desire to achieve greater economies of scale through more efficient cargo-loading and discharging techniques, the growth of larger vessels and better overall transport systems from origin of cargoes to destinations all these have an impetus to the technological and organisational changes in shipping.

It is widely accepted that, the introduction of containers in the shipping industry substituted the relatively less expensive inputs for relatively more
expensive ones and actually increased costs, for example containerisation is capital intensive but this was justified because of the 'spin off' associated with this.

The technological innovations which were experienced by the maritime industry in the last two decades lead to the increase of the size and drafts of ships, modification of cargo handling methods and new transportation and cargo distribution concepts, from these developments the old organisational and functional methodology of the ports had to change inorder ito cope up with what was happening in the maritime industry. Now the movement of cargo is viewed in light with total distribution system. The shipper or receiver of goods is interested in the overall total distribution costs of the merchandise which comprises the following components - inland transportation (railway, road,river transportation), port transit and ocean voyage, this is an integrated voyage from shipper to a consignee. In the emerging intergrating transport systems brought about by the idea of the total distribution the ocean carrier and the inland carrier share the same responsibilities or closely corporate in the carriage and delivery of goods. The intermodal transport is considered as a second new phase into the container revolution, though the two differ but their impacts on seaports are closely related.

Containerisation and the associated intermodal transport system have altered most of the traditional port functions (some disappearing others are being modified). The traditional function of the port as a transfer point of cargo between ocean carrier and land carriers, with the containerisation era (increasing of containerised general cargo moving rapidly through the
now the transfer function is declining in favour of performing the transport function, in this case the ports are establishing themselves as links in a transportation chain for containers.

The port's storage function is decreasing gradually as the volume of in-transit cargo through the port increase, short dwelling times of the containers in the port and containers themselves provides temporary storage.

The storage and sorting functions which were often located at the waterfront are being transferred in the inland container depots (ICDs)/dry ports as they are called sometimes. Many of the large warehouses adjacent to the piers that formerly served the conventional general cargo have become obsolete.

The need for the conventional cargo-related services such as cooperage, bagging, weighing inspecting, measuring and many others is dying out.

The storage function of bulk commodities such as crude oil, grains and others which formerly found at the waterfront has been affected also because the tremendous increase in the size of oil tankers and bulk vessels caused the relocation of the storage areas for their cargoes to larger sites remote from urban areas.

4.2 Containerisation

Containers were used along time ago as far as in the 1920s, but it is said that the container revolution started in April, 1963, when the first 'Sea Land' service
opened from Puerto Rico to Baltimore in the U.S.A. The ships Mobile and New Orleans, operated this service successfully in such away that Sea Land constructed the first container terminal at Baltimore [3].

Then what is the container? A container is a steel-framed box, with a strong floor and panelled sides end and roof. The door at the open end can be secured and sealed giving good protection to the goods inside. The steel frame is strong enough to support other containers which are stacked above it, because in some ships containers are stacked seven high or a bit more. Most of the containers in service are standardised metal boxes made on a modular principle with a cross section of 8 feet by 8 feet and 10, 20, 30 or 40 feet long sometimes more, the TEU (twenty foot equivalent unit) being the datum for comparison [4]. In short most of the containers are designed and manufactured according to the International Standards Organisation (ISO) standards which allow the easy transfer of containers between different modes of transport, that is from ship to road vehicles to rail and vice versa. There are many different types of containers in use the most common ones see figure 8. For some information on the specifications of containers see annex IV.
Fig 8 Types of containers in use

(a) General cargo container
(b) Open-top container
(c) Half-height container
(d) Open-sided container
(e) Flat-rack container
(f) Dry-bulk container
(g) Tank container
Containers offer several advantages, which can be summarise as follows:-
(a) Containers permits the efficient use of capital equipment by improving the utilisation of ships and marine terminals.
(b) Reduces inventory by the reduction of the time for which the cargo is spent in transit because of the speeded cargo handling and ship's time in ports.
(c) Permits the quick handling between different modes of transport thus reduces delays, pilferage and damages to cargo.
(d) Potentially lower packing and insurance costs because the container itself reduces the need of expensive packing for each unit loaded into it, the reduced damages and pilferage leads to low insurance costs.
(e) The introduction of containers in the maritime trade lead to the use of larger cellular vessels, this has a crew cost savings. Few or the same number of crew are needed for larger vessels which have increased their cargo carrying capacities.
(f) The introduction of automatic handling techniques associated with containerisation reduced direct labour costs at the dockside and increased the labour productivity, the following table illustrates this;
Table 10. Dockside labour productivity for different types of cargo loading.

<table>
<thead>
<tr>
<th>Mode</th>
<th>Men</th>
<th>Tons</th>
<th>Time/hrs</th>
<th>Tons/man-hr</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conventional Ship</td>
<td>90</td>
<td>1,200</td>
<td>8</td>
<td>1.67</td>
</tr>
<tr>
<td>Pallets</td>
<td>50</td>
<td>1,800</td>
<td>8</td>
<td>4.50</td>
</tr>
<tr>
<td>Containers</td>
<td>20</td>
<td>6,000</td>
<td>10</td>
<td>30.00</td>
</tr>
</tbody>
</table>

Source: National Ports Council (U.K)

(g) Containerisation has allowed a much deeper inland penetration of cargo than before.

4.3. Development of containerisation in Tanzania

Shipping being an international industry, the technological changes which occurred in this industry spearheaded by the developed world due to the reasons already given before did not leave the seaports in the Third World unaffected, due to the double end characteristics of the maritime trade. Tanzania as other developing countries in the world conducts her trade mainly with the developed world, and more than 90 percent of her foreign trade is seaborne this means that as more and more of the developed trade was being containerised the Tanzanian seaports came under pressure with this new cargo technology because of the aspect of double end voyage - shipowners and others involved in sea transport to and from developed countries wanted that ports facilities in developing countries match up with facilities in industrialised countries or at least rising world minimum level.
Containers appeared in the Tanzanian seaports especially the port of Dar es Salaam in the 1970s. As a number of containers handled at the same port increased in the late 1970s, this forced the port to enter the containerisation era. Berth 9 formerly a conventional berth was hastily rehabilitated, equipped and converted to handle containers as a temporary measure. Since that time the share of containers through the Tanzanian ports (for Tanzanian trade and the neighbouring landlocked countries) has been on the increase. The table below shows the number of container through the port of Dar es Salaam for exports and imports traffic for Tanzania, Zaire, Zambia, Burundi, Rwanda, Uganda and Malawi.

Table 11 The Number of Containers through the Port of Dar es Salaam 1979 - 1985

<table>
<thead>
<tr>
<th>Year</th>
<th>Imports</th>
<th>Exports</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1979</td>
<td>3,358</td>
<td>1,849</td>
<td>5,207</td>
</tr>
<tr>
<td>1980</td>
<td>7,295</td>
<td>4,408</td>
<td>11,703</td>
</tr>
<tr>
<td>1981</td>
<td>9,729</td>
<td>8,240</td>
<td>17,969</td>
</tr>
<tr>
<td>1982</td>
<td>15,066</td>
<td>11,232</td>
<td>26,298</td>
</tr>
<tr>
<td>1983</td>
<td>14,074</td>
<td>12,342</td>
<td>26,416</td>
</tr>
<tr>
<td>1984</td>
<td>18,406</td>
<td>14,031</td>
<td>32,437</td>
</tr>
<tr>
<td>1985</td>
<td>22,613</td>
<td>18,098</td>
<td>40,711</td>
</tr>
</tbody>
</table>

Source: Tanzania Harbours Authority (THA)

The table below shows the number of containers though the port of Tanga this is mainly the Tanzanian traffic.
Table 12 The number of Containers through the Port of Tanga

<table>
<thead>
<tr>
<th>Year</th>
<th>Imports</th>
<th>Exports</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1978</td>
<td>174</td>
<td>-</td>
<td>174</td>
</tr>
<tr>
<td>1979</td>
<td>219</td>
<td>-</td>
<td>219</td>
</tr>
<tr>
<td>1980</td>
<td>211</td>
<td>263</td>
<td>474</td>
</tr>
<tr>
<td>1981</td>
<td>833</td>
<td>711</td>
<td>1,544</td>
</tr>
<tr>
<td>1982</td>
<td>1,070</td>
<td>942</td>
<td>2,012</td>
</tr>
<tr>
<td>1983</td>
<td>1,272</td>
<td>1,169</td>
<td>2,441</td>
</tr>
</tbody>
</table>

Source: Tanzania Harbours Authority (THA)

The above tables 11 and 12 qualify the point that since the introduction of containers in the Tanzanian seaports the number have been on the increase.

4.4. Handling of large vessels in ports

One of the main results of technological changes in shipping is the introduction of larger and faster vessels. The requirements of these vessels to the ports' infrastructure and superstructure is immense quite different from the conventional ones. The large carrying capacities and the high speeds of the vessels have a great impact also on the traditional functions usually found at the waterfront, big sheds and warehouses along the berths and yards are no more feasible the same is for the finger piers and narrow aprons. Ports with ample space and big backup spaces are the ones favourable to large vessels for efficient and speedy discharging and loading of cargo.
The analysis of the long term development of marine transport shows a continuous increase of the average size of the vessels, though this tendency was checked by the oil shock of 1975 it is anticipated that this tendency is going to continue in the long run. Large vessels means that, increased in length, breadth, and draft as well as increase in the carrying capacity per ship, this imply that the ports must have deep berths and wide entrance channels also the facilities for cargo operations must match up with the different sizes of ships that is, ports must arrange for higher capacities of the discharging and/or loading facilities at berth and improving the efficient of equipment.

Most of Tanzanian seaports are at a disadvantage including the port of Dar es salaam which is a major port because of narrow entrance channel which can allow only vessels with the length up to 180 meters and 9 meters draft to enter the main port where berths and inner anchorages are, this means that, the sizes of the ships inside the harbour is limited to between 30,000 -35,000 deadweigt (dwt). The widening of the entrance channel project has been on papers for a long period now the implementation of the same is curtailed due to lack of necessary funds, but this is a very important project for the well being of the port because at a later stage with the maritime transportation being performed by larger vessels the port will end up by serving feeder ships from the neighbouring ports in Kenya (Mombasa) and ports in Mozambique (Beira, Nacala, Maputo etc).

Tanga being a lighterage port this means there is a double handling of cargo, no ship can anchor alongside the berth with the exception of smaller coasters
because of restricted draft at all points near the shoreline. Cargo is discharged and loaded by means of ships' own gear to and from the pontoons, this is very unsuitable to the modern cargo liners/container vessels, the turn around time is not improved and cannot be improved or the costs of improving this can exceed the benefits to be derived, the use of sophisticated cargo handling equipment is restricted, and the modern large container vessels do not have cargo handling gear. The only solution to this port is a complete relocation to another new site. Mwambani Bay area 7 kilometers south of Ras Kazone at Ras Nyamaku was proposed as a possible site, but due to the low cargo traffic through this port, its central position between Mombasa Port in Kenya in the north and Dar es salaam Port in the south, and containerisation as other earlier technological innovations in maritime transport tends to operate selectively to reduce the number and increase the relative importance of major ports and reduce the relative status of minor ports unable to attract traffic based upon the new technology this adventure is not feasible at this juncture.

Mtwara Port in the southern part of the country, though it has a big reserve capacity several factors such as a sharp bend at the entrance, low cargo traffic and poor connection to the hinterland all mitigate against any consideration of adjusting the port in order to service larger and faster vessels.

For the time being more efforts must be on the port of Dar es salaam, to widened the entrance channel and dredging of some parts of the inner harbour for draft clearance for taking care of larger vessels. The
equipment to handle container ships and other cargo is being taken care of and the commissioning of the new container terminal is due in this year. The other ports of Tanga and Mtwara no justifications for them to service modern larger vessels the current idea of ‘Load Centre’, which implies that, a concentration of container traffic at a limited number of larger points, supports this argument in East African ports only Mombasa Port in Kenya and Dar es salaam Port in Tanzania qualify to this idea.

4.5 The Through Transport (Intermodal transport)

Containerisation and the through transport concept though closely related, represent different impacts on seaports and other related activities. The through transport have been there for a long time even in the era of break bulk cargoes now it is gaining importance with the introduction of containers in the maritime transport at a larger scale and it is said that this intermodal transport has introduced a new second phase into the container revolution [5]. The container presented traders with a strong box which they could seal at their own premises and then transported to the premises of the importer in a different country, the container could be easily be transferred between transport modes, from road and/or rail to ship and vice versa. The though transport in the true sense is brought about by the issuance of a through bill of lading from the origin of the cargo to the final destination with the single through rate throughout the transport chain, figure on the next page shows the movement of cargo from origin to final destination through different modes of transport under one through bill of lading and rate.
The multimodal Transport Convention which was adopted in May, 1980 (the convention itself is attached here as annex 1) though not yet in force, is giving the legal regime to the through transport by creating an organisational, legal framework for the application of its provisions to the containers. The main aim of the convention is to facilitate the movement of goods especially in containers at a continuous supervision and responsibility of a single operator from origin to destination removing the ambiguity of operators acting as agents only, this has removed also the burden to the shippers of the need to approach different modal carriers thus increasing the overall efficiency in transport between different modes.
The idea of through transport takes into consideration the need of free and smooth movements of goods through different modes of transport from consignor to consignee. Thus, the through transport can be defined as the movement of cargo from shipper to consignee by at least
at least two different modes of transport under a single rate, through billing and though liability [6]. In the multimodal transport it is insisted that the movement of cargo must also be international.

Containerisation together with the through transport have changed the role of a seaport in the total transport chain, in the conventional break bulk trades, ports tended to be regarded as as terminal points of sea transport and land transport, but in the through transport system ports are considered as interface points and thus are integral part of the total transport chain [7]. Ports are no longer ship oriented as earlier considered, modern port in today’s changing role of the port, the port is transport conscious that it is involved in cargo’s destination on or before arrivals. The port is now a link of communication between ocean and hinterland, between ships and forwarders, rail and road. Seaports as indispensable links in the total transport chain must provide all facilities required in the efficient and quick transfer of cargo from the land based and sea based modes of transport because the through transport concept is characterised by speed which means fast transportation and handling of cargo in all stages.

Coordination and cooperation is a very important aspect now because providers of transport services can no longer operate on the basis of maximizing their own profits while disregarding the others in the same industry providing links in the transportation and distribution system. The main happening in the maritime transportation is the increased coordination and the integration displayed by, shipping lines, ports, and railways.
Though the Tanzanian seaports are well connected to the main railway lines and major roads each transport mode is operating separately, it is better before it is too late to lay concrete ways of coordination between them and this is the best way of rationalising the meager resources available. Through transport like containerisation is the further development in transport no way to resist it what is important is to prepare grounds for it.

Through transport if well implemented permits the low transport costs in which both shipper and consignee can benefit and the port can increase its throughput and future congestions can be avoided.

4.6. Port Information Systems and the EDP

A proper documentation and information system is necessary tool for the shipowner, for the cargo owner as well as the terminal operator. For the shipowner and the cargo owner the documentation and the information system is necessary for the purpose of container and cargo control. For the terminal operator the documentation and information system is necessary to keep control over the terminal activities for the operation planning and other purposes.

With the development of larger and faster vessels the command by a port of a good information and communication system is very important. The last element assisting the container revolution is the computer, the computer is assisting in the controlling of the movement of containers, taking bookings, printing out bills of lading
and invoices and transmitting advices and information to different users such as the forwarding companies, ship agents, and many other interested parties\[8\]. The Golden Rule for efficient container operation is: "Always have the right container in the right place at the right time"[9]. This can only be achieved by having a good computer information system. Formerly, all planning work, container inventory control, and related management functions were accomplished by manual means but, as the size and complexity of container operations grew, computerisation of these activities became essential. Today there are many computer programs covering all aspects of shipping, ports and multimodal transport for more information see the attached annex 11. The selection of the programs best suited for individual operators depends on each company’s particular situation.

Port and port users should actually analyse their respective requirements in each field of application before making a decision on the type of software to acquire even the hardware itself. It is important that software should be chosen first hardware which is the computer itself must come second not the other way round because it is the software which is important for improved performance. It is important also to select programs which are compatible with each other or which at least can operate on the same type of hardware (preferably programs written on the same language) \[10\].

Computers are becoming standard equipment in the most ports and shipping companies mainly dealing with containers and other cargoes in large quantities, the importance of computers is attached on the speed at which information can be processed and retrieved a big
achievement in human history and to how the computer can
memorise the information fed in it. It could have been
impossible to achieve high productivities in ports and
the related activities with the advent of containerisation
without computers.

Computer controlled systems are geared to a high
speed transmission of information, logging of containers
and transmitting instructions in the container terminals,
ship to shore and vice versa. Computers are replacing
many malfunctions in the preparation of documents and
other clerical tasks. In 1983 some 78 per cent of the
world’s container terminals were using computers for
administrative tasks and 43 per cent for operation
control and the increase in productivity from the
application of computers are reflected in the
reductions in terminal idle time. It has been calculated
that the average handling time to idle time ratio is 82.5
per cent in a computerised terminal and 65 per cent in a
manually operated terminal. Also it is widely accepted
that the application of micro-chip technology to handling
operations, plant maintenance, information flow and
documentation is going to proceed at a rapid pace in the
port and port related activities.

According to Baudelaire, as soon as the number of
containers handled by the port exceeds some 30,000 units
a year it is advisable to introduce the computer because
it becomes almost if not impossible to keep track of each
of them manually on the marshalling yard [11].
Notes:
6. As Above [5]
11. J.G. Baudelaire, (1986), Port Administration and Management, IAPH, Tokyo, Japan
5.1 General Introduction

The introduction of containers in the ports of the developing countries at first met big resistance from both port operators and national governments, this was mainly due to lack of facilities to cater for these new developments in the maritime industry, and to provide these facilities required big investments in foreign currency (hard currency) which most of the developing countries lack. The container system is fundamentally capital intensive, this needs highly skilled manpower to operate both the super and infrastructure which extends beyond the port limits, in this respect the developing countries are not in good position to counter the challenge posed by this.

The "double-ended" voyage aspect of shipping forced the developing countries with the help of the international financial institutions like the World Bank to provide minimum requirements for containerisation, such as the container handling equipment, container berths and the like. From the port perspective containerisation has been viewed as a technological change in the cargo handling and an advancement in the cargo form technology compared to the conventional era. The impact of the above can be viewed on two aspects that is, spatial and organisational. The improvement in cargo handling techniques have an immediate on the ratio of the
length of a berth and the amount of back up lands, the finger pier docks and the narrow aprons became unsuitable for speedy handling of containers for example 2,500 to 3,000 tons of containerised cargo can be loaded in an 8 hour shift compared to about 100 to 200 tons of conventional general cargo on the same time per shift [1]. On the spatial impact, container handling is a space demanding operation, the containers themselves demand a big back space for temporary storage, marshalling and manoeuvring, stripping and stuffing, and the easy accessibility to the inland transportation network these can no longer be performed at the waterfront. The requirements of big back space have forced most of the older ports in the developed world to move to the fringe of the urban areas where space is available because it became impossible to operate on the existing waterfront, some countries even went to the extreme of relocating to an entire new location the good example is in London from the old docks to a new site at Tilbury.

On the organisational impact—various organisational aspects of the port industry have also been altered, some big ports have declined some prospered, while some smaller ports well situated have prospered and grew into larger modern ports.

Figure 10 summarises most of the impact and consequences of the said challenges on the conventional general cargo port system.
Fig. 10 The impact of containerisation on the conventional general cargo port system

Source: Hayuth, Y. Intermodality: Concept and Practice, Lloyd's of London Press, 1987
The impacts and consequences of these challenges on the seaports of the developing countries are mostly reflected in the problems they face with containerisation and the intermodal transport, these are summarised below:

-the use of containers substitute capita for labour this is a big impact on the ports of the developing countries because most of the ports in these countries right from the break bulk era they rely very much on the abundant manual labour, with the introduction of the capital intensive methods this means that most of the labour force had to be unemployed and to make matter worse this displaced labour is illiterate or semi-illiterate. So labour intensive port operations have been preferred to capital intensive operations;

-the capital intensive facilities for handling cargo in the port can only be economically operated when intensively utilised but the amount of containerised tonnage in most of developing countries ports is insufficient to guarantee the intensive use of these facilities, this means that the justification of capital invested in these is not justified in the overall economic development of these countries but are forced to do it;

-in order to maximise the benefits of advances in cargo handling and transport technology, the whole system-ships, ports, internal distribution, must be technologically consistent, unfortunately in most of the developing countries while new investments are occurring in the ports facilities the hinterland links are left behind unsuitable for the carriage of
containers, thus rendering the through transport impossible. This means the major advantages of unitisation/containerisation is partly or fully lost; the inherent trade imbalances between the developed and developing countries, this means that some containers are exported empty from the developing countries.

The containerisation which lead to the construction of larger and faster ships which later under the cover of leaping the economies of scale by carrying great tonnages and cutting down operating costs by shortening the turn round of ships, this increased the pressure on old port and more new ideas surfaced such as the creation of inland container depots (ICD) and the load centres. Also the cost reduction affected labour employed in the ports because all the above process introduced the efficient mechanical handling methods which required fewer people.

5.2 Inland Container Depots (ICDs)

A solution to the need for wider back up areas in order to increase the cargo throughput in the port areas, it was rational to allocate some of the port functions to inland container depots where space is available or it can be available at a low cost.

Containerisation and the accompanied through transport have not only shaped the functions of the seaports the inland transportation has been affected by the movement of the containers inland which required different organisational procedures on traffic flow, logistics, and physical distribution. Physical
distribution has been defined as the movement and handling of goods from one point of production to the point of consumption or use [2]. Logistic is defined as, it is the act of governing the flow of materials and goods from the source to the user [3]. The need to establish the inland container depots is from the lack of available back up space for the handling of increasing volumes of container flows and the shifting of actual handling of cargo for example the stripping and stuffing of containers could no longer be carried out effectively and efficiently in the port areas. The actual amount of back up space required by a container terminal varies in each port depending on several factors of operation such as the volume of containers to be moved, stripped and stuffed at the terminal, the average length of stay of containers at the terminal [4].

Inland container depots also known as the dry ports because these have assumed and taken over a number of port traditional functions and services traditionally located at the waterfront such as the shipping lines agents, trucking companies, clearing and forwarding companies, banks, insurances agencies, container repair facilities, packing firms, and government inspection agencies. Now the range of functions of inland container depots are wide that is, they serve as cargo consolidation centres, stripping and stuffing of containers, sorting and packing of containers to be transported to other places such as either to seaports or to inland destinations. The depot can serve as a base for customs clearance, warehouse, storage area and as a marshalling yard for containers destined for various modes of transportation and a variety of destinations. Figure 11 summarise the said functions.
One of the most important functions of the inland container depot is the consolidation of shipments, that is, the grouping of consignment with different origins and destinations into larger units for the next leg of the journey. This function benefits both small and larger shippers and receiver because many if not all of them are located away from the port area, so an inland container
depot where consolidation is carried can minimize transport costs by exploiting the economy of movements of full container loads and many units of containers. Also the deconsolidation of imported containers arriving from different overseas origins, dispatch consignments intended for the local area, and consolidated shipments bound for inland destinations, thus obtaining in the process, higher utilisation of the containers and a saving on transportation costs.

Reasons as to why inland container depots are located outside the port areas can be summerised as follows [53]:
(a) the ICDs can act as buffers between the premises of the manufacturers and the terminal or between the port and the cargo destinations;
(b) they can fill the need for personal service which a large port can not accommodate because of its prime need to serve the requirements to serve the ship rather than those of the shipper;
(c) alleviate overloading of handling facilities within the terminal;
(d) ICDs promotes the concept of the through transport as consignment can remain unbroken from a place close to the shipper to a place close to the consignee;
(e) ICDs have a beneficial effect on the trading and industrial activities of a country or a region. They enhance the attractiveness of a region for industrial settlement.

5.3 Load Centres (Super Port Concept)

This is not a new idea at all, it has been there even during the hey days of the conventional ships because the conventional break bulk cargo liners spent a lot of
time in port, and the multiplication of ports and berths added to port time and shifting expenses so most of these ships preferred to call at a few ports in the way inorder to minimise expenses.

Load centre means a concentration of container traffic at a limited number of larger ports with large amounts of cargo both for discharging and loading.

The reasoning behind the creation of the load centres or for concentrating container traffic is best explained by examining the three segments of the integrated intermodal transportation system that is, the ocean voyage, the transit through the port, and the inland transportation journey.

It is estimated that for a modern container vessel the daily operating costs are up to 40,000 US dollars so container ship owners are rationalising their operations by cutting down on port time by decreasing the turn around time in port and reducing the number of ports of call. The attractive economies of scale achieved by larger vessels serving longer routes therefore prefer the concentration of container traffic at a fewer commodious ports at each end of the trade route [6].

Ports able to command a reliable efficient inland connections with good trunk roads, railway network and a big hinterland are in better position to capture this idea of load centre. A seaport with a small number of terminals can handle a much larger volume and capture a large share of the trade if it efficiently and effectively handle the same as to increase the throughput at the sametime permitting the fast turn around time of
ships, this can be true and only true if all other modes of transport to and from the port facilities are operating efficiently. The choice of port to the shippers and receivers depends very much on the price and quality of services offered by land and ocean carriers so the ports must endeavour to improve their land and ocean links [7].

If this idea matures several seaports of the world will end up being primary feeder ports, and at the same time you find that most of these ports have invested heavily to handle container ships of any sizes. Some ports in the Far East which are threatened by this have only recently begun to reap the benefits of direct calls by the long haul vessels.

5.3 Port labour

The impact of the said changes on the port labour may be seen throughout both developed and developing countries with some minor variations depending on the environmental conditions. The introduction of containers in the break bulk trade meant that these containers could not be handled manually this called for the introduction of advanced mechanical handling equipment for handling these heavy units, with this it inevitable that fewer dock workers needed and a good number reduced.

Traditionally in most of the ports of the world, the port cargo handling worker functioned in a gang, lived in close proximity to the port. With the changing role of the port brought about by the development in the cargo form and handling technology, which have removed some of the traditional functions which were usually carried out
at the waterfront to the inland locations, this have affected the social life of the dock worker and the new systems which occurred reduced number required at work. Also the nature of work at the modern terminals calls for new skills and mental attitudes, it has been difficult in many places in transferring and retraining workers from the old break bulk systems.

Table 13: Examples of Port Labour (longshore workers) changes, 1970s - 1980s

A. Developed Countries’ ports 1970s 1980s % change

<table>
<thead>
<tr>
<th>Port</th>
<th>1970s</th>
<th>1980s</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amsterdam</td>
<td>3,540</td>
<td>1,906</td>
<td>-46.2</td>
</tr>
<tr>
<td>Liverpool</td>
<td>11,065</td>
<td>2,333</td>
<td>-78.8</td>
</tr>
<tr>
<td>London</td>
<td>17,000</td>
<td>4,200</td>
<td>-75.3</td>
</tr>
<tr>
<td>New York</td>
<td>18,561</td>
<td>9,657</td>
<td>-48.3</td>
</tr>
<tr>
<td>Rotterdam</td>
<td>12,443</td>
<td>9,598</td>
<td>-22.9</td>
</tr>
<tr>
<td>Seattle</td>
<td>1,170</td>
<td>770</td>
<td>-33.2</td>
</tr>
<tr>
<td>Sydney</td>
<td>4,479</td>
<td>1,821</td>
<td>-59.3</td>
</tr>
</tbody>
</table>

B. Developing Countries’ ports

<table>
<thead>
<tr>
<th>Port</th>
<th>1970s</th>
<th>1980s</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alexandria</td>
<td>7,000</td>
<td>5,000</td>
<td>-28.6</td>
</tr>
<tr>
<td>Aqaba</td>
<td>400</td>
<td>3,000</td>
<td>+650.0</td>
</tr>
<tr>
<td>Bombay</td>
<td>12,738</td>
<td>13,725</td>
<td>+8.0</td>
</tr>
<tr>
<td>Colombo</td>
<td>12,522</td>
<td>12,896</td>
<td>+5.3</td>
</tr>
<tr>
<td>Freetown</td>
<td>4,697</td>
<td>4,576</td>
<td>-2.6</td>
</tr>
<tr>
<td>Port Kelang</td>
<td>1,206</td>
<td>1,138</td>
<td>-5.6</td>
</tr>
<tr>
<td>Tauchung</td>
<td>731</td>
<td>703</td>
<td>-3.8</td>
</tr>
</tbody>
</table>

Source: A.D. Couper, The Development of New Cargo Handling Techniques and the Implication on Employment and skills In the World Port Industry, ILO, 1986
From the table above many of the ports in developing countries do not yet show the labour decline on the same degree as in the developed countries, there are several factors to this among them are; most of the containers are of less than container load (LCL) or port to port so they are stripped and stuffed within the port area this needs a lot people, the inland transport infrastructure does not permit the movement of containers inland, most of the ports in developing countries are government owned so prefer to keep people employed as against efficiency and productivity, most of the people employed in these port are unaware as to how the computer system works, and problems like lack of container handling equipment in the hinterland terminals. No sooner there will be potential loss of jobs as elsewere because of international character of this industry. In case of the above happening the related impact on port communities will represent a massive problem for many of the developing countries because many of these countries have no official social security system and in most cases alternative employment opportunities are zero [8].

Though jobs have been created to compensate jobs lost in the terminals in the fields of container repairs and cleaning, freeports, environmental control and many others the fact remain the same that to be efficient the new port technology requires only a few skilled operators so more and more people will be out of work and those jobs newly created can not fully compensate them.
Notes:
1. UNCTAD, (1976), Manual on Port Management, UNCTAD, Geneva
3. SATCC, (1986), Regional Cooperation in Shipping, Project 3.0.1., Trieste, Italy
8. A.D. Couper, (1986), The Development of New Cargo Handling Techniques and the Implication on Employment and skills in the World Port Industry, ILO.
CHAPTER 6

PROSPECTS OF TANZANIAN SEAPORTS

Shipping being an international industry, the prospects of Tanzanian seaports is very much dependent as to how the country is reacting now and how it will act in the future to the developments taking place now, and what is going to take in the future in the industry itself.

Changes in the technology of shipping affects also the technology of the seaports, with the growing sizes of vessels especially in the container trade this means that the entrance channel at the port of Dar es Salaam needs to be widened and the inner harbour dredged to allow for the future larger vessels with deep draft clearance. The other ports of Tanga and Mtwara due to reasons given previously they are not feasible with these new developments. The answer for the country to service the main line shipping lies in the improvement in the port of Dar es Salaam and the hinterland connections thereto.

It is important to note that, current orders of new ship buildings of cellular container vessels are in favour of larger vessels now the shipping industry is talking of the 5th generation, ships which can carry more than 5,000 TEUs (see annex 111 the development of container vessels), the idea of reaping the economies of scale has been favouring this development. With the present fleet of the combined carriers ageing, when phased out the new fleet in the liner trade will be composed of only larger vessels and ports with favourable conditions such as; those with no restrictions regarding the entrance channel and draft clearance, with attractive
quantities of cargo containers both for discharging and loading, efficient operations which allows a quick dispatch of vessels, without unnecessary regulations and registrations, and a good coordinated hinterland will be served by the main line container vessels, ports short of these factors will be served by feeder vessels collecting cargo from the ports served by main line vessels (load centres), this implies that this double handling will increase the costs of transportation and of course in most cases most of these feeder vessels will be old thus affecting the quality of services.

The Tanzanian port of Dar es salaam stands a good chance of being a main line port given its favourable position it occupy within the Eastern African region. The East African ports have traditionally been dominated by Mombasa because the port was built on the comparatively strong local market, having modern installations and equipment, and a good inland connections of rail and roads. Dar es salaam port which commands a possible vast area including the most of landlocked countries of central and eastern Africa could not do better because of poor facilities and equipment, while Mombasa with a limited hinterland handled more than 6 million tonnes a year Dar es salaam handled less than 3 million tonnes a year.

With the completion of and commissioning of the new container terminal at the port of Dar es salaam before the end of this 1988 already there are sign of improvements in traffic passing through this port, the port is capturing some traffic which formerly passed through the port of Mombasa and still stands a better chance of winning more and more traffic handled.
previously by Mombasa because is in an attractive position to service Central African states more than Mombasa distancewise, and other immediate ports of Nacala and Beira in Mozambique (Msumbiji) in the south, at the moment they do not pose any challenge because of unreliable inland connections. All the above are strong conditions in favour of the port of Dar es salaam for the future to be come a main line port.

Other positive indications are, apart from developing a container terminal in the port of Dar es salaam also this time there have been a green light for positive development in the other modes of transport, that is, both the railway systems, and the major highways have been undergoing major rehabilitation through different international agencies such as the African Development Bank (ADB), the World Bank, the European Economic Community (EEC) and many others. This is important after looking into the previous development programmes in the transport industry which were no properly coordinated, this time there is a scope of coordination. The modernisation of the port is going hand in hand with the improvements and or rehabilitation of the two major railway systems and the trunk roads. Another important development is that the port of Dar es salaam has been allowed to retain 50 percent of its foreign exchange earnings to buy spare parts thus avoiding going through the laborious Bank of Tanzania (the Central Bank) procedures.
6.1 Development programmes in the ports

(a) Container Terminal

The most celebrated development programme responding to the development of cargo form and handling technology in the shipping industry is the conversion of berths 9, 10 and 11, formerly the general cargo berths, to container handling facilities which started in September, 1985 at the value of 18 million US dollars. This involved the dismantling of the existing transit shed, modification of the railway tracks and the strengthening of the berth apron to support two ship-to-shore container gantry cranes. A new rail terminal within the port area also has been established. The container terminal covers approximately a total area of 13 hectares and the warehousing complex adds a further 7 hectares. Equipment such as the two ship-to-shore gantry cranes, several rubber tyred container carriers, a rail mounted gantry crane and several tractor and trailer units have been introduced at the terminal, and this terminal is expected to be in operational this 1988. The projected capacity of this terminal is in excess of the short term requirements but is justified because the port is a gateway to many of the landlocked countries of eastern and central Africa.

(b) The Inland Container Depot (ICD)

The former storage shed for the Zambian cargo 10 kilometers away from the port area at Ubungo has been converted into an inland container depot (ICD) as to improve the port’s efficiency by taking away some container handling operations out of the immediate port area. Inland container depots are important elements of
Fig. 12 Principles of container terminal layout

Four basic areas of operations

Area 1: Transfer of containers between the vessel and the storage area.

Area 2: Transfer of containers between the storage area and the interchange point or the CFS.

Area 3: The receiving and delivery area where the transfer between the carrier and the terminal is effected.

Area 4: Transfer of containers between the container freight station and the storage area.
containerisation and the accompanied intermodal transportation. Nowadays these depots are vital element in the transport chain because they have assumed a number of traditional port functions and services and they are attracting many related services that traditionally were located in the port area, and they are known as dry ports because of this. One of the most important function performed at here is the consolidation process.

The consolidation process involves the grouping of consignment with different origins and destinations into a larger unit, like a full container loads (FCL), for the next leg of the journey. This function can benefit both small and larger shippers because transport costs are reduced by transporting larger units at once rather than small packages at different times, this is the economy of movements of full container loads. The nearness of this depot to the port is also very important because it can carry out the functions of a consolidation centre with both low property and transport costs. In most port of the world which have the consolidation process in their container depots have been able actually to create additional jobs in direct consolidation activities of stuffing and stripping containers. So such activities of stripping and stuffing of containers currently performed inside the port of Dar es Salaam can be transferred to this depot. As most of the local import containers are of less than container load (LCL) the customs clearance can be carried out in this depot, so as to reduce the time containers spend in the port areas thus releasing the land space in the port for container operations because it has been experienced in other countries both developed and developing countries that as volume of traffic moving through the port grew, the slow customs
procedures, particularly for the less than container loads (LCL), creates such congestion that establishment of inland clearance depots especially within the inland container depot became an almost an indispensable solution [1].

(c) Rehabilitation of berths 1 to 8

Most of the traditional break bulk general cargo is being containerised, even copper, but it is assumed that at least not all of it will be containerised in the near future. Berths 1 to 8 are being upgraded and re-equipped under a combined SIDA, NORAD, and CIDA aid programme, for the normal general cargo operations.

(d) Other programmes

Other development programmes include the modernisation of the existing lighter wharf, rehabilitation of the oil jetty and the construction of the grain silos. Some of these development programmes have been completed and inoperational now, others are in progress but the crucial project of widening of the entrance channel this the funds are still being sought. All in all when these projects are completed it is a good package for the port of Dar es salaam and the international shipping considering also that the projects in the other transportation modes are executed as required in time.

6.2. Observations

The major East African ports of Mombasa (Kenya) and Dar es salaam (Tanzania) both compete for the same
hinterland which comprise of Uganda, Rwanda and eastern parts of Zaire. Dar es salaam has a monomopoly on the hinterlands of Zambia and Malawi to certain extent. This means that shippers in those countries have options of routing their cargoes, and most of the ships that calls at the port of Dar es salaam also calls at the port of Mombasa. Imports and exports from these countries and trading partners overseas are the same, for example coffee earns about 35 per cent of Tanzania's foreign exchange, Kenya 25 per cent, Rwanda 65 per cent, Uganda 90 per cent and Burundi 85 per cent and trading partners are countries of Western Europe such as the United Kingdom, West Germany, Belgium, France, The Netherlands and many others. Imports to these countries is dominated by crude oil, bulk oil imports represents about 60 per cent of all imports through the Port of Dar es salaam and approximately 50 per cent of all imports passing through the Port of Mombasa [2].

An import element in defining a port's business is its geographical location. The Port of Rotterdam, the largest port in the world, its advantageous location in Western Europe contributed to its success, that is, located at the estuaries of the main European rivers of the Rhine, Scheldt and Maas. The Port of Dar es salaam is better positioned geographically compared with its close challenger the Port of Mombasa, but still Mombasa handles more cargo than Dar es salaam. For many years many more shippers from Burundi and Rwanda have been routing their imports and exports through Mombasa, despite the long distances between these countries and the port, the inconveniences of crossing through two nations with different regulations and legislations while, avoiding the nearer and convenient Port of Dar es salaam. Reasons
noted used to be that, the Port of Mombasa was more efficient and less costly. For example, in 1984 the Port of Mombasa recorded 124 tonnes per gang/hour while Dar es salaam and Tanga recorded 75.3 tonnes and 62.5 tonnes respectively. The port offered better customer services and lower tariffs. For example wharfage charge at the Port of Mombasa was set at 1 per cent of the value of export and 1.25 per cent of the CIF value of imports, while at the ports of Dar es salaam and Tanga was 1.25 of the value of both exports and imports, and at December in 1985, bagged coffee export at the Port of Mombasa costed 15 per cent less than at Dar es salaam, and containerised coffee export 18 per cent less at the Port of Mombasa than at Dar es salaam.

With developments in the maritime transport in general, particularly with containerisation and the accompanied through transport, a good link between seaports and the hinterland has become very important. Geographically, the Port of Dar es salaam is closer to Uganda, Rwanda and Burundi and this follows other factor remaining constant, transit times should favour Dar es salaam but due to the poor infrastructure linking the port with the hinterland, Mombasa becomes closer than Dar es salaam.

The introduction of larger faster vessels in the container trade (also in liner trades) and the coming load centre concept, this means that, the Port of Mombasa is at a very good advantage compared to the other ports, for example, the port is accessible with vessels of up to 305 meters in length and 13.72 meters of draft and can accommodate vessels of up to 100,000 dwt. While the Port of Dar es salaam because of the narrow entrance channel,
vessels with length up to 180 meters and 9 meters draft can enter the inner harbour, so inside the harbour the sizes of the ships is limited to between 30,000-35,000 dwt. Also there are many factors which favour the Port of Mombasa in dealing with these new forms of cargo technologies.

The Port of Mombasa is cooperating with the Kenya Railways Corporation in constructing and operating inland container depots (ICDs) such as that at Embakasi this is very important because ports now are moving away from the old concept of transfer function to transport function, THA must cooperate and coordinate with TRC in the operation and movement of the cargo, constructing and operating the inland container terminals currently under construction or to be constructed in the future. The old monopoly position of East African ports are over, the question is either join the new developments or risk being reduced to the second rate or die out.

Recently the Port of Mombasa has been losing some of her cargo to the Port of Dar es Salaam, in response to this negative development it was announced that, Kenya is to expand the country’s major port of Mombasa on the Indian Ocean coast, at a cost of 111 million US dollars to improve its operations, and the move has been taken because the port is" losing a lot of business to Dar es Salaam"-neighbouring Tanzania's major port [3]. So what is the response of Dar es Salaam port?

Notes:

CHAPTER 7

Summary and Conclusion

Technological change in shipping largely initiated by the cargo form and handling technology in recent years as in other industries was inevitable unless the whole world had agreed to resist it, something which is impossible. Shipping is an international industry, this means that whatever changes occurring in one part of the world in this industry affects the whole system in the world, and whatever happens in the developments in cargo form affects the ship technology and handling technology in the ports.

For many centuries ports of the world played a passive role within the shipping industry, because any changes which occurred in the ports were largely a reflection and or response to changes occurring in the industry they served. It was guaranteed that wherever there was a port cargo will flow automatically and ships will naturally call there, now the situation is changing, new technologies and the accompanied competition have forced ports to look for cargo and to be more concerned with the movements of cargo from origin to destination. Changes started to sweep through this industry with the introduction of the unitised cargo especially containerisation. Major technological changes can be summarised as: technological changes in cargo form, handling and transfer; changes in ship board and in port facilities serving ships; ship management-computerised cargo, voyage and ship condition planning.
The cargo form and handling technology did not affect the ships alone, ports as terminals for ocean transportation and as vital links in the transportation and production chain, have been greatly affected. Containerisation and the accompanied through transport are altering some of the traditional port functions, some are declining in their importance, some moving to inland locations and many more coming in. The modern port of today are physically involved in the physical distribution of cargo, ports are stretching their activities and functional responsibility beyond the traditional port boundaries integrating new transport concepts. Ports as well as land carriers are cooperating and coordinating their activities in a systematic manner, ports ready to take these opportunities can benefit more and more because of their traditional central location in the transport chain, one of the crucial area where a port can start with is the consolidation.

To conclude, one must bear in mind that one of the main objectives of containerisation development in the cargo form is to reduce the turn around of ships in port by improving cargo-handling methods, thus increasing the productivity of longshore labour. This means that the port must have modern cargo handling equipment, well maintained to ensure their availability at all times when needed, and emphasis has to be on preventive maintenance. Also modern equipment needs well trained and motivated personnel, it is stressed that a port is as good as the people who work in it. While machines are indispensable, so are the worker, and planning and investment in modern facilities will not increase productivity unless the labour force is trained to operate and maintain the facilities effectively and efficiently.
To ensure the quick turnaround of ships in ports with containerisation, the ship must discharge as quick as possible and load as quick as possible and in order to induce the big cellular vessels to call at the port. The port must have ample containers to offload and to load at the same time, the implication of this is the load centre concept, ports with enough containers to be discharged and loaded will become load centres to be served by the mainline vessels and the rest to be served by feeder vessels only. For future prospects of the Tanzanian seaports especially Dar es Salaam, due to her geographical position she occupy there are opportunities of being a load centre if the entrance channel is widened the inner harbour dredged, and the hinterland connections of roads and railways improved and the coordination and cooperation among the modes of transportation.

The first phase of containerisation involved a period of technological change and a massive growth in the spatial dimensions of terminals. The second phase focuses attention on the organisational aspect of international transport and the port industry. On marketing strategies for example the Port of Bremen and Bremenhaven have representatives in most of the major cities in the hinterland served by this port in West Germany and countries bordering her, and also representatives in countries outside Europe where most of the exports originate. The aim of this is to keep in close touch with the customers of the port and to get more customers. Most of the major ports are now participating in the physical distribution of cargo to and from customers, clear examples are ports of Gothenburg, Hamburg, Rotterdam, and Bremen and this function is gaining more importance than the cargo handling operations, and ports
are investing more in this function. The implication of this, is that, in the future ports will master all the movements of the cargo from manufacturers/producers to consumers. This is very important because in the future ports without this service will lose business to nearby ports with this. The Tanzanian seaport are not immune because later shippers and shipping companies will select ports of shipments or call not on the merit that it provides cheaper services, but a comprehensive analysis of the total route. They may choose more costly port because the advantages of inland transportation and other services provided by the port which later makes the delivery costs cheaper per unit (total transport).

It is noted that, the projected capacity of the modernisation scheme of the Port of Dar es Salaam is in fact in excess of short term Tanzanian requirements. Container terminal are both expensive to construct and to maintain, and it follows that fixed costs are much higher than variable costs, it is obvious ports will strive to increase throughput by attracting more and more customers who are shipowners and shippers. There will be special care for special customers - usually special customer are those who frequently use the port and who have large quantities of cargo for either export or import, this involves the signing of contracts on special tariffs for a given period of time. For the Tanzanian seaports special customers are the neighbouring landlocked countries. At this stage it is important to have a strong effective and efficient marketing department within THA to take care of this. Kenya Port Authority (KPA) has already established one. Most of the European ports have strong marketing departments and it is one of the prerequisites in the container business of gaining more
Another crucial area is a good command of the information system. Ports are investing much in computers inorder to have good command of cargo flow information from ship owners, cargo owners, terminal operators. He who now commands a good information network commands business and the important device in this respect is the computer. Computers are important because of their usefulness in sphere of quick memory, calculations, retrieval and storage of information.

The last important area which will determine the prospects of the seaports is how they cooperate and coordinate their activities with the other transport modes in the transfer and transporting of cargo. A separate body is advocated with members drawn from the harbours authority and the railways whose primary and permanent task is to coordinate the daily activities of movements of cargo from port to customers and vice versa.

The prospects of the Tanzanian seaports will depend very much on how these new ideas brought about by the developments in the cargo form and handling technology in the maritime industry are put into practice. A point to note is that ports are no longer playing passive roles in the maritime industry, but are now playing active roles of shaping the course of the port industry within the transportation system.
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UNITED NATIONS CONVENTION ON INTERNATIONAL MULTIMODAL TRANSPORT OF GOODS

The States parties to this Convention,

Recognizing:

(a) That international multimodal transport is one means of facilitating the orderly expansion of world trade;
(b) The need to stimulate the development of smooth, economic and efficient multimodal transport services adequate to the requirements of the trade concerned;
(c) The desirability of ensuring the orderly development of international multimodal transport in the interest of all countries and the need to consider the special problems of transit countries;
(d) The desirability of determining certain rules relating to the carriage of goods by international multimodal transport contracts, including equitable provisions concerning the liability of multimodal transport operators;
(e) The need that this Convention should not affect the application of any international convention or national law relating to the regulation and control of transport operations;
(f) The right of each State to regulate and control at the national level multimodal transport operators and operations;
(g) The need to have regard to the special interest and problems of developing countries, for example, as regards introduction of new technologies, participation in multimodal services of their national carriers and operators, cost efficiency thereof and maximum use of local labour and insurance;

(h) The need to ensure a balance of interests between suppliers and users of multimodal transport services;

(i) The need to facilitate customs procedures with due consideration to the problems of transit countries;

Agreeing to the following basic principles:

(a) That a fair balance of interests between developed and developing countries should be established and an equitable distribution of activities between these groups of countries should be attained in international multimodal transport;

(b) That consultation should take place on terms and conditions of service, both before and after the introduction of any new technology in the multimodal transport of goods between the multimodal transport operator, shippers, shippers' organizations and appropriate national authorities;

(c) The freedom for shippers to choose between multimodal and segmented transport services;

(d) That the liability of the multimodal transport operator under this Convention should be based on the principle of presumed fault or neglect;

Have decided to conclude a Convention for this purpose and have thereto agreed as follows:

PART I
General provisions

Article 1
DEFINITIONS

For the purposes of this Convention:

1. "International multimodal transport" means the carriage of goods by at least two different modes of transport on the basis of a multimodal transport contract from a place in one country at which the goods are taken in charge by the multimodal transport operator to a place designated for delivery situated in a different country. The operations of pick-up and delivery of goods carried out in the performance of a unimodal transport contract, as defined in such contract, shall not be considered as international multimodal transport.
2. "Multimodal transport operator" means any person who on his own behalf or through another person acting on his behalf concludes a multimodal transport contract and who acts as a principal, not as an agent or on behalf of the consignor or of the carriers participating in the multimodal transport operations, and who assumes responsibility for the performance of the contract.

3. "Multimodal transport contract" means a contract whereby a multimodal transport operator undertakes, against payment of freight, to perform or to procure the performance of international multimodal transport.

4. "Multimodal transport document" means a document which evidences a multimodal transport contract, the taking in charge of the goods by the multimodal transport operator, and an undertaking by him to deliver the goods in accordance with the terms of that contract.

5. "Consignor" means any person by whom or in whose name or on whose behalf a multimodal transport contract has been concluded with the multimodal transport operator, or any person by whom or in whose name or on whose behalf the goods are actually delivered to the multimodal transport operator in relation to the multimodal transport contract.

6. "Consignee" means the person entitled to take delivery of the goods.

7. "Goods" includes any container, pallet or similar article of transport or packaging, if supplied by the consignor.

8. "International convention" means an international agreement concluded among States in written form and governed by international law.

9. "Mandatory national law" means any statutory law concerning carriage of goods the provisions of which cannot be departed from by contractual stipulation to the detriment of the consignor.

10. "Writing" means, inter alia, telegram or telex.

Article 2

SCOPE OF APPLICATION

The provisions of this Convention shall apply to all contracts of multimodal transport between places in two States, if:

(a) The place for the taking in charge of the goods by the multimodal transport operator as provided for in the multimodal transport contract is located in a Contracting State, or

(b) The place for delivery of the goods by the multimodal transport operator as provided for in the multimodal transport contract is located in a Contracting State.

Article 3

MANDATORY APPLICATION

1. When a multimodal transport contract has been concluded which according to article 2 shall be governed by this Convention, the provisions of this Convention shall be mandatorily applicable to such contract.

2. Nothing in this Convention shall affect the right of the consignor to choose between multimodal transport and segmented transport.

Article 4

REGULATION AND CONTROL OF MULTIMODAL TRANSPORT

1. This Convention shall not affect, or be incompatible with, the application of any international convention or national law relating to the regulation and control of transport operations.

2. This Convention shall not affect the right of each State to regulate and control at the national level multimodal transport operations and multimodal transport operators, including the right to take measures relating to consultations, especially before the introduction of new technologies and services, between multimodal transport operators, shippers, shippers' organizations and appropriate national authorities on terms and conditions of service; licensing of multimodal transport operators; participation in transport; and all other steps in the national economic and commercial interest.

3. The multimodal transport operator shall comply with the applicable law of the country in which he operates and with the provisions of this Convention.

PART II

Documentation

Article 5

ISSUE OF MULTIMODAL TRANSPORT DOCUMENT

1. When the goods are taken in charge by the multimodal transport operator, he shall issue a multimodal transport document which, at the option of the consignor, shall be in either negotiable or non-negotiable form.

2. The multimodal transport document shall be signed by the multimodal transport operator or by a person having authority from him.

3. The signature on the multimodal transport document may be in handwriting, printed in facsimile, perforated, stamped, in symbols, or made by any other mechanical or electronic means, if not inconsistent with the law of the country where the multimodal transport document is issued.

4. If the consignor so agrees, a non-negotiable multimodal transport document may be issued by making use of any mechanical or other means preserving a record of the particulars stated in article 8 to be contained in the multimodal transport document. In such a case the multimodal transport operator, after having taken the goods in charge, shall deliver to the consignor a readable document containing all the particulars so recorded, and such document shall for the purposes of the provisions of this Convention be deemed to be a multimodal transport document.
Article 6

NEGOTIABLE MULTIMODAL TRANSPORT DOCUMENT

1. Where a multimodal transport document is issued in negotiable form:
   (a) It shall be made out to order or to bearer;
   (b) If made out to order it shall be transferable by endorsement;
   (c) If made out to bearer it shall be transferable without endorsement;
   (d) If issued in a set of more than one original it shall indicate the number of originals in the set;
   (e) If any copies are issued each copy shall be marked "non-negotiable copy".

2. Delivery of the goods may be demanded from the multimodal transport operator or a person acting on his behalf only against surrender of the negotiable multimodal transport document duly endorsed where necessary.

3. The multimodal transport operator shall be discharged from his obligation to deliver the goods if, where a negotiable multimodal transport document has been issued in a set of more than one original, he or a person acting on his behalf has in good faith delivered the goods against surrender of one of such originals.

Article 7

NON-NEGOTIABLE MULTIMODAL TRANSPORT DOCUMENT

1. Where a multimodal transport document is issued in non-negotiable form it shall indicate a named consignee.

2. The multimodal transport operator shall be discharged from his obligation to deliver the goods if he makes delivery thereof to the consignee named in such non-negotiable multimodal transport document or to such other person as he may be duly instructed, as a rule, in writing.

Article 8

CONTENTS OF THE MULTIMODAL TRANSPORT DOCUMENT

1. The multimodal transport document shall contain the following particulars:
   (a) The general nature of the goods, the leading marks necessary for identification of the goods, an express statement, if applicable, as to the dangerous character of the goods, the number of packages or pieces, and the gross weight of the goods or their quantity otherwise expressed, all such particulars as furnished by the consignor;
   (b) The apparent condition of the goods;
   (c) The name and principal place of business of the multimodal transport operator;
   (d) The name of the consignor;
   (e) The consignee, if named by the consignor;
   (f) The place and date of taking in charge of the goods by the multimodal transport operator;
   (g) The place of delivery of the goods;
   (h) The date or the period of delivery of the goods at the place of delivery, if expressly agreed upon between the parties;
   (i) A statement indicating whether the multimodal transport document is negotiable or non-negotiable;
   (j) The place and date of issue of the multimodal transport document;
   (k) The signature of the multimodal transport operator or of a person having authority from him;
   (l) The freight for each mode of transport, if expressly agreed between the parties, or the freight, including its currency, to the extent payable by the consignee or other indication that freight is payable by him.
   (m) The intended journey route, modes of transport and places of transhipment, if known at the time of issuance of the multimodal transport document;
   (n) The statement referred to in paragraph 3 of article 28;
   (o) Any other particulars which the parties may agree to insert in the multimodal transport document, if not inconsistent with the law of the country where the multimodal transport document is issued.

2. The absence from the multimodal document of one or more of the particulars referred to in paragraph 1 of this article shall not affect the legal character of the document as a multimodal transport document provided that it nevertheless meets the requirements set out in paragraph 4 of article 1.

Article 9

RESERVATIONS IN THE MULTIMODAL TRANSPORT DOCUMENT

1. If the multimodal transport document contains particulars concerning the general nature, leading marks, number of packages or pieces, weight or quantity of the goods which the multimodal transport operator or a person acting on his behalf knows, or has reasonable grounds to suspect, do not accurately represent the goods actually taken in charge, or if he has no reasonable means of checking such particulars, the multimodal transport operator or a person acting on his behalf shall insert in the multimodal transport document a reservation specifying these inaccuracies, grounds of suspicion or the absence of reasonable means of checking.

2. If the multimodal transport operator or a person acting on his behalf fails to note on the multimodal transport document the apparent condition of the goods, he is deemed to have noted on the multimodal transport document that the goods were in apparent good condition.

Article 10

EVIDENTIARY EFFECT OF THE MULTIMODAL TRANSPORT DOCUMENT

Except for particulars in respect of which and to the extent to which a reservation permitted under article 9 has been entered:
(a) The multimodal transport document shall be prima facie evidence of the taking in charge by the multimodal transport operator of the goods as described therein; and

(b) Proof to the contrary by the multimodal transport operator shall not be admissible if the multimodal transport document is issued in negotiable form and has been transferred to a third party, including a consignee, who has acted in good faith in reliance on the description of the goods therein.

**Article 11**

**LIABILITY FOR INTENTIONAL MISSTATEMENTS OR OMISSIONS**

When the multimodal transport operator, with intent to defraud, gives in the multimodal transport document false information concerning the goods or omits any information required to be included under paragraph 1 (a) or (b) of article 8 or under article 9, he shall be liable, without the benefit of the limitation of liability provided for in this Convention, for any loss, damage or expenses incurred by a third party, including a consignee, who acted in reliance on the description of the goods in the multimodal transport document issued.

**Article 12**

**GUARANTEE BY THE CONSIGNOR**

1. The consignor shall be deemed to have guaranteed to the multimodal transport operator the accuracy, at the time the goods were taken in charge by the multimodal transport operator, of particulars relating to the general nature of the goods, their marks, number, weight and quantity and, if applicable, to the dangerous character of the goods, as furnished by him for insertion in the multimodal transport document.

2. The consignor shall indemnify the multimodal transport operator against loss resulting from inaccuracies in or inadequacies of the particulars referred to in paragraph 1 of this article. The consignor shall remain liable even if the multimodal transport document has been transferred by him. The right of the multimodal transport operator to such indemnity shall in no way limit his liability under the multimodal transport contract to any person other than the consignor.

**Article 13**

**OTHER DOCUMENTS**

The issue of the multimodal transport document does not preclude the issue, if necessary, of other documents relating to transport or other services involved in international multimodal transport, in accordance with applicable international conventions or national law. However, the issue of such other documents shall not affect the legal character of the multimodal transport document.
well as from delay in delivery, if the occurrence which caused the loss, damage or delay in delivery took place while the goods were in his charge as defined in article 14, unless the multimodal transport operator proves that he, his servants or agents or any other person referred to in article 15 took all measures that could reasonably be required to avoid the occurrence and its consequences.

2. Delay in delivery occurs when the goods have not been delivered within the time expressly agreed upon or, in the absence of such agreement, within the time which it would be reasonable to require of a diligent multimodal transport operator, having regard to the circumstances of the case.

3. If the goods have not been delivered within 90 consecutive days following the date of delivery determined according to paragraph 2 of this article, the claimant may treat the goods as lost.

Article 17

CONCURRENT CAUSES

Where fault or neglect on the part of the multimodal transport operator, his servants or agents or any other person referred to in article 15 combines with another cause to produce loss, damage or delay in delivery, the multimodal transport operator shall be liable only to the extent that the loss, damage or delay in delivery is attributable to such fault or neglect. Provided that the multimodal transport operator proves the part of the loss, damage or delay in delivery not attributable thereto.

Article 18

LIMITATION OF LIABILITY

1. When the multimodal transport operator is liable for loss resulting from loss of or damage to the goods according to article 16, his liability shall be limited to an amount not exceeding 820 units of account per kilogram of gross weight of the goods lost or damaged, whichever is the higher.

2. For the purpose of calculating which amount is the higher in accordance with paragraph 1 of this article, the following rules apply:
   (a) Where a container, pallet or similar article of transport is used to consolidate goods, the packages or other shipping units enumerated in the multimodal transport document as packed in such article of transport are deemed packages or shipping units. Except as aforesaid, the goods in such article of transport are deemed one shipping unit.
   (b) In cases where the article of transport itself has been lost or damaged, that article of transport, if not owned or otherwise supplied by the multimodal transport operator, is considered one separate shipping unit.

3. Notwithstanding the provisions of paragraphs 1 and 2 of this article, if the international multimodal transport does not, according to the contract, include carriage of goods by sea or by inland waterways, the liability of the multimodal transport operator shall be limited to an amount not exceeding 8.33 units of account per kilogram of gross weight of the goods lost or damaged.

4. The liability of the multimodal transport operator for loss resulting from delay in delivery according to the provisions of article 16 shall be limited to an amount equivalent to two and a half times the freight payable for the goods delayed, but not exceeding the total freight payable under the multimodal transport contract.

5. The aggregate liability of the multimodal transport operator, under paragraphs 1 and 4 or paragraphs 3 and 4 of this article, shall not exceed the limit of liability for total loss of the goods as determined by paragraph 1 or 3 of this article.

6. By agreement between the multimodal transport operator and the consignor, limits of liability exceeding those provided for in paragraphs 1, 3 and 4 of this article may be fixed in the multimodal transport document.

7. “Unit of account” means the unit of account mentioned in article 31.

Article 19

LOCALIZED DAMAGE

When the loss of or damage to the goods occurred during one particular stage of the multimodal transport, in respect of which an applicable international convention or mandatory national law provides a higher limit of liability than the limit that would follow from application of paragraphs 1 to 3 of article 18, then the limit of the multimodal transport operator’s liability for such loss or damage shall be determined by reference to the provisions of such convention or mandatory national law.

Article 20

NON-CONTRACTUAL LIABILITY

1. The defences and limits of liability provided for in this Convention shall apply in any action against the multimodal transport operator in respect of loss resulting from loss of or damage to the goods, as well as from delay in delivery, whether the action be founded in contract, in tort or otherwise.

2. If an action in respect of loss resulting from loss of or damage to the goods or from delay in delivery is brought against the servant or agent of the multimodal transport operator, if such servant or agent proves that he acted within the scope of his employment, or against any other person of whose services he makes use for the performance of the multimodal transport contract, if such other person proves that he acted within the performance of the contract, the servant or agent of such other person shall be entitled to avail himself of the defences and limits of liability which the multimodal transport operator is entitled to invoke under this Convention.

3. Except as provided in article 21, the aggregate of the amounts recoverable from the multimodal transport
operator and from a servant or agent or any other person of whose services he makes use for the performance of the multimodal transport contract shall not exceed the limits of liability provided for in this Convention.

Article 21

LOSS OF THE RIGHT TO LIMIT LIABILITY

1. The multimodal transport operator is not entitled to the benefit of the limitation of liability provided for in this Convention if it is proved that the loss, damage or delay in delivery resulted from an act or omission of the multimodal transport operator done with the intent to cause such loss, damage or delay or recklessly and with knowledge that such loss, damage or delay would probably result.

2. Notwithstanding paragraph 2 of article 20, a servant or agent of the multimodal transport operator or other person of whose services he makes use for the performance of the multimodal transport contract is not entitled to the benefit of the limitation of liability provided for in this Convention if it is proved that the loss, damage or delay in delivery resulted from an act or omission of such servant, agent or other person, done with the intent to cause such loss, damage or delay recklessly and with knowledge that such loss, damage or delay would probably result.

PART IV

Liability of the consignor

Article 22

GENERAL RULE

The consignor shall be liable for loss sustained by the multimodal transport operator if such loss is caused by the fault or neglect of the consignor, or his servants or agents when such servants or agents are acting within the scope of their employment. Any servant or agent of the consignor shall be liable for such loss if the loss is caused by fault or neglect on his part.

Article 23

SPECIAL RULES ON DANGEROUS GOODS

1. The consignor shall mark or label in a suitable manner dangerous goods as dangerous.

2. Where the consignor hands over dangerous goods to the multimodal transport operator or any person acting on his behalf, the consignor shall inform him of the dangerous character of the goods and, if necessary, the precautions to be taken. If the consignor fails to do so and the multimodal transport operator does not otherwise have knowledge of their dangerous character:

(a) The consignor shall be liable to the multimodal transport operator for all loss resulting from the shipment of such goods; and

(b) The goods may at any time be unloaded, destroyed or rendered innocuous, as the circumstances may require, without payment of compensation.

3. The provisions of paragraph 2 of this article may not be invoked by any person if during the multimodal transport he has taken the goods in his charge with knowledge of their dangerous character.

4. If, in cases where the provisions of paragraph 2 (b) of this article do not apply or may not be invoked, dangerous goods become an actual danger to life or property, they may be unloaded, destroyed or rendered innocuous, as the circumstances may require, without payment of compensation except where there is an obligation to contribute in general average or where the multimodal transport operator is liable in accordance with the provisions of article 16.

PART V

Claims and actions

Article 24

NOTICE OF LOSS, DAMAGE OR DELAY

1. Unless notice of loss or damage, specifying the general nature of such loss or damage, is given in writing by the consignee to the multimodal transport operator not later than the working day after the day when the goods were handed over to the consignee, such handing over is prima facie evidence of the delivery by the multimodal transport operator of the goods as described in the multimodal transport document.

2. Where the loss or damage is not apparent, the provisions of paragraph 1 of this article apply correspondingly if notice in writing is not given within six consecutive days after the day when the goods were handed over to the consignee.

3. If the state of the goods at the time they were handed over to the consignee has been the subject of a joint survey or inspection by the parties or their authorized representatives at the place of delivery, notice in writing need not be given of loss or damage ascertained during such survey or inspection.

4. In the case of any actual or apprehended loss or damage the multimodal transport operator and the consignee shall give all reasonable facilities to each other for inspecting and tallying the goods.

5. No compensation shall be payable for loss resulting from delay in delivery unless notice has been given in writing to the multimodal transport operator within 60 consecutive days after the day when the goods were delivered by handing over to the consignee or when the consignee has been notified that the goods have been delivered in accordance with paragraph 2 (b) (ii) or (iii) of article 14.

6. Unless notice of loss or damage, specifying the general nature of the loss or damage, is given in writing by the multimodal transport operator to the consignor not later than 90 consecutive days after the occurrence of such loss or damage or after the delivery of the goods in accordance with paragraph 2 (b) of article 14, whichever is later, the failure to give such notice is prima facie
evidence that the multimodal transport operator has sustained no loss or damage due to the fault or neglect of the consignor, his servants or agents.

7. If any of the notice periods provided for in paragraphs 2, 5 and 6 of this article terminates on a day which is not a working day at the place of delivery, such period shall be extended until the next working day.

8. For the purpose of this article, notice given to a person acting on the multimodal transport operator's behalf, including any person of whose services he makes use at the place of delivery, or to a person acting on the consignor's behalf, shall be deemed to have been given to the multimodal transport operator, or to the consignor, respectively.

Article 25
LIMITATION OF ACTIONS

1. Any action relating to international multimodal transport under this Convention shall be time-barred if judicial or arbitral proceedings have not been instituted within a period of two years. However, notice in writing, stating the nature and main particulars of the claim, has not been given within six months after the day on which the goods were delivered or, where the goods have not been delivered, after the day on which they should have been delivered, the action shall be time-barred at the expiry of this period.

2. The limitation period commences on the day after the day on which the multimodal transport operator has delivered the goods or part thereof, or where the goods have not been delivered, on the day after the last day on which the goods should have been delivered.

3. The person against whom a claim is made may at any time during the running of the limitation period extend that period by a declaration in writing to the claimant. This period may be further extended by another declaration or declarations.

4. Provided that the provisions of another applicable international convention are not to the contrary, a recourse action for indemnity may be instituted even after the limitation period provided for in the preceding paragraphs if instituted within the time allowed by the law of the State where proceedings are instituted; however, the time allowed shall not be less than 90 days commencing from the day when the person instituting such action for indemnity has settled the claim or has been served with process in the action against himself.

Article 26
JURISDICTION

1. In judicial proceedings relating to international multimodal transport under this Convention, the plaintiff, at his option, may institute an action in a court which, according to the law of the State where the court is situated, is competent and within the jurisdiction of which is situated one of the following places:

(a) The principal place of business or, in the absence thereof, the habitual residence of the defendant; or

(b) The place where the multimodal transport contract was made, provided that the defendant has there a place of business, branch or agency through which the contract was made; or

(c) The place of taking the goods in charge for international multimodal transport or the place of delivery; or

(d) Any other place designated for that purpose in the multimodal transport contract and evidenced in the multimodal transport document.

2. No judicial proceedings relating to international multimodal transport under this Convention may be instituted in a place not specified in paragraph 1 of this article. The provisions of this article do not constitute an obstacle to the jurisdiction of the Contracting States for provisional or protective measures.

3. Notwithstanding the preceding provisions of this article, an agreement made by the parties after a claim has arisen, which designates the place where the plaintiff may institute an action, shall be effective.

4. (a) Where an action has been instituted in accordance with the provisions of this article or where judgment in such an action has been delivered, no new action shall be instituted between the same parties on the same grounds unless the judgement in the first action is not enforceable in the country in which the new proceedings are instituted;

(b) For the purposes of this article neither the institution of measures to obtain enforcement of a judgement nor the removal of an action to a different court within the same country shall be considered as the starting of a new action.

Article 27
ARBITRATION

1. Subject to the provisions of this article, parties may provide by agreement evidenced in writing that any dispute that may arise relating to international multimodal transport under this Convention shall be referred to arbitration.

2. The arbitration proceedings shall, at the option of the claimant, be instituted at one of the following places:

(a) A place in a State within whose territory is situated:

(i) The principal place of business of the defendant or, in the absence thereof, the habitual residence of the defendant; or

(ii) The place where the multimodal transport contract was made, provided that the defendant has there a place of business, branch or agency through which the contract was made; or

(iii) The place of taking the goods in charge for international multimodal transport or the place of delivery; or

(b) Any other place designated for that purpose in the arbitration clause or agreement.

3. The arbitrator or arbitration tribunal shall apply the provisions of this Convention.

4. The provisions of paragraphs 2 and 3 of this article shall be deemed to be part of every arbitration
clause or agreement and any term of such clause or agreement which is inconsistent therewith shall be null and void.

5. Nothing in this article shall affect the validity of an agreement on arbitration made by the parties after the claim relating to the international multimodal transport has arisen.

PART VI
Supplementary provisions

Article 28
CONTRACTUAL STIPULATIONS

1. Any stipulation in a multimodal transport contract or multimodal transport document shall be null and void to the extent that it derogates, directly or indirectly, from the provisions of this Convention. The nullity of such a stipulation shall not affect the validity of other provisions of the contract or document of which it forms a part. A clause assigning benefit of insurance of the goods in favour of the multimodal transport operator or any similar clause shall be null and void.

2. Notwithstanding the provisions of paragraph 1 of this article, the multimodal transport operator may, with the agreement of the consignor, increase his responsibilities and obligations under this Convention.

3. The multimodal transport document shall contain a statement that the international multimodal transport is subject to the provisions of this Convention which nullify any stipulation derogating therefrom to the detriment of the consignor or the consignee.

4. Where the claimant in respect of the goods has incurred loss as a result of a stipulation which is null and void by virtue of the present article, or as a result of the omission of the statement referred to in paragraph 3 of this article, the multimodal transport operator must pay compensation to the extent required in order to give the claimant compensation in accordance with the provisions of this Convention for any loss of or damage to the goods as well as for delay in delivery. The multimodal transport operator must, in addition, pay compensation for costs incurred by the claimant for the purpose of exercising his right, provided that costs incurred in the action where the foregoing provision is invoked are to be determined in accordance with the law of the State where proceedings are instituted.

Article 29
GENERAL AVERAGE

1. Nothing in this Convention shall prevent the application of provisions in the multimodal transport contract or national law regarding the adjustment of general average, if and to the extent applicable.

2. With the exception of article 25, the provisions of this Convention relating to the liability of the multimodal transport operator for loss of or damage to the goods shall also determine whether the consignee may refuse contribution in general average and the liability of the multimodal transport operator to indemnify the consignee in respect of any such contribution made or any salvage paid.

Article 30
OTHER CONVENTIONS

1. This Convention does not modify the rights or duties provided for in the Brussels International Convention for the unification of certain rules relating to the limitation of the liability of owners of sea-going vessels of 25 August 1924; in the Brussels International Convention relating to the limitation of the liability of owners of sea-going ships of 10 October 1957; in the London Convention on limitation of liability for maritime claims of 19 November 1976; and in the Geneva Convention relating to the limitation of the liability of owners of inland navigation vessels (CLN) of 1 March 1973, including amendments to these Conventions, or national law relating to the limitation of liability of owners of sea-going ships and inland navigation vessels.

2. The provisions of articles 26 and 27 of this Convention do not prevent the application of the mandatory provisions of any other international convention relating to matters dealt with in the said articles, provided that the dispute arises exclusively between parties having their principal place of business in States parties to such other convention. However, this paragraph does not affect the application of paragraph 3 of article 27 of this Convention.

3. No liability shall arise under the provisions of this Convention for damage caused by a nuclear incident if the operator of a nuclear installation is liable for such damage:

(a) Under either the Paris Convention of 29 July 1960 on Third Party Liability in the Field of Nuclear Energy as amended by the Additional Protocol of 28 January 1964 or the Vienna Convention of 21 May 1963 on Civil Liability for Nuclear Damage, or amendments thereto, or

(b) By virtue of national law governing the liability for such damage provided that such law is in all respects as favourable to persons who may suffer damage as either the Paris or Vienna Conventions.

4. Carriage of goods such as carriage of goods in accordance with the Geneva Convention of 19 May 1956 on the Contract for the International Carriage of Goods by Road in article 2, or the Berne Convention of 7 February 1970 concerning the Carriage of Goods by Rail, article 2, shall not for States Parties to Conventions governing such carriage be considered as international multimodal transport within the meaning of article 1, paragraph 1, of this Convention, in so far as such States are bound to apply the provisions of such Conventions to such carriage of goods.

Article 31
UNIT OF ACCOUNT OR MONETARY UNIT AND CONVERSION

1. The unit of account referred to in article 18 of this Convention is the Special Drawing Right as defined by the International Monetary Fund. The amounts referred to in article 18 shall be converted into the national currency of a State according to the value of such currency on the date of the judgement or award or the
date agreed upon by the parties. The value of a national currency, in terms of the Special Drawing Right, of a Contracting State which is a member of the International Monetary Fund, shall be calculated in accordance with the method of valuation applied by the International Monetary Fund, in effect on the date in question, for its operations and transactions. The value of a national currency in terms of the Special Drawing Right of a Contracting State which is not a member of the International Monetary Fund shall be calculated in a manner determined by that State.

2. Nevertheless, a State which is not a member of the International Monetary Fund and whose law does not permit the application of the provisions of paragraph 1 of this article may, at the time of signature, ratification, acceptance, approval or accession, or at any time thereafter, declare that the limits of liability provided for in this Convention to be applied in its territory shall be fixed as follows: with regard to the limits provided for in paragraph 1 of article 18, to 13,750 monetary units per package or other shipping unit or 41.25 monetary units per kilogram of gross weight of the goods, and with regard to the limit provided for in paragraph 3 of article 18, to 124 monetary units.

3. The monetary unit referred to in paragraph 2 of this article corresponds to sixty-five and a half milligrams of gold of millesimal fineness nine hundred. The conversion of the amount referred to in paragraph 2 of this article into national currency shall be made according to the law of the State concerned.

4. The calculation mentioned in the last sentence of paragraph 1 of this article and the conversion referred to in paragraph 3 of this article shall be made in such a manner as to express in the national currency of the Contracting State as far as possible the same real value for the amounts in article 18 as is expressed there in units of account.

5. Contracting States shall communicate to the depositary the manner of calculation pursuant to the last sentence of paragraph 1 of this article, or the result of the conversion pursuant to paragraph 3 of this article, as the case may be, at the time of signature or when depositing their instruments of ratification, acceptance, approval or accession, or when availing themselves of the option provided for in paragraph 2 of this article and whenever there is a change in the manner of such calculation or in the result of such conversion.

PART VII
Customs matters

Article 32

CUSTOMS TRANSIT

1. Contracting States shall authorize the use of the procedure of customs transit for international multimodal transport.

2. Subject to provisions of national law or regulations and intergovernmental agreements, the customs transit of goods in international multimodal transport shall be in accordance with the rules and principles contained in articles I to VI of the annex to this Convention.

3. When introducing laws or regulations in respect of customs transit procedures relating to multimodal transport of goods, Contracting States should take into consideration articles I to VI of the annex to this Convention.

PART VIII
Final clauses

Article 33

DEPOSITARY

The Secretary-General of the United Nations is hereby designated as the depositary of this Convention.

Article 34

SIGNATURE, RATIFICATION, ACCEPTANCE, APPROVAL AND ACCESSION

1. All States are entitled to become Parties to this Convention by:

(a) Signature not subject to ratification, acceptance or approval; or

(b) Signature subject to and followed by ratification, acceptance or approval; or

(c) Accession.

2. This Convention shall be open for signature as from 1 September 1980 until and including 31 August 1981 at the Headquarters of the United Nations in New York.

3. After 31 August 1981, this Convention shall be open for accession by all States which are not signatory States.

4. Instruments of ratification, acceptance, approval and accession are to be deposited with the depositary.

5. Organizations for regional economic integration, constituted by sovereign States members of UNCTAD, and which have competence to negotiate, conclude and apply international agreements in specific fields covered by this Convention, shall be similarly entitled to become Parties to this Convention in accordance with the provisions of paragraphs 1 to 4 of this article, thereby assuming in relation to other Parties to this Convention the rights and duties under this Convention in the specific fields referred to above.

Article 35

RESERVATIONS

No reservation may be made to this Convention.
Article 36

ENTRY INTO FORCE

1. This Convention shall enter into force 12 months after the Governments of 30 States have either signed it not subject to ratification, acceptance or approval or have deposited instruments of ratification, acceptance, approval or accession with the depositary.

2. For each State which ratifies, accepts, approves or accedes to this Convention after the requirements for entry into force given in paragraph 1 of this article have been met, the Convention shall enter into force 12 months after the deposit by such State of the appropriate instrument.

Article 37

DATE OF APPLICATION

Each Contracting State shall apply the provisions of this Convention to multimodal transport contracts concluded on or after the date of entry into force of this Convention in respect of that State.

Article 38

RIGHTS AND OBLIGATIONS UNDER EXISTING CONVENTIONS

If, according to articles 26 or 27, judicial or arbitral proceedings are brought in a Contracting State in a case relating to international multimodal transport subject to this Convention which takes place between two States of which only one is a Contracting State, and if both these States are at the time of entry into force of this Convention equally bound by another international convention, the court or arbitral tribunal may, in accordance with the obligations under such convention, give effect to the provisions thereof.

Article 39

REVISION AND AMENDMENTS

1. At the request of not less than one third of the Contracting States, the Secretary-General of the United Nations shall, after the entry into force of this Convention, convene a conference of the Contracting States for revising or amending it. The Secretary-General of the United Nations shall circulate to all Contracting States the texts of any proposals for amendments at least three months before the opening date of the conference.

2. Any decision by the revision conference, including amendments, shall be taken by a two thirds majority of the States present and voting. Amendments adopted by the conference shall be communicated by the depositary to all the contracting States for acceptance and to all the States signatories of the Convention for information.

3. Subject to paragraph 4 below, any amendment adopted by the conference shall enter into force only for those Contracting States which have accepted it, on the first day of the month following one year after its acceptance by two thirds of the Contracting States. For any State accepting an amendment after it has been accepted by two thirds of the Contracting States, the amendment shall enter into force on the first day of the month following one year after its acceptance by that State.

4. Any amendment adopted by the conference altering the amounts specified in article 18 and paragraph 2 of article 31 or substituting either or both the units defined in paragraphs 1 and 3 of article 31 by other units shall enter into force on the first day of the month following one year after its acceptance by two thirds of the Contracting States. Contracting States which have accepted the altered amounts or the substituted units shall apply them in their relationship with all Contracting States.

5. Acceptance of amendments shall be effected by the deposit of a formal instrument to that effect with the depositary.

6. Any instrument of ratification, acceptance, approval or accession deposited after the entry into force of any amendment adopted by the conference shall be deemed to apply to the Convention as amended.

Article 40

DENUNCIATION

1. Each Contracting State may denounce this Convention at any time after the expiration of a period of two years from the date on which this Convention has entered into force by means of a notification in writing addressed to the depositary.

2. Such denunciation shall take effect on the first day of the month following the expiration of one year after the notification is received by the depositary. Where a longer period is specified in the notification, the denunciation shall take effect upon the expiration of such longer period after the notification is received by the depositary.

In witness whereof the undersigned, being duly authorized thereto, have affixed their signatures hereunder on the dates indicated.

DONE AT Geneva, this twenty-fourth day of May, one thousand nine hundred and eighty, in one original in the Arabic, Chinese, English, French, Russian and Spanish languages, all texts being equally authentic.

ANNEX

Provisions on customs matters relating to international multimodal transport of goods

Article 1

For the purposes of this Convention:
"Customs transit procedure" means the customs procedure under which goods are transported under customs control from one customs office to another.
"Customs office of destination" means any customs office at which a customs transit operation is terminated.

"Import/export duties and taxes" means customs duties and all other duties, taxes, fees or other charges which are collected on or in connection with the import/export of goods, but not including fees and charges which are limited in amount to the approximate cost of services rendered.

"Customs transit document" means a form containing the record of data entries and information required for the customs transit operation.

Article II

1. Subject to the provisions of the law, regulations and international conventions in force in their territories, Contracting States shall grant freedom of transit to goods in international multimodal transport.

2. Provided that the conditions laid down in the customs transit procedure used for the transit operation are fulfilled to the satisfaction of the customs authorities, goods in international multimodal transport:

(a) Shall not, as a general rule, be subject to customs examination during the journey except to the extent deemed necessary to ensure compliance with rules and regulations which the customs are responsible for enforcing. Flowing from this, the customs authorities shall normally restrict themselves to the control of customs seals and other security measures at points of entry and exit;

(b) Without prejudice to the application of law and regulations concerning public or national security, public morality or public health, shall not be subject to any customs formalities or requirements additional to those of the customs transit regime used for the transit operation.

Article III

In order to facilitate the transit of the goods, each Contracting State shall:

(a) If it is the country of shipment, as far as practicable, take all measures to ensure the completeness and accuracy of the information required for the subsequent transit operations;

(b) If it is the country of destination;

(i) Take all necessary measures to ensure that goods in customs transit shall be cleared, as a rule, at the customs office of destination of the goods;

(ii) Endeavour to carry out the clearance of goods at a place as near as is possible to the place of final destination of the goods, provided that national law and regulations do not require otherwise.

Article IV

1. Provided that the conditions laid down in the customs transit procedure are fulfilled to the satisfaction of the customs authorities, the goods in international multimodal transport shall not be subject to the payment of import/export duties and taxes or deposit in lieu thereof in transit countries.

2. The provisions of the preceding paragraph shall not preclude:

(a) The levy of fees and charges by virtue of national regulations on grounds of public security or public health;

(b) The levy of fees and charges, which are limited in amount to the approximate cost of services rendered, provided they are imposed under conditions of equality.

Article V

1. Where a financial guarantee for the customs transit operation is required, it shall be furnished to the satisfaction of the customs authorities of the transit country concerned in conformity with its national law and regulations and international conventions.

2. With a view to facilitating customs transit, the system of customs guarantee shall be simple, efficient, moderately priced and shall cover import/export duties and taxes chargeable and, in countries where they are covered by guarantees, any penalties due.

Article VI
# GOODS DECLARATION (CUSTOMS TRANSIT)

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<thead>
<tr>
<th>Consignor (name and address)</th>
<th>Office of departure</th>
<th>Date</th>
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<table>
<thead>
<tr>
<th>Consignee (name and postal address)</th>
<th>Declarant (name and address)</th>
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<table>
<thead>
<tr>
<th>Delivery address</th>
<th>Country whence consigned</th>
<th>Country of destination</th>
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<table>
<thead>
<tr>
<th>Place of loading</th>
<th>Pier, warehouse, etc.</th>
<th>Documents attached</th>
<th>Official use</th>
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<thead>
<tr>
<th>Via</th>
<th>Mode and means of transport</th>
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<table>
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<th>Office of destination</th>
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<table>
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<tr>
<th>B/L No</th>
<th>Transport-unit [type, identification No.]; Marks &amp; numbers of packages or items</th>
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<table>
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<tr>
<th>Number &amp; kind of packages; Description of goods</th>
<th>Commodity No.</th>
<th>Gross weight, kg.</th>
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<tr>
<th>Total number of packages</th>
<th>Total gross weight, kg.</th>
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</table>

(Guarantee details)

(National administrative requirements)

I, the undersigned, declare that the particulars given in this Declaration are true and correct and accept responsibility for fulfilment of the obligations incurred under this Customs transit operation in accordance with the conditions prescribed by the competent authorities.

Place, date and signature of declarant
ANNEX II

TYPES OF AVAILABLE SOFTWARE PROGRAM

Software programs available for use in the shipping industry in general fall into the following broad categories:

**Accounting systems**
(a) On-board crew payroll/records systems
(b) On-shore crew payroll and personnel management systems

**Documentation systems**
(a) Export forms (bills of lading, multi-modal transport documents, manifests)
(b) Import form
(c) Customs forms
(d) Groupage forms

**Booking systems**
(a) Cargo bookings
(b) Passenger bookings

**Tariff systems**

**Stowage planning**

**Stability analysis of ships**

**Cargo handling**
(a) General cargo (break bulk)
(b) Container handling
(c) Barge handling

**Dangerous cargo management**

**Navigation**

**Fuel and speed optimization**

**Ship repairs**
(a) Surveys, reports and estimates
(b) Workshop planning
(c) Planned maintenance

**Container control**
(a) Container/chassis fleet control
(b) Container repairs
(c) Container planned maintenance

**Terminal systems**
(a) Gate control
(b) Interchange reports
(c) Automated container handling systems
(d) Equipment performance
(e) Container tracking (inside terminals)
(f) Reefer container monitoring
(g) Port management

**Chartering**
(a) Sales and purchase
(b) Ship brokering
(c) Voyage estimation

**Fleet scheduling**

**Voyage estimating/simulation**

**Ship design**

**Data bases**

**Communications**
(a) Automated telexing/telefax etc.
(b) Communications with vessels via MARSAT

**Training**
(a) Shipping management
(b) Port management
(c) Terminal control

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Annex III

Containership Evolution

1ST GENERATION
- Converted Dry Cargo Vessel (Pre-1960) (16 KTS)
- Converted Oil Tanker (1960-1970) (16 KTS)

2ND GENERATION

3RD GENERATION
- Cellular Containership Panamax Class (1980-1990) (23 KTS)
- Econoship Panamax Class (1985) (17 KTS)

4TH GENERATION
- Post Panamax (1986-2000) (23 KTS)

Beam Size and Draft

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<th>Panamax</th>
<th>Post Panamax</th>
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**Capacity**

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<th>2nd Generation</th>
<th>3rd Generation Panamax</th>
<th>4th Generation Post Panamax</th>
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<td>(16 KTS)</td>
<td>(23 KTS)</td>
<td>(23 KTS)</td>
<td>(23 KTS)</td>
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<td>2,000 TEU's</td>
<td>4,000-5,000 TEU's</td>
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<tr>
<td>(Approx.)</td>
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<tr>
<td>1,000 TEU's</td>
<td>2,000 TEU's</td>
<td>3,000 TEU's</td>
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<tr>
<td>4,000-5,000 TEU's</td>
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**Crane Evolution**

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<thead>
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<th></th>
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</tr>
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<tbody>
<tr>
<td>Cost $750,000</td>
<td>Cost $2,400,000</td>
<td>Cost $3,600,000 - $4,000,000</td>
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</tbody>
</table>

105
OPEN TOP CONTAINERS

Overall lengths of 20ft. (6.05m) or 40ft. (12.19m). For many types of heavy cargo units, e.g. machinery or raw materials. Top covers may be rolled back for loading by crane or the larger types of forklift. Rear headers may be removed or swung to one side. With covers properly secured all are T.I.R. approved.

Typical open-top container data follows:

**Drawing (F)**

- Exterior: 40ft. (12190mm) x 8ft. (2435mm) x 8ft. 6in. (2590mm) high.
- Interior: 39ft. 6in. (12055mm) x 7ft. 7 1/8in. (2332mm) x 7ft. 8 5/8in. (2352mm) high at peak.
- Height at sides: 7ft. 6 5/8in. (2301mm).
- Door opening: 7ft. 5in. x 7ft. 4 1/8in. (2285mm x 2245mm) high.
- Capacity: 2295ft.³ (20m³).
- Tare weight: 8708lb (4100kg).
- Max. payload: 577181b (26380kg).
- Max. payload (U.S.A.): 430001b (19504kg).
- Max. gross weight: 67195lb (30480kg).

**Drawing (G)**

- Exterior: 40ft. (12190mm) x 8ft. (2435mm) x 4ft. 3in. (1295mm) high.
- Interior: 39ft. 6 5/64in. (11925mm) x 7ft. 8 11/64in. (2341mm) x 3ft. 0 1/16in. (915mm) high.
- Door opening: 6ft. 11 3/8in. x 3ft. 2 1/16in. (2132mm x 920mm) high.
- Capacity: 918ft.³ (26m³).
- Tare weight: 9260lb (4200kg).
- Max. payload: 57940lb (26304kg).
- Max. payload (U.S.A.): 43000lb (19504kg).
- Max. gross weight: 67200lb (30480kg).

**Drawing (H)**

- Exterior: 20ft. (6055mm) x 8ft. (2435mm) x 8ft. (2435mm) high.
- Interior: 19ft. 4in. (5892mm) x 7ft. 7 1/2in. (2318mm) x 7ft. 0 7/8in. (2147mm) high.
- Door opening: 7ft. 6in. x 8ft. 7 7/8in. (2355mm x 2029mm) high.
- Capacity: 1030ft.³ (29.2m³).
- Tare weight: 4875lb (2210kg).
- Max. payload: 36922lb (168110kg).
- Max. payload (U.S.A.): 39922lb (181100kg).
- Max. gross weight: 44797lb (20320kg).
Liquid cargo container
Ideal for bulk liquid movement. It consists of a cylindrical tank encased in a steel frame. With or without heating facilities and suitable for the carriage of hazardous cargo; non-hazardous cargoes: wine and spirits. Frame 20’ x 8’ x 8½’ (6.055 mm x 2.435 mm x 2.591 mm). Capacity approximately 4,000 imp.gallons (18,180 litres).
Open top/open sided container

Built to facilitate the through shipment of heavy and awkward pieces of cargo. These containers can also be placed into a ship to form a platform upon which heavy lifts can be placed.

Bin Container

Internal Dimensions

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Measurement</th>
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<tbody>
<tr>
<td>Length</td>
<td>5.90 m</td>
</tr>
<tr>
<td>Width</td>
<td>2.30 m</td>
</tr>
<tr>
<td>Height</td>
<td>1.05 m</td>
</tr>
<tr>
<td>Ramp opening</td>
<td></td>
</tr>
<tr>
<td>Width</td>
<td>2.27 m</td>
</tr>
<tr>
<td>Height</td>
<td>1.05 m</td>
</tr>
</tbody>
</table>

Weights

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<tr>
<th>Type</th>
<th>Weight</th>
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<tbody>
<tr>
<td>Maximum gross</td>
<td>20.320 kg</td>
</tr>
<tr>
<td>Net</td>
<td>18.800 kg</td>
</tr>
<tr>
<td>Tare</td>
<td>1.520 kg</td>
</tr>
<tr>
<td>Cubic</td>
<td>14.3 m³</td>
</tr>
</tbody>
</table>
GOODS CONTAINERS

Overall lengths of 20ft. (6.05m) or 40ft. (12.19m). For most types of general dry cargo. End-doors allow mechanical aids (forklifts, conveyors, etc.) to be used for loading and stripping. Integral lashing points.

For through transport operations, containers delivered on chassis which provide working height compatible with standard road transport loading bays.

Typical dry goods container data:

**Drawing (A)**
- Exterior: 40ft. (12190mm) x 8ft. (2435mm) x 8ft. (2590mm) high.
- Interior: 39ft. 5 5/8in. (12030mm) x 7ft. 8 3/4in. (2338mm) x 8ft. 6in. (2590mm) high.
- Door opening: 7ft. 3 3/16in. x 7ft. 6in. (2290mm x 2285mm) high.
- Capacity: 23600 ft.³ (66 m³).
- Tare weight: 7936 lb (3600kg).
- Max. payload: 59250 lb (26880kg).
- Max. gross weight: 67195 lb (30480kg).

**Drawing (B)**
- Exterior: 40ft. (12190mm) x 8ft. (2435mm) x 8ft. (2435mm) high.
- Interior: 39ft. 6 7/8in. (12062mm) x 7ft. 8 3/4in. (2349mm) x 7ft. 3 13/16in. (2231mm) high.
- Door opening: 7ft. 8 3/4in. x 7ft. 1in. (2347mm x 2159mm) high.
- Capacity: 2232 ft.³ (63.26m³).
- Tare weight: 6330 lb (2873kg).
- Max. payload: 60670 lb (27607kg).
- Max. payload (U.S.A.): 43000 lb (19504kg).
- Max. gross weight: 67200 lb (30480kg).

**Drawing (C)**
- Exterior: 20ft. (6055mm) x 8ft. (2435mm) x 8ft. (2435mm) high.
- Interior: 19ft. 10 1/2in. (5919mm) x 7ft. (2132mm) x 8ft. 6in. (2590mm) high.
- Door opening: 7ft. 6in. x 7ft. 3 1/4in. (2285mm x 2144mm) high.
- Capacity: 1106 ft.³ (31.3m³).
- Tare weight: 4101 lb (1850kg).
- Max. payload: 40750 lb (18500kg).
- Max. payload (U.S.A.): 38000 lb (17237kg).
- Max. gross weight: 50000 lb (22680kg).

**REFRIGERATED CONTAINERS**

**Drawing (D)**
- Thermo-King diesel-electric refrigeration unit with Thermograph recording equipment.
- Temperature range: -20°F (-28.9°C) to +70°F (+21.1°C).
- Exterior: 40ft. (12190mm) x 8ft. (2435mm) x 8ft. 6in. (2590mm) high.
- Interior: 36ft. 9 11/16in. (11217mm) x 7ft. 3 7/8in. (2232mm) x 7ft. 5 15/16in. (2286mm) high.
- Door opening: 7ft. 3 1/8in. x 7ft. 3 1/2in. (2291mm x 2215mm) high.
- Capacity: 2006 ft.³ (56.81m³).
- Tare weight: 12660 lb (5740kg).
- Max. payload: 54550 lb (24740kg).
- Max. payload (U.S.A.): 38000 lb (17237kg).
- Max. gross weight: 67200 lb (30480kg).

**TWIN-TANK CONTAINERS**

**Drawing (E)**
- For alcohol or chemicals. Full length stainless steel tanks with manholes and centre dipping ports.
- Exterior: 40ft. (12190mm) x 8ft. (2435mm) x 4ft. 3in. (1285mm) high.
- Tare weight: 9250 lb (4200kg).
- Max. payload: 40750 lb (18500kg).
- Max. gross weight: 50000 lb (22680kg).
Diagram of a standard container, showing the sizes of parts used for assembly:

- 3/16" reinforced corner post (all 4 corners)
- 3/16" fillet welds throughout frame assembly
- 3/16" thick steel top side rail
- 1/8" thick F.R.P. roof panel with non-skid safety grit.
- 3/16" stainless steel fasteners - all panels
- 1/8" roof protection plate
- Standard I.S.O. high strength steel corner fittings
- 3/16" thick steel box section header
- Security strip full length of door
- 1/8" thick core .024 stainless steel bonded both sides
- Dual seal
- High strength anti-rack door lock (2 each)
- Door: hot dip galvanized
- 3/16" thick steel box section end sill
- 3/8" dia. stainless steel tamper proof fasteners all door hardware
- Strakes welded to frame (non-removable)
- 1/4" thick steel anti-rack hinge
- 3/16" dia. stainless steel non-removable hinge pin
- 1/4" hinge butt welded to reinforced corner post

Additional details:
- Dual seal
- Security strip full length of door
- High strength anti-rack door lock (2 each)
- Door: hot dip galvanized
- 3/16" thick steel box section end sill
- 3/8" dia. stainless steel tamper proof fasteners all door hardware
- Strakes welded to frame (non-removable)
- 1/4" thick steel anti-rack hinge
- 3/16" dia. stainless steel non-removable hinge pin
- 1/4" hinge butt welded to reinforced corner post

Floor supported all around the periphery and sealed for water tight service.

- 1/4"-20 flat head self tap steel screws, cadmium plated, recessed in floor
- 3/16" fork lift pockets - optional on 20 ft. only
- 1-3/8" thick floor (kiln dried) with shiplap joints & crusher beads
- Crossmembers on 10" centers
- 6/16" hinge butt welded to reinforced corner post.